Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

T R A N S M I T T A L

To: Beverly Hills Unified School District
255 South Lasky Drive
Beverly Hills, California 90212

Date: December 28, 2012

Project No. 603314-007

Attention: Mr. Nelson Cayabyab

Transmitted:		The Following:		For:	
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			Proposal		
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Subject: Second Response to California Geological Survey Review Comments, Fault Rupture Hazard Review, Beverly Hills High School, 241 South Moreno Drive, Beverly Hills, California, CGS Application No. 03-CGS0960

LEIGHTON CONSULTING, INC.

By: Philip Buchiarelli, Joe Roe

Distribution: (6) Addressee
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SECOND RESPONSE TO CALIFORNIA GEOLOGICAL SURVEY REVIEW COMMENTS FAULT RUPTURE HAZARD REVIEW BEVERLY HILLS HIGH SCHOOL 241 SOUTH MORENO DRIVE BEVERLY HILLS, CALIFORNIA CGS APPLICATION NO. 03-CGS0960

Prepared for

Hill, Farrer & Burrill, LLP

One California Plaza - 37th Floor
300 South Grand Avenue
Los Angeles, California 90071-3147

Project No. 603314-008

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Hill, Farrer & Burrill, LLP
One California Plaza - 37th Floor
300 South Grand Avenue
Los Angeles, California 90071-3147

Attention: Mr. Kevin H. Brogan, Partner

Subject: Second Response to California Geological Survey Review Comments
Fault Rupture Hazard Review
Beverly Hills High School
241 South Moreno Drive
Beverly Hills, California
CGS Application No. 03-CGS0960

In accordance with your authorization, Leighton Consulting, Inc. (Leighton) has prepared this report to provide our second response to the California Geological Survey's review of our April 2012 report summarizing our fault hazard assessment of the West Beverly Hills Lineament in the campus of the Beverly Hills High School located in western Beverly Hills, California. The California Geological Survey's review sheet is dated May 21, 2012 and is included with this report (Appendix F). We have conducted an additional investigation at the Beverly Hills High School campus based on California Geological Survey's written comments, and verbal discussions with the California Geological Survey held in their offices and in the field. This report documents the results of that additional investigation.

It is our opinion, based on our work on the campus and our review of work conducted by others in the area, that no active faults underlie the campus of Beverly Hills High School as delineated on Plate 1 of this report. No setbacks from active faults are recommended for any of the buildings on the campus.

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We appreciate the opportunity to be of service to Hill, Farrer & Burrill, LLP, and the Beverly Hills Unified School District. If you have any questions, please contact the undersigned directly at the e-mail addresses and phone numbers listed below, or at 866-LEIGHTON.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

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Leighton

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1.0 INTRODUCTION

1.1 Purpose

Leighton Consulting, Inc. (Leighton) has been retained by the Beverly Hills Unified School District to conduct a Fault Hazard Assessment for the Beverly Hills High School campus located in western Beverly Hills, California.

Leighton prepared and submitted an initial report to the California Geological Survey in April 2012 ***(****Leighton, 2012a)*. The purpose of this current investigation and report is to provide a detailed response to the California Geological Survey's review comments presented in their Fault Rupture Hazard Review dated May 21, 2012 *(California Geological Survey, 2012, Appendix F).* Those comments requested additional geologic information assessing the possible presence of active faults associated with the West Beverly Hills Lineament and the Santa Monica Fault Zone within the Beverly Hills High School campus (Figure 1, Site Location Map) as shown on Plate 1- Geologic-Boring and Fault Trench Location Map (current Study). To obtain these additional data, we conducted additional field studies. The results of those studies are summarized in this report.

1.2 Background of Previous Fault Studies

This investigation has been preceded by a series of studies looking to establish the presence (or absence) and recent activity of the West Beverly Hills Lineament and Santa Monica Fault in the vicinity of the Beverly Hills High School Campus. A review of those studies helps establish the background for this current investigation.

Dolan and Sieh (1992)

James Dolan and Kerry Sieh (1992) originally described the West Beverly Hills Lineament as a north to northwest-trending lineament located west of, but parallel to the projected trend of the Newport Inglewood Fault Zone (NIFZ) suggesting that the lineament is the possible northern extension of the Newport Inglewood Fault Zone. They described the lineament as forming primarily east-facing erosional escarpments that separate the elevated alluvial terrain to the west (within the Cheviot and Beverly Hills) from the gently sloping younger alluvium within the Benedict Canyon drainage to the east. Their interpretation of the West Beverly Hills Lineament is based in part on Hoots (1931) geological

mapping prior to significant development of the area. Although the West Beverly Hills Lineament was recognized in the early 1990s, it is not clear if its origin was related to faulting or to other geologic processes.

Parsons Brinckerhoff Westside Subway Extension Project- October 14, 2011

Parsons Brinckerhoff conducted subsurface and geophysical studies to investigate the West Beverly Hills Lineament and the Santa Monica Fault Zone as part of the investigation for the Los Angeles County Metropolitan Transportation Authority (MTA) Westside Subway Extension project. The conclusions were presented in a report entitled *Century City Area Fault Investigation Report*, *October 14, 2011* hereafter referred to as the Parsons Brinckerhoff, 2011b report. Parsons Brinckerhoff concluded: 1) that North-South trending faults are present along the West Beverly Hills Lineament within an 880-foot wide zone; 2) that those faults are associated with the Newport Inglewood Fault Zone; 3) because of their association with the Newport Inglewood Fault Zone, the faults are active; and 4) specific active faults were shown as transecting the Beverly Hills High School campus. Parsons Brinckerhoff refers to this fault zone as the *West Beverly Hills Lineament-Newport-Inglewood Fault Zone (Parsons Brinckerhoff, 2011b, Fault Exploration Plan, Plate 3)*.

In our opinion, the Parsons Brinckerhoff (2011b) study contained several limitations in their investigation and analysis including:

- Parsons Brinckerhoff made no trench or test pit excavations in the study area and none of their core borings intersected any of the faults they mapped.

- The Parsons Brinckerhoff faults were identified based solely upon interpretation of widely spaced subsurface boring, Cone Penetration Testing and geophysical data. Parsons Brinckerhoff appears to have assumed that most sediments in the area are horizontal and as a result that changes in the elevation of the units from boring to boring are evidence of faulting.

- Parsons Brinckerhoff apparently presumed that the faults they interpreted trend essentially perpendicular to their transects. (Such faults, should they exist, could trend in almost any direction, however, no physical data to confirm the strike of the faults were established).

- Parsons Brinckerhoff assumed that their interpreted faults are the West Beverly Hills-Newport-Inglewood fault zone and therefore prepared their maps accordingly.

- Parsons Brinckerhoff did not develop any estimates for the ages of the sediments encountered in their borings. Instead, based on the presumed association of the faults with the West Beverly Hills Lineament and correlating that lineament with the Newport Inglewood Fault Zone, Parsons Brinckerhoff concluded that the northwest trending faults must be active.

- Parsons Brinckerhoff also identified numerous fault strands along Santa Monica Boulevard that they concluded are associated with the Santa Monica Fault Zone. Then, based on a process that is not transparent, Parsons Brinckerhoff concluded that those strands that cross or are north of Santa Monica Boulevard are Holocene active, and those strands that are south of Santa Monica Boulevard are Holocene indeterminate.

Leighton Consulting Inc.,- Beverly Hills High School Fault Hazard Assessment- April 22, 2012

The assumptions and conclusions made by Parsons Brinckerhoff, 2011b were of critical significance to Beverly Hills High School (and the surrounding community) as the West Beverly Hills Lineament – Newport Inglewood Fault Zone as mapped by Parsons Brinckerhoff, transects most of the Beverly Hills High School campus, and other Beverly Hills Unified School District facilities (Figure 2, a portion of the Parsons Brinckerhoff, 2011b Fault Exploration Plan). If present and active, these faults could pose a significant threat to the safety of the students and staff of Beverly Hills High School. Further, the faults would impact future development and continued use of the campus, planning for which was already underway.

The school district therefore felt it imperative that these faults be precisely located, their age of last movement assessed and mitigation measures developed. Leighton was retained and conducted several investigative phases to locate active faults and quantitatively define the fault hazard associated with the West Beverly Hills Lineament–Newport-Inglewood Fault Zone at the Beverly Hills High School campus and other Beverly Hills Unified School District buildings as shown on Plate 1 of this report. Leighton conducted an extensive and significant fault investigation of the Beverly Hills High School property to intersect the Parsons Brinckerhoff (2011b) mapped fault locations. The investigation

consisted of continuous core borings, fault trench excavations, cone penetrometer soundings, and soil age dating by relative and numerical means of the near surface and deep sediments. All of these tasks were designed to better define the location and activity of the faults anticipated to be present at the school campus, based upon the conclusions in the Parsons Brinckerhoff 2011b report. The Leighton report *(2012a)*, submitted to the California Geological Survey for review, concluded that **no** active faults associated with the West Beverly Hills Lineament and Newport-Inglewood Fault underlie the campus in the area shown on Plate 1 of this report. This conclusion is at serious odds with the Parsons Brinckerhoff (2011b) findings.

Parsons Brinckerhoff Response to Leighton Consulting Inc. Report - May 14, 2012

Parsons Brinckerhoff prepared a report entitled *Response to Leighton Consulting Inc. Report*, *dated May 14, 2012* hereafter referred to as the Parsons Brinckerhoff, 2012 report. While the Parsons Brinckerhoff report (2012) compiled, correlated and confirmed some of the conclusions and findings of the Leighton report (2012a) and stated that the fault trench data were considered valid, Parsons Brinckerhoff did not change its fundamental position that faults are present through the campus. Instead, in their report Parsons Brinckerhoff adjusted their fault map by either shortening fault lengths or simply moving the faults to gaps in the Leighton fault trench coverage (Figure 3 of this report is a portion of Parsons Brinckerhoff, 2012, Updated Fault Exploration Map). Parsons Brinckerhoff (2012) also stated that the Lakewood Formation and San Pedro Formation were combined into one unit called the San Pedro Formation for purposes of facilitating consistent correlation between the two groups (even though in their own work they inconsistently separated or combined these very similar units, particularly in the Century City area).

Further, Parsons Brinckerhoff stated, with respect to fault locations, that lines depicted on their Plate 3 Fault Exploration Plan (Parsons Brinckerhoff, 2011b) and their Figure 1, Updated Fault Exploration Plan (Parsons Brinckerhoff, 2012) represented only approximate locations and that the actual fault locations could be tens of feet laterally from the lines shown on their initial maps. For purposes of correlation, the previous and current fault lines presented by Parsons Brinckerhoff are shown on Plate 1 of this report and also included separately as Figures 2 and 3. Parsons Brinckerhoff also stated that compilation of all available borehole and CPT data from the Century City area revealed strong

evidence for a major NNW-trending strike slip fault along or just west of the Beverly Hills and Century City boundary (See Plate 1, this report for data compilation). Parsons Brinckerhoff alleges that this new fault has 350 to 400 feet of right lateral displacement across the top of the underlying San Pedro Formation (shown on Figure 2a, Parsons Brinckerhoff 2012). This newly interpreted fault was derived from a compilation of old geotechnical data recovered from (but not presented) in Parsons Brinckerhoff's files, by misrepresenting the data from the Leighton (2012a) investigation, and by inconsistently classifying the Lakewood / San Pedro units within the Century City (Constellation Boulevard) area.

California Geological Survey Fault Rupture Hazard Review - May 21, 2012

The California Geological Survey review letter acknowledged that while large portions of the campus are clear of active faulting, the Leighton (2012a) report did not provide sufficient evidence to preclude active faulting in certain locations at the campus. The California Geological Survey review letter stated specifically that gaps in the trench coverage and the uncertain strike of the potential faults resulted in uncertainties regarding the faults (soil cracks) observed in FT-2 and the possibility of faulting in the gaps between trench exposures (FT-1/FT-3 to FT-2/FT-4). Specifically, with respect to the Newport-Inglewood-West Beverly Hills Lineament, the California Geological Survey stated:

> *"The consultants should evaluate and discuss the potential for faulting between borings T4-B10/CB-13, CB-3/CB-4, CB-8/CB-9 and CB-17/CB-18. Additionally, they should adequately address the gaps between trenches and the area east of FT-4, finally, they should provide additional data to address the potential for strike slip faulting at the site."*

Based upon an anomalous drop of approximately 100 feet between the San Pedro Formation marker beds (Qsp_1 and Qsp_2) identified in the central portion of the Beverly Hills High School campus (CB-1-Cross Section A-A') and the northern portion of the campus (CB-13-Cross Section B-B'), California Geological Survey stated:

> *"The consultants should address this anomaly and evaluate the potential for all possible faults, not just those associated with the West Beverly Hills Lineament – Newport-Inglewood Fault Zone, at the school site. Further*

studies should include the southeastern portion of the campus, which is yet unexplored."

Leighton Initial Response to California Geological Survey Review Comments - June 8, 2012

Leighton provided an initial response to the California Geological Survey review comments (Leighton, 2012b) stating its belief that the Leighton data (2012a) clearly demonstrates the absence of active faulting on the campus in the area shown on Plate 1 of this report (a conclusion Leighton maintains to this date).

Joint Review Meeting at California Geological Survey offices – July 5, 2012

Leighton requested a meeting with the California Geological Survey reviewers which was held on July 5, 2012 at California Geological Survey, Los Angeles offices to discuss possible approaches to answering their comments. During the meeting, considerable discussion related to the standard of review to be applied to the interpretation of data and analysis, particularly the apparent Parsons Brinckerhoff position that unless faulting can be absolutely precluded, the presence of active faulting should be presumed. Direction received by California Geological Survey staff was that this would not be the standard to be applied. Instead, the standard would be to adopt the conclusion best supported by the evidence. California Geological Survey Senior Engineering Geologist, Chris Wills verbally confirmed that the standard for review would be based on the *"best explanation of the data."* The joint review meeting on July 5, 2012 helped resolve concerns over some of the review comments and established objective review criteria to be applied to outstanding review comments.

Joint Field Meeting at Beverly Hills High School – July 12, 2012

During the July 5 meeting an additional field meeting was scheduled to conduct additional field review of adjacent recovered cores to help further establish gaps in the subsurface data. In-field core review was held at the Beverly Hills High School campus on July 12, 2012 with Leighton, Earth Consultant International, California Geological Survey, and AMEC geologists in attendance. Review of Parsons Brinckerhoff, 2011b, boring T4-B10 and Leighton borings CB-13, CB-3/CB-4, CB-8/CB-9 and CB-17/CB-18 was conducted. Minor changes to the boring logs and cross sections were made based upon in-field refinement of geologic contacts conducted during the core review. It was our opinion that this meeting helped resolve most concerns regarding the presence of northwest

trending faults between the fault trenches and the borings. Revised boring logs and cross sections based on these field interpretations are contained in Appendix A, and as Plate 2, Cross Section AA' and Plate 3, Cross Section BB'.

Concerns over potential east-west trending faults at the northwest corner of the campus were not resolved by this review. We determined during the meeting that a geologic investigation consisting of advancement of continuous cores adjacent to buildings A and L would be required to resolve concerns related to the anomalous drop between the San Pedro Formation marker beds. This investigation was planned and carried out by Leighton in August 2012 (Plate 1).

Kenney GeoScience Geomorphic, Structural and Stratigraphic Evaluation - July 18, 2012

Kenney GeoScience (KGS) provided a geologic evaluation of the Century City/Cheviot Hills area in a report entitled *"Geomorphic, Structural and Stratigraphic Evaluation of the Eastern Santa Monica Fault Zone, and West Beverly Hills Lineament, Century City/Cheviot Hills, California."* The purpose of the Kenney GeoScience report was to establish a regional geologic context evaluating site specific data being generated by all parties using standard methods of analysis and evaluation for the regional area. The Kenney GeoScience reports makes several conclusions that are relevant to the Beverly Hills High School study area. Specifically, the Kenney GeoScience report concluded that based on existing data, the Santa Monica Boulevard faults were active approximately 150,000 years ago, they offset a soil profile dated at approximately 134,000 years old, and may have ceased activity 40,000 to 50,000 years ago based on minimum soil age estimates.

The KGS (2012) report also indicated that faults associated with the West Beverly Hills Lineament - Newport Inglewood Fault Zone as postulated by Parsons Brinckerhoff (2011b, 2012) in the study area (shown for reference on Plate 1-this report) do not exist along the West Beverly Hills Lineament. The West Beverly Hills Lineament resulted from concurrent folding (uplift of Century City-Cheviot Hills) and erosion by Benedict Canyon Wash and any faults associated with the West Beverly Hills Lineament, if they exist, are most likely located east of the study area and the Beverly Hills High School campus..

One, and possibly two fault strands identified by Parsons Brinckerhoff (2011b) as part of their proposed West Beverly Hills Lineament Fault Zone are actually

extensions of fault strands that exist within the Santa Monica Boulevard Fault Zone (Fault F1 and F2, Kenney GeoScience, 2012), a generally east-west trending structure. A viable interpretation of the structure considers normal displacement across these north dipping, northeast trending faults as the precursor to the local depression which allowed for capture of the ancient Benedict Canyon Wash to flow southerly through the Cheviot Hills beginning a minimum of approximately 150,000 to 200,000 years ago.

The Kenney GeoScience report predicted that two faults (Fault F-1 and F-2) would intersect the northwest corner of the campus. This provided added incentive to conduct additional continuous core borings to quantify the anomalous elevation differences identified along the top of the San Pedro Formation between Leighton borings CB-1 and CB-13 (Leighton, 2012a). Kenney GeoScience predicted that faults F-1 and F-2 would dip steeply to the north with an apparent normal dip-slip separation, an interpretation which is consistent with Leighton findings presented in Section 3.0 of this report and shown on Plate 4, Cross Section C-C'. Sediment age estimates presented in both this report and Feffer/Geocon (2012) provide supportive evidence of the general stratigraphic relations proposed by Kenney GeoScience in the Century City area (i.e. presence of the Older Benedict Canyon Wash deposits); however, the age estimates for the sediments may result in a revision of the timing of geologic events in the area. Kenney GeoScience is currently revising their report that incorporates these age results.

Feffer Geological Consulting and Geocon West Inc. - Fault Rupture Hazard Investigation-August 24, 2012

The property located at 10000 Santa Monica Boulevard lies immediately north of the Beverly Hills High School campus. Multiple West Beverly Hills Lineament faults mapped by Parsons Brinckerhoff (2011b, 2012) through the Beverly Hills High School campus are also shown to cross through the 10000 Santa Monica Blvd. site (Plate 1). The map of these faults triggered the City of Los Angles to require a fault investigation at the 10000 Santa Monica Blvd. property before development there could proceed.

Feffer Geological Consulting and Geocon West Inc. conducted the fault investigation of the 10000 Santa Monica Boulevard site in response to Parsons Brinckerhoff, 2011b and 2012 conclusions of active faulting at the site. Feffer Geological Consulting and Geocon West Inc. prepared a report entitled *"Report*

of Fault Rupture Hazard Investigation 10000 Santa Monica Boulevard, Los Angeles, California," hereafter referred to as the Feffer/Geocon 2012 report. The investigation included excavation of one, continuous 308-foot long fault trench, perpendicular to the postulated trend of faults identified by Parsons Brinckerhoff, (2011b, 2012) to depths of 18-20 feet below grade (See Plate 1 of this report for the approximate location of the Feffe/Geocon trench). The geologic units exposed in the trench were characterized as Pleistocene in age, consisting of older Benedict Canyon Wash sediments and localized paleo-channel deposits., The ages of these sediments were determined using soil-stratigraphic techniques yielding a minimum surface age of between 30ka and 60ka with an estimated age for the entire 20-foot thick section of between 208 and 345ka.

Feffer/Geocon 2012 concluded that no faults were observed within their fault trench and that the units exposed in the trench are laterally continuous and not offset by faulting. According to representatives from Feffer Geological Consulting and Geocon West Inc., these conclusions were verbally corroborated by an on-site review of the 10000 Santa Monica Boulevard trench by Jerry Trieman of the California Geological Survey. Further, Leighton geologists visited the Feffer/Geocon trench site on October 15, 2012 and concurred, based on limited review, with the lack of fault exposure. We understand the City of Los Angeles Department of Building and Safety has accepted and approved the fault investigation report and has since issued a building permit for the site, allowing construction to proceed.

The 10000 Santa Monica fault trench investigation is significant to the Beverly Hills High School campus in that the trench shadows the full width of the northern end of the campus along the west extension of Durante Drive (Plate 1). Feffer/Geocon 2012 conclusions corroborate the Leighton investigation and conclusions related to absence of active faulting (Plate 3, Cross Section B-B') at the north end of the campus west of CB-18. It clearly ruled out the presence of faulting within the depths and lengths explored. If faults are present below the depths explored then, based upon the soil age dates provided, these faults would not be considered active per the State's definition of fault activity.

The 10000 Santa Monica fault trench Investigation is also significant in that it rules out the fault interpreted by Parson Brinckerhoff (2012) along or just west of the Beverly Hills and Century City corporate boundary (between Leighton Boring CB-13 and Parsons Brinckerhoff Boring T4-B10). No fault in this location was observed in the trench at 10000 Santa Monica Boulevard.

1.3 Site Location and Description

Beverly Hills High School is depicted on the United States Geological Survey (USGS) 7.5-minute Beverly Hills Quadrangle (Section 23, Township 1 South, Range 15 West). Specifically, the Beverly Hills High School is located at 241 South Moreno Drive, approximately 8.5 miles west of downtown Los Angeles and 6 miles northeast of the Pacific Ocean (Figure 1, Site Location Map). Bordering streets are Spalding Drive and Moreno Drive along the east and northeast; Olympic Boulevard on the south and Durant Drive on the north. The corporate boundary between Beverly Hills and Los Angeles (Century City area) is at the western edge of the campus.

The campus is on the western edge of low hills referred to as the Cheviot Hills and Beverly Hills (Figure 4, Geologic Map). The hills are elevated 30 to 40 feet above the surrounding valley, and the campus generally drains to the south and east. Elevations within the area of investigation range from a high of approximately 287 feet mean sea level (msl) in the west to a low of 246 feet msl in the east.

1.4 Project Scope

The investigation consisted of in-field core reviews of borings recovered during the Leighton (April 2012) and Parsons Brinckerhoff (2011b) field investigations as requested by the California Geological Survey; drilling, logging and field review of five new continuous core borings; and excavation of one 125-foot long fault trench to depths of 12-15 feet below grade. The work was performed in response to review comments from the California Geological Survey (2012) with respect to Leighton's initial April 22, 2012 fault hazard assessment.

The scope of our current investigation has included:

- Review of relevant geologic reports and maps identified in Section 1.2 of this report. Specific references reviewed including those mentioned above are noted at the rear of text.

- Review of oblique aerial photographs taken between the early 1920s and 1931, specifically to identify continuous lineaments or geomorphic evidence of possible on-site active faults associated with the SMFZ (Appendix E-Figures E-8 through E-10). Aerial photos previously included in Appendix E (2012a) were reviewed to look for landforms indicative of faulting associated with the

SMFZ. Figures E-8, E-9 and E-10 are a numerical continuation from the 2012a Appendix E annotated photos. Figures E-8 through E-10, included with this report, present the current City boundaries/ Beverly Hills High School property line and Leighton fault trenches FT-1 through FT-5, the fault identified in between core borings CB-23 and CB-24 and observed in trench FT-5, the fault observed in fault trench FT-3 and other local landforms.

- In field review of the fault trench located on the 10000 Santa Monica Boulevard site. Our review was conducted on October 15, 2012 with Leighton personnel and representatives of Geocon West and Feffer Geological Consulting Inc.

- Coordination with Underground Service Alert (USA), Beverly Hills High School, district personnel and utility subconsultants to have underground services and/or utility easements located prior to the beginning of field investigations.

- Drilling, sampling and geologic logging of 5 continuous core borings (CB-22 through CB-26) between August 1 and August 20, 2012. Borings were excavated by a subcontracted driller to depths ranging from 115 to 175 feet, and were initially logged by a State certified engineering geologist from our staff. Continuous core samples were collected except where “no recovery” was obtained as noted on the boring logs (Appendix A) and cross-sections (Plates 2 through 4). The cores (CB-22 through CB-26) were further reviewed and photo-documented in the field by Leighton, Earth Consultants International and California Geological Survey representatives on August 25, 2012. After excavation, the borings were backfilled with bentonite and soil cuttings. Excess soil was placed in Department of Transportation-approved drums and removed from the site. Core logs and core photos are provided in Appendix A, boring locations (Leighton, 2012a, Parsons Brinckerhoff, 2011b) are shown on the Geologic-Boring and Fault Trench Location Map, Plate 1 of this report.

- Cores recovered from the additional borings, CB-22, CB-23, CB-24, CB-25 and CB-26 were reviewed in the field with representatives from the California Geological Survey, Earth Consultants International and Leighton. During the core review it was noted that a significant change in elevation across well-defined marker beds assigned to the San Pedro Formation (SPF) over a horizontal distance of approximately 120 feet occurred between borings CB-

26 and CB-24 (Plate 4, Cross Section C-C'). This sudden anomalous drop in elevation is not consistent with the elevations of the San Pedro Formation (Qsp_1 and Qsp_2) when compared to our previous transects, A-A' and B-B' (Leighton, 2012a) showed slight fall of approximately 2° to the east. Upon conclusion of the August 25, 2012 core review and input from both Earth Consultants International and the California Geological Survey it was determined that the anomalous drop in elevation of the marker beds Qsp_1 and Qsp_2 was suggestive of faulting and that a physical fault trench exposure of the sediments within the 125-foot span would be required to be included as part of the response to the California Geological Survey review comments.

- Excavation and geologic logging of one additional fault trench, FT-5 (totaling approximately 125 lineal feet) was conducted in September and October 2012. The trench ranged in depth from 12 to 15 feet, was excavated by a subcontracted excavator and operator and was shored in accordance with Cal-OSHA guidelines. Following excavation, the trench was enclosed using existing gates and temporary fencing to limit site access and to improve site safety. Each wall of the trench was cleaned (brushed and scraped) to delineate the geologic contacts. Our geologists logged, photographed and described the primary stratigraphic units. The trench was backfilled and compacted in October 2012. All Trench locations (Leighton 2012a, Feffer/Geocon 2012) are shown on the Geologic-Boring and Fault Trench Location Map, Plate 1 (in Pocket). Copies of the trench logs are included as Plate 2 (Cross-section A-A'), Plate 3 (Cross Section B-B'), and Plate 4 (Cross Section C-C'), Plate 5 (Fault Trench FT-5) and Plate 6 (Fault Trench FT-2, Station 1+70 to 1+80). Photos of the fault trenches at specific stations are included in Appendix B, Figures B-1 through B-17.

- The fault trench was also observed by geologists from the California Geological Survey. Ms. Tania Gonzalez with Earth Consultants International assisted in providing soil-stratigraphic age estimates (Appendix C). Mr. Eldon Gath also assisted with logging and interpreting the fault trench geology. Dr. Miles Kenney, from Kenney GeoScience, reviewed the fault trench exposure and shared data collected during his research of the Santa Monica fault in the local area.

- Infra-Red Stimulated Luminescence (IRSL) dating measurements were conducted on sediment samples (OSL-13 through OSL-21) collected within Fault Trench FT-5 to aid in establishing the age of the sediments. Professor

Edward J Rhodes from the University of California at Los Angeles conducted the testing. The IRSL data and interpretations are provided in Appendix C. Locations of OSL samples are shown on Plate 5-Fault Trench FT-5, East and West Walls. Fault trench FT-5 exposed clay filled cracks and faults with offsets of several feet or less. To determine if the clay observed and documented in cracks and along several faults is tectonic or pedogenic in origin Dr. Robert Graham was retained to collect samples of the clay in order to analyze the microfabric of the clay infill. Sample locations for microfabric analysis in Fault Trench FT-5 were determined in consultation with the California Geological Survey during the joint trench review meeting. Dr. Graham's data and interpretations are provided in Appendix D. Sample locations are shown on Plate 5 of this report.

- Geologic Cross-sections A-A' (Plate 2) and B-B' (Plate 3) were revised based upon in-field core reviews and refinement of sediment layers exposed in Parsons Brinckerhoff, 2011b, boring T4-B10 and Leighton borings CB-13, CB-3/CB-4, CB-8/CB-9 and CB-17/CB-18. The sections were revised to show minor re-interpretations of the subsurface geology, specifically with respect to paleosol thicknesses, and sedimentary units and to document the relative continuity of sediments exposed in the trenches (FT-1 through FT-4, 2012a) and correlated on the deep core borings (CB-1 through CB-21) (Plates 2 and 3)

- Geologic Cross-section C-C' was developed to present the subsurface geology interpreted from cores CB-1, CB-13, CB-22 through CB-26 and fault trench FT-5 illustrated on Plate 4 of this report.

- Preparation of this response report summarizing our findings and conclusions.

2.0 FINDINGS

2.1 Geologic Setting

Beverly Hills High School is located in the northwesterly portion of the Los Angeles basin, at the eastern margin of northwest-trending hills referred to as the Cheviot and Beverly Hills. These hills are composed of Quaternary alluvial fan and fluvial deposits that have been elevated and dissected. Older terrestrial alluvial fan deposits exposed at the surface consist of gravel, sand, silt, and clay that were eroded from nearby hills and mountains. These sediments are underlain by interbedded Pleistocene-age near-marine and marine sediments deposited on beaches and shallow ocean floors (Figure 4: Regional Geologic Map). The Santa Monica Mountains are north of the area. Their uplift is mainly from movement along the Santa Monica and Hollywood fault zones. These faults are two of a series of east-west trending, reverse, left-lateral oblique-slip structures along the southern Transverse Ranges province that accommodate north-directed shortening between Peninsular Ranges province (including the Los Angeles Basin) against the Transverse Ranges province. Their left-lateral (westerly) component of slip is accommodating the NW-vergent portion of the strain (Dolan et al., 1997).

2.2 West Beverly Hills Lineament

Dolan and Sieh (1992) described the West Beverly Hills Lineament as a north, to northwest-trending lineament oriented west of, but parallel to the projected trend of the Newport Inglewood Fault Zone (NIFZ) suggesting that the lineament is the possible northern extension of the Newport Inglewood Fault Zone. The lineament is mainly comprised of east-facing erosional escarpments that separate the elevated alluvial terrain to the west (within the Cheviot and Beverly Hills) from the gently sloping younger alluvium within the Benedict Canyon drainage to the east. Hoots (1931) mapped the geology prior to significant development as shown in the 1920's aerial photographs of the area (Appendix E: Leighton 2012a). A portion of the Hoots map showing the Beverly Hills area is provided as Figure 5 of this report with annotations depicting the West Beverly Hills Lineament. Additionally, Figure 6, Regional Fault Map shows the West Beverly Hills Lineament as located using the California Geological Survey database. Although the West Beverly Hills Lineament has been recognized since early 1990, it was not clear if its origin relates to faults or to other geologic

processes. Parsons Brinckerhoff (2011b, p. 13) summarized the interpretations available at the time for the West Beverly Hills Lineament:

> *"Various tectonic interpretations have been proposed for the West Beverly Hills Lineament. In the absence of previous fault subsurface exploration, the location and characteristics of the West Beverly Hills Lineament, including whether it is a fault zone, was not well defined. To the north of its intersection with the Santa Monica fault zone, the West Beverly Hills Lineament acts as a connection between the Santa Monica and Hollywood fault zones, transferring slip between these two oblique-slip fault systems (Dolan and Sieh, 1992; Dolan et al., 1997; 2000a). Dolan et al. (1997) speculated that this northern part of the West Beverly Hills Lineament might represent an east-dipping normal fault associated with extension along the left step between these faults. To the south of its intersection with the Santa Monica fault zone, Dolan and Sieh (1992) and Dolan et al. (1997; 2000a) considered the West Beverly Hills Lineament to be the northern continuation of the active Newport-Inglewood fault zone located approximately 3 miles to the south-southeast. The Newport-Inglewood fault zone is composed of a series of discontinuous, northwest-trending en echelon faults and pressure ridges extending from the Baldwin Hills southeastward to Newport Beach and continuing offshore to the south (Barrows, 1974). Lang (1994) expressed the opinion that subsurface mapping within the Cheviot Hills and Beverly Hills oil fields, constrained by dense subsurface control, precluded the existence of the West Beverly Hills Lineament as a fault zone."*

2.3 Santa Monica Fault Zone (SMFZ)

The Santa Monica Fault Zone is part of the Transverse Ranges Southern Boundary fault system characterized as a west-trending system of reverse, oblique-slip, and strike slip faults that extends for more than 200km marking the southern boundary of the Transverse Ranges (Dolan, et al., 1997). The northeast trending Santa Monica Fault extends from Pacific Palisades through Santa Monica and West Los Angeles and merges with the Hollywood Fault somewhere near the West Beverly Hills Lineament in Beverly Hills.

Dolan et al., (2000), stated that the Santa Monica Fault is expressed at the surface as a series of left-stepping, en echelon, south facing scarps (the Santa Monica Boulevard Lineaments) with an overall southward convex map pattern. It

should be noted that the Santa Monica Boulevard Lineament (SMBL) is geomorphically expressed by a linear swale through which a railroad was constructed (Kenney GeoScience, 2012) (Hoots, 1931). This later became the location of the modern Santa Monica Boulevard. By 1931, the date of the Hoots survey (Hoots, 1931) and various aerial photographs (Leighton, 2012a) the Santa Monica Boulevard Lineament had already been physically altered. The straightness of this lineament, assuming a fault origin, suggests that most slip is lateral (Kenney GeoScience, 2012).

Parsons Brinckerhoff (2011b) investigated the Santa Monica Boulevard Lineament, referred herein as the Santa Monica Fault Zone (SMFZ) with a series of borings, CPT soundings and geophysical surveys that crossed the trend of the Santa Monica Fault Zone. They interpreted the Santa Monica Fault Zone as located generally west of the Beverly Hills High School site. Parsons Brinckerhoff identified a northeast trending area, 220-feet wide as part of the Santa Monica Fault Zone, “Holocene Activity Undetermined” (Figure 2), whereas the remainder of the Santa Monica Fault Zone was classified as active per State of California definition (Parsons Brinckerhoff, 2011b, Fault Exploration Plan, Plate 3). This conclusion is of primary significance to Beverly Hills High School as the eastward projection of this southernmost fault crosses the northwest corner of the Beverly Hills High School campus where locally there is a depression or swale. This projection of an undefined fault into the Beverly Hills High School campus, the Kenny Geoscience (2012) prediction of Faults F-1 and F-2 through the area along with the unexplained difference in elevation of San Pedro Formation marker beds between Leighton sections A-A’ and B-B’ are the reason Leighton undertook the investigation looking for east-west trending faults in the northern portion of the campus (Cross Section C-C’ and FT-5).

2.4 Geologic Units

Leighton’s core borings and fault trench exposed an early to mid-Pleistocene sedimentary sequence comprising four main units. The oldest and deepest are the +500 ka-1Ma marine and near-shore deposits of the early Pleistocene San Pedro Formation (Qsp). In apparent conformable contact, lies the +300-500 ka alluvial fan deposits (Qoaf, Unit 6 in this report), dipping northerly at 0-2 degrees and stratigraphically correlated to the prior (Leighton, 2012a) sections. Lying unconformably above the Qoaf deposits is a well-stratified and channeled mid-late Pleistocene alluvial deposit of the abandoned former outlet of Benedict Canyon Wash (QalBCW, Units 2, 3, 4, & 5 in this report) ranging in age from

+100-300 ka. Unconformably overlying the old Benedict Canyon Wash deposits is a >30 ka sequence of fine sands and silts that are interpreted as overbank flood deposits from the current Benedict Canyon / Moreno Creek channels (Unit 1). Age estimates are all minimum ages as they are mainly derived from summing the multiple pedogenic horizon's development ages. The ages do not include any periods of time bracketing stable periods of soil formation when depositional and erosional processes dominated. Most sediments range in grain size from basal channel gravels overlain by progressively fining upward sands, silt and clays. These sediments were mainly laid down by now dissected distributary fans emanating from the Santa Monica Mountains to the north. Clast composition typically consists of Santa Monica slate (Jsm), siltstone and sandstone of the Monterey Formation (Tm) and occasional basalt, scattered granitic cobbles and pebbles.

2.4.1 Artificial Fill (Map Symbol (Af)

Up to four feet of artificial fill was observed in the borings and trench excavated during this round of investigation. This fill is likely associated with construction of the retaining wall that binds the western edge of the campus along the Century City corporate boundary. We are unaware of any documentation regarding compaction of the fill material associated with grading and construction of the wall. Artificial (undocumented) fill at the site generally consists of dark brown to brown, moist sands, silts and clays with angular to sub-angular gravel and small cobbles. In general, the fill appears to be derived from onsite native soils.

2.4.2 Quaternary Alluvium: Benedict Canyon Drainage: Map Symbol (Qal)

Fault Trench FT-5 and boring CB-24 exposed generally flat-lying alluvium between Stations 0+70 to 1+25 (Plate 5). It lies unconformably atop a buried soil (Bt) horizon and consists predominately of very fine to fine grained sands and massive sandy silts with thinly interbedded clays. This unit, within the Benedict Canyon drainage is interpreted as floodplain/overbank deposits of Moreno Creek. This unit, also encountered in core borings CB-13 through CB-18 (Leighton, 2012a) was formerly identified as Quaternary young alluvium (Qya). Strike and dip measurements of thin clay beds at the northern end of the trench yielded a strike of N60°E, dipping 4°N (Plate 5).

2.4.3 Quaternary Alluvium: Old Benedict Canyon Wash Deposits (Qal_{BCW})

Fault trench FT-5 and core borings CB-23, CB-24 and CB-26 exposed generally gently dipping alluvial sediments ranging from 4° to 10° that were deposited in an old abandoned channel by a former southwest flowing drainage (Units 2 through 5, Plate 5). It is unconformably incised into the older Quaternary age alluvial fan deposits (Unit 6, Plate 5). These channel sediments generally consist of thin to thick bedded, orange brown to olive-brown, dry to very moist at depth, unconsolidated clayey sandy silt to silty fine-grained sand with varying proportions of locally derived pebbles and gravel channels that fine vertically into massive eolian and fluvial packages containing several thinly bedded baked red sandy clays.

The unconformable contact between the Older Benedict Canyon Wash Deposits (OBCWD) and underlying Quaternary old alluvial and fluvial deposits identified as the basal scour of Unit 5 (Plate 5) has a strike of N73°E, and a dip of 4°N. Moving upsection into the OBCWD, thin to thick beds of poorly to moderately well sorted channel (fluvial) gravels that grade laterally into finer grained sands and silts were identified and mapped. Sand beds underlying some of these thickly bedded gravels around Station 0+40 (Plate 5) yielded a strike of N40°E, and a dip of 10°N. Typical sediment packages contain imbricated clasts, channel cross bedding and thin laminations with fining-upward sequences in laterally discontinuous sand beds and lenses. The overall dip of the unit increases with proximity to the fault zone (Plate 5, Station 0+40 to 0+50) and becomes flatter to the north.

2.4.4 Quaternary Old Alluvial and Fluvial Sediments: Map Symbol: (Qoaf)

The borings and trench FT-5 (Unit 6, Plate 5) exposed an assemblage of alluvial fan and meandering fluvial stream deposits, laterally migrating paleo channels, fine-grained to laminated overbank and distributary alluvial fan sediments combined with chaotic assemblages of debris flows. These deposits are poorly to well-sorted, dominantly reddish-brown in color and consist of clays, silts, sands and gravels derived from the Santa Monica Mountains. The sands and gravels typically occur at the base of the channels, decreasing in size upward and are cross-bedded with interbedded parallel laminations. Some channels are dominantly clast-supported, whereas others have a matrix of silty clayey sand overprinted

with strong soil development. These soils are mainly hard, very dark greyish-brown to dark brown, dry to moist, predominately clayey fine-grained sand to sandy clay with trace amounts of fine subangular to subrounded gravels. Soil structure is moderately developed with locally open, small voids (1-2mm). Calcium carbonate, locally in heavy abundance, and clays and iron oxide also line the ped faces and some voids. The heavily carbonate impregnated soils primarily contained abundant clay. These calcium carbonate soils were labeled as "carbonate packages" (Plates 2 through 4) and are used as marker beds that, because of their stratigraphic consistency can be correlated from one boring to the next. Correlation of these units allowed us to determine the relatively continuous nature of the subsurface soils as shown on cross sections A-A', B-B' and C-C'.

2.4.5 San Pedro Formation (Map Symbol: Qsp1, Qsp2)

In borings CB-1 and CB-13 (Leighton, 2012a) and current borings CB-22 through CB-26, Leighton recognized two discrete units, described by Parsons Brinckerhoff (2011b) as San Pedro Formation, that we herein refer to as Qsp1 and Qsp2. The upper San Pedro Formation, (Qsp1), was encountered at depths ranging from 85 to 160 feet (elevation 107 to 205). It is typically a massive, friable to loose, yellowish-brown to light greenish-gray, fine to medium-grained sand and silty fine sand with scattered pockets of well-rounded and flattened gravel layers. Leighton interprets this unit's origin as deposited in a wave-dominated, near-shore environment mechanically influenced by stream erosion emanating from the rising highlands to the north.

The lower conformable marker unit (Qsp2) is interpreted as a shallow water, near- shore marine deposit given that it consists of fossiliferous, dark gray to black sandy silt to sandy clay containing locally abundant mollusk fragments. The unit is flat lying to gently dipping. These and adjacent sand and gravel layers are commonly cemented with calcium carbonate.

2.5 Groundwater

Groundwater was encountered in all of the core borings performed as part of the current investigation; most groundwater was locally perched. The perched and

local groundwater conditions encountered in each boring, CB-22 through CB-26 are summarized in the following table:

Boring	Perched Water Depth (feet)	Groundwater Depth (feet)
CB-22	46.7, 50, 55, 65, 68.7, 70 and 71.3	98.4
CB-23	40, 61.9, 75, 86.4, 91.7, 102.3 and 109.1	111
CB-24	35, 53.6-55, 75-86.2, 100.5-101.5, 120-122.6, 140 and 150-151.6	157.5
CB-25	34.4, 39.2, 48.5, 54.7	85
CB-26	35-37.6, 39.4, 41-42.4, 60.8, 77 and 80	85

The historically shallowest groundwater level within the Benedict Canyon Drainage west of the campus is on the order of 20 feet (California Geological Survey, 1998).

2.6 Aerial Photograph Review

Leighton obtained and interpreted several vintage aerial photographs of the site to look for landforms potentially indicative of faulting (Leighton, 2012a). Most images came from the University of California at Los Angeles (UCLA) as well as from Leighton's in-house collection (see references for a listing of photographs). Particularly relevant photographs with annotation are provided in Appendix E of the Leighton April 22, 2012 report. Selected aerial photos were enlarged and analyzed with respect to possible east west trending structures associated with the Santa Monica Fault Zone. These photos are included with this report as Figures E-8, E-9 and E-10.

Early 1920's (Figure E-8): Oil field activity and agricultural activity was taking place west and south of the future high school campus. The drainage course of Moreno Creek is visible in the photo as an irregular shaped boundary capturing an easterly flowing drainage swale within the abandoned channel (wind gap) of Benedict Canyon Wash. A constructed water pond is visible across the mouth of the drainage swale where it would have discharged into Moreno Creek. The local geomorphic depression (wind gap) is partially evident within the disced field as the discing operation appears to stop along the toe of the north facing gentle slopes indicating a southwesterly trend to the hills in this area. Dirt roads traversing the oil field area, when compared to the 1930 photograph, are not

visible suggesting the area is prone to significant changes in surface expression due to man's activity or are obscured by agricultural or natural vegetation..

1930 (Figure E- 9): Oil field operations continued on adjacent properties west and south of Beverly Hills High School. Leighton specifically focused on geomorphic evidence of faulting where the projected trace of the SMFZ (Parsons Brinckerhoff, 2011b) is expected to pass through the northwest corner of the campus shown in yellow as the Beverly Hills/Century City Boundary. The fault observed in FT-5 is situated within, but approximately 200 feet north of the geomorphically preserved former Benedict Canyon Wash channel. The trend of the fault was measured as N35-40°E, dipping 70°N between Stations 0+40 and 0+50 in FT-5. This trend is similar to a linear feature within the local depression (wind gap) which appears to be a result plowing and discing with a furrow of vegetation created at the boundary between different fields. However it is also possible this could be the fault line exposed by the agricultural plowing/discing operations. The current drainage swale, visible along the toe of the north facing slope, flows easterly towards the future Beverly Hills High School campus and Durante Drive, is considerably underfit for the size of the now abandoned channel. Leighton does not find any evidence in the relatively continuous nature of the underlying sediments between core borings CB-22, CB-25 and CB-26 (Plate 1) that suggest this landform (drainage swale) is emplaced due to faulting, rather it is a product of erosion within the Benedict Canyon Wash wind gap. The northern margin of the wind gap is truncated easterly at Heath Avenue by the current depositional apron of Moreno Creek and Benedict Canyon Wash, which has been dated in FT-2 as late Pleistocene. There is no geomorphic signature of the fault extending across this surface.

1931 (Figure E-10): Oil field operations continued on the high school and adjacent properties to the west and to the south in 1931. The Benedict Canyon Wash wind gap is defined by several arcuate shaped vegetated plots located southerly of what appears to be bare ground, possibly associated with the golf course construction visible to the west of this area.

A linear feature is visible along the current Century City/Beverly Hills corporate boundary consistent with the approximate location of the Parsons Brinckerhoff, 2012, relocated fault line (see Figure 3 this report). Parsons Brinckerhoff interpreted tectonic geomorphic features and a contour analysis of the San Pedro contact (incorrectly using Leighton 2012a data), to relocate their main WBHL

fault and interpret 350-400 feet of right-lateral offset, essentially along the property line.

The fault trench at the 10000 Santa Monica Boulevard site was excavated perpendicular to this feature. The 10000 Santa Monica Boulevard site fault trench findings rule out a fault origin for the linear feature where mapped by Parsons Brinckerhoff.

2.7 Field Exploration

Leighton excavated five new continuous core borings (CB-22 through CB-26) (Plate 4, Cross Section C-C') along the western border of the Beverly Hills High School campus between previously explored east-west transects at mid-campus and at the northern end of the campus (Plate 1). This line of borings was sited to investigate the recognized difference in elevation of the San Pedro Formation units between Cross-sections A-A' and B-B'. The new core borings are also roughly perpendicular to the trend of a suspected southern strand of the Santa Monica Fault Zone inferred by Parsons Brinckerhoff (2011b) and Kenney Geoscience (2012).

The transect, which includes the previous borings CB-1 (Transect A-A') and CB-13 (Transect B-B') is 735 feet long, consists of closely spaced boreholes ranging in depth from 115 to 175 feet deep.

The subcontracted driller used a hollow stem auger system equipped with a five foot long, 3-inch continuous core barrel. Core recovery was generally good in all holes and recovery in most intervals exceeded 90%, except where noted on the logs. Core runs were hand scraped to remove the rind of disturbed material then logged by a professional geologist. Continuous core samples were stored in boxes for further review and photo documentation (Appendix A). Correlation was performed by laying out the recovered cores in the Beverly Hills High School parking lot, where correlation from core to core was based on grain size, color, texture, soil horizons and the thickness of the stratigraphic unit or soil horizon. Reviewers also identified thin laminations and fining upward stratigraphic packages to aid in the correlation of units.

The majority of the transect core borings presented gently sloping sedimentary units that could be reliably correlated across the borings. However, between core borings CB-24 and CB-26 (Plate 1) approximately 78 feet of anomalous

north side down separation was measured between the top of the Qsp_1 marker bed (Plate 4). This separation, although decreasing in magnitude, was also recognized in other shallower units to depth of about 40 feet. Above ~30 feet, there were suggestions of a unit correlation across the borings, however due to reduced core recovery and multiple pedogenic weathering horizons, no clear correlation across the cores could be established.

Fault Trench FT-5, with a total length of 125 feet, was excavated across this area and geologically logged between September 1 and October 15, 2012. The trench was placed between borings CB-24 and CB-26 (Plate 1) to expose surficial sediments in the area where elevation differences in the Qsp unit was noted in the borings and where fault F2 had been proposed by Kenney GeoScience, (2012, Plate ES-2b), and Parsons Brinckerhoff, (2011b, Plate 3). The trench was excavated using a rubber tired backhoe with a 3-foot wide bucket. Fault Trench FT-5 was limited to 3-feet wide due to on-site building and infrastructure and ranged from 12-15 feet deep. During excavation, the footing for a 9-10 foot high retaining wall was encountered and marked the western edge of the trench.

After excavation, the trench was initially cleaned to view the sediments and overlying soils. A level line was hung along the length of the trench using nylon string, nails and a pocket level. The east and west walls of the trench were photographed (Appendix B) and logged at a scale of 1-inch equal to 5 feet (Plate 5). Multiple field reviews were conducted by the California Geological Survey, Kenney GeoScience, Earth Consultants International, Dr. Robert Graham of UCR, Dr. Edward Rhodes of UCLA, and Leighton.

Trench locations were mapped (Plate 1) using locally identifiable landmarks evident in the AutoCAD file provided by the District which allowed for reasonably precise elevation control across the trenching operation.

Cross-section C-C' (Plate 4) illustrates the subsurface geology as encountered in borings CB-22 through CB-26 and fault trench FT-5 at a scale of 1"=10'. This plate includes data from Borings CB-1 and CB-13 (Leighton, 2012a). Plate 5 illustrates the east and west (mirror image) walls of FT-5 logged at a scale of 1"=5'.

2.8 Soil Age Estimates

The State of California Alquist-Priolo Earthquake Fault Zoning Act of 1972 (Bryant and Hart, 2007) defines an active fault as one in which surface or near surface movement has occurred within the Holocene period (in the past~11,000 years). If Holocene sediments are tectonically displaced, then the causative fault is deemed to be active. The only currently allowed mitigation for habitable structures including school buildings is avoidance. Structural setbacks from active faults for school buildings are at a minimum 50 feet wide, but wider zones may be warranted depending on fault geometry and off fault deformation.

To estimate the age of the earth materials at Beverly Hills High School in the borings and fault trenches, Leighton used both relative (soil stratigraphy) and numeric (optically stimulated luminescence OSL) techniques (Appendix C).

2.8.1 Soil-Stratigraphic Age Estimate

Beverly Hills Unified School District retained the services of Earth Consultants International (Appendix C) to assist Leighton to measure and describe the sediments and soils exposed in Fault Trench FT-5 and cores CB-23, CB-24 and CB-26 for the uppermost 40 feet. The characteristics of the soil horizons exposed therein were compared to those of dated soils elsewhere to estimate the age of the deposits. The ages of the dated horizons were added together to estimate the age of the entire section. The following is a brief summary of the data supplied in the Earth Consultants International report contained in Appendix C.

The profile analyzed within Fault Trench FT-5 at approximate Station 0+81 (east wall) indicates that the soils in the uppermost 11.4 feet (3.5 meters) are Pleistocene age sediments with a minimum age of 150,000 years. The sediments exposed consist of fluvial gravels and sands near the southern end of the trench and finer grained silts and clays at its northern end. Based on soils described in the three cores CB-23, CB-24 and CB-26, the sediments in the southern portion of the trench were estimated to be a minimum 70,000 years old whereas the sediments in the northern part of the trench are estimated to be a minimum of 30,000 years old.

Note that Soil Tectonics described the soil profiles from the same fault trench stratigraphy from core boring CB-13 in the initial Leighton study (2012a). The Soil Tectonics conclusions corroborated those of Earth

Consultants International*; namely, that the Beverly Hills High School is underlain by late Pleistocene sediments (Appendix C: Leighton 2012a).*

Sediments described in CB-26 (Station 0+00, FT-5) noted four separate soils identified in the upper 30 feet (9.14 meters) indicating at least four separate, geomorphically stable periods when soil forming processes dominated. Two of those soils were identified in FT-5 at depths of 7.75 to 11.92 feet and in CB-24 at 11.92 and 18.67. The dominate sedimentary process is deposition of sediments from pulses of cyclic sedimentation within a wash system. Although sourced from the same area, the Older Benedict Canyon Wash Deposits are dominantly fluvial in origin (Kenney GeoScience, 2012) and stratigraphically distinct from the underlying Quaternary Old Alluvial Fan sediments (Leighton, 2012a). The gravels encountered in Leighton's core borings CB-23 and CB-24 at depths of 20.75 feet and 36.5 feet, respectively, correlate closely with Kenney GeoScience's proposed bottom for Benedict Canyon Wash.

2.8.2 Infra-Red Optically Stimulated Luminescence Dating

Nine sediment samples, (referred to as OSL-13 through OSL-21 on the FT-5 trench log), were collected from Fault Trench FT-5 (Plate 5) and prepared for age determination Infra-Red Stimulated Luminescence (IRSL) testing by Professor Edward J. Rhodes, Department of Earth and Space Sciences, University of California Los Angeles (UCLA). The intent of the sample collection and subsequent laboratory testing was to provide numerical ages for the quartz and feldspar minerals' last exposure to sunlight prior to burial in the fluvial fine grained sandy sediments exposed in the trench walls of FT-5. Based upon the IRSL dating of K feldspar fractions, the five sediment samples strongly suggest that deposition of the older wash sediments and old alluvium occurred in two separate periods as also recorded in the pedogenic soil profiles. The earlier depositional phase probably relates to the last interglacial (c. 135-120 ka), or the period shortly after that, and includes deposits encompassed by the lower four samples, representing most of the sediments exposed in the sampled trench. The uppermost sample appears to have been deposited around 60 ka, and may relate to MIS (marine isotope stage) 4, or early in MIS 3.The ISRL data is included in Appendix C.

3.0 OBSERVATIONS AND DISCUSSION

3.1 Fault Trenches

All of the Leighton Fault Trenches (FT-1 through FT-5) were excavated within the central and northern portions of the Beverly Hills High School campus (Plate 1, this report) and across the inferred zone of the West Beverly Hills Lineament (Parsons Brinckerhoff, 2011b, 2012). The locations of the Fault Trenches with respect to the Parsons Brinckerhoff faults from their *Plate 3: Fault Exploration Plan* (Parsons Brinckerhoff, 2011b) and their *Figure 1: Updated Fault Exploration Plan* (Parsons Brinckerhoff, 2012) are shown on Plate 1. The fault trenches did provide full east-west coverage across the central and northern part of the campus as shown on Plate 1 of this report except for a 65-foot wide gap along Heath Avenue and a gap of ±20-feet in fault trench FT-2. For these areas Leighton relied on continuous core boring data to supplement fault trench exposures. Additionally, a fault trench was excavated by others off-campus at the 10000 Santa Monica Boulevard site located immediately north of the campus (Geocon/Feffer, 2012). The 10000 Santa Monica Boulevard trench supplements the Leighton data in the area of Cross Section B-B'.

3.2 California Geological Survey Response

The California Geological Survey (CGS) reviewed the Leighton April 22, 2012 report entitled *Fault Hazard Assessment of the West Beverly Hills Lineament, Beverly Hills High School, 241 South Moreno Drive, Beverly Hills, California* and provided comments in California Geological Survey review letter dated May 21, 2012, (Appendix F). For the ease of reference, the review comments are reiterated below followed by Leighton's responses.

3.2.1 Comment and Response: West Beverly Hills Lineament

California Geological Survey Comment: ***The Consultant should evaluate and discuss the potential for faulting between borings T4 B-10 and CB-13***:

Leighton Response: Since publication of the Leighton April 22, 2012 report, Parsons Brinckerhoff (2012), based on interpretation and acceptance of Leighton (2012a) subsurface fault trench data, revised its fault locations (Plate 1 and Figure 3 of this report). In particular, Parsons

now infers a fault with significant offset extending from approximately 25 feet west of Beverly Hills High School (west of Leighton CB-1 along Transect A) northward between Leighton Boring CB-13 and Parsons Brinckerhoff T4-B10 (along Transect B). Parsons Brinckerhoff suggests up to 350-feet of right lateral offset along this fault, an offset which they defined by constructing a structural contour map of the top of the San Pedro Formation using borehole data. It appears Parsons Brinckerhoff did not consider any other alternatives such as an offset of the San Pedro Formation along the Santa Monica Fault Zone as a viable interpretation for the difference in elevation along the top of the San Pedro Formation. Between Cross Sections AA' and BB', the specific area in which Parsons Brinckerhoff has alleged the 350-foot lateral offset, an anomalous 78 feet of elevation difference was recognized during this study (Plate 4, Cross Section CC').

The Parsons Brinckerhoff (2012) analysis was initially flawed as it was contradicted by available data even as they presented it. Their structural contour map misrepresented the data from the Leighton Transect A-A' which showed a gentle 2° dip to the NE on the San Pedro contact, by redrawing it to reflect a steeper more northerly dip, and simply disregarding the actual boring and trench exposure data. Drawing the structural contours correctly results in a gentle anticlinal warp across the Century City area, with the fold axis trending NW through the Constellation area.

If there is in fact 350-feet of right lateral offset of the top of the San Pedro Formation between CB-13 and T4-B10, then, using their structural contour map, there must be at least 40 to 50 feet of vertical separation across this fault between CB-13 and T4-B10. However, there is only about 6 feet of elevation difference between the San Pedro Formation bedrock contact in Parsons Brinckerhoff Boring T4-B10 and Leighton Boring CB-13 (Leighton 2012b, Figure 2). This difference in elevation is consistent with the slight northeasterly dip of approximately 1-2° as measured consistently through the Beverly Hills High School campus. There is no additional vertical separation to attribute to a fault offset.

If the Parsons Brinckerhoff fault is present as inferred, it must be a distinct feature and not a wide zone of faulting as no evidence of faulting (or even fracturing) was observed in Leighton Fault Trench FT-1 immediately to the

east of the fault line. Subsequent to the Parsons Brinckerhoff report, a more detailed joint review of the core samples for T4-B10 and CB-13 was conducted by Leighton and California Geological Survey geologists. We concluded that there is no evidence indicating the presence of this fault presented in the cores for borings T4-B10 and CB-13. If the fault drawn by Parsons actually exists, then it must lie to the west of their boring T4-B10.

Finally, the fault as mapped by Parson Brinckerhoff would also pass through the western end of the fault trench excavated at the 10000 Santa Monica Boulevard site. A fault investigation report of this site by Feffer Geological Consulting and Geocon West Inc. (2012) concluded “no faults” are present within the 308-foot long fault trench excavated across the site specifically to look for northerly trending faults associated with the West Beverly Hills Lineament –Santa Monica Fault Zone. Note that this report was accepted and approved by the City of Los Angeles Department of Building and Safety which has subsequently authorized high-rise construction to proceed on the site.

Leighton therefore concludes on the basis of data presented in our report (Leighton, 2012a) and the report prepared by Feffer Geological Consulting and Geocon West Inc (2012) that no active fault exists between borings T4-B10 and CB-13 within the depths explored nor within the depths of exploration of the 10000 Santa Monica Blvd. site.

California Geological Survey Comment: ***The Consultant should evaluate and discuss the potential for faulting between borings CB-3 and CB-4:***

Leighton Response*:* The horizontal distance between borings CB-3 and CB-4 (Plate 1) is approximately 130-feet. CB-3 is located at Station 0-22 in Fault Trench FT-1, a trench that is agreed to show no evidence of faulting. Fault trench FT-3 was excavated with significant overlap of FT-1 beginning at Station 0+00 (FT-1) and trending east to the intersection of Heath Avenue (Plate 1). This leaves approximately 60 feet with no physical trench exposures of sediments other than those recovered in the core borings CB-3 and CB-4 under Heath Avenue.

Parsons Brinckerhoff (2012) argues that there is a fault directly underlying Heath Avenue. However, the mere presence of a gap in the trenching is

insufficient to presume the presence of faulting, especially where there is other evidence that contradicts the presence of faulting. The lineament identified in the aerial photo review (Figures E-8 and E-10, 1930's) is a dirt road as evidenced in Figure E-9 (early 1920's) along the approximate future location of Heath Avenue. This lineament was covered by the fault trench FT-3 exposure, a trench that shows no evidence of Holocene faulting.

California Geological Survey reviewers (May, 2012), expressed concern that differences in elevation of marker beds observed in Leighton Consulting, Inc. borings are suggestive of faulting.

There are elevation differences in the units observed in the continuous core borings CB-1, CB-2 and CB-3. The contact between Qsp_1 and Qsp_2 drops 7 feet between CB-1 and CB-3. However, Trench FT-1 is located above these units and there are no faults in FT-1. Similarly the contact between Qsp_1 and Qsp_2 drops 7.5 feet between CB-5 and CB-7. No evidence of faulting is observed in Trench FT-2 above these units (Plate 2, this report).

Leighton Consulting, Inc. agrees that the units between CB-3 and CB-4 show a slight dip to the east of approximately 1-2°, but note that this is consistent with other lengths of this transect where no faults were found. This dip is also consistent with the measured 1-2° easterly and northerly dip shown in Section A-A' and C-C' and the calculated strike and dip of the underlying San Pedro Formation as N71°W, 2°N. Furthermore, this is the same strike and dip as the overlying Qoaf deposits as seen in FT-2.

Should there be an active Holocene fault under Heath Avenue, as Parsons Brinckerhoff (2012) suggests, then there should be a change to the highly consistent stratigraphic layering between CB-3 and CB-4. A fault requires offset to be called a fault, and even a pure strike slip fault would show some offset even in gently dipping sediments. Indeed, the continuity of the geologic section and its consistently gentle east dip on both sides of CB-3 and CB-4 requires that there <u>not</u> be a fault there. It is our opinion, that the best geologic interpretation of the data is that there is no fault between CB-3 and CB-4. Instead gently dipping sediments are present.

While the trench in 10000 Santa Monica does not specifically cross the inferred Heath Ave fault of Parsons Brinckerhoff (2011b, 2012), it does excavate to within only a few feet from its inferred projection, and there is no increase in fracturing, or change in dip to indicate that a Holocene fault would be nearby. Instead, as on the BHHS campus, gently dipping mid-Pleistocene sediments are present.

California Geological Survey Comment: ***The Consultant should evaluate and discuss the potential for faulting between borings CB-8 and CB-9:***

Leighton Response: California Geological Survey reviewers indicate that within the vicinity of Station 2+20 in Fault Trench FT-2, where the paleosol peds display inclinations of approximately 21° from horizontal, that an elevation difference of three to five feet between marker beds in borings CB-8 and CB-9 is compatible with interpretation of fault offset at depth.

Leighton Consulting, Inc. strongly disagrees with this interpretation. The elevation difference noted above is consistent with the gentle easterly dip of the sediments underlying the campus at depth. There are numerous examples of similar differences in elevation in other locations that clearly have an absence of faulting. For example, there is a 7.5 foot drop in elevation between Qsp_1 and Qsp_2 between CB-5 and CB-7, however no evidence of faulting is observed in Trench FT-2 above these units (Plate 2-this report). This is consistent with the 2° dip of the Qsp contact with the overlying Qoaf, and within all units and even paleosols of the Qoaf.

The area between borings CB-8 and CB-9 (Sta. 1+88 to Sta. 2+50 in FT-2) reveals the MB-1 paleosol overlain by the much younger prehistoric Benedict Canyon channel sediments as a buttress unconformity. The paleosol displayed prismatic and angular blocky peds that formed due to “shrink-swell” processes in clay rich argillic horizons. Typically, ped boundaries are normally either vertical or horizontal whereas these ped boundaries (Plate 2-FT-2) displayed inclinations up to 20° from horizontal at the slope face. California Geological Survey reviewers are concerned that this inclination is evidence of faulting. This is not our interpretation.

The MB-1 paleosol is exposed throughout most of the western extent of FT-2, where it is dipping 2-3 degrees east northeast, the same as the

Qoaf units above and below it. MB-1 is a strongly developed but gleyed Bt soil horizon with incorporated distinctive original chert chips and secondary manganese nodules, about 1.5-2 foot thick formed on a 1.5 foot thick silty light tan sand. It is probable that there was a higher original percentage of clay in the MB-1 portion of the unit. The top of the MB-1 paleosol is marked by channel incisions filled with sand and small gravels then overlain by a 1.5 foot thick distinctive light greenish grey gleyed sand. In our interpretation these two units were formed during a wet cienega period and the water perched on the MB-1 soil/clay resulting in reducing conditions for it and the overlying sand.

The MB-1 horizon is readily correlated west to boring CB-1, and was captured in CB-8 before excavation of FT-2. Where this paleosol was daylighted on the former slope, the pedogenically structured clays are still vertical to within a few feet of the slope face, where they then are increasingly rotated slopeward, up to ~20° as noted. Eroded remnants of the MB-1 clays are then also distributed down the slope as colluvium. The gleyed sand layer above MB-1 is still horizontal out to where it is terminated by the slope, as is the underlying tan sand layer. No tilting or fracturing of the lower unit is present, even though it is present under the rotated ped portion of MB-1, before it too is truncated by the channel incision. No similar folding is observed in the younger Benedict Canyon alluvium that unconformably overlies the tilted peds.

The only place that the tilted peds were observed was the northern wall of FT-2 where the original channel slope was almost 30 degrees. The southern wall of FT-2 exposed a channel wall of only about 15 degrees, and no noticeable ped rotation in MB-1 (Appendix B, Figure B-1). The ped rotation of MB-1 cannot be explained by faulting or tectonic folding because the units above and below, and east and west are not deformed. Where the slope was steep, the ped rotation is large, but where the slope was gentle, the ped rotation was not observed or was significantly reduced. The slope is clearly the controlling factor. Thus the ped rotation is best explained by downslope creep of the erosionally exposed paleosol, resulting in its plastic deformation by gravitational forces (see photographs of FT-2 in Appendix B).

The ages of the Benedict Canyon alluvial units and channel margin colluvium have been established along Soil Profile No. 3, Sta. 2+15-FT-2

(Leighton, 2012a) as being demonstrably older than 11,500 years and clearly are not faulted. Leighton Consulting, Inc. concludes that no tectonic significance should be attributed to these tilted peds or drop in elevation of marker bed units. It is our opinion that the data shows good continuity of the underlying sediments and no evidence of recent faulting.

California Geological Survey Comment: ***The Consultant should evaluate and discuss the potential for faulting between borings CB-17 and CB-18***:

Leighton Response: The Parsons Brinckerhoff fault (2011b and 2012) (Plate 1, this report) adjacent to CB-17 when projected southerly should have been intercepted by Fault Trench FT-2 between Station 0+15 and Station 0+25, No faults affecting the near surface stratigraphy were observed in this trench (Plate 2). There is an approximately 14-foot drop in elevation of the top of Qsp1 marker bed between borings CB-17 and CB-18. In contrast between borings T4-B10 to CB-17, a distance of 427 feet we note an average drop in elevation of the top of Qsp_1 of only 3 feet. We believe it to be probable that this anomalous drop in elevation of the Qsp_1 is simply erosion into the Qsp_1 contact surface. Indeed, it is perhaps more anomalous as to how planar this contact is everywhere else. The differences in elevation along Section BB' could be attributed to the backshore depositional environment of the San Pedro formation at this location. Unusually high storm waves, wind and erosion from streams leaving the highlands could have attributed to a redistribution of the sands sufficient to create these elevation differences.

There are no anomalous elevation differences within the marker units above the Qsp_1 contact. They match the trend observed between other borings we have drilled on campus with slight fall to the east. The elevation differences (drops) of marker beds in Section BB' between CB-17 and CB-18 above the Qsp_1 contact: Marker Bed 4, elevation difference of 5 feet; Paleo Surface P3 an elevation difference of 4 feet; Paleo Surface P2 an elevation difference of 7 feet; and Paleo Surface P1 an elevation difference of 5 feet. The consistently gentle dipping continuous stratigraphy of these marker beds above the San Pedro Formation do preclude the presence of an active fault as these sediment ages greatly exceed 100 ka. In addition, no faults were exposed in the eastern half of FT-2, and these sediments greatly exceed 11,000 ka.

California Geological Survey Comment: ***The Consultant should provide additional data to address the potential for strike-slip faulting at the site:***

Leighton Response: During the field visits with the California Geological Survey reviewers to observe the core samples, there was much discussion regarding the difficulty in recognizing pure strike slip faulting within the cores if the units were near horizontal. Leighton Consulting, Inc. has calculated the strike and dip of the top of the Qsp2 marker bed (Plate 1) from core borings CB-3, CB-19 and CB-26 as striking N71°W, dipping 2° northeast. The marker beds above the lower San Pedro Formation (Qsp2) are slightly modified by erosion and deposition of sediments but these also show slight dips to the east-northeast. The Parsons Brinckerhoff West Beverley Hills Lineament faults are drawn oblique to the strike of the sediments meaning that even pure strike slip would still result in a vertical separation of the strata. The core data are so consistent that we are able to correlate strata across the site with vertical resolution to within a foot or two, and at this scale, there is no geological evidence from which to interpret a fault. If there are no offsets, there are no faults.

In FT-2, Leighton Consulting, Inc. has noted apparent thickness variations in units on either side of the trench within gravel beds exposed in the older alluvium. However, channel geomorphology, laterally migrating channels, point bar, transverse bar deposits, etc. could account for thickness variations related to deposition and redistribution of sediments in a wash system. This is clearly visible in the upper FT-2 trench exposures where channels have cut down as much as 5 feet into underlying units. The overall gross stratigraphy at the site does not indicate, and indeed refutes the presence of, N-S faulting through the site. An over-interpretation of the internal fluvial stratigraphy of individual units as indicating faults is inconsistent with all the other available data.

California Geological Survey noted that its field measurements of fractures in FT-2 at Station 1+65 indicate up to 2-inches of vertical offset and thickness variations within corresponding layers on either side of these fractures which indicates lateral slip components. Leighton Consulting's interpretation of these "faults" was that they were formed by downslope movement of the outer slope face, potentially in response to strong seismic shaking. The "faults" are sub-parallel to the slope face, and lie

within the upper third of the paleoslope where seismic shaking is known to focus. Fracturing of a slope face is rarely perfectly parallel to the slope face as the extension of the rock usually forms an arc. In this way, lateral slip is a component of the slope dilation. If these were Holocene features, lateral slip should have resulted in shearing of the clays observed within the fractures, while pure extension might not have. Tectonic shearing was not observed in the microfabric analysis. Instead, the clays were observed to be translocated (not sheared) and the secondary fabric was estimated to be tens of thousands to hundreds of thousands of years old (Appendix D). Even if the fractures were a result of fault movement (instead of slope movement during seismic shaking as Leighton Consulting, Inc. believes), the fractures have been demonstrated to be pre-Holocene in age and are thus not active.

3.2.2 Comment and Response Santa Monica Fault Zone

California Geological Survey Comment**: *The Consultant should evaluate the potential for all possible faults, not just those associated with the West Beverly Hills Lineament, at the school site. Further studies should include the southeastern portion of the campus, which is not yet explored:***

Leighton Response: Leighton Consulting, Inc. has evaluated the anomalous elevation change between the top of the San Pedro Formation marker beds on Sections A & B, at Beverly Hills High School. The investigation and evaluation consisted of drilling five continuous core borings, CB-22 through CB-26 and excavation of one 125-foot long 12-15-foot deep fault trench, as shown on Plate 1 of this report. The investigation did conclude that the elevation change is due to fault offset, but that the last surface rupturing event on the fault occurred at least 100 ka, and poses no hazard or planning constraint to the school. The southern area of the campus remains unexplored at this time but we see nothing to indicate that Holocene-age faults are present, and question the necessity to do any additional fault studies.

Borings CB-22 to CB-26

The first task of the supplemental investigation was to confirm whether the Qsp_1 elevation change between CB-1 and CB-13 was gradual or abrupt.

CB-22 confirmed the gentle 1-2° dip, and CB-25 and CB-26 continued it to the north. But CB-23 and CB-24 showed abrupt downdropping of the Qsp_1 contact and several units within the Qoaf. Attempts to correlate the uppermost Qoaf units across CB-26, CB-23, and CB-24 were unconvincing. A trench was recommended and FT-5 was excavated to cover the zone between CB-23 and CB-26.

Fault Trench FT-5

Trench FT-5 was excavated along the western boundary of the High School, west of Buildings A and L (Plate 1). This trench provided north south coverage within the zone of faulting interpreted from differences in elevation of the top of the San Pedro Formation in core borings CB-23, CB-24 and CB-26. Fault Trench FT-5 was 125 feet in length and about 12-15 feet in depth (Plate 5). The trench exposed a concrete retaining wall footing underlain by a thin veneer of fill consisting of locally derived materials. Exposures in the trench walls consisted of Quaternary alluvium of the Benedict Canyon Drainage-Moreno Creek (Qal) and of older alluvial fan deposits (Qoaf) capped by Older Benedict Canyon Wash Deposits (Qal_{BCW}) (Plate 5). A well-developed argillic Bt soil horizon was present under the artificial fill in the north end of the trench (Unit 2, Plate 5), but it appears the soil profile had been removed from the south end of the trench around Station 0+45 due to construction of the retaining wall and footing. This buried paleosol was assigned a minimum development age of 100ka (Earth Consultants International, Appendix C). Based on Leighton Consulting Inc.'s site visit to the 10000 Santa Monica Boulevard fault trench, review of the Geocon/Feffer and IRSL sediment dating results, Earth Consultants International and Leighton Consulting made the following correlations based upon depositional characteristics and soil ages:

Geologic Units		Soils for Age Estimation				Best Age Estimate Based on ECl/Helms work	OSL Age Results ka
Leighton	Feffer & Geocon	ECl	Age (ka)	Helms	Age (ka)		
Unit 1	Unit 1	FT-2 Qal1-3	40	SP3, SS + BS1	30-60	30-60	52.3-66.3 (at bottom of Unit 1 in T-5)
	Unit 2			SP3, BS2-4	68-135	68-135	
Unit 2	Unit 4 Upper	FT-5 Soil1	24-60	SP1, SS	30-70	54-130	
Unit 3	Unit 4 Lower	FT-5 Soil2	26-80	SP2, SS+BS1	30-70	80-200	
Unit 3a	Unit 5	FT-5 Soil3	16-69	SP1, BS1-2; SP2 BS2-3	23-45	96-245	110-144
Unit 4	Unit 6	Not described		SP1, BS3; SP2, BS4	15-30	111-275	
Unit 5	Unit 7	No soils preserved		SP3, BS5	15-30	126-305	100-128
Unit 6-Qoaf/?	Not Observed	CB-26, Soil1	17-30			143-335	121-159 (combining 2 samples)

Table from Earth Consultants International Soil Descriptions and Age Estimates, Leighton Fault Trench FT-5, Beverly Hills High School, 241 S. Moreno Drive, Beverly Hills, California in Appendix C this report.

Several faults were observed in the area of Stations 0+35 to 0+55 and are expressed as an upwardly flowering and stepping zone of faults and fractures about 20 feet wide and having a cumulative ± 3 feet of north side down displacement, and some undetermined lateral offset (Plate 5 and Figures B-9 through B-15). Based on upward terminations, it is possible to interpret that at least two, maybe three events occurred within Units 2 through 5 as some of the faults are vertically truncated by progressively younger sediments within the old alluvial package. The faults have various strikes ranging from N35°E to N43°E and dipping between 65° and 70° north.

The fault at Station 0+51.2 on the east wall appears to affect the overlying Pleistocene age colluvium (Unit 2, Plate 5 and Figures B-13 and B-14). This is evidenced only by a series of discontinuous gleyed cracks above the fault trace that all contain a dense matrix with no orientation of fabric or sheared grains. At the bottom of the trench the infilling clay material in

the fault contained intact laminated clay linings, plugging pores between sand grains and lining tubular pores (Appendix D). These clay linings were mostly 0.03mm thick but some were up to 0.3mm thick which can be attributed to infiltrating water carrying clay particles in suspension down along the fault compared to the regolith material on either side (Appendix D). It is the Leighton Consulting, Inc. opinion that the fault at Station 0+51.2, traceable from the bottom of the trench up to or just slightly below a siltstone rock clast (Figure B-10) line terminates normal vertical displacement at approximately 4.5 feet below current ground surface (Plate 5), signifying the last rupture event. The gleyed cracks above the fault are not related to the fault but rather a phenomena of shaking and slope creep (Figures B-7 and B-8). Even if this fault does offset the base of the colluvium, it loses expression within the deposit interpreted as lack of renewal of the displacements and progressive destruction of the old fault fabric by weathering and time (Figures B-10 and B-14). The upward flowering of the fault, combined with the clast rotation, diminished offsets, and distributed shatter (dilation) of the units is interpreted as a fault rupture to the paleosurface resulting in a surface moletrack. That event occurred when Unit 2 was the ground surface but before the development of the strong Bt that caps it, because the fault surfaces are only readily visible within the C horizon beneath that Bt. The Unit 2 soils are in turn overlain by a thick sequence of younger deposits (Unit 1 in FT-5 and Units 1 & 2 in the 10000 Santa Monica trench) which are cumulatively 30-120 ka. Thus, the last surface rupturing event on the FT-5 faults is 30-120 ka plus the development age of the Unit 2 soil (30-70 ka), or 60-190 ka.

There are also numerous greenish gray semi-vertical "fractures" similar to those identified in Fault Trench FT-2 located within and above this zone of faulting and even more frequent throughout Units 3 and 4 indicating the cracks and fractures are not specific to the fault location (Figures B-7 through B-17). Some of these fractures are vertically truncated upward and downwards (Figure B-7 through B-17). They also occur in a similar location on the paleoslope of the alluvial channel as did the FT-2 fractures and are oriented perpendicular to the FT-2 slope. Based on observation, it is Leighton Consulting, Inc. opinion that the fractures are surficial phenomena associated with slope cracking and movement during strong seismic shaking. Similar fractures were observed within multiple units in the 10000 Santa Monica trenches (Geocon/Feffer, 2012). None of those

fractures exhibited offset across them, and they were assigned a non-tectonic origin.

Leighton Consulting and Dr. Robert Graham of the University of California Riverside sampled the clay fabric of the gleyed faults (Figure B-13) and cracks at multiple locations (Plate 5) in consultation with California Geological Survey during site visits to view the trench exposure. Subsequent translocation clay infilling of vertical fractures have been color enhanced by redox reactions of surface water infiltration. Additionally, as documented by the microfabric analysis (Appendix D) the fractures are demonstrably not sheared and are on the order of tens of thousands of years old. The locations of the samples are shown on Plate 5, labeled as 0+48.9, 0+62, etc.

4.0 CONCLUSIONS

It is Leighton Consulting Inc.'s opinion that no active faults associated with the West Beverly Hills Lineament or Santa Monica Fault Zone are present on the campus of Beverly Hills High School, associated buildings and nearby district structures as encompassed in the area shown on Plate 1 of this report. This conclusion is based upon our initial investigation (Leighton Consulting, 2012a) and additional review of the Leighton Consulting, Inc. (2012a) core boring interpretations jointly by the California Geological Survey, Leighton Consulting, Inc., Earth Consultants International, and AMEC. It is also based upon the drilling of 5 additional core borings (CB-22 to CB-26) and the excavation of fault trench FT-5 along the western property line of the Beverly Hills High School. Specifically, Leighton Consulting Inc. has documented the presence of sediments and soils, dated by a variety of relative and absolute techniques to at least tens of thousands to hundreds of thousands of years old, being unaffected by younger fault offsets.

Parsons Brinckerhoff (2011b) presented a map of "well-understood" active West Beverly Hills Lineament faults that intersected the Beverly Hills High School campus. Parsons Brinckerhoff (2012) re-located these faults to fit gaps in our trench coverage and further mapped a new wide zone of faulting along the western edge of the campus on the order of 550 feet wide in response to our initial data (Leighton, 2012a). We found no evidence of active faulting and our findings refute the presence of these active faults.

The five Leighton Consulting Inc.'s Fault Trenches and the fault trench excavated on the north side of Durant Street by others at 10000 Santa Monica Boulevard (Geocon/Feffer, 2012) have directly intersected the trend of the originally mapped (Parsons Brinckerhoff 2011b) and newly mapped (Parsons Brinckerhoff 2012) Parsons Brinckerhoff faults. Leighton Consulting, Inc.'s on campus and Feffer/GeoCon's off-campus trenches did not encounter any of the West Beverly Hills Fault strands that were mapped and "well understood" by Parsons Brinckerhoff. The subsurface details of both investigations reveal no evidence of West Beverly Hills Lineament faulting in the study area shown on Plate 1.

Two fault strands were encountered on the Beverly Hills High School campus. The minor "fault" identified in Fault Trench FT-3, appears to be more likely related to seismically induced sediment failure than to tectonic offset, but in any case it has been shown to have last moved in excess of 100,000 years ago. The second fault, encountered in Fault Trench FT-5 is likely an eastward abandoned strand of the Santa Monica Fault Zone that was not considered to be active by Parsons. We concur with

this opinion and have shown here that it has been inactive for over 100,000 years. Leighton Consulting, Inc. has been unable to independently replicate the Parsons Brinckerhoff findings despite extensive investigation and multiple reviews of the Leighton Consulting, Inc. results by the California Geological Survey and other licensed professional geologists. It is our professional opinion that the West Beverly Hills Lineament faults mapped by Parsons Brinckerhoff (Plate 1), Figure 2 and 3) do not exist on the Beverly Hills High School campus.

Leighton Consulting, Inc. again states that it has found no evidence of active faulting at Beverly Hills High School, and that based on this study no fault-related structural setbacks associated with the West Beverly Hills Lineament or Santa Monica Fault Zone are required for Beverly Hills High School in the area shown on Plate 1 of this report.

Significant findings of the Leighton Consulting, Inc. investigation include:

- There is direct geologic evidence that there has been no faulting associated with the West Beverly Hills Lineament at Beverly Hills High School in the area delineated on Plate 1 for at least 100,000 years and perhaps more than 500,000 years.
- There is direct geologic evidence to refute the north-south West Beverly Hills Lineament faults mapped by Parsons Brinckerhoff through Beverly Hills High School and subsequently realigned by Parsons Brinckerhoff upon consideration of the data presented in the Leighton Consulting, Inc. April 22, 2012 report. Fault trenches specifically excavated across the surface trace of the Parsons Brinkerhoff faults by Leighton Consulting Inc. and others (Geocon/Feffer, 2012) (Plate 1) did not encounter evidence of active faulting.
- There is direct geologic evidence that the slope below Beverly Hills High School was created by lateral erosion from Benedict Canyon Wash more than 100,000 years ago and no evidence to suggest an active fault origin for this escarpment at the location of Beverly Hills High School.
- The faults that we did find in FT-5 exhibit as normal separation faults with some component of strike slip within the uppermost 100-300ka alluvial sediments. There is 2-3 feet of apparent cumulative vertical separation (normal north side down) occurring in a zone approximately 20-30 feet wide dipping to the north at 60 and 70 degrees.
- The faults are nearly perpendicular to the trench, though they are somewhat difficult to correlate across. Some faults are clearly vertically truncated by alluvial deposits

(Units 3, 4 and 5, Plate 5), some by colluvium (Unit 2, Plate 5). One the faults may affect the colluvium that is overlying the alluvium. The fault that may affect the base of the colluvium (Unit 2, Plate 5) loses expression within the deposit which we have interpreted as a lack of renewal of the displacements and progressive destruction of the old fault fabric by pedogenic weathering and time.

- There are numerous greenish gray semi-vertical "fractures" in Fault Trench F-5 similar to those encountered in Fault Trench FT-2 (and in the Geocon/Feffer trench). Some of these fractures are vertically truncated upward and downwards. The presence of strongly oriented illuviation argillans in the infilling material and intact weathered feldspar grains suggests stability since these fragile features formed, which requires tens of thousands of years to form.

All trenches excavated during the Leighton Consulting, Inc. exploration were observed by Dr. Miles Kenney of Kenney GeoScience, by Mr. Eldon Gath and Mrs. Tania Gonzalez with Earth Consultants International and by Mr. Jerry Treiman and Mr. Brian Olson with the California Geological Survey. Additional review of trenches FT-2 and FT-5 was provided by Dr. Robert Graham of the University of California Riverside and Dr. Edward Rhodes of the Department of Earth and Space Sciences of the University of California Los Angeles. Additional review of trenches FT-1, FT-2, FT-3 and FT-4 was provided by Dr. Glen Borchardt of Soil Tectonics, Inc.

Geotechnical studies should be conducted for future planned improvements on the campus as required to meet California Building Code (CBC), Division of the State Architect (DSA) and California Geological Survey requirements.

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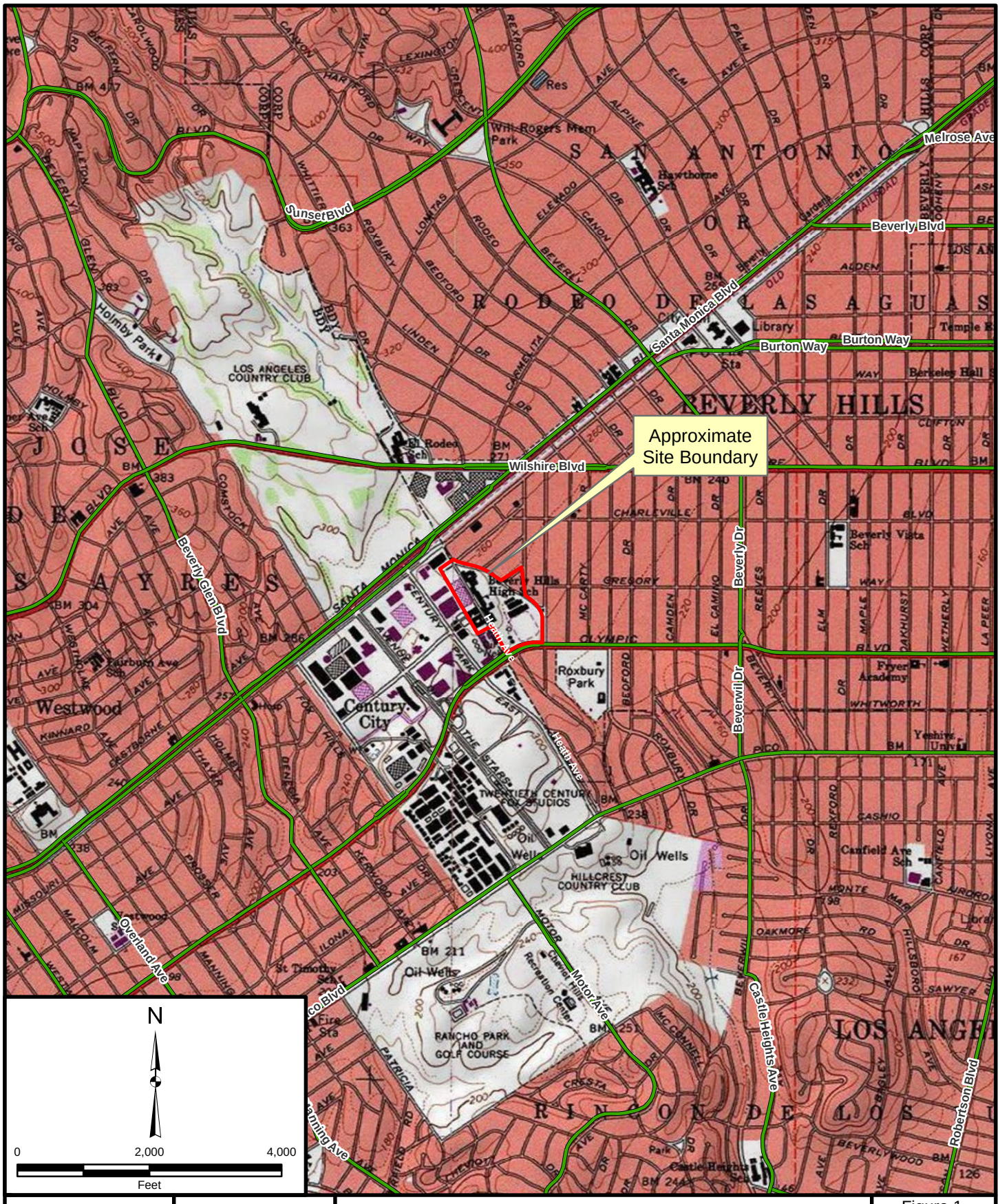
Aerial Photographs Reviewed

Date	Flight No.	Frame Nos.	Approx. Scale	Source
No date (early 1920's)	n/a	7086	n/a (oblique)	Spence Air Photos, Inc.
No date (early 1920's)	n/a	4232	n/a (oblique)	Spence Air Photos, Inc.
12/10/1926	n/a	E-965	n/a (oblique)	Spence Air Photos, Inc.
5/9/1927	n/a	E-1252	n/a (oblique)	Spence Air Photos, Inc.
11/1/1927	n/a	E-1643	n/a (oblique)	Spence Air Photos, Inc.
10/31/1928	n/a	E-2224	n/a (oblique)	Spence Air Photos, Inc.
11/4/1929	n/a	O-326	n/a (oblique)	Fairchild Aerial Surveys
2/17/1930	n/a	E-4064	n/a (oblique)	Spence Air Photos, Inc.
8/23/1931	n/a	E-46, F-57	1"=540'	Spence Air Photos, Inc.
10/10/1932	n/a	E-3782	n/a (oblique)	Spence Air Photos, Inc.
5/22/1938	AXJ	26-19, 26-20, 26-22	1:20,000	USDA
3/5/1939	n/a	O-6100	n/a (oblique)	Fairchild Aerial Surveys
11/19/1953	AXJ-14K	62, 63	1:20,000	USDA
5/8/1956	n/a	E-23A-99	n/a (oblique)	Spence Air Photos, Inc.



Project: 603314-008	Eng/Geol: TCB/JAR
Scale: 1 " = 2,000 '	Date: December, 2012

Base Map: USGS Topographic Maps served by Esri Basemaps Resource Center, 2012

Thematic Info: Leighton

Author: (jpflueger)

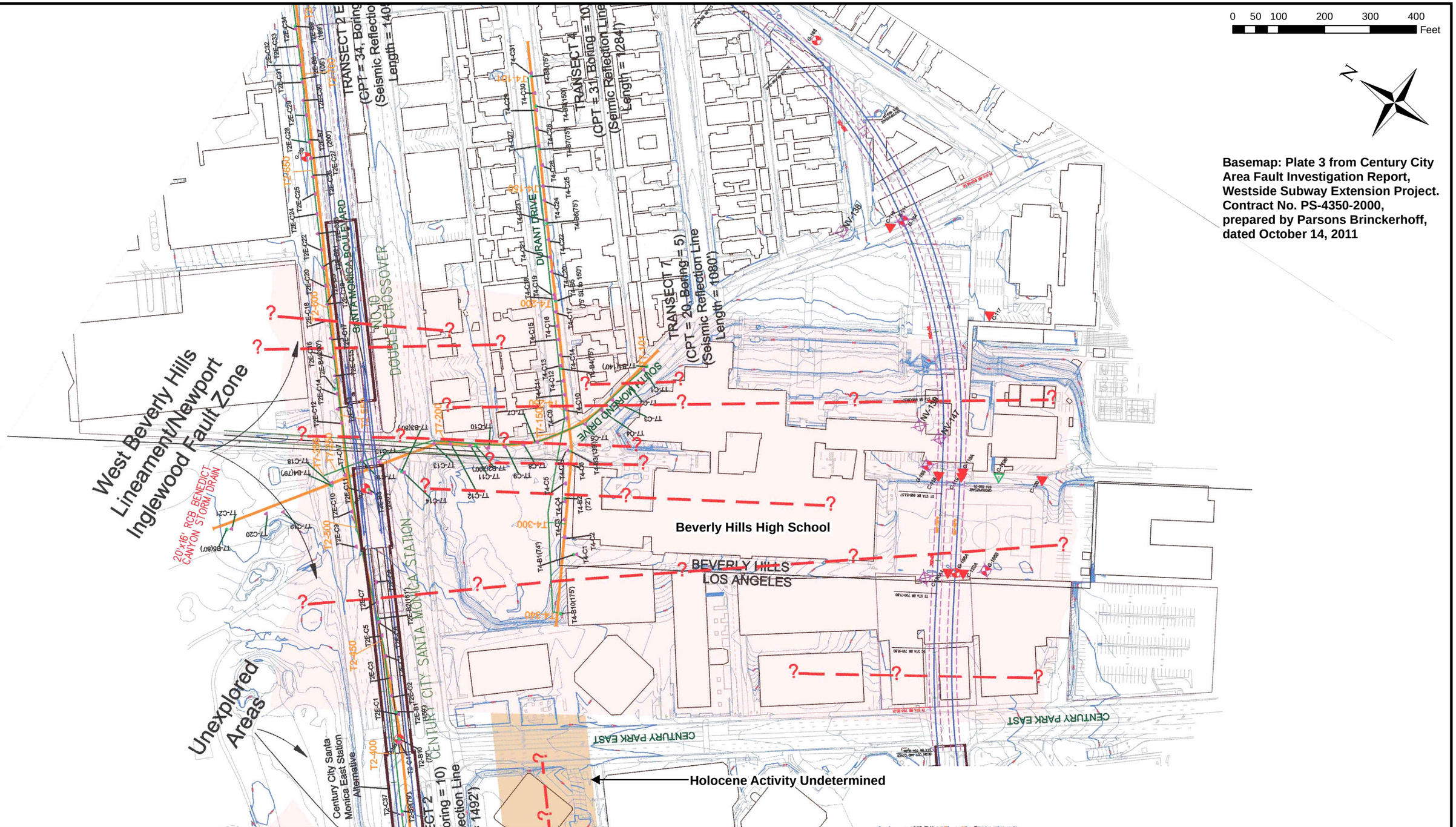
SITE LOCATION MAP

Beverly Hills High School
241 South Moreno Drive
Beverly Hills, California

Figure 1

Leighton

Map Saved as P:\Drafting\603314\008\GIS\Figure1_SiteLocationMap.mxd on 12/20/2012 1:39:47 PM

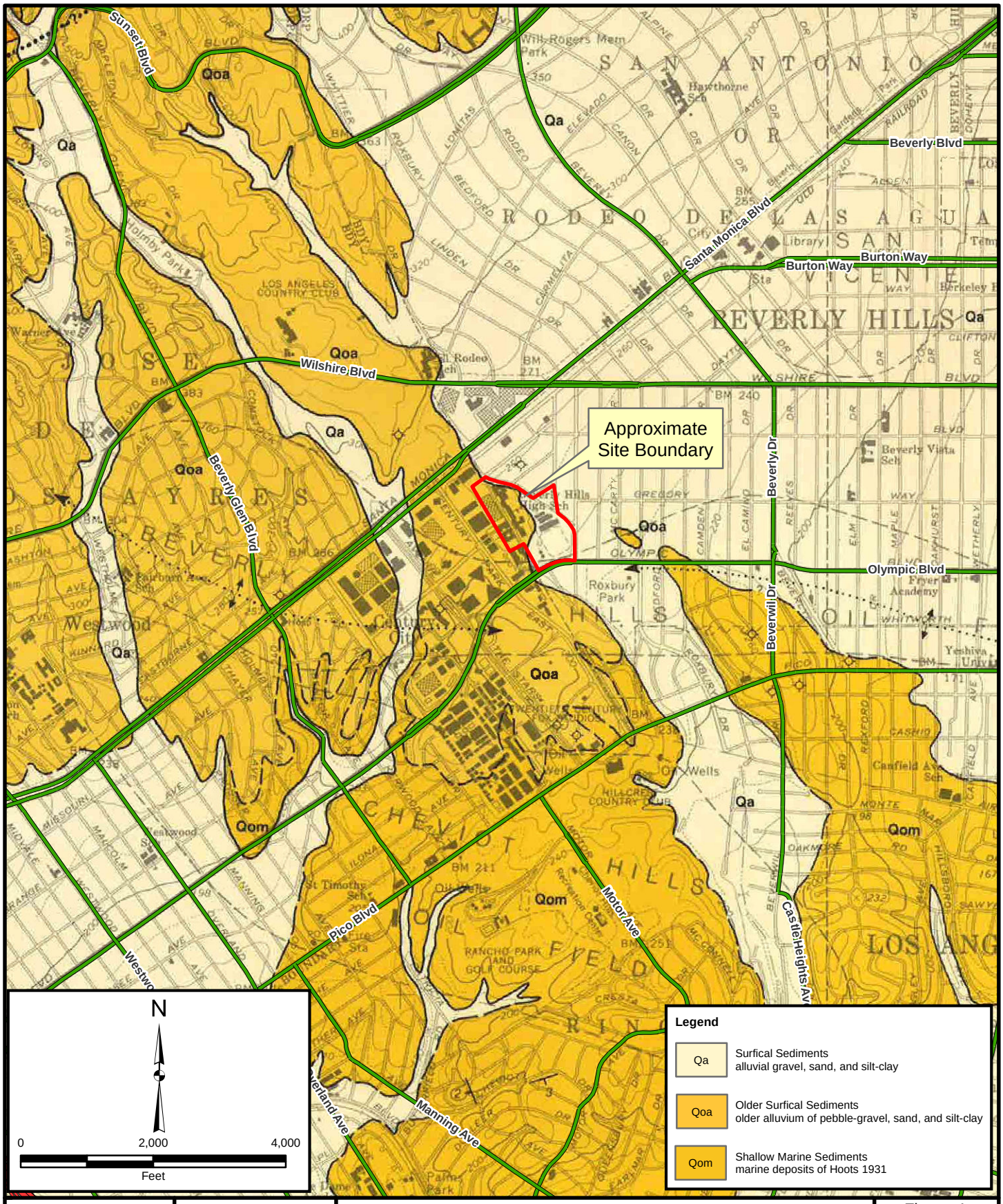


Project: 603314-008	Eng/Geol: TCB/JAR	**Parsons Brinckerhoff Fault Exploration Plan** **Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure 2
Date: December, 2012	Scale: 1 " = 200 '		

P:\Drafting\603314\008\GIS\Figure2.mxd

Project: 603314-008	Eng/Geol: TCB/JAR	**Updated Parsons Brinckerhoff Fault Exploration Plan** **Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure 3
Date: December, 2012	Scale: 1 " = 200 '		

P:\Drafting\603314\008\GIS\Figure2.mxd



Project: 603314-008	Eng/Geol: TCB/JAR
Scale: 1 " = 2,000 '	Date: December, 2012

Geology: Geologic Map of the Beverly Hills And Van Nuys (South 1/2) Quadrangles, Los Angeles County, California by Thomas W. Dibblee, Jr., 1991.

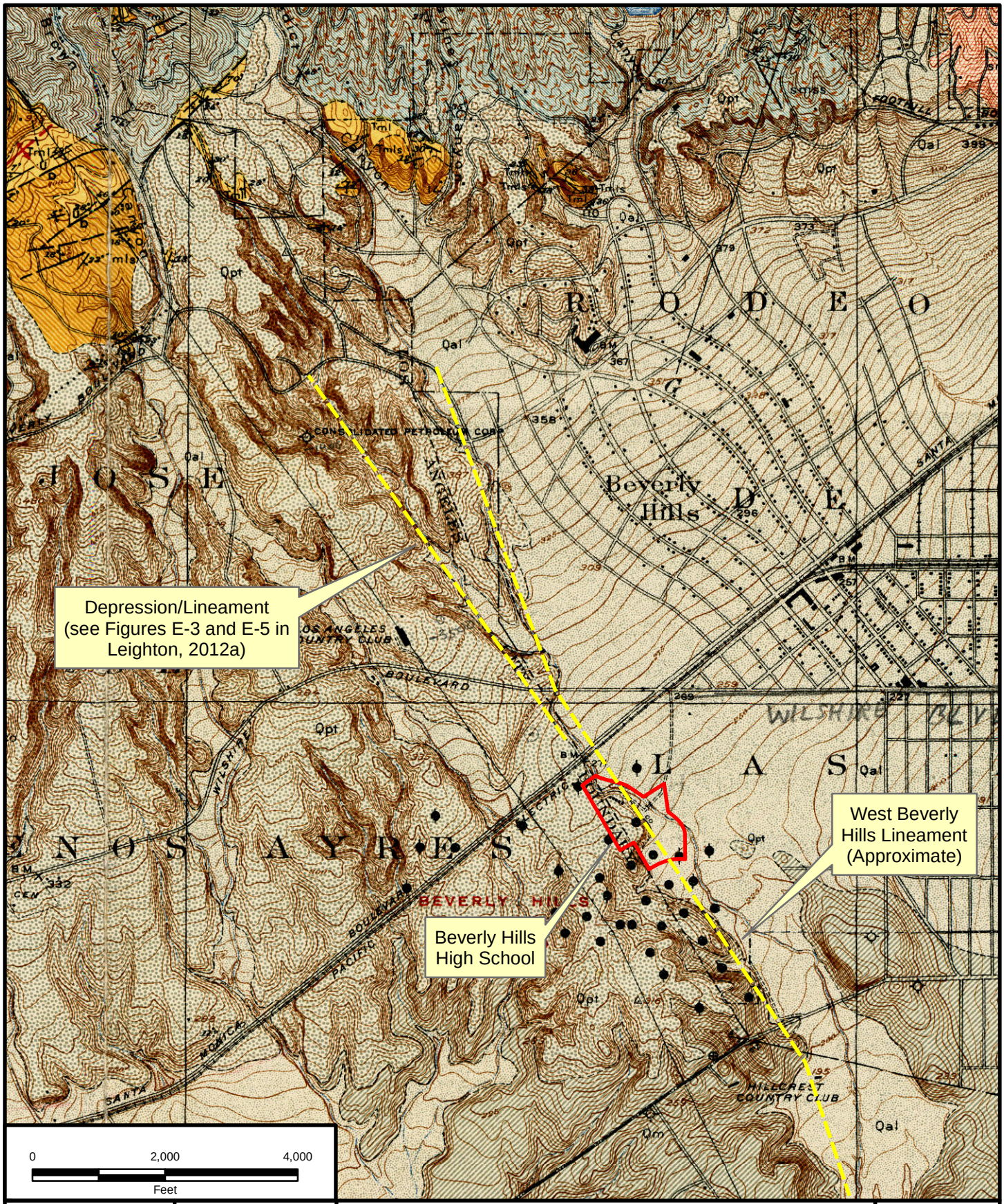
REGIONAL GEOLOGIC MAP

Beverly Hills High School
241 South Moreno Drive
Beverly Hills, California

Figure 4

Leighton

Map Saved as P:\Drafting\603314\008\GIS\Figure4_RegionalGeologicMap.mxd on 11/19/2012 3:20:48 PM Author: (jpflueger)



Project: 603314-008	Eng/Geol: TCB/JAR
Scale: 1 " = 2,000 '	Date: December, 2012

Base Map: Hoots, H.W., 1931
Thematic Info: Leighton
Author: (jpflueger)

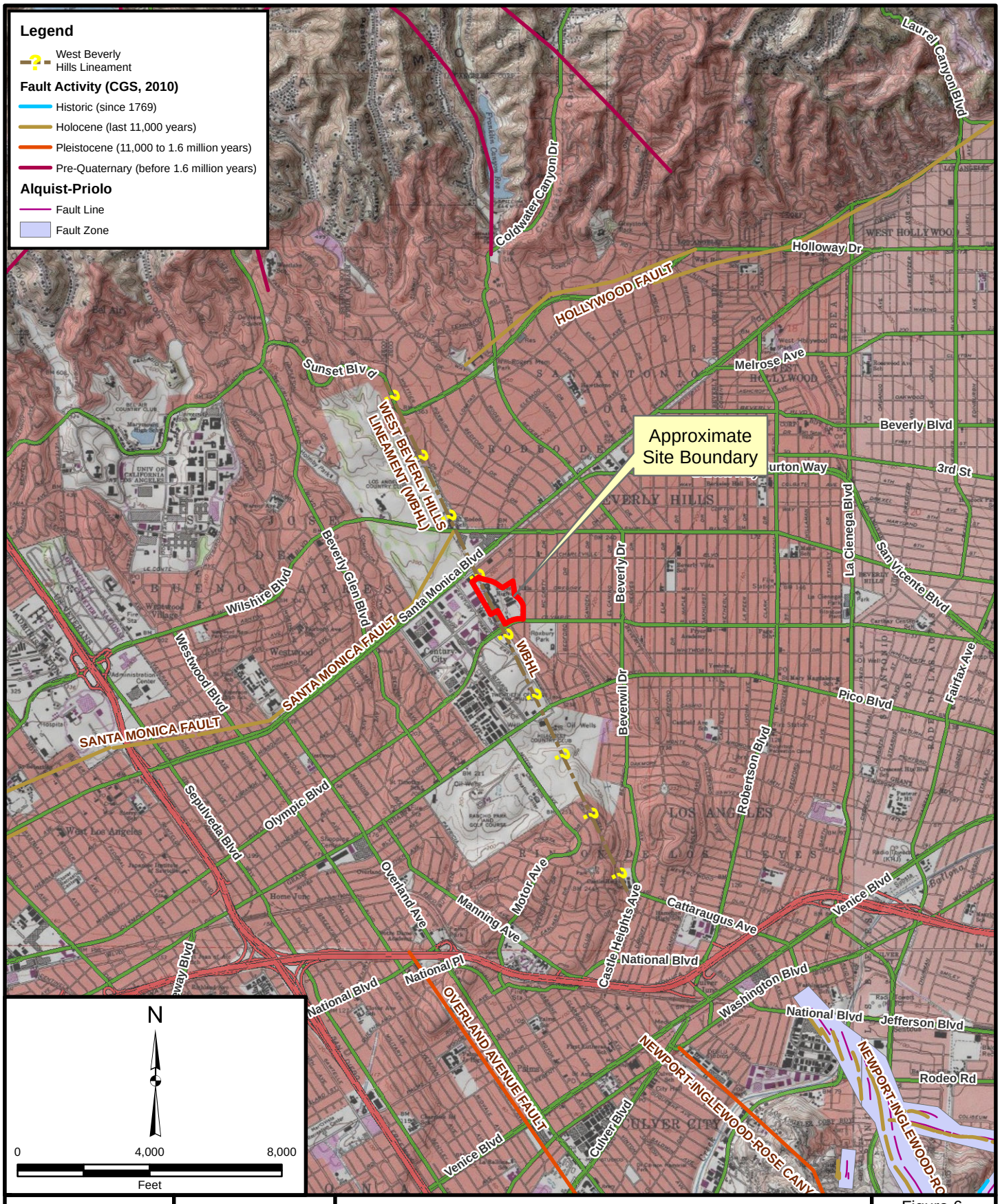
REGIONAL GEOLOGIC MAP (Hoots, 1931)

Beverly Hills High School
241 South Moreno Drive
Beverly Hills, California

Figure 5

Leighton

Map Saved as P:\Drafting\603314\008\GIS\Figure5_RegionalGeologicHootsMap.mxd on 11/19/2012 3:10:39 PM



Project: 603314-008	Eng/Geol: TCB/JAR
Scale: 1 " = 4,000 '	Date: December, 2012

Base Map: USGS Topographic Maps served by Esri Basemaps Resource Center, 2012
Quaternary and Younger Faults in GIS format from California Fault Activity Map served by California Geological Survey, 2010.
Alquist-Priolo Fault Zones served by California Geological Survey, 2002.

REGIONAL FAULT MAP

Beverly Hills High School
241 South Moreno Drive
Beverly Hills, California

Figure 6

Leighton

Map Saved as P:\Drafting\603314\008\GIS\Figure6_RegionalFaultMap.mxd on 11/19/2012 3:26:04 PM Author: (jpflueger)

APPENDIX A

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 1**
PAGE 1 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/15/11	ATD	▽ 42.6				INCLINED	Bit (Feet)	
12/15/11	ATD	▼ 102				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 6**
ELEVATION:	**286 Feet**
DATE START:	**12/15/2011**
DATE FINISH:	**12/15/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
286 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac)
						Artificial fill(Af):
						@0' to 1': Silty SAND (SM) with trace of clay, mottled dark brown, porous fine sand, trace pebbles-rounded
	0-5	Box 1	4.8	96		**Quaternary older alluvial and fluvial deposits (Qoaf):**
						@1' to 2.5': Silty Sandy CLAY (CL-ML), mottled dark brown, fine sand, moderately hard
						@2.5' to 4.75': Silty SAND (SM), mottled dark brown, porous, fine sand, some clay, weakly developed blocky structure
281 / 5						@4.75' to 7.35': No Recovery
						@6': Depth of Fault Trench FT-1 @Station 1+08
	5-10	Box 1	2.7	54		@7.35' to 8.3': With fines, elongated, flattened black slaty gravel (Jsm)
						@8.3' to 10': Silty Sandy CLAY (CL-ML) with gravel, mottled bluish gray light tan to mild orange brown, moist, thinly bedded to laminated bluish gray clay and fine sandy tan micaceous silt, to chaotic assemblage of silt, clay, sand and fine subrounded gravel, coarse, white decomposed granitic sand with subrounded flattened slaty gravel (Jsm)
276 / 10						@10' to 12.1': No Recovery
	10-15	Box 1	2.9	58		@12.1' to 13.4': Gravelly SAND (SP_g) with clay, massive, dark orange brown, fine to coarse sand, fine to coarse subangular to subrounded gravel, some small cobbles to 4-inches, chaotic assemblage, predominantly black slaty gravel (Jsm), with hard clayey matrix
						@13.4' to 15': Thinly bedded, mottled bluish gray laminated clay with tan fine grained silty sand with coarse sand sized quartz and flattened black slaty gravel, with thin beds of fine to medium grained silty clayey sand, abrupt contact @14.7' to 14.9'-(SC-SM)
271 / 15						@15' to 16.8': No Recovery
	15-20	Box 2	3.2	64		@16.8' to 18.8': Gravelly SAND (SP_g) with clay, massive, dark brown, fine to coarse sand, fine to coarse gravel, gravel subrounded to subangular, flattened gravel-black slate with subrounded granite fine gravel and quartz, unconsolidated, loose, gradational
						@18.8' to 19.7': Chaotic (debris) assemblage of Clayey GRAVEL (GC), hard, mottled olive brown, bluish gray to black to dark red to orange brown, clast supported, composed of SILTSTONE, granitic, sandstone, black slaty gravel in very fine grained sandy clay interstices
266 / 20						@19.7' to 22.8': Clayey GRAVEL (GC), massive, orange brown, moist, fine to coarse sand, fine to coarse subrounded gravel, fine to coarse clayey sand matrix, moderately indurated
	20-25	Box 2	5	100		@22.8' to 25': Sandy CLAY (CL_s), mottled, orange brown to light gray, fine grained sand with occasional fine subrounded gravel, gleying from medium to light gray clayey pockets, massive to very thin beds bound by dark brown reddish clay laminae, occasional bluish gray thin beds of clayey gravel, fine,
261 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 1**
PAGE 2 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/15/11	ATD	▽ 42.6				INCLINED	Bit (Feet)	
12/15/11	ATD	▼ 102				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 6**
ELEVATION: **286 Feet**
DATE START: **12/15/2011**
DATE FINISH: **12/15/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
261 25						elongated gravel with coarse sand grains (slaty and quartz-granite), contact abrupt with clayey gravel, silt and clay transition gradational
						@25' to 26.8': No Recovery
	25-30	Box 2	3.2	64		@26.8' to 27': Sandy Clayey SILT (ML), brown, moist, soft, fine grained, micaceous, grades to
						@27' to 30': Silty Sandy CLAY (CL-ML), reddish brown, trace fine gravel-black slate, moderately developed soil horizon-blocky structure clay film and Mn on soil faces, moderately indurated, firm rounded pebbly gravel, predominantly fine grained sand, trace coarse sand, Marker Bed 1: Paleosol
256 30						@30' to 30.3': No Recovery (likely auger dust)
						@30.3' to 31.9': Silty Sandy CLAY (CL-ML), olive brown, trace fine gravel, well developed soil horizon, blocky structure with clay films, lined pores-voids from 5 to 9mm, gleyed, lined with Mn,
	30-35	Box 3	4.6	92		@31.9' to 35': Gravelly CLAY (CL_g), hard, orange brown, moist, massive, coarse sand to fine granitic gravel and black slate (Jsm) @32.5'
251 35						@35' to 35.6': No Recovery
						@35.6' to 37.4': Silty Clayey SAND (SM-SC) with gravel, orange brown, moist, poorly indurated, fine to coarse sand, fine to coarse rounded gravel, grades to
	35-40	Box 3	4.4	88		@37.4' to 40': Sandy CLAY (CL_s) with some gravel, massive, well indurated-hard, orange brown, moist, fine grained sand, trace coarse sand, fine slaty gravel, occassional granitic clast, core breaks along very thinly bedded sand
246 40						@40' to 40.7': No Recovery
						@40.7' to 42.6': Silty CLAY (CL), olive gray to reddish brown, very moist, well developed blocky structure, minor clay film and Mn on soil faces, gleying of soil faces, mottled light gray to red brown on soil faces, trace fine slaty gravel, micaceous, abrupt contact
▽	40-45	Box 3	4.3	86		@42.6': Perched groundwater encountered
						@42.6' to 42.8': Thin bed of fine grained, wet, SAND (SP), dark brown, with coarse sand, sized black subrounded slaty sand
						@42.8' to 45': Sandy CLAY (CL_s), hard, mottled light gray to orange brown, fine sand, trace coarse grained sand, some Mn, massive, gradational thin zones 1 to 2 inches, higher proportion of coarse sand and pebbly fine gravel
241 45						
▽						@45' to 45.9': No Recovery
▽						@45.9': Perched groundwater encountered
	45-50	Box 4	4.1	82		@45.9' to 46.7': Sandy CLAY (CL_s), hard, mottled olive brown, to orange brown, predominantly fine sand as thin laminae with trace coarse sand in matrix, trace fine gravel, moderate Mn development on soil faces
						@46.7': Perched groundwater encountered
						@46.7': Silty Clayey SAND (SM-SC), mottled orange brown to gray brown, soft, wet, fine grained
236 ▽ 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 1**
PAGE 3 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/15/11	ATD	▽ 42.6				INCLINED	Bit (Feet)	
12/15/11	ATD	▼ 102				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 6**
ELEVATION:	**286 Feet**
DATE START:	**12/15/2011**
DATE FINISH:	**12/15/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
236 50	50-55	Box 4	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @47.5' to 50': Sandy Silty CLAY (CL-ML), hard, mottled olive brown to orange reddish brown, moist, micaceous, laminated dark reddish brown clay to thinly bedded to massive silty clay, gleying along poorly developed blocky structure, mottled light gray to orange brown silty clay within beds @50': Perched groundwater encountered @50' to 50.4': SAND (SP) with gravel, soft, wet, brown, loose, fine to coarse sand, fine subrounded gravel @50.4' to 51.1': Sandy CLAY (CL_s), hard, mottled olive brown to reddish brown, predominantely fine sand, trace coarse subrounded black slaty sand, moderate Mn in matrix, moist
231 55	55-60	Box 4	5	100		@51.1': Perched groundwater encountered @51.1' to 51.5': SAND (SP), trace clay, dark brown to reddish brown, wet, fine to coarse sand, trace fine subrounded gravel, clay in matrix @51.5' to 53.3': Sandy CLAY (CL_s), hard, mottled olive brown to reddish brown, moist, fine sand, trace Mn in matrix @53.3' to 53.6': Sandy SILT (ML), soft, olive brown, very moist, very fine grained sand, micaceous, very moist @53.6' to 55': Sandy Silty CLAY (CL-ML), reddish brown, moderately developed blocky soil fracture, gleying along soil faces and occasional void, void linings are light gray, overall mass dark reddish brown, weak clay lining on soil faces, moist @53.7': Measured perched Groundwater-rose to 52.7' bgs in 2 min 20 sec, >51.7' in 6 min 57 sec, 50.7' in 14 min 20 sec
226 60	60-65	Box 5	5	100		@55': Perched groundwater encountered @55' to 60': Sandy CLAY (CL_s), mottled, light gray to orange brown to reddish brown, well developed blocky soil fracture, clay lining on soil faces, some voids gleying along pore boundary with $CaCO_3$ filled voids and nodules, voids near vertical in soil mass, very moist to wet on soil faces @60' to 60.2': Perched groundwater encountered @60.2' to 65': Silty Sandy CLAY (CL-ML), hard, reddish brown to olive brown, massive, gradational changes in amount of sand and silt moderately developed blocky soil fracture, some clay lining, very moist to wet on soil faces, most notable in Fe development on soil faces, along fracture boundaries and within soil mass, voids filled with Fe specules, @60.2': Marker Bed 2
221 65	65-70	Box 5	5	100		@65' to 66.5': CLAY (CL), dark brown, hard, moist @66.5' to 67': Silty SAND (SM-SC) with clay, oxidized, brown to orange brown, wet, fine grained, micaceous @67': Perched groundwater encountered @67' to 67.4': Sandy CLAY (CL_s), olive brown, to orange brown, moist
216 70	70-75	Box 5	5	100		@67.4' to 69.7': Silty SAND (SM), loose, oxidized, wet, fine grained @69.7' to 70': CLAY (CL), hard, dark brown, moist, well developed blocky structure **Carbonate Package** @70' to 75': Sandy CLAY (CL_s), hard, olive brown, moist, fine grained sand with pockets of light brown micaceous fine sand in matrix, some $CaCO_3$ in matrix as stringers, hackly structure Marker Bed 3: Paleo Surface
211 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 1**
PAGE 4 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/15/11	ATD	▽ 42.6				INCLINED	Bit (Feet)	
12/15/11	ATD	▼ 102				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 6**
ELEVATION:	**286 Feet**
DATE START:	**12/15/2011**
DATE FINISH:	**12/15/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
211 75						@75' to 75.7': Silty CLAY (CL), moderately hard, medium gray, homogeneous, slightly oxidized, slightly moist
						@75.7': Erosional contact, uneven, hummocky
▽	75-80	Box 6	5	100		@75.7' to 77.5': SAND (SP), loose, yellow brown to orange brown, fine grained, poorly graded, oxidized, slightly moist
						@77.5': Perched groundwater encountered
						@77.5' to 77.7': Gradational change from SAND (SP) to CLAY (CH)
						@77.7' to 80': CLAY (CH), moderately hard, medium gray, mild Mn development in matrix, moist, high plasticity, internal shears, shrink and swell, clay lining on parting surfaces
206 80						@80' to 81.4': No Recovery
▽						@81.4': Perched groundwater encountered
	80-85	Box 6	3.6	72		@81.4' to 82.4': CLAY (CH), medium gray to orange brown, wet, high plasticity, mild Mn development in matrix, moist, high plasticity, internal shearing, some $CaCO_3$
						San Pedro Formation (Qsp):
						@82.4' to 85': SAND (SP), light gray, fine grained, poorly graded, massive, homogeneous, slightly moist to dry, erosional contact with above
201 85						@85' to 88': No Recovery-likely SAND (SP)
	85-90	Box 6	2	40		
						@88' to 90': SAND (SP), light gray, dry, predominantly fine grained, poorly graded, massive, homogeneous, trace coarse sand sized subangular to subrounded slaty sand
196 90						@90' to 90.1': No Recovery
	90-95	Box 7	4.9	98		@90.1' to 93.8': SAND (SP) with gravel, unconsolidated, dark greenish gray, slightly moist, fine to coarse sand, fine rounded gravel, clasts-slate, quartz, green sandstone-well rounded, well graded
						@93.8' to 95': SAND (SP) with some gravel, light greenish gray, dry, predominantly fine sand, poorly graded
191 95						@94': Encountered cobbles>3 inches in diameter
	95-100	Box 7	1.8	36		@95' to 98.2': No recovery due to cobble obstruction, large cobble stuck in sampler barrel, cobble composed of siliceous quartz with thin silica veins, well rounded
						@98.2' to 100': Silty SAND to Sandy SILT (SM-ML), medium green, fine grained, poorly graded, very moist
186 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 1**
PAGE 5 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/15/11	ATD	▽ 42.6				INCLINED	Bit (Feet)	
12/15/11	ATD	▼ 102				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 6**
ELEVATION:	**286 Feet**
DATE START:	**12/15/2011**
DATE FINISH:	**12/15/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
186 100						@100' to 101.6': No Recovery
▼	100-105	Box 7	3.4	68		@101.6' to 103': Silty SAND to Sandy SILT (SM-ML), medium green, fine grained, wet, micaceous @102': Local groundwater table encountered
						@103': Coarse GRAVEL (GP), rounded - 1.5 inches in size
181 105						@103.1' to 105': Color change, SAND with silt to Silty SAND (SP-SM), light yellowish brown, wet, fine grained, micaceous
	105-110	Box 8	5	100		@105' to 110': SAND with silt to Silty SAND (SP-SM), massive, yellow brown, wet, fine to medium sand
176 110						@110' to 110.7': No Recovery
	110-115	Box 8	4.3	86		@110.7' to 112.7': SAND with silt to Silty SAND (SP-SM), massive, yellow brown, wet, fine to medium sand
						@112.7' to 114.4': SAND with silt to Silty SAND (SP-SM), oxidized, fine grained, wet
171 115						**San Pedro Formation: Marine (Qsp):**
	115-120	Box 8	3	60		@114.4' to 115': Abrupt transition, Sandy SILT to Silty SAND (ML-SM), dark gray, wet, fine grained, abundant sea shells, with pocket of oxidized orange brown fine sand, mild organic odor, shells are bivalves @115' to 120': Encounter cobbles-gravel, rig chatter, auger jump, poor sample recovery @117' to 117.5': GRAVEL (GP) and fossiliferous cobbles, dark gray, matrix washed out @117.5' to 118.6': CLAY (CH), dark gray, seashells, slighly moist, hard, mild organic odor @118.6' to 118.9': Cemented SAND (SP) concretion, very hard, very well cemented, dark gray, dry
166 120						@118.9' to 120': SAND (SP), with concretionary gravel, light bluish gray, concretions are rounded well cemented, fine to medium sand, poorly graded, no shells below 118.9', slightly moist
	120-125	Box 9	5	100		@120' to 124.3': SAND (SP), gray, wet, fine to medium sand, some mica, unconsolidated trace shell debris
161 125						@124.3' to 125': Clayey SAND (SC), hard, dark gray, very moist, fine grained

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 1**
PAGE 6 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/15/11	ATD	▽ 42.6				INCLINED	Bit (Feet)	
12/15/11	ATD	▼ 102				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 6**
ELEVATION: **286 Feet**
DATE START: **12/15/2011**
DATE FINISH: **12/15/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
161 125						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Total depth of coring: 125' bgs Perched groundwater encountered @42.6', 45.9', 46.7', 50, 51.1', 55', 60', 67'-69.7', 77.5' and 81.4' bgs (approximate depths) Local groundwater table encountered @102' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
156 130						
151 135						
146 140						
141 145						
136 150						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 2**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/16/11	ATD	▽ 50				INCLINED	Bit (Feet)	
12/16/11	ATD	▼ 101.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**285 Feet**
DATE START:	**12/16/2011**
DATE FINISH:	**12/16/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
285 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac)
	0-5	Box 1	5	100		**Artificial fill(Af):** @0' to 1.6': Silty SAND (SM), dark brown, moist, with trace of clay, porous, sharp contact **Quaternary older alluvial and fluvial deposits (Qoaf)** @1.6' to 2': Silty SAND (SM) with trace of clay, medium brown, moist, porous, few pebbles, sharp contact @2' to 4.6': Silty SAND (SM) with clay, reddish brown, moist, mottled, trace of angular pebbles @4.6' to 5.7': Silty SAND (SM), reddish brown, moist, with trace of clay and angular gravel @5.7' to 6.8': gradational contact, Silty SAND (SM), gray brown, with trace of clay, angular pebbles
280 / 5						
	5-10	Box 1	5	100		@6.8' to 9': Silty Sandy CLAY (CL-ML) with gravel, mottled, bluish gray light tan to mild orange brown, moist, thinly bedded bluish gray clay and fine sandy tan silt, chaotic assemblage of silts, clays, sands and subrounded gravel @9' to 10': Fluvial sands and gravels (SP-GM), dry to moist, fine to coarse sands, fine to coarse gravels
275 / 10						
	10-15	Box 1	3.7	74		@10' to 11.3': No Recovery @11.3' to 12.5': Silty SAND (SM) with gravel, fine to coarse sand, fine gravel @12.5' to 14.8': Grades to reddish brown Silty SAND (SM) with trace of clay, angular gravel, sharp contact @13' @14': Depth of Fault Trench FT-1 @Station 0+44
270 / 15						
	15-20	Box 2	3.9	78		@14.8' to 15.0': Sandy CLAY (CL_s) with gravel, mottled, bluish gray, light tan to mild orange brown, thinly bedded @15' to 16.1': No Recovery @16.1' to 18': Gravelly SAND (SP_g) with clay, dark orange brown, fine to coarse sand, fine to coarse subangular to subrounded gravel @18' to 21.5': Silty Sandy CLAY (CL_s) with subangular to subrounded gravel, moist, bluish gray to dark orange mottle, decomposed quartz and flattened black slaty gravel
265 / 20						
	20-25	Box 2	5	100		@21.5 to 24.3': Silty Sandy CLAY (CL_s), moist, massive, orange brown, subangular, pebbles @24.3' to 25': Chaotic assemblage of moist Clayey GRAVEL (GC), olive brown,
260 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 2**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/16/11	ATD	▽ 50				INCLINED	Bit (Feet)	
12/16/11	ATD	▼ 101.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 5**
ELEVATION:	**285 Feet**
DATE START:	**12/16/2011**
DATE FINISH:	**12/16/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
260 25						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						bluish gray, dark red to orange brown, clast supported, sharp contact
						@25' to 25.9': Silty SAND (SM) with clay, moist to very moist, subrounded gravel, grades to Sandy CLAY (CL_s)
	25-30	Box 2	5	100		@25.9' to 30.6': Sandy CLAY (CL_s), mottled orange brown Paleosol, moist, fine grained sand with occasional fine subrounded gravel, massive, well developed blocky structure, Marker Bed 1: Paleosol
255 30						
						@30.6' to 31': Sandy Clayey SILT (CL-ML), moist, blocky structure, olive brown, soft, moderately developed soil horizon, clay lining on soil faces,
	30-35	Box 3	5	100		@31' to 32.1': Sandy CLAY (CL_s), moist, massive, orange brown @32.1': Sandy CLAY (CL_s), moist, orange brown, mottled bluish gray brown, subrounded gravel to subangular gravel with occasional subangular gravel, black slaty gravels (Jsm)
						@33.6': GRAVEL bed, black slaty gravels to granitic rock fragments and siliceous white SILTSTONE fragments
250 35						
	35-40	Box 3	5	100		
						@38.5' to 41.5': Silty Sandy CLAY (CL_s), moist, brown, with subrounded pebbles to subangular pebbles
245 40						
						@41.5' to 41.8': Gravelly SAND (SP_g), dark orange brown, moist, to very moist, with subrounded gravel and pebbles
	40-45	Box 3	5	100		@41.8' to 42.9': Clayey SAND (SC), orange brown, moist, occasional subangular pebbles, grades to
						@42.9 to 43.9': CLAY (CL), olive brown, moist, Fe staining, laminated<1 inch, sharp with below
240 45						@43.9' to 44': SAND (SP), moist, brown, fine grained with subangular pebbles, sharp with below
						@44' to 45': CLAY (CL), brown, moist, Fe staining, laminated<1-inch
						@45' to 46.8': Silty CLAY (CL), mottled olive to orange brown fine sand, trace subangular pebbles, Mn with oxidizing staining, blocky structure
	45-50	Box 4	5	100		@46.8' to 47.6': Sandy CLAY (CL_s), hard, mottled, olive to orange brown, with fine sand, moderate Mn development
						@47.6' to 50.9': Silty CLAY (CL), hard, mottled olive, orange brown, trace subangular pebbles, Fe oxides and Mn development
235 ▽ 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 2**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/16/11	ATD	▽ 50				INCLINED	Bit (Feet)	
12/16/11	ATD	▼ 101.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 5**
ELEVATION:	**285 Feet**
DATE START:	**12/16/2011**
DATE FINISH:	**12/16/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
235 50						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@50': Perched groundwater encountered
	50-55	Box 4	5	100		@50.9' to 51.5': Sandy CLAY (CL_s), hard, mottled olive brown, blocky structure with trace sand @51.5' to 60': Sandy CLAY (CL_s), hard, mottled olive brown, orange brown with fine sand, moderate Mn development on pedogenic faces, Fe oxide staining, poor recovery from 56' to 59.4'
230 55						
	55-60	Box 4	1.6	32		
225 ▽ 60						@60': Perched groundwater encountered @60' to 67': Silty Sandy CLAY (CL_s), hard, reddish brown to olive brown, massive, grades back and forth between silty clay and sandy clay, blocky structure, very moist to wet, Fe development on soil faces, Fe specules in soil matrix, erosional contact with below, Marker Bed 2
▽	60-65	Box 5	5	100		@63': Perched groundwater encountered
220 65						
▽	65-70	Box 5	5	100		@67': Perched groundwater encountered @67' to 68.3': Silty CLAY (CL), hard reddish brown to mottled olive greenish brown, blocky structure, wet, Fe development on pedogenic surfaces ("paprika-like"), Mn development @68.3' to 71.2': Silty CLAY (CL), hard, olive dark brown Paleosol, mottled, blocky structure, Fe prevalent and Mn nodules, micaceous, Marker Bed 3: Paleo Surface
215 70						
	70-75	Box 5	5	100		**Carbonate Package** @71.2' to 72': Silty CLAY (CL), hard, olive dark brown, blocky structure, $CaCO_3$ nodules, prevalent Fe staining and Mn nodules @72' to 78.7': Silty CLAY (CL), hard, olive orange brown, mottled, blocky structures $CaCO_3$ nodules, Fe stain, highly developed Mn
210 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 2**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/16/11	ATD	▽ 50				INCLINED	Bit (Feet)	
12/16/11	ATD	▼ 101.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **285 Feet**
DATE START: **12/16/2011**
DATE FINISH: **12/16/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
210 75	75-80	Box 6	5	100		@67': Perched groundwater encountered @67' to 68.3': Silty CLAY (CL), hard reddish brown to mottled olive greenish brown, blocky structure, wet, Fe development on pedogenic surfaces ("paprika-like"), Mn development
						San Pedro Formation (Qsp) @78.7' to 80': SAND (SP), loose, bluish green, fine grained, poorly graded, very moist, erosional contact with above
205 80	80-85	Box 6	3.9	78		@80' to 81.1': No Recovery @81.1' to 85': SAND (SP), loose, yellow light tan, fine grained, poorly graded, slightly moist
200 85	85-90	Box 6	3.5	70		@85' to 86.5': No Recovery, likely SAND (SP) @86.5' to 87': SAND (SP), gray, medium sand, poorly graded, massive, homogeneous, very moist @87' to 90': SAND (SP), light gray to yellow, medium sand, poorly graded, massive, homogeneous, slightly moist to dry
195 90	90-95	Box 7	2.9	58		@90' to 92.1': No Recovery, likely SAND (SP) with gravel @92.1' to 93.7': SAND (SP) with gravel, unconsolidated dark greenish gray, moist, fine to coarse sand, fine rounded gravel, clasts, slate, quartz, green sandstone, well rounded, well graded @93.7' to 94.6': SAND (SP), unconsolidated, greenish light gray, moist, fine sand
190 95	95-100	Box 7	4	80		@94.6' to 95': SAND (SP) with gravel, unconsolidated, medium greenish gray, moist, fine sand with angular slate, gravel and pebble @95' to 96': No Recovery @96' to 96.7': SAND (SP) with gravel, unconsolidated, dark greenish gray, moist, fine to coarse sand, fine rounded gravel clasts, slate quartz, green sandstone, well rounded and well graded @96.7' to 100': Silty SAND (SM), greenish gray, moist, silty fine sand, with Fe stain, massive
185 100						

FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS

The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 2**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/16/11	ATD	▽ 50				INCLINED	Bit (Feet)	
12/16/11	ATD	▼ 101.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**285 Feet**
DATE START:	**12/16/2011**
DATE FINISH:	**12/16/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
185 100						@100' to 101.6': No Recovery
▼	100-105	Box 7	3.4	68		@101.6': Local groundwater table encountered @101.6' to 103': Silty SAND to Sandy SILT (SM-ML), medium green, fine grained, wet @103' to 105': Silty SAND to Sandy SILT (SM-ML), yellow brown, wet, fine grained, well developed, Fe staining
180 105						@105' to 105.3': No Recovery
	105-110	Box 8	4.7	94		@105.3' to 109.3': SAND (SP), light brown, wet, fine grained, massive sharp contact with below
						@109.3' to 110': Silty SAND to Sandy SILT (SM-ML), light brown, wet, well developed, Fe staining, fine grained
175 110						@110' to 111': No Recovery
	110-115	Box 8	4	80		@111' to 112': SAND (SP), light brown, wet, fine grained, massive @112' clay nodules/clast, brown, wet @112' to 112.3': SAND (SP), light brown, wet, medium grained, massive, mottled to olive @112.3' to 113.5': SAND (SP), light brown, wet, fine grained, massive
						@113.5' to 115': Silty SAND to Sandy SILT (SM-ML), moist to very moist, red brown, fine grained, massive, iron staining
170 115						@115' to 116.1': No Recovery
	115-120	Box 8	3.9	78		@116.1' to 116.6': Silty SAND to Sandy SILT (SM-ML), wet, medium brown, fine grained, massive **San Pedro Formation: Marine (Qsp):** @116.6' to 117.7': Abrupt transition, Sandy SILT to Silty SAND (ML-SM), dark gray, wet, fine grained, abundant sea shells (bivalves) @117.7' to 118': SAND (SP) with gravel, dark gray, wet, coarse grained, abundant sea shells, angular slate gravel
165 120						@118' to 118.5': Sandy SILT to Silty SAND (ML-SM), dark gray, wet, fine grained, abundant sea shells @118.5' to 120': Silty CLAY (CL), hard, dark gray, wet, abundant sea shells
						Total depth of coring: 120' bgs Perched groundwater encountered @50', 60', 63' and 67' bgs Local groundwater table encountered @ 101.6' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
160 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 3**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 48				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 96.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**282.5 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
283 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete
						Artificial fill(Af):
						@0' to 1.1': Silty SAND to Clayey SAND (SM-SC), dark brown, moist, fine to coarse sand, fine subangular gravel
	0-5	Box 1	5	100		**Quaternary older alluvial and fluvial deposits (Qoaf)**
						@1.1' to 2': Sandy CLAY (CL_s), dark brown, very moist, fine sand
						@2' to 3.6': Gravelly CLAY (CL_g), hard, dark brown to reddish brown, moist, fine to coarse sand, fine subrounded gravel, clasts of slate and quartz
278 / 5						@3.6' to 5': Silty SAND (SM) with gravel, reddish brown to dark brown, moist, fine to coarse sand, fine to coarse gravel, subangular to subrounded, slaty gravel, basalt fragments, coarse granitic decomposed gravels, friable (fluvial incisions)
						@5' to 5.4': No Recovery
	5-10	Box 1	4.6	92		@5.4' to 10': Sandy GRAVEL (GM_s) with silt, mottled bluish gray, dark reddish brown to orange brown, moist, fine to coarse sand and gravel, predominantly tabular to subrounded to subangular, slaty gravel with granitic sand in matrix, friable, well graded, well indurated fluvial channel gravels
						@9': Depth of Fault Trench FT-1 @Station 0+11
273 / 10						@10' to 11.7': No Recovery
	10-15	Box 1	3.3	66		@11.7' to 15': Sandy GRAVEL (GM_s) with silt, some clay in matrix, sand grains display subrounding, gravel clasts, particularly slaty gravel are tabular-angular to subangular
268 / 15						@15' to 15.6': Clayey silty GRAVEL (GM-GC)-see overlying description, well graded
	15-20	Box 2	5	100		@15.6': Becomes gradationally Sandy CLAY (CL_s), brown, moderately hard, moist, predominantly fine grained, homogeneous, @19.5' to 20': Becoming coarser grained with angular slaty gravel and rounded siliceous to basaltic red gravels
263 / 20						@20' Resumed drilling 21 Dec 2011 @0630hrs
						@20' to 20.5': No Recovery
						@20.5' to 21.3': Silty Clayey SAND (SM-SC), brown, soft, predominantly fine sand, very moist, trace coarse sand, slaty fine subangular to subrounded gravel, composed primarily of slate clasts (Jsm), occasional basalt fragments
	20-25	Box 2	4.5	90		@21.3' to 21.8': Gravelly SAND (SP_g), with some silt, brown to yellow brown, very moist, fine sand, thin bed, fine angular slaty gravel, unconsolidated, well graded, grades to Sandy CLAY (CL_s)
						@21.8' to 24.1': Sandy CLAY (CL_s), mottled orange brown to olive brown, predominantly fine sand, trace coarse subangular sand, occasional fine gravel,
258 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 3**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 48				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 96.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 5**
ELEVATION:	**282.5 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
258 25	25-30	Box 2	5	100		massive @24.1' to 25': Grades to CLAY (CL), very hard, dark brown, moist with fine flattened, tabular-angular slaty clasts (Jsm) @25' to 25.5': CLAY (CL), very hard, dark brown moderately developed Paleosol, moist with fine flattened, tabular-angular slaty clasts (Jsm), Marker Bed 1: Paleosol @25.5' to 27.6': Clayey SAND (SC) with gravel , moderately hard, dark brown, moist, fine to coarse sand, fine to coarse gravel, contains SILTSTONE clasts (Tm), slaty gravel and sands with basalt rock fragments, massive, grades to Sandy CLAY (CL_s)
253 30	30-35	Box 3	5	100		@27.6' to 29.4': Sandy CLAY (CL_s), very hard, brown to dark brown, moist, occasional coarse sand and basalt/slate rock fragments @29.4' to 31.1': Silty Clayey SAND (SM-SC), soft, olive brown, very moist, fine sand with some coarse slaty sand and fine slaty gravel, grades to CLAY (CL), moderate blocky structure, some voids 2-4mm lined with Mn, @31.1' to 32.1': Sandy CLAY (CL_s), hard, fine sand, orange brown, moist, grades to Silty Clayey SAND (SC-SM) @32.1' to 34.4': Silty Clayey SAND (SM-SC) with gravel, moderately hard, brown to orange brown, moist, fine to coarse sand, fine to coarse subangular slaty gravel, thin layer of $CaCO_3$ <1 inch thick and slaty to SILTSTONE gravel @32.9'
248 35	35-40	Box 3	5	100		@34.4' to 35': Sandy CLAY (CL_s), gradational changes - see 31.1' to 32.1' @35' to 36.1': Silty SAND (SM), with clay, soft, brown, moist, predominantly fine grained with abundant rock clasts, basalt clasts, slaty subrounded to subangular clasts (Jsm) @36.1' to 38.1': Silty CLAY (CL) with sand, dark brown, soft, moist, fine grained
243 40	40-45	Box 3	5	100		@38.1' to 44.2': Color change, mottled orange brown to olive gray, laminated to gradational occasional rock fragments, (Tm), massive, oxidized, very moist, moderately hard
238 45	45-50	Box 4	5	100		@44.2' to 44.3': Grades to coarse grained Clayey SAND (SC), thin bed, becomes CLAY (CL) @44.3' to 45': Silty CLAY (CL) with sand, same as 38.1' to 44.2' @45' to 48': Silty CLAY (CL), mottled orange brown to gray brown, very moist, occasional coarse slaty angular sand, moderately well developed blocky soil, massive ▽ @48': Perched groundwater encountered @48' to 48.2': SAND (SP) bed, dark brown, dry fine grained with some basalt rock fragments, and fine subrounded granitic gravel, poorly graded
233 50						@48.2' to 50': Silty CLAY (CL), mottled orange brown to gray brown, very

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 3**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 48				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 96.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 5**
ELEVATION: **282.5 Feet**
DATE START: **12/20/2011**
DATE FINISH: **12/21/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
233 50	50-55	Box 4	5	100		moist, occasional coarse slaty angular sand, moderately well developed blocky soil, massive @50' to 55': Silty Sandy CLAY (CL_s), mottled orange brown to gray brown to brown, hard, very moist, fine grained, homogeneous, @ 52.5': Paleosol, poorly developed blocky structure, groundwater perched within thin sand beds and within sandy clay matrix @53': Perched groundwater encountered
228 55	55-60	Box 4	5	100		@55' to 60': Silty Sandy CLAY (CL_s), well developed blocky structure, moist, moderate clay development on soil faces, gradational changes in the proportional amounts of silts and sands, mineralization, gleying along soil face boundaries, soil faces exhibit dominant gray brown color along boundaries, homogeneous @57': Perched groundwater encountered
223 60	60-65	Box 5	5	100		@60' to 67': Silty Sandy CLAY (CL_s), with onset of Mn development, Fe within and along soil fracture boundaries, poorly developed blocky structure, homogeneous, massive, Fe specules, erosional contact with above @60': Marker Bed 2
218 65	65-70	Box 5	5	100		**Carbonate Package** @67' to 70': Silty CLAY (CL), dark brown Paleosol, moderately hard, moist, well developed blocky soil fracture, clay lining on soil faces, becomes very moist, and soft, @69.5' to 70': with trace shell fragments and minor calcium carbonate, Marker Bed 3: Paleo Surface
213 70	70-75	Box 5	5	100		@70' to 72.6': Silty CLAY (CL), mottled orange brown to gray brown, soft, very moist, lack of clay development on weakly developed soil faces @72.6' to 73': Clayey SAND (SC), abrupt change, fine grained sand, mottled, grades to Silty SAND (SM) @73' to 73.3': Silty SAND (SM), fine grained, soft, very moist, abrupt change @73.3 to Silty Sandy CLAY (CL_s)
208 ▽ 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 3**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 48				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 96.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **282.5 Feet**
DATE START: **12/20/2011**
DATE FINISH: **12/21/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
208 75	75-80	Box 6	5	100		@73.3' to 75': Silty Sandy CLAY (CL_s), olive brown to dark brown, very moist, predominantly fine grained, weakly developed blocky structure, Mn sparsely developed on soil faces, trace $CaCO_3$ along fracture boundaries @75': Perched groundwater encountered @75': Becomes predominantly olive brown in color, hard with $CaCO_3$ stringers and waxy-polished soil faces with Mn developed on portions of soil faces @75' to 79.5': CLAY (CH) with silt, moderately hard, olive gray, moist to wet along soil faces, homogeneous, trace oxidation predominantly along soil faces, clay lined, encountered perched groundwater, minor $CaCO_3$ on soil faces
203 ▽ 80	80-85	Box 6	4.5	90		@79.5' to 80': Abrupt change, erosional contact, Clayey SAND (SC), very moist, olive gray, fine grained sand, becomes wet @ 80', most noteable is lack of slaty fine sand and gravel @80': Perched groundwater encountered **San Pedro Formation: (Qsp)** @80' to 80.5': No Recovery @80.5' to 85': SAND (SP), light tannish brown, dry, loose, unconsolidated, poorly graded fine grained, quartz predominates, subrounded to subangular, homogeneous
198 85	85-90	Box 6	4	80		@85' to 86': No Recovery @86' to 87': SAND (SP), becoming greenish gray @87' to 90': SAND (SP), Greenish gray, fine grained, subrounded to subangular sand, predominantly quartz sand, homogeneous, poorly graded, unconsolidated, dry
193 90	90-95	Box 7	3.8	76		@90' to 91.2': No Recovery @91.2' to 91.9': SAND (SP), fine grained, poorly graded, dry greenish gray @91.9' to 92.8': Grades to Gravelly SAND (SP_g), fine to coarse sand, with well rounded gravel-black slaty gravels, dry @92.8' to 93.7': SAND (SP), fine grained, no gravel @93.7' to 94.7': SAND (SP), with coarse, well rounded siliceous greenish black gravel, dry
188 95 ▼	95-100	Box 7	3.4	68		@94.7' to 95': SAND (SP), fine grained, trace silt, dry @95' to 96.6': No Recovery @96.6': Local groundwater table encountered @96.6' to 99.4': SAND (SP), dark greenish gray, loose, wet, coarse sand with trace fine slaty gravel, poorly graded
183 100						@99.4' to 100': Sandy GRAVEL (GP), unconsolidated, mottled yellow brown to

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 3**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 48				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 96.6				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**282.5 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
183 100	100-105	Box 7	3	60		greenish gray, wet, coarse sand and well rounded gravels, slaty gravel, granitic-quartz gravel, siliceous hard quartz gravels, well graded @100' to 102': No Recovery, gravel obstruction
						@102' to 102.6': Sandy GRAVEL (GP), see 99.4' to 100', abundant pebbles, gravels
						@102.6' to 105': SAND (SP), wet, fine grained, poorly graded, brown
178 105	105-110	Box 8	3.8	76		@105' to 106.2': No Recovery
						@106.2' to 109.1': Yellow brown, fine to medium wet SAND (SP), poorly graded, unconsolidated
						@109.1' to 110': Laminated fine grained, Sandy SILT (ML), moderately indurated, wet
173 110	110-115	Box 8				@110' to 113.4': No Recovery
						@113.4' to 115': Continued Sandy SILT (ML), wet, fine grained sand, becomes dark gray fine grained Sandy SILT (ML), laminae, planar
168 115	115-120	Box 8				@115' to 116.5': No Recovery
						@116.5' to 118.6': SAND (SP), wet, fine grained
						San Pedro Formation: Marine (Qsp): @118.6' to 120': Abrupt transition, nearly horizontal, interfingered SAND (SP) with dark gray, very fine grained Sandy SILT (ML), wet, with abundant shells and well cemented fossiliferous, concretions
163 120						Total depth of coring: 120' bgs Perched groundwater encountered @48', 53', 57', 75', and 80' bgs Local groundwater table encountered @ 96.6' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
158 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 4**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/17/11	ATD	▽ 44.5				INCLINED	Bit (Feet)	
12/17/11	ATD	▼ 90				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**277 Feet**
DATE START:	**12/17/2011**
DATE FINISH:	**12/17/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
277 / 0						6 inches of **Asphalt concrete (Ac)** over 6 inches of Base course
						Artificial fill(Af)
	0-5	Box 1	4.5	90		@0 to 1.5': No Recovery @1.5' to 2.6': Silty SAND (SM), moist, orange brown, trace to scattered pebbles @2.6' to 11.5': Chaotic assemblage of silts, clays and sand with scattered angular to subangular pebbles and gravels
272 / 5						@5' to 5.9': No Recovery
	5-10	Box 1	4.1	82		@5.9' to 10': Silty CLAY to Clayey SILT (CL-ML), chaotic assemblage of scattered angular to subrounded pebbles and slaty gravels (Jsm)
267 / 10						@10' to 10.5': No Recovery
						@10.5' to 11.5': Silty CLAY to Clayey SILT (CL-ML), chaotic assemblage of scattered angular to subrounded pebbles and slaty gravels (Jsm)
	10-15	Box 1	1	20		**Quaternary older alluvial and fluvial deposits (Qoaf):** @11.5' to 15': No Recovery - 3 to 4 inch cobbles lodged in core barrel tip
262 / 15						@15' to 20': Silty SAND to Sandy SILT (SM-ML), light brown to brown, moderately hard, pin point pores, subrounded gravels and black slaty gravels (Jsm)
	15-20	Box 2	5	100		
257 / 20						@20' to 20.9': No Recovery
						@20.9' to 22.1': Silty SAND to Sandy SILT (SM-ML), brown, scattered subrounded gravels
	20-25	Box 2	4.1	82		@22.1' to 23.2': SAND (SP), brown, black slaty gravels (Jsm)
						@23.2' to 25.4': Silty SAND to Sandy SILT (SM-ML), light brown to brown, slightly moist, scattered angular to subrounded gravels (Jsm)
252 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 4**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
12/17/11	ATD	▽ 44.5				INCLINED	Bit (Feet)	
12/17/11	ATD	▼ 90				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 5**
ELEVATION:	**277 Feet**
DATE START:	**12/17/2011**
DATE FINISH:	**12/17/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
252 25	25-30	Box 2				@25.4' to 30.9': Sandy Clayey SILT (CL-ML), olive brown, slightly moist, fine grained slaty sand, moderately developed blocky soil fracture, porous, 1-4mm voids lined with Mn, Marker Bed 1: Paleosol @28' to 29': Thin bed of slaty fine gravel with SILTSTONE rock fragments
247 30	30-35	Box 3				@30.9' to 32.1': Silty SAND to Sandy SILT (SM-ML), reddish brown, slightly moist @32.1' to 36.5': Grades to Silty SAND (SM), light tan to brown, scattered subangular to subrounded gravels with moderate $CaCO_3$ development, thin layer of gravels near contact with above
242 35	35-40	Box 3				@36.5' to 39.4': Silty SAND to Sandy SILT (SM-ML) with gravelly sand, tan to light brown
237 40	40-45	Box 3				@39.4' to 41.7': Sandy SILT (ML), brown, scattered gravels @41.7' to 44.5': Clayey Sandy SILT (CL-ML) assemblage, brown, slightly moist, moderate soil development, blocky structure
▽ 232 45	45-50	Box 4				@44.5': Perched groundwater encountered @44.5' to 45.5': SAND (SP), light brown, loose, wet, fine grained @45.5' to 47': Clayey SILT (ML), light brown, slightly moist @47' to 54.5': Silty SAND to Sandy SILT (SM-ML), very hard, reddish brown, slightly moist, poorly developed structure
227 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 4**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/17/11	ATD	▽ 44.5				INCLINED	Bit (Feet)	
12/17/11	ATD	▼ 90				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 5**
ELEVATION: **277 Feet**
DATE START: **12/17/2011**
DATE FINISH: **12/17/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
227 50	50-55	Box 4				@47' to 54.5': Silty SAND to Sandy SILT (SM-ML), very hard, reddish brown, slightly moist, poorly developed structure
222 ▽ 55						@54.5' to 55': SAND (SP), light brown, loose, wet
	55-60	Box 4	5	100		@55' to 60': Perched groundwater encountered @55' to 60': Silty SAND to Sandy SILT (SM-ML), reddish brown, medium dense to stiff
217 60	60-65	Box 5	5	100		@60' to 64.1': Clayey Sandy SILT (CL-ML), moderately hard, mottled orange brown to olive gray, wet, fine grained sand, oxidized, moderate blocky structure, Marker Bed 2
						@64.1' to 65': Clayey SAND (SC), moderately hard, mottled orange brown to olive gray, very moist, fine grained with some fine subangular to subrounded slaty gravel, micaceous
212 65	65-70	Box 5	5	100		@65' to 66.1': Silty SAND to Sandy SILT (SM-ML), reddish brown, slightly moist, fine grained @66.1' to 71.4': Silty CLAY (CL), very hard, dark brown to dark reddish brown, moist, charcoal flakes in matrix, trace very fine sand, massive, moderate soil development, blocky structure, @68.8': Marker Bed 3: Paleosurface
207 70	70-75	Box 5	5	100		**Carbonate Package** @71.4' to 75': Notable color change - (CL_s), mottled, olive gray, reddish brown to greenish white, hard, moist, onset of $CaCO_3$ nodules, and calcareous sands, sands occur as thin beds <1 inch and as lenses, some fine sand in matrix, overall massive,
202 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 4**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/17/11	ATD	▽ 44.5				INCLINED	Bit (Feet)	
12/17/11	ATD	▼ 90				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 5**
ELEVATION:	**277 Feet**
DATE START:	**12/17/2011**
DATE FINISH:	**12/17/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
202 75						@75' to 75.3': No Recovery
						@75.3' to 76.4': Sandy SILT (ML), olive brown to orange brown, very moist, fine sand, micaceous, grades to Silty CLAY (CL)
	75-80	Box 6	4.7	94		@76.4' to 76.9': Silty CLAY (CL) with sand, mottled, olive brown to grayish white, hard, moist, trace fine subrounded feldspar gravel, $CaCO_3$ sands and concretions, moderate Mn development on weakly developed soil faces, oxidized, grades to Sandy SILT (ML)
						@76.9' to 77.7': Sandy SILT (ML), moderately hard, moist, fine grained with some subangular fine gravel sized slaty clasts, grades to Silty CLAY (CL) with sand, see 76.4' to 76.9
197 80						@77.7' to 78.6': Silty CLAY (CL) with sand, mottled, olive brown to grayish white, hard, moist, trace fine subrounded feldspar gravel, $CaCO_3$ sands and concretions, moderate Mn development on weakly developed soil faces, oxidized, grades to (ML)
	80-85	Box 6	5	100		@78.6' to 78.9': Thin bed of fine grained Silty SAND (SM), dark reddish brown, moist, micaceous, abrupt change @ 78.9'
						@78.9' to 80': Silty CLAY (CL), hard, olive brown to orange brown, moist, oxidized
						@80' to 80.8': Silty CLAY (CL), olive brown to orange brown, oxidized, hard, thinly bedded to laminated
192 85						@80.8' to 81.1': Paleosol - CLAY (CH), hard, dark brown, moist, sheared, waxy plastic undulatory surfaces, becomes fine grained, olive brown moist, silty SAND (SM), erosional contact with below
	85-90	Box 6	2.9	58		**San Pedro Formation (Qsp)** SAND (SP), unconsolidated, fine grained, light olive brown to light brown, poorly graded
						@81.9': color change, bluish green fine grained sand, homogeneous, moist
						@82.4' to 85': No Recovery
						@85' to 87.9': SAND (SP), unconsolidated, dark bluish green, fine to medium sand, trace subangular slaty fine gravel (Jsm), clasts, moist, homogeneous
187 ▼ 90						@87.9' to 90': No Recovery
						@90': Local groundwater table encountered
						@90' to 92.2': No Recovery - wet sand in barrel
	90-95	Box 7	2.8	56		@92.2' to 95': Gravelly SAND to Sandy Gravel (SP-GM), dark grayish black to bluish green, wet, fine to coarse sand, rounded fine to coarse gravel, gravel clasts composed of slate and SILTSTONE gravels, very hard, some clay in matrix, @94.9' - thin bed of light brown, fine grained sand
182 95						@95' to 96.4': No Recovery, wet sand in barrel, heaving
	95-100	Box 7	3.6	72		@96.4' to 100': Slight color change, Silty SAND (SM), olive brown to very light brown, wet, predominantly fine grained, micaceous with occasional coarse sandy slate and flattened, elongated subrounded black slate, poorly graded, oxidized
177 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 4**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/17/11	ATD	▽ 44.5				INCLINED	Bit (Feet)	
12/17/11	ATD	▼ 90				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 5**
ELEVATION: **277 Feet**
DATE START: **12/17/2011**
DATE FINISH: **12/17/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
177 100						@100' to 101.3': No Recovery, wet sandy slough, heaving sand
	100-105	Box 7	3.7	74		@101.3' to 105': SAND (SP), unconsolidated, wet, fine grained with trace silt, poorly graded, light brown, massive
172 105						@105' to 105.5': No Recovery
	105-110	Box 8	4.5	90		@105.5 to 110': SAND (SP), unconsolidated, light brown, wet, fine to medium sand, trace silt, poorly graded, massive
167 110						@110' to 111.6': No Recovery
	110-115	Box 8	3.4	68		@111.6' to 113': SAND (SP), unconsolidated, light brown, wet, fine to medium sand, grades to Sandy SILT (ML)
						@113' to 115': Sandy SILT (ML), soft, olive brown to orange brown, wet, oxidized fine grained micaceous, with trace gravel at gradational contact with above SAND (SP), massive
162 115						@115' to 116.6': No Recovery
	115-120	Box 8	3	60		**San Pedro Formation: Marine (Qsp):** @116.6' to 120': Abrupt contact, Sandy SILT (ML), moderately hard, dark grayish black, wet, fine grained, abundant bivalve shells
157 120						Total depth of coring: 120' bgs Perched groundwater encountered @44.5', 55'-60' bgs Local groundwater table encountered @90' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
152 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 5**
PAGE 1 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/04/12	ATD	▽ 26.2				INCLINED	Bit (Feet)	
01/04/12	ATD	▼ 87				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 6**
ELEVATION:	**276 Feet**
DATE START:	**1/3/2012**
DATE FINISH:	**1/4/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
276 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
	0-5	Box 1	5	100		**Upper Lawn Terrace-Artificial fill (Af)** @0 to 2.8': Sandy CLAY (CL_s), brown, very moist, fine grained
						Quaternary older alluvial and fluvial deposits (Qoaf): @2.8' to 5': Clayey SAND (SC), mottled orange to yellowish brown to blackish gray, moist, fine to coarse sand, fine to coarse angular gravel and rock fragments
271 5						@5' to 6.3': No Recovery
	5-10	Box 1	3.7	74		@6.3' to 12.2': Clayey Gravelly SAND (SC_g), hard, mottled orange to yellowish brown to blackish gray, moist, fine to coarse sand, fine to coarse angular gravel and rock fragments, fluvial gravels cemented with Fe at basal contact @9': Depth of Fault Trench FT-2 @ Station 0+10
266 10						
	10-15	Box 1	5	100		@12.2' to 15': Silty CLAY (CL), moderately indurated, orange brown, very moist, trace fine sand, moderately plastic, homogeneous
261 15						@15' to 20': Silty CLAY (CL), with pockets of Silty SAND (SM), brown, soft, very moist, occasional rounded, flattened rock fragments, pinpoint voids (1-2mm), unlined pockets of silty sand are wet
	15-20	Box 2	5	100		
256 20						@20' to 25': Silty SAND to Sandy SILT (ML-SM), with clay, soft, brown, very moist, predominantly fine sand with occasional slaty gravel and basalt rock fragments, homogeneous voids (1-2mm), are wet, migrant path for water infiltration
	20-25	Box 2	5	100		
251 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 5**
PAGE 2 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/04/12	ATD	▽ 26.2				INCLINED	Bit (Feet)	
01/04/12	ATD	▼ 87				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 6**
ELEVATION: **276 Feet**
DATE START: **1/3/2012**
DATE FINISH: **1/4/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
251 25 ▽	25-30	Box 2	5	100		@25' to 26.1': Silty SAND to Sandy SILT (ML-SM), with clay, soft, brown, very moist, predominantly fine sand with occasional slaty gravel and basalt rock fragments, homogeneous, voids (1-2mm) are wet, migrant path for water infiltration @26.1' to 30': Sandy CLAY (CL_s), hard, dark brown, moist, fine to coarse slaty sand, fine, rounded, flattened slaty gravel, well developed blocky structure with clay lined soil faces, @26.2': Perched groundwater encountered Marker Bed 1: Paleosol @28.9': Thin bed of slaty to SILTSTONE gravel
246 30	30-35	Box 3	5	100		@30' to 35': Sandy CLAY (CL_s), hard, brown, moist, fine sand, trace coarse sand and fine subangular gravel, gravel fragments consists of black slate and occasional SILTSTONE rock fragments, homogeneous
241 35	35-40	Box 3	3.6	72		@35' to 36.4': No Recovery @36.4' to 40': Clayey SAND to Sandy CLAY (SC-CL), hard, brown, moist, fine sand with fine slaty, subangular rock fragments
236 40	40-45	Box 3	5	100		@40' to 40.6': Gravelly SAND (SP_g), loose, dark brown, moist, fine to coarse sand, fine subrounded gravel @40.6': Erosional contact become Silty Clay (CL) @40.6' to 45': Silty CLAY (CL), hard, mottled brown to grayish brown, moist, trace coarse sand sized slate fragments, moderately oxidized, homogeneous
231 45	45-50	Box 4	5	100		@45' to 46.4': Silty SAND (SM), loose, brown, moist, fine grained, becomes silty CLAY (CL) @46.4' to 48.7': Silty CLAY (CL), hard, mottled orange brown to gray brown, moist, some fine sand, moderate blocky structure @48.7' to 48.9': Thin bed of fine grained sand, contacts gradational above and below
226 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 5**
PAGE 3 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/04/12	ATD	▽ 26.2				INCLINED	Bit (Feet)	
01/04/12	ATD	▼ 87				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 6**
ELEVATION: **276 Feet**
DATE START: **1/3/2012**
DATE FINISH: **1/4/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
226 50	50-55	Box 4	5	100		@48.9' to 50': Sandy Silty CLAY (CL_s), mottled orange brown to gray brown, moist, hard, fine sand, trace subrounded, tabular, grayish white SILTSTONE rock fragments, grades to Sandy SILT (ML) @50' to 55': Sandy SILT (ML) with clay, moderately hard, mottled dark brown to grayish brown, very moist, fine grained
221 55	55-60	Box 4	5	100		@55' to 60': Silty Sandy CLAY (CL_s), hard, moist, oxidized, orange brown to gray brown @56': Becomes dark brown with well developed blocky structure, $CaCO_3$ development along soil faces, trace slaty fragments, homogeneous
216 60	60-65	Box 5	5	100		@60' to 64.8': Sandy CLAY (CL_s), hard, mottled orange brown to gray brown, moist, fine grained sand, occasional slaty rock fragments, oxidized on soil faces (Fe specks), moderate blocky structure, Marker Bed 2
211 65	65-70	Box 5	5	100		@64.8' to 65': Sandy SILT (ML), moderately hard, orange brown to gray brown, moist, fine grained, Mn development in soil matrix @65' to 66': Sandy Clayey SILT (ML), soft, mottled orange brown to gray brown, very moist, fine sand, moderate Mn development, grades to SAND (SP) @66' to 66.2' @66' to 67.7': SAND (SP), loose, dark yellow brown, wet, fine to coarse subangular to subrounded sand, quartz, slaty sand, occasional feldspar (fluvial) @67': Perched groundwater encountered @67.7' to 70': Abrupt erosional contact, Silty CLAY (CL), mottled olive brown to orange brown, moist, hard, oxidized, with Mn development, oxidation as red specules
206 70	70-75	Box 5	5	100		@70' to 71.4': Silty CLAY (CL), mottled olive brown to orange brown, moist, hard, oxidized, with Mn development, oxidation as red specules @71.4': Perched groundwater encountered @71.4' to 72.7': Clayey SAND (SC), orange brown, wet, fine grained, grades to Silty CLAY @72.7' to 73.9': Silty CLAY (CL), hard, dark brown, Paleosol, moist, well developed blocky structure Marker Bed 3: Paleo Surface **Carbonate Package**
201 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 5**
PAGE 4 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/04/12	ATD	▽ 26.2				INCLINED	Bit (Feet)	
01/04/12	ATD	▼ 87				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 6**
ELEVATION:	**276 Feet**
DATE START:	**1/3/2012**
DATE FINISH:	**1/4/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
201 75						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@73.9' to 75': Paleosol-carbonaceous, Silty CLAY (CL), whitish gray, blocky to hackly structure, moderately cemented with pockets of dark reddish brown silty clay, Mn development on soil faces, trace water on soil faces, abundant carbonate nodules,
	75-80	Box 6	5	100		@75' to 75.4': No Recovery
						@75.4' to 77.7': Silty CLAY (CL), hard, mottled, olive brown to grayish white, blocky to hackly soil fracture, heavy $CaCO_3$ mineralization, along fracture boundaries, oxidized with Mn on internal matrix, moist
▽						@77.7' to 78.9': SAND (SP), loose, olive brown to orange brown, fine grained quartz, very fine grained black slaty sand
196 80						@78.9' to 80': Sandy CLAY (CL_s) with silt, hard, olive green to greenish white, very moist, block fracture, $CaCO_3$ along soil boundaries, fine to coarse sand, with well cemented concretionary sand lenses, free water on soil boundaries
	80-85	Box 6	5	100		@79': Perched groundwater encountered @80' to 80.1': Sandy CLAY (CL_s) with silt, hard, olive green to greenish white, very moist, block fracture, $CaCO_3$ along soil boundaries, fine to coarse sand, with well cemented concretionary sand lenses, free water on soil boundaries
						@80.9' to 81.4': Grades to Sandy Clayey SILT (ML), soft, dark orange brown, wet, oxidized, fine grained micaceous sand, abrupt contact at 81.4', becomes Silty CLAY (CL)
191 85						@81.4' to 83.5': Silty CLAY (CL), hard, olive green to bluish gray, moist, well developed blocky structure, oxidized along soil boundaries from dark orange to reddish brown and within soil matrix, abrupt contact, roughly planar (horizontal), becomes dark black Organic CLAY (CH)
▼	85-90	Box 6	5	100		@83.5' to 84': Organic CLAY (CH), hard, dark black, moist, thinly laminated with plant debris, grades to dark brown to olive green Silty CLAY with trace fine sand (CL_s) from 84' to 84.9', erosional contact @84.9'
						San Pedro Formation (Qsp): @84.9' to 85': SAND (SP), moderately hard, moist, greenish gray, fine grained, homogeneous
186 90						@85' to 88.5': No Recovery @87': Local groundwater table encountered
						@88.5' to 90': SAND (SP), loose, bluish green, wet, fine grained, quartz sand, moderately oxidized in pockets, poorly graded
	90-95	Box 7	3.3	66		@90' to 91.7': No Recovery
						@91.7' to 95': SAND (SP), loose, maroon brown to greenish blue, wet, fine grained quartz sand with occasional well rounded gravels, siliceous quartz gravel
181 95						@95': Clayey GRAVEL (GC), mottled orange brown to grayish white to greenish gray, fine to coarse sandy matrix, slaty black gravel clasts
						@95' to 95.5': No Recovery
	95-100	Box 7	4.5	90		@95.5' to 96.6': Gravelly SAND (SP_g), loose, grayish green, wet, fine to coarse sand, fine to coarse well rounded gravel, predominantly siliceous quartz gravel with occasional subrounded flattened slaty fragments, well graded
						@96.6' to 98.5': Sandy SILT (ML), yellow brown, soft, wet, very fine sand
						@98.5' to 100': SAND (SP), becoming coarse grained, yellow brown, wet, occasional rounded gravel, some gravel mechanically fractured
176 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 5**
PAGE 5 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/04/12	ATD	▽ 26.2				INCLINED	Bit (Feet)	
01/04/12	ATD	▼ 87				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 6**
ELEVATION: **276 Feet**
DATE START: **1/3/2012**
DATE FINISH: **1/4/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
176 100						@100' to 102.4': No Recovery, wet, slough in barrel
	100-105	Box 7	2.6	52		@102.4' to 104.2': SAND (SP), massive, homogeneous @104.2' to 105': Becomes thinly bedded to laminated, beds of oxidized and unoxidized, fine to medium sand Note: See CB-12 @105'
171 105						@105' to 105.9': No Recovery
	105-110	Box 8	4.1	82		@105.9' to 110': SAND (SP), light brown, loose, wet, fine to medium grained sand with trace highly weathered SILTSTONE rock fragments, predominantly quartz sand with fine sand sized slaty rock fragments, homogeneous, massive
166 110						@110' to 110.7': No Recovery
	110-115	Box 8	4.3	86		@110.7' to 115': SAND (SP), loose, brown, wet, fine grained, massive, homogeneous @114.8': Becomes thinly bedded and laminated, soft sediment deformation along laminations, slightly moist, lamination alternating between oxidized sand and clay
161 115						@115' to 117.8': No Recovery, wet sand in barrel
	115-120	Box 8	2.2	44		@117.8' to 119.8': Sandy SILT (ML), orange brown, fine grained, slightly moist, trace clay, abrupt contact, erosional, uneven, nearly horizontal
156 120						**San Pedro Formation: Marine (Qsp):** @119.8' to 120': Sandy SILT (ML), abrupt transition, hard, dark gray, moist, fine grained with shell debris, bivalves @120' to 120.7': No Recovery
	120-125	Box 9	4.3	86		@120.7' to 124.1': Sandy SILT (ML), hard, dark gray, moist, fine grained with shell debris @124.1' to 125': Becomes SAND (SP), dark gray, wet, coarse grained, grades to Sandy SILT (ML), dark gray, wet, fine grained
151 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 5**
PAGE 6 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/04/12	ATD	▽ 26.2				INCLINED	Bit (Feet)	
01/04/12	ATD	▼ 87				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 6**
ELEVATION: **276 Feet**
DATE START: **1/3/2012**
DATE FINISH: **1/4/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
151 125						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
146 130						Total depth of coring: 125' bgs Perched groundwater encountered @26.2', 67', 71.4' and 79' bgs Local groundwater table encountered @87' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
141 135						
136 140						
131 145						
126 150						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 6**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/05/12	ATD	▽ 40.8				INCLINED	Bit (Feet)	
01/05/12	ATD	▼ 83				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **1 of 5**
ELEVATION: **271 Feet**
DATE START: **1/4/2012**
DATE FINISH: **1/5/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
271 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Artificial fill (Af) **Terraced Lawn Area** @0' to 2': Silty Clayey SAND to Sandy CLAY (SC-CL), with layers of sandy gravel with cobbles, porous, voids lined with water
	0-5	Box 1	5	100		**Quaternary older alluvial and fluvial deposits (Qoaf):** @2' to 9.5': Silty Clayey SAND to Sandy CLAY (SC-CL), with layers of sandy gravel with cobbles from approx. 3' to 4.5', porous, voids lined with water
266 5						
	5-10	Box 1	5	100		
261 10						@9.5' to 10': Silty CLAY (CL), orange brown, very moist, trace fine sand, moderately plastic, trace pinhole voids (1-2mm), becomes Sandy CLAY (CL_s)
	10-15	Box 1	5	100		@10' to 15': Sandy CLAY (CL_s), brown, soft, very moist, fine sand with occasional slaty angular rock fragments, becomes wet at 14' to 15', pockets of silty fine sand retaining water
256 15						@15' to 15.7': Becomes Silty SAND (SM), soft, moist, light brown to brown, grades to
	15-20	Box 2	5	100		@15.7' to 21.2': Silty SAND (SM-SC), brown, very moist, very fine sand with occasional slaty rock fragment @ 19.6', trace subrounded SILTSTONE rock fragment, @16': Depth of Fault Trench FT-2 @Station 0+59
251 20						
	20-25	Box 2	5	100		@21.2' to 23.4': Sandy CLAY (CL_s), hard, olive brown, moist, well developed blocky structure, clay lined faces, Marker Bed 1: Paleosol
						@23.4' to 25': Grades to Sandy CLAY (CL_s) with gravel, fine to coarse sand, fine subangular slaty gravel, weakly developed blocky structure, well oxidized, thin bed of slaty to SILTSTONE gravel @24'
246 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 6**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/05/12	ATD	▽ 40.8				INCLINED	Bit (Feet)	
01/05/12	ATD	▼ 83				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 5**
ELEVATION: **271 Feet**
DATE START: **1/4/2012**
DATE FINISH: **1/5/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
246 25	25-30	Box 2	5	100		@25' to 30': Silty Sandy CLAY (CL_s), hard, reddish brown, moist, fine sand, trace coarse subangular gravel and occasional, elongated well rounded, slaty gravel
241 30	30-35	Box 3	5	100		@30' to 35': Silty Sandy CLAY (CL_s) with gravel, moderately hard, brown, moist, fine coarse sand and subangular to rounded gravel
236 35	35-40	Box 3	5	100		@35' to 35.7': Sandy Clayey SILT (ML), soft, dark brown, moist, fine sand, trace black slaty fine gravel @35.7' to 36.6': Silty CLAY (CL), mottled dark reddish brown to grayish brown, moist, grades to @36.6' to 36.9': Silty SAND (SM), dark brown, very moist, fine grained @36.9' to 40.8': Silty Sandy CLAY (CL_s), dark brown, moderately indurated, moist, poorly developed blocky structure
231 40 ▽	40-45	Box 3	5	100		@40.8' to 41.3': Perched groundwater encountered @40.8' to 41.3': Silty SAND (SM), dark brown, loose, fine grained, quartz, feldspar, slaty fine sand grains, wet, grades to Silty CLAY (CL) @41.3' to 45': Silty CLAY (CL), hard, mottled, grayish brown to orange brown, moderately oxidized, some fine sand, homogeneous
226 45 ▽	45-50	Box 4	5	100		@45' to 45.9': Silty CLAY (CL), hard, mottled, grayish brown to orange brown, moderately oxidized, some fine sand, homogeneous @45.9': Perched groundwater encountered @45.9 to 46.5': Gravelly SAND (SP_g) with clay, loose, dark brown, wet, fine to coarse sand, fine subrounded gravel, grades to Silty CLAY (CL) @46.5' to 55': Silty CLAY (CL), mottled orange brown to gray brown, very moist, fine sand matrix, trace gravel (SILTSTONE rock fragment) @49': Perched groundwater encountered
221 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 6**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/05/12	ATD	▽ 40.8				INCLINED	Bit (Feet)	
01/05/12	ATD	▼ 83				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 5**
ELEVATION: **271 Feet**
DATE START: **1/4/2012**
DATE FINISH: **1/5/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
221 50	50-55	Box 4	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @46.5' to 55': Silty CLAY (CL), mottled orange brown to gray brown, very moist, fine sand matrix, trace gravel (SILTSTONE rock fragment) @50.2' to 50.4': Silty SAND (SM), homogeneous, moderate blocky structure, free water on poorly formed soil faces
216 55	55-60	Box 4	5	100		@55' to 59.4': Silty Sandy CLAY (CL_s), mottled, reddish brown to orange brown and gray brown, gleying along poorly developed blocky structure, fine to coarse sand, fine subrounded-subangular gravels, oxidized on soil faces, Marker Bed 2
211 60	60-65	Box 5	5	100		@59.4' to 60': Becomes Sandy CLAY (CL_s), mottled orange brown to gray brown, moist, hard, oxidized, "paprika like" charcoal fragments 5th Jan 2012 groundwater measured at 43.6' 0815hrs @60' to 62.2': Sandy SILT (ML), hard, mottled orange brown to olive brown, very moist, poorly developed blocky structure, managnese development ▽ @62.2': Perched groundwater encountered @62.2' to 62.5': Grades to coarse grained, loose, SAND (SP), fine to coarse sand, fine subrounded gravels, fluvial origin, wet, yellow brown @63.5': Abrupt contact, becomes Silty CLAY (CL), orange brown, hard, moist, olive to brown, Mn within matrix
206 65	65-70	Box 5	5	100		@67.6': Grades to Clayey SAND to Silty SAND (SC-SM), unconsolidated, orange brown to olive brown, moist, fine to medium sand, trace coarse sand to fine gravel, size subrounded black slate @68.7' to 70.6': Grades to Sandy CLAY (CL_s), dark brown Paleosol, hard, moist, fine grained, becomes Silty CLAY (CL), well develoed blocky structure, Marker Bed 3: Paleo Surface
201 70	70-75	Box 5	5	100		**Carbonate Package** @70.6' to 73.3': Paleosol-carbonaceous Silty CLAY (CL), whitish gray, blocky to hackly structure, moderately cemented with coarse sand size $CaCO_3$ concretions, mild Mn development on broken soil faces, some water on soil fracture faces, carbonatization lessens with depth, erosional contact with above, @73.3' to 74.6': Becomes Silty Clayey SAND (SC-SM), mottled orange brown to olive brown, very moist, moderately indurated, fine grained, oxidized
▽ 196 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 6**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/05/12	ATD	▽ 40.8				INCLINED	Bit (Feet)	
01/05/12	ATD	▼ 83				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **271 Feet**
DATE START: **1/4/2012**
DATE FINISH: **1/5/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
196 75						@74.6' to 75': Silty SAND (SM), loose, orange brown, wet, fine grained,
						@75' to 76.1': No Recovery, wet sand in barrel
	75-80	Box 6	3.9	78		@76.1' to 78.1': Clayey SAND (SC), wet, predominantly fine grained olive brown to grayish white thin layers of olive gray sand and silt
						@74.6' to 78': Perched groundwater encountered
						@78.1' to 79.5': Sandy SILT (ML) with clay, hard, olive gray to dark orange brown, moist, fine grained
191 80						@79.5' to 80': Becomes Sandy CLAY (CL_s), very hard, heavily oxidized, dark orange brown to dark blackish brown, slightly moist, fine grained
						San Pedro Formation (Qsp)
						@80' to 82.5': No Recovery, wet sand in barrel
▼	80-85	Box 6	2.5	50		@82.5' to 85': SAND (SP), unconsolidated, wet, olive brown to orange brown, fine grained, homogeneous, moderate oxidation in pockets
						@83': Local groundwater table encountered
186 85						@85' to 86.9': No Recovery
	85-90	Box 6	3.1	62		@86.9' to 90': SAND (SP), unconsolidated, moist, bluish green, fine grained, poorly graded
						@89': Gravel, fine to coarse, rounded, flattened black slaty gravel, siliceous, volcanic dark green, and siliceous quartz, gravels
181 90						@89.9' to 90': Cemented sand, overlies cobble >3 inches in size, cobble wedged in sampler head
	90-95	Box 7	5	100		@90' to 91.1': Sandy GRAVEL (GP_s), fine to coarse sand, gravel subrounded to rounded consists of phyllitic slate, granitic clasts, some slaty gravel, small well rounded cobbles, in fine to coarse sandy matrix, wet, well graded, loose
						@91.1' to 95': Sandy SILT to Silty SAND (ML-SM), loose, olive brown, wet, very fine grained with occasional coarse sand lense, becomes well oxidized to orange brown, @94.6', oxidation as pockets of medium sand
176 95						@95' to 96.6': No Recovery
	95-100	Box 7	3.4	68		@96.6' to 100': SAND (SP), unconsolidated, olive brown to orange brown, wet, fine grained, oxidized, poorly graded in pockets and as lenses of medium sand, experienced heave in augers
171 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 6**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/05/12	ATD	▽ 40.8				INCLINED	Bit (Feet)	
01/05/12	ATD	▼ 83				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 5**
ELEVATION: **271 Feet**
DATE START: **1/4/2012**
DATE FINISH: **1/5/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
171 100	100-105	Box 7	5	100		@96.6' to 100': SAND (SP), unconsolidated, olive brown to orange brown, wet, fine grained, oxidized, poorly graded in pockets and as lenses of medium sand, experienced heave in augers @100' to 105': SAND (SP), yellowish brown, massive, homogeneous, poorly graded, predominantly quartz sand with trace slaty fine sand
166 105	105-110	Box 8	4.6	92		@105' to 105.4': No Recovery @105.4' to 109.8': SAND (SP), loose, light brown, wet, fine sand, poorly graded, some silt and fine sand sized to fine gravel sized slaty fragments, subrounded, flattened slaty gravel, homogeneous, massive
161 110	110-115	Box 8	2.3	46		@109.8' to 110': Laminated gray brown Silty CLAY (CL) with sand laminations, dark orange brown, moist @110' to 112.7': No Recovery, wet sand in barrel @112.7' to 115': Sandy SILT to Silty SAND (ML-SM), loose, orange brown, very moist, trace clay and sea shells
156 115	115-120	Box 8	3.4	68		@115' to 116.6': No Recovery **San Pedro Formation: Marine (Qsp):** @116.6' to 116.8': Concretionary Sandy SILT (ML), micaceous with sea shells @116.8': Sandy SILT (ML), hard, dark gray, wet, very fine marine sand,
151 120						Total depth of coring: 120' bgs Perched groundwater encountered @40.8'-41.3', 45.9', 49', 62.2', and 74.6'-78' bgs Local groundwater table encountered @83' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
146 125						

FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS

The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 7**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/06/12	ATD	▽ 45				INCLINED	Bit (Feet)	
01/06/12	ATD	▼ 75				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **1 of 5**
ELEVATION: **263 Feet**
DATE START: **1/5/2012**
DATE FINISH: **1/6/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
263 / 0	0-5	Box 1	5	100		**Artificial fill (Af)** **Terraced Lawn Area** @0' to 2.7': Silty Sandy CLAY (CL_s), dark black, moist, fine to coarse sand, fine gravel and brick fragments
						Quaternary older alluvial and fluvial deposits (Qoaf): @2.7' to 5': Sandy Clayey SILT (ML), brown, dry, fine sand, fine to coarse subangular to subrounded gravels, occasional basalt fragments and concrete debris
258 / 5	5-10	Box 1	5	100		@5' to 8.2': Sandy SILT (ML), brown, moist, fine sand, porous, 1 to 2 mm voids, unlined, with thin bed of dark red Silty CLAY (Paleosurface)
						@8.2' to 9.1': Clayey SAND (SC) with gravel, dark brown, fine to coarse sand, fine to coarse gravel, subangular to angular gravels and rock fragments
253 / 10	10-15	Box 1	5	100		@9.1' to 10': Sandy Silty CLAY (CL_s), hard, brown, very moist, very fine sand, grades to Silty SAND (SM) @10' to 10.4': Silty SAND (SM), dark brown, very moist, fine grained, grades to silty clay @10.4' to 12.2': Silty CLAY (CL), brown, very moist, some fine sand and subangular slaty and SILTSTONE gravels @12.2' to 12.4': SAND (SP), brown, moist, fine to medium sand with coarse sand sized slate @12.4' to 15': Becomes Silty CLAY to Clayey SILT (CL-ML), brown, very moist, some fine sand @14' (approx. due to projection): Depth of Fault Trench FT-2 @ Station 1+24
248 / 15	15-20	Box 2	5	100		@15' to 15.5': SAND (SP), loose, brown, fine to medium grained, with some subrounded gravel @15.5' to 20': Silty CLAY (CL) with gravel, hard, dark olive brown, moist, some sand and fine subrounded to subangular slaty gravels, well developed blocky structure, Marker Bed 1: Paleosol @17.8': Thin bed of black slaty gravel with SILTSTONE rock clasts
243 / 20	20-25	Box 2	5	100		@20' to 25': Sandy Clayey SILT to Silty Sandy CLAY (CL-ML), moderately hard to hard, brown, moist, fine to medium silty sand, homogeneous
238 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 7**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/06/12	ATD	▽ 45				INCLINED	Bit (Feet)	
01/06/12	ATD	▼ 75				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 5**
ELEVATION: **263 Feet**
DATE START: **1/5/2012**
DATE FINISH: **1/6/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
238 25	25-30	Box 2	5	100		@25' to 30': Sandy Silty CLAY (CL_s), hard, mottled orange brown to gray brown, moist, fine sand with slaty fine gravel
233 30	30-35	Box 3	5	100		@30' to 35': Sandy CLAY (CL_s), hard, mottled olive brown to orange brown, moist, fine sand and scattered gravels, moderately developed blocky structure
228 35	35-40	Box 3	5	100		@35' to 40': Sandy CLAY (CL_s), hard, mottled reddish brown to orange brown, moist, fine sand and fine coarse subrounded to rounded granitic and slaty gravel @37.1', trasnsitions to fine grained clayey sand
223 40	40-45	Box 3	5	100		@40' to 45': Sandy Silty CLAY (CL-ML), gradational proportions of silt and clay, fine sand, very moist
218 ▽ 45	45-50	Box 4	5	100		@45': Perched groundwater encountered at contact @45' to 48.8': Sandy Silty CLAY (CL_s), hard, dark brown to reddish brown, moist, fine to medium sand with occasional fine slaty gravels, poorly developed soil fracture, blocky
▽ 213 50						@48.8' to 50': Gravelly CLAY (GC) with sand, dark reddish brown, wet, fine to medium sand, fine slaty gravel, oxidized along poorly developed soil

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 7**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/06/12	ATD	▽ 45				INCLINED	Bit (Feet)	
01/06/12	ATD	▼ 75				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 5**
ELEVATION: **263 Feet**
DATE START: **1/5/2012**
DATE FINISH: **1/6/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
213 50	50-55	Box 4	5	100		boundaries @49': Perched groundwater encountered @50' to 54.8': Silty Sandy CLAY (CL_s), hard, mottled olive brown to orange brown, moist, fine sand and slaty rock fragments, poorly developed blocky structure, oxidized, Marker Bed 2
208 55	55-60	Box 4	5	100		@54.8' to 56.1': Silty SAND (SM), unconsolidated, orange brown to brown, very moist, fine to coarse sand, fine subangular to subrounded slaty gravel, well graded, @56.1' abrupt contact @56.1' to 60': Silty CLAY (CL), mottled brown to olive brown to orange brown, moist, some fine sand, homogeneous
203 ▽ 60	60-65	Box 5	5	100		@60': Perched groundwater encountered @60' to 60.7': Silty CLAY (CL), hard, dark brown, moist, fine grained, grades to Silty SAND (SM) from 60.7' to 61.1' @61.1' to 61.6': SAND (SP), loose, brown, wet, fine grained, grades to sandy clay with silt @61.6 to 64.5': Silty Sandy CLAY (CL_s), hard, dark brown paleosol, moist, fine grained sand, erosional contact with below, well developed blocky structure, Marker Bed 3
▽						@64.5': Perched groundwater encountered
198 65	65-70	Box 5	3	60		**Carbonate Package** @64.5' to 65.2: Paleosol-Silty Carbonaceous CLAY (CL), whitish gray, blocky to hackly structure moderately cemented to friable, trace Mn with coarse sand sized angular concretions, moderately cemented $CaCO_3$ lessens with depth, some water on fracture faces @65.2' to 66.7': Grades to Silty CLAY (CL), hard, olive brown to dark orange brown, moist, trace fine sand @66.7' to 67': Thin horizontal layer of Carbonaceous CLAY (CL), grades downward to Silty Clayey SAND (SC-SM), moderately hard, olive brown, moist, very fine sand, maganese in matrix
193 70	70-75	Box 5	4.1	82		@67' to 68': Perched groundwater encountered @67' to 68': SAND (SP), loose, brown to orange brown, wet, fine grained, homogeneous, oxidized @68' to 70.9': No Recovery-wet sand in barrel @70.9' to 72.6': SAND (SP), moderately hard, fine grained, very moist, trace slaty fine sand, heavily oxidized @72.6' to 73.3': Silty CLAY (CL), hard, olive brown, moist, erosional contact with below
188 ▼ 75						**San Pedro Formation (Qsp):** @74' to 75': SAND (SP), light brown to orange brown, moist, fine grained

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 7**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/06/12	ATD	▽ 45				INCLINED	Bit (Feet)	
01/06/12	ATD	▼ 75				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **263 Feet**
DATE START: **1/5/2012**
DATE FINISH: **1/6/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
188 75						@75': Local groundwater table encountered Groundwater at 56.46' bgs at 0750hrs 6th, Jan 2012 Groundwater at 71' bgs 5th, Jan 2012; @75' to 77': No Recovery-wet sand in barrel
	75-80	Box 6	3	60		@77' to 80': SAND (SP), unconsolidated, orange brown to olive brown, fine grained, predominantly quartz sand, trace feldspar, oxidized, poorly graded
183 80						@79.6': Color change, dark olive green
						@80' to 82': No Recovery-wet sand in barrel
	80-85	Box 6	3	60		@82' to 85': SAND (SP), becomes coarse grained @83.4' wet with clay in matrix, dark green to oxidized orange brown, some fine, rounded gravel and clay laminations, well graded
178 85						@85' to 88': No Recovery-wet sand in barrel
	85-90	Box 6	2	40		@88' to 90': SAND (SP), loose, yellow brown, wet, fine grained, predominantly quartz sand, trace feldspar and slaty fine sand, trace rounded gravel, massive poorly graded
173 90						@90' to 92': No Recovery, wet sand in barrel
	90-95	Box 7	3	60		@92' to 93.5': SAND (SP), loose, yellow brown, wet, fine grained, predominantly quartz sand, trace feldspar and slaty fine sand, trace rounded gravel, massive poorly graded
						@93.5': COBBLE (GP), well rounded, 3-inches along the long dimension, overlies well oxidized sand with laminations consisting of oxidized sands with few clayey sand laminae
168 95						@95' to 96.8': No Recovery, wet sand in barrel
	95-100	Box 7	3.2	64		@96.8' to 97.4': SAND (SP), yellow brown,, wet, fine sand, massive, poorly graded @97.4' to 100': Color change, olive brown, fine grained with silt, @99.2' becomes oxidized, coarse sand in matrix
163 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 7**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
01/06/12	ATD	▽ 45				INCLINED	Bit (Feet)	
01/06/12	ATD	▼ 75				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 5**
ELEVATION: **263 Feet**
DATE START: **1/5/2012**
DATE FINISH: **1/6/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
163 100						@100' to 101.6': No Recovery, wet sand in barrel
	100-105	Box 7	3.4	68		@101.6' to 103.9': SAND (SP), loose, brown, wet, fine grained quartz sand with trace feldspar and mica, massive @103.9' to 105': Mottled orange brown to brown to olive brown
158 105						@105' to 106.6': No Recovery, wet sand in barrel
	105-110	Box 8	3.4	68		@106.6' to 108.5': SAND (SP), with silt, moderately indurated, mottled brown, orange brown to gray, wet, very fine sand
153 110						**San Pedro Formation: Marine (Qsp):** @108.5' to 110': Dark gray, angular concretionary SILTSTONE rip up clast with shells, trace shells above for several inches, becomes dark gray, fine grained Sandy SILT (ML) below 108.5', storm surge @110' to 112.5': No Recovery, wet sand in barrel
	110-115	Box 8	2.5	50		@112.5' to 114': SAND (SP), brown, unconsolidated, wet, fine sand, trace shell debris, poorly graded, massive @114': Erosional contact, nearly horizontal, uneven, becomes Sandy SILT (ML), dark gray, wet, very fine marine sand with some shell debris
148 115						@115' to 117': No Recovery
	115-120	Box 8	3	60		@117': Concretionary dark gray Sandy SILT (ML) with shells, becomes moderately hard sandy clayey silt with fine grained sand and shells to total depth
143 120						Total depth of coring 120' bgs Perched groundwater encountered @45', 49', 60', 64.5', and 67'-68' bgs Local groundwater table encountered @75' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
138 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 8**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/19/11	ATD	▽ 20				INCLINED	Bit (Feet)	
12/19/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**252 Feet**
DATE START:	**12/19/2011**
DATE FINISH:	**12/19/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
252 / 0						**Artificial fill (Af)** @0' to 2': Sandy CLAY (CL_s), dark brown, very moist, fine grained with rootlets
						Quaternary older alluvial and fluvial deposits (Qoaf): @2' to 4': Sandy CLAY (CL_s), dark brown, fine grained
						@4' to 5': Sandy Silty CLAY (CL_s), brown, moist, fine grained, trace fine gravel
247 / 5						@5' to 5.9': No Recovery
	5-10	Box 1	4.1	82		@5.9' to 6.6': Sandy CLAY (CL_s), dark brown, very moist, fine grained with rootlets @6.6' to 7.5': Sandy CLAY (CL_s), mottled dark brown, light orange brown, very moist, fine grained sand with rootlets
						@7.5' to 8.5': Clayey SAND (SC), orange brown, moist, medium sand, porous
242 / 10						@8.5' to 10': Sandy CLAY (CL_s), mottled olive brown to olive green, moist, fine sand, Mn stains and Mn nodules, blocky structure, Marker Bed 1: Paleosol
	10-15	Box 2	5	100		@10' to 14.5': Sandy CLAY (CL_s), mottled, olive brown, moist, fine sand, subangular pebbles, blocky structure, moderate clay development along soil faces @12': Depth of Fault Trench FT-2 @Station 1+90 @13.8': Abundant white SILTSTONE rock clasts (rock-line)
237 / 15						@14.5' to 15': Sandy CLAY (CL_s), mottled orange brown, moist, fine sand, subangular slaty gravel @15' to 16.8': Sandy CLAY (CL_s), mottled olive, orange brown, moist, fine sand, subangular pebbles, blocky structure
	15-20	Box 3	2.5	50		@16.8' to 17.5': Clayey SAND (SC), mottled red brown, moist, medium sand, angular gravel and angular pebbles @17.5' to 20': No Recovery
232 ▽ / 20						@20' to 22.5': Perched groundwater encountered @20' to 22.5': Gravelly SAND (SP_g), dark brown, wet, coarse grained, subrounded pebbles and gravels, subangular pebbles and gravels
	20-22.5	Box 3	2.5	100		
	22.5-25	Box 4	0	0		@22.5 to 25': No Recovery
227 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 8**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/19/11	ATD	▽ 20				INCLINED	Bit (Feet)	
12/19/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 5**
ELEVATION: **252 Feet**
DATE START: **12/19/2011**
DATE FINISH: **12/19/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
227 25	25-27.5	Box 4	2.5	100		@25' to 25.5': Sandy CLAY (CL_s), mottled orange to olive, very moist, Mn staining, Fe staining @25.5' to 25.7': Clayey SAND (SC), mottled orange to olive, very moist, coarse grained, Mn and Fe stains @25.7' to 28.2': Sandy CLAY (CL_s), mottled, orange to olive, very moist, fine sand, Mn nodules, Fe stains
	27.5-30	Box 4	2.5	100		@28.2' to 30.5': Sandy CLAY (CL_s), mottled olive with orange, very moist, fine to medium sand, Fe stains, subangular gravel
222 30	30-32.5	Box 5	2.5	100		@30.5' to 31.1': Sandy CLAY (CL_s), mottled olive with orange, very moist, fine to medium sand, Fe stains, Mn nodules, subangular pebbles @31.1' to 33.4': Clayey SAND (SC), olive brown, fine grained, very moist, Fe staining
▽	32.5-35	Box 5	2.5	100		@33.4': Perched groundwater encountered @33.4' to 33.5': Clayey SAND (SC), dark brown, coarse grained, wet
217 ▽ 35	35-37.5	Box 6	2.5	100		@33.5' to 35': Sandy CLAY (CL_s), moist, red brown, fine grained, Mn nodules, subangular pebbles, Fe staining, blocky structure @35' to 36.1': Perched groundwater encountered @35' to 36.1': SAND (SP), dark brown, wet, medium grained, poorly graded @36.1 to 36.9': SAND (SP), red brown, medium grained, poorly graded, wet, with subangular pebbles, upward fining sequence
	37.5-40	Box 6	2.5	100		@36.9' to 37.5': Sandy CLAY (CL_s), mottled olive, orange, fine sand, moist, Fe stains @37.5' to 38.5': Clayey SAND (SC), brown, moist, very fine to fine grained, Fe stains, moderate blocky structure, paleosurface, oxidized along soil faces @38.5' to 40': Clayey SAND (SC), mottled olive to dark brown, moist, fine to very fine sand, Mn nodules, Fe stains, subangular pebbles,
212 40	40-42.5	Box 7	2.5	100		Marker Bed 2 @40' to 44.3': Sandy CLAY (CL_s), mottled olive to orange, fine sand, moist, subangular pebbles, angular gravel, Mn nodules, Fe staining along soil faces
	42.5-45	Box 7	2.5	100		
207 45	45-47.5	Box 8	2.5	100		@44.3' to 44.8': CLAY (CL), olive light brown, moist, Mn nodules, Fe staining @44.8' to 46': Sandy CLAY (CL_s), mottled olive to orange, moist, fine sand, Mn nodules and Fe staining
▽						@46' to 47': Perched groundwater encountered @46' to 47': Gravelly SAND (SP_g), dark brown, wet, subangular pebbles and gravels
	47.5-50	Box 8	0	0		@47' to 47.5': Sandy CLAY (CL_s), olivebrown Paleosol, moist, fine sand, Mn nodules and Fe staining, well developed blocky structure @47.5' to 50': No Recovery
202 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 8**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/19/11	ATD	▽ 20				INCLINED	Bit (Feet)	
12/19/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 5**
ELEVATION: **252 Feet**
DATE START: **12/19/2011**
DATE FINISH: **12/19/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
202 50	50-52.5	Box 8	2.5	100		**Carbonate Package** @50' to 50.9': Sandy CLAY (CL_s), brown, moist, fine sand, Mn nodules, $CaCO_3$ stringers, Marker Bed 3 @50.9' to 51.9': Sandy CLAY (CL_s), olive brown, moist, fine sand, Mn nodules, $CaCO_3$ stringers, Fe staining
	52.5-55	Box 9	2.5	100		@51.9' to 52.5': Clayey SAND (SC), olive, moist, fine sand, $CaCO_3$ stringers, Fe staining and sharp contact with below @52.5' to 53.4': Clayey SAND (SC), dark olive brown, moist, fine sand, $CaCO_3$ nodules, and Fe staining,
197 55	55-57.5	Box 9	2.5	100		@53.4' to 54': Clayey SAND (SC), olive brown, moist, fine sand, $CaCO_3$ nodules, and Fe staining @54' to 55': Clayey SAND (SC), olive brown, moist, fine grained, Fe staining, angular pebbles
	57.5-60	Box 10	2.5	100		**San Pedro Formation (Qsp)** @55' to 55.5': Silty SAND (SM), olive brown, moist to very moist, fine sand to medium sand, massive @55.5' to 56.1': Silty SAND (SM), olive brown, moist, fine sand, massive, Fe staining @56.1' to 57.5': Silty SAND (SM), red brown, moist, fine sand, massive, Fe staining
192 60	60-62.5	Box 10	2.5	100		@57.5' to 60': Silty SAND (SM), red dark brown, moist, fine sand, massive, Fe staining @60' to 61': Silty SAND (SM), red brown, moist to very moist, massive @61' to 62.5': Silty SAND (SM), yellowish brown, moist, massive, Fe staining
	62.5-65	Box 11	2.5	100		@62.5' to 63.3': Silty SAND (SM), moist, yellowish orange brown, fine sand, massive, Fe stains 63.3' to 65': SAND (SP), light brown to brown, very moist, medium sand, massive
▼ 187 65	65-67.5	Box 11	2.5	100		@65': Local groundwater table encountered @65' to 65.7': SAND (SP), yellowish dark gray, very moist to wet, fine to medium sand, upward fining @65.7' to 66.2': SAND (SP), yellowish gray, very moist to wet, fine sand, massive Fe staining
	67.5-70	Box 12	0	0		@66.2' to 67.5': SAND (SP), greenish blue, very moist to wet, fine sand, Fe staining, massive @67.5' to 70': No Recovery, wet barrel
182 70	70-72.5	Box 12	2.5	100		@70' to 72': SAND (SP), olive gray, wet, fine to medium sand, Fe staining, massive, poorly graded
	72.5-75	Box 12	2.5	100		@72' to 72.2': Gravelly SAND (SP_g), orange, olive, fine to coarse sand with Fe stains, angular pebbles @72.2' to 76.7': Gravelly SAND (SP_g), red light brown, wet, Fe stains, subangular to subrounded gravels and pebbles
177 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 8**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/19/11	ATD	▽ 20				INCLINED	Bit (Feet)	
12/19/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 5**
ELEVATION:	**252 Feet**
DATE START:	**12/19/2011**
DATE FINISH:	**12/19/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
177 75	75-77.5	Box 13	2.5	100		@72' to 72.2': Gravelly SAND (SP_g), orange, olive, fine to coarse sand with Fe stains, angular pebbles
						@76.7' to 78.2': Silty SAND to Sandy SILT (SM-ML), fine sand, olive brown, wet, Fe stains prevalent
	77.5-80	Box 13	2.5	100		@78.2' to 78.7': Silty SAND (SM), olive dark brown, wet, fine sand, subrounded gravel and subangular gravel
						@78.7' to 80': Silty SAND to Sandy SILT (SM-ML), olive, wet, massive, fine to very fine sand, Fe stains
172 80	80-82.5	Box 14	2.5	100		@80' to 81.2': SAND (SP), olive brown, wet, well graded, massive, subangular pebbles
						@81.2' to 82.5': Silty SAND (SM), olive red brown, wet, fine sand, Fe staining prevalent
	82.5-85	Box 14	2.5	100		@82.5' to 83.8': Silty SAND (SM), brown, wet, massive fine sand
						@83.8' to 85': Silty SAND (SM), mottled olive to orange brown, wet, Fe stain prevalent
167 85	85-87.5	Box 15	0	0		@85' to 90': No Recovery
	87.5-90	Box 15	0	0		
162 90	90-92.5	Box 15	0	0		@90' to 92.5': No Recovery
	92.5-95	Box 15	2.2	88		@92.5' to 93.2': Silty SAND to Sandy SILT (SM-ML), orange brown, wet, fine grained, Fe stains
						@93.2' to 93.5': Sandy SILT (ML), orange brown, wet
						@93.5' to 95': No Recovery
157 95	95-97.5	Box 15	1.3	52		@95' to 95.3': Silty SAND (SM), red brown, wet, fine sand, Fe staining, Mn nodules
						@95.3 to 96.3': Silty SAND (SM), olive, orange, wet, fine sand, Fe stains and Mn nodules
						@96.3' to 97.5': No Recovery
	97.5-100	Box 15	2.5	100		@97.5' to 99.9': Sandy SILT to Silty SAND (ML-SM), olive red brown, wet, fine sand, Mn nodules and Fe staining
152 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 8**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/19/11	ATD	▽ 20				INCLINED	Bit (Feet)	
12/19/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**252 Feet**
DATE START:	**12/19/2011**
DATE FINISH:	**12/19/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
152 100	100-102.5	Box 16	2.5	100		**San Pedro Formation: Marine (Qsp):** @99.9' to 107': Sandy SILT to Silty SAND (ML-SM), dark gray, massive, very fine marine sands with sea shells, bivalves, abrupt horizontal contact with above
	102.5-105	Box 16	2.5	100		
147 105	105-107.5	Box 17	2.5	100		
	107.5-108.5	Box 17	1	100		@107' to 108.5': Sandy SILT to Silty SAND (ML-SM), dark gray, massive, fine sand, sea shells prevalent
142 110						Total depth of coring: 108.5' bgs Perched groundwater encountered @20'-22.5', 33.4', 35'-36.1', and 46'-47' bgs Local groundwater table encountered @65' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
137 115						
132 120						
127 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 9**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 37				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **1 of 5**
ELEVATION: **250 Feet**
DATE START: **12/20/2011**
DATE FINISH: **12/20/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
250 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Artificial fill(Af) @0' to 2.5': Clayey SAND (SC), dark brown, moist, fine grained, rootlets and subangular pebbles
						Quaternary mudflow (Qmf): @2.5' to 7': Clayey SAND to Silty SAND (SM-SC), brown to dark brown, slightly moist, porous, fine to coarse grained with occasional scattered gravel, friable, angular to well rounded gravel and rock clasts
245 / 5						
	5-10	Box 1	5	100		**Quaternary mudflow (Qmf):** @7' to 8.5': Clayey SAND (SC), medium brown, moist, fine grained, subangular to angular slaty pebbles, moderate blocky structure
						@8.5' to 11.5': Sandy CLAY to Clayey SAND (CL-SC), olive brown, moist, fine sand, subangular pebbles and few coarse sand
240 / 10						
	10-15	Box 2	4.5	90		**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @11.5' to 14': Sandy CLAY to Clayey SAND (CL-SC), olive brown, moist, fine sand, subangular pebbles and few coarse sand
						@13' to 15': No Recovery
						@14': Depth of Fault Trench FT-2 @Station 2+52
235 / 15						
	15-16.5	Box 3				@15' to 16': Sandy CLAY (CL_s), brown, moist, fine sand, subangular slaty gravel and pebbles
						@16' to 16.5': Gravelly SAND (SP_g), brown, moist to very moist, subrounded gravel
	16.5-20	Box 3	1.5	30		@16.5' to 20': No Recovery, possible cobble obstruction
230 / 20						
						@20' to 21.1': Silty SAND (SM), brown, moist, fine grained with subangular gravel
						@21.1' to 22.5': Gravelly SAND (SP_g), gray brown, moist, with subrounded pebbles and gravels
	20-25	Box 3	2.5	50		@22.5' to 25': No Recovery, possible cobble obstruction
225 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 9**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 37				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 5**
ELEVATION:	**250 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/20/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
225 25	25-30	Box 3	5	100		@25' to 28': Gravelly SAND (SP_g), moist, gray brown, subrounded pebbles and gravels
						@28' to 28.5': Basal Gravelly SAND (SP_g), moist, black, hydrocarbon sheen and odor sample collected for testing, Max. Concentration of 62.6ppm while in bag (in-field test), erosional contact with below
220 30	30-35	Box 4	5	100		**Quaternary older alluvial and fluvial deposits (Qoaf):** @28.5' to 30': CLAY (CL), moist, mottled olive green, Fe stains and Mn nodules, blocky structure, laminated near contact, becomes sandy below, fine grained sand @30' to 31.5': Sandy CLAY (CL_s), olive brown, moist, fine sand, with Fe stains and subangular pebbles @31.5' to 31.7': SAND (SP) with gravel, orange brown, moist, fine sand, subangular gravel and pebbles @31.7' to 34.5': Sandy CLAY (CL_s), olive brown, moist, fine grained, with Fe stains and subangular pebbles
215 35	35-40	Box 5	3.5	70		@34.5' to 34.7': Granitic COBBLE (COBBLES) @34.7' to 35': Clayey SAND (SC), olive brown, moist, fine grained, with Fe stains and blocky structure @35' to 37.5': No Recovery, wet sand in barrel @37': Perched groundwater encountered @37.5' to 39': Silty SAND (SM), olive dark brown, moist to very moist, fine grained, blocky structure, subrounded pebbles, Marker bed 2: Paleosurface
210 40	40-42.5	Box 5	5	100		@39' to 41.9': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe staining, and Mn nodules, oxide specks, calcium carbonate along soil fractures and pebbley gravels
						@41.9' to 42': GRAVEL (GP), blackish orange, angular slate, oxide specks
	42.5-45	Box 6				@42' to 45': Sandy CLAY (CL_s), mottled olive orange, moist, fine grained, Fe stains and Mn nodules, minor calcium carbonate rimming gravels
205 ▽ 45	45-47.5	Box 6	5	100		@45': Perched groundwater encountered @45' to 46.1': Clayey SAND (SC), olive, wet, fine grained, subrounded gravels, upward fining sequence @46.1' to 46.8': Sandy CLAY (CL_s), olive very moist, fine sand, blocky structure
	47.5-50	Box 7				@46.8' to 49.2': Sandy CLAY (CL_s), olive, moist, fine grained sand, Fe stains and Mn nodules, angular pebbles
200 50						@49.2' to 50': Clayey SAND (SC), mottled, olive orange, moist, fine grained, Fe

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 9**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 37				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 5**
ELEVATION:	**250 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/20/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
200 50	50-52.5	Box 7	5	100		stains, angular pebbles @50' to 51.5': Sandy CLAY (CL_s), olive, moist, very fine sand, Fe stains and Mn nodules, grades to @51.5' to 52.5': Sandy CLAY (CL_s), brown to dark brown Paleosol, moist, very fine grained, Fe stains and Mn nodules, moderately developed blocky structure, Marker Bed 3 **Carbonate Package** @52.5' to 55': Sandy CLAY (CL_s), brown to olive brown, moist, very fine sand, with $CaCO_3$ nodules, and Fe staining, grades to Clayey SAND (SC), olive, moist, very fine grained with $CaCO_3$ nodules
	52.5-55	Box 8				
195 55	55-57.5	Box 8	5	100		@55' to 55.3': Clayey SAND (SC), olive, moist to very moist, medium grained, Fe stains @55.3' to 57.5': Silty SAND (SM) with clay, olive brown, very moist, medium to fine grained, Fe stains
	57.5-60	Box 9				**San Pedro Formation (Qsp):** @57.5' to 59.5': Sand (SP) with clay, orange olive, very moist, medium to fine grained, Fe stains @59.5' to 62.5': Sand (SP) with clay, orange yellow, very moist, massive
190 60	60-65	Box 9	2.5	50		@62.5' to 65': No Recovery
185 ▼ 65	65-70	Box 10	5	100		@65': Local groundwater table encountered @65' to 69.5': SAND (SP), yellow gray, medium grained, massive, poorly graded, wet, unconsolidated, lack of fines
180 70	70-75	Box 11	2.5	50		@69.5' to 70': SAND (SP), yellow orange, wet, medium grained, massive poorly graded @70' to 72.5': No Recovery @72.5' to 74.5': Gravelly Sand (SP_g) with clay, yellow orange, wet, subrounded and subangular slaty gravel and pebbles
175 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 9**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 37				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 5**
ELEVATION:	**250 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/20/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
175 75	75-77.5	Box 11	4	80		@74.5' to 75': Silty SAND (SM), light brown to orange, mottled, wet, fine grained, Fe stains @75' to 75.4': Silty SAND (SM), mottled, orange to olive, wet, fine grained, Fe stains @75.4' to 75.7': Gravelly SAND (SP_g), mottled gray to orange, wet subrounded gravel and pebbles, Fe stains
	77.5-80	Box 12				@75.7' to 76.2': Silty SAND (SM), mottled orange to olive, wet, fine grained, Mn nodules, subangular pebbles and Fe stains @76.2' to 76.9': Gravelly SAND (SP_g), mottled gray to orange, wet, subrounded, pebbles, Fe stains
170 80	80-85	Box 12	3.5	70		@76.9' to 77.5': Silty SAND (SM), fine grained, mottled orange to yellow, wet, Fe stains, Mn nodules, subangular pebbles @77.5' to 78.4': Silty SAND (SM), olive, wet, fine grained, Fe stains @78.4' to 78.5': SAND (SP) fine to coarse grained, orange, wet, Fe stains @78.5' to 79': Silty SAND to Sandy SILT (SM-ML), olive, wet, fine grained, Fe stains @79' to 80': No Recovery @80' to 82': Silty SAND to Sandy SILT (SM-ML), mottled orange to olive, wet, massive, fine grained, Fe stains
165 85	85-90	Box 13	1.5	30		@82' to 82.5': No Recovery @82.5' to 84': Silty SAND to Sandy SILT (SM-ML), mottled olive to orange, wet, massive Fe stains, fine grained @84' to 87.5': No Recovery @87.5' to 89': Silty SAND (SM), orange, wet, fine grained, massive @89' to 90': No Recovery
160 90	90-95	Box 13	2.5	50		@90' to 90.8': Silty SAND to Sandy SILT (SM-ML), light orange, wet, massive, fine sand, Fe stains @90.8' to 91': Silty SAND (SM), brown, wet, massive fine grained @91' to 92.5': No Recovery @92.5' to 93.3': Silty SAND (SM), mottled orange to olive, wet, Fe stains, fine grained @93.3' to 94': Sandy SILT to Silty SAND (ML-SM), mottled, wet, Fe stains, Mn nodules, massive @94' to 95': No Recovery
155 95	95-97.5	Box 13				@95' to 96': Sandy SILT to Silty SAND (ML-SM), mottled orange to olive, wet, Fe staining @96' to 97.5': No Recovery
	97.5-100	Box 14	2.3	46		@97.5' to 98.7': Sandy SILT to Silty SAND (ML-SM), mottled orange to olive, Fe stains, Mn nodules, wet, fine grained, abrupt horizontal contact below **<u>San Pedro Formation: Marine (Qsp):</u>** @98.7' to 98.8': Silty SAND (SM), dark gray, wet, fine grained, massive, sea
150 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 9**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 37				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**250 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/20/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
150 100						shells, marine sand
						@98.8' to 100': No Recovery
						@100' to 101.6': Silty SAND (SM), dark gray, wet, fine grained, massive, abundant sea shells
	100-105	Box 14	4.1	82		@101.6' to 102.5': No Recovery
						@102.5' to 105.3': Silty SAND (SM), dark gray, wet, fine grained, massive, sea shells
145 105						
	105-107.5	Box 15	0	0		@105.3' to 107.5': No Recovery
140 110						Total depth of coring: 107.5' bgs Perched groundwater encountered @37' and 45' bgs Local groundwater table encountered @65' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
135 115						
130 120						
125 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 10**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**249 Feet**
DATE START:	**12/21/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
249 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Artificial fill (Af) @0' to 2.5': Clayey SAND (SC), dark brown, moist, fine grained with rootlets
						Quaternary mudflow (Qmf): @2.5' to 7': Clayey SAND (SC), dark brown, moist, fine grained with scattered subrounded pebbles and subangular gravel, porous, friable
244 / 5						
	5-10	Box 1	5	100		**Quaternary mudflow (Qmf):** @7' to 8': Clayey SAND to Sandy CLAY (SC-CL), brown, moist, fine sand, scattered subangular to rounded gravel, moderate blocky structure @8' to 12': Clayey SAND (SC), brown, moist, fine grained with subrounded pebbles and subangular gravel, few coarse grained sand
239 / 10						
	10-15	Box 2	2.5	50		**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @12' to 12.5': SAND (SP), gray dark brown, moist to very moist, fine to coarse sand, subrounded pebbles and subangular gravel @12.5' to 15': No Recovery
234 / 15						
	15-20	Box 2	2.5	50		@15' to 17': SAND (SP), gray dark brown yellowish, moist to very moist, fine to coarse sand, subangular pebbles and gravel @17': Depth of Fault Trench FT-2 @Station 2+95 @17' to 17.5': Clayey GRAVEL (GC), dark gray yellow, moist to very moist, subangular gravel, shales, Fe stains @17.5' to 20': No Recovery
229 / 20						
	20-25	Box 3	2.5	50		@20' to 20.1': Gravelly SAND (SP_g), dark gray yellow, moist to very moist, medium grained, subangular gravel @20.1' to 21.6': Silty SAND (SM), brown, moist to very moist, fine grained with subrounded pebbles @21.6' to 21.7': SAND (SP), brown, very moist, fine to coarse grained @21.7' to 22': SAND (SP), brown, very moist, fine grained, subrounded pebbles @22' to 22.5': Clayey SAND (SC), gray orange, fine to coarse grained, very moist, subangular gravel, subrounded pebbles
224 / 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 10**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 5**
ELEVATION:	**249 Feet**
DATE START:	**12/21/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
224 25	25-30	Box 3	2.5	50		@22.5' to 25': No Recovery @25' to 26': Clayey GRAVEL (GC), very moist, with coarse sand, subangular to angular slaty gravel and pebbles @26' to 26.3': Orangish gray weathered COBBLE (GP) @26.3' to 27.5': Gravelly SAND (SP_g), very moist, fine to coarse grained, subrounded pebbles and subangular gravel @27.5' to 30': No Recovery
219 ▽ 30	30-35	Box 4	5	100		@30' to 42.5': Perched groundwater encountered **Quaternary older alluvial and fluvial deposits (Qoaf):** @30' to 31.5': Clayey SAND (SC), brown, very moist, fine grained, subangular pebbles @31.5' to 31.6': Gravelly SAND (SP_g), brown gray, wet, medium to coarse grained, subangular pebbles @31.6' to 35': Clayey SAND (SC), brown, very moist to wet, fine grained, subangular pebbles
214 35	35-40	Box 5	5	100		@35' to 40': Clayey SAND (SC), mottled grayish brown to brownish gray, wet, fine grained, Fe stains, subrounded pebbles
209 40 ▽	40-45	Box 6	5	100		@40' to 42.5': Sandy CLAY (CL_s), mottled dark gray, wet, coarse sand with subangular gravel and pebbles, Fe stains, sheen on pebbles and some black oil on pebbles <1.5ppm @42.5' to 43.8': Sandy CLAY (CL_s), brown, olive, very moist, fine grained, Fe staining @43.8' to 49': Perched groundwater encountered @43.8' to 44.5': Sandy CLAY (CL_s), mottled grayish brown, wet, fine grained, Fe stains
204 45	45-50	Box 7	5	100		@44.5' to 45': CLAY (CL) with sand, grayish brown, very moist to wet, fine grained @45' to 45.2': Clayey SAND (SC), brown, wet, fine grained, with subangular pebbles @45.2' to 46.7': CLAY (CL) with sand, brown, wet, fine grained, Fe stains @46.7' to 48': Clayey SAND (SC), mottled grayish brown, wet, fine grained @48' to 49': Sandy GRAVEL (GP), gray, wet, medium to coarse grained, subrounded gravel and pebbles
199 50						@49' to 49.9': Gravelly SAND (SP_g), gray, very moist to wet, fine grained,

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 10**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 5**
ELEVATION:	**249 Feet**
DATE START:	**12/21/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
199 50	50-55	Box 8	5	100		subrounded gravel and pebbles, small cobbles, basal scour @49.9' to 50': CLAY (CL), olive brown, very moist, Fe stains and Mn nodules @50' to 50.4': Clayey SAND (SC), brown, wet, micaceous, fine grained, massive @50.4' to 52.3': Sandy CLAY (CL_s), olive, moist, fine grained, Fe stains and Mn nodules @52.3' to 52.8': Sandy CLAY (CL_s), brown, moist, fine grained, Fe stains and Mn nodules, no carbonate @52.8' to 54.5': Clayey SAND (SC), orange brown, moist, fine to medium grained, massive
194 55	55-60	Box 9	5	100		@54.5' to 55': Sandy CLAY (CL_s), orange brown Paleosol, moist, fine grained, Mn nodules, moderate blocky structure, Marker Bed 3: Paleo Surface @55' to 55.6': Clayey SAND (SC), orange olive brown, moist, fine grained, no carbonate @55.6' to 57.1': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains and Mn nodules @57.1' to 58.5': Clayey SAND (SC), mottled orangish olive, moist, fine grained, Fe stains
189 60	60-65	Box 10	2.5	50		**San Pedro Formation (Qsp):** @58.5' to 59.1': Sand (SP) with clay, orange brown, massive, moist, fine to medium grained @59.1' to 60': SAND (SP), greenish blue, moist, fine grained, massive @60' to 60.7': SAND (SP), green, moist, medium grained, massive @60.7' to 60.8': SAND (SP), brown, moist, medium grained, massive with subangular pebbles @60.8' to 62.5': SAND (SP), light green, moist, medium grained, massive @62.5' to 65': No Recovery
184 ▼ 65	65-67.5	Box 10	3.5	70		@65': Local groundwater table encountered @65' to 67.5': SAND (SP), yellow, wet, medium grained, massive Fe stains, unconsolidated, clean quartz sand
	67.5-70	Box 11				@67.5' to 68.5': SAND (SP), yellowish olive, wet, medium grained, Fe stains, massive @68.5' to 70': No Recovery
179 70	70-75	Box 11	3	60		@70' to 71.5': Sand (SP) with clay, yellowish olive, wet, medium grained, Fe staining @71.5' to 72.5': No Recovery @72.5' to 74': Clayey SAND (SC), grayish orange, very moist, fine to coarse grained, subangular slate pebbles, highly weathered @74' to 75': No Recovery
174 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 10**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **249 Feet**
DATE START: **12/21/2011**
DATE FINISH: **12/21/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
174 75	75-76	Box 11				@75' to 75.7': Clayey SAND (SC), grayish yellow, fine sand, wet, subrounded pebbles, Fe stains
	76-80	Box 12	4	80		@75.7' to 76.2': Silty SAND (SM), yellow, wet, fine grained, Fe stains @76.2' to 76.3': Gravelly SAND (SP_g), yellow gray, wet, fine grained, subangular gravel @76.3' to 76.6': Silty SAND (SM), yellowish light brown, wet, fine grained, Fe stains @76.6' to 77.5': Silty SAND (SM), brown, wet, fine grained, massive, subrounded pebbles and gravel
169 80	80-82	Box 12	3	60		@77.5' to 78': SAND (SP), orange brown, wet, coarse grained, subrounded pebbles and subangular gravel @78' to 79': Silty SAND (SM), yellowish light brown, wet, fine grained, Fe stains @79' to 80': No Recovery
	82-85	Box 13				@80' to 80.6': Silty SAND (SM), yellowish light brown, wet, fine grained, massive @80.6' to 80.9': Cobbles, black slate clay on faces, wet @80.9' to 82': Silty SAND (SM), orangish brown, wet, fine grained, massive Fe stains @82' to 82.5': No Recovery
164 85	85-90	Box 13	1.5	30		@82.5' to 83.5': Silty SAND (SM), mottled orange to brown, wet, fine grained, Fe stains @83.5' to 85': No Recovery @85' to 85.5': Silty SAND (SM), red brown, wet, fine grained, massive, Fe stains @85.5' to 85.9': Silty SAND (SM), mottled olive to orange, wet, Fe stains, fine grained @85.9' to 86.5': Silty SAND (SM), orange, wet, fine grained, massive @86.5' to 90': No Recovery
159 90	90-95	Box 13	1.5	30		@90' to 91': Sandy SILT to Silty SAND (ML-SM), orange, wet, fine grained, Fe stains @91' to 92.5': No Recovery @92.5' to 93': Silty SAND (SM), olive, wet, fine grained, Fe stains @93' to 95': No Recovery
154 95	95-95.7	Box 14				@95' to 97': Silty SAND (SM), mottled orange to olive, wet, fine grained, Fe stains
	95.7-100	Box 14	4.5	90		@97' to 97.5': No Recovery @97.5' to 99': Silty SAND (SM), olive, wet, fine grained, Fe stains @99' to 99.6': Silty SAND (SM), orangish olive, wet, fine grained
149 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 10**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/21/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/21/11	ATD	▼ 65				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**249 Feet**
DATE START:	**12/21/2011**
DATE FINISH:	**12/21/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
149 100	100-105	Box 15	1.5	30		@99.6' to 100.2': Silty SAND (SM), olive, wet, fine grained, Mn nodules, sea shells, marine sands, abrupt contact with below @97.5' to 99': Silty SAND (SM), olive, wet, fine grained, Fe stains **San Pedro Formation: Marine (Q_{sp}):** @100.2' to 101.5': Silty SAND (SM), dark gray, wet, fine grained, sea shells, massive @101.5' to 105': No Recovery
144 105	105-110	Box 15	0.5	10		@105' to 105.5': Silty SAND (SM), dark gray, moist, fine grained, sea shells, cobble @105.5' to 110': No Recovery, cobbles causing difficulty with sampling retrieval
139 110	110-114	Box 15	1.5	38		@110' to 110.4': Sandy GRAVEL (GP_s), dark gray, wet, subrounded pebbles and gravel with sea shells @110.4' to 111.5': Gravelly SAND (SP_g), dark gray, wet, subangular pebbles and gravels with sea shells, mollusk@111.5' @111.5' to 114': No recovery due to cobbles
134 115						Total depth of coring: 114' bgs Perched groundwater encountered @30-42.5', 43.8-49' bgs Local groundwater table encountered @65' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
129 120						
124 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 11**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/22/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/22/11	ATD	▼ 60				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**248 Feet**
DATE START:	**12/22/2011**
DATE FINISH:	**12/22/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
248 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Artificial fill(Af) @0' to 2': Clayey SAND (SC), dark brown, moist, fine grained
						Quaternary mudflow (Qmf): @2' to 5': Clayey SAND (SC), dark brown, moist, fine grained, scattered subangular pebbles, porous with occasional SILTSTONE, slaty and granitic rock fragments, friable
243 / 5	5-10	Box 1	5	100		**Quaternary mudflow (Qmf):** @5' to 10': Clayey SAND (SC), brown, moist, fine grained, subangular pebbles, scattered gravels, moderate blocky structure
238 / 10	10-15	Box 2	4.5	90		**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @10' to 12.9': SAND (SP) with clay, brown, moist, fine grained, subangular pebbles, trace clay
						@12.9' to 13.2': Gravelly SAND (SP_g), yellowish brown, moist, coarse grained with subrounded gravel
						@13.2' to 13.6': Silty SAND (SM), yellow brown, moist, fine grained
						@13.6' to 14.5': Clayey SAND (SC), brown, moist, fine grained with subrounded pebbles
233 / 15	15-20	Boxes 2-3	4.5	90		@14.5' to 15': No Recovery @15': Depth of Fault Trench FT-2 @Station 3+49 @15' to 18.3': Clayey SAND (SC), orange brown, moist, fine grained with subangular slaty gravel and subrounded pebbles
						@18.3' to 18.8': Silty SAND (SM), brown, moist, fine grained, with subrounded gravel and pebbles
						@18.8' to 19.5': Silty SAND (SM), light gray to light brown, moist, fine grained, subrounded cobbles and pebbles, gravel
228 / 20	20-25	Boxes 3-4	3.8	76		@19.5' to 20': No Recovery @20' to 22.6': Silty SAND (SM), brown, moist, fine grained, subangular pebbles and gravel
						@22.6' to 23.3': Gravelly SAND (SP_g), gray light brown, moist, fine grained, subangular gravel and subrounded pebbles
						@23.3' to 23.8': Silty SAND (SM), brown, moist, fine grained, subangular gravel
223 / 25						@23.8' to 25': No Recovery

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 11**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/22/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/22/11	ATD	▼ 60				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 5**
ELEVATION: **248 Feet**
DATE START: **12/22/2011**
DATE FINISH: **12/22/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
223 25	25-30	Boxes 4-5	2.5	50		@25' to 27.5': Gravelly CLAY (CL_g), gray brown, moist, subangular slaty gravel and pebbles, with coarse sand @27.5' to 30': No Recovery
218 ▽ 30	30-35	Boxes 5	3.5	70		@30' to 41.9': Perched groundwater encountered @30' to 31.3': Silty SAND (SM), brown gray, wet, fine grained, massive @31.3' to 32.2': Gravelly SAND (SP_g), orangish gray, wet, medium grained, subrounded pebbles and subangular gravel @32.2' to 33.5': Gravelly SAND (SP_g), orangish gray, wet, fine grained, subangular gravel, clay development between fractures @33.5' to 35': No Recovery
213 35	35-40	Boxes 5-6	4.7	94		@35' to 35.4': SAND (SP), dark gray, wet, fine to coarse grained, subrounded pebbles @35.4' to 38.5': Gravelly SAND (SP_g), light gray brown, wet, fine grained, subrounded pebbles and gravel @38.5' to 39.7': Gravelly SAND (SP_g), dark gray, wet, fine grained, subangular gravel, pebbles, sheen on material < 1.5ppm @39.7' to 40': No Recovery
208 40	40-45	Boxes 6-7	5	100		@40' to 41.9': Gravelly SAND (SP_g), gray, wet, medium to coarse grained, subrounded pebbles and subangular gravel, gradational contact with below **<u>Quaternary older alluvial and fluvial deposits (Qoaf)</u>:** @41.9' to 42.5': Sandy CLAY (CL_s), mottled olive brownish, moist, Fe stains, fine grained @42.5' to 42.8': Sandy CLAY (CL_s), mottled olive brownish, moist, Fe stains, and Mn nodules, fine grained @42.8' to 43.5': Sandy CLAY (CL_s), olive brown, moist, Fe stains, subrounded pebbles @43.5' to 46': Sandy CLAY (CL_s), olive orangish, moist, fine sand, Fe stains
203 ▽ 45	45-50	Boxes 7-8	5	100		@46' to 51.5': Perched groundwater encountered @46' to 47.5': Clayey SAND (SC), mottled orangish olive, wet, Fe stains, fine grained @47.5' to 50': Clayey SAND (SC), olive gray, wet, fine grained
198 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 11**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/22/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/22/11	ATD	▼ 60				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 5**
ELEVATION: **248 Feet**
DATE START: **12/22/2011**
DATE FINISH: **12/22/2011**
DRILLER: **Gregg**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
198 50	50-55	Boxes 8-9	5	100		@50' to 51.5': SAND (SP), orangish gray, wet, fine to coarse grained, massive
						@51.5' to 52.5': Sandy CLAY (CL_s), olive, moist, fine grained, Fe stains, blocky structure with moderate clay development, free water on surface
						@52.5' to 54.2': Clayey SAND (SC), olive, moist, fine grained, Fe stains
193 55	55-60	Boxes 9-10	5	100		@54.2' to 54.7': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains @54.7' to 55.5': Sandy CLAY (CL_s), olive brown Paleosol, moist, fine grained, Fe stains, well developed blocky structure, MB-3 equivalent, no carbonate
						@55.5' to 56.8': Clayey SAND (SC), mottled orange brown, moist, fine grained, Fe stains, no carbonate
						San Pedro Formation (Qsp): @56.8' to 57.8': Sand (SP) with clay, green, moist, fine grained, Fe stains
						@57.8' to 60': SAND (SP), orangish olive moist, fine grained, massive, Fe stains
188 ▼ 60	60-65	Boxes 10-11	3	60		@60': Local groundwater table encountered @60' to 60.1': Clayey SAND (SC), brown, wet, fine grained, unoxidized, clean quartz sand
						@60.1' to 61.3': SAND (SP), orange brown, wet, fine grained, Fe stains @61.3' to 63': SAND (SP), green, wet, fine grained, massive
						@63' to 65': No Recovery
183 65	65-70	Box 11	3	60		@65' to 68': SAND (SP), orangish green, wet, fine grained, Fe stains
						@68' to 70': No Recovery
178 70	70-75	Box 12	4	80		@70' to 74': SAND (SP), orangish green, wet, fine grained, Fe stains
						@74' to 75': No Recovery
173 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 11**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
12/22/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/22/11	ATD	▼ 60				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 5**
ELEVATION:	**248 Feet**
DATE START:	**12/22/2011**
DATE FINISH:	**12/22/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
173 75						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
	75-80	Boxes 12-13	5	100		@75' to 77.7': Clayey SAND (SC), mottled orangish gray to green, wet, fine grained, subangular gravel and pebbles, slate highly weathered
168 80						@77.7' to 78.2': Gravelly SAND (SP_g), orangish red, wet, medium to coarse grained, Fe stains, subangular gravel @78.2' to 79': Gravelly SAND (SP_g), olive gray, wet, fine to medium sand, subrounded, subangular pebbles and gravel @79'to 79.2': Gravelly SAND (SP_g), dark orange red, wet, fine grained, subrounded pebbles @79.2' to 80': Gravelly SAND (SP_g), olive gray, wet, fine grained, subrounded pebbles
	80-85	Boxes 13-14	4	80		@80' to 82': Silty SAND (SM), reddish brown, wet, fine grained, massive @82' to 82.9': Silty SAND (SM), orangish olive, wet, fine grained, Fe stains @82.9' to 84': Silty SAND (SM), olive orange, wet, fine grained, Fe stains, subrounded gravel
163 85						@84' to 90': No Recovery
	85-90	Box 14	0	0		
158 90						@90' to 91.5': Silty SAND (SM), orangish olive, wet, fine grained, Fe stains, subrounded pebble
	90-95	Box 14	1.5	30		@91.5' to 95': No Recovery
153 95						@95' to 96': Silty SAND (SM), orangish brown, wet, fine grained, Fe stains @96' to 96.5': Silty SAND (SM), orangish olive, wet, fine grained, Fe stains, Mn nodules @96.5' to 97.5': Silty SAND (SM), mottled orange to olive, wet, fine grained, Fe stains
	95-100	Boxes 14-15	2.5	50		@97.5' to 100': No Recovery
148 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 11**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Gregg Drilling**
EQUIPMENT USED: **M-12, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
12/22/11	ATD	▽ 30				INCLINED	Bit (Feet)	
12/22/11	ATD	▼ 60				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**248 Feet**
DATE START:	**12/22/2011**
DATE FINISH:	**12/22/2011**
DRILLER:	**Gregg**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
148 100	100-105	Boxes 15-16	5	100		**San Pedro Formation: Marine (Qsp):** @100' to 105': Silty SAND (SM), dark gray, wet, fine grained marine sands, massive with concretions and sea shells
143 105						Total depth of coring: 105' bgs Perched groundwater encountered @30'-41.9' and 46'-51.5' bgs Local groundwater table encountered @60' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
138 110						
133 115						
128 120						
123 125						

FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS

The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 12**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 36.4				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 67				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**247 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/20/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
247 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
	0-5	Box 1	5	100		**Asphalt concrete (Ac)** **Artificial fill (Af)** @0 to 1.2': No Recovery @1.2' to 3.3': Sandy CLAY (CL_s), with gravel, soft, dark brown, very moist, fine grained sand, minor $CaCO_3$ in matrix, some angular gravels
242 5						**Quaternary mudflow (Qmf):** @3.3': Silty CLAY (CL), moderately hard, dark brown, very moist, trace voids, <1mm thick, unlined to poorly lined, trace fine angular to subangular slaty gravels
	5-10	Box 1	5	100		**Quaternary mudflow (Qmf):** @5.5' to 10': Silty CLAY (CL), moderately hard, brown, moist, some fine sand, and occasional fine subangular subrounded slaty gravel, moderately developed blocky structure
237 10						**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @10' to 11': Silty Sandy GRAVEL (GP_s) with clay, loose, brown, moist, fine to coarse sand, fine to coarse subangular to subrounded slaty gravels (fluvial gravels)
	10-15	Box 1	2	40		@11' to 12': Encounter gravel and cobbles during advancement, fine to coarse subangular to subrounded gravels, consisting of slate, basalt fragments, well cemented, SILTSTONE (Tm) with fine to coarse sandy matrix @12' to 15': No recovery
232 15						@15' to 16': No Recovery
	15-20	Box 2	4	80		@16' to 16.6': Clayey SAND (SC), dark brown, moist, fine to medium sand, occasional fine subangular to subrounded gravels @16.6' to 18.6': Fluvial SAND and GRAVEL (GM-GP), dark brown, unconsolidated well graded, slightly moist, fine to coarse sands, fine to coarse slaty gravels with fine SILTSTONE gravels, subrounded @18.6' to 19': Thin bed of yellow brown, slightly moist, unconsolidated, well graded, fine to coarse sand, fine to coarse slaty gravels with trace subrounded SILTSTONE gravels,
227 20						@19' to 20': Sandy GRAVELS (GP), loose, yellow brown to black, fine sand with coarse slate, sand size particles with fine to coarse, flattened to subangular to rounded slaty gravel, trace quartz fragments, gravels, basalt rock fragments, highly weathered
	20-25	Box 2	4	80		@20' to 21.2': No Recovery @21.2' to 22.3': Sandy GRAVELS (GP), loose, yellow brown to black, fine sand with coarse slate sand size particles, with fine to coarse slaty gravel, trace quartz fragments, gravels flattened to subangular to rounded basalt rock fragments
222 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 12**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 36.4				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 67				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 5**
ELEVATION: **247 Feet**
DATE START: **12/20/2011**
DATE FINISH: **12/20/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
222 25	25-30	Box 2	5	100		@22.3' to 24.5': Sandy CLAY (CL_s), soft, brown, moist, fine grained, with occasional fine slaty gravel @24.5' to 25': Gravelly Silty SAND (SM), moderately hard, dark brown, moist, fine grained slaty sand, fine slaty subrounded gravel @25' to 26.9': Fluvial gravels-Sandy GRAVELS (GP), loose, yellow brown to black, fine sand with coarse slate sand size particles, with fine to coarse slaty gravel, trace quartz fragments, gravels flattened to subangular to rounded basalt fragments @26.9' to 30': Silty CLAY (CL), soft, brown, very moist, trace fine sand, homogeneous, trace coarse, sand sized slate
217 30	30-35	Box 3	5	100		@30' to 34.4': Sandy Clayey SILT (ML), soft, brown, very moist, fine grained
212 35	35-40	Box 3	3.6	72		@34.4' to 35': Silty SAND (SM) with gravel, dry, loose, fine to medium sand, fine subangular slaty gravels, poorly graded @35' to 36.4': No Recovery @36.4' to 37.9': Perched groundwater encountered @36.4' to 37.9': Sandy GRAVEL (GP), wet, fine to coarse sand, fine to coarse subangular-subrounded slaty gravels, unconsolidated, well graded, abrupt contact @ 37.9' @37.9' to 39.2': Sandy SILT (ML), soft, olive brown, very moist, fine grained, micaceous, some clay @39.2': Slaty rock fragments, 1 inch thick, > 3inches in size, angular, mechanically broken becomes Silty SAND (SM) @39.2' to 40': Silty SAND (SM), loose, olive brown, very moist, fine grained, micaceous
207 40	40-45	Box 3	4.7	94		@40' to 40.3': No Recovery @40.3' to 41.9': Sandy SILT (ML), soft, olive brown, moderately oxidized, wet, predominantly fine grained, occasional slaty to quartz gravel @41' to 52.1': Perched groundwater encountered @41.9' to 43': SAND (SP) with silt, olive brown, wet, fine to coarse graded sequences, oxidized with fine sand at coarse sand boundaries, quartz, feldspar and slaty sands
202 45	45-50	Box 4	5	100		@43' to 43.7': Thin zone of heavily oxidized Silty Clayey SAND (SC), fine sand to coarse sand, graded sequences, heavy oxidation and precipitation of Fe in gravel matrix @43.7' to 45': SAND (SP) with lenses of gravel, fine grained sand, wet, fine subangular to subrounded gravels @45' to 46.7': Sandy SILT (ML), soft, olive gray, wet, fine grained with lenses of coarse sand and fine gravels @46.7' to 49': Fluvial gravels, coarse sands, heavily oxidized @49' to 50': Clayey GRAVEL (GC), fine to coarse slaty gravels in fine grained, silty clayey sand matrix, oxidized
197 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 12**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 36.4				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 67				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 5**
ELEVATION:	**247 Feet**
DATE START:	**12/20/2011**
DATE FINISH:	**12/20/2011**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
197 50						@50' to 52.1': Fluvial basal gravels-Benedict Canyon wash gravels, wet, loose, fine to coarse clean sand with fine to coarse sand, fine to coarse, flattened and subrounded to rounded gravels and small cobbles, erosional contact with below
	50-55	Box 4	5	100		**Quaternary older alluvial and fluvial deposits (Qoaf):** @52.7' to 55': Silty Sandy CLAY (CL_s), mottled olive brown to orange brown, hard, moist, very fine sand, moderately developed blocky soil fracture with Fe precipitation along soil fracture boundaries trace coarse slaty sand
192 55						
	55-60	Box 4	5	100		@55' to 60': Silty Sandy CLAY (CL_s), mottled olive brown to orange brown, moderate blocky structure, very fine sand, moist, oxidized with gradational changes in proportion of silt and sand, homogeneous @59.3' becomes well developed Paleosol, MB-3 equvalent
187 60						@60' to 61.3': Silty Sandy CLAY (CL_s), mottled olive brown to orange brown, hard, moist, fine grained sand
	60-65	Box 5	5	100		**Carbonate Package** @61.3' to 62.1': Carbonaceous, Silty Clayey SAND to Silty Sandy CLAY (SC-CL), fine grained, moist, zone of $CaCO_3$ precipitate along soil boundaries, zone is heavily mineralized with Fe and $CaCO_3$, becomes (SC), olive brown, homogeneous @64.1': $CaCO_3$ linear horizon, appears erosional, material below horizon becomes Sandy Silty CLAY (CL_s), olive gray to orange brown, heavily oxidized
182 65						@65' to 65.5': No Recovery @65.5' to 66.6': Silty SAND to Sandy SILT (SM-ML), olive green, hard, moist, fine sand, trace slaty oxidized, within matrix along thin uneven bands generally 1/8 inch to 1 inch thick, erosional contact, thin laminations
▼	65-70	Box 5	4.5	90		@66.6' to 67': Silty SAND trace clay (SM), olive brown to orange brown, moist, fine grained @67': Local groundwater table encountered **San Pedro Formation: (Qsp):** @67' to 70': SAND (SP), unconsolidated, light brown, wet, fine grained, homogeneous, poorly graded, unoxidized, trace clay
177 70						@70' to 71.4': No Recovery, wet sandy slough in barrel
	70-75	Box 5	3.6	72		@71.4' to 75': SAND (SP), fine grained, light brown, wet, poorly graded, unoxidized, becomes, oxidized, @ 74.4', massive
172 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 12**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 36.4				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 67				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **247 Feet**
DATE START: **12/20/2011**
DATE FINISH: **12/20/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
172 75	75-80	Box 6	2	40		@75' to 78': No Recovery, wet slough in barrel
						@78' to 80': SAND (SP), wet, loose, fine to medium grained sand, homogeneous, unoxidized, massive
167 80	80-85	Box 6	4	80		@80' to 81': No Recovery, wet sand
						@81' to 84.5': SAND (SP), very moist, fine to medium grained, homogeneous, massive
162 85	85-90	Box 6	2	40		@84.5' to 85': Becomes thinly bedded sand, silty, clay and rounded gravel, (SP-SC), mottled olive gray, orange brown, reddish brown, coarse sandwith fine, well rounded quartz gravel, hard
						@86' to 88': No Recovery, wet sand in barrel
						@88' to 89': SAND (SP), very moist, fine to medium grained, homogeneous, massive
157 90	90-95	Box 7	3.5	70		@89' to 90': Sandy GRAVEL (GP_s) with silt, oxidized, orange brown, wet, fine sand, predominantly with some coarse grains, fine to coarse gravels, predominantly, very hard, slaty gravel, zone is heavily oxidized
						@90' to 91.5': No Recovery
						@91.5' to 94.7': SAND (SP), very moist, fine to medium grained, homogeneous, massive
152 95	95-100	Box 7	3.5	70		@94.7' to 95': Thinly bedded to laminated fine grained sands and silt with fine gravel (SP-SC), alternating layers by color, dark orange brown, light gray, yellow brown, with thin bed 11/8inch thick of fine gravel with fine sand matrix
						@95' to 96.5': No Recovery
						@96.5' to 100': SAND (SP), brown, wet, fine to medium grained, loose, homogeneous
147 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 12**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
12/20/11	ATD	▽ 36.4				INCLINED	Bit (Feet)	
12/20/11	ATD	▼ 67				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 5**
ELEVATION: **247 Feet**
DATE START: **12/20/2011**
DATE FINISH: **12/20/2011**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
147 100						@100' to 101.6': No Recovery, wet sand
	100-105	Box 7	3.4	68		@101.6' to 104.7': SAND (SP), loose, orange brown, wet, fine to medium grained, homogeneous, poorly graded
142 105						@104.7' to 105': Laminated SANDs (SP)
	105-110	Box 8	2.5	50		@105' to 107.5': No Recovery @107.5' to 109.6': SAND (SP), loose, brown, wet, fine grained, homogeneous, poorly graded
137 110						**San Pedro Formation: Marine (Qsp):** @109.6' to 110': Erosional contact, uneven, becomes, Sandy SILT (ML), moderately hard, gray, wet, fine grained marine sand with shell debris
132 115						Total depth of coring: 110' bgs Perched groundwater encountered @36.4'-37.9' and 41'-52.1' bgs Local groundwater table encountered @67' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
127 120						
122 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 1 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 9**
ELEVATION:	**265 Feet**
DATE START:	**2/17/2012**
DATE FINISH:	**2/18/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
265 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate base (Ab)**
						@0' to 5': Hand Auger
						Artificial fill (Af):
						@0' to 2': Silty SAND (SM), brown, moist, fine grained
						Old Benedict Canyon Wash deposits (Qal_{bcw}):
						@2' to 5.6': Silty SAND (SM), orange brown, moist, fine grained
260 / 5						
						@5.6' to 7': Clayey SAND (SC), brown, moist, fine grained, subangular slaty pebbles
	5-10	Box 1	3.3	66		@7' to 8.3': Clayey SAND to Sandy CLAY (SC-CL), brown to light brown, moist, laminated
						@8.3' to 10': No Recovery
255 / 10						@10' to 10.5': Silty SAND (SM), orange brown, moist, fine to medium grained, Fe stains
						@10.5': Heavy Fe staining, contact with below
						@10.5' to 11.1': Silty CLAY (CL), olive, moist, Fe staining
	10-15	Box 1	5	100		@11.1' to 13.4': Silty CLAY (CL), oxidized lamillae, olive green to orange brown, moist, fine grained
						@13.4' to 15': Silty CLAY (CL), olive brown, moist, Fe staining, moderate blocky structure, unoxidized
250 / 15						@15' to 16.6': Clayey SILT (ML_c), olive brown, moist, blocky structure
						@16.6' to 17.8': SILT (ML), orangish light olive, moist, laminated, Fe staining
	15-20	Box 1	5	100		@17.8' to 20': Sandy CLAY (CL_s), orangish olive, moist, fine grained, laminated, Fe staining,
						Bottom of Paleosol 1, top missing
245 / 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 2 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 9**
ELEVATION:	**265 Feet**
DATE START:	**2/17/2012**
DATE FINISH:	**2/18/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
245 20						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@20' to 21.5': Sandy SILT (ML), orangish olive, moist, very fine grained, Fe stains
	20-25	Box 2	5	100		@21.5' to 22': Sandy SILT to Silty SAND (ML-SM), orangish light olive, moist, fine grained, Fe stains
						@22' to 22.85': Silty SAND (SM), orange olive, moist, fine grained, Fe stains, subangular slaty pebbles
						@22.85' to 22.9': Slaty GRAVEL (GP)
						@22.9' to 23.9': Sandy CLAY (CL_s), orange brown, moist, fine grained, trace coarse grains, subangular pebbles
240 25						@23.9' to 24.4': Sandy CLAY (CL_s), brown, moist, fine grained, subangular pebbles
						@24.4' to 26.1': Silty SAND (SM) with trace clay, red brown, moist, fine grained, Fe stains, blocky structure,
						Paleosol 2
	25-30	Box 2	5	100		@26.1' to 29': Clayey SAND to Sandy CLAY (SC-CL), orangish olive, laminated, moist, very fine to fine grained sand, subangular pebbles
						@29' to 30': Silty SAND (SM), orange brown, moist, fine grained sand, subangular slaty pebbles
235 30						@30' to 30.3': SAND (SP), reddish brown, moist, medium to coarse grained, poorly sorted, Fe stains
						@30.3' to 30.9': Silty SAND (SM), orange brown, moist, medium grained, Fe stains, subangular slaty pebbles
						@30.9' to 31.8': Silty SAND (SM), brown, moist, fine grained sand, subrounded pebbles
	30-35	Box 2	3.4	68		@31.8' to 32.2': Silty SAND (SM), brown, moist, fine grained, with subangular gravel
						@32.2' to 33.4': Gravelly SAND (SP_g), gray brown, moist, medium to coarse grained sand, subangular to angular gravels and pebbles, Fe stains
						@33.4' to 35': No Recovery
230 35						@35' to 36': Gravelly SAND (SP_g), gray brown, moist, medium to coarse grained sand, subrounded gravels and pebbles
						@36' to 36.6': Sandy CLAY (CL_s), olive brown, moist, fine grained
						@36.6' to 36.9': Silty CLAY (CL), orangish olive, moist, Fe stains, Mn nodules
	35-40	Box 3	5	100		@36.9' to 37.05': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains, Mn nodules
						@37.05' to 37.2': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains
						@37.2' to 37.5': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains
						@37.5' to 38.2': CLAY (CL), olive light brown, moist, Fe stains, Mn nodules prevalent
225 40						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 3 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 9**
ELEVATION:	**265 Feet**
DATE START:	**2/17/2012**
DATE FINISH:	**2/18/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
225 40						@38.2' to 38.4': Silty SAND (SM), orange brown, moist, fine grained, Fe stains
						@38.4' to 40': Sandy CLAY (CL_s), olive brown, moist, fine grained, Mn nodules, Fe stains
						@40' to 40.6': Silty SAND (SM), orange brown, moist, fine grained, Fe stains
▽						@40.6' to 41.9': Silty SAND (SM), orange olive, laminated, moist, fine grained, Fe stains
	40-45	Box 3	5	100		@41.9' to 43.1': Clayey SAND (SC), olive, moist, fine to very fine grained sand, subangular pebbles and gravels
						@42' to 44.5': Perched groundwater encountered
						@43.1' to 44.2': Gravelly SAND (SP_g), orange, moist, medium grained, subangular, Fe stains
						@44.2' to 44.5': Silty SAND (SM), olive, very moist, fine to medium grained
220 45						@44.5' to 45.7': Clayey SAND (SC), olive, moist to very moist, fine grained sand, subangular pebbles, Fe stains
						@45.7' to 46.6': Silty SAND (SM), olive, very moist, fine grained, subangular gravels and pebbles
						@46.6' to 46.7': Silty SAND (SM), red brown, very moist, medium grained
	45-50	Box 3	3.9	78		@46.7' to 47.3': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains
						@47.3' to 48': Silty CLAY (CL), olive brown, moist, Fe stains, subangular to angular gravels and pebbles
▽						@48' to 48.4': Gravelly SAND (SP_g) with clay, gray olive, wet, medium grained, subangular to angular gravels and pebbles
						@48.4': Perched groundwater encountered
						@48.4' to 48.9': Gravelly SAND (SP_g), red brown, wet, medium grained sand, subangular to angular gravels and pebbles
215 50						@48.9' to 50': No Recovery
▽						@50' to 50.6': Silty CLAY (CL), olive, moist, Fe stains, subangular slaty pebbles
						@50.6' to 51.7': Perched groundwater encountered
	50-55	Box 4	5	100		@50.6' to 51.2': Gravelly SAND (SP_g), orange brown, wet, fine to coarse grained sand, subangular to subrounded slaty gravels and pebbles
						@51.2' to 51.7': Gravelly SAND (SP_g), brown, wet, fine to coarse grained sand, subangular and subrounded slaty gravels and pebbles
						@51.7' to 52.3': Silty CLAY (CL), orange olive, moist, Fe stains, subangular pebbles
						@52.3' to 54': Sandy SILT (ML), olive, moist, fine grained sand, subangular pebbles
210 55						@54' to 54.2': Silty SAND (SM), orange, moist, fine to medium grained, Fe stains
						@54.2' to 54.8': CLAY (CL), oilve brown, moist
						@54.8' to 55': Silty SAND (SM), gray orange, moist, fine to medium grained
						<u>Quaternary older alluvial and fluvial deposits (Qoaf)</u>:
▽	55-60	Box 4	5	100		@55' to 57.3': Silty CLAY (CL), olive, moist, $CaCO_3$ stringers, Mn nodules, erosional surface
						@57.3': Perched groundwater encountered
						@57.3' to 57.5': Gravelly CLAY (CL_g), light gray brown, wet, subangular gravels
						@57.5' to 58.5': Silty CLAY (CL), olive, moist, $CaCO_3$ stringers, Fe stains
205 60						@58.5' to 59.6': Silty CLAY (CL), brown, moist, $CaCO_3$ stringers

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 4 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 9**
ELEVATION:	**265 Feet**
DATE START:	**2/17/2012**
DATE FINISH:	**2/18/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
205 60						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@59.6' to 60': Silty CLAY (CL), reddish brown, moist, $CaCO_3$ stringers
						@60' to 64.5': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, $CaCO_3$ stringers, Paleosol 3
	60-65	Box 4	5	100		
						@64.5' to 65': Sandy CLAY (CL_s), red brown, moist, fine grained, Fe stains
200 65						@65' to 65.7': CLAY (CL), brown, very moist, $CaCO_3$ stringers, subangular slaty pebbles
						@65.7' to 67.7': Clayey SAND (SC), olive brown, moist, fine grained sand, $CaCO_3$ stringers, subangular slaty pebbles
	65-70	Box 5	5	100		
						@67.7' to 68.1': Silty SAND (SM), gray brown, very moist, fine grained, subangular pebbles and gravels
						@68.1' to 70': Clayey SAND (SC), orange brown, moist, fine grained sand, subangular pebbles, $CaCO_3$ stringers, Mn nodules
195 70						@70': Stopped drilling on 02/17/12 Drilling Resumed on 02/18/12
						@70' to 70.6': Clayey SAND to Sandy CLAY (SC-CL), brown, moist, fine grained sand, subangular slaty pebbles
	70-75	Box 5	5	100		@70.6' to 71.5': Sandy CLAY (CL_s), orange brown, moist, fine grained sand, subangular slaty pebbles, with light gray clay lenses
						@71.5' to 75': Clayey SAND (SC), orange brown, moist, fine grained, subangular slaty pebbles, Fe stains, Mn nodules
190 75						@75' to 77.2': Silty SAND (SM) with clay, orange brown, moist to very moist, fine grained, Fe stains, subangular to angular gravels, subangular slaty pebbles
	75-80	Box 5	5	100		
						@77.2' to 77.6': Silty SAND (SM), red brown, very moist, fine grained, Fe staining, angular gravels
						@77.6' to 78.2': Sandy CLAY (CL_s), red brown, very moist, fine grained, Fe stains
						@78.2' to 78.9': Sandy CLAY (CL_s), olive brown, moist to very moist, fine grained, subangular slaty pebbles
185 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 5 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 9**
ELEVATION:	**265 Feet**
DATE START:	**2/17/2012**
DATE FINISH:	**2/18/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
185 80	80-85	Box 6	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @78.9' to 80': Clayey SAND (SC), red brown, moist, fine grained, Fe stains, subangular pebbles @80' to 80.4': Clayey SAND (SC), brown, moist, fine grained sand, subrounded pebbles @80.4' to 81.6': Sandy CLAY (CL_s), orange brown, moist, fine grained @81.6' to 83.6': Silty CLAY (CL) with sand and gravel, olive gray, moist, fine grained, Fe stains, $CaCO_3$ stringers, subrounded pebbles, Marker Bed 4 @83.6' to 84.55': Sandy CLAY (CL_s), olive, moist, fine grained, Fe stains, Mn nodules, blocky structure
180 85	85-90	Box 6	5	100		@84.55' to 86.3': Sandy CLAY (CL_s), olive brown, moist, fine grained, laminated, Fe stains, subangular pebbles @86.3' to 86.5': Sandy CLAY (CL_s), brown, moist, fine grained, Fe stains, $CaCO_3$ stringers, Bottom of Marker Bed 4 @86.5' to 90': Sandy CLAY to Clayey SAND (SC-CL), mottled orange to olive, moist, fine grained, Fe stains, subangular slaty pebbles
175 90	90-95	Box 6	5	100		@90' to 91.1': Silty SAND (SM) with clay, orange brown, moist, fine grained, Fe stains, subangular pebbles @91.1' to 93.7': Clayey SAND (SC), brown, moist, fine grained, laminated, Fe stains, subangular pebbles and gravels @93.7' to 94.5': Sandy CLAY (CL_s), mottled olive to brown, moist, fine grained sand, Fe stains, Mn nodules @94.5' to 95': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains
170 95	95-100	Box 7	5	100		@95' to 97.2': Sandy CLAY (CL_s), olive brown, moist, very fine grained, blocky structure @97.2' to 97.9': Sandy CLAY (CL_s), brown, moist, very fine grained sand, blocky structure @97.9' to 98.2': Silty SAND (SM), brown, very moist, medium grained, subangular gravels and pebbles @98.2' to 98.6': Silty SAND (SM), brown, moist, fine grained sand, subangular pebbles @98.6' to 98.9': Sandy CLAY (CL_s), brown, moist, very fine grained
165 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 6 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 9**
ELEVATION: **265 Feet**
DATE START: **2/17/2012**
DATE FINISH: **2/18/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
165 100	100-105	Box 7	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @98.9' to 99.8': Clayey SAND (SC), olive brown, moist, fine grained, Fe stains @99.8' to 100': Silty SAND (SM), brown, very moist, medium grained @100' to 100.75': Clayey SAND (SC), orange gray, moist, fine grained, Fe stains @100.75' to 101.6': Silty SAND (SM), orange gray, moist, very moist, medium grained, Fe stains, subangular pebbles and gravels @101.6' to 102.7': Silty CLAY - Clayey SILT (CL-ML), orange gray, moist, Fe stains, angular slaty pebbles @102.7' to 103.3': Sandy SILT (ML) with clay, orangish olive, moist, very fine grained, Fe stains @103.3' to 105': Silty CLAY (CL), orangish gray, moist, Fe stains, $CaCO_3$ stringers, Mn nodules
160 105	105-110	Box 7	5	100		@105' to 106.5': Silty SAND (SM), orangish brown, moist, fine grained, Fe stains @106.5' to 106.6': SAND (SP), orangish brown, moist to very moist, medium to coarse grained, Fe stains @106.6' to 107.4': Sandy CLAY (CL_s), orangish gray, moist, fine grained, Fe stains, $CaCO_3$ stringers @107.4': Perched groundwater encountered @107.4' to 108.9': Gravelly SAND (SP_g), orangish gray, wet, medium to coarse grained, Fe stains, subrounded to subangular pebbles and gravels @108.9' to 112.6': Clayey SAND (SC), orangish gray, moist, fine grained, Fe stains, subangular slaty pebbles
155 110	110-115	Box 8	4.6	92		112.6' to 114.6': Clayey SAND (SC), olive, moist, fine grained, Fe stains, $CaCO_3$ stringers (increase with depth) @114.6' to 115': No Recovery
150 115	115-120	Box 8	5	100		@115' to 116.7': Sandy CLAY (CL_s), olive, moist, very fine to fine grained, Fe stains, $CaCO_3$ stringers prevalent @116.7' to 118.5': Sandy CLAY (CL_s), olive brown, moist, very fine to fine grained, Fe stains, Mn nodules, $CaCO_3$ stringers, trace subangular gravels @118.5' to 120': Sandy CLAY (CL_s), grayish brown, moist, very fine to fine grained, Fe stains, $CaCO_3$ stringers
145 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 7 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **7 of 9**
ELEVATION: **265 Feet**
DATE START: **2/17/2012**
DATE FINISH: **2/18/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
145 120						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@120' to 121.5': Clayey SAND (SC), brown, moist, fine grained, Fe stains, blocky structure
	120-125	Box 8	5	100		@121.5' to 123.3': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains, $CaCO_3$ stringers, subangular slaty pebbles
						@123.3' to 123.4': Gravelly SAND (SP_g) with clay, red brown, moist, fine grained sand, angular gravels
						@123.4' to 124.1': Silty SAND (SM), red brown, moist, fine grained, Fe stains
140 125						@124.1' to 125': Clayey SAND (SC), olive brown, moist, fine grained, Fe stains, $CaCO_3$ stringers
						@125' to 126.5': Clayey SAND (SC), olive brown, moist, fine grained
	125-130	Box 9	5	100		@126.5' to 127.3': Clayey SAND (SC), olive light brown, moist, fine grained, $CaCO_3$ stringers, Fe stains
						@127.3' to 128.2': CLAY (CL), olive, moist, $CaCO_3$ stringers, Fe stains
						@128.2' to 129.2': Silty CLAY to Clayey SILT (CL-ML), orangish olive, moist, Fe stains
						@129.2' to 131.4': Silty CLAY (CL), olive light brown, moist, $CaCO_3$ stringers, Fe stains, Mn nodules
135 130						
						@131.4' to 131.8': Silty SAND (SM), orangish olive, moist, fine grained, $CaCO_3$ nodules, Fe stains, Mn nodules
	130-135	Box 9	5	100		@131.8' to 132.5': Silty SAND (SM), orangish olive, very moist, medium grained, Fe stains, subangular slaty pebbles
						@132.5' to 133.1': Clayey SAND (SC), orangish olive, moist, fine grained sand, Fe stains, subangular slaty pebbles
						@133.1' to 133.8': Clayey SAND (SC), olive, moist, fine grained, Fe stains, subangular to angular pebbles and gravels
130 135						@133.8' to 134.5': Gravelly SAND (SP_g), orange gray, very moist, medium grained, Fe stains, subangular gravels and pebbles
						@134.5' to 135.85': Clayey SAND to Sandy CLAY (SC-CL), orangish olive, moist, fine grained, Fe stains, $CaCO_3$ stringers
						@135.85' to 136.4': Clayey SAND (SC), olive, moist, fine grained, Fe stains, subangular slaty pebbles
	135-140	Box 9	5	100		@136.4' to 136.75': Silty SAND (SM), laminated 1/4" orange olive bands, moist, fine grained, Fe stains
						@136.75' to 137.65': Sandy CLAY (CL_s), olive light brown, moist, fine grained, Fe stains, Mn nodules
						@137.65' to 138.6': CLAY (CL), olive gray, moist, Fe stains, Mn nodules, $CaCO_3$ nodules
125 140						@138.6' to 141.5': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 8 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**8 of 9**
ELEVATION:	**265 Feet**
DATE START:	**2/17/2012**
DATE FINISH:	**2/18/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
125 140						prevalent @137.65' to 138.6': CLAY (CL), olive gray, moist, Fe stains, Mn nodules, $CaCO_3$ nodules
						@141.5' to 142.2': Clayey SAND (SC), olive brown, moist, fine grained, $CaCO_3$ stringers
	140-145	Box 10	5	100		@142.2' to 142.5': Silty SAND (SM), olive gray, moist to very moist, medium grained
						@142.5' to 145': CLAY (CL) with sand, olive brown, moist, fine grained, $CaCO_3$ stringers prevalent, Fe stains, Mn nodules
120 145						@145' to 146.8': Silty CLAY (CL), brown, moist, $CaCO_3$ stringers prevalent, blocky structure
	145-150	Box 10	5	100		@146.8' to 148.8': Silty CLAY (CL), brown, moist, $CaCO_3$ stringers prevalent, Fe staining
						@148.8' to 149.3': Sandy CLAY (CL_s), gray brown, moist, fine grained, $CaCO_3$ stringers prevalent, blocky structure
115 150						@149.3' to 150': Sandy CLAY (CL_s), gray brown, moist, fine grained, $CaCO_3$ stringers prevalent, Fe staining
						@150' to 150.2': Sandy CLAY (CL_s), gray brown, moist to very moist, fine grained, $CaCO_3$ stringers, Fe stains
						@150.2' to 150.6': CLAY (CL), gray brown, very moist
						@150.6' to 152': Silty CLAY (CL) with trace fine sand, gray brown, moist, $CaCO_3$ stringers, Fe stains, subangular gravel, blocky structure
	150-155	Box 10	5	100		@152' to 152.5': Silty SAND (SM), gray brown, moist, fine grained, Fe stains
						@152.5' to 153.5': Silty SAND (SM), gray olive, moist, fine grained, Fe stains, $CaCO_3$ stringers
						@153.5' to 154.1': CLAY (CL), brown, moist, $CaCO_3$ stringers
						@154.1' to 155': CLAY (CL), olive gray, moist, Fe stains, Mn nodules, $CaCO_3$ stringers
110 155						@155' to 157': CLAY (CL), dark olive, moist, $CaCO_3$ stringers, Fe stains, Mn nodules
	155-160	Box 11	4.6	92		**San Pedro Formation (Qsp):** @157' to 157.4': Silty SAND (SM), brown, moist, fine grained, poorly sorted, massive
						@157.4' to 159.6': Silty SAND (SM), olive brown, moist, fine grained, poorly sorted, massive, Mn nodules
105 160						@159.6' to 160': No Recovery

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 13**
PAGE 9 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/17/12	ATD	▽ 42				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **9 of 9**
ELEVATION: **265 Feet**
DATE START: **2/17/2012**
DATE FINISH: **2/18/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
105 160	160-165	Box 11	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @160' to 160.6': Silty SAND (SM), olive brown, moist, fine grained, massive, Fe stains @160.6' to 163.3': SAND (SP), green, moist, medium grained, poorly sorted, massive, Fe stains @163.3' to 165': SAND (SP), yellowish green, dry to moist, medium grained, massive, Fe stains
100 165						Total depth of coring: 165' bgs Perched groundwater encountered at 42'-44.5', 48.4', 50.6'-51.7', 57.3', and 107.4' Boring experienced air-intake (vacuum) @165' bgs. Cause unknown Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess cuttings disposed of in D.O.T. approved drums and disposed offsite Asphalt patched with cold patch mix
95 170						
90 175						
85 180						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 1 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **1 of 8**
ELEVATION: **263 Feet**
DATE START: **2/16/2012**
DATE FINISH: **2/16/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
263 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate Base (Ab)**
						@0' to 5': Hand Auger
						Artificial Fill
						@0' to 2': Silty SAND (SM), dark brown, moist, fine grained
						Old Benedict Canyon Wash deposits (Qal_{bcw}):
						@2' to 6.5': Silty SAND (SM), dark brown, moist, fine grained subangular gravel and pebble
258 5						
	5-10	Box 1	5	100		@6.5' to 6.6': Silty SAND (SM), olive brown, moist, fine grained @6.6' to 6.9': Silty SAND (SM), dark brown, moist, fine grained, subangular pebbles @6.9' to 7.1': Silty SAND (SM), mottled olive brown to brown, moist, fine grained @7.1' to 7.9': Silty SAND (SM), dark brown, moist, fine grained, subangular pebbles
						@7.9' to 8.7': Silty CLAY (CL), mottled olive brown to red brown, moist, subangular pebbles @8.7' to 10.4': Silty CLAY (CL), olive, moist, Fe staining
253 10						
	10-15	Box 1	5	100		@10.4' to 12.9': Silty SAND (SM), mottled olive brown to red brown, moist, fine grained, Fe staining, oxidized lamilli
						@12.9' to 14.3': Silty CLAY (CL), dark olive gray, moist, $CaCO_3$ nodules, angular slaty pebbles, unoxidized
						@14.3' to 16.7': Clayey SILT (ML), olive, moist, subangular slaty pebbles, abundant $CaCO_3$ stringers
248 15						
	15-20	Box 1	4	80		@16.7' to 17.4': Silty CLAY (CL), olive red, moist, subangular slaty pebbles @17.4' to 19': Silty CLAY (CL), olive yellow, moist, subrounded gravel
						@19' to 20': No Recovery
243 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 2 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 8**
ELEVATION: **263 Feet**
DATE START: **2/16/2012**
DATE FINISH: **2/16/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
243 20	20-25	Box 2	4.4	88		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @20' to 20.5': Gravelly SAND (SP_g), yellow gray, moist, subrounded to subangular slaty and quartz gravels @20.5' to 20.9': Silty SAND (SM), olive yellow, moist, fine grained, subrounded pebbles, Fe staining @20.9' to 21.2': SAND (SP), fine to coarse, red gray, moist, subrounded pebbles @21.2' to 23.5': Silty SAND (SM), reddish olive brown, moist, fine grained subrounded pebbles, Fe staining, @22.5' to 23': Paleosol 1 @23.5' to 24.4': Sandy CLAY (CL_s), yellow olive, moist, very fine grained, trace coarse sand, well developed blocky structure @24.4' to 25': No Recovery
238 25	25-30	Box 2	5	100		@25' to 26.4': Sandy CLAY (CL_s), olive brown, moist, very fine trace coarse sand @26.4' to 27': Sandy CLAY (CL_s), reddish olive, moist, fine grained, subangular slaty pebbles, Fe staining @27' to 30': Sandy CLAY (CL_s), red brown, moist, fine grained sand, subangular gravel and slaty pebbles, well developed blocky structure, clay lining on pedogenic faces Paleosol 2
233 30	30-35	Box 2	5	100		@30' to 31': Clayey SAND (SP_c), red brown, moist, fine grained, subangular gravel @31' to 32': Sandy CLAY (CL_s), red brown, moist, very fine grained, subangular slaty gravels and pebbles @32' to 32.9': Clayey SAND (SP_c), red brown, moist, fine grained, subangular gravel @32.9' to 33.1': SAND (SP), red gray, moist, fine to coarse grained, subangular slaty gravel @33.1' to 33.9': Clayey Silty SAND (SM-SC), olive red brown, moist, laminated with olive, very fine sand, ~1/8" thick @33.9' to 34.9': Silty CLAY (CL), red brown, moist, subangular pebbles
228 35	35-40	Box 3	2.3	46		@34.9' to 35': Silty SAND (SM), brown, moist, fine grained @35' to 35.5': Gravelly SAND (SP_g), red gray, moist, subrounded gravel and tabular gravel, subrounded pebbles, Fe staining @35.5' to 35.9': Silty SAND (SM), red brown, moist, fine grained, subrounded pebbles @35.9' to 36': GRAVEL (GP), gray, moist, subrounded @36' to 36.6': Silty SAND (SM), red brown, moist, fine grained, subangular pebbles @36.6' to 36.9': GRAVEL (GP), dark gray, moist, subangular to angular slaty pebbles and gravel @36.9' to 37.3': SAND (SP), brown, very moist, fine to coarse grained, subangular slaty pebbles
223 ▽ 40						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 3 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 8**
ELEVATION: **263 Feet**
DATE START: **2/16/2012**
DATE FINISH: **2/16/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
223 40	40-45	Box 3	3	60		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @37.3' to 40': No Recovery @40' to 58.9': Perched groundwater encountered @40' to 41': Gravelly SAND (SP_g), brown, wet, fine to coarse grained, subrounded to subangular gravels and pebbles @41' to 43': Silty SAND (SM), red brown, very moist to wet, fine grained, subangular gravels and pebbles @43' to 45': No Recovery
218 45	45-50	Box 3	5	100		@45' to 46': SAND (SP), red gray brown, wet, medium to coarse grained, poorly sorted, upward fining sequence @46' to 46.1': Sandy SILT (ML), olive brown, wet, very fine grained @46.1' to 46.6': Silty SAND (SM), orange brown, wet, fine grained, subrounded pebbles, Fe staining @46.6' to 47.9': Silty SAND (SM), orange gray brown, wet, fine grained with subangular pebbles and gravels @47.2' to 47.9': Heavy concentration of slaty gravels and pebbles @47.9' to 49.1': SAND (SP), orange gray brown, wet, medium to coarse grained with subangular pebbles @49.1' to 49.2': Silty CLAY (CL), orange brown, wet
213 50	50-55	Box 4	1.7	34		@49.2' to 50': SAND (SP), orange gray brown, wet, medium to coarse grained with subangular pebbles @50' to 51.2': SAND (SP), orange gray, wet, medium to coarse grained, poorly sorted, upward fining sequence @51.2' to 51.5': Sandy SILT (ML), orange brown, wet, fine grained, subangular pebbles and gravels, Fe stains @51.5' to 51.6': Sandy SILT (ML), orange olive, wet, fine grained, subangular slaty pebbles @51.6' to 51.7': SAND (SP), dark red, wet, medium to coarse grained, subangular gravel @51.7' to 55': No Recovery
208 55	55-60	Box 4	5	100		@55' to 56.1': Silty SAND (SM), orange olive, wet, very fine grained, Fe staining @56.1' to 56.4': Gravelly SAND (SP_g), olive, wet, subrounded pebbles and gravels @56.4' to 56.6': Silty SAND (SM), orange, wet, very fine grained, Fe staining @56.6' to 57.9': Silty SAND (SM), olive, wet, fine grained, subangular slaty gravels and pebbles, subrounded quartz pebbles @57.9' to 58.4': Gravelly SAND (SP_g), brown, wet, medium to coarse grained, subangular pebbles and gravels **Quaternary older alluvial and fluvial deposits (Qoaf):** @58.4' to 58.9': Silty SAND (SM), olive brown, moist to very moist
203 60						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 4 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 8**
ELEVATION:	**263 Feet**
DATE START:	**2/16/2012**
DATE FINISH:	**2/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
203 60	60-65	Box 4	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@58.9' to 59.3': Sandy SILT to Silty SAND (ML_s-SM), interbedded, orange to olive, moist to very moist, fine to medium grained, Fe staining
						@59.3' to 59.6': CLAY (CL), orange, moist, Fe staining, blocky structure, Paleosol 3
						@59.6' to 60': CLAY (CL), olive, moist
						@60' to 60.7': CLAY (CL), olive brown, moist, Fe stains
						@60.7' to 61.2': CLAY (CL), mottled, orange to olive, moist, Fe stains
						@61.2' to 63.1': CLAY (CL), olive, moist, $CaCO_3$ nodules, Mn nodules
						@63.1' to 63.75': Silty CLAY (CL), mottled olive to orange, moist, Fe stains
						@63.75' to 63.9': Silty SAND (SM), brown, moist, fine grained
						@63.9' to 64.3': Silty SAND (SM), olive, moist, fine grained, $CaCO_3$ stringers
198 65						@64.3' to 65': Silty CLAY (CL), mottled orange to olive, moist, Fe stains
	65-70	Box 5	5	100		@65' to 65.2': Silty SAND (SM), orange brown, moist, medium grained
						@65.2' to 65.4': Silty SAND (SM), orange to olive, moist, fine grained
						@65.4' to 65.55': Silty CLAY (CL), olive, moist
						@65.55' to 65.65': Silty SAND (SM), orange, moist, medium grained
						@65.65' to 65.7': Silty SAND (SM), olive, moist, very fine grained
						@65.7' to 65.8': SILT (ML), dark brown to dark gray, moist, thinly laminated
						@65.8' to 66.7': Silty CLAY (CL), olive, moist, $CaCO_3$ nodules
						@66.7' to 72': Silty SAND (SM), orange olive, moist, fine sand, Fe staining, $CaCO_3$ nodules, trace subrounded gravel
193 70						
	70-75	Box 5	5	100		@72' to 75': Silty SAND (SM), orange brown, moist, fine sand, Fe staining, subangular pebbles
188 75						
	75-80	Box 5	5	100		@75' to 78': Silty SAND (SM), orange brown, moist, fine grained with subangular slaty gravels and pebbles, 2" diameter gravels
						@78' to 78.2': SAND (SP), gray orange, moist, medium to coarse grained with subangular pebbles
						@78.2' to 80': Silty CLAY (CL), olive brown, moist, trace coarse grained sand
183 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 5 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 8**
ELEVATION: **263 Feet**
DATE START: **2/16/2012**
DATE FINISH: **2/16/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
183 80	80-85	Box 6	5	100		@80' to 80.9': Silty SAND (SM), orange dark brown, moist, fine grained, subangular gravels @80.9' to 82.2': Silty SAND (SM), orange brown, moist, fine grained, subangular pebbles @82.2' to 86.4': Silty SAND (SM), brown, moist, fine grained, subangular and subrounded pebbles
178 85	85-90	Box 6	5	100		@86.4' to 91.4': Silty CLAY (CH), dark gray, moist, Mn nodules and Fe staining, internal clay shears from shrink and swell, waxy parting surfaces, blocky structure Marker Bed 4
						@89.5' to 90': CLAY (CL), dark olive brown, moist, Fe staining
173 90	90-95	Box 6	5	100		@90' to 90.6': CLAY (CL), dark olive brown, moist, Fe stains @90.6' to 91.1': Orange to olive, moist, Fe stains @91.1' to 91.4': Dark brown, moist, $CaCO_3$ stringers @91.4' to 95': Silty SAND (SM), mottled orange to olive, moist, fine to very fine grained, subangular highly-weathered gravels and pebbles, Fe stains
168 95	95-100	Box 7	5	100		@95' to 97': Silty CLAY (CL), mottled, orange to olive, moist, subrounded pebbles, Fe staining @97' to 97.5': CLAY (CL), olive, moist, subrounded slaty pebbles, Fe staining @97.5' to 98.5': Silty SAND (SM), laminated ~1/8" to 1/4", orange and olive, moist, fine sand with some coarse grained sand and subrounded pebbles @98.5' to 100': Clayey SILT to Silty CLAY (ML-CL), laminated, orange and olive, with subrounded pebbles
163 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 6 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**6 of 8**
ELEVATION:	**263 Feet**
DATE START:	**2/16/2012**
DATE FINISH:	**2/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
163 100						@100' to 100.4': Silty CLAY (CL), olive brown, moist, subrounded pebbles
						@100.4' to 100.8': CLAY (CL), brown, moist
						@100.8' to 101.2': Silty SAND (SM), brown, moist, fine grained
						@101.2' to 101.5': Gravelly SAND (SP_g), red brown, moist, fine to medium grained, subrounded to rounded pebbles
	100-105	Box 7	5	100		@101.5' to 102': Silty SAND (SM), orange brown, moist, fine grained
						@102' to 102.3': CLAY (CL), brown, moist
						@102.3' to 103': Sandy CLAY (CL_s), orange to olive, moist, very fine grained, with subangular slaty gravels, Fe stains
						@103' to 104.2': Silty SAND (SM), orange to olive, moist, fine grained, Fe stains
158 ▽ 105						@104.2' to 105': Silty CLAY (CL), olive, moist, $CaCO_3$ nodules, Fe staining, with subangular gravel, localized fine sand lenses <1/4" thick
						@105' to 108': Perched groundwater encountered
						@105' to 105.5': Silty SAND (SM), brown, very moist to wet, fine grained, subangular pebbles and gravels
	105-110	Box 7	5	100		@105.5' to 106': Silty SAND (SM), orange brown, very moist, very fine to fine grained sand, subangular highly-weathered gravel
						@106' to 107.3': SAND (SP), brown, very moist to wet, fine to medium grained, with subrounded gravel and pebble, localize silt blebs
						@107.3' to 107.8': Silty CLAY (CL), orange to olive, moist, $CaCO_3$ nodules, Fe stains
						@107.8' to 108': SAND (SP), brown, very moist to wet, medium grained, Fe stains
153 110						@108' to 108.2': Silty SAND (SM), olive brown, very moist, fine grained, Fe stains
						@108.2' to 110': Silty CLAY to Clayey SILT (CL-ML), laminated, brown, olive, orange, moist, Fe staining
	110-115	Box 8	5	100		@110' to 111.3': Silty SAND (SM), orangish olive, moist, fine grained, $CaCO_3$ nodules, Fe staining
						@111.3' to 112': Silty SAND to Sandy SILT (SM-ML), dark olive, moist, very fine grained, $CaCO_3$ nodules and stringers
						@112' to 112.8': Silty SAND to Sandy SILT (SM-ML), dark olive, moist, very fine grained, Fe stains
						@112.8' to 112.9': Silty SAND (SM), red brown, moist, fine grained, Fe stains
148 115						@112.9' to 114': Silty SAND (SM), orangish olive, moist, very fine grained, Fe stains
						@114' to 114.5': Silty SAND (SM), orange brown, moist, fine grained, Fe stains, subrounded pebbles
						@114.5' to 115': Silty SAND (SM), orange to olive, moist, fine to very fine grained with subangular slaty gravels and pebbles
	115-120	Box 8	5	100		@115' to 115.2': Gravelly SAND (SP_g), orange to dark brown, moist to very moist, fine to medium grained, subangular pebbles and gravels
						@115.2' to 116': Silty SAND (SM), olive, moist, fine grained with Mn nodules
						@116' to 116.3': Gravelly SAND (SP_g), dark gray, moist to very moist, fine grained sand, subangular pebbles and gravels
▽						@116.3' to 119.5': Silty SAND (SM), orange brown, moist to very moist, fine grained, Fe stain, subangular gravels
143 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 7 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**7 of 8**
ELEVATION:	**263 Feet**
DATE START:	**2/16/2012**
DATE FINISH:	**2/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
143 120	120-125	Box 8	2.7	54		@119.5' to 120.7': Perched groundwater encountered @119.5' to 120.5': Gravelly SAND (SP_g), dark gray, wet, fine grained, subangular gravels and pebbles, Fe staining @120.5' to 120.7': Silty SAND (SM), gray brown, wet, fine grained @120.7' to 121.2': Gravelly SAND (SP_g), dark gray, very moist, subangular gravels and pebbles @121.2' to 121.3': SILT (ML), olive, moist, Fe stains @121.3' to 121.4': SILT (ML), dark brown, moist, laminated @121.4' to 122.7': Silty SAND (SM), orangish olive, moist, fine grained @122.7' to 125': No Recovery
138 125	125-130	Box 9	4.2	84		@125' to 126.9': Silty CLAY (CL), brown, moist, Fe staining, Mn nodules @126.9' to 129.2': Sandy CLAY (CL_s), olive, moist, very fine to fine grained, Fe stains, subrounded pebbles and subangular gravels @129.2' to 130': No Recovery
133 130	130-135	Box 9	4.2	84		@130' to 130.8': Sandy CLAY (CL_s), olive, moist, very fine to fine grained, Fe stains subangular pebbles @130.8' to 132.5': Sandy CLAY (CL_s), olive, moist, very fine to fine grained, laminated, Fe stains, subangular pebbles @132.5' to 133.5': Sandy CLAY (CL_s), light olive, moist, fine grained, laminated, Fe stains, subangular pebbles @133.5' to 134.2': Sandy CLAY (CL_s), light olive, moist, fine grained, Fe stains, $CaCO_3$ nodules and stringers @134.2' to 135': No Recovery
128 135	135-140	Box 9	5	100		@135' to 135.3': Sandy CLAY (CL_s), light olive, very moist, fine grained, subangular pebbles @135.3' to 135.5': CLAY (CL), orangish light olive, very moist, Fe staining @135.5' to 135.6': CLAY (CL), light olive, very moist, Fe staining @135.6' to 136': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, Mn nodules @136' to 136.5': Sandy CLAY (CL_s), olive, very moist, fine grained, Fe stains @136.5' to 136.6': Silty SAND (SM), orangish olive, very moist, fine grained, Fe stains @136.6' to 137.9': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, $CaCO_3$ nodules, Mn nodules @137.9' to 138.7': Sandy CLAY to Clayey SAND (SC-CL), orangish olive,
123 140						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 14**
PAGE 8 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/16/12	ATD	▽ 40				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **8 of 8**
ELEVATION: **263 Feet**
DATE START: **2/16/2012**
DATE FINISH: **2/16/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
123 140						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

moist, fine grained, Fe stains, Mn nodules
@138.7' to 138.9': Clayey SAND (SC), blackish orange olive, moist to very moist, fine grained, Fe stains, Mn layer ~1" thick
@138.9' to 140': Clayey SAND (SC), orangish olive, moist, fine grained, Fe stains, subangular gravel

118 145

Total depth of coring: 140' bgs
Perched groundwater encountered @40'-58.9', 105'-108' and 119.5'-120.7'
Boring backfilled with bentonite and soil cuttings upon completion of drilling
Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
Asphalt patched with cold patch mix

113 150

108 155

103 160

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 1 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 9**
ELEVATION:	**262 Feet**
DATE START:	**2/29/2012**
DATE FINISH:	**3/1/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
262 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate base (Ab)**
						@0' to 5': Hand Auger
						Artificial fill (Af):
						@0' to 2': Silty SAND (SM), dark brown, dry, fine grained
						Old Benedict Canyon Wash deposits (Qal_{BCW}):
						@2' to 5.5': Silty SAND (SM), brown, Dry to moist, fine grain, subrounded pebbles and gravel
257 5						
	5-10	Box 1	5	100		@5.5' to 8.6': CLAY (CL), olive brown, Moist, Fe stain, subangular pebbles
						@8.6' to 9.1': Sandy CLAY (CL_s), red brown, moist, fine grain, Fe stains
						@9.1' to 9.55': Sandy CLAY (CL_s), brown, moist to very moist, fine grain, Fe stains, subrounded pebbles, Mn nodules
252 10						@9.55' to 10.4': Silty CLAY (CL), orangish olive, moist to very moist, Fe stains, Mn nodules
						@ 10.4' to 10.9': CLAY (CL), olive, moist to very moist, Fe stains
						@10.9' to 11.5': CLAY (CL) with sand, olive, moist to very moist, fine grain, Mn nodules, subangular pebbles
	10-15	Box 1	5	100		@11.5' to 12.1': Sandy CLAY (CL_s), red brown, moist to very moist, fine to medium grained, Fe stains, Mn nodules, subangular pebbles, oxidized
						@ 12.1' to 13.4': CLAY (CL), olive, moist, Fe stains, Mn nodules, oxidized lamilli
						@13.4' to 16.1': CLAY (CL), olive gray, moist, Fe stains, Mn nodules, unoxidized
						@14' to 15': $CaCO_3$ stringers
247 15						
						@16.1' to 17': Sandy CLAY (CL_s), orangish olive, moist to very moist, fine grain, Fe stains, Mn nodules
	15-20	Box 1	5	100		@17' to 17.5': CLAY (CL), olive, moist to very moist, Fe stains, Mn nodules (Bt lamilli)
						@17.5' to 17.7': Sandy CLAY (CL_s), orange olive, moist to very moist, fine grain, Mn nodules, Fe stains, subangular pebbles
						@17.7' to 18.2': CLAY (CL) with sand, orangish brown, moist to very moist, fine grained, Fe stains
242 20						@18.2' to 19.2': Sandy CLAY (CL_s), orangish olive brown, very moist, fine

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 2 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
242 20	20-25	Box 2	5	100		grain, Fe stains, Mn nodules @19.2' to 19.4': CLAY (CL), brown, moist to very moist, subangular pebble @19.4' to 20': CLAY (CL), mottled orangish to olive brown, moist, Fe stains, Mn banding @20' to 21': Clayey SILT (ML_c), orangish olive, moist, Fe stains blocky structure @21' to 21.5': Sandy CLAY (CL_s), orangish olive, moist to very moist, very fine grain, Fe stains (Bt lamilli) @21.5' to 21.6': Silty SAND (SM), olive brown, moist to very moist, very fine grain, Fe stains, Ca CO3 stringers @21.6' to 22.3': Sandy CLAY (CL_s), orangish olive, moist to very moist, very fine grain, Fe stains, Mn banding (Bt lamilli)
237 25	25-30	Box 2	5	100		@22.3' to 23.5': Sandy CLAY (CL_s), orangish olive, moist, fine grain, Fe stains, Mn banding (Bt lamilli), subangular slaty pebbles @23.5' to 24.3': CLAY (CL) with sand, brown, moist to very moist, fine grain, Fe stains, Mn nodules, subrounded pebbles, @24.3' to 25.5': CLAY (CL), red brown, moist to very moist, Mn nodules, Fe stains, subangular pebbles, Paleosol 1 @25.5' to 26.2': CLAY (CL), orangish olive, very moist, Fe stains (Bt lamilli), subangular slaty pebbles @26.2' to 26.5': Sandy CLAY (CL_s). red brown, very moist, fine grain, Fe stains @26.5' to 27': Sandy CLAY (CL_s), orangish olive, very moist, fine grain, Fe stains, Mn banding
232 30	30-35	Box 2	5	100		@27' to 28.6': Silty CLAY (CL), orangish gray, moist, Fe stains, subrounded gravel, subangular pebbles @28.6' to 29.2': CLAY (CL), red brown, moist, Fe stains, subangular gravel and pebble common @29.2' to 31.5': Clayey SAND (SC), red brown, moist fine to medium grain, Fe stains, subangular pebble and gravel, Paleosol 2 @31.5' to 32.8': Silty SAND (SM), red brown, moist, fine to medium grain, Fe stains, subangular gravel and pebble @32.8' to 33.6': Silty SAND (SM), gray brown, moist, fine grain, Fe stains, subangular gravel and pebble @33.6' to 35': No Recovery
227 ▽ 35	35-40	Box 3	3.6	72		@35': Perched groundwater encountered @35' to 35.6': Gravelly SAND (SP_g), dark red brown, wet, medium to coarse, subrounded and subangular, gravel and pebble, Fe stains @35.6' to 35.8': Silty SAND (SM), orangish gray, moist to very moist, fine to medium grain, Fe stains, weathered, subangular gravel and pebble @35.8' to 37.1': Silty SAND (SM), gray, moist, fine to medium grain, Sub rounded and subangular pebble and gravel cemented @37.1' to 40': No Recovery
222 ▽ 40						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 3 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
222 40	40-45	Box 3	4.7	94		@40' to 48.8': Perched groundwater encountered @40' to 44.7': Gravelly SAND (SP_g), reddish gray, wet, medium to coarse grain, Fe stains, subangular slaty gravel and pebble, subangular gravel and pebble trace, subrounded cobble
217 45	45-50	Box 3	5	100		@44.7' to 45': No Recovery @45' to 45.6': SAND (SP), orange black, wet, coarse grained, poorly sorted, subrounded pebble and gravel @45.6' to 48.8': Gravelly SAND (SP_g), orangish gray, wet, medium to coarse grain, sub rounded gravel and pebbles, subangular slaty gravel and pebble @48.8' to 49.9': Silty SAND (SM), mottled orange to olive, very moist, fine grain, Fe stain, Mn nodules
212 50	50-55	Box 4	4.5	90		@49.9' to 50': CLAY (CL), olive, moist, angular, slaty gravel @50' to 50.4': CLAY (CL), orange olive, moist, Fe stains @50.4' to 50.6': Silty SAND (SM), red brown, very moist, fine to medium grain, Fe stains @50.6' to 51.7': Silty SAND (SM), orangish olive, very moist, fine grain, Fe stains @51.7' to 52': Silty SAND (SM), red brown, very moist, fine to medium grain, Fe stains, subangular pebble @52' to 53.8': CLAY (CL), orangish olive, very moist, Fe stains, Mn nodules @53.8' to 54': CLAY (CL), brownish olive, very moist, Fe stains, Mn nodules @54' to 54.3': Silty SAND (SM), orangish olive, very moist, fine grain, Fe stains @54.3' to 54.5': CLAY (CL), brownish olive, very moist, Fe stains, Mn nodules
207 55 ▽	55-60	Box 4	5	100		@54.5' to 55': No Recovery @55' to 55.6: CLAY (CL), orangish olive, very moist, Fe stains, subangular pebble @55.6' to 56.5': Silty SAND (SM), olive brown, very moist, fine grain, Fe stains, subangular slaty pebbles @56.5' to 58.1': Perched groundwater encountered @56.5' to 58.1': Gravelly SAND (SP_g), red gray, wet, medium to coarse grain, subangular gravel and pebbles, subrounded pebbles gravel and trace cobble @58.1' to 58.7': Sandy CLAY (CL_s), orangish olive, very moist, fine grain, Fe stains
202 60						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 4 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
202 60						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
	60-65	Box 4	5	100		@58.7' to 59.7': Silty SAND (SM), orangish olive, very moist, fine grain, Fe stain, subangular gravel and pebble, Mn nodules @59.7' to 60.5': CLAY (CL), olive, very moist, Fe stains @60.5' to 61.1': Silty SAND (SM), orange, moist to very moist, very fine grain, Fe stains **Quaternary older alluvial and fluvial deposits (Qoaf):** @61.1' to 61.3': CLAY (CL), orangish olive, moist, Fe stains, blocky structure, Paleosol 3 @61.3' to 61.4': Silty SAND (SM), orange, moist, very fine grain, Fe stain @61.4' to 61.55': CLAY (CL), olive, moist, Fe stains @61.55' to 61.6': Silty SAND (SM), orange, moist, very fine grain, Fe stain
197 65 ▽	65-70	Box 5	5	100		@61.6' to 61.75': CLAY (CL), dark olive, moist, Mn nodules @61.75' to 61.85': CLAY (CL), olive, moist, Fe stains, Mn nodules @61.85' to 62.5': CLAY (CL), dark olive, moist, Mn nodules, $CaCO_3$ nodules @62.5' to 62.65': Silty SAND (SM), orangish olive, moist, fine grain, Fe stains, Mn nodule, $CaCO_3$ stringers @62.65' to 62.9': CLAY (CL), orangish olive, moist, Fe stains, $CaCO_3$ nodules and stringers, Mn nodules @62.9' to 63.1': Silty SAND (SM), orangish olive, moist, fine grain, Fe stains @63.1' to 63.2': CLAY (CL), orange olive, moist, Fe stains, $CaCO_3$ nodules @63.2' to 63.3': CLAY (CL), orange brown, moist, $CaCO_3$ stringers @63.3' to 63.65': Silty SAND (SM), orangish olive, moist, fine grain, Fe stains, $CaCO_3$ stringers
192 70	70-75	Box 5	5	100		@63.65' to 63.9': CLAY (CL), orangish olive, moist, Fe stains, $CaCO_3$ nodules @63.9' to 64.1': CLAY (CL), gray brown, moist, $CaCO_3$ nodules and stringers, subangular slaty pebble @64.1' to 65': Silty SAND (SM), orangish olive, moist, fine grain, Fe stains, $CaCO_3$ nodules @65' to 65.3': Silty SAND (SM), orange, moist to very moist, fine grain @65.3' to 65.6': CLAY (CL), light olive, moist to very moist, Fe stains, $CaCO_3$ nodules @65.6': Perched groundwater encountered @65.6' to 66.6': CLAY (CL), olive, moist, Mn nodules, $CaCO_3$ stringers @66.6' to 67.1': CLAY (CL), olive brown, moist, Fe stains, $CaCO_3$ stringers (Bt lamilli) @67.1' to 68.8': CLAY (CL), olive, moist Fe stains, $CaCO_3$ stringers prevalant @68.8' to 70.4': CLAY (CL), orangish dark olive, moist, Fe stains, $CaCO_3$ nodules and stringers @70.4' to 71.8': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules and stringers, subangular slaty pebble
187 75	75-80	Box 5	5	100		@71.8' to 74.5': CLAY (CL), orangish olive, moist, Fe stains, $CaCO_3$ nodules (Bt lamilli), subangular slaty pebbles @74.5' to 75': CLAY (CL), orangish brown, moist, Fe stains, subangular slaty pebbles @75' to 76.1': CLAY (CL), orangish brown, moist, Fe stains, $CaCO_3$ stringers, blocky structure @76.1' to 77.1': Sandy CLAY (CL_s), orangish olive, moist to very moist, fine grain, Fe stains, $CaCO_3$ stringers, subangular pebbles @77.7' to 79.2': Silty CLAY (CL), orangish brown, moist to very moist, Fe stains, $CaCO_3$ stringers, blocky structure
182 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 5 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
182 80	80-85	Box 6	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @79.2' to 80': CLAY (CL), orangish brown, moist, Fe stains, $CaCO_3$ stringers, subangular pebble @80' to 81.8': Silty SAND (SM), brown, moist, very fine grain, subangular gravel, Fe stains, blocky structure @81.8' to 82.4': Silty SAND (SM), brown, moist, very fine grain, subangular pebbles @82.4' to 82.55': CLAY (CL), brownish olive, moist @82.55' to 83.6': Silty SAND (SM), brown, moist, fine grain, subangular pebbles @83.6' to 84': CLAY (CL), brownish olive, moist $CaCO_3$ nodules @84' to 84.5': Sandy CLAY (CL_s), brown, moist, fine grain, Mn banding at contact with above $CaCO_3$ nodules
177 85	85-90	Box 6	5	100		@84.5' to 84.6': COBBLE encountered @84.6' to 85: CLAY (CL), olive brown, moist, $CaCO_3$ nodules @85' to 85.5': Silty SAND (SM), moist, fine grain, $CaCO_3$ stringers, Fe stains, blocky structure @85.5' to 86.2': CLAY (CL) with sand, olive gray, moist, subangular pebbles, $CaCO_3$ nodules, internal clay shears from shrink and swell, blocky structure Marker Bed 4 @86.2' to 90': CLAY (CL), dark olive, moist, Fe stains, $CaCO_3$ stringers
172 90	90-95	Box 6	5	100		@90' to 90.8': Silty CLAY (CL), orangish dark brown, moist, Fe stains, $CaCO_3$ stringers, blocky structure @90.8' to 90.0': CLAY (CL), olive, moist, Fe stains, blocky structure @90.9' to 91.3': CLAY (CL), dark brown, moist, Fe stains, $CaCO_3$ stringers, blocky structure @91.3' to 92': Silty CLAY (CL), orangish brown, moist, Fe stains, subangular pebbles @92' to 94.6': CLAY (CL), orangish olive, moist, Fe stains, subangular pebbles and gravel common, $CaCO_3$ stringers Bt Lamilli
167 95	95-100	Box 7	5	100		@94.6' to 95': CLAY (CL), orangish brown, moist, Fe stains, subangular pebbles (Bt lamilli) @95' to 96.7': Sandy CLAY (CL_s), mottled orangish gray, moist, fine grain, Fe stains, $CaCO_3$ nodules @96.7' to 97.3': CLAY (CL), mottled orangish gray, very moist, Fe stains, subrounded gravel and pebble @97.3' to 97.7': CLAY (CL) with sand, orange, moist to very moist, fine grained, Fe stains @97.7' to 99.6': Sandy CLAY (CL_s), orangish olive, moist, fine grain, Fe stains, Mn nodules
162 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 6 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
162 100 ▽	100-105	Box 7	5	100		@99.6' to 100.3': CLAY (CL), mottled olive brown, moist, Fe stain, Mn nodule, $CaCO_3$ nodules @100.3' to 101': Silty SAND (SM), orangish dark brown, moist, fine grain, Fe stains, $CaCO_3$ straingers, subrounded gravel @101' to 102.2': Perched groundwater encountered @101' to 101.9': Gravelly SAND (SP_g), orangish gray, wet, medium to coarse grain, subrounded pebbles and gravels @101.9' to 102.2': Silty SAND (SM), orangish brown, wet, fine grain, Fe stains @102.2' to 102.6': Clayey SILT (ML_c), orangish brown, moist, Fe stains, $CaCO_3$ stringers @102.6' to 103': CLAY (CL), orangish olive, moist, Fe stains, Gravelly contact with below
157 105 ▽	105-110	Box 7	5	100		@103' to 103.2': Silty SAND (SM), orange brown, moist, very fine grain, Fe stains @103.2' to 103.3': CLAY (CL), brown, moist @103.3' to 103.35': SAND (SP), orange, very moist, fine grain @103.35' to 103.5': CLAY (CL), brown, moist, $CaCO_3$ nodules @103.5' to 103.8': Gravelly CLAY (CL_g), orangish gray, moist, subangular, pebbles and gravels @103.8' to 104.3': Silty SAND (SM), orange brown, very moist, fine grain, Fe stains, subangular pebbles @104.3' to 105': No Recovery
152 110 ▽	110-115	Box 8	4	80		@105' to 105.7': CLAY (CL) with sand, orangish olive, very moist, fine grain, Fe stains, Mn nodules @105.7' to 106': CLAY (CL), olive. moist to very moist, Fe stains, Mn nodules @106' to 106.4': Clayey SAND (SC), orangish gray, very moist, fine grain, Fe stains, Mn stains on sand grains @106.4' to 106.6': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules @106.6' to 110.6': Perched groundwater encountered @106.6' to 107.2': Silty SAND (SM), orange brown, wet, fine grain, Fe stains @107.2' to 107.35': Silty SAND (SM), red brown, wet, fine grain, Fe stains @107.35' to 107.7': Silty SAND (SM), orangish olive, very moist to wet, fine grain, Fe stains @107.7' to 108': Silty SAND (SM), red brown, wet, fine grain, Fe stains @108' to 108.7': CLAY (CL), olive, moist, Fe stains @108.7' to 109.3': CLAY (CL), mottled olive orange brown, moist, Fe stains, Mn nodules, $CaCO_3$ nodules
147 ▽ 115 ▽	115-120	Box 8	2.6	52		@109.3' to 110': Silty SAND (SM), orangish olive, wet, fine grain, Fe stains @110'-110.2': CLAY (CL), olive, wet, Fe stains @110.2'- 110.6': Silty SAND (SM), olive, wet, Fine grain @110.6' to 111.8': Sandy CLAY (CL_s), dark olive, very moist, fine grain, Fe stains, subangular slaty pebbles @111.8' to 112.9': Sandy CLAY (CL_s), orangish olive, very moist, very fine grain, Fe stains (Bt lamilli) subangular pebbles @112.9' to 113.1': Silty SAND (SM), red gray, very moist, fine to medium grain, Fe stain, subangular slaty pebbles @113.1 to 113.55': Sandy CLAY (CL_s), gray brown, very moist, fine grain, Fe stain, subangular gravel and pebble
142 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 7 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **7 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
142 120	120-125	Box 8	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @113.5': Perched groundwater encountered @113.55' to 113.8': SAND (SP), gray brown, wet, fine to medium grain, subrounded gravel @113.8' to 114': Silty SAND (SM), orangish brown, very moist, very fine grain, Fe stains @114' to 115': No Recovery @115': Perched groundwater encountered @115' to 115.75': Silty SAND (SM), orange brown, wet, fine grain, Fe stains, subangular slaty pebbles @115.75' to 116.3': Silty SAND (SM), gray brown, very moist, fine grain, Fe stains, some clay @116.3' to 121': Perched groundwater encountered @116.3' to 117.1': SAND (SP), red gray, wet, fine to medium grain, subrounded pebbles and gravels @117.1' to 117.6': Silty SAND (SM), orangish brown gray, wet, fine grain, Fe stains, Mn bandings @117.6' to 120': No Recovery
137 125	125-130	Box 9	5	100		@120' to 121': Silty SAND (SM), olive, wet, fine grain, Fe stains, subangular gravel @121' to 121.7': CLAY (CL) with sand, olive gray, moist, fine grain, Fe stains, $CaCO_3$ nodules and stringers @121.7' to 122.35': CLAY (CL) with sand, orange olive, moist, fine grain, Fe stains, $CaCO_3$ stringers @122.35' to 123.15': Sandy CLAY (CL_s), olive brown, moist, fine grain, Fe stains, subangular pebbles, Mn banding contact with above @123.15' to 125.8': CLAY (CL), brown, moist, Fe stains, $CaCO_3$ stringers, subrounded and subangular pebbles @125.8' to 127': Sandy CLAY (CL_s), orangish brown, very moist, fine grain, Fe stains, subangular slaty pebbles common, highly weathered, angular gravels
132 130	130-135	Box 9	5	100		@127' to 127.5': Silty SAND (SM), orangish gray, very moist, fine grain, Fe stains, subangular slaty pebble @127.5': Perched groundwater encountered @127.5' to 128.5': Silty SAND (SM), orangish gray, wet, fine grain, Fe stains, subangular slaty pebble gravel @128.5' to 128.8': Silty SAND (SM), orangish olive, very moist, very fine grain, Fe stain @128.8' to 129.4': Sandy CLAY (CL_s), orangish olive, very moist, fine grain, subgrounded pebbles @129.4' to 130': Sandy CLAY (CL_s), grayish brown, very moist, fine grain, subgrounded, pebbles
127 135	135-140	Box 9	5	100		@130' to 130.55': CLAY (CL), olive, very moist, Fe stains, Mn module @130.55' to 131.5': Sandy CLAY (CL_s), olive, very moist, fine grain, Fe stains, Mn nodules common @131.5' to 134': CLAY (CL), light olive, moist, Fe stains, $CaCO_3$ stringers prevalent, subangular pebbles @134' to 136.6': Sandy CLAY (CL_s), olive, moist, fine grain, Fe stains, $CaCO_3$ stringers, subangular slaty pebbles @136.6' to 137.5': Sandy CLAY (CL_s), orangish olive, moist to very moist, fine grain, Fe stains, Mn nodules
122 140						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 8 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **8 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
122 140	140-145	Box 10	5	100		@137.5': Perched groundwater encountered @137.5' to 138.4': Clayey SAND (SC), olive brown, wet, fine grain, Fe stains, subrounded pebbles and gravels @138.4' to 138.8': CLAY (CL) with sand, orangish olive, moist, fine grain, Fe stains, Mn nodules @138.8' to 141': CLAY (CL), olive, moist, Fe stains, Mn nodules, $CaCO_3$ stringers and nodules @141' to 142': CLAY (CL), green gray, moist, slight $CaCO_3$ stringer development @142' to 145.8': CLAY (CL), olive, moist, Fe stains, Mn nodules, $CaCO_3$ stringers prevelent
117 145	145-150	Box 10	4.2	84		@145.8' to 146.6': CLAY (CL), olive dark brown, moist, Mn nodules, $CaCO_3$ stringers @146.6' to 147.4': Clayey SAND (SC), olive, moist to very moist, Fe stains, medium grained @147.4' to 149.2': CLAY (CL), olive dark brown, moist Fe stains, subangular pebbles, $CaCO_3$ nodules, Mn nodules @149.2'- 150': No Recovery
112 150	150-155	Box 10	5	100		@150' to 152.8': CLAY (CL), dark olive brown, moist, Fe stains, $CaCO_3$ stringers, Mn nodules, subangular pebbles @152.8' to 155.5': Sandy CLAY (CL_s), dark olive gray, moist, fine grain, Fe stains, $CaCO_3$ stringers, subangular
107 155	155-160	Box 11	4.2	84		@155.5' to 155.8': Gravelly CLAY (CL_g), dark olive gray, moist, Fe stains, subrounded pebbles and gravels @155.8' to 157.8': Sandy CLAY (CL_s), dark olive gray, moist, fine grain, Fe stains, subangular pebbles, $CaCO_3$ stringers @157.5' to 158.7': Sandy CLAY (CL_s), olive brown, moist, fine grain, Fe stains, subangular slaty pebbles **San Pedro Formation (Qsp):** @158.7' to 159.2': SAND (SP), green, moist, fine grain, poorly sorted @159.2' to 160': No Recovery
102 160						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 15**
PAGE 9 OF 9

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/01/12	ATD	▽ 35				INCLINED	Bit (Feet)	
03/01/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **9 of 9**
ELEVATION: **262 Feet**
DATE START: **2/29/2012**
DATE FINISH: **3/1/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
102 160						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@160' to 160.6': SAND (SP), dark green, very moist, fine grain, poorly sorted massive
						@160.6' to 165': No Recovery
	160-165	Box 11	0.6	12		
97 165						
						@165' to 166.4': SAND (SP), olive green, moist, fine grain, poorly sorted
						@166.4' to 166.8': SAND (SP) with gravel, yellow green, moist, fine grain, subrounded pebble and gravel
	165-170	Box 11	3.7	74		@166.8' to 168.7': SAND (SP), olive green, moist, fine grain, Mn stains, subrounded pebble
						@168.7 to 170- No Recovery
92 170						
						Total depth of coring: 170' bgs Perched groundwater encountered @35', 40'-48.8', 56.5'-58.1', 65.6', 101'-102.2', 106.6'-110.6', 113.5', 115', 116.3'-121', 127.5', and 137.5' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling Excess cuttings disposed of in D.O.T. approved drums and disposed offsite Asphalt patched with Cold Patch mix Boring experienced air-intake (vacuum) @170' bgs. Cause unknown
87 175						
82 180						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 1 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **1 of 7**
ELEVATION: **261 Feet**
DATE START: **2/20/2012**
DATE FINISH: **2/20/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
261 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate base (Ab)**
						@0' to 5': Hand Auger
						Artificial fill (Af):
						@0' to 2': Silty SAND (SM), dark brown, moist, fine grained
						Old Benedict Canyon Wash deposits (Qal_{BCW}):
						@2' to 6.4': Silty SAND (SM), brown, moist, fine grained, subangular gravel and pebbles
256 / 5						
	5-10	Box 1	5	100		@6.4' to 7.3': Clayey SAND (SC), brown, moist, fine grained, subangular slaty pebbles
						@7.3' to 8.5': Clayey SAND (SC), olive brown, moist, fine grained, subangular pebbles, Fe staining
						@8.5' to 8.6': Silty SAND (SM), reddish brown, moist, fine to medium grained, subangular to subrounded pebbly gravel
						@8.6' to 10': Silty CLAY (CL), olive brown, moist, Fe staining
251 / 10						@10' to 10.9': Silty CLAY (CL), olive, moist
						@10.9' to 11.3': Silty SAND (SM), yellow olive, moist, fine to medium grained, subrounded pebbles
	10-15	Box 1	5	100		@11.3' to 13.5': Sandy CLAY (CL_s), olive, moist, very fine grained sand, Fe staining, oxidized
						@13.5' to 14.6': Silty CLAY (CL), olive gray, moist, unoxidized
246 / 15						@14.6' to 15': Sandy CLAY (CL_s), olive, moist, very fine grained sand, Fe staining, $CaCO_3$ stringers
						@15' to 16.7': Silty CLAY (CL), olive, moist, $CaCO_3$ stringers, subangular slaty pebbles, blocky structure
	15-20	Box 1	5	100		@16.7' to 22': Silty CLAY (CL), mottled orange to olive, moist, Fe staining prevalent
241 / 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 2 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 7**
ELEVATION: **261 Feet**
DATE START: **2/20/2012**
DATE FINISH: **2/20/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
241 20						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@15' to 16.7': Silty CLAY (CL), olive, moist, $CaCO_3$ stringers, subangular slaty pebbles, blocky structure
	20-25	Box 2	5	100		@22' to 22.5': Silty SAND (SM), orange olive, moist, fine grained, Fe staining, angular slaty gravel @22.5' to 23.4': Silty SAND (SM), orange brown, moist, fine grained, Fe staining, subangular pebbles
						@23.4' to 25': Silty CLAY (CL), olive gray, moist, Fe stained Mn nodules
236 25						@25' to 26.6': Silty CLAY (CL), olive gray, moist, Fe staining, contains Mn nodules, subangular slaty pebbles
	25-30	Box 2	5	100		@26.6' to 27.4': Sandy CLAY (CL_s), brown, moist, very fine grained, Fe staining, Mn nodules, subangular slaty pebbles, Paleosol 1 @27.4' to 29.5': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe staining, Mn nodules
231 30						@29.5' to 32.4': Sandy CLAY (CL_s), brown, moist, very fine grained, subangular pebbles, Paleosol 2
	30-35	Box 2	5	100		@32.4' to 35': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe staining, subangular gravel and pebbles
226 35						@35' to 36': Silty SAND (SM), orange brown, moist to very moist, fine grained, Fe staining, subangular pebbles
	35-40	Box 3	5	100		@36' to 36.1': SAND (SP), orange brown, very moist, medium to coarse grained, Fe staining, subarounded pebbles @36.1' to 37.5': Clayey SAND (SC), orange brown, moist to very moist, fine grained, Fe staining, subangular gravel and pebbles @37.5' to 37.8': SAND (SP), orange brown, very moist to wet, medium to coarse grained, Fe staining, subrounded pebbles @37.8' to 38.5': Silty SAND (SM), orange brown, very moist, very fine grained, Mn nodules @38.5' to 39.4': Silty SAND (SM), orange brown, moist, fine grained, subangular gravel and pebbles
221 40						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 3 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 7**
ELEVATION: **261 Feet**
DATE START: **2/20/2012**
DATE FINISH: **2/20/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
221 40 ▽						@39.4' to 40.5': Silty SAND (SM), brown, moist, fine grained, subangular gravel and pebbles
						@40.5': Perched groundwater encountered
						@40.5' to 40.9': SAND (SP), brown, very moist to wet, medium to coarse grained, subrounded pebbles
	40-45	Box 3	5	100		@40.9' to 41.1': Silty SAND (SM), orange brown, moist, very fine grained, Mn nodules, Fe staining
						@41.1' to 41.8': Silty SAND (SM), orange brown, moist, fine to medium grained, Fe staining, Mn nodules
						@41.8' to 42.4': Silty SAND (SM), orange olive, moist, Fe staining, Mn nodules
						@42.4' to 44.6': CLAY (CL), orange olive, moist, Mn nodules, Fe staining, interbedded with silty sand, moist, very fine grained
216 45						@44.6' to 46': CLAY (CL), olive brown, moist, Mn nodules and Fe staining prevalent
	45-50	Box 3	4.6	92		@46' to 47.9': Silty CLAY (CL), orangish olive, moist to very moist, Fe staining, Mn nodules
						@47.9' to 49.5': Silty SAND (SM), orangish olive, very moist, fine to medium grained, Fe staining, subangular slaty pebbles
211 ▽ 50						@49.5' to 49.6': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, Fe stains, subrounded gravel and pebbles
						@49.6' to 50': No Recovery
						@50': Perched groundwater encountered
						50' to 51': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, Fe staining, subrounded and subangular gravel and pebbles
	50-55	Box 4	1	20		@51' to 55': No Recovery
206 55						@55' to 56': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, subrounded and subangular gravel and pebbles
						@56' to 60': No Recovery
	55-60	Box 4	1	20		
201 60						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 4 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 7**
ELEVATION: **261 Feet**
DATE START: **2/20/2012**
DATE FINISH: **2/20/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
201 60						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@60' to 61.85': CLAY (CL), orangish brown, very moist to wet, Fe staining, Mn nodules
						@61.8' to 62.3': CLAY (CL), gray, very moist to wet, Fe staining
	60-65	Box 4	2.9	58		@62.3' to 62.5': SAND (SP), orange gray, wet, medium to coarse grained
						Quaternary older alluvial and fluvial deposits (Qoaf):
						@62.5' to 62.9': CLAY (CL), orange olive, very moist, Fe staining, Mn nodules, blocky structure,
						Paleosol 3
						@62.9' to 65': No Recovery
196 65						@65' to 65.2': Silty SAND (SM), gray, moist to very moist, fine grained
						@65.2' to 65.6': Clayey SAND to Sandy CLAY (SC-CL), orangish olive, moist to very moist, fine grained, Fe staining
						@65.6' to 65.8': Silty CLAY to Clayey SILT (CL-ML), moist to very moist, Fe staining, $CaCO_3$ stringers
	65-70	Box 5	5	100		@65.8' to 66.1': Reddish brown mottling of unit above
						@66.1' to 66.7': Silty SAND (SM), orangish olive, very moist, fine to very fine grained, Fe staining
						@66.7' to 68.3': Sandy CLAY to CLAY (CL_s-CL), gray, moist, fine grained, $CaCO_3$ stringers, Mn nodules, Fe staining
						@68.3' to 68.8': Sandy CLAY (CL_s), gray brown, moist, fine grained, $CaCO_3$ stringers, Fe staining
191 70						@68.8' to 71.7': CLAY (CL), orangish olive (tiger banding), moist, $CaCO_3$ stringers and nodules, Fe staining, subangular slaty pebbles
						@71.7' to 72.8': Clayey SAND (SC), orangish olive (tiger banding), moist to very moist, fine to medium grained, Fe staining, subangular slaty pebbles more prevalent than above
	70-75	Box 5	5	100		@72.8' to 73.5': Clayey SAND (SC), orangish olive (tiger banding), moist, fine grained, Fe staining
						@73.5' to 74.5': Clayey SAND (SC) with gravel, orangish gray, moist, fine to medium grained with angular gravel and pebbles
						@74.5' to 75.6': Clayey SAND (SC), orange, moist, fine grained, $CaCO_3$ stringers
186 75						@75.6' to 76.8': CLAY (CL), orange brown, moist to very moist, $CaCO_3$ stringers, Mn nodules
	75-80	Box 5	5	100		@76.8' to 78.2': Clayey SAND (SC), brown, moist to very moist, fine grained, blocky structure, $CaCO_3$ stringers
						@78.2' to 79': Sandy CLAY (CL_s), orange brown, moist, fine grained, $CaCO_3$ stringers
						@79' to 80': Silty CLAY (CL), olive brown, moist, blocky structure
181 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 5 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 7**
ELEVATION: **261 Feet**
DATE START: **2/20/2012**
DATE FINISH: **2/20/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
181 80	80-85	Box 6	5	100		@80' to 81.4': Silty SAND (SM), olive brown, moist, fine grained, blocky structure
						@81.4' to 82': Silty SAND (SM) with clay, olive brown, moist, fine grained
						@82' to 84': Silty SAND (SM), olive brown, moist, fine grained
						@84' to 85.5': Silty SAND (SM), brown, moist, fine grained, $CaCO_3$ stringers
176 85	85-90	Box 6	5	100		@85.5' to 86': Clayey SILT (MH), brown, moist, $CaCO_3$ stringers, blocky structure, Marker Bed 4 @86' to 88': Clayey SILT (MH), dark gray, moist, $CaCO_3$ stringers, blocky structure
						@88' to 90': Clayey SILT to Silty CLAY (ML-CL), dark gray, moist, $CaCO_3$ stringers, Fe staining
171 90	90-95	Box 6	5	100		@90' to 91.3': Silty CLAY (CL), brown, dark gray, moist, $CaCO_3$ stringers, Fe staining, blocky structure
						@91.3' to 92.5': Sandy CLAY (CL_s), orange brown, moist, fine grained, $CaCO_3$ stringers, Fe staining
						@92.5' to 95': Silty SAND (SM), orange brown, moist, fine grained with gray concretions, angular gravel and pebbles, Fe staining
166 95	95-100	Box 7	4.1	82		@95' to 96.2': CLAY (CL) with sand, orange olive, moist to very moist, fine grained, angular gravels and pebbles, Fe staining @96.2' to 98.5': CLAY (CL) with sand, orange olive, moist, fine grained, subangular pebbles
						@98.5' to 98.8': CLAY (CL), orange olive, moist, Fe staining @98.8' to 99.2': CLAY (CL), brown, moist, Fe staining, angular gravel
161 ▽ 100						@99.2' to 100': No Recovery

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 6 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**6 of 7**
ELEVATION:	**261 Feet**
DATE START:	**2/20/2012**
DATE FINISH:	**2/20/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
161 100	100-105	Box 7	5	100		@100': Perched groundwater encountered @100' to 101.3': Gravelly SAND (SP_g), dark gray, wet, medium to coarse grained with subrounded gravel and pebbles @101.3' to 101.6': Silty SAND (SM), orange brown, very moist, fine grained @101.6' to 101.7': Gravelly SAND (SP_g), orange gray, wet, medium to coarse grained, medium to course grained with subrounded pebbles @101.7' to 101.9': Silty SAND (SM), gray brown, very moist, very fine grained, Fe staining @101.9' to 102.5': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe staining @102.5' to 102.6': Silty SAND (SM), brown, moist, fine grained @102.6' to 103.1': Silty SAND (SM), orange olive, moist, fine to very fine grained, Fe staining
156 105	105-110	Box 7	5	100		@103.1': Perched groundwater encountered @103.1' to 104': SAND (SP) with clay, gray brown, wet, medium to coarse grained, subrounded gravel and pebbles @104' to 104.55': Clayey SAND (SC), orangish olive, very moist, fine grained, Fe staining @104.55' to 105': No Recovery @105' to 105.5': CLAY (CL), orangish brown, very moist, Fe staining, Mn nodules, subrounded pebbles @105.5' to 105.9': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe staining, Mn nodules @105.9' to 106': CLAY (CL), light olive, moist, Fe staining @106' to 106.3': SAND (SP), orangish gray, moist, medium to coarse grained, Fe staining, subrounded pebbles @106.3' to 106.5': CLAY (CL), olive, moist to very moist, Fe staining
151 110	110-115	Box 8	5	100		@106.5': Perched groundwater encountered @106.5' to 107.2': SAND (SP), orange gray, wet, medium to coarse grained, subrounded pebbles and gravel @107.2' to 109': Silty SAND to CLAY (SM to CL), interbedded, orangish olive, moist, Mn nodules, Fe staining, concretions with $CaCO_3$ @109' to 109.7': CLAY (CL), olive brown, moist, mottled, Mn nodules and Fe staining prevalent @109.7' to 110': Silty SAND (SM), orangish olive, moist, fine grained, Fe staining
146 115	115-120	Box 8	5	100		@110' to 110.8': Silty SAND (SM), orange brown, moist, fine grained, Fe staining @110.8' to 110.9': CLAY (CL), orange brown, moist, Fe staining @110.9' to 111.4': Silty SAND (SM), gray brown, moist to very moist, medium grained, Fe staining @111.4' to 112.2': Clayey SAND (SC), orangish olive, moist, fine grained (tiger banding), Fe staining, $CaCO_3$ and Mn nodules @112.2' to 113.6': Clayey SAND (SC), orangish olive, moist, fine grained (tiger banding), Fe staining, Mn nodules, subangular slate pebbles @113.6' to 114.6': Silty SAND (SM), orange gray, moist to very moist, fine grained, Fe staining, sub angular gravel and pebbles @114.6': Perched groundwater encountered
141 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 16**
PAGE 7 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/20/12	ATD	▽ 40.5				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **7 of 7**
ELEVATION: **261 Feet**
DATE START: **2/20/2012**
DATE FINISH: **2/20/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
141 120	120-125	Box 8	4.7	94		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@114.6' to 115': Silty SAND (SM), orange gray, wet, fine to medium grained, Fe staining, subrounded pebbles and gravel
						@115' to 115.9': Gravelly SAND (SP_g), brownish gray, wet, medium to coarse grained, subrounded gravel and pebbles
						@115.9' to 116.7': Silty SAND (SM) with clay, very moist to wet, fine grained, Fe staining, subangular gravel and pebbles
						@116.7' to 117.3': Silty SAND (SM), orange gray, wet, medium to coarse grained, subrounded gravel and pebbles
						@117.3' to 118.75': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, subrounded gravel and pebbles
						@118.75' to 119': Sandy CLAY (CL_s), olive gray, moist, fine grained, Mn nodules
136 125						@119' to 119.1': Silty SAND (SM), orangish olive, moist to very moist, fine grained, Fe staining
						@119.1' to 123': Sandy CLAY (CL_s), olive gray, moist, fine grained, Fe staining, $CaCO_3$ nodules, subangular pebbles
						@123' to 124.7': Sandy CLAY (CL_s), brown, moist, fine grained, Fe staining, Mn nodules, subangular slaty pebbles
						@124.7' to 125': No Recovery
						Total depth of coring: 125' bgs
						Perched groundwater encountered @40.5', 50'-62.5', 100'-101.7', 103.1', 106.5, 114.6'-117.3'
						Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging
						Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
						Asphalt patched with cold patch mix
131 130						
126 135						
121 140						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 1 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
261 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate base (Ab)**
						@0' to 5': Hand Auger
						Artificial fill (Af):
						0' to 5': Silty SAND (SM), dark brown, moist, fine grained
256 5						**Old Benedict Canyon Wash deposits (Qal$_{ocw}$):**
						@5' to 5.3': Silty SAND (SM), brown, moist, fine to medium grained, subrounded gravel
						@5.3' to 6.9': Clayey SAND (SC), brown, moist, fine grained, Mn nodule, subangular slate pebbles
	5-10	Box 1	5	100		@6.9' to 8': CLAY (CL), brown, moist, Fe staining
						@8' to 9.7': Sandy CLAY (CL$_s$), brown, moist, fine grained, subangular slate pebbles
251 10						@9.7' to 9.75': SAND (SP), reddish brown, moist, medium grained
						@9.75' to 10': Sandy CLAY (CL$_s$), brown, moist, fine grained
						@10' to 11.2': CLAY (CL), mottled orangish oive, moist, Fe stains
						@11.2' to 11.6': Silty SAND (SM), orange, moist, fine grained, Fe stains
	10-15	Box 1	5	100		@11.6' to 12.6': CLAY (CL), mottled, orangish olive, moist, Fe stains, $CaCO_3$ stringer
						@12.6 to 13.7': Sandy CLAY (CL$_s$), mottled orangish olive, moist, Fe stains, subangular gravel and pebbles, oxidized lamilli
						@13.7' to 18.8': CLAY (CL), olive, moist, Fe stains, laminated, unoxidized
246 15						
	15-20	Box 1	5	100		@18.8' to 20': CLAY (CL), orangish olive, moist, Fe stains, subangular pebbles
241 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 2 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
241 20						@20' to 21': CLAY (CL), olive, moist, Fe staining, Mn nodules
	20-25	Box 2	5	100		@21' to 23.5': CLAY (CL), mottled orangish olive, moist, Fe stains (Bt Lamilli)
						@23.5' to 24.6': CLAY (CL), orangish brown, moist, Fe stains, subangular slate pebbles
236 25						@24.6' to 25': CLAY (CL) with sand, brown, moist, fine grained
	25-30	Box 2	5	100		@25' to 27': CLAY (CL), olive, moist, Fe stains, Mn nodules
						@27' to 27.5': Silty SAND (SM), mottled orangish olive, moist, Fe stains, very fine grained
						@27.5' to 28': Silty SAND (SM), orangish brown, moist, very fine grained, Fe stains
						@28' to 28.6': CLAY (CL), brown, moist, Fe stains, Mn nodules, Paleosol 1
231 30						@28.6' to 30': CLAY (CL) with sand, orangish brown, moist, fine grained, Fe stains, subangular slate pebbles
	30-35	Box 2	4.6	92		@30' to 30.9': Sandy CLAY (CL_s), oxidized, blocky structure, Paleosol 1
						@30.9' to 33.6': CLAY (CL), orangish brown, moist, Fe stains, subangular slate pebbles
						@33.6' to 34.3': Sandy CLAY (CL_s), reddish brown, moist, fine grained, Fe stains, subangular pebbles, Paleosol 2
226 35						@34.6' to 35': No Recovery
	35-40	Box 3	5	100		@35' to 37.1': Clayey SAND (SC), orange brown, moist, Fe stains, subangular slate pebbles
						@37.1' to 39.6': Clayey SAND (SC), orangish olive, moist, fine grained, subangular pebbles
221 40						@39.6' to 40': Clayey SAND (SC), brown, moist, fine grained, subangular

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 3 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
221 40						pebbles
						@40' to 40.7': Gravelly SAND (SP_g) with clay, dark gray, moist to very moist, medium grained, subangular gravel and pebbles
						@40.7' to 41.6': CLAY (CL) with sand, orangish brown, moist, fine grained, subangular pebbles
	40-45	Box 3	5	100		@41.6' to 42.5': CLAY (CL), olive light brown, moist, Fe stains, Mn nodules
						@42.5' to 42.6': Silty SAND (SM), olive brown, moist, very moist, fine grained, Fe stains
						@42.6' to 43.2': CLAY (CL) mottled olive orange, moist, Mn nodules, prevalent Fe staining
						@43.2' to 43.5': Silty SAND (SM), mottled olive orange, moist, Fe stains
216 45						@43.5' to 44.3': CLAY (CL), mottled olive orange, moist to very moist, Fe stains
						@44.3' to 45.7': CLAY (CL), mottled olive orange, moist, Fe stains, Mn nodules, and banded lamilli
						@45.7' to 47.4': CLAY (CL), mottled olive orange, moist, Fe stains, Mn nodules prevalent
	45-50	Box 3	3.8	76		@47.4' to 48.5': Sandy CLAY (CL_s), mottled olive orange, moist, Fe stains (Bt lamilli)
						@48.5' to 48.8': Sandy CLAY (CL_s), orange brown, moist, Fe stains
						@48.8' to 50': No Recovery
211 ▽ 50						@50' to 51.5': Perched groundwater encountered
						@50' to 50.6': SAND (SP), brown, wet, fine to medium grained, massive
						@50.6' to 51.5': Silty SAND (SM) with clay, wet, fine grained, Fe stains, subangular pebbles and gravel
						@51.5' to 51.8': CLAY (CL), orangish olive, moist to very moist, Fe staining
	50-55	Box 4	5	100		@51.8' to 52.3': CLAY (CL), orange brown, very moist, Fe stains, Mn nodules, subangular pebbles
						@52.3' to 52.6': Silty SAND (SM), orange brown, very moist, fine grained, subangular pebbles and gravel
						@52.6' to 53.3': CLAY (CL), motled orange olive, very moist, Fe stains
						@53.3' to 53.8': CLAY (CL), mottled orange gray, very moist, subangular pebbles
206 ▽ 55						@53.8' to 54.7': Silty SAND (SM), orange, very moist, very fine to fine grained, Fe stains, subangular pebbles
						@54.7' to 55': CLAY (CL), olive orange, moist, Fe stains
						@55' to 57.2': Perched groundwater encountered
						@55' to 55.5': Silty SAND (SM) with clay, orangish gray, very moist, fine grained, Fe stains
	55-60	Box 4	5	100		@55.5' to 55.8': CLAY (CL), orangish gray, very moist, Fe stains
						@55.8' to 56.4': Gravelly SAND (SP_g), orange dark gray, wet, medium to coarse grained, subangular pebbles and gravel
▽						@56.4' to 56.7': Silty SAND (SM), orange gray, very moist to wet, fine grained, Fe stains
201 60						@56.7' to 57.2': Silty SAND (SM), red brown, wet, fine grained, Fe stains

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 4 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
201 60						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@57.2' to 57.7': CLAY (CL), mottled orange gray, Mn banding, Fe stains (paleosoil) @57.7' to 58.5': CLAY (CL), orangish gray, very moist, Fe staining @58.5' to 59': CLAY (CL), orangish gray, very moist, Fe stains, subangular gravel
	60-65	Box 4	5	100		@59' to 63.5': Perched groundwater encountered @59' to 59.3': Silty SAND (SM), orange brown, wet, fine grained, subangular pebbles @59.3' to 59.6': CLAY (CL), orange brown, wet, Fe stains @59.6' to 59.8': Silty SAND (SM), orange brown, wet, fine grained, Fe stains @59.8' to 60.9': CLAY (CL), mottled orangish olive, wet, Fe stains, Mn nodules @60.9' to 61.9': CLAY (CL), orange olive, wet, Fe stains
196 65						@61.9' to 62.3': Silty SAND (SM), red brown, wet, fine grained, Fe stains, Mn nodules
	65-70	Box 5	5	100		**Quaternary older alluvial and fluvial deposits (Qoaf):** @62.3' to 63.2': CLAY (CL), orange olive, moist, Fe stains, $CaCO_3$ stringers, blocky structure, Paleosol 3 @63.2' to 63.5': Silty SAND (SM), orange green, wet, medium to coarse grained, Fe stains @63.5' to 64': CLAY (CL), orange olive, very moist, Fe stains @64' to 65': CLAY (CL), olive, very moist, $CaCO_3$ nodules @65' to 65.5': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains
191 70						@65.5' to 66.8': CLAY (CL), orangish olive, moist to very moist, Fe stains, $CaCO_3$ stringers @66.8' to 67.4': CLAY (CL), olive brown, moist, $CaCO_3$ nodules @67.4' to 67.6': Silty SAND (SM), olive brown, moist, fine grained @67.6' to 68.1': CLAY (CL), olive light gray, moist, $CaCO_3$ stringers, Mn nodules @68.1' to 68.2': Silty SAND (SM), olive, moist, Fe stains @68.2' to 68.5': CLAY (CL), olive, moist to very moist, $CaCO_3$ stringers
	70-75	Box 5	5	100		@68.5' to 73.6': Perched groundwater encountered @68.5' to 69.1': Gravelly SAND (SP_g), orange dark gray, wet, medium to coarse grained, subangular gravel and pebbles @69.1' to 69.5': CLAY (CL), olive, very moist, $CaCO_3$ stringers @69.5' to 71.7': CLAY (CL), dark gray, moist, $CaCO_3$ stringers, Fe staining @71.7' to 72.7': Sandy CLAY (CL_s), olive, moist, fine grained, Fe stains, $CaCO_3$ stringers @72.7' to 73.6': Silty SAND (SM), orange gray, very moist, fine grained, Fe stains
186 75						@73.6' to 74.3': Gravelly SAND (SP_g), orange dark gray, wet, medium to coarse grained, subangular gravel and pebbles
	75-80	Box 5	5	100		@74.3' to 75': CLAY (CL), mottled orange olive, very moist, Fe stains @75' to 75.7': CLAY (CL), mottled orange gray, moist, Fe stains, $CaCO_3$ nodules @75.7' to 76.6': CLAY (CL), mottled orange brown gray, moist, Fe stains, $CaCO_3$ nodules @76.6' to 78.2': CLAY (CL), orange brown, moist, Fe stains, $CaCO_3$ nodules
181 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 5 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
181 80	80-85	Box 6	5	100		@78.2' to 82.3': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe stains, $CaCO_3$ stringers and nodules
						@82.3' to 85': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe stains, subangular pebbles
176 85	85-90	Box 6	5	100		@85' to 85.6': Sandy CLAY (CL_s), orange brown, moist, fine grained, $CaCO_3$ nodules
▽						@85.6' to 86.4': CLAY (CL), brown, moist to very moist, Fe stains
						@86.4': Perched groundwater encountered
						@86.4' to 86.8': Gravelly SAND (SP_g), orange dark gray, wet, medium to coarse grained, subangular pebbles
						@86.8' to 87.8': CLAY (CH), dark gray, very moist, $CaCO_3$ nodules
						@87.8' to 92': CLAY (CL), orange olive gray, moist to very moist, Fe stains, $CaCO_3$ stringers and nodules, Marker Bed 4
171 90	90-95	Box 6	5	100		@92' to 96': CLAY (CL), orange brown, moist, Fe stains, Mn nodules, $CaCO_3$ stringers and nodules, internal clay films on waxy parting surfaces, shrink and swell stresses
166 95	95-100	Box 7	5	100		@96' to 100': Gravelly CLAY (CL_g), orange brown to reddish brown, moist, heavily weathered and oxidized, moderate $CaCO_3$ in matrix
161 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 6 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**6 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
161 100						@100' to 101': No Recovery
	100-105	Box 7	4	80		@101' to 101.8': CLAY (CL), orangish olive, moist, Fe stains @101.8' to 102': CLAY (CL), brown, moist, Fe stains, $CaCO_3$ stringers @102' to 102.6': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe stains @102.6' to 103': Silty SAND (SM) with clay, orangish olive, moist, fine grained, Fe stains @103' to 103.3': Silty SAND (SM) with clay, orangish brown, moist, medium grained, Fe stains
156 105						@103.3' to 104': CLAY (CL), orangish brown, moist, Fe stains @104' to 105': Sandy CLAY (CL_s), orangish brown, moist, fine grained, Fe stains, $CaCO_3$ stringers @105' to 105.9': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, subangular slate pebbles @105.9': Perched groundwater encountered
	105-110	Box 7	5	100		@105.9' to 106.1': Silty SAND (SM), red brown, wet, medium grained, Fe stains @106.1' to 106.4': Silty SAND (SM) with clay, orangish olive, very moist, fine grained, Fe stains @106.4' to 107': Sandy CLAY (CL_s), orangish olive, very moist, fine grained, Fe stains, subangular slaty pebbles @107' to 107.2': CLAY (CL), orangish brown, moist, Fe staining, Mn nodules
151 110						@107.2' to 107.5': Silty SAND (SM), orangish brown, moist to very moist, fine grained, Fe stains @107.5' to 108.1': CLAY (CL), orangish olive, moist, Fe stains, Mn nodules, $CaCO_3$ nodules @108.1' to 108.4': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains, Mn nodules
	110-115	Box 8	5	100		@108.4' to 108.9': CLAY (CL) with sand, orangish olive, moist, fine grained, Fe stains, $CaCO_3$ nodules @108.9' to 109.7': CLAY (CL), mottled orangish gray, moist, $CaCO_3$ nodules, Fe stains @109.7' to 110': Silty SAND (SM), orangish light olive, moist, very fine grained, Fe stains
146 115						@110' to 110.4': CLAY (CL), mottled orange olive, moist, Fe stains @110.4' to 111.5': CLAY (CL), olive brown, moist, Fe stains, block fracture, $CaCO_3$ nodules @111.5' to 112.1': Silty SAND (SM), olive brown, moist to very moist, fine grained, Fe stains @112.1' to 112.4': CLAY (CL), olive brown, moist to very moist, Fe stains
	115-120	Box 8	5	100		@112.4' to 114': Sandy CLAY (CL_s), orange brown, moist to very moist, fine grained, Fe stains, Mn nodules @114' to 115': Sandy CLAY (CL_s), orangish gray, moist, fine grained, Fe stains, subangular pebbles @115' to 116.4': Silty SAND (SM), olive gray, very moist, fine grained, Fe stains, subangular gravel and pebbles @116.4' to 118.6': Perched groundwater encountered
141 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 7 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**7 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
141 120						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@116.4' to 117.3': Gravelly SAND (SP_g), olive gray, wet, medium to coarse grained, subangular gravel and pebbles, Fe stains
						@117.3' to 117.7': Silty SAND (SM), orangish olive, very moist to wet, fine to medium grained, Fe stains
						@117.7' to 117.9': CLAY (CL), orange gray, very moist to wet, Fe staining, Mn nodules
	120-125	Box 8	5	100		@117.9' to 118': Gravelly SAND (SP_g), orange gray, wet, medium to coarse grained, Fe stains, subangular gravel and pebbles
						@118' to 118.5': Silty SAND (SM), orangish gray, wet, fine grained, Fe stains, subangular slaty pebbles
						@118.5' to 118.6': Silty SAND (SM), orange gray, wet, fine to medium grained, Fe stains, subangular gravel and pebbles
136 125						@118.6' to 120': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe stains, subangular pebbles
						@120' to 121.6': Silty SAND (SM), olive gray, moist, fine grained, Fe stains, subangular pebbles
						@121.6' to 120': Silty SAND (SM), gray brown, moist to very moist, fine to medium grained, Fe stains
	125-130	Box 9	5	100		@122' to 122.5': Sandy CLAY (CL_s), olive gray, moist, fine grained, $CaCO_3$ nodules
						@122.5' to 123.5': Sandy CLAY (CL_s), olive gray, moist, fine grained, Fe stains, $CaCO_3$ nodules, subangular slaty pebbles
						@123.5' to 124.1': Sandy CLAY (CL_s), gray brown, moist, fine grained, Fe stains, $CaCO_3$ nodules, subangular slaty pebbles
						@124.1' to 125': Sandy CLAY (CL_s), orange brown, moist, fine grained, Fe stains, Mn nodules
131 130						@125' to 125.7': Silty SAND (SM), grayish brown, moist, fine to very fine grained, Fe stains, blocky structures
▽						@125.7' to 127': CLAY (CL), grayish brown, moist, Fe stains, Mn nodules
						@127' to 127.3': Silty SAND (SM), orange brown, moist, fine grained, Fe stains, subangular pebbles
	130-135	Box 9	5	100		@127.3' to 128.6': CLAY (CL), orange brown, moist, Fe stains, subangular pebbles
						@128.6' to 130': Gravelly CLAY (CL_g), gray brown, moist to very moist, Fe stains, subangular gravel and pebbles
						@130' to 131': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, subangular gravel and pebbles, subrounded gravel and pebbles, subangular cobbles
126 135						@131' to 141.5': Perched groundwater encountered
						@131' to 131.1': CLAY (CL), orangish olive, very moist, Fe stains, subangular pebbles
						@131.1' to 131.9': Silty SAND (SM), reddish brown, wet, fine to medium grained, Fe stains, subangular slaty pebble
	135-140	Box 9	3.1	62		@131.9' to 132.6': CLAY with sand to Sandy CLAY (CL_s), moist, fine grained, Fe stains, subangular pebbles
						@132.6' to 135': No Recovery
						@135' to 136': Silty SAND (SM), olive, wet, fine grained, Fe stains, subangular slaty pebbles and gravels
						@136' to 136.8': CLAY (CL), olive, wet, Fe stains, subangular pebbles
121 140						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 8 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**8 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
121 140						prevalent @136.8' to 138.1': CLAY (CL), olive, very moist, Fe stains, $CaCO_3$ nodules, subangular pebbles @138.1' to 140': No Recovery
	140-145	Box 10	5	100		@140' to 141.5': Silty SAND (SM), orange light brown, wet, fine grained, Fe stains, subangular, slaty pebbles and gravel @141.5' to 141.9': Sandy CLAY (CL_s), orangish olive, very moist, fine grained, Fe stains @141.9' to 120': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ stringers, Mn banding @142.8' to 143.1': Silty SAND (SM), olive brown, moist, fine grained, Fe stains, Mn nodules
116 145						@143.1' to 143.5': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules and stringers, Mn nodules @143.5' to 143.9': CLAY (CL), olive brown, moist, Fe stains, Mn nodules and banding @143.9' to 144.1': Silty SAND (SM), orange olive, moist, fine grained, Fe stains, Mn nodules
	145-150	Box 10	5	100		@144.1' to 145.2': CLAY (CL), mottled olive to brown, moist, Fe stains, $CaCO_3$ nodules, Mn banding @145.2' to 146.4': CLAY (CL), gray, moist, $CaCO_3$ nodules, Fe stains @146.4' to 149': CLAY (CL), light gray, moist, $CaCO_3$ nodules prevalent, Fe stains, Mn nodules @149' to 153': CLAY (CL), light gray, moist, $CaCO_3$ stringers (marbled sample), Fe stains
111 150						
	150-155	Box 10	5	100		@153' to 153.6': Sandy CLAY to Clayey SAND (CL-SC), gray, moist to very moist, fine grained, Fe stains, $CaCO_3$ stringers @153.6' to 154.8': Silty SAND (SM), gray, moist to very moist, fine grained, Fe stains, $CaCO_3$ stringers
106 155						@154.8' to 155.6': Silty SAND (SM), brown, moist, fine grained, Fe stains
	155-160	Box 11	3.4	68		@155.6' to 158': Silty SAND (SM), brown gray, moist, fine grained, Fe staining, $CaCO_3$ stringers **<u>San Pedro Formation (Qsp):</u>** @158' to 158.4': Silty SAND (SM), greenish gray, moist, fine grained, massive @158.4' to 160': No Recovery
101 160						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 9 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**9 of 10**
ELEVATION:	**261 Feet**
DATE START:	**2/24/2012**
DATE FINISH:	**2/27/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
101 160						@160' to 161': Silty SAND (SM), greenish gray, moist, fine grained, poorly graded, massive
						@161' to 161.3': Cobble
						@161.3' to 162.1': Silty SAND (SM), yellow brown, moist, fine grained with subangular gravel and pebbles
	160-165	Box 11	2.3	46		@162.1' to 162.3': Gravelly SAND (SP_g), light gray, moist, fine grained, cemented, subrounded to subangular gravel and pebbles
						@162.3' to 166': No Recovery
96 165						
						@166': Perched groundwater encountered
						@166' to 166.6: Gravelly SAND (SP_g), dark gray, wet, fine grained, subrounded gravel and pebbles
	165-170	Box 11	1	20		@166.6' to 167': Cobbles
						@167' to 170': No Recovery
91 170						
						@170' to 170.7': Silty SAND (SM), gray, wet, fine grained, massive
						@170.7' to 171.1': Silty Sand (SM), gray, wet, fine grained, massive, angular slate pebbles and subrounded gravel
	170-175	Box 12	1.1	22		@171.1' to 175': No Recovery
86 175						
						@175' to 177.7': SAND (SP), light gray, moist, fine grained, massive
	175-180	Box 12	2.7	54		@177.7' to 180': No Recovery
81 180						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 17**
PAGE 10 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/27/12	ATD	▽ 50				INCLINED	Bit (Feet)	
		▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **10 of 10**
ELEVATION: **261 Feet**
DATE START: **2/24/2012**
DATE FINISH: **2/27/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
81 180						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
76 185						Total depth of coring: 180' bgs Perched groundwater encountered @50'-51.5', 55'-57.2', 59'-63.5', 68.5'-73.6', 86.4', 105.9', 116.4'-118.6', 131'-141.5', and 166' bgs Boring backfilled with bentonite cement and soil cuttings upon completion of drilling Excess cuttings disposed of in D.O.T. approved drums and disposed offsite Boring experienced air-intake (vacuum) @175' bgs. Cause unknown Asphalt patched with cold patch mix
71 190						
66 195						
61 200						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 1 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 10**
ELEVATION:	**259 Feet**
DATE START:	**2/21/2012**
DATE FINISH:	**2/23/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
259 0						**Asphalt concrete (Ac)** over **Aggregate base (Ab)**
						Artificial fill (Af): @0' to 3': Silty SAND (SM), dark brown, moist, fine grained
						Old Benedict Canyon Wash deposits (Qal_{BCW}): @3' to 5.9': Silty SAND (SM), brown, moist, fine grained, subrounded gravel and pebbles
254 5						
	5-10	Box 1	2	40		@5.9' to 6.3': Sandy CLAY (CL_s), brown, moist, fine grained, subrounded pebbles @6.3' to 7': Sandy CLAY (CL_s), olive gray, moist, fine grained, subrounded gravel @7' to 10': No Recovery
249 10						
						@10' to 11.8': Sandy SILT (ML), olive, moist, fine grained, Fe stains, subangular slaty pebbles
	10-15	Box 1	5	100		@11.8' to 13.7': Silty SAND (SM), olive, moist, fine grained, Fe stains, subrounded pebbles
						@13.7' to 14': Clayey SAND (SC), mottled orangish olive, moist, fine grained, Fe stains prevalent
						@14' to 14.2': SAND (SP), orange, moist, medium grained, Fe stains prevalent
244 15						
						@14.2' to 15': Silty SAND (SM), orangish olive, moist, very fine grained, Fe stains
						@15' to 16.1': Silty SAND (SM) with clay, olive, moist, fine grained, Fe stains, subangular pebbles
						@16.1' to 16.3': Silty SAND (SM), orangish red, fine grained, Fe stains
	15-20	Box 1	5	100		@16.3' to 17.5': Sandy SILT (ML) with clay, orangish olive, moist, fine grained, Fe stains, Mn nodules
						@17.5' to 21': Sandy CLAY (CL_s), olive, moist, fine grained, Fe stains, subrounded pebbles
239 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 2 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
239 20	20-25	Box 2	5	100		@17.5' to 21': Sandy CLAY (CL_s), olive, moist, fine grained, Fe stains, subrounded pebbles
						@21' to 21.9': Silty SAND (SM), mottled orange olive, moist, fine grained, Fe stains, subangular slaty pebbles
						@21.9' to 26.7': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains, Mn nodules, subangular pebbles
234 25	25-30	Box 2	5	100		@26.7' to 27.8': Silty SAND (SM), mottled orange olive, moist, fine grained, Fe stains
						@27.8' to 30': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains, Mn nodules
229 30	30-35	Box 2	5	100		@30' to 30.5': Silty CLAY (CL), brown, moist, Fe stains
						@30.5' to 31.9': Silty SAND (SM), mottled orange brown, moist, fine grained, Fe stains
						@31.9' to 32': CLAY (CL), orange brown, moist, Fe stains
						@32' to 32.7': Silty SAND (SM), mottled orange olive, moist, very fine grained, Fe stains
						@32.7' to 33.3': Sandy CLAY (CL_s), olive brown, moist, Fe stains, subangular slaty pebbles
						@33.3' to 34.4': Sandy CLAY (CL_s), reddish brown, moist, fine grained, Fe stains, Mn nodules, subangular pebbles
224 35	35-40	Box 3	5	100		@34.4' to 36.6': CLAY (CL), olive brown, moist, Fe stains, well developed blocky structure, @34.4': Paleosol 1
						@36.6' to 36.8': Sandy CLAY (CL_s), orangish olive, moist, Fe stains
						@36.8' to 39.4': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains, subangular slaty pebbles
219 40						@39.4' to 42.6': CLAY (CL) with sand, brown, moist, fine grained, subangular to

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 3 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
219 40	40-45	Box 3	3.1	62		subrounded pebbles, well developed blocky structure, @39.4': Paleosol 2 @40' to 40.6': CLAY (CL) with sand, orangish olive, moist, fine grained, Fe stains, Mn nodules @40.6' to 41.8': Sandy CLAY (CL_s), orange brown, moist, fine grained, subangular and subrounded pebbles @42.7' to 43.1': Sandy CLAY (CL_s), brown, moist, fine grained, subangular gravel prevalent @43.1' to 45': No Recovery
214 45 ▽	45-50	Box 3	3.2	64		@45' to 46': Silty SAND (SM) with clay, orange brown, moist to very moist, fine grained, subangular slaty pebbles, Fe stains @46' to 48': Perched groundwater encountered @46' to 48': Gravelly SAND (SP_g), brown, wet, medium to coarse grained, subangular and subrounded gravel and pebbles @48' to 48.2': Silty SAND (SM), orangish olive, very moist, very fine grained, Fe stains, some thinly bedded clay @48.2' to 50': No Recovery
209 50 ▽	50-55	Box 4	5	100		@50' to 51': Silty SAND (SM), mottled orangish olive, very moist, very fine grained, Fe stains @51' to 53.8': Perched groundwater encountered @51' to 52': Clayey SAND to Sandy CLAY (SC-CL), brown, wet, medium to coarse grained, subangular slaty pebbles @52' to 52.8': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, subrounded to subangular pebbles @52.8' to 53.4': CLAY (CL), olive gray, very moist, Fe stains, Mn nodules @53.4' to 53.6': Sandy CLAY (CL_s), orange olive, very moist, fine to coarse grained, Fe stains, subangular pebbles @53.6' to 53.8': Silty SAND (SM), orange gray, wet, medium to coarse grained sand, Fe stains, subangular gravel and pebbles
204 55	55-60	Box 4	4.4	88		@53.8' to 55.5': Sandy CLAY (CL_s), orangish olive, moist to very moist, Fe stains, fine grained, subangular slaty pebbles @55.5' to 56.4': Silty SAND (SM) with clay, mottled orangish olive, moist to very moist, Fe stains @56.4' to 57.8': Sandy CLAY (CL_s), mottled orangish olive, very moist, Fe stains, fine grained, subangular slaty pebbles @57.8' to 58.4': CLAY (CL), orangish olive, very moist, Fe stains @58.4' to 58.7': Silty SAND (SM), orangish olive, very moist, fine grained, Fe stains, subangular pebbles @58.7': Perched groundwater encountered @58.7' to 59.4': Gravelly SAND (SP_g), dark gray, wet, medium to coarse
199 60						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 4 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
199 60	60-65	Box 4	2.6	52		grained, subrounded gravel and pebbles @59.4' to 60': No Recovery @60' to 61.5': Silty SAND (SM), brown, wet, fine grained @61.5' to 62.6': SAND (SP), gray brown, wet, medium to coarse grained, subrounded gravel and pebbles @62.6' to 65': No Recovery
194 65	65-70	Box 5	1.4	28		@65' to 65.8': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, subrounded gravel and pebbles **Quaternary older alluvial and fluvial deposits (Qoaf):** @65.8' to 66.4': CLAY (CL), orange olive, wet, Fe stains, blocky structure, Paleosol 3 @66.4': Perched groundwater encountered @66.4' to 70': No Recovery
189 ▽ 70	70-75	Box 5	5	100		@70': Perched groundwater encountered @70' to 70.3': Silty SAND (SM), olive, very moist to wet, fine grained @70.3' to 70.5': CLAY (CL), olive, very moist to wet @70.5' to 70.85': SAND (SP), orangish olive, wet, medium to coarse grained, subrounded pebbles @70.85' to 71.2': Sandy CLAY (CL_s), olive brown, very moist, very fine grained, Fe stains, $CaCO_3$ stringers @71.2' to 71.3': CLAY (CL), orangish olive, moist, Fe stains @71.3' to 72.6': CLAY (CL), olive, moist @72.6' to 73': Silty SAND (SM), orangish olive, moist, very fine grained, Fe stains @73' to 73.5': CLAY (CL), orangish olive, moist, Fe stains
184 75	75-80	Box 5	5	100		@73.5' to 74.1': Silty SAND (SM), orangish olive, moist, fine grained @74.1' to 74.15': SAND (SP), brown, moist, medium to coarse grained @74.15' to 74.5': Silty SAND (SM), brown, moist, fine grained @74.5' to 75': CLAY (CL), olive brown, moist, Fe stains @75' to 75.6': Silty SAND (SM), orangish olive, very moist, fine grained, Fe stains @75.6' to 76.3': CLAY (CL), orangish olive, moist, Fe stains @76.3' to 76.6': Silty SAND (SM), orangish olive, moist, fine grained, Fe stains @76.6' to 77.4': CLAY (CL), olive brown, moist, Mn nodules @77.4' to 78.3': CLAY (CL), orangish olive, moist, Fe stains, Mn nodules @78.3' to 78.8': Silty SAND (SM), orangish gray, moist to very moist, fine
179 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 5 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
179 80						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						grained, Fe stains
						@78.8' to 79': CLAY (CL), olive brown, moist
						@79.4' to 79.7': Sandy CLAY (CL_s), brown, moist, fine grained, blocky structure
						@79.7' to 80': Sandy CLAY (CL_s), dark brown, gray, moist, fine grained
						@79' to 79.4': Sandy CLAY (CL_s), gray, moist, fine grained
	80-85	Box 6	5	100		@80' to 81.7': Sandy CLAY (CL_s), dark gray, moist, fine grained, subangular pebbles
						@81.7' to 82.3': Sandy CLAY (CL_s), dark gray, moist, fine grained, Fe stains, subangular pebbles
						@82.3' to 82.5': Sandy CLAY (CL_s), dark gray, moist, fine grained, Fe stains, $CaCO_3$ stringers
						@82.5' to 84.3': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules and stringers
174 85						@84.3' to 85': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules and stringers, subangular slaty pebbles
						@85' to 86.3': Silty SAND (SM), orangish olive, moist to very moist, Fe stains, subangular gravel and pebbles
	85-90	Box 6	5	100		@86.3' to 88.5': CLAY (CL), mottled orangish olive, moist, Fe stains, $CaCO_3$ nodules, subangular slaty pebbles, Mn nodules
						@88.5' to 90': Sandy CLAY (CL_s), mottled orangish olive, moist, Fe stains, subangular pebbles
169 90						@90' to 91.6': Clayey SILT (ML), brown, moist
	90-95	Box 6	5	100		@91.6' to 93': Clayey SILT (MH), grayish brown moist concretions, $CaCO_3$ nodules, subangular gravel
						Marker Bed 4
						@93' to 95': Sandy CLAY (CL_s), brown, moist, fine grained, $CaCO_3$ stringers and nodules
						Drilled to 95' on 2/21/12,
						Continued on 2/22/12
164 95						
	95-100	Box 7	5	100		@95' to 97.9': Sandy CLAY, brown, moist, fine grained, $CaCO_3$ stringers
						@97.9' to 98.6': CLAY (CL), brown, moist, Mn nodules, $CaCO_3$ nodules
						@98.6' to 99.4': CLAY (CL), brown, moist, Fe stains, Mn nodules, $CaCO_3$ nodules
159 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 6 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**6 of 10**
ELEVATION:	**259 Feet**
DATE START:	**2/21/2012**
DATE FINISH:	**2/23/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
159 100	100-105	Box 7	5	100		@99.4' to 103.5': Sandy CLAY (CL_s), gray, moist, Mn nodules, $CaCO_3$ nodules, Marker Bed 4
						@103.5' to 104.5': Silty SAND (SM) with clay, orange gray, moist to very moist, fine grained, Fe stains, Mn nodules
154 105	105-110	Box 7	5	100		@104.5' to 105': CLAY (CL), gray, moist to very moist, $CaCO_3$ nodules, Fe stains @105' to 106.7': Sandy CLAY (CL_s), orangish gray, moist to very moist, fine grained, Fe stains, $CaCO_3$ nodules and stringers @106.7' to 109.5': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, $CaCO_3$ stringers and nodules, subangular slaty pebbles
149 110	110-115	Box 8	5	100		@109.5' to 110': Sandy CLAY (CL_s), orangish gray, moist, fine grained, Fe stains, $CaCO_3$ nodules @110' to 110.6': Gravelly SAND (SP_g) with clay, orangish gray, moist, medium to coarse grained, Fe stains, rounded pebbles and gravel @110.6' to 113.4': Sandy CLAY (CL_s), orangish olive, moist, fine grained, Fe stains, subangular pebbles and gravel @113.4' to 114': Sandy CLAY (CL_s), orangish brown, moist, fine grained, Fe stains @114' to 114.6': CLAY (CL), orange olive, moist, Fe stains
144 115	115-120	Box 8	5	100		@114.6' to 114.65': SAND (SP), moist, fine to medium grained, Fe stains @114.65' to 115': Sandy CLAY (CL_s), brown, moist, fine grained @115' to 115.8: Silty SAND (SM), orange gray, moist, fine grained, Fe stains @115.8' to 116.5': Silty SAND (SM), gray, moist, fine grained, $CaCO_3$ stringers, Fe stains @116.5' to 117': Sandy CLAY (CL_s), orange olive, moist, fine grained, Fe stains, $CaCO_3$ stringers @117' to 118.2': SILT (ML), orange gray, moist, Fe stains @118.2' to 121.9': Sandy SILT (ML), orange brown, moist, fine grained, Fe stains, $CaCO_3$ nodules
139 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 7 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **7 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
139 120						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@118.2' to 121.9': Sandy SILT (ML), orange brown, moist, fine grained, Fe stains, $CaCO_3$ nodules
	120-125	Box 8	5	100		@121.9' to 123.5': CLAY (CL), mottled gray brown, moist, Fe stains, Mn nodules
						@123.5' to 123.8': CLAY (CL), mottled orangish olive, moist, Fe stains
						@123.8' to 125': CLAY (CL), mottled gray brown, moist, Mn nodules
134 125						@125' to 125.7': CLAY (CL), dark gray brown, moist, $CaCO_3$ nodules, Fe stains, blocky structures
	125-130	Box 9	3.9	78		@125.7' to 128.9': Clayey SILT (ML), orangish gray, moist, Fe stains, blocky structures
						@127.7' to 128.9': Sandy SILT (ML), orangish gray, moist, fine grained, Fe stains, subangular slaty pebbles
						@128.9' to 130': No Recovery
129 ▽ 130						@130' to 135.8': Perched groundwater encountered
						@130' to 131': Gravelly SAND (SP_g), gray brown, wet, medium to coarse grained, subrounded gravel, pebbles, and cobbles
						@131' to 131.2': CLAY (CL), orange gray, wet, Fe stains, subrounded pebbles
	130-135	Box 9	1.2	24		@131.2' to 135': No Recovery
124 135						@135' to 135.8': Silty SAND (SM), brown, wet, fine grained, Fe stains, Mn nodules, subangular slaty pebbles
						@135.8' to 136.3': Sandy CLAY (CL_s), yellowish olive, moist, fine grained, Fe stains
						@136.3' to 136.6': Sandy CLAY (CL_s), olive gray, moist, fine grained, Fe stains
	135-140	Box 9	5	100		@136.6' to 139': Sandy CLAY (CL_s), olive gray, moist, Fe stains, $CaCO_3$ stringers and nodules, subangular slaty pebbles
						@139' to 140': Sandy CLAY (CL_s), olive gray, moist, fine grained, Fe stains, $CaCO_3$ nodules prevalent
119 140						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 8 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **8 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
119 140						@140' to 140.6': Sandy CLAY (CL_s), gray brown, moist, fine grained, Fe stains, $CaCO_3$ nodules prevalent
						@140.6' to 141.3': Silty SAND (SM), gray brown, moist, fine grained, Fe stains, subangular slaty pebbles
	140-145	Box 10	4.7	94		@141.3' to 142.7': Sandy CLAY (CL_s), gray brown, moist, Fe stains, subangular slaty pebbles
						@142.7' to 143.1': Silty SAND (SM), gray brown, moist, fine grained, Fe stains, subangular slaty pebbles
						@143.1' to 143.3': CLAY (CL), gray brown, moist, Fe stains
						@143.3' to 144.7': CLAY (CL), dark gray, moist, Fe stains, Mn nodules, $CaCO_3$ nodules
114 ▽ 145						@144.7' to 145': No Recovery
						@145' to 146': Perched groundwater encountered
						@145' to 146.2': CLAY (CL), gray, wet, $CaCO_3$ nodules, subangular slaty pebbles and gravel
						@146.2' to 146.8': CLAY (CL), gray, wet, Fe stains, $CaCO_3$ nodules, subangular pebbles and gravel
	145-150	Box 10	5	100		@146.8' to 148.5': Sandy CLAY (CL_s), olive, moist, fine grained, $CaCO_3$ nodules, Fe stains, subangular slaty pebbles
						@148.5' to 149': Silty SAND (SM) with clay, gray brown, very moist, fine grained, Fe stains, subangular slaty pebbles
						@149' to 150': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains, $CaCO_3$ stringers
109 ▽ 150						@150': Perched groundwater encountered
						@150' to 150.8': Silty SAND (SM) with clay, gray brown, wet, very fine grained, Fe stains
						@150.8' to 152.2': CLAY (CL), light gray, moist, $CaCO_3$ nodules
	150-155	Box 10	5	100		@152.2' to 155': CLAY (CL), light gray, moist, $CaCO_3$ nodules, Fe stains (paprika), Mn nodules
104 ▽ 155						@155' to 158': Perched groundwater encountered
						@155' to 155.7': CLAY (CL), light gray, moist, $CaCO_3$ nodules, Fe stains, subangular slaty pebbles
						@155.7' to 156.8': CLAY (CL), olive gray, wet, Fe stains, subangular pebbles
	155-160	Box 11	5	100		@156.8' to 158.8': Sandy CLAY (CL_s), orangish olive, wet, fine grained, Fe stains, subangular pebbles
						@158.8' to 160': CLAY (CL), olive, moist, Mn nodules, Fe stains, $CaCO_3$ nodules, subangular slaty pebbles
99 160						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 9 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **9 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
99 160						@160' to 161.3': No Recovery, Drilled to 160' on 2/22/12, Continued on 2/23/12
	160-165	Box 11	3.7	74		@161.3' to 162.2': CLAY (CL), olive gray, moist, $CaCO_3$ nodules @162.2' to 163': CLAY (CL), olive gray, moist, Fe stains, $CaCO_3$ stringers and nodules, Mn nodules @163' to 164.3': CLAY (CL), olive, moist, Fe stains, $CaCO_3$ nodules and stringers, Mn nodules
94 165						@164.3' to 164.6': Clayey SAND (SC), olive light brown, moist, fine grained, Fe stains @164.6' to 165': CLAY (CL), olive brown, moist, $CaCO_3$ stringers @165' to 165.4': Clayey SAND (SC), olive brown, moist, fine grained, Fe stains @165.4' to 166.7': CLAY (CL), olive gray, moist, Fe stains, $CaCO_3$ stringers and nodules
	165-170	Box 11	5	100		@166.7' to 167.2': Sandy CLAY (CL_s), olvie brown, moist, fine grained, Fe stains, $CaCO_3$ stringers and nodules @167.2' to 169.2': CLAY (CL), gray, moist, Fe stains, $CaCO_3$ nodules and stringers prevalent
89 170						@169.2' to 170.4': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains, $CaCO_3$ stringers and nodules prevalent
	170-175	Box 12	1.6	32		**San Pedro Formation (Qsp):** @170.4' to 171.2': Clayey SAND (SC), gray, very moist, medium grained, massive @171.2' to 171.5': SAND (SP), light gray, moist, medium grained, massive @171.5' to 171.6': Weathered cobble @171.6' to 175': No Recovery
84 175						@175' to 177': SAND (SP), green light gray, moist, fine to medium grained, massive
	175-180	Box 12	2	40		@177' to 180': No Recovery
79 180						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 18**
PAGE 10 OF 10

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
02/21/12	ATD	▽ 46				INCLINED	Bit (Feet)	
02/21/12	ATD	▼				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **10 of 10**
ELEVATION: **259 Feet**
DATE START: **2/21/2012**
DATE FINISH: **2/23/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
79 180						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Total depth of coring: 180' bgs Perched groundwater encountered @46'-48', 51'-53.8', 58.7', 66.4', 70', 130'-135.8', 145'-146', 150', and 155'-158' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Boring experienced air-intake (vacuum) @175' bgs. Cause unknown Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
74 185						
69 190						
64 195						
59 200						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 19**
PAGE 1 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I D
03/23/12	ATD	▽ 35.6				INCLINED	Bit (Feet)	
03/23/12	ATD	▼ 65				BEARING	Barrel (Feet)	5
					0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/23/2012**
DATE FINISH:	**3/23/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
246 0	0-5	Box 1				**Artificial fill (Af)** @0' to 6': Hand Auger @0' to 6': Silty Clayey SAND (SM-SC), dark brown, moist, fine to coarse sand, minor angular to subrounded gravels, with trace asphalt pieces
241 5	5-10	Box 1	5	100		**Quaternary mudflow (Qmf):** @6' to 8.3': Silty SAND to Sandy SILT (SM-ML), brown, slightly moist, slate fragments, trace slate fragments over 1.5" @8.3' to 11.15': Sandy SILT (ML), brown to light brown, slightly moist, slate fragment 1/8" to 1/4", some subangular very fine gravel
236 10	10-15	Box 1	5	100		**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @11.15' to 11.4': SAND (SP), brown, fine to medium sand with subangular to subrounded gravel @11.4' to 12.4': Sandy SILT (ML), brown, fine gravel @12.4' to 13.3': Silty SAND (SM), brown, fine to medium grained with some fine gravel, Fe staining, fresh angular rock fragment 2.3" @13.3' to 14.2': Silty SAND (SM), dark grayish brown, medium to coarse grained sand with abundant angular to subangular gravel @14.2' to 15.3': Sandy SILT (ML), dark brown, moist, fine to medium grained sand, fine slaty gravels @15.3' to 17.7': Silty SAND (SM), subangular slate fragments, abundant fine pebbles @16.3' to 16.6'
231 15	15-20	Box 2	3.2	64		@17.7' to 18': Lens of SAND (SP), fine grained, trace fine gravel @18' to 18.2': Silty SAND (SM), brown, fine grained @18.2' to 20': No Recovery
226 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 19**
PAGE 2 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I D
03/23/12	ATD	▽ 35.6				INCLINED	Bit (Feet)	
03/23/12	ATD	▼ 65				BEARING	Barrel (Feet)	5
					0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 6**
ELEVATION: **246 Feet**
DATE START: **3/23/2012**
DATE FINISH: **3/23/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
226 20	20-25	Box 2	4.2	84		@20' to 24.2': Silty SAND (SM), brown, fine grained sand with pebbles 1/8" to 1/4", subrounded to subangular, trace highly weathered slate fragments
						@24.2' to 25': No Recovery
221 25	25-30	Box 2	5	100		@25' to 25.6': SAND (SP), brown, medium to coarse grained, abundant slate fragments @25.6' to 28.2': Silty SAND (SM), brown, slightly moist to moist, fine to medium grained, trace of pebbles @28.2': Increase in pebble content
216 30	30-35	Box 3	5	100		@30' to 30.5': SAND (SP), brown, fine to medium grained @30.5': Sharp contact with above, interbedded brown fine SILT (ML) with very fine to fine grained SAND (SP), Fe staining, band width 1/8" to 1/4", trace of gravels and pebbles @31.4' to 34': SAND (SP), darker brown, thicker bands with fine pebbles to coarse sand grains, more prominent Fe staining
						@34' to 35': Silty CLAY (CL), olive brown, some fine to medium sand, Fe stains within sand, sand increasing with depth
211 35 ▽	35-40	Box 3	4.5	90		@35' to 35.6': SAND (SP), light brown, moist, medium to coarse grained, few fines, subangular gravels to 1/2" @35.6' to 46.6': Perched groundwater encountered @35.6' to 36.3': Sandy SILT (ML), olive brown, fine gravel, wet @36.3' to 36.5': SAND (SP), olive to light brown, zone of medium to coarse sand with abundant subrounded to angular gravel, slate fragments @36.5' to 36.8': Clayey SILT (ML), brown, very moist, with gravel @36.8' to 37.7': Silty SAND (SM), gray to olive brown, fine grained, wet, some gravels increasing with depth (pumping) @37.7' to 39.9': Silty SAND (SM) with gravel, gray brown to olive brown, wet, medium to coarse sand, some fine angular to subrounded gravel (red brick weathered clast)
206 40						

FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS

The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 19**
PAGE 3 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I D
03/23/12	ATD	▽ 35.6				INCLINED	Bit (Feet)	
03/23/12	ATD	▼ 65				BEARING	Barrel (Feet)	5
					0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 6**
ELEVATION: **246 Feet**
DATE START: **3/23/2012**
DATE FINISH: **3/23/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
206 40	40-45	Box 3	3.9	78		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @39.3' to 39.8': No Recovery @39.8' to 40': GRAVEL (GP), gray to black, wet, some weathered SANDSTONE clasts, gravel is fine to medium @40' to 41.3': Gravelly SAND (SP_g), black to dark gray, wet, medium to coarse grained, subangular clast, some mica grains @41.3' to 41.8': SAND (SP), gray, fine to medium sand, no gravel @41.8' to 42.2': GRAVEL (GP), gray, angular to subangular with some fine to medium sand @42.2' to 43.9': SAND (SP), gray, fine to medium sand, trace of gravel, fractured with Fe staining infill @43.9' to 45': No recovery
201 45	45-50	Box 4	5	100		@45' to 45.3: SAND (SP), gray, wet, medium to coarse grained @45.3' to 45.8': Clayey SILT (ML), gray to brown, some medium to coarse sand, trace gravel, some Fe staining @45.8' to 46.6': GRAVEL (GP), fine to medium grained, wet, with Sandy SILT (ML), some clay content, fine to medium highly weathered clasts, basal gravel **Quaternary old alluvial and fluvial deposits (Qoaf:)** @46.6' to 47.7': Silty CLAY (CL), "banded" brown to orange brown, some gravel and pebbles, orange brown from Fe staining, moist to very moist, moderate blocky structure @47.7' to 50': Interbedded Clayey SILT (ML) and Silty SAND (SM), color change from blue green to olive green in clayey silt, moist, sand to silty sand has Fe stains, layers 1/2" to 3/4", increasing fine gravel with depth, $CaCO_3$ stringers
196 50	50-55	Box 4	5	100		@50' to 51.5': Sandy SILT (ML), brown, fine to medium sandy silt with abundant fine gravels and pebbles, some Fe staining, some blue gray to gray layers @51.5' to 51.9': Silty SAND (SM), light brown, slightly moist to moist, layer bounded by heavy Fe stains, gravel @51.9' to 53.2': Clayey SILT to Silty CLAY (ML-CL) with fine pebbles, light brown to olive brown, some Fe staining in pockets, some highly weathered slate fragments, moderate blocky structure, oxide along pedogenic faces @53.2' to 53.9': Gradational change @53.9' to 54.55': Silty SAND (SM) with gravel, brown to orange brown, slightly moist, increased Fe staining
191 55	55-60	Box 4	5	100		@54.55' to 55': SAND (SP) with gravel, orange brown, fine to medium sand @55' to 55.5': Clayey SILT (ML), orange brown, Fe stains in pockets, trace fine gravel @55.5' to 56.3': Silty SAND (SM), brown to olive brown, fine to medium gravel, Fe staining @56.3' to 57.5': Silty SAND (SM), brown to olive brown with Fe stains, Mn lined feature, contact with fine sand @57.5' @57.5' to 57.9': SAND (SP), brown to red brown, fine to medium sand with some silt, no gravel, moist @57.9' to 60': Sandy SILT (ML) with banding, brown, Fe stains, trace pockets of highly weathered slate clast, Mn, well developed Paleosol, MB-3 eqivalent, no carbonate
186 60						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 19**
PAGE 4 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I D
03/23/12	ATD	▽ 35.6				INCLINED	Bit (Feet)	
03/23/12	ATD	▼ 65				BEARING	Barrel (Feet)	5
					0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/23/2012**
DATE FINISH:	**3/23/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
186 60						@60' to 61.7': Silty CLAY (CL), brown to orange brown, Mn stain in pockets, wet, some Fe stains
	60-65	Box 5	5	100		@61.7' to 63': Clayey SAND (SC), brown to orange brown, Fe and Mn stains, very moist, trace gravels
181 ▼ 65						**San Pedro Formation (Qsp):** @63' to 65': SAND (SP), tan to light brown, occasional Fe stained band, very moist
	65-70	Box 5	4.1	82		@65': Local groundwater table encountered @65' to 66.5': SAND (SP), brown, wet, fine to medium grained, with Fe stained sections @66.5' to 69.1': SAND (SP), light brown to tan, very moist to wet, fine to medium grained, trace Fe stains
						@69.1' to 70': No Recovery
176 70						@70' to 74.1': SAND (SP), white and clean, wet, fine to medium grained, no observed gravels nor pebbles
	70-75	Box 5	4.1	82		
						@74.1' to 75': No Recovery
171 75						@75' to 78': SAND (SP), light brown to tan, wet, fine to medium grained, poorly graded
	75-80	Box 6	3.4	68		@78' to 78.4': Clast, slaty, 1/8", angular to subangular
						@78.4' to 80': No Recovery
166 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 19**
PAGE 5 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I D
03/23/12	ATD	▽ 35.6				INCLINED	Bit (Feet)	
03/23/12	ATD	▼ 65				BEARING	Barrel (Feet)	5
					0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 6**
ELEVATION: **246 Feet**
DATE START: **3/23/2012**
DATE FINISH: **3/23/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
166 80						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@80' to 81.5': SAND (SP), light brown to tan, wet, medium to medium-coarse grained, poorly graded, trace slaty clasts
	80-85	Box 6	2.4	48		@81.5' to 81.9': Silty SAND (SM) with gravel, gray, abundant slate fragments, angular to subangular, Mn and Fe staining @81.9' to 82.4': Silty SAND (SM) with gravel, brown, increasing Fe staining in sand and silt, $CaCO_3$, orange brown, gray, red brown @tip within light brown to brown material @82.4' to 85': No Recovery
161 85						
	85-90	Box 6	2.4	48		@85' to 86': SAND (SP), brown, fine to medium grained with some silt, very wet, wet, traces slaty clast @86' to 86.45': Silty SAND (SM), brown to orange brown, fine grained, no observed gravel nor pebbles @86.45' to 86.55': Silty SAND (SM), dark red brown, banding within material as above @86.55' to 86.7': Silty SAND (SM), brown to orange brown, wet, fine grained, some medium to coarse sand @86.7' to 86.9': Silty SAND (SM), gray, fine grained, Fe stained bands @86.9' to 87.4': Silty SAND (SM), brown, fine grained, Fe staining, trace fine gravel @87.4' to 90': No Recovery
156 90						
	90-95	Box 7	1.7	34		@90' to 90.6': Silty SAND (SM), brown, fine to medium grained, wet, some gravel, slaty clasts, Fe stains @90.6' to 91.3': Silty SAND (SM), brown, fine to medium grained, increasing medium to coarse sand, Fe stains, some $CaCO_3$ @91.3' to 91.7': Silty SAND (SM), brown, very wet, fine to medium grained with medium to coarse sand, abundant Fe staining and $CaCO_3$ @ 91.7' to 95': No Recovery
151 95						
	95-100	Box 7	3	60		@95' to 96.5': SAND (SP), light brown, wet, fine grained, poorly graded @96.5' to 97.6': SAND (SP), light brown, fine sand, poorly graded, very moist to wet, some coarse sand grains, slaty fine gravels within trace fine gravel @97.6' to 98': Silty SAND (SM), brown, fine grained, Fe stains in thin bands, trace Mn @98' to 100': No Recovery
146 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 19**
PAGE 6 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I D
03/23/12	ATD	▽ 35.6				INCLINED	Bit (Feet)	
03/23/12	ATD	▼ 65				BEARING	Barrel (Feet)	5
					0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 6**
ELEVATION: **246 Feet**
DATE START: **3/23/2012**
DATE FINISH: **3/23/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
146 100						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@100' to 100.1': Silty SAND (SM), fine grained, Fe stained bands, some gravel fragments
						San Pedro Formation: Marine (Qsp)
						@100.1' to 101.8': Silty SAND (SM), black, very moist, fine sand with shell fragments
	100-105	Box 7	1.8	36		@101.8' to 105': No Recovery
141 105						@105' to 107.3': Silty SAND (SM), black, wet, fine grained with seashell fragments, some gravel
	105-110	Box 8	2.3	46		@107.3' to 110': No Recovery
136 110						Total depth of coring: 110' bgs Perched groundwater encountered @35.6'-46.6' bgs Local groundwater table encountered @65' Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
131 115						
126 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 20**
PAGE 1 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME-75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/22/12	ATD	▽ 37				INCLINED	Bit (Feet)	
03/22/12	ATD	▼ 71.3				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/22/2012**
DATE FINISH:	**3/22/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
246 / 0	0-5	Box 1				**Artificial fill (Af):** @0' to 5': Grass; Silty CLAY (CL), dark brown, very moist with trace fine sand and SILTSTONE rock fragments, abundant rootlets, flattened tabular SILTSTONE rock fragments
241 / 5	5-10	Box 1	5	100		**Quaternary mudflow (Qmf):** @5' to 7.1': Sandy CLAY (CL_s) with silt, hard, moist, dark brown, fine sand, poorly developed blocky structure, minor gleying along soil faces
						@7.1' to 9': Grades to Sandy CLAY (CL_s), moderately hard, brown, moist, fine sand, with SILTSTONE and slaty rock fragments, occasional granitic pebbles, subrounded, decomposed, becomes Silty CLAY (CL)
236 / 10	10-15	Box 1	5	100		**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @9' to 10', Massive thin bed of yellow brown Sandy SILT (ML)
						@10' to 11': Sandy Silty CLAY (CL_s) with gravel, hard, dark brown, moist, coarse slaty gravel @10.6, SILTSTONE rock clast, mechanically broken @11' to 11.1'
						@11.1' to 13': Sandy CLAY (CL_s), soft, orange brown, very moist, predominantly fine grained with trace slaty rock fragments, grades to Silty SAND (SM) @13'
						@13' to 14.5': Silty SAND (SM), moderately indurated, brown, moist, very fine grained, trace slaty fine gravels
231 / 15	15-20	Box 2	4	80		@14.5' to 15.4': Gravelly SAND (SP_g), brown to orange brown, moist, fine to coarse sand, fine to coarse slaty to SILTSTONE gravels, some clay and silt in matrix
						@15.4' to 16.7': Gravelly CLAY (CL_g), soft, brown, very moist, some fine sand, fine to coarse scattered subangular slaty gravels, some mica
						@16.7' to 17.9': Grades to Clayey SAND (SC), soft, brown, moist, fine to coarse slaty sand, fine slaty gravels, massive
						@17.9' to 19': Becomes Sandy SILT (ML) with trace clay, soft, moist, very fine grained with fine grained sandy laminations, trace slaty gravels
						@19' to 20': No Recovery
226 / 20						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 20**
PAGE 2 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME-75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/22/12	ATD	▽ 37				INCLINED	Bit (Feet)	
03/22/12	ATD	▼ 71.3				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/22/2012**
DATE FINISH:	**3/22/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
226 20	20-25	Box 2	4.6	92		@20' to 20.4': Sandy SILT (ML) with trace clay, soft, moist, very fine grained with fine grained sandy laminations, trace slaty gravels
						@20.4' to 22.6': SAND with silt and gravel (SP-SM), loose, brown, moist, fine to medium sand, pebbly to fine subrounded slaty gravels, unconsolidated (channel gravels), well graded
						@22.6' to 24.6': Abrupt transition, erosional contact, Sandy Silty CLAY (CL-ML), hard, brown, moist, massive, predominantly very fine sand and scattered fine subangular slaty and SILTSTONE gravels, gradational changes from proportions of sands and silts
221 25						@24.6' to 25': No Recovery
	25-30	Box 2	5	100		@25' to 26.1': Silty SAND (SM), loose, brown, moist, fine to medium sand, with pebbly fine subrounded slaty gravels, unconsolidated, poorly graded
						@26.1' to 28': Abrupt change, erosional contact, Clayey SILT (ML), soft, reddish brown, micaceous
						@28' to 28.6': Becomes laminated, very fine grained, yellow brown, micaceous sand
						@28.6' to 30': Becomes coarser grained as sandy thin beds <1/2" thick, with rounded to subrounded pebbly gravels within Sandy CLAY (CL_s) massive matrix
216 30	30-35	Box 3	5	100		@30' to 31.6': Sandy SILT (ML), brown to orange brown, moist, fine grained, micaceous, with trace subrounded gravels, oxidized at contact with channel gravels below
						@31.6' to 32.5': Fluvial gravels, SAND (SP), reddish brown to yellow brown, dry, fine to coarse sands, pebbly to fine subrounded slaty gravels, unconsolidated, erosional contact with below
						@32.5' to 32.9': Thin bed of very fine grained Silty SAND (SM)
						@32.9' to 36.9': Sandy GRAVEL (GP_s), brown to reddish brown, dry, fine to coarse sands and pebbly fine to coarse subrounded to rounded gravels, coarse sand and fine rounded slaty gravels @35' to 36.9'
211 35						
▽	35-40	Box 3	5	100		@37' to 55': Perched groundwater encountered, erosional contact with below
						@37.1' to 38.4': Clayey Sandy SILT (ML), gray brown, very moist, very fine grained, micaceous
						@38.4' to 40': Sandy GRAVEL (GP_s), brown to yellow brown, wet, fine to coarse sand, fine to coarse subrounded to rounded slaty to heavily weathered siliceous gravels, well graded, unconsolidated
206 40						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 20**
PAGE 3 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME-75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/22/12	ATD	▽ 37				INCLINED	Bit (Feet)	
03/22/12	ATD	▼ 71.3				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/22/2012**
DATE FINISH:	**3/22/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
206 40	40-45	Box 3	5	100		@40' to 45': Sandy GRAVEL (GP_s), dark brown to blackish brown, wet, bedded fine to coarse sands and gravels with sandy matrix, trace silt, becomes oxidized @42.6', subrounded to rounded slaty gravels with occasional SILTSTONE, quartz, and granitic gravels
201 45	45-50	Box 4	2.9	58		@45' to 47.9': Sandy GRAVEL (GP_s) with lenses of coarse sand, wet, coarse sand predominantly subrounded quartz with occasional feldspars and dark red weathered micaceous SILTSTONE clasts @47.9' to 50': No Recovery
196 50	50-55	Box 4	1.7	34		@50' to 51.4': SAND (SP), loose, gray brown, wet, fine to coarse sand, subrounded to rounded quartz and feldspar grains @51.4' to 51.7': Sandy GRAVEL (GP_s) and cobbles, gray brown, trace clay in matrix, basal cobbles and gravels @52' to 55': No Recovery, Cobble wedged in tip
191 55	55-60	Box 4	5	100		**<u>Quaternary older alluvial and fluvial deposits (Qoaf)</u>:** @55' to 60': Erosional contact, channel gravels over Sandy CLAY (CL_s), olive green to dark brown, moist, fine sand with occasional coarse slaty sand to fine pebble,
186 60						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 20**
PAGE 4 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME-75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/22/12	ATD	▽ 37				INCLINED	Bit (Feet)	
03/22/12	ATD	▼ 71.3				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 6**
ELEVATION: **246 Feet**
DATE START: **3/22/2012**
DATE FINISH: **3/22/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
186 60	60-65	Box 5	5	100		**Carbonate Package** @60' to 61.3': Sandy CLAY (CL_s), olive green, hard, moist, well developed blocky structure, Fe stains along soil faces, $CaCO_3$ as stringers and nodules, massive @61.3' to 62.2': Sandy CLAY (CL_s), olive green to orange brown, moist, fine grained @62.2': Perched groundwater encountered @62.2' to 62.4': SAND bed (SP-SC), olive green, wet, fine to coarse sand @62.4' to 65': Sandy CLAY (CL_s), olive green Paleosol, hard, moist, fine sand, well developed blocky structure, few clay lining along faces, oxidized, laminated, thin bands of Sandy CLAY (CL_s) approximately 1" thick
181 65	65-70	Box 5	5	100		@65' to 67.5': Sandy CLAY (CL_s), hard, mottled olive brown to orange brown, moist, fine sand, well developed blocky to hackly structure, abundant Fe stains and Mn on soil faces, very moist @67.5' to 68.6': Soil crack, <1/8" wide, clay lined becomes heavily carbonaceous Sandy CLAY (CL_s), near vertical (60-65°), irregular $CaCO_3$ veins, 1/4" wide max. and within and along soil faces @68.6' to 69.1': Color change to bluish gray Sandy CLAY (CL_s) with $CaCO_3$ @69.1' to 70.4': Clayey SAND (SC), olive brown to orange brown, moist, fine sand laminated with $CaCO_3$ along laminations to thin beds
176 70	70-75	Box 5	5	100		@70.4' to 71.3': Clayey SAND (SC), bluish gray, very moist, fine sand with thinly bedded olive green sands and dark reddish brown, very fine sandy laminations **San Pedro Formation (Qsp):** @71.3': Local groundwater table encountered @71.3' to 75': SAND with silt (SP-SM), bluish gray to light gray, wet, fine grained quartz sand, homogeneous, massive sands, becomes loose @73.6'
171 75	75-80	Box 6	5	100		@75' to 77.4': SAND (SP), bluish gray to light gray, wet, fine grained @77.4' to 79.3': SAND (SP), mottled bluish gray, yellow brown to orange brown, wet, fine grained, oxidized, massive, unconsolidated @79.3' to 79.7': Heavily oxidized, reddish brown, fine grained sand, with quartz
166 80						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 20**
PAGE 5 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME-75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/22/12	ATD	▽ 37				INCLINED	Bit (Feet)	
03/22/12	ATD	▼ 71.3				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 6**
ELEVATION: **246 Feet**
DATE START: **3/22/2012**
DATE FINISH: **3/22/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
166 80	80-85	Box 6	1.1	22		and feldspar grains, massive, unconsolidated @79.7' to 80': No Recovery @80' to 80.8': SAND (SP), loose, brown to light brown, wet, fine to medium sands, quartz and feldspar grains @80.8' to 81.1': SAND (SP), hard, yellow brown to orange brown to gray brown, laminated, heavily oxidized @81.1' to 85': No Recovery
161 85	85-90	Box 6	3.7	74		@85': Encountered gravel and cobbles during drilling @85' to 87.3': Gravelly SAND (SP_g), mottled yellow brown, orange brown to black, fine to coarse sand, wet, some clay, well rounded siliceous fine gravels to rounded and flattened black slaty gravels @87.3' to 88.7': Sandy SILT (ML), light brown to orange brown, very moist, fine grained sand, homogeneous, quartz sand, trace feldspar grains, becomes coarse grained and gravelly @88.7' @88.7' to 90': No Recovery
156 90	90-95	Box 7	3	60		@90' to 90.4': SAND with gravel (SP_g), moderately indurated, light brown to reddish brown, wet, fine to coarse sand, fine subrounded to rounded gravels @90.4' to 93': SAND with silt (SP-SM), loose, yellow brown, wet, predominantly fine grained with pockets of coarse sand and fine subrounded and flattened gravels, quartz and feldspar gravels, heavy oxidation with dark reddish brown, Fe stains @93' to 95': No Recovery
151 95	95-100	Box 7	3.3	66		@95' to 96.3': SAND (SP), loose, light brown, wet, fine to medium sand, unconsolidated @96.3' to 98.1': SAND with clay (SP-SC), orange brown to yellow brown, wet to 97.8', heavily oxidized @97.8': Laminated fine grained oxidized sands overlying gravels, gravels not recovered @98.3' to 100': Missing, driller states gravel and cobbles over this interval
146 100						

The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 20**
PAGE 6 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME-75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/22/12	ATD	▽ 37				INCLINED	Bit (Feet)	
03/22/12	ATD	▼ 71.3				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 6**
ELEVATION: **246 Feet**
DATE START: **3/22/2012**
DATE FINISH: **3/22/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
146 100	100-105	Box 7	2.7	54		@100' to 102': SAND (SP), loose, brown, wet, fine to medium grained sand @102' to 102.7': Laminations, fine sand and black silt, becomes hard, oxidized and slightly moist, fine grained laminated Sandy SILT (SM) @102.7' to 105': No Recovery
141 105	105-110	Box 8	4.4	88		@105' to 107.4': Poor Recovery, SAND (SP), loose, light brown, wet, fine grained, micaceous @107.4' to 109.4': SAND with Silt (SP-SM), hard, brown to orange brown, moist, fine sand, @109' to 109.4' becomes laminated with reddish brown, oxidized fine sand to dark black fine to coarse sand @109.4' to 110': No Recovery
136 110	110-115	Box 8	3.3	66		@110' to 112.3': SAND with gravel (SP_g), loose, yellow brown to reddish brown, wet, fine sand, fine to coarse rounded gravels, black slaty to siliceous to granitic gravels **San Pedro Formation: Marine (Qsp):** @112.3' to 113.3': Abrupt transition, SAND with Silt (SP-SM), dark gray, fine grained, shell debris @113' @113.3': Onset of gravels, partial cementation of fine grained sands @113.3' to 115': No Recovery, abundant gravels encountered during drilling over this interval
131 115						Total depth of coring: 115' bgs Perched groundwater encountered @37'-55' and 62.2' bgs Local groundwater table encountered @71.3' Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
126 120						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 21**
PAGE 1 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/21/12	ATD	▽ 43.6				INCLINED	Bit (Feet)	
03/21/12	ATD	▼ 70				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/21/2012**
DATE FINISH:	**3/21/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
246 0						**FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS** The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Artificial fill (Af) @Surface - Grass @0' to 5': Hand Auger @0' to 5': Silty Clayey SAND (SM-SC), brown to dark brown, moist to very moist, fine to coarse sand and pebbly gravel, trace asphalt debris
241 5						**Quaternary mudflow (Qmf):** @5' to 5.8': CLAY (CL), dark brown, moist, subangular slaty pebbles @5.8' to 7.7': CLAY (CL), brown, moist, subangular slaty pebbles
	5-10	Box 1	4.2	84		@7.7' to 9.2': Sandy CLAY (CL_s), red brown, moist, very fine grained, subangular pebbles and gravels, trace rootlets
236 10						**Quaternary alluvium (Qal):** **Benedict Canyon Drainage** @9.2' to 10': No Recovery
	10-15	Box 1	4	80		@10' to 11.3': Silty SAND (SM), brown, moist, fine grained, with rootlets @11.3' to 11.6': SAND (SP), brown, dry to moist, fine grained, poorly sorted @11.6' to 12.8': Silty SAND (SM), brown, moist, fine grained, subrounded pebbles @12.8' to 12.9': SAND (SP), gray brown, dry to moist, medium grained, poorly sorted @12.9' to 14': Silty SAND (SM) with clay, brown, moist, very fine grained @14' to 15': No Recovery
231 15						@15' to 15.8': CLAY (CL) with silt, brown, moist, subangular to subrounded pebbles, rootlets @15.8' to 17.6': Silty SAND (SM), brown, moist, fine grained, subangular slaty pebbles
	15-20	Box 1	4.3	86		@17.6' to 18.2': Gravelly SAND (SP_g), gray brown, moist, fine grained, subangular to anulgar slaty gravel @18.2' to 19.3': Clayey SAND (SC), brown, moist, fine grained, subangular slaty pebbles @19.3' to 20': No Recovery
226 20						@20' to 20.9': Silty SAND (SM), brown, moist, fine grained, subangular weathered gravels and pebbles @20.9' to 21.1': Gravelly SAND (SP_g), gray brown, moist, fine grained, subangular weathered gravels and pebbles
	20-25	Box 2	2.1	42		@21.1' to 22.1': Silty SAND (SM), brown, moist, fine grained, subangular slaty pebbles @22.1' to 25': No Recovery
221 25						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 21**
PAGE 2 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/21/12	ATD	▽ 43.6				INCLINED	Bit (Feet)	
03/21/12	ATD	▼ 70				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/21/2012**
DATE FINISH:	**3/21/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
221 25	25-30	Box 2	5	100		@25' to 26.5': Silty SAND (SM) with clay, brown, moist, very fine grained, subangular slaty pebbles
						@26.5' to 27.6': CLAY (CL) with sand, brown, moist to very moist, very fine grained, subangular slaty pebbles
						@27.6' to 28.8': Clayey SAND (SC), brown, moist, fine grained with coarse grained sand, subangular slaty pebbles increasing in concentration with depth
216 30	30-35	Box 2	3	60		@28.8' to 30.75': Gravelly SAND (SP_g), gray brown, moist, medium to coarse grained, subangular pebbles and gravels @30.75' to 33': Gravelly SAND (SP_g), dark gray brown, moist, medium to coarse grained, subangular gravels, pebbles, and cobbles
						@33' to 35': No Recovery
211 35	35-40	Box 3	5	100		@35' to 37': Gravelly SAND (SP_g), dark gray brown, very moist, medium to coarse grained, angular pebbles and gravels
						@37' to 37.55': Silty SAND (SM) with clay, red brown, very moist, very fine grained, subangular slaty pebbles @37.55' to 38.6': Silty SAND (SM), orange brown, very moist, very fine grained, Fe stains, mica @38.6' to 39.3': Silty SAND (SM), orange brown, very moist, fine grained, Fe stains
206 40	40-45	Box 3	5	100		@39.3' to 40': CLAY (CL) with silt, red brown, very moist, Fe stains @40' to 41.4': Sandy CLAY (CL_s), orange olive, very moist, fine grained, Fe stains, Mn stains, mica @41.4' to 42.2': Sandy CLAY (CL_s), orange olive, very moist to moist, fine grained, Fe stains, mica @42.2' to 43.6': Silty SAND (SM), orange olive, very moist to moist, fine grained, Fe stains, mica
▽						@43.6' to 55': Perched groundwater encountered
201 45	45-50	Box 3	4	80		@43.6' to 44.1': Gravelly SAND (SP_g), dark gray red, wet, medium to coarse grained, angular weathered gravels and pebbles, Fe stains @44.1' to 44.8': SAND (SP) with silt, orange brown, wet, fine to medium grained, Fe stains, mica @44.8' to 45.7': SAND (SP), red brown, wet, medium grained, Fe stains @45.7' to 47': Silty SAND (SM), orangish olive, wet, fine to medium grained, Fe stains, Mn banding @45.85' to 46' @47' to 48.8': Gravelly SAND (SP_g), orange olive, wet, fine to medium grained, Fe stains, subangular gravels and pebbles
						@48.8' to 49': SAND (SP), dark red, wet, medium to coarse grained, subangular gravels and pebbles
196 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 21**
PAGE 3 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/21/12	ATD	▽ 43.6				INCLINED	Bit (Feet)	
03/21/12	ATD	▼ 70				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **3 of 6**
ELEVATION: **246 Feet**
DATE START: **3/21/2012**
DATE FINISH: **3/21/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
196 50						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@49' to 50': No Recovery
						@50' to 50.7': Gravelly SAND (SP_g), dark gray brown, wet, medium to coarse grained, subrounded gravels and pebbles, Fe stains
						@50.7' to 51.6': Silty SAND (SM), orangish olive, wet, fine grained, Fe stains
	50-55	Box 4	5	100		**Quaternary older alluvial and fluvial deposits (Qoaf):**
						@51.6' to 51.9': Clayey SAND (SC), orange brown, wet, fine grained, Fe stains, subangular slaty pebbles
						@51.9' to 52.7': Silty SAND (SM), gray brown, wet, fine grained, subangular pebbles
191 55						@52.7' to 55': Clayey SAND (SC), orange brown, wet, fine grained, subangular pebbles
						@55' to 56.4': CLAY (CL) with sand, olive brown, moist, fine grained, Fe stains, subangular pebbles
	55-60	Box 4	5	100		@56.4' to 57.5': CLAY (CL), olive brown, moist, Fe stains, Mn nodules
						@57.5' to 58': CLAY (CL), olive, moist, Fe stains
						@58' to 61.9': Sandy CLAY (CL_s), olive brown, moist, fine grained, Fe stains, few Mn nodules, subangular slaty pebbles, massive
186 60						
	60-65	Box 4	5	100		@61.9' to 64': (Sharp contact with above), CLAY (CL), olive orange gray, laminated, moist, Fe stains, Mn nodules prevalent
▽						@64' to 66.2': Perched groundwater encountered
						@64' to 65': CLAY (CL), olive, wet, Fe stains, Mn nodules, well developed Paleosol, MB-3 equivalent
181 65						@65' to 65.8': Sandy CLAY (CL_s), orange olive, wet, fine grained, Fe stains
						@65.8' to 66.2': CLAY (CL), olive, wet, Fe stains
						@66.2' to 66.55': CLAY (CL), olive, very moist, Fe stains, Mn nodules prevalent
	65-70	Box 5	5	100		@66.55' to 66.8': CLAY (CL), orange olive, moist, Fe stains
						@66.8' to 67.6': CLAY (CL), olive, moist, Fe stains
						Carbonate Package
						@67.6' to 67.8': Sandy CLAY to Clayey SAND (CL-SC), light olive orange, moist, fine grained, Fe stains, $CaCO_3$ stringers (horizontal)
176 ▼ 70						@67.8' to 68': Sandy CLAY to Clayey SAND (CL-SC), olive orange, moist, fine grained, Fe stains
						@68' to 68.7': Clayey SAND (SC), olive, moist, fine grained, Fe stains
						San Pedro Formation (Qsp):
	70-75	Box 5	1.3	26		@68.7' to 70': Silty SAND (SM), olive, very moist to wet, fine grained, massive
						@70': Local groundwater table encountered
						@70' to 71.3': Silty SAND (SM), olive brown, wet, fine grained, massive
						@71.3' to 75': No Recovery
171 75						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 21**
PAGE 4 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/21/12	ATD	▽ 43.6				INCLINED	Bit (Feet)	
03/21/12	ATD	▼ 70				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 6**
ELEVATION: **246 Feet**
DATE START: **3/21/2012**
DATE FINISH: **3/21/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
171 75	75-80	Box 5	5	100		The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual. @75' to 79.1': Silty SAND (SM), brown, wet, fine grained, massive, Fe stains, homogeneous, unconsolidated @79.1' to 80': Silty SAND (SM), red brown, wet, fine grained, massive, Fe stains
166 80	80-85	Box 6	2.6	52		@80' to 81': Silty SAND (SM), brown, wet, fine grained, massive, homogeneous, unconsolidated @81' to 82': Silty SAND (SM), orange, wet, fine grained, Fe stains, massive @82' to 82.6': Silty SAND (SM), mottled dark brown to olive orange, wet, fine grained, Fe stains @82.6' to 85': No Recovery
161 85	85-90	Box 6	3.1	62		@85' to 87.3': Silty SAND (SM), brown, wet, fine grained, massive, homogeneous, unconsolidated, few subrounded highly-weathered pebbles and gravels @87.3' to 87.55': Silty SAND (SM), mottled brown to light gray orange, wet, fine grained @87.55' to 88.1': Sandy SILT (ML), orange olive, wet, very fine grained, Fe stains @88.1' to 90': No Recovery
156 90	90-95	Box 6	2.2	44		@90' to 90.35': Silty SAND (SM), brown, wet, fine grained @90.35' to 90.8': Silty SAND (SM), orange brown, wet, fine grained, Fe stains @90.8' to 91.7': Silty SAND (SM) with clay, orange olive, wet, very fine grained, Fe stains, angular slaty pebbles and granitic gravel @91.7' to 92.2': Silty SAND (SM), orange, wet, fine grained, Fe stains @92.2' to 95': No Recovery
151 95	95-100	Box 7	1.2	24		@95' to 95.7': SAND (SP), brown, wet, fine grained, massive, homogeneous, unconsolidated @95.7' to 96.2': Silty SAND (SM) with clay, orange brown, wet, very fine grained, laminated, subangular slaty pebbles @96.2' to 100': No Recovery
146 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 21**
PAGE 5 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/21/12	ATD	▽ 43.6				INCLINED	Bit (Feet)	
03/21/12	ATD	▼ 70				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 6**
ELEVATION:	**246 Feet**
DATE START:	**3/21/2012**
DATE FINISH:	**3/21/2012**
DRILLER:	**Martini**
PREPARED BY:	**AWS**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
146 100	100-105	Box 7	2.6	52		@100' to 102.6': SAND (SP), brown, wet, fine grained, massive, homogeneous, unconsolidated @102.6' to 105': No Recovery
141 105	105-110	Box 7	1.3	26		@105' to 105.5': SAND (SP), brown, wet, fine grained, massive, homogeneous, unconsolidated @105.5' to 106.3': Silty SAND (SM), orange brown, wet, very fine grained, Fe stains @106.3' to 110': No Recovery
136 110	110-115	Box 8	2	40		@110' to 112': Silty SAND (SM), orange brown, wet, very fine grained, Fe stains, few Mn stains @112' to 115': No Recovery
131 115	115-120	Box 8	2.1	42		@115' to 116.35': Silty SAND (SM), orange brown, wet, very fine grained, Fe stains, few Mn nodules @116.35' to 116.4': Silty SAND (SM), olive gray, wet, very fine grained, laminated **San Pedro Formation: Marine (Qsp):** @116.4' to 116.9': Silty SAND (SM), dark gray, wet, fine grained, Mn nodules @116.9' to 117.1': Silty SAND (SM), light gray, wet, fine grained, cemented @117.1' to 120': No Recovery
126 120	120-125	Box 8	1.5	30		@120' to 120.7': Silty SAND (SM), gray brown, wet, fine grained, massive @120.7' to 121.1': Silty SAND (SM), dark gray with brown, wet, very fine grained, massive @121.1' to 121.5': Silty SAND (SM), dark gray, wet, very fine grained, massive, with sea shells @121.5' to 125': No Recovery
121 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 21**
PAGE 6 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
03/21/12	ATD	▽ 43.6				INCLINED	Bit (Feet)	
03/21/12	ATD	▼ 70				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 6**
ELEVATION: **246 Feet**
DATE START: **3/21/2012**
DATE FINISH: **3/21/2012**
DRILLER: **Martini**
PREPARED BY: **AWS**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
121 125						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Total depth of coring: 125' bgs Perched groundwater encountered @43.6'-55' and 64'-66.2' bgs Local groundwater table encountered @ 70' bgs Boring backfilled with soil cuttings upon completion of drilling and logging Excess cuttings disposed of in D.O.T. approved drums and disposed offsite
116 130						
111 135						
106 140						
101 145						
96 150						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 22**
PAGE 1 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/01/12	ATD	▽ 46.7				INCLINED	Bit (Feet)	
08/01/12	ATD	▼ 98.4				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 6**
ELEVATION:	**283.5 Feet**
DATE START:	**8/1/2012**
DATE FINISH:	**8/1/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
284 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@0' to 3": 3" **Asphalt concrete (Ac)**over
						Artificial fill (Af)
						Hand Auger to 3'
						@3" to 3': Silty Clayey SAND with gravel (SM-SC_g), dark brown to brown, slightly moist, fine to coarse gravels, siltstone fragments, tree roots, asphalt debris, concrete fragments
						Begin Core @3'
						@3 to 3.6': No Recovery
						@4.2' to 4.5': Concrete aggregate, cobble size, angular, mechanically crushed
279 5						**Quaternary older alluvial and fluvial deposits (Qoaf)**
						@4.5' to 4.7': Thin Silty SAND (SM) lamination overlying Silty Clayey SAND with gravel (SM-SC_g), slightly moist, hard
						@4.7' to 4.9': Thin CLAY (CL) bed, dark reddish brown, very moist, root traces, with fine quartz sand, minor clay development around grains
						@4.9' to 5.4': Silty Clayey SAND with gravel (SM-SC_g), yellow brown, slightly moist, dominantly slaty subrounded gravels
						@5.4' to 6.4': Sandy SILT (ML), reddish brown, moderately hard, weakly laminated with occasional fine angular slaty gravel, poorly developed structure, frosted quartz grains (wind-blown)
274 10						@6.4' to 7.7': Clayey SILT (ML) with sand, orange brown to reddish brown, slightly moist, well-developed laminations altering between light gray to dark orange brown, poorly developed structure
						@7.7' to 8.3': Sandy Clayey SILT (ML), hard, dark brown, fine to coarse slaty angular sand, fine angular gravels, occasionaly slaty
						@8.3' to 10': No Recovery
						@10' to 11': Clayey Silty SAND (SM-SC), soft, dark reddish brown to light orange brown (banded color), fine sand, trace coarse sand and fine slaty gravels
269 15						@11' to 13.3': Becomes Clayey Sandy GRAVEL (GC_s), olive gray to bluish gray, well developed laminations of silt, clay, very fine sand and coarse sand-sized decomposed white feldspar grains, subrounded slaty gravel and basalt fragments
						@13.3' to 14': Abrupt contact with coarse material above, Silty Clayey SAND with gravel (SM-SC_g), more massive with sandy laminations and feldspar grains, occasional basalt fragments
						@14' to 15.8': No Recovery
						@15.8' to 16': Silty Clayey SAND with gravel (SM-SC_g), more massive with sandy laminations and feldspar grains, occasional basalt fragments
264 20						@16' to 16.7': Sandy CLAY (CL_s), dark reddish brown to orange brown, moist, fine to coarse sands, occasional subrounded slaty gravel, poorly developed structure, minor gleying along faces
						@16.7' to 17.4': Gravelly Silty SAND (SM_g), loose, orange brown, moist, occasional flattened subrounded slaty gravel to subrounded weathered granitic gravel, unconsolidated
						@17.4' to 17.8': Silty SAND with clay and gravel (SM-SC_g), reddish brown, hard, fine quartz and slaty sand, subrounded pebbly slaty gravels with weathered basalt fragments
259 25						@17.8' to 18.2': Silty SAND with gravel (SM_g), loose, unconsolidated, yellow brown to orange brown, predominantly fine sand, with fine subrounded slaty

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 22**
PAGE 2 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/01/12	ATD	▽ 46.7				INCLINED	Bit (Feet)	
08/01/12	ATD	▼ 98.4				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 6**
ELEVATION:	**283.5 Feet**
DATE START:	**8/1/2012**
DATE FINISH:	**8/1/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
259 25						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						gravel
						@18.2' to 19.4': Silty SAND with clay (SM-SC), hard, dark reddish brown to orange brown, moist, fine to coarse sand, fine subangular slaty gravels, laminated with fine gray sand
						@19.4' to 20': Abrupt contact, very fine gray sand over very fine grained laminated Sandy CLAY (CL_s) with very fine feldspar grains
						@20' to 22': Sandy Silty CLAY (CL_s), soft, orange brown to gray, moist, very fine sand, well-developed blocky structure, gleying and Mn development on pedogenic faces, laminated to very thinly bedded
254 30						@22' to 23.5': Grades to Sandy GRAVEL with silt (GP-GM), fine to coarse sand, fine subrounded weathered slaty gravels, basalt fragments
						@23.5' to 25': Abrupt contact, Sandy Silty CLAY (CL_s), hard, orange brown, moist, poorly developed structure, very minor gleying
						@25' to 26.8': Sandy SILT with clay (ML_c), orange brown, moderately hard, minor gleying along higher concentrations of very fine sand
						@26.8' to 27.2': Paleosol - well developed Silty CLAY (CL), dark reddish brown, thickly banded up to 1/2-inch (gleyed), some fine sand and spotty Mn pedogenic faces
249 35						@27.2' to 30': Sandy CLAY (CL_s), very hard, dark brown, moist, medium to coarse feldspar and slaty sand, blocky structure, Mn developments along poorly developed laminations
						@30' to 30.8': No Recovery, Possibly gravels
						@30.8' to 31': Silty Clayey SAND (SM-SC), hard, coarse sand sized siltstone fragments to subrounded slaty gravels, basalt fragments
						@31' to 32.9': Clayey SILT with sand (ML), brown, moist, hard, weakly laminated
						@32.9' to 34.5': Sandy CLAY (CL_s), hard, brown, coarse slaty sand, some silt, thinly bedded to laminated
						@34.5' to 34.7': Silty CLAY (CL), dark red, moist, laminated
244 40						@34.7' to 35.4': Clayey SILT with gravel (ML), dark reddish brown, moist, fine subrounded slaty gravel
						@35.4' to 37.8': Sandy SILT (ML), orange brown, fine sand, frosted quartz grains, trace subrounded to subangular slaty gravel
						@37.8' to 40.4': Grades to Sandy Clayey SILT to Sandy CLAY (ML-CL), poorly developed structure, fine sand, with subrounded slaty gravels and trace weathered granitic gravels, massive, very minor gleying in matrix
						@40.4' to 42.8': Grades to Silty Sandy CLAY (CL_s), brown to orange brown, moist, hard, weakly laminated and gleyed
239 45						@42.8' to 43.9': Becomes strongly laminated Sandy CLAY (CL_s), gleyed along very fine sandy lamillae
▽						@43.9' to 45': Depositional contact, dark brown, laminated CLAY (CL), increase in very fine sand @44', laminated, gleyed fine Silty Sandy CLAY (CL_s), soft
						@45' to 46.7': Sandy SILT with clay (ML-CL), reddish brown, moist, predominantly fine sand, coarse sand sized angular slaty fragments
						@46.7': Perched groundwater encountered
						@46.7' to 46.9': Silty SAND (SM) bed, fine grained, wet
234 ▽ 50						@46.9' to 47.5': Sandy Clayey SILT (ML), dark blackish brown, very moist, very

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 22**
PAGE 3 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/01/12	ATD	▽ 46.7				INCLINED	Bit (Feet)	
08/01/12	ATD	▼ 98.4				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 6**
ELEVATION:	**283.5 Feet**
DATE START:	**8/1/2012**
DATE FINISH:	**8/1/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
234 50						fine sand, trace mica, trace weathered basalt fragments, charcoal fragments
						@47.5' to 50': Sandy CLAY (CL_s), hard, reddish brown to olive brown to 48.7', then becomes heavily oxidized olive gray to orange brown, well developed blocky structure, gleyed along soil faces, Mn development, laminated (color banded), Mn and gleying along very fine sand lamillae, becomes olive brown @49.8'
						@50': Perched groundwater encountered
						@50' to 50.5': SAND (SM) bed, fine sand, unconsolidated, wet
						@50.5' to 51.2': Abrupt erosional contact with above, Clayey SILT (ML), mottled orange brown to gray, very moist, soft, with very fine sand, gleyed
229 ▽ 55						@51.2' to 55': Grades to Sandy Silty CLAY (CL), hard, mottled orange brown to gray, heavily oxidized, moist, some coarse sand, occasional pebbly gravel, moderately developed blocky structure, gleying within matrix and along pedogenic faces, minor spotty mangangese development, massive
						@55': Perched groundwater encountered
						@55' to 55.4': Silty SAND (SM), dark brown to gray, wet, fine to medium sand, unconsolidated, some clay
						@55.4' to 57.6': Grades to Silty Sandy CLAY (CL_s), mottled olive gray to orange brown, moist, free water on poorly developed pedogenic faces, very fine sand, gleyed, with spotty Mn development,
224 60						@57.6' to 57.7': Paleosol - Grades to Silty CLAY (CL), dark reddish brown, well developed blocky structure, clay development on pedogenic faces, free water on soil faces, gleying on soil faces, massive to 62.3'
						@60' to 62.3': Clay overprinting of laminations
						@62.3' to 65': Silty Sandy CLAY (CL_s), mottled orange brown to olive gray, moist, poorly developed structure, spotty Mn development, very fine sand, thinly bedded to laminated
219 ▽ 65						@65': Perched groundwater encountered
						@65' to 66.5': Marker Bed 2: Paleosurface - Silty Sandy CLAY (CL_s), hard, dominantly orange brown, moist, becomes heavy orange brown @66.5', moderately developed structure, abundant spotty Mn development, iron oxide specks, wet on soil faces
▽						@66.5' to 68.7': Sandy CLAY (CL_s), orange brown to gray brown, moist, very fine sand, gleyed along very fine sandy lamillae and as pockets in matrix, spotty Mn development
						@68.7': Perched groundwater encountered
214 ▽ 70						@68.7' to 69.2': Silty Clayey SAND (SM-SC), olive brown, very moist to wet, very fine sand, trace fine slaty gravel and siltstone angular rock fragments, Mn development in matrix
▽						@69.2' to 70': Becomes Sandy Clayey SILT (ML), mottled orange brown to gray brown, moist, gleyed, spotty Mn development in matrix
						@70': Perched groundwater encountered
						@70' to 70.4': Sandy SILT (ML), brown, fine grained, wet
209 75						@70.4' to 71.3': Clayey SILT (ML), moderately hard, mottled olive brown, orange brown to gray, very moist, very fine sand, spotty Mn development, poorly developed structure, gleyed on weakly developed soil faces and in matrix

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 22**
PAGE 4 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/01/12	ATD	▽ 46.7				INCLINED	Bit (Feet)	
08/01/12	ATD	▼ 98.4				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 6**
ELEVATION:	**283.5 Feet**
DATE START:	**8/1/2012**
DATE FINISH:	**8/1/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
209 75						@71.3': Perched groundwater encountered @71.3' to 71.7': Grades to Silty SAND (SM), brown, wet, fine grained, micaceous, trace coarse sand sized siltstone fragments
						@71.7' to 72.8': Sandy Silty CLAY (CL), olive brown to brown, very moist, very fine sand, moderately developed blocky structure, minor gleying along faces and in matrix
						@72.8' to 76.5': Paleosol - Grades to Sandy Silty CLAY (CL), hard, dark brown, moist, well developed blocky structure, clay lined pedogenic faces, gleying along faces, very fine sand, predominantly Silty CLAY (CL) @74.4', very hard
204 80						@76.5' to 82.4': **Carbonate Package** Silty CLAY (CL), hard, olive brown to grayish white to dark brown, moist, well developed blocky structure, heavy $CaCO_3$ development, very fine sand, clay and $CaCO_3$ on pedogenic faces, dominantly olive gray to grayish white below 78' to 82.4'
						@82.4' to 83.4': Grades to Clayey SAND (SC), moderately hard, olive brown to orange brown, fine sand, poorly graded, oxidized
						@83.4' to 84.5': SAND with silt (SP-SM), olive gray to light gray, unconsolidated, very moist, fine grained, poorly graded, becomes Sandy SILT (ML) to 85', oxidized, orange brown
199 85						@85' to 86.4': Erosional contact, CLAY (CH), very hard, medium gray, moist, well developed blocky structure, clay lined pedogenic faces, internal shearing (shrink-swell), with trace amounts of fine sand sized feldspar grains
						@86.4' to 86.7': Erosional contact, SAND (SP) bed, light brown, fine grained, slightly moist
						@86.7' to 87.1': Sandy CLAY (CL_s), hard, mottled brown to orange brown, moist, oxidized
						San Pedro Formation (Qsp): @87.1' to 87.7': SAND (SP), light brown, fine grained, unconsolidated, moist
194 90						@87.7' to 90': Becomes bluish green to greenish gray, poorly graded, unconsolidated
						@90' to 91': No Recovery
						@91' to 95': SAND (SP), bluish green to greenish gray, fine grained, poorly graded, unconsolidated, moist
189 95						@95' to 96': No Recovery
						@96' to 100': SAND (SP), dark olive green, moist, coarse sand to 97.2'
						@97.2' to 97.8': Fine to medium sand
▼						@97.8' to 98.4': Rounded fine gravels, becomes predominantly medium to coarse sand, very moist, massive, poorly graded
						@98.4': Local groundwater table encountered
184 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 22**
PAGE 5 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/01/12	ATD	▽ 46.7				INCLINED	Bit (Feet)	
08/01/12	ATD	▼ 98.4				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 6**
ELEVATION: **283.5 Feet**
DATE START: **8/1/2012**
DATE FINISH: **8/1/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
184 100						@99.8': Becomes laminated fine to coarse sand, color change to light yellow brown, fine grained with rounded fine gravel @100' to 103': No Recovery, wet sand in barrel, yellow brown with pebbles
						@103' to 105': SAND (SP), yellow brown, wet, unconsolidated, fine sand, fine to coarse well rounded gravels
179 105						@105' to 106': No Recovery
						@106' to 110': SAND (SP), yellow brown, wet, fine to medium sand, poorly graded, unconsolidated
174 110						@110' to 111.2': No Recovery
						@111.2' to 114.5': SAND (SP), light brown, wet, fine grained, massive, unconsolidated with mica
169 115						@114.5' to 115': Sandy SILT (ML), orange brown, wet, very fine sand, laminated, moderately indurated @115' to 116.2': SAND (SP), light brown, wet, heaving, sand bridged and would not allow sample to be retained **San Pedro Formation: Marine (Qsp):**, erosional abrupt contact @116.2' to 120': No Recovery
164 120						@120' to 121.6': Sandy SILT (ML), hard, dark gray, abundant sea shells, wet
						@121.6' to 122': Concretionary with gravel and sea shells @122' to 125': Sandy SILT (ML), with clay, hard, dark gray, fine grained with shells and sandy concretions
159 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 22**
PAGE 6 OF 6

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
08/01/12	ATD	▽ 46.7				INCLINED	Bit (Feet)	
08/01/12	ATD	▼ 98.4				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**6 of 6**
ELEVATION:	**283.5 Feet**
DATE START:	**8/1/2012**
DATE FINISH:	**8/1/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
159 125						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Total depth of coring: 125' bgs Perched groundwater encountered @46.7', 50', 55', 65', 68.7', 70', and 71.3' bgs Local groundwater table encountered @98.4' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
154 130						
149 135						
144 140						
139 145						
134 150						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 1 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 7**
ELEVATION:	**263.5 Feet**
DATE START:	**8/2/2012**
DATE FINISH:	**8/3/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
264	0					8": **Asphalt concrete (Ac)** over 5" **Aggregate base (Ab)** and 13" Reinforced **Concrete**
						@0' to 5': Hand Auger
						Artificial fill (Af)
						@2.6' to 2.9': Silty Sandy CLAY to Clayey SAND (CL-SC-SM), dark reddish brown, moist, trace gravel with clay pods
						Old Benedict Canyon Wash deposits (Qal_{OCW}):
259	5					@2.9': Clayey SILT (ML), moderately hard, mottled dark reddish brown and light brown, moist, trace medium quartz grains, columnar structure, clay along irregular shaped pedogenic faces, Paleosol - well developed
						@6': Light gray, very fine grained SAND (SP) lamination, becomes Clayey SILT (ML), with some clay, light brown, moist, trace fine angular SILTSTONE rock fragments and slaty fragments
						@7.4': Very fine SAND (SP) laminations, oxidized, yellow brown
						@7.8': Very fine SAND (SP) laminations, oxidized, yellow brown
						@8.5' to 8.9': Contact, GRAVEL and coarse SAND (SP-GP), thinly bedded to laminated, with silt and clay, dark reddish brown, very moist
254	10					@8.9' to 10': No Recovery
						@10' to 10.7': SAND (SP), fine to coarse, well graded, moist
						@10.7' to 11.4': SAND with gravel (SP_g), base of fining upward sequence
						@11.4' to 11.7': Gradational changes, becoming finer, very fine sand lamination, oxidized yellow brown @11.7'
						@11.8' to 12.2': Becomes Sandy CLAY (CL_s), soft, dark reddish brown, very moist, becomes hard, fine to coarse sand and pebbly gravels, subangular to subrounded, oxidized
						@12.2' to 12.8': Grades to Silty CLAY (CL), mottled dark reddish brown to gray, very moist, very fine sand and some slaty gravels, gleyed in sandy pockets and around subrounded slaty and basalt gravels, poorly developed structure
249	15					@12.5': Depth of Fault Trench FT-5 @Station 0+64
						@13.8' to 15': No Recovery
						Bottom of Trench FT-5
						@15' to 17.3': Sandy Silty CLAY (CL_s), mottled dark orange brown to gray, trace coarse sand grains, moist, laminated, distinct gleying along very fine sand
						@17.3' to 18.6': SILTSTONE rock fragment, 1/2-inch in size, gley banding less distinct, similar matrix, onset of subrounded fine slaty gravels and siltstone rock fragments
244	20					@18.6' to 19': Basalt gravels, slaty gravels, coarse sands
						@19' to 19.5': Silty Sandy CLAY (CL), mottled dark orange brown to gray, very moist, fine grained sand
						@19.5' to 20': Oxidized contact with onset of GRAVEL and coarse SAND (SP-GP) below, top of fining upward sequence, poorly developed structure, becoming Sandy CLAY (CL_s)
						@20' to 20.8': Silty SAND (SM), dark brown, moist, well graded, fine to coarse sands, basal rounded coarse gravel @20.8'
						@20.8' to 21': Grades into Sandy SILT (ML), orange brown to gray, fine grained, horizontal gleying, trace gravels @21.6' and 21.8'
239	25					

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 2 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 7**
ELEVATION:	**263.5 Feet**
DATE START:	**8/2/2012**
DATE FINISH:	**8/3/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
239 25						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@22' to 23': Abrupt contact, SAND (SP) and very fine pebbly gravel, coarse subrounded sand, pebbly very fine gravel, grades below to very fine Sandy SILT (ML), orange brown to gray, laminated, gleyed
						Quaternary older alluvial and fluvial deposits (Qoaf):
						@23' to 23.7': Abrupt contact, Sandy SILT (ML), very fine, over olive brown Clayey SILT (ML), dark orange brown
						@23.7' to 25.3': Grades below to Clayey SAND (SC), dark orange brown, with dark reddish brown, moist, coarse sand sized subangular to subrounded slaty grains, with basalt fragments, becomes laminated Sandy CLAY (CL_s) with subrounded slaty pebbly gravel @24.1'
234 30						@25.3' to 27.4': Sandy SILT (ML), with bedded (graded) Silty SAND (SM) from 26' to 26.4', reddish brown, moist, fine grained, with fine slaty gravels, minor gleying
						@27.4' to 28.8': Grades to SAND (SP) with gravel, fine sand, fine subangular to subrounded gravels, becomes Sandy CLAY (CL_s) to 28.8'
						@28.8' to 29.4': Color change, becomes olive brown, fine to coarse Sandy CLAY (CL_s), very moist, subrounded coarse sand, trace manganese development
						@29.4' to 30': No Recovery
229 35						@30' to 32.8':Paleosol - Silty CLAY (CL), dark olive brown, moist, well developed blocky structure, clay development on pedogenic faces, some fine sand and subrounded slaty pebbles and basalt fragments
						@32.8' to 38.7': Rockline, SILTSTONE fragments, 2-inch long dimension, subrounded edges, becomes Silty Sandy CLAY (CL_s), dark reddish brown, brown clay lams, moderate structure, pebbly slaty gravels, coarse feldspar sand grains, minor gleying to 38.7'
224 ▽ 40						@38.7' to 39.5': Rockline, SILTSTONE rock fragments, 1 to 2-inches, becomes Sandy CLAY (CL_s), dark brown, moist, fine sand with coarse sand and fine gravel sized rock fragments
						@39.5' to 39.7': Becomes Sandy GRAVEL with silt and clay (GC), fine to coarse sand, fine subrounded pebbly gravel and weathered basalt rock fragments, grades below into coarse Clayey SAND with gravel (SC_g) to 40'
						@40': Perched groundwater encountered
						@40' to 40.4': SAND with silt (SP-SM) and fine gravel, brown, wet
						@40.4' to 40.8': Sandy Clayey SILT (ML) with fine gravel, very moist, soft, gleying along very fine sand lams and around slaty gravel
						@40.8' to 42.4': Silty Clayey SAND (SC-SM), dark brown, moist, soft, predominantly fine sand with some fine subrounded to subangular slaty gravels and weathered SILTSTONE rock fragments
219 45						@42.4' to 42.6': Becomes Silty Clay (CL), orange brown to gray, very moist, poorly developed structure, spotty minor manganese development, laminated, minor gleying, dark red clayey lam at 43.6', CLAY (CL) bed at 44.7' to 44.9'
						@45' to 47': Paleosol - Silty CLAY (CL), dark reddish brown, some fine sand, very moist, hackly structure, intermittent deposition of olive brown to orange brown CLAY (CL), with spotty manganese development from 45.8' to 46.2' @46.2' to 47': Moderately to well developed blocky structure, Silty Sandy CLAY (CL_s), with occasional fine subrounded slaty gravels, with trace weathered granitic gravels, clay development on pedogenic face, gleying
214 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 3 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 7**
ELEVATION:	**263.5 Feet**
DATE START:	**8/2/2012**
DATE FINISH:	**8/3/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
214	50					@47' to 50.4': Silty Sandy CLAY (CL_s), orange brown to gray, fine sands to coarse subrounded gravels, subrounded basalt and slaty gravel at 48.2' to 48.4' @48.9': Rockline, SILTSTONE, moderately developed blocky structure, abundant manganese development
						@50.4' to 51.7': Silty Clayey SAND (SC-SM) with gravel, dark brown, very moist, fine to coarse sand, fine subrounded slaty gravels, with weathered SILTSTONE fragments
						@51.7' to 52.6': Becomes Sandy Clayey SILT (ML) with pebbly gravel, brown, poorly developed structure, minor gleying and manganese development
209	55					@52.6' to 55': Laminated Silty Sandy CLAY (CL_s), mottled olive brown to orange brown to dark brown, moist, some coarse slaty sand and fine slaty gravel, dominantly laminated, dark brown clayey lams become very fine sandy lams (repetitive), moderately developed structure with spotty manganese development @55' to 56.4': Increase in very fine sand, basal weathered SILTSTONE fragments with subrounded edges
						@56.4' to 57.3': Silty Sandy CLAY (CL_s) olive brown to orange brown, moist, fine sand, moderately blocky structure, minor manganese development
204	60					@57.3' to 58.2': Silty SAND to Sandy SILT with clay (SM-ML), olive brown to orange brown, oxidized, very moist, fine sand, trace fine gravel, minor gleying
						@58.2' to 58.7': Laminated Silty CLAY (CL), spotty manganese development, gleying along very fine sandy lams
▽						@58.7' to 60': Sandy CLAY (CL_s), dark reddish brown to gray, thin bed to laminated clay, very moist, very fine sand, gleyed
						@60' to 61.2': Silty CLAY (CL), dark reddish brown to 60.3', then olive brown to orange brown, hard, moist, thinly bedded with some rounded slaty coarse sand and SILTSTONE rock fragments, poorly developed structure, minor manganese development on pedogenic faces, gleying
199	65					@61.2' to 61.9': Sandy Silty CLAY (CL_s), coarse SILTSTONE gravel @61.2', fine to medium sand below, oxidized, very moist, olive brown to orange brown, minor gleying
						@61.9': Perched groundwater encountered @61.9' to 62.5': Gravelly SAND (SP_g), dark blackish brown to yellow brown, wet, fine to coarse sand, fine subrounded gravel, well graded, unconsolidated
						@62.5': Abrupt contact, Silty CLAY (CL), dark red, moist, moderately developed blocky structure
						@62.8' to 63.3': Becomes Sandy SILT (ML), orange brown to gray brown, wet, fine sand, spotty manganese development
194	70					@63.3' to 63.8': Coarse SAND (SP) pulse
						@63.8' to 64.1': Grades to CLAY (CL) bed, dark reddish brown
						@64.1' to 64.3': Sandy Clayey SILT (ML), orange brown to gray, moist, fine sand, micaceous
						@64.3' to 65': Becomes Silty CLAY (CL), olive brown to orange brown, hard, moist, dark reddish brown clay lam @64.5', 1/4-inch thick with laminated very fine sandy silt and clay
189 ▽	75					@65' to 67': Sandy Clayey SILT (ML), mottled olive brown to dark brown to orange brown, very moist, very fine sand, moderately developed blocky fracture, thinly bedded to laminated, Mn and iron oxide on pedogenic faces

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 4 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 7**
ELEVATION: **263.5 Feet**
DATE START: **8/2/2012**
DATE FINISH: **8/3/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
189 75						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@67' to 67.2': SAND with silt (SP-SM), thin bed, moist
						@67.2' to 70': Abrupt contact, Silty Sandy CLAY to Silty CLAY (CL), mottled dark reddish brown to orange brown, moist, few coarse rounded slaty sand grains, moderately developed blocky structure, minor clay development on pedogenic faces, gleying to 70'
						@70' to 71.8': Silty SAND to Sandy CLAY (SC-SM), dark reddish brown, very fine silty sand with some coarse sand and fine subrounded slaty gravels, moist, grades to Sandy CLAY (CL_s) between 70.6' to 71.4', interval contains clay lams, spotty Mn development
184 80						@71.4': Weathered SILTSTONE rock fragment, 2+1/4-inch long dimension, silty sand with clay below to 71.8'
						@71.8' to 73.8': Grades to Sandy Silty CLAY (CL_s), orange brown to olive brown, hard, moist, laminated with frequent dark brown clay lams, poorly developed structure, with spotty Mn development
						@73.8' to 75': Depositional contact, becomes dark reddish brown to orange brown sandy silty clay, poorly developed structure
						@75': Perched groundwater encountered
						@75' to 76.2': Well developed Paleosol - Silty Sandy CLAY (CL_s), dark reddish brown, free water on pedogenic faces, hard, clay development on pedogenic faces, dominantly blocky to weak hackly structure, trace $CaCO_3$, very minor on very fine grained sandy inclusion
179 85						@76.2' to 81.5': Sandy CLAY (CL_s), hard, orange brown to gray, fine to coarse sand in matrix, occasional slaty fine pebbly gravel, first appearance of $CaCO_3$ stringers and gleying along poorly developed blocky structure, weathered basalt fragments @79.3'
▽						@81.5' to 83.3': Absence of $CaCO_3$ stringers, Sandy Clayey SILT (ML), olive brown to orange brown, hard, moist, fine sand, poorly developed blocky structure, minor gleying, some groundwater on pedogenic faces (minor)
						@83.3' to 85': Onset of trace $CaCO_3$ in matrix, Clayey SAND to Sandy CLAY (SC-CL), olive brown, oxidized orange brown, moist, fine sand, trace fine SILTSTONE rock fragments @83.8', heavy $CaCO_3$ stringers and Mn from 84.6' to 85', $CaCO_3$ horizontal and along weakly developed blocky fracture
174 90						@85' to 90': Sandy CLAY (CL_s), some silt, hard, olive brown, moist, laminated, abundant $CaCO_3$ and Mn in 5' run, rockline @85.4', coarse grained gravel sized subrounded SANDSTONE, wet along rock
▽						@86.4': Perched groundwater encountered
						@86.4': SILTSTONE rock line, wet, subrounded along edges, mechanically broken
						@90' to 91.3': Silty CLAY (CL), olive brown, hard, moist, fine sand, Mn and $CaCO_3$ prevalent as stringers and fine angular gravel sized concretions
169 95						@91.3' to 91.7': Clayey SAND (SC), olive brown to orange brown, wet, very fine grained, micaceous, with silt
						@91.7': Perched groundwater encountered
						@91.7' to 95': Silty CLAY (CL), dark olive brown to gray brown, hard, moist, abundant $CaCO_3$ stringers and along moderately developed pedogenic faces, abundant Mn development
						@95' to 98.9': Well developed Paleosol - Silty CLAY (CL), dark blackish brown, very hard, moist, well developed blocky structure, abundant $CaCO_3$ and iron oxide and pedogenic faces
164 100						@98.9' to 101.6': Becomes more olive gray to orange brown, abundant $CaCO_3$ in matrix

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 5 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **5 of 7**
ELEVATION: **263.5 Feet**
DATE START: **8/2/2012**
DATE FINISH: **8/3/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
164 100						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@95' to 98.9': Well developed Paleosol - Silty CLAY (CL), dark blackish brown, very hard, moist, well developed blocky structure, abundant $CaCO_3$ and iron oxide and pedogenic faces
						@101.6' to 102.3': Minor $CaCO_3$ in matrix
						@102.3': Perched groundwater encountered
						@102.3' to 108.9': Silty CLAY (CL), olive gray to orange brown, hard, well developed soil horizons, abundant $CaCO_3$ gravel sized concretions, wet, dominantly olive gray on faces
159 105						
						@108.9' to 109.1': Grades to Sandy CLAY (CL_s), dark orange red, some fine sand, well developed blocky structure, $CaCO_3$ absent
154 110						@109.1': Perched groundwater encountered
						@109.1' to 110': Sharp contact, SAND (SP), olive gray, wet, fine, unconsolidated
						@110' to 111': Heaving sands, driller changed rods, added more water to attempt to clean hole, sampler restarted @110' and advanced to 115', slough in barrel, 110' to approximately 111', sand
						@111': Local groundwater table encountered
						San Pedro Formation (Qsp)
						@111' to 111.5': 1+1/2-inch thick CLAY (CL) bed, very hard, dark brown, basal portion of sample has thin coating of very fine grained clear quartz sand, subrounded with bluish green silty clayey matrix
149 115						@111.5' to 115.2': No Recovery, lack of $CaCO_3$ in recovered sample, wet below clay, possible local groundwater table
						@115.2' to 116': SAND (SP), Color changes to olive brown, orange brown to black, mottled to medium gray, to dark green, moderately hard, wet, fine grained, clear, clean quartz sand, light brown sands contain higher percentage of subrounded to rounded quartz, darker gray to green sands display subangular quartz grains as higher percentage
						@116' to 116.5': Driller states gravel and possible cobble intrusion in sampler preventing soil recovery
144 120						@116.5' to 120': No Recovery
						@120' to 125': Driller states gravel encountered continuously over this interval, No Recovery, sand washed from sampler - indicates sand and groundwater present, possibly loose sand
139 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 6 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **6 of 7**
ELEVATION: **263.5 Feet**
DATE START: **8/2/2012**
DATE FINISH: **8/3/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
139 125						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@125' to 130': Very poor recovery, 1.5' recovered from unknown interval, SAND (SP) with gravel and cobbles, dominantly clean, subangular to subrounded quartz sand, rounded gravels and cobbles, 3" to 6" in size, cobble obstruction was retained in sampler and mechanically broken, color dark greenish gray
134 130						@130' to 135': GRAVELS (GP), poor recovery, <1' retained in core barrel, coarse rounded sand, rounded pebbles, rounded fine to coarse gravel and rounded cobbles, clast supported, <10% fines recovered (possible wash-out during retrieval), clast composition highly variable: SANDSTONE, hard granitic, pure quartz, slaty gravels, siliceous volcanic, well graded gravel
129 135						@135' to 140': No Recovery, cobbles wedged in sampler *Note: These conditions appear similar to CB-17 @158' to 180' bgs End of Day @15:30 Hours, August 2, 2012
124 140						Start of Drilling, August 3, 2012 @140' **San Pedro Formation: Marine (Qsp):** @140' to 140.7': Limited recovery, SAND (SP), dark gray, wet, subrounded fine quartz sand, poorly graded, unconsolidated @140.7' to 141.1': Sandy SILT (ML), hard, very moist, very fine sand, dark gray, laminated dark gray to olive green silt and very fine sand, trace clay @141.1' to 145': No Recovery
119 145						@145' to 146': Sandy SILT (ML), dark gray, wet, fine grained predominantly, with pockets of fine rounded gravels and coarse sand, trace shells, fossilized wood (driftwood) fragments @146' to 150': No Recovery
114 150						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 23**
PAGE 7 OF 7

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/02/12	ATD	▽ 40				INCLINED	Bit (Feet)	
08/02/12	ATD	▼ 111				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **7 of 7**
ELEVATION: **263.5 Feet**
DATE START: **8/2/2012**
DATE FINISH: **8/3/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
114 150						@150' to 151.5': Sandy SILT (ML), hard, dark gray, wet, very fine sand, seashell fragments, fossilized driftwood, laminated
						@151.5' to 155': No Recovery
109 155						@155' to 156.5': Sandy SILT (ML), hard, dark gray, very moist, very fine sand, with shells and driftwood debris, laminated
						@156.5' to 160': No Recovery
104 160						Total depth of coring: 160' bgs Perched groundwater encountered @40', 61.9', 75', 86.4', 91.7', 102.3', 109.1' bgs Local groundwater table encountered @111' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling and logging Excess soil cuttings disposed of in D.O.T. approved drums and disposed offsite
99 165						
94 170						
89 175						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 1 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
265 / 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate Base (Ab)**
						@0' to 5': Hand Auger
						Artificial fill (Af)
						@1.5' to 2.0': Concrete, reinforced, 12 inches overlying Sandy SILT (ML), brown, moist, fine grained, with some fine gravel and asphalt debris
						@2': **Old Benedict Canyon Wash deposits (Qal_{BCW}):**
260 / 5						@4' to 5': Becomes Clayey SILT (ML), mottled olive brown to orange brown, very moist, oxidized
						@5': Depth of Fault Trench FT-5 @Station 1+13.5
						@5' to 6.5': (Begin Core), Clayey SILT (ML), mottled orange brown to olive brown, very moist, with very fine sand lams, poorly developed hackly structure, minor gleying along sand lams
						@6.5' to 8.9': Paleosol - well developed, contact, becomes Sandy CLAY (CL) with silt, hard, olive brown to orange brown, moist, fine to coarse sand sized slaty fragments, subangular slaty gravel, trace weathered basalt fragments, laminated to thinly bedded, columnar structure
						@8.9' to 10': No Recovery
255 / 10						@10' to 11.8': Sandy SILT (ML), olive brown to orange brown, moist, very fine sand with trace coarse slaty sand, laminated to massive, minor gleying along sand, blocky structure
						@11.8' to 13.3': Contact, Sandy CLAY (CL) with silt, hard, dark reddish brown, moist, trace coarse sand sized rock fragments (feldspar)
						@13.3' to 13.6': Contact, Sandy CLAY (CL), hard, dark reddish brown, moist, poorly developed structure, minor gleying, coarse sand sized slaty SILTSTONE fragments
250 / 15						@13.6' to 15': No Recovery
						@15' to 15.5': Sandy CLAY (CL), hard, dark reddish brown, moist, poorly developed structure, minor gleying, coarse sand sized slaty SILTSTONE fragments
						@15.5' to 16.5': Becomes Sandy SILT (ML) with clay, soft, reddish brown to orange brown, very moist, very fine sand, poorly developed structure, trace rock fragments
						@16.5' to 18': Grades to Clayey SILT with gravel (ML_g), orange brown to reddish brown, moist, very fine sand, with fine to coarse subrounded slaty gravel, minor gleying
245 / 20						@18' to 18.3': CLAY (CL) bed, laminated, olive brown to orange brown, minor gleying
						@18.3' to 18.6': Clayey SILT with gravel (ML_g), orange brown to reddish brown, moist, very fine sand, with fine to coarse subrounded slaty gravel, minor gleying, poor blocky structure
						@18.6' to 20.3': Contact, thin orange brown very fine sand lam, becomes Clayey SILT (ML) with gravel, hard, dark reddish brown, moist, fine to coarse sand, with fine to coarse subrounded slaty and weathered basalt and SILTSTONE gravels
240 / 25						@20.3' to 22.4': Becomes dark reddish brown Silty CLAY (CL), thin bed of

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 2 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
240 25						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						baked clay, weak structure, becomes Clayey SILT (ML), soft, brown to orange brown, very moist, with pockets of very fine quartz, feldspar, and slaty sand, some fine slaty subrounded gravels
						@22.4' to 24.6': Becomes Silty CLAY (CL), soft, dark reddish brown to olive gray, laminated, minor gleying along sand lams, trace SILTSTONE and slaty gravel, poorly developed structure, discontinuous sand lams and pockets
						@24.6' to 25': Contact, Clayey Silty SAND (SC-SM) with gravel, olive brown to orange brown, moist, predominantly very fine sand matrix with coarse slaty sand and fine to coarse subrounded slaty gravels, with weathered basalt and SILTSTONE gravels, subrounded hard siliceous gravels, thin bed
235 30						@25' to 26.6': Sandy SILT to Silty SAND (SM-ML), soft, brown to orange brown, moist, very fine sand, trace clay
						@26.6' to 27.6': Becomes Sandy Silty CLAY (CL), mottled orange brown to olive gray, moist, laminated to thinly bedded, gleying along sand lams and in sand pockets, poorly developed structure
						@27.6' to 28.35': Laminated Sandy CLAY (CL), mottled olive brown to orange brown, oxidized dark brown, very fine sand lams, with fine to coarse subrounded slaty and siliceous gravels
						@28.35' to 28.9': Oxidized dark reddish orange sand lam, abundant gravel to 28.9
230 ▽ 35						@28.9' to 29.4': Silty SAND (SM) with gravel, dark reddish brown, slightly moist, fine to coarse sand with fine subangular to subrounded slaty gravels (channel gravels
						@29.4' to 30': Abrupt contact, Sandy CLAY (CL), dark brown to orange brown, laminated to thinly bedded, with coarse sand and slaty fine gravel, minor gleying and oxidation laminations
						@30' to 31.4': Silty SAND (SM) with gravel, brown to orange brown, slightly moist, fine to medium sand, fine to coarse subangular SILTSTONE rock fragments,
225 40						@31.4' to 31.9': Abrupt contact, Clayey SILT (ML) with sand, olive brown to orange brown, moist, very fine sand, with coarse sand lams and pockets, minor gleying and oxidation along sands @31.4' Becomes moderately developed blocky structure, abundant gravels, laminated and gleyed, minor Mn development, Silty SAND (SM) with minor clay to 34.1
						@34.1' to 34.4': Color change, dark blackish brown to brown, Silty SAND (SM), with minor clay, very moist, fine to coarse sand, laminated to thinly bedded
						@34.4' to 35': No Recovery
						@35': Perched groundwater encountered @35' to 36.5': Silty SAND (SM) with gravel, dark black brown, wet, fine to coarse sand, fine to coarse subrounded slaty gravels
220 45						**Quaternary older alluvial and fluvial deposits (Qoaf):** @36.5' to 37': Abrupt erosional contact, Sandy SILT (ML) with clay, soft, orange brown, very moist, fine sand, minor gleying and Mn development
						@37' to 37.8': Becomes Sandy CLAY (CL), olive brown to orange brown, moderately hard, very moist, very fine sand, fine slaty gravels, oxidized around gravels, moderate Mn development, gleyed
215 50						@37.8' to 38.5': Grades to Silty SAND to Sandy SILT (SM-ML), olive brown to reddish brown, moist, fine to coarse sands, some slaty fine subrounded gravels, gleying in matrix, minor Mn development

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 3 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
215 / 50						@38.5' to 39.8': Abrupt contact, Silty CLAY (CL), with some very fine sand and coarse sand sized slaty fragments, dark olive gray to olive brown, moderate blocky structure, oxidation rimming of slaty inclusions, laminated with weathered coarse sand sized basalt @39.8': Abundant fine gravels
						@40' to 40.9': Clayey SILT to Silty CLAY (CL-ML), hard, dark blackish brown, moist, trace fine sand, moderate blocky structure
▽						@40.9' to 43.7': Paleosol - Sandy Silty CLAY (CL), mottled dark reddish brown to gray, hard, moist, well developed blocky structure, clay development and gleying along pedogenic faces, minor Mn development along pedogenic faces, with trace subangular slaty gravels, laminated
210 / 55						@43.7' to 45': Becomes Silty CLAY (CL), very hard, dark reddish brown, moist, Mn development in matrix, with coarse basalt and SILTSTONE rock fragments @44.4': SILTSTONE rock line @44.9': SILTSTONE rock line
						@45' to 47.2': Silty Sandy CLAY (CL), moderately hard, dark reddish brown, moist, very fine sand, gleying along scattered sandy pockets, poorly developed structure
205 / 60						@47.2' to 50': Becomes Sandy CLAY (CL) with gravel, hard, laminated, very fine sand and clayey laminations, fine to coarse gravels, subangular to subrounded siliceous and slaty gravels, weathered basalt fragments, poorly developed @49': Coarse slaty gravel and basalt fragment rock line
						@50' to 52': Paleosol - Sandy Silty CLAY (CL) with gravel, dark reddish brown to brown, onset of $CaCO_3$ as stringers in matrix, laminated to thinly bedded, moderately developed structure, SILTSTONE and slaty fine gravels
						@52' to 53.6': Clayey SAND (SC), hard, olive brown to reddish brown, moist, fine to coarse sand, fine subangular to subrounded gravels, minor gleying
						53.6' to 55': Perched groundwater encountered @53.6' to 55': Silty SAND (SM), loose, brown to dark blackish brown, wet, poorly graded, fine sand, with subangular to subrounded gravels, unconsolidated
200 / 65						@55' to 56.3': Clayey SILT to Silty CLAY (CL-ML), hard, orange brown to brown, very moist, minor gleying along sandy inclusions, grades to Silty SAND (SM), thin bed, very fine sand, abrupt contact @56.6'
						@56.6' to 60': Paleosol - Sandy Silty CLAY (CL), hard, dark brown to reddish brown, moist, very fine sand, moderate blocky structure, minor Mn and $CaCO_3$ development in matrix, thinly laminated to thinly bedded, with some slaty gravels
195 / 70						@60' to 62.4': Well Developed Paleosol - Silty CLAY (CL), hard, olive brown to orange brown, becomes dark blackish brown to reddish brown @61.6', moist, well developed blocky structure, clay lined pedogenic faces, Mn and $CaCO_3$ development on pedogenic faces, with very fine sand, and trace coarse sand sized SILTSTONE and slaty rock fragments
						@62.4' to 65': SILTSTONE rock line, becomes Silty Sandy CLAY (CL), moderately developed blocky structure, with gleying along sand lams, dark brown clay lams, trace $CaCO_3$ @64.5', otherwise absent over this interval
190 ▽ / 75						@65' to 66.2': Paleosol - Sandy CLAY to Silty SAND (CL-SM), hard, mottled orange brown to gray, moist, very fine sand, fine subrounded slaty gravels and SILTSTONE fragments, moderate blocky structure, gleying along pedogenic faces and in matrix, minor $CaCO_3$ as stringers and on pedogenic faces

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 4 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
190 75						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@66.2' to 66.8': Becomes Silty SAND (SM) with gravel, dark blackish brown, slightly moist, fine to coarse sand
						@66.8' to 67.8': SAND (SP) lamination, medium gray, very fine grained, becomes Sandy CLAY (CL), dark brown to orange brown, laminated, moderate blocky structure, abundant dark brown clay lams, Mn development along lams and in matrix, minor gleying on pedogenic faces
						@67.8' to 70': Becomes Clayey SAND (SC) with gravel, hard, mottled orange brown to gray, moist, laminated fine to coarse sand, fine to coarse subangular to subrounded SILTSTONE and slaty gravels, abundant $CaCO_3$, gleyed
185 80						@70' to 75': Sandy CLAY (CL) with silt and gravel, hard, mottled olive brown, moist, well developed blocky structure, fine to coarse sand, fine subrounded to subangular gravels, abundant $CaCO_3$ and Mn development @71': SILTSTONE rock line @74': Slaty gravel rock line
						@75' to 86.2': Perched groundwater encountered @75' to 76.5': Clayey GRAVEL (GC), dark brown to reddish brown, wet, thinly bedded to massive, pebbly to fine to coarse subrounded to rounded slaty gravels, in very fine sandy clay matrix, minor weathered basalt fragments, weathered SILTSTONE fragments, abundant $CaCO_3$
180 85						@76.5' to 77.7': Weathered SILTSTONE fragments, >3" in size, mechanically broken, becomes Silty GRAVEL (GM), dark brown to blackish brown, very moist, wet around clasts, fine to coarse sand, fine to coarse gravels, well graded, unconsolidated, minor $CaCO_3$, becomes clayey from 77.7' to 77.9', grades to Silty SAND (SM), brown, wet, fine to coarse sand, lack of $CaCO_3$, grades to Sandy CLAY (CL) @78.5'
						@78.5' to 80': Becomes Sandy CLAY (CL), mottled dark reddish brown to orange brown to gray, hard, moist, predominantly fine sand, trace coarse sand and fine subangular to subrounded gravels, laminated, gleyed, sand bed from 78.9' to 79.2', grades back to laminated sandy clay
175 90						@80' to 83.3': Sandy CLAY (CL) with gravel, very hard, orange brown to dark brown, very moist, wet around rock clasts, laminated, fine to coarse sand, fine to coarse subangular to subrounded gravels, subhorizontal laminations from oxidized to gleyed lams to dark brown thinly bedded clay, moderate blocky structure, minor $CaCO_3$
						@83.3' to 86.2': Clayey GRAVEL to Gravelly CLAY (CL-GC), mottled orange brown to gray, wet, fine to coarse sand, fine to coarse gravels, subhorizontal oxidized and gleyed laminations, truncation of gleyed lams @83.2' to 83.3', heavy $CaCO_3$ and Mn development, decomposed SILTSTONE fragments, heavily weathered basalt fragments, water on soil faces
170 95						@86.2' to 88.7': Quartz COBBLES, becomes strongly laminated Sandy Silty CLAY (CL) with minor gravel, dark blackish brown to orange brown, moist, moderate blocky structure, very fine sand and dark brown clay lams, subangular coarse sand sized to pebbly basalt, slate and SILTSTONE fragments, heavy $CaCO_3$ development
						@88.7' to 89.7': Laminated Sandy CLAY (CL), gravel less than 8%
						@89.7' to 90': Silty SAND (SM) with gravel, slightly moist, fine to coarse sand, fine pebbles and subrounded gravels, unconsolidated
						@90.3' to 91.9': Clayey SILT (ML), hard, mottled orange brown to gray, moist, moderate blocky structure, gleying and oxidation on pedogenic faces, $CaCO_3$ on pedogenic faces and in matrix, trace SILTSTONE rock fragments
165 100						@91.9' to 92.7': Silty CLAY (CL), hard, mottled orange brown to reddish brown,

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 5 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
165 100						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
▽						moist, laminated, $CaCO_3$ on pedogenic faces
						@92.7' to 93': Silty SAND (SM) bed, moist, poorly graded, very fine sand, grades to Silty CLAY (CL), laminated, gleyed, $CaCO_3$ in matrix
						@93.9' to 94': Becomes dark brown Gravelly CLAY to Clayey GRAVEL (CL-GC), moist, some coarse sand and silt, heavily weathered and decomposed SILTSTONE rock fragments, $CaCO_3$ around clasts, becomes Silty CLAY (CL)
						@94.8' to 96': Silty CLAY (CL), hard, dark reddish brown to gray, very fine sand, trace coarse sand sized slaty grains, subrounded with subangular quartz sand
160 105						@96' to 97': Silty GRAVEL with some clay (GM), mottled dark reddish brown to light brown to gray, fine to coarse sand, subrounded pebbly slate, fine to coarse subangular to subrounded slaty gravel, $CaCO_3$ in matrix
						@97' to 99.3': Contact, Clayey Sandy SILT (ML), fine grained, grades below to Silty SAND (SM) with gravel, mottled, slightly moist, fine to coarse sand, fine to coarse gravels, SILTSTONE and basalt rock fragments, lack of $CaCO_3$
						@99.3' to 99.8': Contact, Sandy CLAY (CL), hard, reddish brown to gray, moist, very fine sand, gravel @99.8'
						@99.8' to 100.5': Silty SAND (SM), loose, reddish brown, wet, fine to coarse sand, well graded, unconsolidated
155 110						@100.5' to 101.5': Perched groundwater encountered @100.5' to 101.5': Grades below to Silty Sandy CLAY (CL), mottled olive brown to orange brown to gray, wet on moderately developed pedogenic faces, laminated to thinly bedded, very fine sand with coarse sand and pebbly fine gravel inclusions in silty clayey matrix, gleyed, oxidized along very fine sand lams
						@101.5' to 101.6': Very fine sandy carbonate concretions, becomes Clayey SILT (ML) with sand, dark brown to reddish brown, very moist
						@102.3': Thin bed of very fine Sandy SILT (ML) @102.7': Thin bed of very fine Sandy SILT (ML)
150 115						@102.8' to 103.4': Silty CLAY (CL), hard, dark brown to orange brown, moist, laminated, color change to very light brown to orange brown between 103.4' to 103.7': Color change to very light brown to orange brown
						@104.2' to 105': Grades to Clayey Sandy SILT (ML), laminated, very fine sand, with clay between 104.4' to 104.5', grades back and forth from laminated fine SAND (SP) to Silty Sandy CLAY (CL), clayey strata contain $CaCO_3$, lack of $CaCO_3$ in very fine sands
						@105' to 106.3': Sandy Silty CLAY (CL), hard, mottled dark brown and gray to orange brown, very moist, moderate blocky structure, gleyed and oxidized on soil faces, $CaCO_3$ in matrix
145 ▽ 120						@106.3' to 108.4': Becomes Clayey Silty SAND (SM-SC), brown, wet, fine to coarse sand, fine subrounded pebbly gravel, well graded, unconsolidated, grades below to Clayey Sandy SILT (ML), mottled reddish brown to gray, very fine sand with some coarse sand sized slaty grains and weathered basalt, gleyed, minor Mn, lack of $CaCO_3$
						@108.4' to 109.2': Grades to Silty SAND (SM) with gravel and clay, mottled dark reddish brown to gray, moist, fine to coarse sand, fine subangular to subrounded slaty gravels and weathered basalt
140 125						@109.2' to 110': Abrupt contact, dark blackish red, oxidized, very fine SAND (SP) over laminated Silty Sandy CLAY (CL), well developed blocky structure, gleyed and oxidized, Mn development on pedogenic faces and along

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 6 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**6 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
140 125						laminations, lack of $CaCO_3$
						@110' to 110.7': SAND (SP-SM) bed, brown to dark black, wet, very fine sand, Mn development strong near contact with below Sandy SILT (ML)
						@110.7' to 112.9': Grades to Sandy SILT (ML), laminated sandy silt with clay, orange brown to reddish brown to 111.6', @111.6' color change, abrupt change to olive gray Sandy CLAY (CL) with very fine and subrounded fine slaty gravel, lacks $CaCO_3$ moderate structure to 112.9'
						@112.9' to 114.3': Sandy CLAY (CL), laminated very fine sand with coarse sand and fine gravel, $CaCO_3$ in matrix, Paleosol - Color change, orange brown to gray, laminated very fine sand and dark brown clay
135 130						@114.3' to 115': Contact, CLAY (CL), hard, dark reddish brown
						@114.4' to 115': No Recovery
						@115' to 120': Well developed Paleosol - Silty CLAY (CL), mottled dark reddish brown to gray, well developed blocky structure, clay on pedogenic faces, gleyed on faces, heavy $CaCO_3$ along blocky structure, strongly laminated from 118' to 120', @119.5' prominent reddish brown fine sand lam, brown, oxidized
						@120' to 122.6': Perched groundwater encountered @120' to 122.6': Sandy CLAY (CL), mottled reddish brown to gray, wet on soil faces, moderate blocky structure, very fine sand, with coarse subrounded slaty grains, gleyed with $CaCO_3$ on pedogenic faces
130 135						@122.6' to 124.8': Clayey Sandy SILT (ML), light brown to light gray brown, heavy $CaCO_3$, well developed hackly structure, moist, fine to coarse sand and $CaCO_3$ concretions
						@124.8' to 125': Silty SAND (SM), olive brown to gray brown, moist, very fine sand, thinly bedded
						@125' to 127.7': Sandy Silty CLAY (CL), olive gray to bluish gray, moist, well developed hackly structure, fine to coarse sand and $CaCO_3$ concretions
						@127.2' to 128': Grades below to Silty SAND (SM), color change to mottled olive brown to orange brown, fine sand, fine subrounded slaty gravel
125 ▽ 140						@128' to 129.1': Becomes Clayey SAND (SC), hard, mottled gray brown to dark brown, moist, heavy $CaCO_3$ in matrix, sandy pockets and along deformed laminations, fine to coarse sand, pebbly rounded gravel, laminated clays to thinly bedded gravelly sand
						@129.1' to 130': No Recovery
						@130' to 132.6': Sandy SILT (ML) with clay, hard, olive brown to reddish brown, moist, fine quartz sand, trace basalt, abundant $CaCO_3$ as fine gravel sized angular concretions
						@132.6' to 133.6': Oxidized sharp contact, very fine sand over Sandy CLAY (CL), mottled olive brown, orange brown to gray, very fine sand with dark brown clay laminations
120 145						@133.6' to 135': No Recovery
						@135' to 136.2': Sandy SILT to Silty Sandy CLAY (ML-CL), olive gray to orange brown, slightly moist, predominantly fine sand, trace weathered SILTSTONE fragments, moderate blocky structure, $CaCO_3$ in matrix
						@136.2' to 137': Sandy CLAY (CL), hard, bluish gray, slightly moist, very fine sand, minor $CaCO_3$
115 ▽ 150						@137' to 140': Paleosol - hard, mottled olive gray to orange brown, moist, well developed hackly structure, very fine sand, abundant $CaCO_3$ on pedogenic

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 7 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**7 of 8**
ELEVATION:	**264.5 Feet**
DATE START:	**8/15/2012**
DATE FINISH:	**8/16/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
115 150						faces and as fine angular gravel sized concretions, laminated to thinly bedded, irregular uneven laminated parting surfaces
						@140': Perched groundwater encountered
						@140' to 140.4': Becomes Silty SAND (SM), olive gray, wet, fine sand, trace clay
						@140.4' to 143.2': Grades to Sandy CLAY (CL), hard, olive gray to olive brown, moist, well developed hackly fracture, very fine gleyed sand and $CaCO_3$ on pedogenic faces
						@143.2': Coarse gravel sized $CaCO_3$ very fine sand concretion
110 155						@144' to 145': Grades to Silty CLAY (CL), mottled olive gray to gray brown, very moist, abundant $CaCO_3$
						@145' to 150': Well developed Paleosol - Silty CLAY (CL), olive gray to gray brown, water on soil faces, with very fine sand and abundant $CaCO_3$ on faces and as concretions, uneven irregular laminations, hackly structure
▼						End of Day, August 15, 2012
						@150' to 151.6': Perched groundwater encountered
						@150' to 151.6': CLAY (CH), hard, blue gray to olive brown, mosit, well developed hackly structure, polished parting surfaces, wet on some pedogenic faces, abundant $CaCO_3$, becomes massive and less olive brown between 151.2' to 151.6'
105 160						@151.6' to 154.2': Silty CLAY (CL) with sand, hard, olive brown to bluish gray, laminated very fine sand, silt, and clay, well developed hackly structure, moist, abundant $CaCO_3$
						@154.2' to 155': No Recovery
						@155' to 156.3': CLAY with carbonate sand (CL-CH), dark brown to olive gray, wet, heavy $CaCO_3$ concretions, becomes well oxidized between 155.8' to 156.3', erosional contact, becomes dark blackish gray CLAY (CH), internal randomly oriented parting surfaces, shrink and swell shearing, very moist, with $CaCO_3$ on parting surfaces and in matrix to 157.5'
						@157.5': Local groundwater table encountered
100 165						**San Pedro Formation (Qsp)**
						@157.5' to 158': Sandy, wet, disturbed San Pedro Formation
						@158' to 160': Becomes very fine quartz, subrounded SAND with clay (SP-SC), gray, wet, poorly graded
						@160' to 165': No Recovery, other than a few subrounded to rounded pebbly gravels, clast consists of slaty siliceous quartz, green SANDSTONE, heaving sand 40' into auger, added water to augers
						@165' to 167.2': SAND (SP), green to yellow green, fine grained, subrounded to rounded, predominantly quartz grains, wet, unconsolidated, poorly graded
						@167.2' to 170': No Recovery
95 170						@170' to 172.2': SAND (SP), olive green, wet, fine to coarse sand, predominantly subrounded to rounded quartz grains
						@171.6': Encountered gravel, fine to coarse subrounded to rounded gravels, green siliceous quartz gravels, very hard
						@172.2' to 175': No Recovery
90 175						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 24**
PAGE 8 OF 8

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL	TYPE	Split Sleeve
						HORIZONTAL	SIZE	3.0" I.D.
08/15/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/16/12	ATD	▼ 157.5				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **8 of 8**
ELEVATION: **264.5 Feet**
DATE START: **8/15/2012**
DATE FINISH: **8/16/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
90 175						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Total depth of coring: 175' bgs Perched groundwater encountered @35', 53.6'-55', 75'-86.2', 100.5'-101.5', 120'-122.6', 140', 150'-151.6' bgs Local groundwater table encountered @157.5' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling Excess cuttings disposed of in D.O.T. approved drums and disposed offsite Asphalt patched with cold patch mix
85 180						
80 185						
75 190						
70 195						
65 200						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 25**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/16/12	ATD	▽ 34.4				INCLINED	Bit (Feet)	
08/17/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**266 Feet**
DATE START:	**8/16/2012**
DATE FINISH:	**8/17/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
266 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over subgrade
						@7" to 1.4': Clayey SAND (SC)
						Quaternary older alluvial and fluvial deposits (Qoaf)
						@1.4' to 2.4': Silty SAND (SM) with gravel, hard, dark reddish brown, slightly moist, fine to coarse sand, fine to coarse slaty gravel, blocky structure, oxide on pedogenic faces, trace clay
						@2.4' to 2.8': GRAVEL to COBBLE sized slaty rock fragments, sharp contact below
261 5						@2.8' to 3.7': Silty SAND (SM), dark reddish brown, slightly moist, fine to coarse subangular sand, trace fine gravel and clay, well graded
						@3.7' to 4.2': Coarse GRAVEL and COBBLE sized rock fragments, erosional contact below, uneven to roughly planar
						@4.2': Becomes Silty SAND (SM) with gravel, hard, blocky fracture, oxide on pedogenic faces
						@4.7' to 6.9': Sandy GRAVEL with silt (GM), reddish brown, dry, fine to coarse sand, fine to coarse gravels, well graded, unconsolidated
256 10						@6.9' to 8.6': Erosional contact, very fine grayish white sand lam, Silty Sandy CLAY (CL), reddish brown to orange brown, moist, very fine sand, trace SILTSTONE rock fragment @6.7', becomes laminated below, gleying along discontinuous very fine sand lams and trace clay on very poorly developed structure, moderate Mn development
						@8.6' to 9': Abrupt erosional contact, Silty SAND (SM), fine sand
						@9' to 9.4': Grades to laminated Silty CLAY (CL), orange brown, very moist, very fine sand lams, gleyed
						@9.4' to 9.6': Thin SAND (SP) bed
						@9.6' to 10': Sandy CLAY (CL), reddish brown, moist, fine to coarse sand, Mn in matrix
						@10' to 11.5': Silty SAND with clay (SC-SM), orange brown, moist, fine to medium sand, some subrounded slaty gravel
251 15						@11.5' to 12.3': Grades to Sandy SILT (ML), orange brown, moist, predominantly fine sand, trace coarse sand sized slaty grains
						@12.3' to 13': Some coarse GRAVEL (GP), subrounded
						@13' to 13.1': CLAY (CL), dark reddish brown, bake zone
						@13.1' to 13.3': Becomes strongly laminated Silty Sandy CLAY to Clayey SILT (ML-CL) @13.3': Dark brown clay lamination @13.5': Coarse SAND (SP) influx @13.6': Coarse SAND (SP) influx @14' to 14.1': Basal GRAVEL (GP)
246 20						@14.6' to 15': Sandy CLAY (CL-CH), dark brown, very moist with some coarse angular sand grains, moderately plastic, trace subangular slaty gravel
						@15' to 17.1': Well developed Paleosol - Sandy CLAY (CL), dark reddish brown, moist, fine to coarse sand, blocky structure, iron oxide on pedogenic faces
						@17.1' to 19.1': Very fine SAND (SP) lam, oxidized dark red, becomes Silty SAND with clay (SC-SM), dark reddish brown, moist, fine to coarse sand, fine subangular slaty gravel
241 25						@19.1' to 19.6': Very fine yellow brown SAND (SP) lam, overlies Sandy Clayey

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 25**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/16/12	ATD	▽ 34.4				INCLINED	Bit (Feet)	
08/17/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**2 of 5**
ELEVATION:	**266 Feet**
DATE START:	**8/16/2012**
DATE FINISH:	**8/17/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
241 25						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						GRAVEL (GC)
						@19' to 19.6': Basalt fragment rock line, becomes Sandy SILT (ML), dark orange brown, moist, very fine sand, SILTSTONE rock fragments, some clay from decomposed SILTSTONE, minor Mn development from 19.6' to 20', absent below
						@21.3' to 22.8': Clayey SILT (ML), soft, orange brown, moist, very fine sand, poorly developed structure, gleying on predogenic faces and in matrix
						@22.8' to 24.8': Erosional contact, Moderately developed Paleosol - Silty CLAY (CL), dark reddish brown, moist, minor Mn and oxide on pedogenic faces, becomes sandy to 24.8'
236 30						@24.8' to 26': Becomes Clayey Sandy SILT (ML), orange brown, moist, fine to coarse sand, gleyed, SILTSTONE and slaty sand sized grains
						@26' to 27.5': Silty SAND (SM), orange brown, moist, fine to coarse sand with fine gravel sized subangular slaty fragments
						@27.5' to 28': Rockline, SILTSTONE fragments
						@28' to 28.4': Coarse gravel to cobble sized SILTSTONE rock fragments, mechanically broken
						@28.4' to 30': Silty Clayey SAND (SM-SC), brown, moist, fine to coarse sand, fine to coarse scattered gravel
▽						@29.7' to 29.9': Basalt and SILTSTONE rock line
231 35						@30' to 32': Silty SAND (SM) with clay, brown to orange brown, moist, poorly developed blocky structure, gleyed on some pedogenic faces, trace Mn development
						@32' to 33.1': Very fine dark reddish brown SAND (SP) lam over coarse sand and fine gravel (SP-SM), becomes thinly bedded sand and fine gravels
						@33.1' to 34.4': Grades to Sandy Clayey SILT (ML), dark reddish brown, very moist, very fine grained, dark yellow brown SILTSTONE fragments from 34.6' to 34.8', erosional contact below, CLAY (CL), dark red, bake zone
▽						@34.4': Perched groundwater encountered
						@34.4' to 35': Sandy SILT (ML), brown, wet, very fine grained
226 40						@35': Paleosol - Silty CLAY (CL), hard, mottled dark reddish brown to orange brown and gray, moist, very fine sand, gleyed on moderately developed pedogenic faces
						@35.5' to 35.9': Silty SAND (SM), dark reddish brown, very moist, very fine sand, micaceous
						@35.9' to 36.2': SILT (ML) bed, dark reddish brown, blocky structure, very moist
						@36.2' to 36.4': Becomes Silty SAND (SM) to 36.4', fine to coarse sand, fine gravel
221 45						@36.4' to 37.9': Becomes dark reddish brown, moist Silty CLAY (CL), moderate blocky structure, mottled orange brown to gray, very moist, very fine sand, gleyed on pedogenic faces
						@37.9' to 39.2': Sandy GRAVEL (GM) with bedded silt, wet, clay in matrix, fine sand beds, fine to coarse SILTSTONE, basalt fragments and slaty gravels
						@39.2': Perched groundwater encountered
▽						@39.2' to 39.7': Sandy SILT (ML), orange brown to gray, wet, very fine sand, gleyed
						@39.7' to 42.4': Paleosol - Silty CLAY (CL), olive gray to orange brown, very moist, free water on poorly developed pedogenic faces, becomes moderate blocky structure below 41.1' to 42.4'
216 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 25**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/16/12	ATD	▽ 34.4				INCLINED	Bit (Feet)	
08/17/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 5**
ELEVATION:	**266 Feet**
DATE START:	**8/16/2012**
DATE FINISH:	**8/17/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
216 50						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@42.4' to 42.7': Sandy SILT (ML), wet, very fine sand, micaceous
						@42.7' to 45': Clayey SILT (ML), mottled olive brown to orange brown to gray, wet on moderately developed pedogenic faces, oxidized on pedogenic faces, blocky structure
						@45' to 45.5': Silty Clayey SAND (SM-SC), brown, very moist, fine to coarse sand, fine SILTSTONE and slaty gravel sized rock fragments, Mn development, some basalt fragments, well graded, erosional contact below
						@45.5' to 45.9': Sandy SILT (ML), olive brown to brown, wet, very fine grained
▽ 211 55						@45.9' to 47.2': Silty SAND (SM) with gravel, olive brown to orange brown, wet, very fine sand, fine subrounded slaty and SILTSTONE gravel, poorly developed blocky structure, within silty graded zone from 46.8' to 47', @47.2': SILTSTONE rock line, erosional contact with below
						@47.2' to 48.5': Clayey Sandy SILT (ML), mottled olive brown to gray, very moist, minor gleying of very fine discontinuous sand lams
						@48.5': Perched groundwater encountered
						@48.5' to 50.4': Paleosol - Grades to Silty CLAY (CL), olive brown to dark brown to gray, moist, moderate to well developed blocky structure, oxidation and very fine sand, Mn lined pedogenic faces, laminated, gleyed, dark brown, trace SILTSTONE fragments, laminated clay, pedogenic faces are rough and uneven
206 60						End of day August 16, 2012
						August 17, 2012
						@50.4' to 51.9': Fine gravel sized angular highly weathered basalt clast, grades below to Clayey Sandy SILT (ML), mottled orange brown to brown to gray, moist, very fine sand, laminated, gleyed, poorly developed structure to 51.1'
						@51.9' to 54.7': Sandy SILT (ML), mottled as above, heavy, spotty manganese development in mass, trace clay, gleyed
						@54.7': Perched groundwater encountered
						@54.7' to 55': Silty SAND (SM), olive brown to reddish brown, wet, very fine sand, trace coarse rounded slaty sand grains, poorly graded, gleyed
201 65						@55' to 60': Sandy SILT (ML), dominantly orange brown, very moist, very fine sand, vertical gleying or poorly developed structure, heavy Mn development to 56.7', trace clay in matrix below 56.7', subhorizontal clay lams @58.6', becomes heavy Mn development to mild Mn development and some mica, gleyed in mass as vertical and subhorizontal discontinuous zones of very fine quartz sand, slaty subrounded pebbles @60' to 60.3'
						@60.3' to 63.5': Gradational changes from Silty SAND to Sandy SILT (SM-ML), mottled orange brown to olive brown, slightly moist, very fine sand, with spotty Mn development over interval of Clayey Sandy SILT (ML) from 61.6' to 62'
196 70						@63.5' to 66': Silty Sandy CLAY (CL), olive brown to dark brown, wet on soil faces, moderately developed, thinly bedded Sandy CLAY (CL) with dark brown clay laminations, abundant Mn development on pedogenic faces
						@66.2' to 70': Well developed Paleosol - **Carbonate Package** Silty CLAY (CL), olive brown to brown, very moist, well developed blocky structure, clay and heavy $CaCO_3$ on pedogenic faces (carbonate zone), abundant very fine sand and $CaCO_3$ concretions between 68.3' to 70', becomes hackly structure
						@70' to 73.5': Well developed hackly structure, Silty CLAY (CL), mottled dark olive brown to reddish brown to grayish white, moist, oxide and $CaCO_3$ on pedogenic faces, crumbles easily
191 75						@72.5' to 72.8': Well cemented, Silty CLAY (CL), very hard, dry, becomes laminated below, moist again @73.3'

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 25**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/16/12	ATD	▽ 34.4				INCLINED	Bit (Feet)	
08/17/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**4 of 5**
ELEVATION:	**266 Feet**
DATE START:	**8/16/2012**
DATE FINISH:	**8/17/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
191 75						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						San Pedro Formation (Qsp):
						@73.5' to 74.4': Contact, roughly planar to erosional and uneven, loose, SAND (SP), blue green, moist, very fine grained subangular to subrounded quartz sand, poorly graded, unconsolidated
						@74.4' to 75': Silty SAND (SM), loose, light brown, very fine grained, degree of rounding increasing in quartz sand grains
						@75' to 75.8': SAND with silt (SP-SM), loose, blue green to bluish gray, very moist, very fine subrounded quartz sand, poorly graded
						@75.8' to 76': Becomes Clayey SAND (SC), hard, bluish green, very fine sand
186 80						@76' to 76.4': Laminated oxidized SAND with silt (SP-SM) and trace clay
						@76.4' to 76.6': Bioturbated
						@77.4' to 81.1': Becomes massive SAND (SP), loose, brown, very moist, becoming wet, very fine sand, slaty gravel @77.8', wet @80' to 81.6'
						@81.1' to 81.6': Becomes heavily oxidized, very moist
						@81.6' to 85': No Recovery
181 ▼ 85						@85': Local groundwater table encountered
						@85' to 86.1': SAND (SP), loose, light brown, wet, very fine sand
						@86.1' to 87.1': Becomes slightly oxidized
						@87.1' to 87.6': Becomes Gravelly SAND (SP), laminated, then massive below 82.3', fine slaty subrounded clasts to pebbly, wet
						@87.6' to 90': No Recovery, encountered cobbles during drilling (rig chatter, auger jump)
176 90						@90' to 90.7': Fine grained SAND (SP), basal rounded siliceous gravel
						@90.7' to 92': Coarse sand and fine gravel, Sandy GRAVEL (GP), wet, subrounded to rounded sand and fine gravels
						@92' to 92.4': Fine grained SAND (SP) bed, overlies 1 to 2-inch thick coarse SAND (SP) bed, and gravel to 93.3', wet, granitic cobbles @92.4' to 92.8', very hard, mechanically fractured
						@93.3' to 93.9': Fine to coarse SAND (SP), yellow brown, wet
						@93.9' to 95': No Recovery
171 95						@95' to 96': Very Poor Recovery, SAND (SP), light yellow brown, wet, slough
						@96' to 100': No Recovery
166 100						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 25**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/16/12	ATD	▽ 34.4				INCLINED	Bit (Feet)	
08/17/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**266 Feet**
DATE START:	**8/16/2012**
DATE FINISH:	**8/17/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
166	100					@100' to 101.1': SAND (SP), light brown, wet, very fine sand
						@101.1' to 102.5': Silty SAND (SM), fine sand, oxidized moderately
						@102.5' to 103.4': Sandy SILT (ML), fine silt, heavily oxidized
						@103.4' to 105': No Recovery
161	105					@105' to 105.9': SAND (SP), brown, wet, fine to medium sand
						San Pedro Formation (Qsp):
						@105.9' to 106.4': Abrupt contact, Sandy SILT (ML) dark gray, wet, very fine sand with dark black organic laminations
						@106.4' to 110': No Recovery
156	110					@110' to 113.6': Silty SAND to Sandy SILT (SM-ML), dark gray, massive with sea shells
						@113.6' to 115': No Recovery
151	115					Total depth of coring: 115' bgs Perched groundwater encountered @34.4', 39.2', 48.5', 54.7' bgs Local groundwater table encountered @85' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling Excess cuttings disposed of in D.O.T. approved drums and disposed offsite Asphalt patched with cold patch mix
146	120					
141	125					

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

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LEIGHTON

CORE BORING LOG

BORING NO. **CB - 26**
PAGE 1 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/20/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/20/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**1 of 5**
ELEVATION:	**263 Feet**
DATE START:	**8/20/2012**
DATE FINISH:	**8/20/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
263 0						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						Asphalt concrete (Ac) over **Aggregate base (Ab)** over 12" Reinforced **Concrete**
						@2' to 2.5': No Recovery
						Quaternary older alluvial and fluvial deposits (Qoaf): @2.5' to 4.9': Sandy Clayey SILT (ML), soft, mottled brown to orange brown, very moist, moderately developed structure, blocky with fine oxidized sand on pedogenic faces, gleyed on horizontal and vertical pedogenic faces
258 5						@4.9' to 6.1': Erosional contact, Gravelly SAND (SP) with some silt and clay, slightly moist, fine to coarse sand, fine to coarse slaty gravel, well graded, subangular to subrounded to 6.1'
	0-15	Box 1				@6.1' to 8': Sharp contact, erosional, base of channel, becomes very fine Sandy CLAY (CL), well oxidized, dark reddish brown to orange brown, very moist, becomes Silty GRAVEL (GM) to 7.7', fine to coarse sand, fine to coarse gravel, weathered siliceous and slaty subrounded gravels, some mechanically broken, graded below from 7.7' to 8', becoming oxidized Clayey SAND (SC) with gravel and rock fragments, very moist
253 10						@8' to 8.2': SAND (SM) bed, very fine subrounded sand, wet, sand and silty clay
						@8.2' to 8.7': Erosional contact, becomes Silty CLAY (CL), with bedded coarse Sandy CLAY (CL), mottled olive brown to orange brown, very moist, gleyed, soft
						@8.7' to 10.3': No Recovery
						@10.3' to 12.1': SILTSTONE rock line with basalt fragments, Clayey Sandy SILT (ML), dark reddish brown to gray, very moist, soft, poorly developed structure, gleyed along very fine SAND (SP) lenses and lams
						@12.1' to 12.9': Becomes Silty SAND (SM), reddish brown, very moist, predominantly fine sand, some coarse sand sized slaty grains, fine slaty gravel, unconsolidated, moderately graded
248 15						@12.9' to 13.9': Grades below to Gravelly SILT (ML), oxidized dark red sandy lam with fine pebbly SILTSTONE and slaty gravel below, basal gravel from 13.2' to 13.5', grades below to very fine grained Sandy CLAY (CL) to 13.9
						@13.9' to 14': CLAY (CL) bed, dark reddish brown, very moist, baked clay, overlying SILTSTONE rock fragments
						@14' to 15.5': Becomes Silty Sandy CLAY (CL), mottled dark reddish brown to orange brown, moist, very fine sand, moderately developed blocky structure, with gleying of very fine sand lams and along pedogenic faces, some coarse sand and spotty Mn development to 15.5'
243 20						@15.5' to 16.7': Well developed Paleosol - Silty Sandy CLAY (CL), mottled dark brown to orange brown and gray, very moist, very fine sand, blocky structure, very fine oxidized sand and clay on pedogenic faces, gleyed, laminated, Marker Bed 1
	15-30	Box 2				@16.7' to 17.8': Fine slaty GRAVEL (GP), underlain by laminated dark brown CLAY (CL), with some fine gravel rock fragments @17.4': Rockline
238 25						@17.8' to 18.1': Silty Sandy CLAY (CL), dark brown, moist, fine grained, with some coarse sand sized slaty grains

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 26**
PAGE 2 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/20/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/20/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **2 of 5**
ELEVATION: **263 Feet**
DATE START: **8/20/2012**
DATE FINISH: **8/20/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
238 25						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
						@18.1' to 20': Sandy Clayey SILT to Sandy CLAY (CL-ML), with fine slaty, SILTSTONE, and basalt rock fragments, dark reddish brown to orange brown, poorly developed structure, very fine oxidized sand and minor clay on pedogenic faces, gleyed
						@20' to 23.8': Sandy SILT with clay to Silty SAND (SM-ML), light brown to orange brown, very moist, very fine sand, some subrounded slaty rock fragments, gleyed in matrix, gradational changes between silt and sand content, thinly bedded to massive
						@23.8' to 24.2': Silty CLAY (CL), soft, mottled olive brown to orange brown to reddish brown to gray, very moist, laminated to thinly bedded, with sand, very fine @24.2'
233 30						@25' to 26': Windblown SILT with thinly bedded Sandy CLAY (ML-CL), moderately developed blocky structure, thin beds of windblown SILT with frosted grains, gleyed, dark reddish brown to orange brown, gleyed on pedogenic faces
						@26' to 29': Well developed Paleosol - Silty Sandy CLAY to Sandy Clayey SILT (ML-CL), orange brown to reddish brown to gray, moist, very fine sand, laminated, gleying, very fine sand to dark brown clayey lams, trace slaty fine gravel, Fe on pedogenic faces, fine sand and clay on pedogenic faces
228 ▽ 35						@28.8' to 29': SILTSTONE rockline
						@29' to 29.2': Sandy CLAY (CL), hard, dark reddish brown, very fine sand, with slaty fine gravel
						@29.2' to 29.7': Becomes laminated and gleyed to 30'
						@29.7': Oxidized very fine SAND (SP) lam, dark reddish brown
	30-45	Box 3				@30' to 31.8': Sandy SILT with clay (ML), brown to orange brown, moist, very fine sand, poorly developed structure, mild Mn development, gleyed
						@31.6' to 31.8': Weathered SILTSTONE rock fragments
▽						@31.8' to 33.5': Mn lamination, well developed blocky structure, Sandy CLAY (CL), dark brown to orange brown to gray, moist, very fine oxidized orange brown sand, with weathered SILTSTONE rock fragments, oxidized and fine sand on pedogenic faces
223 40						@33.5' to 34.1': Silty Clayey SAND (SM-SC) with gravel, olive brown, fine to coarse sand, fine subrounded to rounded gravels, basal gravel from 33.8' to 34.1'
▽						@34.1' to 34.5': Abrupt contact, laminated to thinly bedded Sandy CLAY (CL), fine to medium gleyed sand pockets, dark brown laminated clay, coarse sand and SITLSTONE rock fragments in matrix, moderately developed structure, Fe and Mn on pedogenic faces
						@34.5' to 34.7': SAND (SP) bed
						@34.7' to 35': CLAY (CL) bed, with some silt and very fine sand
218 45						@35' to 37.6': Perched groundwater encountered
						@35' to 35.6': Silty SAND to Sandy SILT (SM-ML), dark reddish brown, wet, very fine sand
						@35.7' to 37.6': Gradational changes from Sandy SILT to Silty Clayey SAND and Clayey SILT (SM-ML), dark reddish brown to orange brown, very moist to wet on pedogenic faces, poorly developed structure, fine to medium sand lams, gleyed, spotty Mn development
						@37.6' to 37.9': Grades to Silty Sandy CLAY (CL), mottled orange brown to reddish brown to gray, very moist, very fine sand, laminated clay to thinly bedded, oxidized, spotty Mn on pedogenic faces, grades to Sandy SILT (ML)
213 50						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 26**
PAGE 3 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/20/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/20/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**3 of 5**
ELEVATION:	**263 Feet**
DATE START:	**8/20/2012**
DATE FINISH:	**8/20/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
213 50	45-60	Box 4				from 37.9' to 38.2', gradational contact, becomes laminated, dark brown to reddish brown Sandy CLAY to Clayey SAND (CL-SC), with basal fine basalt and slaty gravels from 38.6' to 38.7'
						@38.7' to 39.4': Sharp contact, Silty CLAY (CL), dark brown to olive brown, laminated to thinly bedded dark brown clay
						@39.4': Perched groundwater encountered
						@39.4' to 39.9': Becomes Sandy SILT (ML), orange brown to gray, wet, very fine sand, gleyed
						@39.9' to 40': CLAY (CL), dark reddish brown, with Mn development, baked clay
208 55						@40' to 41.1': Sandy Clayey SILT (ML), mottled dark reddish brown to olive brown, wet, trace fine slaty gravel, poorly developed, gleyed and oxidized, @41' to 42.4': Perched groundwater encountered
						@41.1' to 41.2': SILTSTONE and slaty gravel rockline, wet
						@41.2' to 42.4': Silty SAND (SM) with fine gravel, wet, fine to coarse subrounded sand, fine slaty and siliceous gravel
						@42.4' to 45': Sandy SILT (ML) with clay, orange brown to olive brown and gray, very moist, moderately developed blocky structure, micaceous, gleyed and oxidized
203 60						@44.8': Very hard dark brown to reddish brown Silty CLAY (CL), dark reddish brown, oxidized very fine sand lams @44.8' to 44.9'
▽						@45' to 48.4': Paleosol - Sandy SILT (ML) with some clay, hard, mottled olive brown to orange brown and oxidized reddish brown, moist, very fine sand, blocky structure, gleyed, Mn and Fe on pedogenic faces, "spotty" oxidation
						@48.4' to 51.5': SILTSTONE rockline, becomes Sandy SILT (ML) with fine gravel in matrix, gleyed, poorly developed structure to 51.5'
						@51.5' to 52.9': Color change to 52.9', Paleosol - Clayey SILT (ML), hard, dark reddish brown, moist, well developed blocky structure, some very fine sand, clay development on pedogenic faces, Marker Bed 2
198 65						@52.9' to 55': Becomes Sandy CLAY (CL), laminated dark brown clay to reddish brown and gray very fine sand lams, some slaty rock fragments @54.9': Dark reddish brown, oxidized sand lam
	60-75	Box 5				@55' to 59.6': Sandy SILT to Sandy CLAY (ML-CL), hard, olive brown to orange brown, moderately well developed blocky structure, abundant Mn development, gleyed on pedogenic faces and along very fine sand lams, dominantly massive with gradational changes @59.6' to 60': Color change to dominantly olive gray to olive brown, Mn prevalent
193 70						@60' to 65': Silty SAND to Sandy SILT (SM-ML), hard to moderately hard, mottled orange brown to olive brown to gray @60.8': Perched groundwater encountered @60.8': Thin bed, wet SAND (SP), abundant Mn in matrix and around pebbly fine gravel, gradational changes, with SILTSTONE rock fragments, @61' becomes clayey @64.8' to 64.9': Gleyed in mass
						@65' to 66.2': SILT (ML) with sand, reddish brown to olive brown, moist, very fine sand, some fine subangular gravels, spotty Mn development
188 75						@66.2' to 67': Well developed Paleosol - **Carbonate Package** hard, olive brown to orange brown, slightly moist, heavy $CaCO_3$ development along hackly

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 26**
PAGE 4 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/20/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/20/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.: **603314-008**
PAGE NO.: **4 of 5**
ELEVATION: **263 Feet**
DATE START: **8/20/2012**
DATE FINISH: **8/20/2012**
DRILLER: **Martini**
PREPARED BY: **JRoe**
LOCATION: **See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
188 75						structure, gleyed
						@67' to 68.8': Well developed blocky structure, absence of $CaCO_3$, becoming laminated @67.3', gleyed
▽						@68.8' to 69.3': Silty CLAY (CL), hard, laminated olive brown to dark reddish brown, moist, $CaCO_3$ nodules @68.8' and 69.3', abundant Mn and very fine sand on pedogenic faces
						@70.2' to 74.7': SILTSTONE rockline, becomes heavily carbonaceous Silty CLAY (CL), mottled dark brown to reddish brown, wet on pedogenic faces, well developed blocky to hackly structure, abundant $CaCO_3$
183 ▽ 80						@74.7' to 74.8': CLAY (CL), dark reddish brown, baked clay zone
						@74.8' to 77': Silty CLAY (CL), olive brown to orange brown to gray, moist, some very fine sand, well developed blocky to hackly structure, abundant $CaCO_3$ and Mn on pedogenic faces
						@77': Perched groundwater encountered
	75-90	Box 6				**San Pedro Formation (Qsp):**
						@77' to 80': Grades to SAND (SP), olive brown to orange brown, wet, subangular to subrounded very fine quartz sand, poorly graded, unconsolidated, spotty orange brown oxidation
						@80': Perched groundwater encountered
						@80' to 80.2': Sandy SILT (ML), olive brown, wet, very fine quartz sand
178 ▼ 85						@80.2' to 80.5': Clayey SILT to Silty CLAY (CL-ML), hard, moist, olive green, underlain by Fe and Mn laminations, becomes Silty SAND (SM), very fine sand
						@80.5' to 81': Silty SAND (SM), olive green to orange brown, moist, very fine subrounded quartz sand
						@81': Color change to dark greenish gray to greenish blue
						@82' to 85': No Recovery
						@85': Local groundwater table encountered
						@85' to 86.5': SAND (SP), light brown, wet, fine grained subrounded to rounded quartz sand, massive
						@86.5' to 88': Massive, becomes oxidized orange brown
173 90						@88' to 88.1': Laminated by some silt and clay, dark blackish brown, heavily oxidized to dark orange brown below
						@88.8' to 90': No Recovery
						@90' to 91.4': SAND (SP), brown, wet, fine grained quartz sand
						@91.4': Becomes oxidized orange brown, with slaty gravels to 92', wet
						@92' to 93': SAND with silt (SP-SM), yellow brown, wet, very fine quartz sand, oxidized laminations @92.6'
						@93' to 95': No Recovery, driller reported gravel and cobbles over this interval, auger jump
168 95						@95' to 96.6': SAND with silt (SP-SM), very fine grained
	90-105	Box 7				@96.5' to 96.7': Basal coarse sand over fine rounded to subrounded gravels, becomes very fine grained olive green sand below with oxidation laminations, wet, with strong oxidation rimming of sand lenses, unconsolidated
						@97.3' to 97.5': Becomes hard, thinly bedded to laminated, fine SAND (SP) predominantly, with trace fine subrounded to rounded slaty to SILTSTONE gravel
163 100						@97.5' to 100': No Recovery

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

LEIGHTON

CORE BORING LOG

BORING NO. **CB - 26**
PAGE 5 OF 5

PROJECT: **Beverly Hills High School**
CLIENT: **Beverly Hills Unified School District**
CONTRACTOR: **Martini Drilling Corporation**
EQUIPMENT USED: **CME 75, Continuous Core**

GROUNDWATER:		DEPTH TO (Feet):			ORIENTATION		CORE BARREL	
DATE	HRS AFT COMP	WATER	BOT. OF CASING	BOT. OF HOLE	X	VERTICAL / HORIZONTAL	TYPE / SIZE	Split Sleeve 3.0" I.D.
08/20/12	ATD	▽ 35				INCLINED	Bit (Feet)	
08/20/12	ATD	▼ 85				BEARING	Barrel (Feet)	5
		▼			0	ANG. FROM VERT.	Total (Feet)	

JOB NO.:	**603314-008**
PAGE NO.:	**5 of 5**
ELEVATION:	**263 Feet**
DATE START:	**8/20/2012**
DATE FINISH:	**8/20/2012**
DRILLER:	**Martini**
PREPARED BY:	**JRoe**
LOCATION:	**See Plate 1**

ELEVATION & CORE DEPTH (Feet)	CORE DEPTH RANGE (Feet)	BOX NUMBER	RECOVERY Feet	RECOVERY %	GRAPHIC LOG	FIELD CLASSIFICATION, REMARKS, AND LIMITATIONS
						The Soil Description applies only to a location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.
163 100						@100' to 101.2': Added water to augers, SAND (SP), loose, light brown, wet, unoxidized @101.2': 1/2-inch thick oxidized fine grained sand lamination, becomes laminated to thinly bedded below, with silt and trace clay, olive brown to orange brown @102' to 105': No Recovery
158 105						@105' to 106.2': SAND (SP), loose, light brown, wet, unoxidized @106.2' to 106.9': Sandy SILT to Silty SAND (SM-ML), yellow brown, wet, very fine sand, oxidized **San Pedro Formation (Qsp):** @106.9': Dark gray contact, very fine quartz sand and silt, slightly moist, erosional planar contact @106.9' to 110': No Recovery
153 110	105-115	Box 8				@110' to 111': Slough, wet sand and drilling tape in sample, not representative, @110': Sandy SILT (ML), dark gray, very fine sand, hard, wet with sea shells and laminations @111' to 115': No Recovery
148 115						Total depth of coring: 115' bgs Perched groundwater encountered @35'-37.6', 39.4', 41'-42.4', 60.8', 77', 80' bgs Local groundwater table encountered @85' bgs Boring backfilled with bentonite and soil cuttings upon completion of drilling Excess cuttings disposed of in D.O.T. approved drums and disposed offsite Asphalt patched with cold patch mix
143 120						
138 125						

FIELD HARDNESS		BEDDING		ATTITUDE AND ANGLE	JOINTS / SHEAR / FRACTURE		WEATHERING
V. HARD	- KNIFE CAN'T SCRATCH	V. THIN	<2"	HORIZONTAL (0-5°)	V. CLOSE	<2"	FRESH
HARD	- SCRATCHES DIFFICULT	THIN	2"-12"	SHALLOW OR LOW ANGLE (5-35°)	CLOSE	2"-12"	V. SLIGHT
MOD. HARD	- SCRATCHES EASILY	MEDIUM	12"-36"	MODERATELY DIPPING (35-55°)	MOD. CLOSE	12"-36"	SLIGHT
SOFT	- GROVES	THICK	36"-120"	STEEP OR HIGH ANGLE (55-85°)	WIDE	36"-120"	MODERATE
V. SOFT	- CARVES	V. THICK	>120"	VERTICAL (85-90°)	V. WIDE	>120"	MOD. SEVERE
							V. SEVERE
					Fe = Iron Oxide	Mn = Manganese Oxide	COMPLETE

ROCKLOG2012 BHHS LOGS.GPJ ROCKLOG2012.GDT 12/24/12

CB-22

CB-22
0-5'


CB-22
15-30


CB-22


CB-22
45-60"

CB-22-020-75
APA
253-620-1400


CB-22


96
001
501

CB-23


0-15

C-23
15-30
APA
32/16
253-620-1400


CB-23
30-45
CB-26


CB-23
45-60

CB-26
10-15'
APA
32/15
253-620-1688


CB-23
75-90
CB-23
75-105
CB-24
75-70

CB-24
CB-23
APA
3/16
APA


EB-23
105-120'
END
120 Run
111-115 No Recovery
116.5-120 No recovery
120-125 No recovery
washout
CONT 125
130


130-135 No recovery
135-140 No recovery
140-145 No recovery
145-150 No recovery
150-155 No recovery
155-160 No recovery
F.D. 160 Drilled
END 150
130-135
140-145
145-150

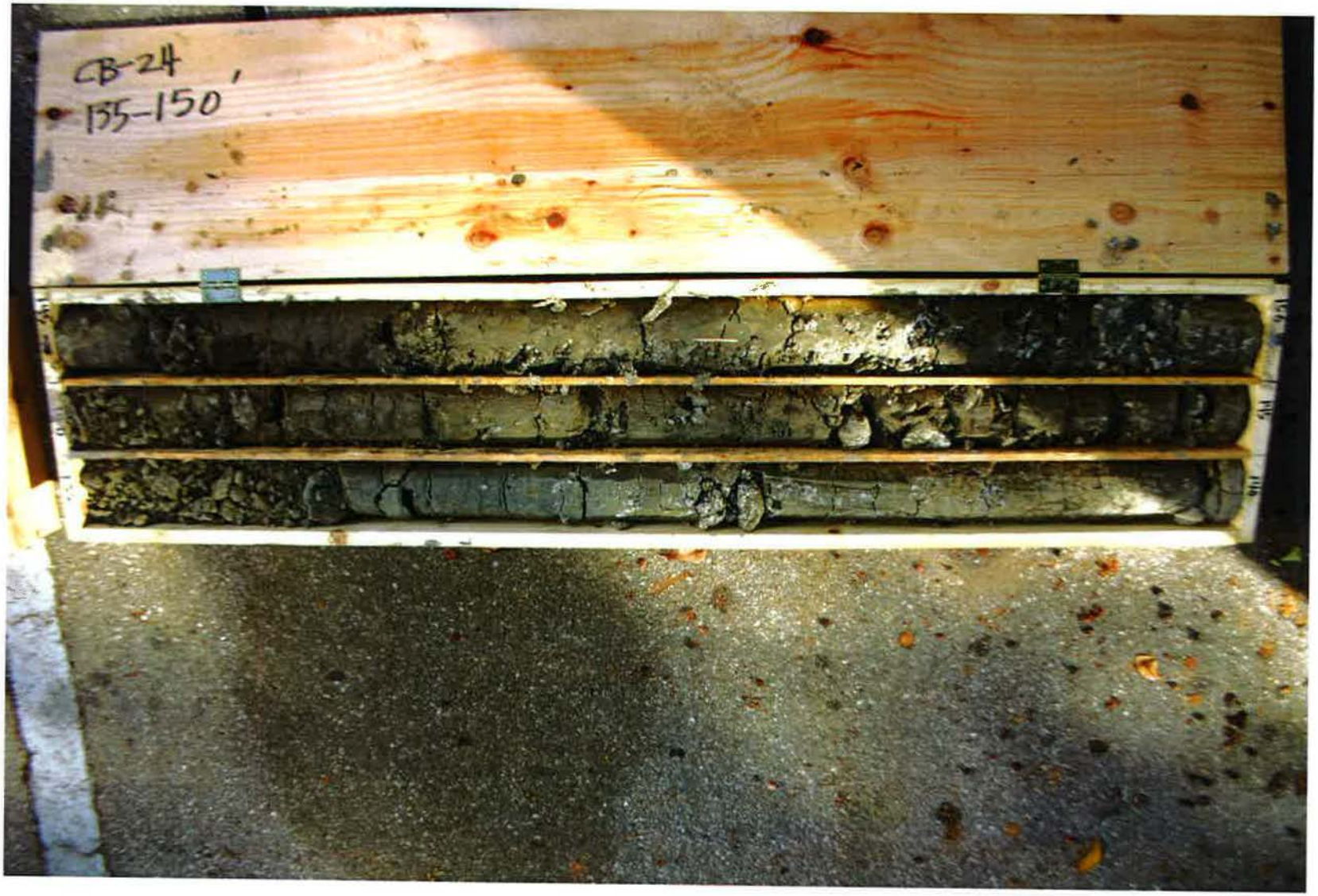
CB-24


CB-24
0-15
AC
AB
concrete


B-24
30-45


CB-24
0-10.5


CB-24
105-120'


CB-24
135-150'


CB-24
150-175
160-165-No recovery
167-170-No recovery
154-155 No recovery
172-175-No recovery
167
170

CB-25


CB-25
0-5'
Bkncore of

CB-25


CB-25
30-45


CB-25

CB-25
6-15


CB-25
113'-115'-No recovery

CB-26


CB-26
0-15
Begin Core @ 2 5'
8' to do recovery


CB-26
15-30


CB-36


CB-26
10-75'


CB-26
90-95
95-100 Varying
100-105 Varying
105-110 Varying
110-111- Slough

APPENDIX B

Sta. 2+00' to 2+40' (S wall):

Note marker bed MB-1 (top of bed noted by yellow green flag) shown nearly horizontally approaching the paleoslope face (slope contact noted by pink flagging). On this southern side of the FT-2 trench, the MB-1 paleosol's peds are not significantly rotated, because the slope is more gentle.

Sta. 2+00' to 2+40' (S wall):

See notes for photo to the left.

Sta. 2+00' to 2+10' (S wall):

Pink flagging delineates the boundary between the paleoslope and underlying old alluvium. Horizontal and vertical string lines form the grid along the south wall. The transition between the old alluvium, characterized by olive green silty clay and the reddish brown to dark brown overlying colluvium displays slightly rotated peds within the colluvium relative to the horizontal string line. Noted by the blue flags, the base of MB-1 peds are near vertical with respect to the string lines. The top of MB-1 is marked by the yellow green flagging.

Sta. 2+00' to 2+10' (S wall):

Photo depicts the base of MB-1 (base of bed marked by blue flagging) with near vertical ped development.

Project: 603314-008	**FT-2 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-1

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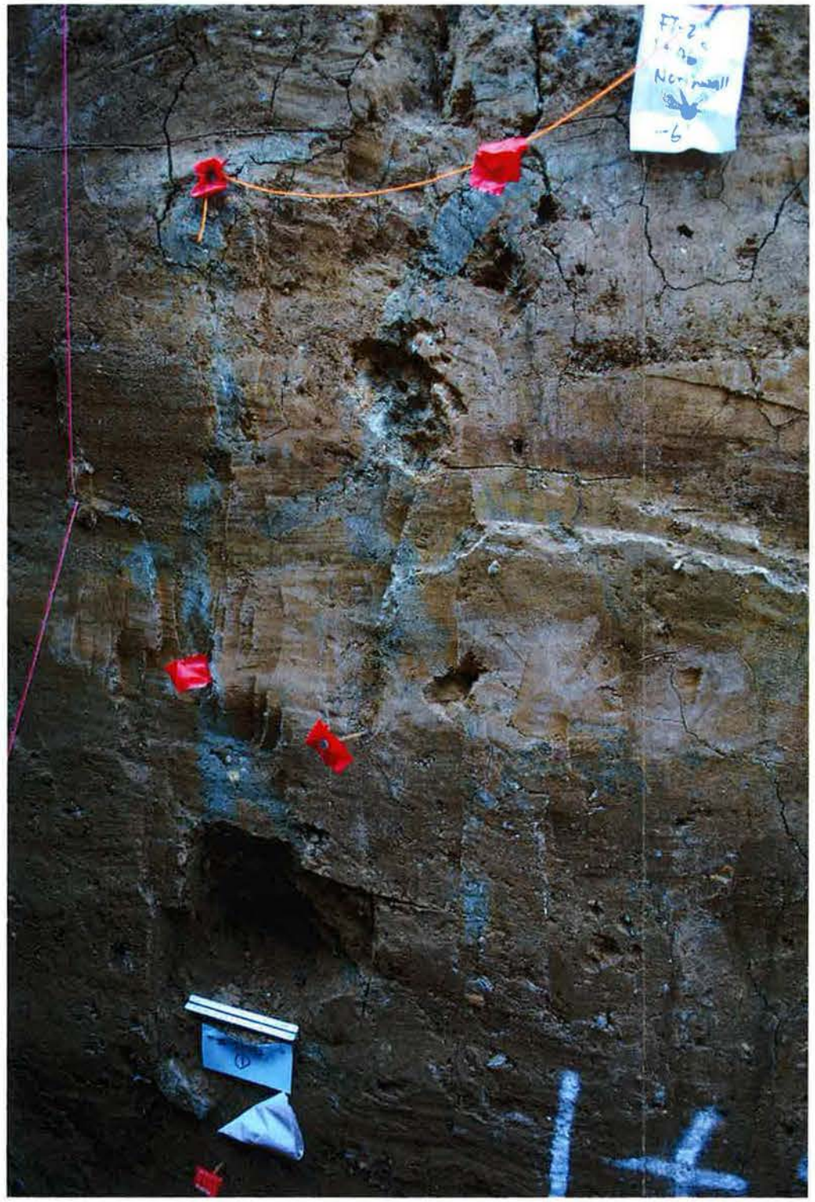
Sta. 2+05' to 2+13' (N wall):

Yellow green flagging marks the top of marker bed MB-1. Base of Benedict Canyon alluvium (paleoslope contact) is marked by pink flagging. Note how base of paleoslope contact descends down and through the old alluvium forming the buttress unconformity. String line in mid photo is horizontal.



Sta. 1+46.5' (north wall):

The clay filled crack trace is marked by red flags visibly observable as grey sinuous vertical and sub-horizontal zones due to oxygen depletion and dissolving of iron oxides. Note sample site 1a, b and c for microfabric analysis at approximately 9 feet below ground surface. The west crack is terminated at approximately 6 feet below grade. The eastern crack propagates upward into overlying gravel channel and does not offset base of overlying gravel channel.

Project: 603314-008	**FT-2 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-2

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Sta. 1+46.5' (north wall):

East crack trace marked by red flags as it propagates through base of the gravel channel. No offset of gravel channel was observed.

Sta. 1+46.5' (north wall):

Note termination of western crack marked by orange string line trending North 70°W. Eastern crack (red flagging) propagates upward through base of gravel channel (orange flagging) and does not offset base of channel.

Sta. 1+49' (south wall):

Red over blue flags indicates the base of a fluvial sequence which contains a crack that is not clay lined passing through unbroken sand and gravel lenses. Crack trend measured as N70°W is marked by the red flag. Crack died out when excavated horizontally into the fluvial sequence in the trench sidewall.

Project: 603314-008	**FT-2 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-3

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Sta. 1+50' (south wall):

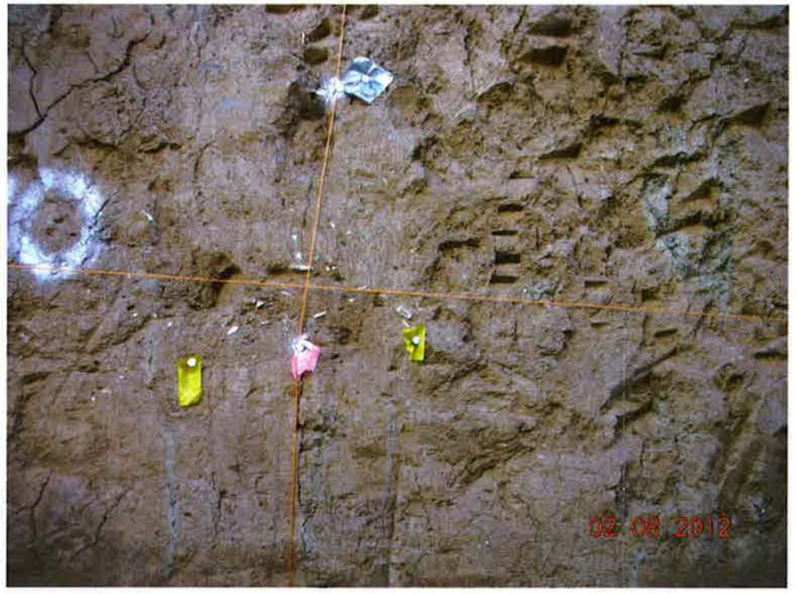
Red flag indicates the upward trend of the crack trending N35°W which was sampled for microfabric analysis. The channel to the right appears offset, a feature attributed to deposition rather than tectonic originated lateral offset. If gravel lens was offset the crack trace should be in contact with the west end of the channel. Microfabric analysis (Graham, April 2012) reports strongly oriented clay linings within tubular pores (illuviation ferrigargiilans) within these samples collected for microfabric analysis.

Sta. 1+53' (north wall):

Note gleyed crack marked by red flag in center of photo. Green flag denotes base of P3 layer. Crack offsets base of overlying gravel channel measured at approximately 1 ½-inches west side down. This crack is the northern continuation of the gleyed crack at Station 1+50 (N35°W) which was sampled for microfabric analysis (Samples 2 and 3, Graham, April 2012).

Sta. 1+75' (south wall):

Note the multiple unlined soil cracks some of which contain rootlet traces. Cracks penetrate upper fluvial sequence marked by blue flags and P2 layer in FT-2 marked by the white flag. No offset of units observed. See Plate 6 for detailed log.



Sta. 1+78' (south wall):

Yellow flags denote bottom of unbroken gravel pocket dominated by siltstone clasts. Gleyed crack marked by pink flag is truncated by gravel pocket. Cracks above gravel pocket are visibly unlined. Gleyed crack to the left of the gravel pocket becomes progressively less visible as you vertically approach the ground surface. See Plate 6 for detailed log.

Project: 603314-008	**FT-2 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-4

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Sta. 1+77' (south wall):

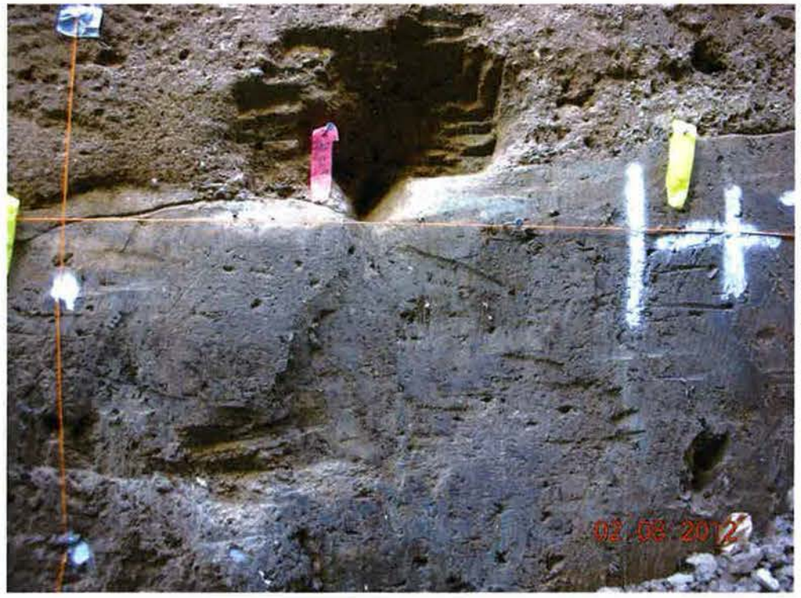
Gleyed crack marked by pink flagging. Crack visibly offsets P3 clay layer noted by blue flagging. Offset is west side down, paleoslope face to the left out of frame of view. Crack propagates downward through the top of the fluvial sands and gravels marked by the yellow flagging. See Plate 6 for detailed log.

Sta. 1+77' (south wall):

View is close up of offset of P3 clay layer approximately 1-inch west side down.

Sta. 1+77' (south wall):

Between 7 and 8 feet below grade. This is a continuation downward of the crack annotated above. Gleyed crack marked by pink flags is visible descending through fluvial unit. See Plate 6 for detailed log.



Sta. 1+77' (south wall):

Between 10 and 11 feet below grade. Crack noted by pink flagging was observed to descend downward into lower silty clay unit. Crack observed within lowest unit as a gradational difference of very fine sand and sandy clay along opposing sides of the crack. Crack no longer becomes visible near base of trench. See Plate 6 for detailed log.

Project: 603314-008	**FT-2 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-5

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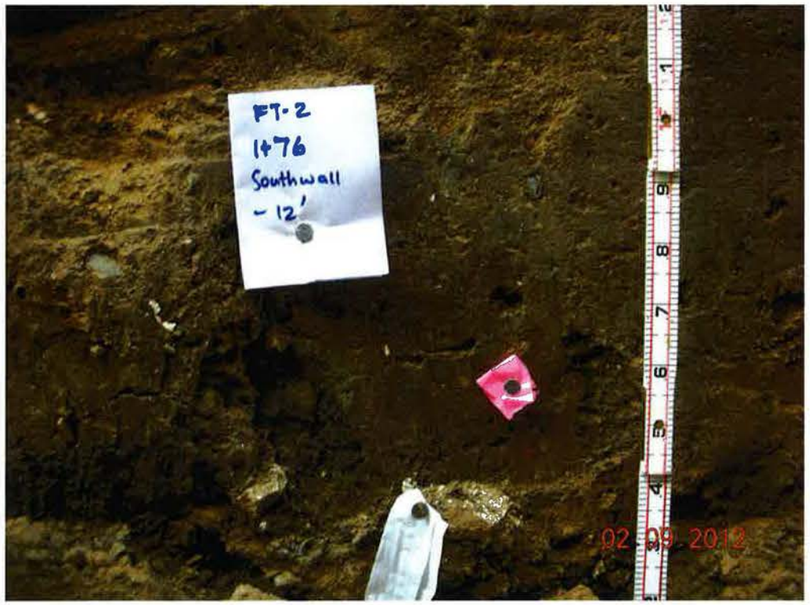

Sta. 1+76' (south wall):

Pink flag marks last visible occurrence of gleyed crack annotated above (Figure B-5). White flag marks siltstone rock fragments in a near horizontal line near the base of the trench. See Plate 6 for detailed log.

Sta. 1+73' to 1+76' (S wall):

Photo depicts P2 layer (Blue flags) offset by crack (pink flags) propagating downward through the top of the fluvial sequence (yellow flags) and entering into the underlying olive green silty clay (base of fluvial sequence noted by yellow flags). See Plate 6 for detailed log.

Project: 603314-008	**FT-2 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-6

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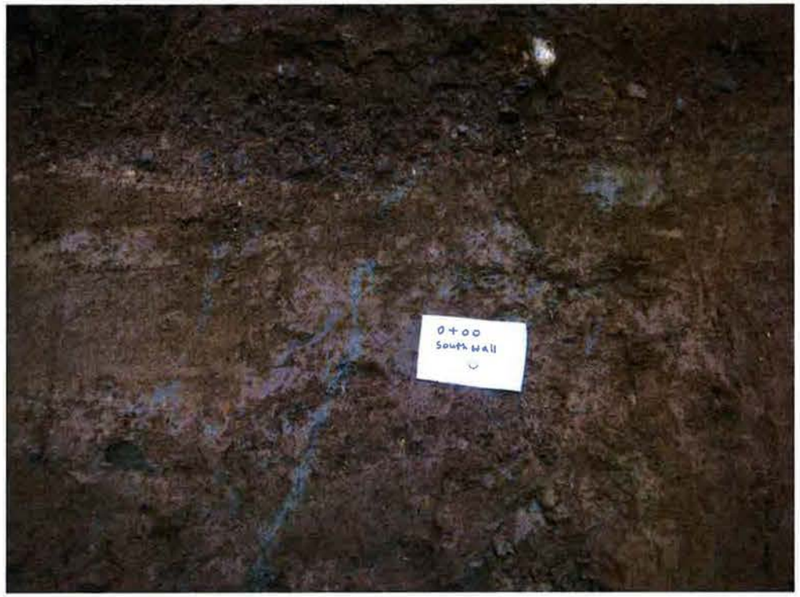

Sta. 0+00' (south wall):

Cracks extend into gravel bed (Unit No. 5), no offset noted. Paleo gravels are rounded, up to 4-1/2" in diameter, consisting of slaty gravels, granitic, sandstone, siltstone, note thin to 4" thick gleying in fine sand (Unit No. 6) below channel deposit.

Sta. 0+05' (east wall):

At 4.4' bgs, contact over paleochannel, note vertical gleyed cracks in abundance (Unit No. 4) do not extend into lower paleochannel (Unit No. 5).

Sta. 0+06' (east wall):

At 10' bgs, contact, paleochannel (Qal-BCW; Unit No. 5) over old alluvium (Qoaf; Unit No. 6). Base of channel represents an unconformity. Note horizontal glayed laminations in Unit No. 6.

Sta. 0+15.5' (east wall):

At 11' bgs, base of paleo-channel (Unit No. 5) underlain by several inches of very fine sand. Cracks in old alluvium (Unit No. 6) are truncated by Qal-BCW.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-7

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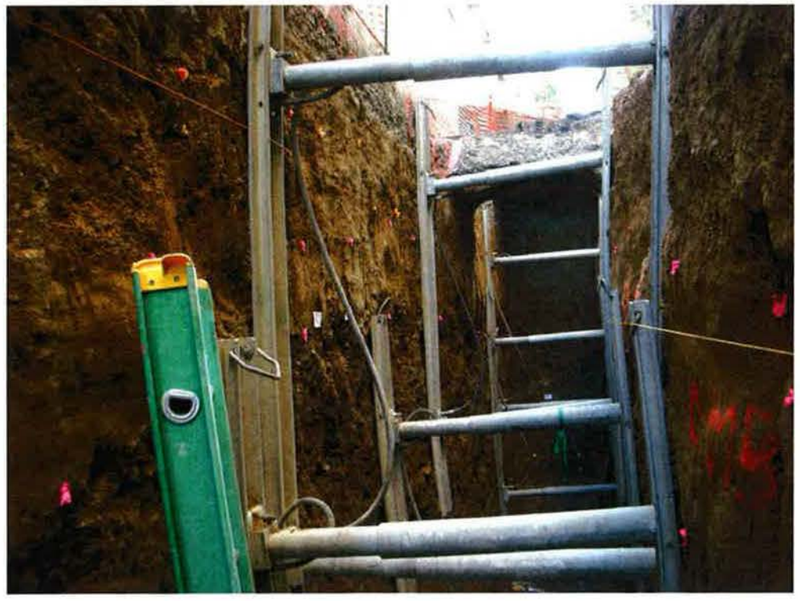
Sta. 0+20' & 0+21' (east wall):

Contact, top of paleochannel, cracks in Unit 4 (pink flags) confined to Unit 4 and overlying coarsening upward sequence, Unit 3a.

Sta. 0+26' (west wall):

Note the abundance of gleyed, sinuous soil cracks contained primarily within Unit No. 4 (Plate 5) interpreted as floodplain deposits capping paleochannel Unit No.5 (Plate 5). No offset along cracks or unit contacts is noted in this area. Cracks are not specific to the fault locations rather they are in abundance and are attributed to seismic shaking and/or paleo-liquefaction of the underlying channel deposit.



Sta. 0+28' to 0+00' (east wall):

Note pink flags delineating upper and lower boundaries of Unit No. 4 (Plate 5). Yellow over orange flagging above marks the artificial fill boundary.

Sta. 0+30' to 0+20' (east wall):

Silty thick bed of Unit No. 4 (Plate 5) is noted above and below by the pink flagging. Unit No. 4 is considered a floodplain deposit which caps the underlying paleochannel deposit. Unit No. 4 contains multiple sinuous, vertical gleyed cracks that for the most part are confined to this unit.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-8

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Sta. 0+30' (east wall):

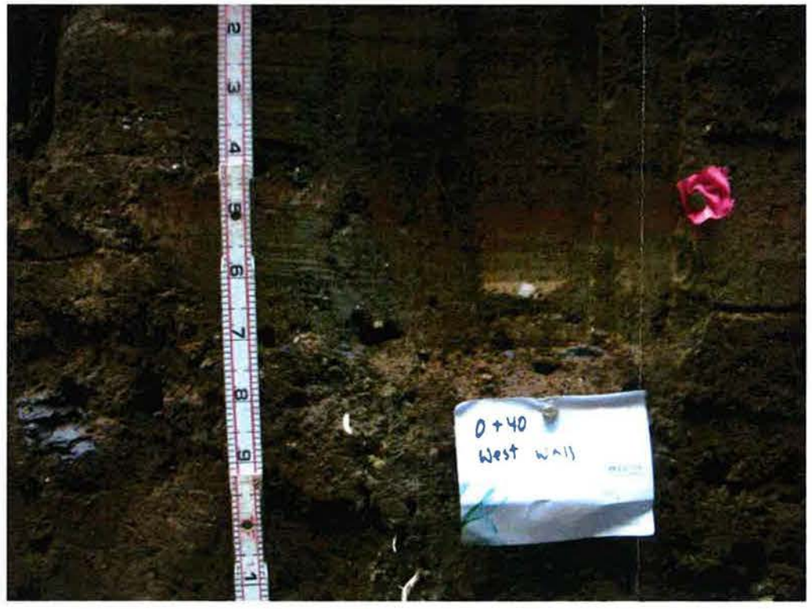
Contact, sand bed of Unit No. 3a, fine-grained, well-sorted, friable, overlying silty clayey sand to silty sandy clay of Unit No. 4 with circular, sand filled burrows and cracks truncated above.

Sta. 0+37.5' (east wall):

At 7.5' bgs, dark red clay (baked) defining base of Unit No. 4. Gravel beds below, note cracks through red clay that appear to not offset gravel beds.

Sta. 0+38' (west wall):

Note barely visible gleyed fault offsetting very thin bed of gravel with approximately 1-1/2 inches of offset north side down (Unit No. 6). Abundant gleying of material around on both sides of fault measured to strike N41°E and dip 67°N.



Sta. 0+40' (west wall):

Note gleyed crack several inches thick propagating through a reddish brown clay layer (baked clay) in Unit No. 4. No offset along the clay bed is noted.

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FT-5 Photos

Beverly Hills High School, 241 South Moreno Drive
Beverly Hills, California

Figure B-9

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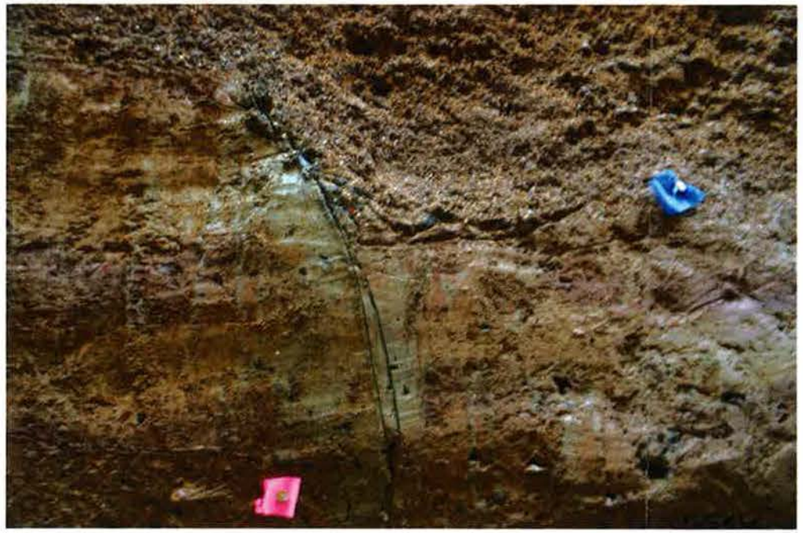
Sta. 0+41.5' (east wall):

At 10.5' bgs, sand bed, shows irregular cracks and roots, truncated above and below by gravels in Unit No. 5.

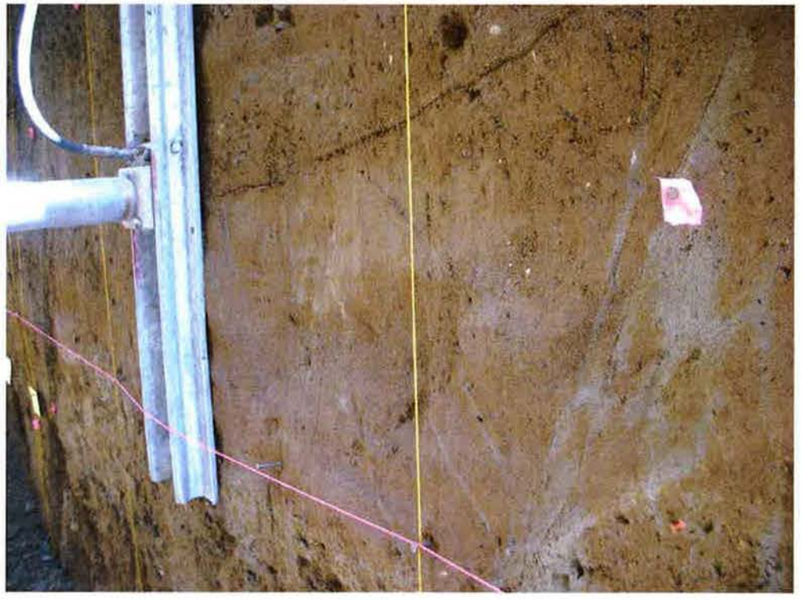


Sta. 0+43' (west wall):

Fault does not appear to offset the dark red clay bed of Unit No. 4 rather obscuring the clay with soil development and clay deposition. Fault is clearly truncated by the overlying sand bed of Unit No. 3a (Plate 5) the base of which is marked by the blue flagging.

Sta. 0+44' (east wall):

Photo depicts excavation into sidewall in areas of soil cracks above a well-defined fault trending N45°E,65°N in Unit Nos. 3 and 3a. Cracks are vertically discontinuous above the siltstone clast lying flat along its long axis approximately centered within the excavation. Yellow over orange flags marks the artificial fill contact.



Sta. 0+45' (east wall):

Note gleyed fault measured to trend N45°E, 65°N above the pink flag and N37°E,74°N at the bottom of the trench below the lower pink string line in Unit No. 5. Microfabric sample 0+47.7' (Plate 5) taken immediately to the left (north) of the fault. Microfabric sample 0+46.7' (Plate 5) taken of the fault near the bottom of the trench.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-10

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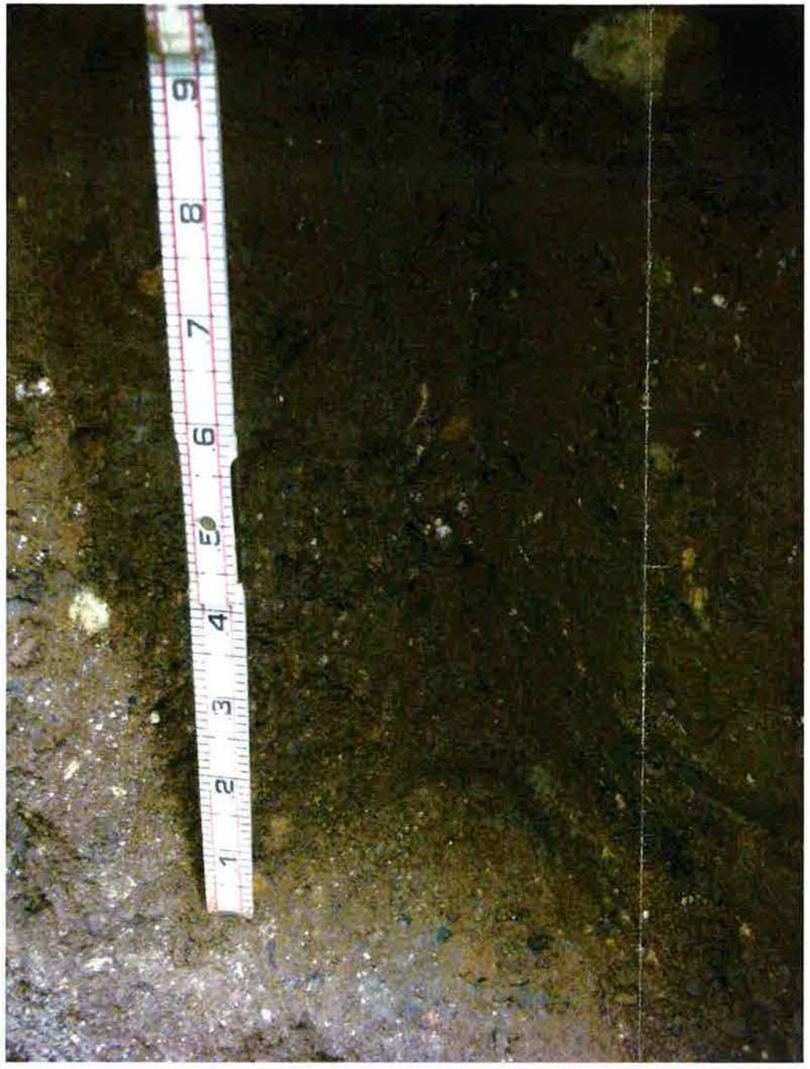
Sta. 0+44' (east wall):

Photo is close in of sidewall excavation. The cracks within this unit (3a) appeared to be truncated at a paleo surface defined by several siltstone rock clasts in a crude horizontal alignment marking the boundary between Unit Nos. 3 and 3a.



Sta. 0+44' (east wall):

See notes for photo to the left.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-11

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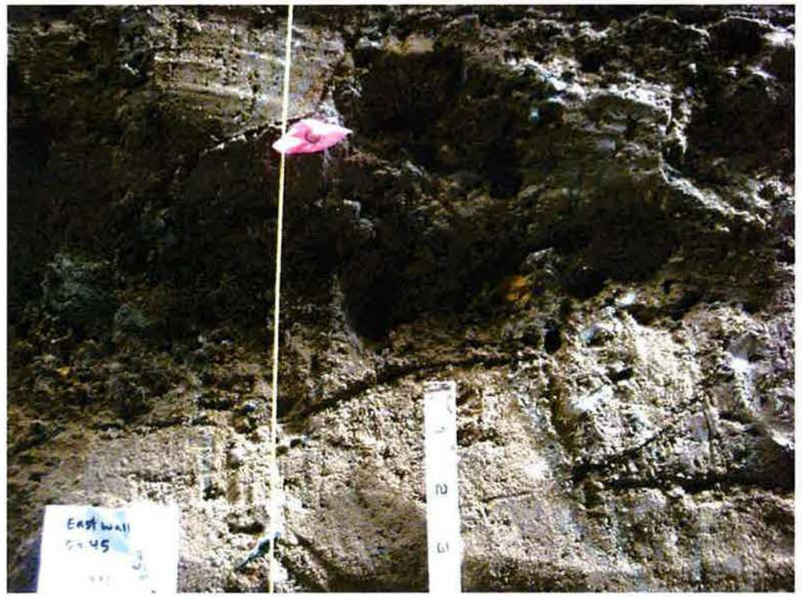
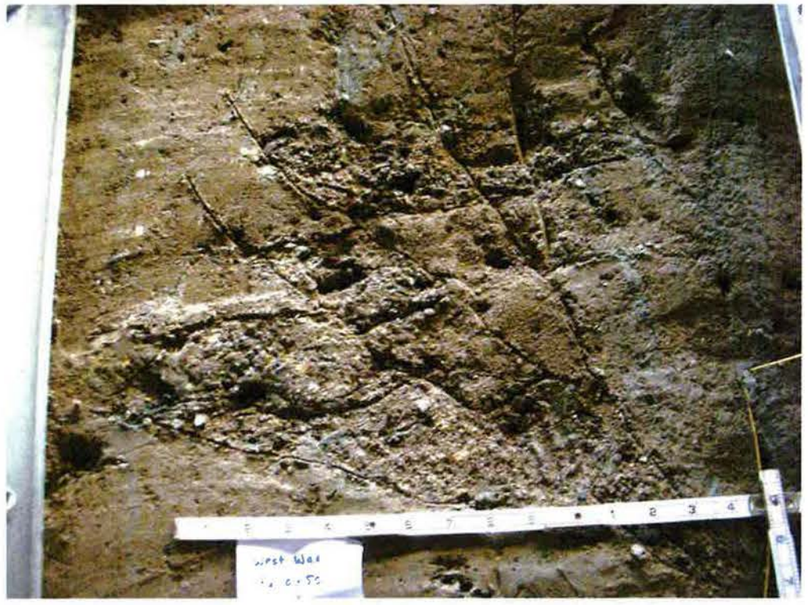


Sta. 0+45' (east wall):

At 10' bgs, grey cracks from fault (N37E,74N) appear to offset gravel base up to 2"-3". Gravel beds less distinct to north but are noted as gradational between finer sands.

Sta. 0+46.5' (east wall):

Fault (N37E,74N) microfabric sample taken of fault clay at bottom of trench. Grey material contains strongly oriented illuviation argillans in voids between sand grains. Clay linings are up to 0.5mm thick. Material adjacent to the fault had fewer clay linings.



Sta. 0+50' (west wall):

Note flower structure and apparent gravel lens offset. Main strand trends N35°E, 70°N and is located just to the right of this structure.

Sta. 0+50' (west wall):

Note flower structure of fault traces offsetting gravel lenses. Main trace of fault measured at base of trench trends N35°E, 70°N. This photo is shown without scarper marks for reference.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-12

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Sta. 0+51.2' (east wall):

Fault, note gravel infill and thick clay development on footwall (microfabric sample). Red flag denotes fault centerline. Infilling material contained intact clay linings up to 0.3mm thick.

Sta. 0+51.2' (east wall):

Photo of microfabric sample 0+51.2 (Plate 5) taken of fault measured to trend N37°E,64°N. Fault centerline is marked by the red flag.

Sta. 0+52' (east wall):

Fault (N37E,64N) offsets gravel channel north side down, top of gravel beds at 2.4' bgs. Blue flagging denotes base of offset gravel channel deposit. Red flag denotes approximate fault contact. Fault not readily visible due to strong overprinting during soil development.

Sta. 0+52' (east wall):

Photo depicts offset channel. Base of upper channel is marked by green flagging. Fault trace, which has been overprinted with clay development, is barely visible as gleyed trace within the sand channel to the north of the fault. Fault trends N37°E,64°N

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-13

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Sta. 0+53' (east wall):

Photo represents excavation into sidewall of trench near surface along vertically discontinuous gleyed cracks above a fault segment trending N37°E, 64°N observed by Leighton and CGS representatives. Cracks trend through but do not offset paleosol (Soil 1 of ECI; Unit No. 2 of this report).

Sta. 0+54' (west wall):

Note base of channel deposit marked by green and blue flags appears offset along a flower structure measured along the main strand as N43°E dipping 80°N.

Sta. 0+55.5' (east wall):

Photo shows excavation into sidewall of trench along gleyed crack previously thought to continue uninterrupted to the ground surface. Cracks were not visible within new excavation indicating fault does not penetrate overlying paleosol (Soil 1 of ECI; Unit No. 2 of this report).

Sta. 0+56' (west wall):

Photo looking north along the west wall. Base of channel (green and blue flags) is Unit No. 3a overlying Unit No. 5 (Plate 5). Flower feature noted above is just slightly to the left of view near the shore in the left hand corner of the photo.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-14

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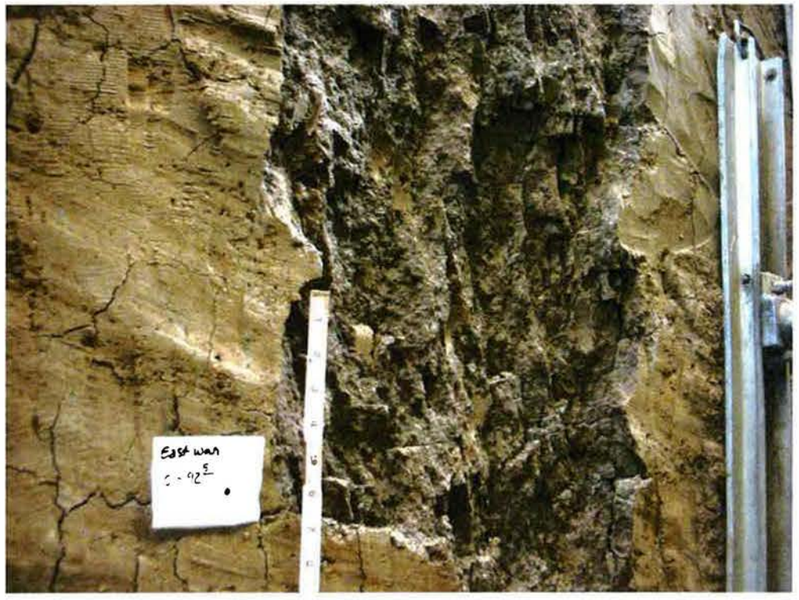
Sta. 0+67.5' (east wall):

Sand bed truncated by channel incision (Unit No. 3). OSL 19 & 20 taken within this approximately 1' thick layer, Unit No. 3a.

Sta. 0+70' (east wall):

The orange over blue flagging at the left marks the contact between Unit No. 1 and 2 (Plate 5). Note well developed prismatic blocky structure of Unit No. 2 (ECI Soil 1).



Sta. 0+92.5' (east wall):

At 2.5' below upper string line. Well developed paleosol, Unit 2, columnar structure, dark reddish brown to grey, blocky, 2-1/2" to 3" blocks interrupted by horizontal faces, rare siltstone clast, subangular, highly weathered gleying of ped faces, discontinuous abundant gleyed streaks, waxy to polished ped faces.

Sta. 0+97' (east wall):

Note very fine grained white sand filling of cracks within fluvial Unit No. 1 (Plate 5). Sand filled crack is truncated at erosional contact with underlying silty sandy clay paleosol. Paleosol (Soil 1 of ECI) is olive green to reddish brown and heavily stained with manganese. Paleosol is very porous with sand filling of pores.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-15

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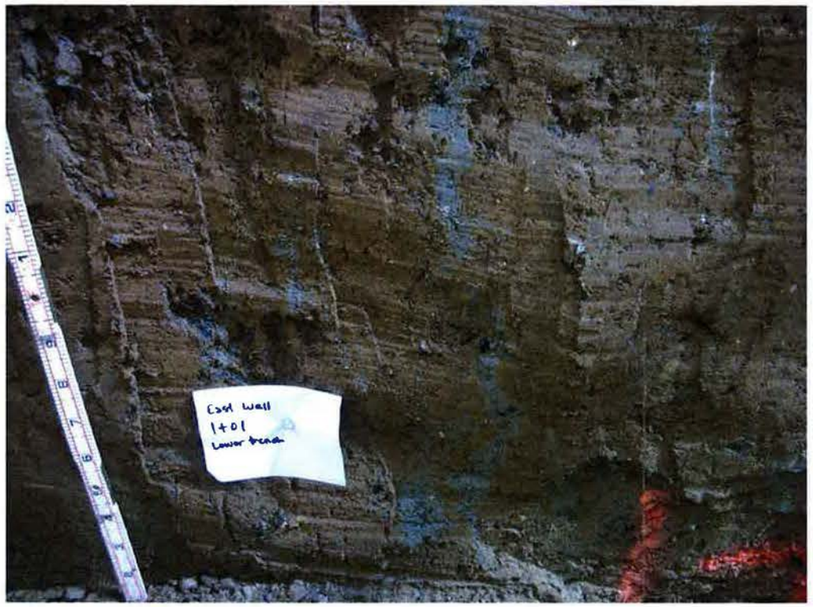
Sta. 0+97.5' (east wall):

Lower trench, 2" wide crack gleyed with CaCO3 infill, does not offset lower 5" thick gravel bed, dies out upward into paleosol (Soil 1 of ECI, Leighton Unit No. 2). Cracks in this area are well filled with clay development along CaCO3 core and are vertically discontinuous (Unit No. 3a).



Sta. 1+01' (east wall):

Series of near vertical discontinuous cracks with CaCO3 core in Unit No. 3, surrounded by translocated clay infill, dipping 57-60 degrees to the south. Lower cracks dipping 75-80 degrees to the south.

Sta. 1+04' (east wall):

Gleyed cracks extend upward to silty sand of Unit No. 1, where they are truncated. Cracks trend approximately N25E, dipping 70 degrees to the south. Cracks shown span lower Unit No. 2 into Unit No. 3.

Sta. 1+05' (east wall):

Above lower stringline, clayey crack feature (N25E,70S), root lined, disappears vertically into paleosol (Unit No. 2), peds dipping 70-75 degrees to the south.

Project: 603314-008	**FT-5 Photos**	Figure B-16
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	

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Sta. 1+12.5' (east wall):

Sand lense in Unit No. 1. Sand above dark brown erosional contact shows near vertical cracks of varying width, truncated below. Material below contact shows greater clay component. SM-ML is friable and discontinuous, lateral gradations occur frequently.

Sta. 1+20' to 1+10' (E wall):

Note the base of the clay beds within Unit No. 1 marked by the yellow flags correlated to the west wall.

Sta. 1+15' to 1+25' (E wall):

Note light brown color of Unit No. 1 (Plate 5). Unit contains two, dark blackish to olive brown thin beds of silty clay base of which is marked by yellow flags. Clay bed strikes N60°E dipping 4°N. This unit has been OSL dated (OSL sample No. 21) at approximately 64,500 ± 7,300. Unit is interpreted to be floodplain deposit correlating to closely to Geocon/Feffer Unit No. 4.

Sta. 1+15' to 1+25' (W wall):

See notes for photo to the left.

Project: 603314-008	**FT-5 Photos**	
Date: December 2012	**Beverly Hills High School, 241 South Moreno Drive** **Beverly Hills, California**	Figure B-17

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APPENDIX C

Earth Consultants International

April 10, 2012
ECI Project No. 3205.02

To: **Hill Farrer & Burrill, LLP**
300 South Grand Avenue, 37th Floor
Los Angeles, California 90071-3147

Attention: **Mr. Kevin Brogan, Partner**

Subject: **Soil-Stratigraphic Studies for Beverly Hills High School, 241 Moreno Drive, Beverly Hills, California**

Dear Mr. Brogan,

Earth Consultants International (ECI) was retained by your firm to conduct a third-party review of the geological work conducted by Leighton Consulting, Inc. (Leighton) at and in the vicinity of the Beverly Hills High School. Part of the work performed included the review of the soils exposed in the trenches and one of the borings emplaced at the high school for the purpose of estimating the age of the sediments that underlie the site. Understanding the regional depositional history of the geologic materials is critical in developing an appropriate interpretation of the tectonic framework for the area, including the nature and recency of activity of faults and folds that have been either observed or inferred from the subsurface work done to date. This letter report summarizes our work estimating the age of the deposits exposed in two trenches and one boring.

Our analysis of the soils reviewed indicates that most of the high-school site sits on an older, geomorphically stable alluvial fan surface. The near-surface soil that has developed on these older alluvial fan deposits has characteristics that indicate that it has been exposed to soil forming processes for a minimum of about 70,000 years, and probably more than 100,000 years. Given that the upper portion of this soil has been removed and that the top section is now undergoing leaching of its clay fraction, these age estimates are considered minimum values.

This near-surface soil is underlain by a sequence of soils developed in alluvial fan and fluvial sediments that overlie marine sands assigned to the San Pedro Formation. Eight buried soils were described in boring CB-3, indicating that there were several periods of soil formation in between periods of alluvial deposition (and probably erosion). By adding the ages of all of the soils described in the boring, we can estimate the minimum age of the entire alluvial sequence, and thus the absolute minimum age of the San Pedro Formation in this area. The soil age estimates indicate that the alluvial sequence is at a minimum between about 530,000

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and 1.3 million years old, depending on the soil age regression curves used. We prefer the first age estimate of 530,000 years, recognizing that this estimate represents only the length of time it took for the various soils to form, and does not account for the length of time it took for the alluvial sediments to be deposited. Other soil-stratigraphic studies to the east of Beverly Hills High School, in the West Hollywood area at the base of the Hollywood Hills, have yielded similar ages of between about 400,000 and 900,000 years for the buried soils – alluvial fan sequence that overlies a marine abrasion platform observed in several borings.

The eastern portion of the campus, below the main escarpment just west of Moreno Drive, is underlain by younger alluvial sediments deposited in the channel of Benedict Canyon Creek (also referred to locally as Moreno Creek), a drainage that incised into the older deposits described above. Three soils developed in younger alluvial deposits were observed and described at the east end of trench T-2. The first (youngest) of these soils has an estimated age of between about 9,500 and 12,500 years. The second soil exposed in the trench is estimated to have been exposed at the surface for about 11,000 years, and the third soil is estimated to have been exposed to soil-forming processes for between about 16,000 and 28,000 years prior to burial. Combining the age of all three soils yields a minimum age for the alluvial sediments exposed in this trench of between about 36,500 and 51,500 years.

Thank you for the opportunity to assist the Beverly Hills School District and your firm with this study. Should you have any questions regarding our attached report, please do not hesitate to contact the undersigned.

Respectfully submitted for
Earth Consultants International, Inc.

Tania Gonzalez, CEG 1859
Vice-President

Soil-Stratigraphic Studies for Beverly Hills High School

BACKGROUND

The term soil as used herein refers to a natural body consisting of layers (or horizons) of mineral and/or organic material that are different from the underlying geologic material in their "morphological, physical, chemical and mineralogical properties and their biological characteristics" (Birkeland, 1984). These differences are the result of weathering and the effects of five main soil-forming factors: parent material, climate, slope or topography, organisms, and time (Jenny, 1941). Time is an important factor because the longer a geologic deposit is exposed to the effects of weathering and soil formation, the better developed the soil characteristics become. We take advantage of this factor when using soils to estimate the age of the deposits.

Soil development occurs on stable geomorphic surfaces (a stable surface is one that is not being impacted by deposition or erosion). Soil development typically starts to occur as soon as a surface stops being eroded or deposited on. In some environments, such as an alluvial plain or alluvial fan, it is not uncommon to find several weakly to moderately well developed buried soils that rest one upon the other, sometimes separated by unaltered sediments (the parent material). The soils represent periods of sub-aerial weathering and soil formation that occurred in between periods of alluvial erosion and deposition. In these environments, the age of the underlying primary deposits is best estimated by summing the age of the individual overlying buried soils. Soil age estimates provide a minimum age for the deposits that the soils formed into, especially in depositional environments where short periods of soil formation occur in between erosional and depositional events.

Furthermore, portions of soil horizons and sometimes even entire soil horizons may be removed (truncated) from the area by erosion during floods or mudflow scour, further limiting the reliability of soils as indicators of the age of the geological deposits that the soils formed into. Nevertheless, if these limitations are recognized and taken into account, soils developed in active fluvial or alluvial fan environments can provide useful information. In areas where suitable datable materials, such as charcoal, are not available, or where the age of the sediments extends beyond the useful range of radiocarbon dating, soil-age estimations are particularly useful.

SCOPE OF WORK and METHODOLOGY

For the Beverly Hills High School project, we were tasked with estimating the age of three near-surface soil profiles exposed in two of the trenches excavated by the Leighton Consulting Group. We were also retained to describe a sequence of soils observed in the core from geotechnical boring CB-3 that exposed, at depth, marine sediments assigned to the San Pedro Formation. By estimating the cumulative age of the soils developed in the alluvial and alluvial fan deposits overlying the San Pedro Formation sediments, we can obtain a minimum age for the marine sediments at this location, and thus an understanding of the geological history of the area.

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We described the soil profiles according to the characteristics and nomenclature set forth by the Soil Survey Staff (1975, 1992) and Birkeland (1984, 1999). Colors of the soil horizons and parent materials were recorded using a Munsell Soil Color Chart. We looked for, among other characteristics, the amount and thickness of translocated clay and silt, the presence of clay films or stains on soil ped faces and clasts and in between sand grains (referred to as bridges), the color (reddening) of the soils, and the looseness or induration of the sediments.

Soil development index (SDI) values were calculated for the soil profiles based on the field descriptions using a modified version of the Harden (1982) index, and the maximum horizon index (MHI) of Ponti (1985). Both SDI and MHI values have been shown to be useful relative indicators of age when comparing soils developed in similar parent materials under similar climatic conditions (Bornyasz and Rockwell, 1997; Rockwell et al., 1990; Rockwell et al., 1984; Harden, 1982). Minimum age estimates for the deposits were made by comparing the SDI and MHI values obtained at the site with those of dated regional soils developed under similar conditions (Dolan et al., 1997; Dolan et al., 2000, and the soil age regressions referenced therein).

The soil profiles described are summarized as follows:

1. Profile 1: On the south wall of Trench T-1 at station 0+44, on the dissected alluvial fan to the west of the main escarpment that extends through the campus.

2. Profile 2: On the south wall of Trench T-2 at station 2+70, near the base of the east-facing scarp that extends in a northerly direction across the front of the school, near Moreno Road.

3. Profile 3: On the north wall of Trench T-2 at station 3+45, farther east than Profile 2 above. Like Profile 2, this one exposed a younger alluvial section underlain by two older alluvial packages.

4. Profile 4: The soils exposed in boring CB-3. This boring was drilled to a depth of 120 feet. Soil descriptions were made to a depth of 80.5 feet (24.5) meters, to the top of the sand assigned to the San Pedro Formation (Qsp1). Nine separate soils were identified in the alluvial section described. The soils varied in their degree of development and thickness.

Summarized soil descriptions for these profiles are provided in Table 1. The complete soil descriptions for each of these profiles are included as Appendix A. The soils exposed in Trench T-3 were reviewed but not described because the soils therein have been modified, limiting our ability to obtain a representative age for the geologic materials. Specifically, the uppermost soil horizons in that area appear to have been removed, and the underlying soil horizons exposed in the trench had been leached. Both of these conditions would yield much lower age estimates. The soils in Trench T-1 were better preserved and thus deemed to provide a much better age estimate for the geomorphic surface upon which a large portion of the school is founded.

FINDINGS

The soil profiles and depositional materials reviewed and described for this project can be separated into two groups, as follows:

1. The soils described in Profiles 2 and 3 developed in relatively young alluvial sediments deposited as fill in the channel of Benedict Canyon, a drainage that incised into the older alluvial sediments described in Trench T-1 and boring CB-3. The soils described in Profiles 2 and 3 (and in the eastern end of the trench T-2) indicate that the near-surface sediments in this area of the high-school campus consist of younger alluvial deposits underlain by two older alluvial packages.

   Soil development in each of these alluvial packages indicates a hiatus in deposition between each section, allowing for soil development to occur before the next, overlying alluvial sediments were deposited. The age estimates developed for the older alluvial packages are minimum age values given that these ages represent only the length of time that the sediments and soils were exposed to soil-forming processes at the surface. The age estimates based on degree of soil development do not provide data on how long it took for the alluvial sediments to be deposited, nor does it account for any periods of infilling and cutting that are no longer preserved in the section. The entire section is younger than the sediments exposed in trench T-1 and boring CB-3.

2. Soil Profile 1 (from Trench T-1) and the soils sequence in boring CB-3 developed in older alluvium, with the near-surface soil in both of these exposures having been exposed to soil-forming processes for a long time. Specifically, Trench T-1 exposed a soil with 7.5YR to 5YR hues, strong coarse to very coarse angular blocky structure, and many moderately thick clay films on ped faces, bridging grains and in pores. The uppermost horizon preserved in the trench, under artificial fill, consists of an incipient E horizon that is forming at the expense of the argillic horizon below. The overlying A horizon has been removed, most likely during construction of the school. The age estimates developed for this profile using soil development indices are considered minimum values given that the soil is truncated and it is currently undergoing leaching of the illuviated clay.

   The uppermost soil described in boring CB-3 is correlative with the soils exposed and described in Profile 1, as this boring was emplaced near the east end of Trench T-1, but the soil in the boring exposed a thicker argillic section and extended to a depth of 4.72 m (15.5 ft), deeper than the bottom of trench T-1. The E soil horizon observed in trench T-1 was not observed in the core of boring CB-3, possibly in part because the upper 2 feet of the boring were not recovered.

   Altogether, the soils in boring CB-3 consist of a stacked sequence of weakly to well-developed soils that rest one upon another, separated by slightly altered to unaltered alluvial fan or fluvial sediments (the parent material). The soils represent periods of sub-aerial weathering and soil formation that occurred in between periods of alluvial erosion and deposition. The entire sequence of stacked soils combined provides a minimum age for the underlying marine sediments assigned to the San Pedro Formation. The buried soils (starting with the second soil) described in boring CB-3 are summarized in the following paragraphs.

The second soil described exhibits a thick argillic section (1.73 m; 5.7 ft), 7.5YR hues, and common to many moderately thick clay films bridging grains. The third soil down the section is thin (69 cm; 27 inches) and less well-developed, with 10YR to 7.5YR hues, few thin clay films on ped faces and many thin clay films bridging grains. The fourth soil, which began at a depth of 7.37 m (24.2 ft), is very well developed, with a 2.05 m (6.7 ft) argillic section, colors in the 7.5YR to 5YR hues, common to many clay films on ped faces, and many to continuous clay films bridging grains. The fifth soil is relatively thin and weakly developed, with only an 18-cm (7-inch) thick argillic section preserved, 10YR hues, and common to many thin clay films on ped faces and many moderately thick clay films bridging grains. Some of these clay films are probably the result of overprinting, whereby clay from the overlying, much better developed soil moved down into this soil.

The sixth soil in the sequence is also relatively thin, with an argillic section only 40 cm (15.7 inches) thick, but the 7.5YR hues and many to continuous moderately thick clay films bridging grains and many thin clay films on ped faces suggest that this was a well-developed soil of which only the bottom part of the profile remains. The argillic section is underlain by a 4.37 m (14.3 ft) thick section of oxidized parent material with 7.5YR Bt lamellae, each 5 to 13 cm (2 to 5 inch) thick. The seventh soil, by contrast, has a well-developed, pedogenic clay-rich argillic section 145 cm (4.75 ft) thick with 10YR-7.5YR hues and 5YR mottles. This soil also has strong angular blocky structure, many moderately thick clay films on ped faces, common to many moderately thick clay films bridging grains, and few scattered calcium carbonate nodules. The eight soil consists of a thick (1.63 m; 5.4 ft) argillic section with 2.5Y to 10YR hues, 7.5YR mottles, and many moderately thick clay films. The ninth (and last) soil in the section has a 53-cm (21 inch) thick argillic section with calcium carbonate nodules and stringers.

Table 1: Soil Descriptions
Soil Profiles Described at Beverly Hills High School

	Depth (cm)	Thickness (cm)	Texture	Color		Structure	Consistency				Clay Films	Comments
				Moist	Dry (sm = slightly moist)		Dry	Moist	Wet	Wet		
Soil Profile 2 - Trench T-2												
2A/Btj1	50 - 98	48	CL	10YR 2/2	10YR 4/3 & 3/2	3f-mabk	so	fr-sfi	s	p	2npf, 3npo	
2Btj2	98 - 123	25	SCL	7.5YR 3/2	10YR 4/3& 3/3, 7.5YR 3/2	2mabk	so-sh	fr-sfi	s	p	1npf, 3mkpo	
2Bt	123 - 141	18	CL-C	10-7.5YR 3/2	10YR 4/3 & 7.5YR 3.5/2	2f-mabk	h	sfi	s	p-vp	2mkbr, 2npo, 2n&1mkpf	
3Ab	141 - 155	14	CL-C	10YR 3/2	10YR 4/3	2msbk		fr	s	p-vp	no clay films	
3BCb1	155 - 179	24	SC-C	7.5YR 3/2	10YR 4/3	1fmsbk		vfr	vs	p-vp		
3BCb2	179 - 237	58	CL	7.5YR 3/3	10YR 4/3	1fmabk		fr	s	p	2nst	
4Btb1	237 - 278	41	gC	7.5YR 3/2 & 3/3	10YR 4/4	3cabk	eh	efi	vs	vp	3mkpf&po, 2mk&3nbr	
5BClam1	278 - 293	15	SCL & SC	7.5YR 3/2 & 3/4	10YR 4/4 & 3/4	m-2mcabk	lo-so & sh	vfr & sfi	s & vs	p & vp	3n-mkpf, 3nbr	
6BCb3	293 - 304	11	siC	10YR 3/3, 3/4 & 7.5YR 3/2		m		fr	s	p-vp	2nst, 3mkcl	
7Btb2	304 - 329	25	gSC	7.5YR 4/4, 3/3 & 3/2		2m-cabk		fr	vs	p	3npf, 3npo, 3mkbr	
7BCb4	329 - 350	21	SL-SCL	7.5-10YR 3/4		sg, 1f-msbk		lo-vfri	ss	sp	2nst, 3mkpo	Moist when sampled and described
7BClam2	350 - 371	21	SCL & C	10YR 3/3 & 7.5YR 3/4		sg & 2cabk		vfr	s	p	3npf&po, 3mkbr	
8Clam1	371 - 388	17	gSL-SCL	10YR 3/3 & 7.5YR 3/2		sg & 2f-msbk		lo & vfr	ss & vs	sp & sp	3mkpf&po, 2-3mkbr, 4ncl	
9Cox1	388 - 401	22	SL - SiL	10YR 3/3		sg		lo-vfr	ss	np		
10Clam2	401 - 416	15	SiL	10YR 3/4 & 7.5YR 3/2		m		lo-vfr	ss-s	np	3npf	
10Cox2	416 - 440+	24	SCL	10YR 3/3		m		vfr	ss	p	3npo	
Soil Profile 3 - Trench T-2												
A/Btj1	25 - 41	16	CL	10YR 2/2	7.5-10YR 3/2	2msbk	h	fi-vfi	s	p-vp	3ncl	
Btj2	41 - 65	24	CL-C	10YR 3/2 & 10YR 3/2	10YR 5/4	2cabk	vh-eh	efi	vs	p-vp	4mkpo	
2Ab1/2Bt1b	65 - 88	23	C	10YR 2/2	10YR 3/2	2mabk-2fabk	vh	vfi	vs	vp	3nst	
2Btb2	88 - 114	26	C	10YR 2/2	10YR 3/3& 2/2	3cabk	vh	vfi	vs	vp	3n&2mkpf, 2mkpo	
3Ab2	114 - 161	47	CL-C	10YR 2/2		2f-mabk - 2cabk	so-sh	fr	s-vs	p	no clay films	
4Btb3	161 - 193	32	C	7.5YR 3/2	7.5YR 3/1 & 3/2	3m-cabk	eh	efi	vs	vp	3mkpf, 4mkpo, 3-4mkbr	
4Btb4	193 - 230	37	C	7.5YR 3/2	7.5YR 3/1& 3/2	3vcabk-3mpr	eh	efi	vs	vp	3n-mkpf, 3mkpo&br	
4Btb5	230 - 260	30	C	10YR 3/3 & 7.5YR 3/2	7.5YR 3/3	3c-vcabk-pr	so-sh	fri	s	p	3mkpf&br, 4mk-kpo	
4BCb1	260 - 297	37	SCL	7.5YR 3/2.5	7.5YR 4/4 & 3/2 sm	2cabk-pr, 3mabk	so-sh	fri	s	sp	2mk&3npf, 3npo, 2-3ncl, 3n-mkbr	
4BCb2	297 - 315	18	SiCL - SiC	7.5YR 3/3& 3/2.5	7.5YR 4/6	2mabk	so-sh	fri	s	p-vp	1-2npf	charcoal sample collected
4Cb1	315 - 367	52	SC - SCL	10-7.5YR 3/3	10-7.5YR 3/4 sm	2mabk		fr	s	p	2npo&st	
4Cb2	367 - 385	18	SCL	7.5-10YR 3/3	7.5-10YR 4/4 sm	1-2fsbk		fr	s	sp-p	1st	
5Cb3	385 - 397	12	S	10YR 3.5/2	10YR 5/4	sg	lo	lo	ns	np	no clay films	
6Cb4	397 - 437+	40	gS	10YR 3/4	10YR 3/3	sg & 1m-cabk	lo-so	lo-vfr	ns	np	no clay films	charcoal and OSL samples collected

ABBREVIATIONS
TEXTURE: g = gravel or gravelly; S= sand; LS = loamy sand; SL = sandy loam; L = loam; SCL = sandy clay loam; SC = sandy clay; CL = clay loam; Si = silt; SiL = silt loam; SiCL = silty clay loam; SiC = silty clay; C = clay. **STRUCTURE**: **Grade**: 1 = weak; 2 = moderate, 3 = strong. **Class**: 1f = very fine, f = fine, m = medium, c = coarse; vc = very coarse. **Type:** m = massive; sg = single-grained; gr = granular, cr = crumb, abk = angular blocky, sbk = subangular blocky, pr = prismatic. **CONSISTENCY**: **Dry**: lo = loose, so = soft, sh = slightly hard, h = hard, vh = very hard, eh = extremely hard. **Moist**: lo = loose, vfr = very friable, fr = friable, fi = firm, vfi = very firm, efi = extremely firm. **Wet**: ns = non-sticky, ss = slightly sticky, s= sticky, vs = very sticky; np = non-plastic, sp = slightly plastic, p = plastic, vp = very plastic. **CLAY FILMS: Abundance:** v1 = very few, 1 = few, 2 = common, 3 = many, 4 = continuous. **Thickness**: vn = very thin, n = thin, mk = moderately thick, k = thicK. **Location**: st = stains, cl = on clasts or clast pockets, po = in pores, br = forming bridges betweeen grains, pf = on ped faces.

Table 1: Soil Descriptions
Soil Profiles Described at Beverly Hills High School

	Depth (cm)	Thickness (cm)	Texture	Color		Structure	Consistency				Clay Films	Comments
				Moist	Dry (sm = slightly moist)		Dry	Moist	Wet	Wet		
Soil Profile 1 - Trench T-1												
Ej	11 - 35	24	CL	7.5YR 3/2	10YR 4/4	m-2fmabk	h	fi	ss-s	sp-p	3-4npo, 2-3nbr	
Bt1	35 - 97	62	C	5YR 3/2	5YR 3/3	3c-vcabk	eh	efi	vs	vp	2kpf, 3npf, 4mkpo	
Bt2	97 - 145	48	SC	5YR 3/4 & 2.5Y 3/1		3cabk-3fabk		fi	vs	vp	1mkpf, 3npf, 3mkbr, 3mkpo	Moist when sampled
2Bt3/E	145 - 201	56	SC	7.5YR 3/3	7.5YR 5/4	3cabk	sh	fr	s	p	3mkbr, 2npf	
3Bt4	201 - 254	53	SC	10YR 3/4	7.5YR 3/4	2mabk	sh-h	fr	s	p	2mkpf, 2n-mkbr	
4BClam1	254 - 266	12	SL & SCL	7.5YR 3/4	7.5YR 4/6	sg & 1-2mabk	lo & so-sh	lo & vfr	ns & ss	np & np-sp	1npf, 2n-mkbr	
5BClam2	266 - 305	39	SG & SCL	7.5YR 4/4	7.5YR 3/4	sg & 1-2msbk	lo & sh	lo & fr	ns & ss	np & np	1npf, 2-3nbr, 3mkcl	
6BClam3	305 - 335	30	SG & SCL	7.5YR 4/4 & 5YR 3/2.5	7.5YR 4/6 & 5YR 3/3	sg & 2-3msbk	lo & h	lo & fr	ns & ss	np & np	2mkpf	
7BClam4	335 - 372	37	SL-L & CL	10YR 3/3 & 3.5/3	10YR 4/4 sm	3f-msbk		fr-fi	ns-ss	sp	2mkbr&po	
7BClam5	372 - 403	31	SL-L & CL	10YR 3/3	10YR 4/4	-2mabk & 3f-mab	so	vfr	ns	sp	3n-mkpf, 3-4npo	
8BClam6	403 - 421+	18	gS & C	7.5YR 3.5/4	7.5YR 4/3 & 5YR 3/3	sg & 3mabk	lo & h-vh	lo & fr	ns & ss-s	np & p	1ncl, 3nbr	
Soil Profile 4 - Boring CB-3												
Bt1	61 - 109	48	gC	10YR 3/2	7.5YR 4/4 m		vh		s	p	2mkb, 2mk-3npf	
Bt2	109 - 152	43	gSCL	10YR 3.5/3 & 7.5YR 4/4	10YR 6/2 & 5YR 5/6			fr				
2Bt3	165 - 264	99	Cg	5YR 4/4	7.5YR 3.5/4	sg		fr				
3Bt4	264 - 305	41	SC	7.5YR 3.5/4	5YR 4/4	2f-mabk					3nbr	
4BC1/Btlam	356 - 472	116	siC, SC	7.5YR 3/4	7.5YR 4/4						2nbr	
5Bt5	472 - 508	36	siC - C	7.5YR 4/4	7.5YR 4/6				vs	vp		
5Bt6	508 - 528	20	SiC - SC	10-7.5YR 4/4	10-7.5YR 4/4				vs	p-vp	2npf, 2-3mkbr	
5Bt7	528 - 597	69	SC-C	10-7.5YR 4/4	10-7.5YR 4/3.5				vs	p-vp	2mkbr	
6Bt8	597 - 645	48	gSC	10-7.5YR3/4	10-7.5YR 4/4				s-vs	p	2-3mkpf, 3mkbr	
6BC2	645 - 668	23	gS, LS-SL	10-7.5YR 4/3	10-7.5YR 3.5/3	sg - 1-2fabk	lo	lo	ns	np		
7Bt9	668 - 691	23	SC	10-7.5YR 3.75/5	10-7.5YR 4/4				s-vs	sp-p	1npf, 3nbr	
7C1	691 - 721	30	fiSC	10YR 4.5/3	10YR 5/4							
7C2	737 - 721	16	SCL	10YR 3.5/4	10YR 4/4				s	sp		
8Bt10	737 - 841	104	C	10-7.5YR 4/4	7.5YR 3/3		vh-eh	vfi-efi	vs	vp	3n&2mkpf, 3mkbr	
9Bt11	841 - 886	45	C	7.5YR 4/3	10YR 5/2.5	3cabk	eh	efi	vs	vp	4mkpo, 3mkpf	
9Bt12	886 - 942	56	SC-C	7.5YR 4/3	7.5YR 5/4	3cabk - 2mcsbk			s	p	3npf, 3mkbr	
10BC3	942 - 1049	107	gSCL	10YR 4/4	10YR 5/4		vh	fr	s	sp-p	2mkbr, 3mkcl	
11Bt13	1049 - 1067	18	gC	10YR 3/4	10YR 4/4		vh	vfi	s	p-vp	3mkbr, 2npf	
11BC4	1067 - 1123	56	SCL	10YR 3/4	10YR 4/4		h	vfr-fr	s	np-sp	1-2npf, 3-4mkbr	
12Bt14	1123 - 1163	40	SiC - C	7.5YR 3.5/3	7.5YR 4/3	3cabk			vs	p-vp	3-4mkbr, 2mk&3npf	
13C3lam	1163 - 1600	437	Si	10YR 5/4	10YR 5/6				vs	sp		
14Bt15	1600 - 1692	92	C	7.5YR 3/3	10YR 3/3		vh-eh	vfi-efi	vs	vp	3mkbr, 3-4mkpf	
14Bt16	1692 - 1745	53	C	10YR 4/3	7.5YR 5/4				vs	vp	1mk&2npf, 2mkbr	
14BC5	1745 - 2047	302	Si-C	2.5Y-10YR 5/3.5	2.5Y-10YR 6.5/3	1-2cabk - m	vh-eh	efi	vs	p-vp		
15Bt17	2047 - 2096	49	C	10YR 4/3	10YR 5/3	2mabk-3fabk			vs	vp	3n&2mkbr	
15Bt18	2096 - 2164	68	C	10-7.5YR 3.5/3.5	10YR 4/3.5	2-3cabk	eh	efi	vs	vp		
15Bt19	2164 - 2210	46	C	2.5Y-10YR 3/2		3fabk	eh	efi	vs	vp	3mk-kpf, 3-4mkbr	
15C4	2210 - 2233	23	S	2.5Y-10YR 6.5/3		m, sg	lo-so	lo-vfr	ns	np		
16Bt20	2233 - 2268	35	SiC	10YR 4.25/2.5	10YR 4.75/3	3cabk			vs	vp		
16Btk	2268 - 2286	18	SiC		2.5Y 6/2 & 7.5YR 6/4				vs	p-vp	3 f-m calcium carbonate nodules and stringers	
16BC6	2286 - 2291	5	S									
16BC7	2291 - 2426	135	C		2.5Y 5/1, 4/1 &10YR 6/8	3fabk					3-4mkbr	
17C5	2426 - 2438	12	SC	2.5Y 5/3	2.5Y 6/2		vh-eh	fr	ss	p		
18C6	2454+		S (Qsp)	5Y 6/2	2.5Y 7/2	sg						

AGE ESTIMATES

The near-surface soil observed in Trench T-2 and described in Profiles 2 and 3 has an approximate age of between 9,500 (Profile 2) and 12,500 (Profile 3) years. Minimum and maximum ages for this soil, defined by the envelopes that capture 95 percent of the data used to develop the soil regressions (Dolan et al., 1997), are 3,000 and 37,500 years, respectively (see Table 2).

The first of the two soils developed in the slightly older alluvium exposed in Trench T-2 was exposed at the surface for approximately 11,000 years before being buried. Minimum and maximum ages for this soil are 3,500 and 34,500 years, respectively.

The second, and deeper of the two soils developed in slightly older alluvium exposed in Trench T-2 was exposed to soil-forming processes at the surface for approximately 16,000 (Profile 2) to 28,000 (Profile 3) years before being buried. Minimum and maximum ages for this soil are 5,000 and 88,000 years, respectively, using the soil age estimates derived from the Soil Development Index (SDI) regressions.

This means that the entire alluvial sequence exposed at the east end of Trench T-2 is, at a minimum, between about 36,500 and 51,500 years old using the average ages of each separate soil described therein.

The older alluvium exposed in Trench T-1 and near the surface in boring CB-3 has been exposed to soil-forming processes for at least 68,500 years (based on the minimum horizon index - MHI, which we prefer in this instance given that the top of the soil has been truncated and the top of the argillic horizon is being modified into an E horizon). The equivalent soil at the top of boring CB-3 has an approximate age of between 72,750 years (using the MHI regression curve) and 107,000 years (using the SDI regression curve).

Each of the now-buried soils described in the core of boring CB-3 was exposed at the surface for sufficient time to develop argillic soil horizons. The age estimates for each of these buried soils vary from a minimum average age of 30,000 years (Qoal5) to 133,000 years (Qoal6) using the values calculated from the SDI regression curve. The MHI regression curve for the same soils yields age estimates for these buried soils that range between about 47,000 and 419,500 years. The combined ages of these buried soils indicate that the entire alluvial section exposed in boring CB-3 is at a minimum between about 530,000 years (using the SDI regression curves) and 1.3 million years old (using the MHI regression curves). This in turn provides an absolute minimum age for the underlying San Pedro Formation sand. We prefer the first value because it is consistent with the 400,000 to 900,000 years age estimate for the marine abrasion platform that has been observed in borings drilled east of the Beverly Hills High School site, in the West Hollywood area of Los Angeles (Lindvall et al., 2001, based on work conducted by Earth Consultants International, William Lettis & Associates, MACTEC, and others). This minimum age estimate is also consistent with the minimum age of 600,000 years for the top of the San Pedro Formation reported by Ponti (1989) for the Wilmington/Dominguez Gap and Signal Hills areas. Given that the San Pedro Formation is a chrono-stratigraphic unit that becomes younger westward, and given that the Beverly Hills area is farther inland than the Dominguez Gap and Signal Hills areas, the age of the San Pedro Formation in the site vicinity should be more than 600,000 years old.

Table 2: Age Estimates for the Soils Described in this Study
(ages rounded to the nearest 500 years)

Soil	SDI	MHI	Average Age (years)	Minimum Age (years)	Maximum Age (years)
Profile 2 (T-2)					
Qal1	25.5		12,500	4,000	37,500
		0.29	11,500	4,000	36,000
Qal2	23.8		11,000	3,500	34,000
		0.26	10,000	3,000	31,500
Qal3	48.1		16,000	5,000	51,000
		0.60	64,000	20,500	197,000
Totals for the section (based on preferred ages, using the SDIs)			39,500	12,500	122,500
Profile 3 (T-2)					
Qal1	15.5		9,500	3,000	31,500
		0.4	22,000	7,000	62,500
Qal2	19.7		11,000	3,500	34,500
		0.44	26,000	8,500	70,000
Qal3	85.1		28,000	9,000	88,000
		0.63	77,000	24,500	255,000
Totals for the section (based on preferred ages, using the SDIs)			42,000	22,500	154,000
Profile 1 (T-1)					
Qoal1	94.8		39,000	12,000	125,000
		0.61	68,500	22,000	220,000
Preferred age (based on the MHI, given that the soil was truncated)			68,500	22,000	220,000
Profile 4 (CB-3)					
Qoal1					
	166.5		107,000	33,000	350,000
		0.62	73,000	23,250	238,000
Qoal2	124		52,500	17,500	171,000
		0.77	187,500	51,500	533,500
Qoal3	102.2		38,000	12,500	119,500
		0.74	141,500	45,000	483,000
Qoal4	134.3		64,000	20,500	203,000
		0.70	120,000	33,000	384,500
Qoal5	87		30,000	9,500	94,500
		0.54	47,000	14,500	128,500
Qoal6	180.1		133,000	40,500	442,500
		0.95	419,500	132,500	1,750,000
Qoal7	145.2		76,000	24,000	243,000
		0.75	165,000	46,500	527,000
Qoal8	102.5		38,500	12,500	120,500
		0.64	94,500	29,500	313,000
Qoal9	96.3		35,000	11,000	108,500
		0.58	59,000	18,500	191,000
Total age for the entire alluvial section above the San Pedro Formation (using MHI values)			1,307,000	394,000	4,548,000
Total age for the entire alluvial section above the San Pedro Formation (using the SDI values)			530,000	167,500	1,723,000

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APPENDIX A:
Beverly Hills High School Trenching Project
SOIL PROFILE DESCRIPTIONS

Profile No. 1 – Leighton's Trench 1, South Wall at approximately Station 0+44.
On dissected alluvial fan above main escarpment; near highest elevation at school.

Depth (ft)	Depth (cm)	Horizon Designation	Photo	Description
0 – 0.36	0 – 11	Ap (Afu)		Gravelly clayey sand with scattered nails and pieces of wire. No samples collected. Abrupt smooth boundary.
0.36 – 1.15	11 - 35	Ej		CLAY LOAM; dark yellowish brown (10YR 4/4) with many distinct fine reddish brown, yellowish red and grayish brown (5YR 4/4, 5YR 4/6 and 10YR 5.5/2) mottles when dry, dark brown (7.5YR 3/2) when moist; massive breaking to moderate fine to medium angular blocky structure; hard when dry, firm when moist, slightly sticky to sticky and slightly plastic to plastic when wet; many to continuous thin clay films in pores, common to many thin clay films bridging grains; very few calcium carbonate nodules; common fine pinhole pores; seems to be section of an argillic horizon undergoing leaching of clay; abrupt wavy to irregular boundary.
1.15 - 3.18	35 - 97	Bt1		CLAY; dark brown (7.5YR 3/2) to dark reddish brown (5YR 3/3) when dry, dark brown (7.5YR 3/2) to dark reddish brown (5YR 3/2), with few black mottles when moist; strong coarse to very coarse angular blocky structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; common thick and many thin clay films on ped faces, continuous moderately thick clay films in pores; common very fine pinhole pores; gravel content increases downward; redder and stronger structure reported above is for soil to the west of where this profile was made; abrupt to clear and wavy boundary.
3.18 – 4.76	97 – 145	Bt2		SANDY CLAY; dark reddish brown (5YR 3/4) with common (30%) coarse very dark gray (2.5Y 3/1) gleyed mottles when moist, dark brown (10YR 3/2) when wet and mixed; strong coarse angular blocky breaking to strong fine angular blocky structure; firm when moist, very sticky and very plastic when wet; few moderately thick and many thin clay films on ped faces, many moderately thick clay films bridging grains and in pores; abundant angular to subangular gravel; moist when sampled; clear and wavy boundary.

4.76 – 6.59	145 – 201	2Bt3/E		Argillic horizon with albic tongues. Argillic section: SANDY CLAY; dark brown (7.5YR 5/4) with few dark reddish brown (5YR 3/3) mottles when dry, dark brown (7.5YR 3/3) when moist; strong coarse angular blocky structure; slightly hard when dry, friable when moist, sticky and plastic when wet; common thin to moderately thick dark brown (7.5YR ¾) clay films bridging grains increasing downward to many moderately thick, common thin clay films on ped faces at bottom; less gravel than horizon above, with scattered rounded to subrounded gravel to 2.5-cm in diameter. Albic tongues: SANDY LOAM, yellowish brown (10YR 5/4) when dry; single-grained structure; loose when dry and moist, non-sticky to slightly sticky and non-plastic when wet; abrupt and wavy boundary.
6.59 – 8.33	201 - 254	3Bt4		CLAYEY GRAVEL (slaty gravel surrounded by pedogenic clay); dark brown and brown (7.5YR 3/4 and 10YR 4/3) with dark reddish brown (5YR ¾) mottles when dry, dark yellowish brown (10YR 3/4) when moist and mixed; moderate medium angular blocky structure; slightly hard to hard when dry, friable when moist, sticky and plastic when wet; common moderately thick clay films on ped faces, common thin to moderately thick clay films bridging grains; gravel predominantly angular, fining downward; abrupt to clear wavy boundary.
8.33 – 8.73	254 - 266	$4BC_{lam}1$		SANDY LOAM with SANDY CLAY LOAM Bt lamellae; strong brown (7.5YR 4/6) when dry, dark brown (7.5YR 3/4) when moist; single-grained, weak to moderate fine angular blocky structure where Bt_{lams} are present; loose when dry and moist, non-sticky and non-plastic when wet; Bt_{lam} sections are soft to slightly hard when dry, very friable when moist, slightly sticky and non-plastic to slightly plastic when wet; Bt_{lam} sections have few thin clay films on ped faces and common thin to moderately thick clay films bridging grains; abrupt wav to irregular boundary (this horizon was locally eroded away by overlying mudflow deposit).

8.73 – 10.01	266 – 305	$5BC_{lam}2$		Fine to coarse SANDY GRAVEL with SANDY CLAY LOAM Bt lamellae; clay is dark brown (7.5YR 3/4) when dry, brown (7.5YR 4/4) when moist; single-grained, weak to moderate medium subangular blocky structure where Bt_{lams} are present; sandy gravel is loose when dry and moist, non-sticky and non-plastic when wet; Bt_{lam} peds are slightly hard when dry, friable when moist, slightly sticky and non-plastic when wet; Bt_{lam} sections are 2- to 5-cm thick, occur especially at the top of the horizon and marking the bottom contact, non-Bt_{lam} sections are 1- to 6-cm thick; few thin clay films on ped faces, common to many thin clay films bridging grains, and many moderately thick clay films coating clast pockets in the Bt_{lam} sections; clasts are angular to subrounded; abrupt and smooth to wavy boundary.
10.01 – 10.99	305 – 335	$6BC_{lam}3$		SANDY GRAVEL with SANDY CLAY LOAM Bt lamellae; strong brown (7.5YR 4/6) when dry, brown (7.5YR 4/4) when moist, clay in Bt_{lam} is dark reddish brown (5YR 3/3) when dry, dark reddish brown (5YR 3/2.5) when moist; single-grained, moderate to strong medium subangular blocky structure where Bt_{lams} are present; sandy gravel is loose when moist, non-sticky and non-plastic when wet, Bt_{lam} peds are hard when dry, friable when moist, slightly sticky and non-plastic when wet; Bt_{lam} sections are about 5-cm thick, separated by non- Bt_{lam} sections about 3-cm thick; common moderately thick clay films on Bt_{lam} peds; similar to unit above except clasts are rounded to subrounded; abrupt and smooth to wavy boundary.
10.99 – 12.20	335 – 372	$7BC_{lam}4$		Fine SANDY LOAM to LOAM with few CLAY LOAM Bt lamellae; dark yellowish brown (10YR 4/4) when moist, dark brown (10YR 3/3) when wet, clay on ped faces in Bt_{lams} is dark brown to brown (10YR 3.5/3) when moist; strong fine to medium subangular blocky structure where Bt_{lams} are present; friable to firm when moist, non-sticky to slightly sticky and slightly plastic when wet; Bt_{lams} have common thin clay films on ped faces, common moderately thick clay films bridging grains and in pores; some primary sedimentary structures still visible; clear and wavy boundary with channel lag at bottom.

12.20 – 13.22	372 – 403	$7BC_{lam}5$		Fine SANDY LOAM to LOAM with few CLAY LOAM Bt lamellae; dark yellowish brown (10YR 4/4) when dry, dark brown (10YR 3/3) when moist; weak to moderate medium angular blocky structure, strong fine to medium angular blocky structure where Bt_{lams} are present; soft when dry, very friable when moist, non-sticky and slightly plastic when wet; Bt_{lams} have many thin to moderately thick clay films on ped faces, many to continuous thin clay films in pores; many very fine pinhole pores; with scattered subrounded to rounded gravel to 2.5-cm diameter; remnant, together with horizon above, channel bank deposit cut into and removed to the west, at about station 0+48; abrupt and wavy boundary.
13.22 – 13.81+	403– 421+	$8BC_{lam}6$		GRAVELLY coarse SAND with CLAY Bt lamellae; brown (7.5YR 4/3) when dry, dark brown to brown (7.5YR 3.5/4) when moist, with dark reddish brown (5YR 3/3) clay when dry; single-grained, strong medium angular blocky structure where Bt_{lams} are present; loose when dry and moist, non-sticky and non-plastic when wet, Bt_{lam} peds are hard to very hard when dry, friable when moist, slightly sticky to sticky and plastic when wet; Bt_{lam} zones are 2-10 cm thick; Bt_{lams} have few thin clay films on clasts, common thin clay films bridging grains; clasts are predominantly subangular to subrounded.

Profile No. 2 – Leighton's Trench 2, South Wall at approximately Station 2+70.
On flat area at base of east-facing scarp; soil developed in younger alluvial deposits.

Depth (ft)	Depth (cm)	Horizon Designation		Description
0 – 0.33	0 - 10	Ap1		Fine gravelly SANDY LOAM to LOAM; dark grayish brown (10YR 4/2) when dry, very dark brown (10YR 2/2) when moist; moderate coarse crumb breaking to strong fine crumb structure; very hard when dry, very firm when moist, sticky and slightly plastic when wet; mixed in composition, locally with argillic-like soil clasts that have common thin clay films on ped faces; abundant roots and rootlets; gravel is angular to subrounded, most less than 0.5 cm in diameter; with plastic netting at about 4 cm below ground surface to grab grass roots; abrupt and smooth to wavy boundary.

0.33 – 1.64	10 - 50	Ap2		CLAY LOAM with gravel and cobbles; dark grayish brown (10YR 4/2) when dry, very dark brown (10YR 2/2) when moist; strong coarse angular blocky structure; very hard when dry, very firm when moist, sticky and plastic when wet; many thin clay films on ped faces; abundant roots throughout, brown (7.5YR 4/4) next to roots and root mats; few worm casts; with pipes near bottom contact and scattered metal objects within; clear and smooth to wavy boundary.
1.64 - 3.22	50 - 98	2A/Btj1		CLAY LOAM; brown and very dark grayish brown (10YR 4/3 and 10YR 3/2) equally when dry, very dark brown (10YR 2/2) when moist; strong fine to medium angular blocky structure; soft when dry, friable to slightly firm when moist, sticky and plastic when wet; common thin clay films on ped faces, many thin clay films in pores; very few fine manganese oxide stains; pinhole porosity; primary sedimentary structure still visible locally, with rip-up clasts and scattered angular gravel; many rootlets; clear and wavy boundary.
3.22 – 4.04	98 – 123	2Btj2		SANDY CLAY LOAM; brown to dark brown (10YR 4/3 to 3/3) with dark brown (7.5YR 3/2) clay on ped faces when dry, dark brown (7.5YR 3/2) when moist; moderate medium angular blocky structure; soft to slightly hard when dry, friable to slightly firm when moist, sticky and plastic when wet; few thin clay films on ped faces, many moderately thick clay films in pores; iron oxide staining along root-holes; primary sedimentary structure still visible locally; scattered angular gravel, coarser sand than above; clear and wavy boundary.
4.04 – 4.63	123 – 141	2Bt		CLAY LOAM to CLAY; brown (10YR 4/3) with dark brown (7.5YR 3.5/2) clay when dry, dark brown to very dark grayish brown (10-7.5YR 3/2) when moist; moderate fine to medium angular blocky structure; hard when dry, slightly firm when moist, sticky and plastic to very plastic when wet; common moderately thick clay films bridging grains, common thin clay films in pores, common thin and few moderately thick clay films on ped faces; manganese oxide staining; many fine pores locally; scattered gravel, but less than horizon above; pockets of coarse sand discernible locally; abrupt to clear and wavy boundary.
4.63 – 5.08	141 - 155	3Ab		CLAY LOAM to CLAY; brown (10YR 4/3) when dry and mixed, very dark grayish brown (10YR 3/2) when moist; moderate medium subangular blocky structure; friable when moist, sticky and plastic to very plastic when wet; common to many very fine pores, locally with very dark gray manganese oxide staining; moist when sampled; few scattered fine rounded chips of slate; finer-grained than overlying horizon; clear and

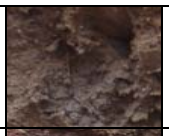
				wavy boundary.
5.08 – 5.87	155 - 179	3BCb1		Very fine SANDY CLAY to CLAY; brown (10YR 4/3) when dry and mixed, dark brown (7.5YR 3/2) when moist; weak fine to medium subangular blocky structure; very friable when moist, very sticky and plastic to very plastic when wet; many pinhole pores; common roots; scattered chips of rounded to subrounded slate; sand more discernible than in overlying horizon; clear and wavy boundary.
5.28 – 7.78	179 – 237	3BCb2		CLAY LOAM; brown (10YR 4/3) when dry and mixed, dark brown (7.5YR 3/3) when moist; weak fine to medium angular blocky structure; friable when moist, sticky and plastic when wet; common thin dark brown (7.5YR 3/2) clay stains on clasts; many pinhole pores; less sand but more slaty gravel than horizon above; abrupt and smooth to wavy boundary.
7.78 – 9.12	237 – 278	4Btb1		Gravelly CLAY; dark yellowish brown (10YR 4/4) when dry and mixed, dark brown (7.5YR 3/2 and 3/3) when moist, with dark reddish brown (5YR 3/2) clay films; strong coarse angular blocky structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; many moderately thick clay films on ped faces and in pores, common moderately thick and many thin clay films bridging grains; gravel primarily angular; abrupt to clear and wavy boundary.
9.12 – 9.61	278 – 293	$5BC_{lam}1$		SANDY CLAY LOAM with SANDY CLAY Bt lamellae at top; dark yellowish brown (10YR 4/4 and ¾) when dry and mixed, dark brown (7.5YR 3/2 to 3/4) when moist; massive, moderate medium to coarse angular blocky structure where Bt_{lams} are present; loose to soft when dry, very friable when moist, sticky and plastic when wet, Bt_{lam} peds are slightly hard when dry, slightly firm when moist, very sticky and very plastic when wet; Bt_{lams} have many thin to moderately thick clay films on ped faces, many thin clay films bridging grains; abrupt and wavy boundary.
9.61 – 9.97	293 – 304	6BCb3		SILTY CLAY; dark brown to dark yellowish brown (10YR 3/3 to ¾) when moist (no dry color available); massive; friable when moist, sticky and plastic to very plastic when wet; common thin dark brown (7.5YR 3/2) clay stains and many moderately thick clay coatings on clast pockets; abundant fine gravel, mostly subangular to subrounded; moist when sampled; abrupt to clear and wavy boundary.

9.97 – 10.79	304 – 329	7Btb2		Gravelly SANDY CLAY; brown and dark brown (7.5YR 4/4 and 3/3) when moist, with dark brown (7.5YR 3/2) clay films; moderate medium to coarse angular blocky structure; friable when moist, very sticky and plastic when wet; many moderately thick clay films bridging grains and in pores, common thin clay films on ped faces; many large pores; moist when sampled; clear and wavy boundary.
10.79 – 11.48	329 – 350	7BCb4		SANDY LOAM to SANDY CLAY LOAM; brown to dark yellowish brown (7.5YR-10YR ¾) when moist; single-grained and weak fine to medium subangular blocky structure; loose to very friable when moist, slightly sticky and slightly plastic when wet; many large pores and common pinhole porosity; common thin stains and many moderately thick clay films in pores; abundant gravel to 2.5-cm in diameter, predominantly angular to subangular, less gravelly than horizon above; moist when sampled; clear and wavy boundary.
11.48 – 12.17	350 – 371	$7BC_{lam}2$		SANDY CLAY LOAM with CLAY Bt lamellae; dark brown (10YR 3/3) when moist; single-grained and moderate coarse subangular blocky structure where Bt_{lams} are present; very friable when moist, sticky and plastic when wet; Bt_{lams} have many thin dark brown (7.5YR ¾) clay films on ped faces and in pores, many moderately thick clay films bridging grains; abundant fine gravel with few clasts to 4-cm in diameter; sand fraction is slightly coarser than horizon above; common to many pinhole pores; moist when sampled; abrupt and smooth to wavy boundary.
12.17 – 12.73	371 – 388	$8C_{lam}1$		Gravelly fine to coarse SANDY LOAM to SANDY CLAY LOAM bracketing a LOAM Bt lamellae 4- to 5-cm thick; dark brown (10YR 3/3) when moist; single-grained except for Bt_{lam} which has moderate fine to medium subangular blocky structure; loose when moist, slightly sticky and slightly plastic when wet, Bt_{lam} material is very friable when moist, very sticky and slightly plastic when wet; Bt_{lam} has many moderately thick dark brown (7.5YR 3/2) clay films on ped faces and in pores, common to many moderately thick clay films bridging grains, and continuous thin coatings on clasts; common pinhole pores in Bt_{lam} section; moist when sampled; abrupt and wavy boundary.
12.73 – 13.16	388 – 401	$9C_{ox}1$		Very fine SANDY LOAM fining upward to SILTY LOAM; dark brown (10YR 3/3) when moist; structureless single-grained; loose to very friable when moist, slightly sticky and non-plastic when wet; scattered fine gravel with many thin clay coatings on clast pockets; common fine pinhole pores; moist when sampled; abrupt and smooth to wavy boundary.

13.16 – 13.64	401 – 416	$10C_{lam}2$		SILT LOAM with Bt lamellae, especially at bottom, at and near contact with underlying horizon; dark yellowish brown (10YR ¾) when moist; massive; loose to very friable when moist, slightly sticky to sticky and non-plastic when wet; Bt_{lams} have many thin dark brown (7.5YR 3/2) clay films on ped faces; many very fine pinhole pores; fewer gravel than horizon above but still present; moist when sampled; clear and wavy boundary.
13.64 – 14.44+	416 – 440+	$10C_{ox}2$		Very fine SANDY CLAY LOAM; dark brown (10YR 3/3) when moist; massive; very friable when moist, slightly sticky and plastic when wet; many fine to medium-sized pinhole pores; many thin clay films in pores; scattered gravel, more than horizon above; moist when sampled.

Profile No. 3 – Leighton's Trench 2, North Wall at approximately Station 3+45.
On flat area to the east of main escarpment; soil developed in younger alluvial deposits.

Depth (ft)	Depth (cm)	Horizon Designation		Description
0 – 0.46	0 - 14	Ap1		Disturbed horizon– not sampled. Moderate to strong fine granular structure at top, in root zone, and moderate fine subangular blocky structure at bottom; mixed horizon with clasts of reddened material; abrupt and smooth to wavy boundary.
0.46 – 0.82	14 - 25	Ap2		Disturbed horizon – not sampled. Gravelly fine to coarse sand with some clay mixed in, especially at bottom; abrupt and wavy boundary.
0.82 - 1.36	25 - 41	A/Btj1		CLAY LOAM; very dark grayish brown and dark reddish brown (10YR 3/2 and 7.5YR 3/2) when dry, very dark brown (10YR 2/2) when moist; moderate medium subangular blocky structure; hard when dry, firm to very firm when moist, sticky and plastic to very plastic when wet; many thin clay coatings on clast pockets; common rootlets; scattered fragments of charcoal; with rip-up clasts of siltstone; common fine subrounded gravel and coarse sand; abrupt and wavy boundary.
1.36 – 2.13	41 – 65	Btj2		CLAY LOAM to CLAY; yellowish brown (10YR 5/4) when dry, very dark brown grayish brown (10YR 3/2) when moist; moderate coarse angular blocky structure; very hard to extremely hard when dry, extremely firm when moist, very sticky and plastic to very plastic when wet; continuous moderately thick very dark grayish brown to very dark brown (10YR 3/2 and 2/2) clay films in pores; common rootlets; many fine to very

				fine pinhole pores; few rounded to subrounded gravel; abrupt to clear and wavy boundary.
2.13 – 2.89	65 – 88	2Ab1/2Bt1b		CLAY; very dark grayish brown (10YR 3/2) when dry, very dark brown (10YR 2/2) when moist; moderate medium angular blocky breaking to moderate fine angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; common thin clay stains; few fine manganese oxide stains and nodules; many very fine pinhole pores; common roots and rootlets; scattered subrounded gravel to 4-cm in diameter; abrupt and wavy boundary.
2.89 – 3.74	88 - 114	2Btb2		CLAY; dark brown and very dark brown (10YR 3/3 and 2/2) when dry, very dark brown (10YR 2/2) when moist; strong coarse angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; many thin and common moderately thick clay films on ped faces, common moderately thick clay films in pores; many fine and medium-sized pinhole pores; scattered gravel to 1-2 cm in diameter, predominantly angular, more than horizon above; abrupt to clear and wavy boundary.
3.74 – 5.28	114 - 161	3Ab2		CLAY LOAM grading down to CLAY at depth; very dark grayish brown (10YR 2/2) when slightly moist and moist (no dry color available); moderate fine to medium angular blocky structure grading to moderate coarse angular blocky structure at depth, in lower bench; soft to slightly hard when slightly moist, friable when moist, sticky to very sticky and plastic when wet; many pinhole pores; abrupt and wavy boundary.
5.28 – 6.33	161 – 193	4Btb3		CLAY; very dark gray and dark brown (7.5YR 3/1 and 3/2) when dry, dark brown (7.5YR 3/2) when moist; strong medium to coarse angular blocky structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; many moderately thick clay films on ped faces, continuous moderately thick clay films in pores, many to continuous moderately thick clay films bridging grains; many rootlets; many subangular to subrounded gravel; clear and wavy boundary.

6.33 – 7.55	193 – 230	4Btb4		CLAY; very dark gray and dark brown (7.5YR 3/1 and 3/2) when dry, dark brown (7.5YR 3/2) when moist; strong very coarse angular blocky breaking to strong medium prismatic structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; many thin to moderately thick clay films on ped faces, many moderately thick clay films in pores and bridging grains; many fine gravel; clear and wavy boundary.
7.55 – 8.53	230 – 260	4Btb5		CLAY; dark brown (7.5YR 3/3) when dry, dark brown (10YR 3/3) when moist; strong coarse to very coarse angular blocky to prismatic structure; soft to slightly hard when dry, friable when moist, sticky and plastic when wet; many moderately thick very dark grayish brown (7.5YR 3/2) clay films on ped faces and bridging grains, continuous moderately thick to thick clay films in pores; few pinhole pores; common coarse sand and very fine gravel; less clay than horizon above; abrupt to clear and wavy boundary.
8.53 – 9.74	260 – 297	4BCb1		SANDY CLAY LOAM; brown and dark brown (7.5YR 4/4 and 3/2) when slightly moist, dark brown (7.5YR 3/2.5) when moist; moderate coarse angular blocky to prismatic breaking to strong medium angular blocky structure; soft to slightly hard when dry, friable when moist, sticky and slightly plastic when wet; common moderately thick and many thin clay films on ped faces, many thin clay films in pores, common to many thin clay coatings on clasts, many thin to moderately thick clay films bridging grains; with subangular to subrounded gravel; many pores; clear and wavy boundary.
9.74 – 10.33	297 – 315	4BCb2		SILTY CLAY LOAM to SILTY CLAY; strong brown (7.5YR 4/6) when dry, dark brown (7.5YR 3/3) when moist; moderate medium angular blocky structure; soft to slightly hard when dry, friable when moist, sticky and plastic to very plastic when wet; few to common thin dark brown (7.5YR 3/2.5 when moist) clay films on ped faces; common pores; clear and wavy boundary with a stoneline at the contact. Charcoal sample collected from this horizon.
10.33 – 12.04	315 – 367	4Cb1		Fine SANDY CLAY grading to SANDY CLAY LOAM at bottom; dark brown (10YR-7.5YR ¾) when slightly moist, dark brown (10YR-7.5YR 3/3) when moist; moderate medium angular blocky structure; friable when moist, sticky and plastic when wet; common thin clay films in pores and as stains; few pinhole pores; scattered coarse sand and fine gravel; clear to gradual and wavy boundary.

12.04 – 12.63	367 - 385	4Cb2		SANDY CLAY LOAM; brown to dark yellowish brown (7.5YR-10YR 4/4) when slightly moist, dark brown (7.5YR-10YR 3/3) when moist; weak to moderate fine subangular blocky structure; friable when moist, sticky and slightly plastic to plastic when wet; few clay stains; common pinhole pores, few rootlets; scattered gravel, less than horizon above; clear and wavy boundary.
12.63 – 13.02	385 – 397	5Cb3		SAND with gravel and cobbles to 8-cm in diameter, especially at bottom; yellowish brown (10YR 5/4) when dry, very dark to dark grayish brown (10YR 3.5/2) when moist; single-grained; loose when dry and moist, non-sticky and non-plastic when wet; clasts are subangular to subrounded; abrupt and wavy boundary.
13.02 – 14.34	397 – 437+	6Cb4		Gravelly fine to medium SAND coarsening upward to Fine SANDY LOAM; dark yellowish brown (10YR ¾) when slightly moist, dark brown (10YR 3/3) when dry; single-grained and weak medium to coarse angular blocky structure; loose to soft when dry, loose to very friable when moist, non-sticky and non-plastic when wet; abundant roots; OSL and charcoal sample collected from this unit; abrupt and smooth boundary to a mudflow deposit exposed to the east of soil profile. Charcoal and OSL samples collected from this unit.

Profile No. 4 – Leighton's Boring CB-3

Depth (ft)	Depth (cm)	Horizon Designation		Description
0 – 2	0 – 61	NA		Not available for review. Refer to Leighton's log for details, based on cuttings.
2 – 3.6	61 – 109	Bt1		Gravelly CLAY, clay content decreases downward; very dark grayish brown (10YR 3/2) and brown (7.5YR 4/4) when moist; common moderately thick clay films bridging grains, common moderately thick and many thin clay films on ped faces; fine subrounded gravel, with clasts of slate and quartz.

4.6 - 5	109 – 152	Bt2-Bt_{lam}		Gravelly SANDY CLAY LOAM with Bt lamellae, especially in the lower section, below 3.9 ft; light brownish gray (10YR 6/2) when dry, brown (10YR 3.5/3) when moist, clay in lamellae is yellowish red (5YR 5/6) when dry, brown (7.5YR 4/4) when moist; friable when moist. [Section between 5 and 5.3' missing].
5.4 – 8.7	165 – 264	2Bt3		CLAYEY GRAVEL (gravel surrounded by pedogenic clay); mixed colors that reflect the mixture of slate, basalt and granitic clasts, with zones associated with weathered clasts that are grayish brown (2.5Y 5/2) when dry, dark gray (2.5Y 4/1) when moist; clay is reddish brown (5YR 4/4) when dry, brown (7.5YR 3.5/4), when moist; friable when moist; predominantly angular gravel.
8.7 - 10	264 – 305	3Bt4		SANDY CLAY; reddish brown (5YR 4/4) when dry, reddish brown (7.5YR 3.5/4) when moist; moderate fine to medium angular blocky soil structure; common thin clay films bridging grains; more clay and less gravel than horizon above.
10 – 15.5	356 – 472	4BC1/Bt_{lam}		SILTY CLAY with SANDY CLAY Bt lamellae zones; silty clay is light olive brown (2.5Y5/3) when dry, dark olive brown (2.5Y3.5/3) when moist; lamellae are brown (7.5YR 4/4) when dry, dark brown (7.5YR 3/4) when moist, with mottles that are reddish brown (5YR 4/3) when dry and dark reddish brown (5YR 3/3) when moist; locally, in the lamellae, common thin clay films bridging grains; abundant gravel, especially at the top of the horizon.
15.5 – 16.7	472 - 508	5Bt5		SILTY CLAY to CLAY with sand; strong brown (7.5YR 4/6) when dry, brown (7.5YR 4/4) when moist; very sticky and very plastic when wet; few thin (1/4-inch) zones with less clay and grayer in color.

16.7 – 17.3	508 - 528	5Bt6		SILTY CLAY to very fine SANDY CLAY; dark yellowish brown (10YR 4/4) with brown (7.5YR 4/4) mottles when dry, dark yellowish brown (10YR 3.5/4) with brown (7.5YR 4/4) mottles when moist; very sticky and plastic to very plastic when wet; common thin clay films on ped faces, common to many moderately thick clay films bridging grains.
17.3 – 19.6	528 – 597	5Bt7		Fine SANDY CLAY to CLAY; dark yellowish brown (10YR 4/4) with brown (7.5YR 4/3) mottles when dry, dark yellowish brown (10YR 3/4) with brown (7.5YR 4/4) mottles when moist; very sticky and plastic to very plastic when wet; common moderately thick clay films bridging grains.
19.6 – 21.2	597 – 645	6Bt8		Gravelly SANDY CLAY; dark yellowish brown to brown (10YR to 7.5YR 4/4) when dry, dark yellowish brown to dark brown (10YR to 7.5YR 3/4) when moist; sticky to very sticky and plastic when wet; common to many moderately thick dark brown (7.5YR 3/3) clay films on ped faces, many moderately thick clay films bridging grains.
21.2 – 21.9	645 – 668	6BC2/Bt_{lam}		Gravelly fine to coarse SAND; dark yellowish brown and dark grayish brown (10YR 4/4 and 4/2) when dry, dark yellowish brown to dark brown (10YR to 7.5YR 3/4); single-grained; with LOAMY SAND to SANDY LOAM Bt lamellae which are dark brown (7.5YR 3/4) when dry, brown (7.5YR 4/4) with yellowish red (5YR 4/6) mottles when moist; lamellae have weak to moderate fine angular blocky soil structure.
21.9 – 22.7	668 – 691	7Bt9		SANDY CLAY; dark yellowish brown (10YR4/4) with brown (7.5YR4/4) clay when dry and dark yellowish brown (10YR3.5/4) with strong brown (7.5YR4/6) clay when moist; sticky to very sticky and slightly plastic to plastic when wet; few thin clay films on ped faces and many thin clay films bridging grains.
22.7 – 23.7	691 – 721	7$C1_{lam}$		Fine SANDY CLAY with Bt lamellae; light brownish gray (2.5Y 6.5/2) when dry, grayish brown (2.5Y4.5/2) when moist; Bt lamellae are reddish yellow (7.5YR 6.5/6) when dry, brown (7.5YR 4/4) when moist; lamellae increase downward, appear to be controlled by primary sedimentary structure.

23.7 – 24.2	721 – 737	7C2		SANDY CLAY LOAM; dark yellowish brown (10YR 4/4) when slightly moist, dark yellowish brown (10YR 3.5/4) when moist; sticky and slightly plastic when wet; primary sedimentary structures visible.
24.2 – 27.6	737 – 841	8Bt10		CLAY; dark brown (7.5YR 3/3) with yellowish red (5YR 5/6) mottles when dry, dark yellowish brown to brown (10YR to 7.5YR 4/4) when moist; extremely hard at the top to very hard at the bottom when dry, very sticky and very plastic when wet; many thin and common moderately thick clay films on ped faces, many moderately thick clay films bridging grains.
27.6 – 29.1	841 – 886	9Bt11		CLAY; dark yellowish brown and gray (10YR 4/4 and 10YR 6/1) when dry, brown (7.5YR 4/3) when moist; moderate coarse angular blocky soil structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; continuous moderately thick clay films in pores, many moderately thick clay films on ped faces.
29.1 – 30.9	886 - 942	9Bt12		SANDY CLAY to CLAY with scattered gravel; brown (7.5YR 5/4) when dry, dark brown (7.5YR 3.5/4) when moist; strong coarse angular blocky grading to moderate medium to coarse subangular blocky soil structure; sticky and plastic when wet; common thin brown (7.5YR 4/3) clay films on ped faces, many moderately thick clay films bridging grains.
30.9 – 34.4	942 – 1049	10BC3		Gravelly SANDY CLAY LOAM; yellowish brown (10YR 5/4) with dark yellowish brown (10YR 4/4) clay stains when dry, dark yellowish brown (10YR 4/4) when moist; very hard when dry, friable when moist, sticky and slightly plastic to plastic when wet; common moderately thick clay films bridging grains, many moderately thick clay films in clast pockets.
34.4 – 35	1049 – 1067	11Bt13		Gravelly CLAY; dark yellowish brown (10YR 4/4) when dry, dark brown (10YR 3/4) when moist; very hard when dry, very firm when moist, sticky and plastic to very plastic when wet; many moderately thick clay films bridging grains, common thin clay films on ped faces.

35 – 36.8	1067 – 1123	11BC4		SANDY CLAY LOAM; dark yellowish brown and light gray (10YR 4/4 and 2.5Y 7/2) with strong brown (7.5YR 5/6) mottles when dry, dark yellowish brown and gray (10YR 3/4 and 2.5Y 5/1) with strong brown (7.5YR 4/6) mottles when moist; hard when dry, friable to very friable when moist, sticky and non-plastic to slightly plastic when wet; few to common thin clay films on ped faces, many to continuous moderately thick clay films bridging grains.
36.8 – 38.2	1123 – 1163	12Bt14		SILTY CLAY to CLAY; brown and dark brown (7.5YR 4/3 and 3/3) when slightly moist, brown (7.5YR 3.5/3) when moist; strong coarse angular blocky soil structure; very sticky and plastic to very plastic when wet; many to continuous moderately thick clay films bridging grains, common moderately thick and many thin clay films on ped faces; stone line at base of horizon.
38.2 – 52.5	1163 – 1600	$13C3_{lam}$		SILT; yellowish brown and light brownish gray (10YR 5/6 and 2.5Y 6/2) when dry, gray and yellowish brown (2.5Y 5/1 and 10YR 5/4) when moist; very sticky and slightly plastic when wet; primary sedimentary structures still visible; locally with Bt lamellae and zones at 477-480", 497-501", 509-511", 522-527", 608-610", and 620-625"; zones are brown (7.5YR 5/4) when dry, dark brown (7.5YR 3/3) when moist; sand lenses at 530 to 532" and 576 to 578".
52.5 – 55.5	1600 – 1692	14Bt15		CLAY with visible sand grains; dark brown (10YR 3/3) when slightly moist, dark brown (7.5YR 3/3) when moist; strong coarse angular blocky breaking to strong fine angular blocky soil structure; very hard to extremely hard when dry, very firm to extremely firm when moist, very sticky and very plastic when wet; many moderately thick clay films bridging grains, common to many moderately thick clay films on ped faces at the top grading to many to continuous moderately thick clay films on ped faces at the bottom; few scattered calcium carbonate nodules; grayer zones seem to be grussified clasts.
55.5 – 57.25	1692 – 1745	14Bt16		CLAY; brown (10YR 5.5/3) with few yellowish red (5YR 5/6) mottles when dry, brown (10YR 4/3) when moist; very sticky and very plastic when wet; few moderately thick and common thin clay films on ped faces, common moderately thick clay films bridging grains.
57.25 – 67.2	1745 – 2047	14BC5		SILTY CLAY to CLAY; light yellowish brown and light gray (10YR 6/4 and 2.5Y 7/2) when dry, yellowish brown and light olive brown (10YR 5/4 and 2.5Y 5/3) when moist; weak to moderate coarse angular blocky soil structure grading to massive at bottom; very hard to extremely hard when dry, extremely firm when

				moist, very sticky and plastic to very plastic when wet; silt at 65 feet (780").
67.2 – 68.75	2047 – 2096	15Bt17		CLAY; brown (10YR 5/3) when dry, brown (10YR 4/3) when moist; moderate medium angular blocky to strong fine angular blocky soil structure; very sticky and very plastic when wet; many thin and common moderately thick dark yellowish brown (10YR 4/4) clay films bridging grains; few manganese oxide stains.
68.75 – 71	2096 – 2164	15Bt18		CLAY; olive brown and brown (2.5Y 4/3 and 10YR 4/3) with brown (7.5YR 4/4) mottles when dry, dark yellowish brown (10YR 3.5/3) with dark brown (7.5YR 3.5/4) mottles when moist; moderate to strong coarse angular blocky soil structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; pockets of sand visible locally.
71 – 72.5	2164 – 2210	15Bt19		CLAY; very dark grayish brown (2.5Y-10YR 3/2) with few fine brown (7.5YR 4/4) mottles when slightly moist; strong fine angular blocky soil structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; many moderately thick to thick clay films on ped faces, many to continuous moderately thick clay films bridging grains.
72.5 – 73.25	2210 – 2233	15C4		Fine SAND; light yellowish brown (10YR 6/4) and light gray (2.5Y 7/2) when moist; massive breaking to single-grained; very friable when moist, non-sticky and non-plastic when wet.
73.25 – 74.4	2233 – 2268	16Bt20		SILTY CLAY; dark grayish brown (2.5Y 4.5/2) with common fine brown (7.5YR 5/4) mottles when dry, dark gray (2.5Y 4.5/1) with brown (7.5YR 4/4) mottles when moist; strong coarse angular blocky soil structure; very sticky and plastic when wet.
74.4 – 75	2268 – 2286	16Btk		SILTY CLAY; light brownish gray (2.5Y 6/2) with reddish yellow (7.5YR 6/4) mottles when dry; very sticky and plastic to very plastic when wet; common fine to medium calcium carbonate nodules and stringers.
75 – 75.2	2286 – 2291	16BC6		SAND with few scattered fine calcium carbonate nodules.

75.2 – 79.6	2291 - 2426	16BC7		CLAY; gray and dark gray (2.5Y 5/1 and 2.5Y 4/1) with brownish yellow (10YR 6/8) mottles when dry; strong fine angular blocky soil structure; many to continuous moderately thick clay films bridging grains.
79.6 – 80	2426 – 2438	17C5		SANDY CLAY; light brownish gray (2.5Y 6/2) when dry, light olive brown (2.5Y 5/3) when moist; very hard to extremely hard when dry, friable when moist, slightly sticky and plastic when wet; cemented. Section between 80-80.5′ (2438-2454 cm) was missing.
80.5+	2454+	18C6		SAND; light gray (2.5Y 7/2) when dry, light olive gray (5Y 6/2) when moist; single-grained; (San Pedro Formation).

December 21, 2012 (updated)
ECI Project No. 3205.02

Earth Consultants International

To: **Hill Farrer & Burrill, LLP**
300 South Grand Avenue, 37th Floor
Los Angeles, California 90071-3147
Attention: **Mr. Kevin Brogan, Partner**

To: **Leighton Consulting, Inc.**
17781 Cowan
Irvine, California 92614
Attention: **Mr. Joe Roe, Sr. Project Geologist**

Subject: **Supplemental Report on the Age of the Sediments Underlying the Beverly Hills High School and Vicinity Using Soil-Stratigraphic Techniques, 241 Moreno Drive, Beverly Hills, California**

Dear Mr. Brogan and Mr. Roe,

At the request of Tim Buresh of PrimeSource Consulting, Earth Consultants International (ECI) provided Leighton Consulting, Inc. (Leighton) with support in the analysis and interpretation of the faulting exposed in trench FT-5, and with the age of the sediments exposed therein and in nearby locations. This letter report summarizes our findings regarding the age of the sediments exposed in the area of trench FT-5, and our assessment of the age of the sediments we examined previously (Earth Consultants, April 2012) based on the findings presented herein. Our opinions regarding the age of the faults exposed in trench FT-5 have been provided in several field and office meetings with personnel from Leighton, the California Geological Survey, Kenney GeoScience, and PrimeSource Consulting. The results of this study add to the body of geological data that has been developed for this area of the Cheviot Hills as a result of several fault investigations conducted at and near the Beverly Hills High School (Leighton, 2012; Kenney GeoScience, 2012; Geocon & Feffer, 2012).

Prior to the excavation of trench FT-5, we reviewed and described the soils and sediments in the uppermost 40 feet of the cores collected from borings B-23, B-24 and B-26. These borings were emplaced by Leighton in the area where trench FT-5 was later excavated. The cores were reviewed to provide an opinion as to whether or not the near-surface deposits present along the transect covered by the borings were similar, which would in turn provide information regarding the lateral continuity of the sediments and the potential for a fault to extend across the area. Upon review of the cores, it was our opinion that there were noticeable differences in the near-surface sediments recovered in the borings, as later confirmed upon excavation of the trench. Our descriptions of the upper sections of the cores are included in this report. Age estimates for the soils developed within these sections were calculated and are also provided here.

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Trench FT-5 was emplaced in a northerly direction starting near the base of, and extending away from the slope at the northern end of the school, across the area where Fault F2 had been proposed (Kenney GeoScience, 2012, Plate ES-2b). The trench exposed Pleistocene-age sediments consisting of fluvial gravels and sands near its southern end, and finer-grained silts and clays at its northern end. The soil profile that we described was from the area of the trench where finer-grained sediments predominated. The soils described in that section of the trench indicate an estimated age of nearly 150,000 years for the uppermost 3.5 meters (11.5 feet). This age estimate is based only on the properties of the soils exposed in that section of the trench. Together with Leighton, we made an effort to correlate the sediments exposed in their trench FT-5 with the soils exposed in the trench excavated in the property to the north, the 10000 Santa Monica Boulevard site (Geocon & Feffer, 2012). If the correlations are correct, the fine-grained sediments near the top of the FT-5 trench, which at this location did not exhibit any soil development, are about 60,000 years old, making the entire section (to a depth of 3.5 meters) at least 210,000 years old. The 60,000-year age for the uppermost sediments is also consistent with the Infra-Red Stimulated Luminescence (IRSL) dating results obtained independently by Dr. Rhodes (2012b). These correlations are discussed further in the body of this report.

Based on the soils that we described in the three cores that were part of this study, the sediments in the southern part of the study area are at least 100,000 years old, whereas the sediments in the northernmost portion of the study area are about 30,000 years old. Both of these age estimates are minimum values, as these ages do not include any periods of time bracketing the stable periods of soil formation when depositional and erosional processes dominated. Furthermore, and significantly, a qualitative comparison of the soils exposed in core CB-26 and in trench FT-5 strongly suggests that the drilling process destroys some of the soil characteristics used in the age estimations, resulting in lower age values. As a result, the age estimates calculated from the cores should be used with caution. This finding most likely also applies to the soil-age estimates we made earlier from boring CB-3 (Earth Consultants, April 2012).

An effort was made to discern whether the sediments exposed in the borings and trench are consistent with and thus can be assigned to either the Cheviot Hills deposits (CHD) or Benedict Canyon Wash deposits (BCWD) of Kenney GeoScience (2012). Dr. Kenney assigned the fluvial gravels and sands observed at the top of the section near the southern end of the trench to the Benedict Canyon Wash deposits; in our opinion that is a viable interpretation. A review of the two borings to the north (CB-23 and CB-24) indicates that gravelly deposits that could represent the bottom of the Benedict Canyon Wash were observed at a depth of 20.75 feet (6.3 meters) in boring CB-23 and a depth of 36.5 feet (11.1 meters) in boring CB-24. Those depths correlate closely with Dr. Kenney's proposed bottom for the Benedict Canyon Wash. However, the finer-grained sediments both above and below these gravelly deposits are similar in texture, color and other characteristics, making it difficult to obtain a more definite determination of the contact between the Cheviot Hills and Benedict Canyon Wash deposits. That these deposits are very similar throughout also suggests that the source for these sediments has not changed in hundreds of thousands of years.

Thank you for the opportunity to assist the Beverly Hills School District and your firms with this study. Should you have any questions regarding our attached report, please do not hesitate to contact the undersigned.

Respectfully submitted for
Earth Consultants International, Inc.

Tania Gonzalez, CEG 1859
Vice-President
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Earth Consultants International

Supplemental Soil-Stratigraphic Studies to Estimate the Age of the Sediments Underlying the Beverly Hills High School Campus

BACKGROUND and METHODOLOGY

Soil-stratigraphic studies have been conducted previously at the campus of the Beverly Hills High School (BHHS) by this firm (Earth Consultants International, April 2012). Please refer to our previous report for a more thorough discussion on the background of soil age estimation and the methodology that we employed. As with our previous study, we described the soil profiles according to the characteristics and nomenclature established by the Soil Survey Staff (1975, 1992) and Birkeland (1984, 1999). Dry and moist colors of the samples were recorded using a Munsell Soil Color Chart.

Soil development index (SDI) values were calculated for the soil profiles observed based on the field descriptions using a modified version of the Harden (1982) index, and the maximum horizon index (MHI) of Ponti (1985). Soil properties used in the analyses include texture, color, structure, consistency, and presence of clay films or clay coatings. Both SDI and MHI values are considered useful relative indicators of age when comparing soils developed in similar parent materials under similar climatic conditions (Bornyasz and Rockwell, 1997; Rockwell et al., 1990; Rockwell et al., 1984; Harden, 1982). Minimum age estimates for the deposits were made by comparing the SDI and MHI values obtained for the soils described with those of dated soils developed in the southern California region under similar climatic and parent material conditions (Dolan et al., 1997; Dolan et al., 2000, and the soil age regressions referenced therein).

To calculate the SDI and MHI values for this study we used a parent material consisting of loamy sand, light gray (10YR 7/2) when dry, pale brown (10YR 6/3) when moist, single-grained, loose when dry and moist, non-sticky and non-plastic when wet. This assumed parent material is sandier and lighter-colored than the parent material that we used for the soil-age estimations presented in our April 2012 report, which consisted of a sandy loam, dark brown (10YR 3/3) when moist, dark yellowish brown (10YR 4/4) when dry, single-grained, loose to soft when dry, loose to very friable when moist, non-sticky and non-plastic when wet. The parent material used in our earlier report was based on a sedimentary bed observed near the bottom of trench FT-2. The parent material used in this study is intermediate between the "raw" alluvium (consisting of sand with 2.5Y and 10YR hues) used by Helms (Geocon & Feffer, 2012) for the soil-age estimations in the 10000 site, and the parent material we used earlier. The result of using this revised parent material is a slight increase in the estimated ages presented in our earlier report.

SCOPE OF WORK

For this study we were tasked with reviewing and describing the near-surface sediments in three borings and one trench emplaced near the northeastern corner of the BHHS campus. The

core descriptions were made before trench FT-5 was excavated, and from that review we were to provide an opinion as to whether or not similar sediments were likely to be exposed along the length of the trench. This in turn would provide data on whether or not the uppermost (i.e., most recent) sediments extend unbroken across this portion of the school campus (a laterally discontinuous package could suggest faulting and/or channeling, for example). Given that the borehole data indicated that the top of the San Pedro sediments is vertically offset through this area, a review of the uppermost section would provide data on whether or not this break or step in the stratigraphy extends upwards to shallow depth, within the area and at the depth that was to be exposed by trenching.

The soil profiles described are summarized as follows:

1. Profile 1: On the east wall of Trench FT-5 at station 0+81.

2. Profile 2: Upper 40 feet of Boring CB-23, which was emplaced about half-way through the study area, in the immediate vicinity of Station 0+65 of Trench FT-5.

3. Profile 3: Upper 40 feet of Boring CB-24, which was emplaced at the north end of the study area, in the immediate vicinity of Station 1+10 of trench FT-5.

4. Profile 4: Upper 40 feet of Boring CB-26, which was emplaced at the south end of the study area, in the immediate vicinity of Station 0+00 of trench FT-5.

Summarized soil descriptions for these profiles are provided in Tables 1 through 4. The complete soil descriptions for each of these profiles are included as Appendix A.

As an addendum to this study, we also reviewed the soil-age estimations made by John Helms for the Geocon West/Feffer Geological Consulting team that studied the fault rupture hazard at the 10000 Santa Monica Boulevard site (the "10000 site") north of the BHHS campus (Geocon & Feffer, 2012). Specifically, we were asked to correlate, if possible, the sediments and soils described in their trench with the sediments and soils described in trench FT-5, and use the age estimates from the 10000 site study to develop a more thorough understanding of the stratigraphic history of the sediments underlying this part of the Cheviot Hills. To that end, we reviewed the soil development indices developed by Mr. Holmes, and compared his soil descriptions to those that we made from borings and trench exposures at BHHS. Together with Leighton's personnel, we also compared the geological descriptions of the units described in the 10000 site with the units described in trench FT-5, in an effort to correlate the geological units across the area between the two exposures. The correlations made, including age estimates for these units, are discussed further below.

FINDINGS

The sediments described in all four profiles are terrestrial materials consisting primarily of alluvial fan, fluvial and mudflow deposits. Notable differences in the amount and extent of soil formation were observed among the profiles described. Specifically, significant soil development was observed in the core of boring CB-26, at the south end of the study area. Four separate soils were identified in the upper 9.14 meters (30 feet) of this core, indicating at least four separate periods of stability when soil-forming processes dominated. The uppermost

soil has an A/Bt1/Bt2 profile, colors in the 7.5YR hue, and many moderately thick clay films in pores and bridging grains. The argillic horizons have a combined thickness of 95 cm (3.12 feet). The next soil down has an A/Btj/C1/C2 profile, 7.5YR hues in the A/Btj/C1 horizons, and few to common thin clay films on ped faces and bridging grains. This soil was exposed to soil-forming processes for a relatively short period of time or its upper horizons were removed by erosion before the overlying sediment was deposited. The third deeper soil is well developed, with a Bt1/B2/Bt3/BC/Cl_{am} profile, 7.5YR hues in the argillic horizons, and common to many moderately thick clay films on ped faces, bridging grains, and in pores. The three argillic (Bt) horizons combined have a thickness of 135 cm (4.43 feet), which could indicate wet climatic conditions during their formation. The deepest soil observed and described has a Bt/C_{lam}1/C_{lam}2 soil profile, 7.5YR hues in the argillic horizon, and few to many thin clay films on ped faces, in pores, and bridging grains. The argillic horizon is only 33 cm (1.08 feet) thick, whereas the underlying C_{lam} horizons have a combined thickness of 221 cm (7.25 feet). This strongly suggests that the uppermost section of this soil was removed by erosion before deposition of the overlying sediment.

In contrast, the core of boring CB-24, at the north end of the study area, displays only minor soil development in a profile dominated by primary sedimentary characteristics. Furthermore, the deposits modified by soil development are both overlain and underlain by sediments not altered by pedogenesis. The sediments comprising this core are typically laminated to thinly bedded, and color banded (variously described as "varved" or "tiger striped"). Two soils were identified in this profile, with the first soil occurring at a depth of between 2.36 and 3.63 meters (7.75 and 11.92 feet), and the second between 3.63 and 5.69 meters (11.92 and 18.67 feet) depth. Both soils display juvenile argillic horizons (Btj) underlain by C horizons. Few thin clay films on ped faces were observed only in the juvenile argillic horizon of the deeper soil.

The core of boring CB-23 was disturbed during the drilling process, exhibiting concentric rings of material of different textures and colors that were evident when the core was broken both longitudinally and in cross-section so as to expose the materials inside. The descriptions of the soils and sediments from that core should therefore be used with caution. Nevertheless, the descriptions do suggest that, as with the core of boring CB-24, most of the materials exhibit primary sedimentary characteristics, with pedogenic development observed only in two portions of the 12.2-m- (40-foot-) thick section. The first of these soils was observed near the surface, at a depth of between 0.66 and 2.64 meters (2.16 and 8.66 feet), although the soil may extend deeper as no core was recovered for the section between 2.64 and 3.05 meters (8.66 and 10 feet). This moderately well-developed soil has an AB/Bt1/Bt2/Bt3 profile, 7.5YR and 10YR hues, and many thin to moderately thick clay films on ped faces, on clasts, and bridging grains in the upper argillic horizon. The argillic horizons have a combined thickness of at least 112 cm (3.7 feet). The second soil described was deeper in the core, at a depth of 9.14 to 12.19 meters (30 to 40 feet). This soil is unusual and unlike the other soils described for this study in that its A1/A2 soil horizons appear to have been burned, as suggested by localized black stains, and because the soil clasts from these horizons do not weigh as much as expected for their size. Structures reminiscent of worm casts were observed in the A2/Bt1 horizon. The combined thickness of the argillic horizons is 71 cm (2.3 feet). Other characteristics include 10YR color hues, moderate to strong angular blocky structure, and common to many thin clay films on ped faces, and many moderately thick clay films in pores and bridging grains.

Finally, the profile described at Station 0+81 in trench FT-5 showed thin layers of non-altered sediment overlying a pedogenically altered section containing three soils. The sedimentary package overlying the uppermost soil increased in thickness toward the north, consistent with the observations made in boring CB-24. The first soil described in this part of the trench has a well-developed soil with an A/Bt1/Bt2/BC profile, 10YR to 7.5YR hues and 2.5Y gleying. The better developed Bt2 horizon has strong fine to moderate prismatic structure breaking to strong angular blocky structure, and many thick to common moderately thick clay films on ped faces and continuous moderately thick clay films bridging grains.

The second soil described is truncated as evidenced by the lack of an A soil horizon and a thin argillic horizon. Colors in this soil range from 2.5Y to 7.5YR. The argillic horizon has many moderately thick clay films bridging grains, and continuous thin and many moderately thick clay films on ped faces. The third and deepest soil observed and described in the trench has a relatively thin argillic horizon underlain by three BC horizons. This deeper soil has 10YR and 7.5YR hues with 2.5Y and 5Y gleying, weak to moderate fine subangular blocky structure, and common to many moderately thick clay films on ped faces in pores, and bridging grains.

AGE ESTIMATES

As we discussed in our April 10, 2012 report, soil age estimates do not provide an absolute age for the sediments; they only provide an estimate of the amount of time that a soil was exposed to soil-forming processes at or near the ground surface. The estimates are also typically minimum values given that erosion often removes the uppermost section of a soil before it gets buried by sediment. This was observed in several of the soils described for this study, wherein the topsoil (A horizon) and part of the argillic (Bt) soil horizons were not present. The lack of these uppermost horizons limits the age estimates obtained using the Soil Development Index (SDI) method, as this method adds up the values calculated for each horizon, taking into consideration the total thickness of the horizon, to arrive at a total soil development index value. For this reason, for the truncated soils we have given preference to the age estimates developed using the Mean Horizon Index (MHI) method, which is based on the characteristics of the best developed horizon within a soil, and is also independent of the thickness of the horizon. The MHI and SDI values calculated for the soils described are provided in the two far-right columns in Tables 1 through 4, and on Table 5. For a summary of the age estimates discussed below, refer to Table 5.

The topmost 12.2 m (40-foot) section of boring CB-26 at the south end of the study area has four stacked soils. The first, third and fourth soils (Soils 1, 3 and 4) in that profile are moderately well-developed, with MHI values around 0.45. The first and third soils are each estimated to have been exposed to soil-forming processes for about 30,000 years, whereas the fourth soil is estimated to have developed over a period of about 26,000 years (median values). Soil 2 in this profile has characteristics that indicate a shorter exposure to soil-forming processes, with estimated ages of about 12,000. Combining all four soils together yields an estimated minimum age for the sediments of nearly 100,000 years.

Three soils were described in the profile exposed near Station 0+81 in trench FT-5. The two deeper soils (Soils 2 and 3) were truncated, as evidenced by a lack of topsoils (A horizons) and by thin argillic horizons. Soil 2 in particular has an overall thickness of 40 cm (1.3 feet), with

an argillic horizon only 26 cm (0.85 foot) thick. However, the preserved soil sections show characteristics consistent with strong soil development, including many to continuous clay films and prismatic soil structure. MHI values we calculated for these soils range from 0.48 (Soil 2) to 0.61 (Soil 3). The first soil (Soil 1) in the profile is estimated to have a median age of about 47,000 years; Soil 2 about 33,000 years, and Soil 3, 68,500 years. The combined age of the stacked soils is 148,500 years using the MHI method (preferred), and 41,500 years using the SDI method.

As mentioned above, the core of boring CB-23 appeared disturbed and is thus believed to be less reliable. This boring, which was emplaced between the two profiles described above (CB-26 and FT-5), includes two soils, one near the current ground surface, and one considerably deeper. Both soils preserve their A soil horizons and have strongly developed argillic horizons. Because the soils preserve their A horizons and are each about 200 cm (6.56 feet) thick, the age estimates obtained using the MHI method correlate closely with the age estimates calculated using the SDI method. The first soil (Soil 1) is estimated to have been exposed to soil-forming processes for 26,000 to 38,000 years, and the second, deeper soil (Soil 2), for about 34,000 to 47,000 years. Since the two soils are separated by 6.5 m (21.3 feet) of sediment, potentially significant additional time needs to have occurred between the two periods of soil formation. Thus, the combined age of 60,500-85,000 years is a minimum value, and not deemed representative of the age of the entire section. [The minimum and maximum age estimates that capture 95% of the data used to construct the regression used in the analysis are 19,000 and 245,000 years, respectively, using both the MHI and SDI age estimates. For additional information refer to Table 5.]

The boring emplaced at the north end of the study area (CB-24) displayed the least amount of soil development, with two relatively weak soils observed in the section between 2.36 and 5.69 meters (7.7 and 18.7 feet). Both soils have only incipient (juvenile) argillic soil horizons with none to few clay films. The first soil is estimated to have been exposed to soil-forming processes for 14,000 years, and the second soil for about 14,500 to 20,500 years. Thus, the combined estimates yield an age for the pedogenically altered section of about 29,000-34,500 years. Additional un-quantified age is assigned to the 12.2 m (40-foot) section given that unaltered sediments both cap and underlie the soils described above. Essentially, in the area where this boring was emplaced, depositional (and possibly erosional) processes have dominated, limiting the usefulness of soils for age estimation.

Visually, the soils and sediments observed in the core of boring CB-26 appear to be better developed and older than the sediments observed in the trench at Station 0+81, even though the age estimates, using the MHI values, indicate otherwise. This suggests that soil descriptions made from cores have limitations that can affect the final age results. Specifically, it is harder to discern and thus describe the soil structure and the quality and quantity of the clay films in a core as compared to a trench wall. Soil structure in particular seems to be compromised by the drilling process. Accordingly, we suggest that the age estimates obtained for the cores and presented above are about 30 to 35% lower than the values that we would have calculated for the same sections had the descriptions been made from a trench or exposure rather than a core.

Table 1: Abbreviated Soil Profile Descriptions - Profile FT-5

Horizon	Depth (cm)	Thickness (cm)	Texture	Color		Structure	Consistency			Clay Films	MHI	SDI
				Moist	Dry		Dry	Moist	Wet			
First Soil												
2Ab	55 - 62	7	fSC	10YR 3/3	10YR 4/3	m - 1fsbk	sh	fri	s p	2-3npf	0.2773	1.9411
2Btb1	62 - 80	18	SC	10YR 3/3	10YR 3/2	2-3msbk	vh	vfi	s p	2mk-3npf, 4mkbr	0.4854	8.7371
2Btb2	80 - 134	54	SC-C	2.5Y 3/2 & 7.5YR 3/4	2.5Y 3/2 & 7.5YR 4/6	3f-mpr - 3fabk	h	fi	s p-vp	2k&3mkpf, 4mkbr	**0.5415**	29.2425
3BCb	134 - 147	13	SC	7.5YR 3/3	7.5YR 4/3 & 3/3	m - 2fsbk	vh	fi-vfi	s p	1mk&2npf, 3nbr	0.4792	6.2302
												46.1509
Second Soil												
4Btb3	147 - 173	26	SC	2.5Y 3/2 & 7.5YR 4/4	10YR 3/2 & 7.5YR 4/4	2fpr	vh-eh	sfi	s p	3mkbr, 4n&3mkpf	**0.4834**	12.5684
5BCb2	173 - 187	14	SC	7.5YR 3/3	7.5YR 4/4 & 2.5Y 4/2	m - 2fsbk	h	fi	s p	2npf, 3nbr	0.4336	6.0697
												18.6381
Third Soil												
6Btb4	187-202	15	SC-C	10YR 3/3 & 2.5Y 3.5/2	7.5YR 3/3 & 3/2	2fpr - 2fsbk	vh	fi	s p	2mk&3npf, 3mkbr	**0.6075**	9.1127
6BCb3	202 - 243	41	SCL	10YR 3/3 & 2.5Y 4/2	10YR 4/4 & 7.5YR 3/2	m - 1fsbk	so	fri	s p	2mkpf, 2-3mkpo	0.3193	13.0933
6BCb4	243 - 256	13	SC-C	10YR 4/4 & 5Y 3.5/1	7.5YR 4/6 & 5Y 4/1	m - 1fmsbk	so	fri	s p-vp	3mkpf&po, 2mk&3nbr	0.3679	4.7831
7BCb5	256 - 340+	84	SCL	10YR 3/3	10YR 3/3 & 7.5YR 3/3	sg-1msbk	lo-so	lo-vfri	ss-s sp	1npf	0.226	18.9872
												45.9763

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Table 2: Abbreviated Soil Profile Descriptions - Profile CB-23

Horizon	Depth (cm)	Thickness (cm)	Texture	Color		Structure	Consistency				Clay Films	MHI	SDI
				Moist	Dry		Dry	Moist		Wet			
First Soil													
AB	66-152	86	SiC	7.5YR 3.5/3	10YR 4.5/3	unk.	vh-eh	fri	vs	p-vp	none	0.3619	31.1202
Bt1	152-178	26	C	10YR 3/3	10YR 5/3 & 7.5YR 4/3	m - 3c-vcabk	eh	efi	s	p-vp	3n-mkpf, 3mkcl, 3nbr	**0.5016**	13.0407
Bt2	178-218	40	C	10YR 4/4	10YR 5/4	1f-mabk	h-vh	vfi	s	p	1npf, 3n-mkcl	0.4106	16.4225
Bt3	218-264	46	SC-C	10YR 3.5/4	10YR 5/4, 7.5YR 4/4 & 2.5Y 5/2	m	vh	vfi	s	p	2npf, 2-3nbr	0.3914	18.7851
													78.5858
											Normalized to 200 cm		**79.3685**
Second Soil													
9Ab1	914-925	11	SiC	2.5Y 4/2	2.5Y 5/2	3fabk	vh	vfi	vs	vp	2npf, 1-2ncl, 2-3npo	**0.5426**	5.9688
9Ab2/Btb1	925-940	15	C	10YR 4/2 & 7.5YR 3/3	10YR 4/2 & 7.5YR 4/3	3f-cabk	vh	vfi	vs	vp	2-4npf, 3nbr	0.4837	7.2562
9Btb2	940-996	56	C	10YR 4/3, 2.5Y 4/2 & 7.5YR 3/3	10YR 3/3, 2.5Y 4/2 & 7.5YR 3/3	2cabk	h-vh	fi	s	p	2n-mkpf, 3mkpo, 3mkbr	0.423	23.6887
9BCb1	1000-1219	219	C-SC	10YR 3/3 & 7.5YR 3/3	10YR 4.5/2, 7.5YR 5/6 & 4/4	3c-vcabk	vh-eh	vfi	s	p	2mkpf, 2npo, 3mkbr	0.4908	107.4874
													144.4011
											Normalized to 200 cm		**94.8292**

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Table 3: Abbreviated Soil Profile Descriptions - Profile CB-24

Horizon	Depth (cm)	Thickness (cm)	Texture	Color		Structure	Consistency			Clay Films	MHI	SDI
				Moist	Dry		Dry	Moist	Wet			
First Soil												
2Btj1	236-318	82	C	10YR 4/3 & 2.5Y 3.5/2	10YR 4/3, 2.5Y 4/1 & 2.5Y 3/2	m - 3c-vcabk	vh-eh	fri	s p	none	0.3295	27.0187
3C2	318-363	45	SiC	7.5YR 4/4 & 2.5Y 4/2	7.5YR 5/4 & 2.5Y 6/2	3m-cabk				none	0.249	11.2031
												38.2218
Second Soil												
4Btj2	363-511	148	C	7.5YR 3.5/3 & 2.5Y 4/2	7.5YR 5/4 & 2.5Y 5/2	m - 2m-cabk	vh	sfi	s p	1npf	**0.3259**	48.2293
5C3	511-569	58	gSCL	10YR 3/4 & 5Y4.5/2	10YR 5/4 & 5Y 5/2	m - 3m-cabk	h-vh	sfi	s sp-p	none	0.2941	17.0594
												65.2887
										Normalized to 200 cm		**63.5239**

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Table 4: Abbreviated Soil Profile Descriptions - Profile CB-26

Horizon	Depth (cm)	Thickness (cm)	Texture	Color		Structure	Consistency			Clay Films	MHI	SDI
				Moist	Dry		Dry	Moist	Wet			
First Soil												
4Ab	241-263	34	SL	7.5YR 3/2	7.5YR 4/3.5	unk.		vfri-fri	s p	1-2ncl, 1-2nbr	0.2956	10.0502
4Btb1	305-340	65	SC	7.5YR 4/4	7.5YR 5/3 & 6/2	3fabk	vh	fi	s-vs p	2-3mkpf, 4mk-kcl, 3mkbr, 3mkpo	**0.4541**	29.5187
4Btb2	340-370	30	C-SiC	7.5YR 4/4 & 5Y 4.5/1	7.5YR 4/3 & 5Y 5/1	2-3fabk	h	fi	vs p	3mkpo	0.417	12.5093
												52.0782
Second Soil												
5Ab/Btjb	370-399	29	LS-S	7.5YR 3.5/2	7.5YR 4/3	unk.	so	vfri	ns np	1-2npf, 1-2nbr	0.1665	4.8296
5Cb1	399-442	43	fSC	7.5YR 4/3 & 5Y 3/2	7.5YR 5/4-4/4 & 5Y 5/2	m	vh	fi	s p		0.2941	12.6475
5Cb2	442-475	33	fSC-SiC	10YR 4/4 & 2.5Y 5/2	10YR 5/4 & 2.5Y 5/2	m	vh-eh	vfi-efi	s p		**0.2993**	9.8754
												27.3525
Third Soil												
6Btb3	475-533	58	C-SC	7.5YR 3/2.5	7.5YR 3/3 & 3/2	2m-cabk	sh	sfi	vs vp	3-4mkpf, 2mkbr	0.4412	25.5912
6Btb4	533-554	21	C	7.5YR 3/3 & 2.5Y 4/2	7.5YR 3/2 & 4/4, 2.5Y 3/1	3m-cabk	vh	sfi	vs vp	2mkpf, 3mkbr	**0.461**	9.6814
7Btb5	554-610	56	SiC	7.5YR 4/3.5 & 2.5Y 4/2	7.5YR 4/4 & 2.5Y 5/1	2cabk	vh-eh	fri	vs vp	2ncl, 1-2npf, 3npo	0.4179	23.4016
8BCb1	610-625	15	fSC	10YR 4/3 & 7.5YR 4/4	10YR 4/4 & 7.5YR 4/4	1-2mabk	h	fri	s p	1npf, 2-3nbr	0.3538	5.3064
8Clamb1	625-660	35	SiC	10YR 4/4 & 7.5YR 4/4	10YR 5/4 & 7.5YR 4/3.5	m-1cabk	so	fri	vs vp	2npf	0.2991	10.4698
												74.4504
Fourth Soil												
9Btb6	660-693	33	fSC	7.5YR 4/3 & 2.5Y 3/2	7.5YR 4/3 & 2.5Y 4/1	1f-mabk		fri	s p	1-2npf, 2-3npo	0.3406	11.2411
9Clamb2	693-851	158	SL-L	10YR 3.5/3 & 4/4	10YR 5/4 & 10-7.5YR 4/4	m-2f-mabk	so	fri	ss np-sp	2-3npf, 2-3nbr	0.2749	43.4325
10Clamb3	851-914	63	C	10YR 3/4 & 7.5YR 3/3	10YR 4/4 & 7.5YR 3/2	m-2m-cabk	vh-eh	fi	s p	2npf, 3n-mkcl	**0.4342**	27.3573
												82.0309
										Normalized to 200		**58.5818**

ABBREVIATIONS

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Table 5: Age Estimates for the Soils Described in this Study
(ages rounded to the nearest 500 years)

Soil	SDI	MHI	Average Age (years)	Minimum Age (years)	Maximum Age (years)
Profile FT-5-1					
Soil 1	46.15		15,500	5,000	48,500
		0.54	47,000	14,500	128,500
Soil 2	18.64		10,500	3,500	34,000
		0.48	33,000	10,500	105,000
Soil 3	45.98		15,500	5,000	48,500
		0.61	68,500	22,000	220,000
Totals for section (using SDIs)			41,500	13,500	131,000
Totals for section (using MHIs) **PREFERRED AGE ESTIMATES**			**148,500**	**47,000**	**453,500**
Profile CB-23					
Soil 1	79.37		26,500	8,000	83,000
		0.50	38,000	12,000	116,500
Soil 2	94.33		34,000	11,000	105,000
		0.54	47,000	14,500	128,500
Totals for section (using SDIs)			**60,500**	**19,000**	**188,000**
Totals for section (using MHIs)			**85,000**	**26,500**	**245,000**
Profile CB-24					
Soil 1	38.22		14,000	4,500	43,500
		0.33	14,500	4,500	46,000
Soil 2	63.52		20,500	6,500	64,000
		0.33	14,500	4,500	46,000
Totals for section (using SDIs)			**34,500**	**11,000**	**107,500**
Totals for section (using MHIs)			**29,000**	**9,000**	**92,000**
Profile CB-26					
Soil 1	52.08		17,000	5,000	54,000
		0.45	30,000	9,000	92,500
Soil 2	27.36		11,500	3,500	36,500
		0.30	12,000	4,000	39,500
Soil 3	74.45		24,500	7,500	76,500
		0.46	30,000	9,500	94,000
Soil 4	82.03		27,000	8,000	85,000
		0.43	25,500	8,000	81,500
Totals for section (using SDIs)			**80,000**	**24,000**	**252,000**
Totals for section (using MHIs)			**97,500**	**30,500**	**307,500**

UNIT CORRELATIONS

As mentioned above, as part of this scope of work, together with Leighton personnel, we attempted to correlate some of the geologic units underlying the BHHS campus with the geologic units described in the trench excavated in the 10000 site (Geocon & Feffer, 2012). The correlations made are based on elevation, texture (grain size), soil development, and other qualitative characteristics of the units that permitted a match between them. Table 6 summarizes the results of this analysis, and provides age estimates for individual units based on the soil-age estimates made both by John Helms for Geocon & Feffer, and Tania Gonzalez for ECI. The table also includes the dating results using Infra-Red Stimulated Luminescence (IRSL) provided by Dr. Ed Rhodes for the samples he collected in Leighton's trench FT-5. In

general, the younger age estimates obtained from the soil-stratigraphic studies agree with the IRSL results. The deeper sediment samples (from Leighton's Unit 6) returned IRSL-derived ages that appear to be too young. Although the IRSL method is thought to be useful to date sediments at least 200,000 years old (Rhodes, 2011), it is possible that these sediments have a limited capacity to take on or trap electrons, and thus saturate at relatively low doses, meaning that the age results obtained under-represent the true age of the materials.

Table 6: Unit Correlations with Age Estimates

Geologic Units		Soils for Age Estimation				Best Age Estimate based on ECI & Helms (ka)	IRSL Age Results (ka) (Rhodes, 2012b)
Leighton FT-5	Geocon and Feffer	ECI (April 2012 and this report)	Time Exposed to Soil Development (range based on SDI and MHI values, in ka)	Helms (Geocon & Feffer, 2012)	Time Exposed to Soil Development (in ka)		
Unit 1	Unit 1	FT-2 Qal1-3	40	SP3, SS + BS1	30-60	30-60	52.3-66.3 (bottom Unit 1 in FT-5)
	Unit 2			SP3, BS2-4	68-135	68-135	
Unit 2	Unit 4 Upper	FT-5 Soil1	24-60	SP1, SS	30-70	54-130	
Unit 3	Unit 4 Lower	FT-5 Soil2	26-80	SP2, SS+BS1	30-70	80-200	
Unit 3a	Unit 5	FT-5 Soil3	16-69	SP1, BS1-2; SP2 BS2-3	23-45	96-245	110-144
Unit 4	Unit 6	Not described		SP1, BS3; SP2, BS4	15-30	111-275	
Unit 5	Unit 7	No soils preserved		SP3, BS5	15-30	126-305	100-128
Unit 6 (Cheviot Hills Deposits?)	Not exposed	CB-26, Soil1	17-30			143-335	121-159 (2 samples combined)

Abbreviations:
SDI = Soil Development Index; **MHI** = Mean Horizon Index (see text of report)
SP = Soil Profile; **SS** = Surface Soil; **BS** = Buried Soil (Applies to Helm's soils, see Geocon & Feffer, 2012).
ka = 1000 years

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APPENDIX A:
Beverly Hills High School Trenching Project
SOIL DESCRIPTIONS

Profile No. FT-5-1 – Leighton's Fault Trench 5, East Wall at approximately Station 0+81.
Section overlain by 38 cm of concrete and road base aggregate that were not included in the descriptions below.

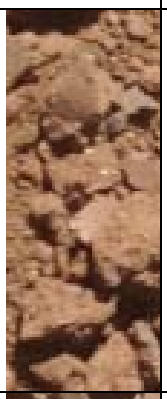
Depth (ft)	Depth (cm)	Horizon Designation	Photograph	Description
0 – 0.69	0 – 21	Af		Gravelly CLAY, mixed; dark brown; massive; abrupt wavy boundary. No samples collected.
0.69 – 0.92	21 - 28	C1 / Af		Fine SANDY LOAM; dark yellowish brown (10YR 3/4) with brown (10YR 4/3) when slightly moist, dark brown (10YR 3/3) when moist; massive; dense; loose to soft when dry, loose to very friable when moist, slightly sticky and non-plastic to slightly plastic when wet; few thin stains; abrupt wavy boundary.
0.92 – 1.48	28 - 45	C2		Very fine SANDY CLAY LOAM with lenses of medium to coarse SAND at top that pinch out laterally; dark yellowish brown (10YR 4/3.5) when slightly moist, dark yellowish brown (10YR 3/4) when moist; massive; loose to soft when dry, loose to very friable when moist, slightly sticky and slightly plastic to plastic when wet; no clay films or stains observed; abrupt wavy boundary.

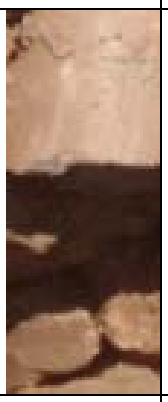
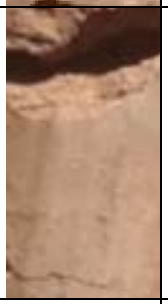
Depth (ft)	Depth (cm)	Horizon Designation	Photograph	Description
1.48 – 1.8	45 – 55	C3		SILTY CLAY LOAM; brown (10YR 4/3) with common dark to very dark grayish brown and yellowish red (5YR 4/6) mottles when dry, dark brown (10YR 3/3) when wet and mixed; massive, thinly laminated; soft when dry, friable when moist, slightly sticky and slightly plastic to plastic when wet; common thin very dark grayish (10YR 3/2) clay stains; abrupt wavy boundary.
1.8 – 2.03	55 – 62	2Ab		Fine SANDY CLAY, possibly overprinted with clay from above; brown (10YR 4/3) when dry, dark brown (10YR 3/3) when moist; massive breaking to weak fine subangular blocky structure; slightly hard when dry, firm when moist, sticky and plastic when wet; common to many thin dark yellowish brown (10YR 4/4 to 4/6) clay films on ped faces; many fine black MnO_2 nodules; abrupt to clear and wavy boundary.
2.03 – 2.62	62 - 80	2Btb1		Fine to coarse SAND CLAY; very dark grayish brown (10YR 3/2) when dry, dark brown (10YR 3/3) when moist; moderate to strong medium subangular blocky structure; very hard when dry, very firm when moist, sticky and plastic when wet; common moderately thick and many thin clay films on ped faces, continuous moderately thick clay films bridging grains; clear wavy to irregular boundary.
2.62 – 4.40	80 - 134	2Btb2		SANDY CLAY to CLAY; gleyed, dark olive brown (2.5Y 3/2) with strong brown (7.5YR 4/6) mottles when dry, dark olive brown (2.5Y 3/2) with dark brown (7.5YR ¾) mottles when moist; strong fine to medium prismatic breaking to strong fine angular blocky soil structure; hard when dry, firm when moist, sticky and plastic to very plastic when wet; common thick and many moderately thick clay films on ped faces, continuous moderately thick clay films bridging grains; black MnO_2 staining; clear wavy to irregular boundary, with scattered gravel at base.

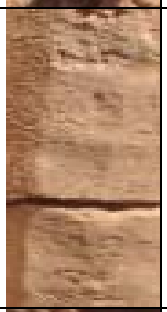
Depth (ft)	Depth (cm)	Horizon Designation	Photograph	Description
4.40 – 4.82	134 – 147	3BCb1		SANDY CLAY, overprinted with clay from above; brown (7.5YR 4/3) when dry, dark brown (7.5YR 3/3) when moist; massive breaking to moderate fine subangular blocky structure; very hard when dry, firm to very firm when moist, sticky and plastic when wet; few moderately thick and common thin dark brown (7.5YR 3/3) clay films on ped faces, many thin clay films bridging grains; MnO_2 staining; abrupt wavy boundary.
4.82 – 5.68	147 – 173	4Btb3		SANDY CLAY; very dark grayish brown (10YR 3/2) with brown (7.5YR 4/4) mottles when dry, very dark grayish brown (2.5Y 3/2) with brown (7.5YR 4/4) mottles when moist; moderate fine prismatic soil structure; very hard to extremely hard when dry, slightly firm when moist, sticky and plastic when wet; continuous thin and many moderately thick clay films on ped faces, many moderately thick clay films bridging grains; MnO_2 staining; clear wavy boundary.
5.68 – 6.14	173 – 187	5BCb2		SANDY CLAY with fine gravel, overprinted with clay from above; brown (7.5YR 4/4) with dark grayish brown (2.5Y 4/2) gleyed zones when moist, dark brown (7.5YR 3/3) when wet; massive breaking to moderate fine subangular blocky soil structure; hard when dry, firm when moist, sticky and plastic when wet; common thin clay films on ped faces, many thin clay films bridging grains; few thin $CaCO_3$ nodules, MnO_2 staining; abrupt wavy boundary.
6.14 – 6.63	187 – 202	6Btb4		SANDY CLAY to CLAY; dark brown (7.5YR 3/3 & 3/2) when slightly moist, dark brown (10YR 3/3) and dark to very dark grayish brown (2.5Y 3.5/2) when moist, dark yellowish brown (10YR 3.5/4) when mixed and wet; moderate fine prismatic breaking to moderate fine subangular blocky soil structure; very hard when dry, firm when moist, sticky and plastic when wet; common moderately thick and many thin clay films on ped faces, many moderately thick clay films bridging grains; many MnO_2 stains; clear wavy boundary.

Depth (ft)	Depth (cm)	Horizon Designation	Photograph	Description
6.63 – 7.97	202– 243	6BCb3		SANDY CLAY LOAM; dark yellowish brown (10YR 4/4) when dry, dark brown (10YR 3/3) and dark grayish brown (2.5Y 4/2) when moist; massive breaking to weak fine subangular blocky structure; soft when dry, friable when moist, sticky and plastic when wet; common moderately thick clay films on ped faces, common to many moderately thick clay films in pores; few weathered gravel; clear to gradual wavy boundary.
7.97 – 8.40	243 – 256	6BCb4		SANDY CLAY to CLAY; strong brown (7.5YR 4/6) and dark gray (5Y 4/1) when moist, dark yellowish brown (10YR 4/4) and dark to very dark gray (5Y 4.5/1) when wet; massive breaking to weak fine to medium subangular blocky soil structure; soft when dry, friable when moist, sticky and plastic to very plastic when wet; few thin clay films on ped faces, many thin clay coatings on clasts; gravel up to ½-inch diameter; abrupt wavy boundary.
8.40 – 11.15+	256 – 340+	7BCb5		Fining upward sequences of sand and fine gravel to 1-inch diameter with SANDY CLAY LOAM zones; dark brown (10YR 3/3 & 7.5YR 3/3) when slightly moist, dark brown (10YR 3/3) when moist; single-grained to weak medium subangular blocky soil structure; loose to soft when dry, loose to very friable when moist, slightly sticky to sticky and slightly plastic when wet; few thin clay films on ped faces, few thin clay coatings on clasts.

Profile No. CB-23 – Leighton's Boring CB-23.
Emplaced at approximately Station 0+65 on Trench FT-5.
This core was disturbed, possibly as a result of missing teeth on the drilling bit. Although descriptions are provided herein, several sections were disturbed and are thus deemed not fully representative of the sediments underlying this location.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
0 – 2.17	0 – 0.66	Ac	NA	According to Leighton's boring log, 8 inches of reinforced concrete over 5 inches of aggregate base, overlying 13 inches of reinforced concrete slab.
2.17 – 5.0	0.66 – 1.52	Af? / AB		SILTY CLAY; brown (10YR4.5/3) when dry, dark brown (7.5YR 3.5/3) when moist; structure not resolvable as section was hand-augered; very hard to extremely hard when dry, friable when moist, very sticky and plastic to very plastic when wet; scattered chips of slate; few $CaCO_3$ coatings.
5.0 – 5.83	1.52 – 1.78	Bt1		CLAY with gravel; brown (10YR 5/3 and 7.5YR 4/3) when dry, dark brown (10YR 3/3) when moist; massive breaking to strong coarse to very coarse angular blocky structure; extremely hard when dry, extremely firm when moist, sticky and plastic when wet; many thin to moderately thick clay films on ped faces, many moderately thick clay films on clasts, and many thin clay films bridging grains; some $CaCO_3$ coatings; very dense, compacted.
5.83 – 7.17	1.78 – 2.18	Bt2		CLAY; yellowish brown (10YR 5/4) when dry, dark yellowish brown (10YR 4/4) when moist; weak fine to medium angular blocky structure; hard to very hard when dry, very firm when moist, sticky and plastic when wet; few thin clay films on ped faces and many thin to moderately thick clay films on clasts; many clasts consisting of gneiss, granite, basalt, and slate.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
7.17 – 8.67	2.18 – 2.64	Bt3		SANDY CLAY to CLAY; mottled yellowish brown (10YR 5/4), brown (7.5YR 4/4), and grayish brown (2.5Y 5/2) when dry, dark yellowish brown (10YR 3.5/4) when moist; massive; very hard when dry, very firm when moist, sticky and plastic when wet; common thin clay films on ped faces and common to many thin clay films bridging grains; 10-15% fine subrounded gravel consisting of basalt, slate, shale, and granite; many colors in core, especially at the bottom of the section.
8.67 – 10	2.64 – 3.05	NR		No Recovery
10 – 11.17	3.05 – 3.40	2C1? (disturbed)		GRAVELLY SAND; many colors; loose when dry; non-sticky and non-plastic when wet.
11.17 – 11.5	3.40 – 3.51	(disturbed)		Mixed material with concentric rings around the core; many colors and textures.
11.5 – 12.17	3.51 – 3.71	3C2		SILTY CLAY to CLAY; dark yellowish brown (10YR 4/4) when dry, dark yellowish brown (10YR 3/4) when moist; massive; extremely hard when dry, very firm when moist, sticky and plastic when wet; laminated; abundant gravel; abrupt boundary.
12.17 – 12.92	3.71-3.94	4C3		GRAVELLY SANDY CLAY; brown (7.5YR 4/3) when dry, brown (7.5YR 5/4) when moist; massive; very hard when dry, slightly firm when moist, slightly sticky to sticky and slightly plastic when wet; 20-30% gravel; horizon feels compressed.
12.92 – 13.92	3.94 – 4.24	5C4		SANDY CLAY LOAM; strong brown (7.5YR 4/6) with strong brown (7.5YR 5/6) and grayish brown (2.5Y 5/2.5) mottles when dry, brown (7.5YR 4/4) with strong brown (7.5YR 4/6) and dark grayish brown (2.5Y 4/2) mottles when moist; massive; extremely hard when dry, very firm when moist, slightly sticky to sticky and plastic when wet; gleyed; 3-5% gravel consisting of schist and sandstone.
13.92 – 15.0	4.24 – 4.57	NR		No Recovery

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
15.0 – 17.96	4.57 – 5.47	5C5		SILTY CLAY LOAM; strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) when dry, brown (7.5YR 4/4) and grayish brown (2.5Y 5/2) when moist; massive; very hard to extremely hard when dry, firm to very firm when moist, slightly sticky and slightly plastic to plastic when wet; $CaCO_3$ nodules; few pinhole-sized pores; fine chips of Monterey shale; clear wavy boundary.
17.96 – 20.0	5.47 – 6.10	5C6		SANDY CLAY grading down to SILTY CLAY; brown (10YR 4.5/3) when dry, dark yellowish brown (10YR 3/4) when moist; massive; very hard to extremely hard when dry, very firm to extremely firm when moist, slightly sticky and plastic when wet; few to common thin clay films on clasts; fining downward sequence; 10-15% fine gravel with clasts up to 1.5-inch diameter consisting primarily of slate, shale, and granite.
20.0 – 20.75	6.10 – 6.32	6C7		GRAVELLY SANDY LOAM; brown (7.5YR 5/4) with grayish brown (2.5Y 5/2) mottles when dry, strong brown (7.5YR 4/6) with dark grayish brown (2.5Y4/2) mottles when moist; soft when dry, very friable when moist; sticky and non-plastic to slightly plastic when wet; fining downward sequence; large gravels up to 2-inch diameter at 20.67 feet; clear boundary.
20.75 – 23.67	6.32 – 7.21	7C8		LOAM; brown (7.5YR 5/4) with thin gleyed light olive brown (2.5Y 5/4) layers when dry, brown (7.5YR 4/4) with grayish brown (2.5Y 5/2) layers when moist; massive breaking to moderate medium to coarse subangular blocky structure; slightly hard when dry, friable when moist, non-sticky and slightly plastic when wet; dense; two fining downward sequences, first to 22.12 feet, second to bottom of section, with 2 inches of CLAYEY SAND at top of deeper section; clear boundary.
23.67 – 25.0	7.21 – 7.62	7C9		LOAM; brown (7.5YR 5/4) with light brownish gray (2.5Y 6/2) mottles when dry, strong brown (7.5YR 4/5) with light olive brown (2.5Y 5/3) mottles when moist; massive; hard when dry, slightly firm to firm when moist, slightly sticky and slightly plastic when wet; few to common clay films on clasts; mix of clasts in a fine-grained matrix; gravel up to 1-inch in diameter.

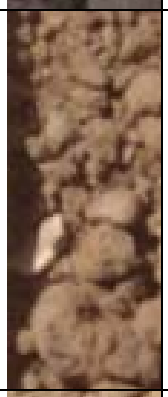
Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
25.0 – 25.58	7.62 – 7.80	7C10		LOAM; reddish yellow (7.5YR 6/6) and light brownish gray (2.5Y 6/2) when dry, brown (7.5YR 4.5/4) and grayish brown (2.5Y 5/2) when moist; massive breaking to strong coarse angular blocky structure; very hard when dry, very firm when moist; slightly sticky to sticky and plastic when wet; $CaCO_3$ nodules; few clasts; many fine pores filled with MnO_2; abrupt boundary.
25.58 – 27.25	7.80 – 8.31	8C11		Fine SAND to LOAMY fine SAND; light yellowish brown (10YR 6/4) when dry, dark yellowish brown (10YR 4/4) when moist; massive breaking to moderate medium subangular blocky structure; hard and fragic when dry, very friable when moist, non-sticky and non-plastic when wet; few scattered gravel; clear boundary.
27.25 – 30.0	8.31 – 9.14	8C12		SANDY LOAM; light yellowish brown (10YR 6/4) when dry, dark yellowish brown (10YR 4/4) when moist; massive; hard when dry, firm when moist, non-sticky to slightly sticky and non-plastic to slightly plastic when wet; gravel at top (27.25 – 27.75 feet), decreases downward; discontinuous very thin red layer at 28.75 feet.
30.0 – 30.33	9.14 – 9.25	9Ab1		SILTY CLAY; grayish brown (2.5Y 5/2) when dry, dark grayish brown (2.5Y 4/2) when moist; strong fine angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; common thin clay films on ped faces, few to common thin clay films on clasts, common to many thin clay films lining pores; very light colored horizon with localized black MnO_2? staining; appears to be a burnt horizon; clear boundary.
30.33 – 30.83	9.25 – 9.40	9Ab2/Btb1		CLAY; dark grayish brown (10YR 4/2) with common brown (7.5YR 4/3) mottles when dry, dark grayish grown (10YR 4/2) with dark brown (7.5YR 3/3) mottles when moist; strong fine to coarse angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; common thin and locally continuous clay films on ped faces, many thin clay films bridging grains; $CaCO_3$ filaments; MnO_2 staining, less common than above; very light and porous; appears bioturbated; gradual boundary.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
30.83 – 32.67	9.40 – 9.96	9Btb2		CLAY; dark brown (10YR 3/3) with dark grayish brown (2.5Y 4/2) and dark brown (7.5YR 3/3) mottles when dry, brown (10YR 4/3) with dark grayish brown (2.5Y 4/2) and dark brown (7.5YR 3/3) mottles when moist; moderate coarse angular blocky structure; hard to very hard when dry, firm when moist, sticky and plastic when wet; common thin to moderately thick clay films on ped faces, many moderately thick clay films in pores, many moderately thick clay films bridging grains; $CaCO_3$ nodules; bioturbated, with worm castings; large clast of Monterey siltstone at 32.67 to 32.83 feet.
32.83 – 40.0	10.0 – 12.19	9BC		CLAY grades downward to SANDY CLAY; mottled dark grayish brown (10YR 4.5/2), strong brown (7.5YR 5/6), and brown (7.5YR 4/4), grading down to dark yellowish brown (10YR 4/4) with stripes of dark grayish brown (2.5Y 4/2) when dry, mottled dark brown (10YR 3/3 and 7.5YR 3/3) grading down to dark brown (10YR 3/4) with dark brown (2.5Y 4/3) stripes when moist; strong coarse to very coarse angular blocky structure; very hard to extremely hard when dry, very firm when moist, sticky and plastic when wet; common moderately thick clay films on ped faces, common thin clay films lining pores, many moderately thick clay films bridging grains; scattered clasts.

Profile No. CB-24 – Leighton's Boring CB-24
Emplaced near the north end of Leighton's trench FT-5, at approximately Station 1+10.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
0 – 2.5	0 – 0.76	Ac / Af	NA	According to Leighton's boring log, 8 inches of concrete over 8 inches of aggregate base, overlying 12 inches of reinforced concrete. Not sampled or described.
2.5 – 7.75	0.76 – 2.36	C1		SILTY CLAY; yellowish brown (10YR 5/4) with grayish brown (2.5Y 5/2) layers when dry, brown (10YR 4/3) when moist; massive breaking to moderate medium to very coarse angular blocky structure (based on section between 5 and 7.75 feet as section above 5 feet was hand-augered; very hard to extremely hard when dry, very friable when moist, sticky and plastic when wet; few MnO_2 stains; layered/ laminated; very few scattered fine gravel; few pinhole-sized pores; clear boundary.
7.75 – 10.42	2.36 – 3.18	2Btj1		CLAY; brown (10YR 4/3) with dark gray (2.5Y 4/1) and very dark grayish brown (2.5Y 3/2) laminations when dry, brown (10YR 4/3) with very dark grayish brown (2.5Y 3.5/2) laminations when moist; massive breaking to strong coarse to very coarse angular blocky structure; very hard to extremely hard when dry, very firm when moist, sticky and plastic when wet; common thin clay films on clasts; laminated; scattered gravel up to 1.5-inch in diameter at base. No recovery between 8.9 and 10.0 but section between 10.0 and 10.42 had the same characteristics as recovered section.
10.42 – 11.92	3.18 – 3.63	3C2		SILTY CLAY; brown (7.5YR 5/4) with light brownish gray (2.5Y 6/2) layers when dry, brown (7.5YR 4/4) with dark grayish brown (2.5Y 4/2) layers when moist; moderate medium to coarse angular blocky structure; few fine pores; few scattered fine gravels; layered or "tiger striped;" clear boundary.
11.92 – 16.75	3.63 – 5.11	4Btj2		CLAY; brown (7.5YR 5/4) with grayish brown (2.5Y 5/2) mottles when dry, dark brown (7.5YR 3.5/3) with dark grayish brown (2.5Y 4/2) mottles when moist; massive breaking to moderate medium to coarse angular blocky structure; very hard when dry, slightly firm when moist, sticky and plastic when wet; few thin clay films on ped faces; few $CaCO_3$ nodules and filaments; fine MnO_2 stains; less obvious "tiger stripes" than above; few scattered gravel. No recovery between 13.83 and 15.0, but

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
				sediments below the no-recovery section were the same as above.
16.75 – 18.67	5.11 – 5.69	5C3		GRAVELLY SANDY CLAY LOAM; yellowish brown (10YR 5/4) with olive gray (5Y 5/2) laminations when dry, dark yellowish brown (10YR 3/4) with olive gray (5Y 4.5/2) laminations when moist; massive breaking to strong medium to coarse angular blocky structure; hard to very hard when dry, slightly firm when moist, sticky and plastic when wet; laminated; about 10% gravel consisting of slate, granite, and Monterey shale chips; more gritty than above; abrupt boundary defined by a stone line.
18.67 – 20.25	5.69 – 6.17	6C4		SANDY CLAY LOAM; light olive brown (2.5Y 5/3) when dry, brown (10YR 4/3) when moist; massive; very hard when dry, slightly firm when moist, sticky and slightly plastic when wet; crudely bedded; about 30% fine gravel consisting predominately of Monterey shale; gradual boundary.
20.25 – 22.92	6.17 – 6.99	6C5		Fine SANDY CLAY LOAM; dark yellowish brown (10YR 4/4) with dark grayish brown (2.5Y 4/2) and brown (7.5YR 4/4) mottles when dry, dark yellowish brown (10YR 3.5/4) with dark gray (2.5Y 4/1) and dark brown (7.5YR 3.5/4) mottles when moist; massive breaking to moderate coarse to very coarse angular blocky structure; very hard when dry, friable to slightly firm when moist, slightly sticky and slightly plastic to plastic when wet; some brown (7.5YR 4/4) clay stains that increase downward; few mottles; scattered MnO_2 stains; scattered clasts up to 1-inch diameter.
22.92 – 24.92	6.99 – 7.60	6C6		Fine SANDY CLAY LOAM to SANDY CLAY; brown (7.5YR 4/4) with light brownish gray (2.5Y 6/2) to light yellowish brown (2.5Y 6/3) varves ("tiger stripes") when dry, dark brown (7.5YR 3.5/4) with dark grayish brown (2.5Y 4/2) varves when moist; massive breaking to moderate coarse to very coarse angular blocky structure; very hard when dry, slightly firm when moist, slightly sticky and slightly plastic to plastic when wet; brown (7.5YR 4/3) clay stains; $CaCO_3$ filaments coincide with gleyed varves (or "tiger stripes").
24.92 – 25.0	7.60 – 7.62	NR		No Recovery

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
25.0 – 27.42	7.62 – 8.36	7C7		Fine SANDY LOAM to LOAM; brownish yellow (10YR 6/6) with pale yellow (2.5Y 7/3) varves when dry, dark yellowish brown (10YR 4/6) with light olive brown (2.5Y 5/3) varves when moist; massive breaking to weak to moderate fine angular blocky structure; slightly hard to hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few MnO_2 stains; $CaCO_3$ filaments that parallel laminations; clear boundary.
27.42 – 30.04	8.36 – 9.16	8C8		Fine SANDY CLAY; light yellowish brown (2.5Y 6/3) with reddish yellow (7.5YR 6/6) varves when dry, olive brown (2.5Y 4/3) with reddish yellow (7.5YR 6/6) varves when moist; massive; very hard to extremely hard when dry, very firm to extremely firm when moist, sticky and plastic when wet; more clasts than above; common dark brown (7.5YR 3/3) MnO_2 stains; several "red" laminations, the most prominent one at 28.38 feet; gravelly section at 29-29.42 feet; few $CaCO_3$ nodules.
30.04 – 31.25	9.16 – 9.53	9C9		Fine to medium SANDY LOAM; light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) when dry, brown (10YR 4.5/3), strong brown (7.5YR 5/6), and olive brown (2.5Y 4/3) when moist; weak medium subangular blocky structure; soft to slightly hard when dry, friable when moist, slightly sticky to sticky and non-plastic to slightly plastic when wet; MnO_2 stains; about 20% gravel up to 1-inch diameter; abrupt boundary.
31.25 – 32.96	9.53 – 10.05	9C10		Fine SANDY CLAY LOAM grades down to fine to coarse SANDY LOAM at bottom; light brownish gray (2.5Y 6/2) with brown (7.5YR 5/4) layers when dry, olive (5Y 5/3) with brown (7.5YR 4/4) layers when moist; massive breaking to moderate medium to coarse angular blocky structure; hard when dry, slightly firm when moist, slightly sticky to sticky and plastic when wet; fining upward sequence; varved; 3-5% scattered gravel consisting of angular to subrounded chips of slate and Monterey shale up to 1-inch diameter; abrupt boundary.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
32.96 – 33.83	10.05 – 10.31	10C11		GRAVELLY LOAMY fine to coarse SAND; brown (10YR 5/3) with yellowish red (5YR 4/6) and dark yellowish red (5YR 3/3) layers when dry, dark yellowish brown (10YR 3/4) with dark yellowish brown (10R 4/6 and 3/4) layers when moist; weak medium subangular blocky structure; soft when dry, friable when moist, non-sticky and non-plastic when wet; abundant FeO and black MnO_2 stains on clays, and along some layers; angular to subangular gravel-sized chips of Monterey shale; clear boundary.
33.83 – 36.5	10.31 – 11.13	10C12		LOAMY fine to coarse SAND; dark grayish brown (10YR 4/2) with yellowish red (5YR 4/6) and light yellowish brown (10YR 6/4) mottles when dry, dark gray (10YR 4/1) with brown (10YR 4/3) and yellowish red (5YR 4/6) mottles when moist; weak medium subangular blocky structure; soft to very hard when dry, friable when moist, slightly sticky and non-plastic when wet; disturbed; clay rich zone at 34.67'; locally gravelly with clasts up to 3-inch diameter, clast-supported sections consisting predominantly of slate and shale, angular in shape and randomly oriented; abrupt boundary.
36.5 – 37.79	11.13 – 11.52	11C12		Very fine SANDY CLAY LOAM with interbedded very fine to medium SAND; light yellowish brown (10YR 6/4) with strong brown (7.5YR 5/6) and light gray (2.5Y 7/2) mottles and lamellae when dry, dark yellowish brown (10YR 4/4) with dark grayish brown (2.5Y 4/2) and strong brown (7.5YR 4/6) mottles and lamellae when moist; massive breaking to weak fine subangular blocky structure; soft to slightly hard when dry, friable when moist, slightly sticky and slightly plastic when wet; laminated/ thinly bedded depositional unit that includes beds of fine to very fine sand and silt; abrupt boundary.
37.79 – 38.5	11.52 – 11.73	11C13		LOAMY fine SAND; pale brown (10YR 6/3) with strong brown (7.5YR 5/6) mottles/ layers when dry, brown (10YR 4/3) with dark brown (7.5YR 3/4) mottles/ layers when moist; massive; soft when dry, friable when moist, non-sticky and non-plastic when wet; MnO_2 staining, locally with large MnO_2 stains; 3-5% fine, mostly rounded gravel; laminated to thinly bedded.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
38.5 – 40.17	11.73 – 12.24	12C14		CLAY; very dark grayish brown (10YR 3.5/2) with strong brown (7.5YR 5/8) mottles when dry, very dark grayish brown (10YR 3/2) with dark brown (7.5YR 3/4) mottles when moist; massive breaking to strong coarse angular blocky structure; extremely hard when dry, extremely firm when moist, very sticky and very plastic when wet; common MnO_2 stains; some polished surfaces; scattered fine gravel; abrupt boundary. Units between 40′ and 50′ are varved, predominately gleyed, with some clay films or polished surfaces.

Profile No. CB-26 – Leighton's Boring CB-26
Located at the south end of Trench FT-5, at approximately Station 0+00.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
0 – 2.3	0 – 0.71	ND		Not described and not sampled.
2.3 – 3.96	0.71 – 1.21	C1		SILTY fine SAND. Not sampled or described.
3.96 – 5.92	1.21 - 1.80	2C2		GRAVELLY SAND. Not sampled or described.
5.92 – 7.92	1.80- 2.41	3C3		CLAYEY SAND with GRAVEL to GRAVELLY SANDY CLAY. Not sampled or described.
7.92 – 8.62	2.41 – 2.63	4Ab		SANDY LOAM, brown (7.5YR 4/3.5) when damp, dark brown (7.5YR 3/2) when moist; friable to very friable when moist; sticky and plastic when wet; few to common thin clay films on clasts and few to common thin clay films bridging grains; few scattered rounded fine gravel.
8.62 - 10	2.63 – 3.05	NR		No Recovery
10 – 11.17	3.05 – 3.40	4Btb1		SANDY CLAY; brown (7.5YR 5/3) with pinkish gray (7.5YR 6/2) mottles when dry, brown (7.5YR 4/4) when moist; strong fine subangular blocky structure; very hard when dry, firm when moist, sticky to very sticky and plastic when wet; common to many moderately thick clay films on ped faces, continuous moderately thick to thick clay films on clasts, many moderately thick clay films bridging grains, many moderately thick clay films lining pores; scattered fine gravel.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
11.17 – 12.12	3.40-3.70	4Btb2		CLAY to SILTY CLAY; brown (7.5YR 4/3) and gray (5Y 5/1) when dry, brown (7.5YR 4/4) and dark gray (5Y 4.5/1) when moist, brown (10YR 4/3) when mixed and wet; moderate to strong fine angular blocky structure; hard when dry, firm when moist, very sticky and plastic when wet; many moderately thick clay films lining pores; many fine pinhole-sized pores; thin gray laminations; gleyed; large broken granite cobble defining abrupt boundary.
12.12 – 13.08	3.70 – 3.99	5Ab/Btjb		LOAMY SAND to SAND; brown (7.5YR 4/3) when dry, dark brown (7.5YR 3.5/2) when moist; soft when dry, very friable when moist, non-sticky and non-plastic when wet; few to common thin clay films on ped faces and few to common thin clay films bridging grains; scattered fine subangular to platy gravel up to 1.5-inch in diameter; clear to abrupt boundary.
13.08 – 14.5	3.99 – 4.42	5Cb1		Fine SANDY CLAY; brown (7.5YR 5/4 to 4/4) and olive gray (5Y 5/2) when dry, brown (7.5YR 4/3) and dark olive gray (5Y 3/2) when moist; massive; very hard when dry, firm when moist, sticky and plastic when wet; no pores visible; grey, black, and red laminations; scattered angular chips of Monterey Fm. ½- to 1-inch in diameter; clear wavy boundary.
14.5 – 15.58	4.42 – 4.75	5Cb2		Fine SANDY CLAY to SILTY CLAY; yellowish brown (10YR 5/4) with grayish brown (2.5Y 5/2) stains in root pores when dry, dark yellowish brown (10YR 4/4) with grayish brown (2.5Y 5/2) stains in root pores when moist; massive; very hard to extremely hard when dry, very firm to extremely firm when moist, sticky and plastic when wet; MnO_2 staining; few scattered fine-grained $CaCO_3$ nodules; clear wavy boundary.
15.58 – 17.5	4.75 – 5.33	6Btb3		CLAY grading downward to SANDY CLAY; dark brown (7.5YR3/3) with dark brown (7.5YR3/2) clay films when dry, dark brown (7.5YR3/2.5) when moist; moderate medium to coarse angular blocky structure; slightly hard when dry, slightly firm when moist, very sticky and very plastic when wet; common to many moderately thick clay films on ped faces, common moderately thick clay films bridging grains; no visible pores; few $CaCO_3$ nodules; scattered clasts of Santa Monica slate; gradual boundary.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
17.5 – 18.17	5.33 – 5.54	6Btb4		CLAY; dark brown (7.5YR 3/2) and brown (7.5YR 4/4) with very dark gray (2.5Y 3/1) mottles when dry, dark brown (7.5YR 3/3) with dark grayish brown (2.5Y 4/2) mottles when moist; strong medium to coarse angular blocky structure; very hard when dry, slightly firm when moist, very sticky and very plastic when wet; common moderately thick clay films on ped faces and many moderately thick clay films bridging grains; few fine $CaCO_3$ nodules; fewer and smaller clasts of Santa Monica slate than horizon above.
18.17 – 20	5.54 – 6.10	7Btb5		SILTY CLAY with fine sand and gravel; brown (7.5YR 4/4) with gray (2.5Y 5/1) mottles when dry, brown (7.5YR 4/3.5) with dark grayish brown (2.5Y 4/2) mottles when moist; moderate coarse angular blocky structure; very hard to extremely hard when dry, friable when moist, very sticky and very plastic when wet; common thin clay films on clasts, few to common thin clay films on ped faces, common thin clay films lining pores; common MnO_2 staining; many (about 10%) angular fine gravel-sized chips of Santa Monica slate.
20 – 20.5	6.10 – 6.25	8BCb1		Fine SANDY CLAY; dark yellowish brown (10YR 4/4) with brown (7.5YR 4/4) clay films and dark gray (2.5Y 4/1) mottles when dry, brown (10YR 4/3) with brown (7.5YR 4/4) clay films and dark grayish brown (2.5Y 4/2) mottles when moist; weak to moderate medium angular blocky structure; hard when dry, friable when moist, sticky and plastic when wet; few thin clay films on ped faces and common to many clay films bridging grains; with 2-3% gravel-sized chips of Santa Monica slate; clear boundary.
20.5 – 21.67	6.25 – 6.60	$8C_{lam}b1$		SILTY CLAY; yellowish brown (10YR 5/4) and dark grayish brown (2.5Y 4/2) with brown (7.5YR 4/3.5) Bt_{lams} when dry, dark yellowish brown (10YR 4/4) and dark grayish brown (2.5Y 4/2) with brown (7.5Y 4/4) Bt_{lams} when moist; massive breaking to weak coarse angular blocky structure; soft when dry, friable when moist, very sticky and very plastic when wet; common clay films on ped faces in the Bt lamellae; primary sedimentary structure consisting of laminations and secondary soil lamellae; clear boundary.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
21.67 – 22.75	6.60 – 6.93	9Btb6		Fine SANDY CLAY; brown (7.5YR 4/3) with dark gray (2.5Y 4/1) mottles when damp, brown (7.5YR 4/3) with very dark grayish brown (2.5Y 3/2) mottles when moist; weak fine to medium angular blocky structure; friable when moist, sticky and plastic when wet; few to common thin clay films on ped faces and few to common thin clay films lining pores; about 5% angular gravel up to 1-inch in diameter that includes Santa Monica slate and Monterey Fm. shale; clear boundary.
22.75 – 27.92	6.93 – 8.51	$9C_{lam}b2$		SANDY LOAM (matrix) and LOAM (Bt lamellae), fining downward section; yellowish brown (10YR 5/4) with dark yellowish brown to brown (10-7.5YR 4/4) Bt zones when dry, dark brown (10YR 3.5/3) with dark yellowish brown (10YR 4/4) Bt zones when moist; massive breaking to moderate fine to medium angular blocky structure; soft when dry, friable when moist, slightly sticky and non-plastic to slightly plastic when wet; clay films in the Bt zones include common to many thin clay films on ped faces and common to many thin clay films bridging grains; lamellae throughout the horizon are up to about 1-inch thick (thicker than in $3C_{lam}b_1$).
27.92 – 30	8.51 – 9.14	$10C_{lam}b3$		CLAY; dark yellowish brown (10YR 4/4) with dark brown (7.5YR 3/2) lamellae when dry, dark yellowish brown (10YR 3/4) with dark brown (7.5YR 3/3) lamellae when moist; massive breaking to moderate medium to coarse angular blocky structure; dense; very hard to extremely hard when dry, firm when moist, sticky and plastic when wet; common thin clay films on ped faces and many thin to moderately thick clay films on clasts; very thin discontinuous light red (10R 6/8) layer at 29.77 feet (9.07m); about 5% gravel consisting of chips of Santa Monica shale and Monterey slate; scattered $CaCO_3$ nodules.

Depth (ft)	Depth (m)	Horizon Designation	Photograph	Description
30 – 33.38	9.14-10.17	10Cb3		SILTY CLAY; yellowish brown (10YR 5/4) with dark grayish brown (10YR 4/2) and light gray (2.5Y 7/2) mottles when dry, dark yellowish brown (10YR 4/4) with dark brown (10YR 3/3) and grayish brown (2.5Y 5/2) mottles when moist; massive breaking to weak fine to medium angular blocky structure; slightly hard when dry, friable when moist, sticky to very sticky and plastic when wet; common to many thin clay films on clasts; common MnO_2 stains; between 31.67 and 32.5 feet (9.65-9.91m) there is an increase in gravel consisting of angular chips of Santa Monica slate and Monterey shale up to 1-inch in diameter; abrupt wavy boundary.
33.38 – 34.17	10.17 – 10.41	11Cb4		LOAMY SANDY GRAVEL; yellowish brown (10YR 5/4) when dry, brown (10YR 4/3) when moist; weak fine subangular blocky structure; soft when dry, very friable when moist, slightly sticky and non-plastic when wet; up to 30% gravel consisting predominately of schist and slate.
34.17 – 35	10.41 – 10.67	12Cb5		SILTY CLAY; mottled yellowish brown (10YR 5/4), brown (10YR 4/3), and light brownish gray (2.5Y 6/2) when dry, mottled brown (10YR 3/4), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/3) when moist; massive breaking to weak fine to medium angular blocky structure; slightly hard to hard when dry, slightly firm to firm when moist, sticky and plastic when wet; sandier zone between 34.6 and 34.75 feet (10.54-10.6 m); laminated; MnO_2 stains; extensively mottled; few scattered fine chips of Monterey shale and Santa Monica slate.
35 – 40	10.67 – 12.19	13Cb6		LOAMY SAND; dark yellowish brown (10YR 4/4) when damp, dark brown (10-7.5YR 3/3) when moist; massive breaking to weak medium angular blocky structure; soft when dry, very friable when damp, non-sticky and non-plastic when wet; few to common thin clay films on ped faces; MnO_2 stains; fining downward sequence; 4-inch thick sand layer starting at 35.5 feet (10.82 m); followed by interbedded sand and silt; few to common fine pores.

IRSL sediment dating results, Beverly Hills High School, Los Angeles County, CA

Introduction

This report details results of Infra-Red Stimulated Luminescence (IRSL) dating measurements made for a second suite of sediment samples collected from the site of Beverly Hills High School, Los Angeles County, CA in September 2012. Measurements were conducted at the site, and samples were collected for subsequent laboratory determinations at UCLA (University of California, Los Angeles). An overview of luminescence dating techniques is provided by Rhodes (2011).

Project summary

The aims of this project were to determine the depositional age of sediments at selected locations.

Five sediment samples were collected and prepared. IRSL measurements based on K-feldspar grains have been conducted, including equivalent dose determinations and detailed fading measurements. All samples provide age estimates towards the upper end of the usual dating range of the technique, leading to some increased uncertainty in these age estimates. Measurements were made using the newly developed Post-Infra-Red IRSL method of Buylaert et al. (2009), in which signals less prone to fading are measured. Post-IR IRSL values measured at 225°C are in broad agreement with conventional IRSL values measured at 50°C. Both data sets are fading-corrected based on direct measurements, and the observed agreement, besides the observed apparent stratigraphic age consistency, provide additional support for the results obtained. Caveats and uncertainties, and guidance in the interpretation of these age estimates, are included below.

IRSL dating sample collection and preparation

Luminescence dating sample locations were identified during the site visit, comprising well-sorted sandy horizons considered well-suited for dating. These mostly consisted of low energy fluvial sediments. Samples were collected in a numerical sequence from the stratigraphically deepest (and therefore oldest) to the youngest.

At each sampling position, steel tubes were inserted horizontally into the exposed sediment section. When filled, tubes were withdrawn, capped and placed in light-tight bags. At each sampling location, the hole was deepened using a hand auger, and direct measurements of the environmental dose rate made using a calibrated portable NaI microNomad EG&G gamma spectrometer.

In the laboratory at UCLA, sample tubes were opened under controlled laboratory lighting conditions. Sediment from both ends of each tube was removed, and not included in the dating sample, as it had been subject to light exposure during the collection process. Each sample was wet-sieved using disposable nylon mesh screens, and grains of 175-250 µm were selected. These were subsequently treated with dilute HCl to remove carbonate. Grains of density less than 2.58 $g.cm^{-3}$ were separated using a dense solution of lithium metatungstate (LMT), incorporating spinning in a centrifuge followed by freezing of the denser component using liquid nitrogen. IRSL signals from this material (less than 2.58 $g.cm^{-3}$) are considered to be dominated by those emitted by feldspar rich in potassium. Individual aliquots were made by adhering grains to the center of aluminium discs with viscous silicone oil. This mineral fraction was selected for age determination as quartz in several Southern Californian locations can display low sensitivity, often making quartz OSL age determination difficult and less precise than when applied elsewhere, whilst K-feldspar typically has a significantly higher sensitivity. Quartz OSL age estimates have also been reported as providing unreliable age determinations in Southern California, possibly as a result of signal contamination by small mineral inclusions with quartz grains, and at this stage, no quartz fractions from these samples have been separated.

IRSL measurement

Luminescence measurements were performed using a Risø TL-DA-20D automated reader with a combination of BG3 and BG39 optical filters to provide a luminescence emission window in the blue part of the spectrum. Preliminary IRSL determinations were conducted in order to assess signal sensitivity and approximate equivalent dose values.

A single aliquot regenerative-dose (SAR) IRSL protocol was used for equivalent dose (D_e) determination. The protocol developed by Buylaert et al. (2009) was followed in detail. This protocol incorporates both a conventional IRSL measurement at 50°C and a second “post-IR” IRSL measurement at 225°C, both for 100s duration. Preheating conditions are at 250°C for 60s, and an identical preheat treatment is used after administering regenerative and test doses. Each SAR cycle also incorporates a final “hot bleach” treatment comprising 40s IRSL at 290°C. Seven full SAR cycles were measured, each comprising nine steps (including seven measurement steps with 250 data points each).

Fading determinations were made for all aliquots from four samples (BHHS12-OSL-13, BHHS12-OSL-15, BHHS12-OSL-18 & BHHS12-OSL-20). These indicate a mean fading rate quoted as a g-value (Auclair et al. 2003) of 3.3 ± 0.3 % per decade for the IRSL at 50°C, resulting in a correction to the IRSL equivalent dose measured at 50°C (Fig. 2). The IRSL measured at 225°C displayed little fading; a mean value of 1.0 ± 0.1 % per decade was used to make a small correction to the natural signals from these measurements.

Samples displayed a degree of variation between different aliquots, consistent with incomplete signal zeroing at the time of deposition. These samples probably included

grains that had travelled only short distances under the prevailing fluvial regime. In a few instances, a single lower aliquot was observed, probably caused by the effects of post-depositional grain translocation from the surface.

In each sample, a well grouped collection of aliquots was used to calculate the D_e (equivalent dose) value and age estimate. Selection of grouped aliquots was based on over-dispersion (OD) values; OD values used for selection ranged up to 15%.

A fading correction based on the above-mentioned g values was applied to natural IRSL signals, in order to provide IRSL age estimates, presented in Table 1. Age estimates are quoted both for the conventional IRSL measured at 50°C, and for post-IR IRSL age estimate measured at 225°C (Buylaert et al., 2009), each corrected for fading as described above. The equivalent dose (D_e) estimates themselves are relatively precise, but the significant uncertainties in the age estimates stem primarily from the uncertainty in the g-values.

Sample field code	Depth from surface (m)	Conventional IRSL age estimate measured at 50°C (years, ± 1 sigma)	Post-IR IRSL age estimate measured at 225°C (years, ± 1 sigma)
BHHS12-OSL-13	3.17	101,000 ± 11,000	138,000 ± 17,000
BHHS12-OSL-15	3.64	110,000 ± 13,000	141,000 ± 18,000
BHHS12-OSL-18	2.60	92,100 ± 10,500	114,000 ± 14,000
BHHS12-OSL-20	3.29	118,000 ± 14,000	127,000 ± 17,000
BHHS12-OSL-21	0.77	64,500 ± 7,300	59,300 ± 7,000

Table 1. Sample field code, sample depth from the present ground surface (in m) and IRSL age estimates based on conventional IRSL measured at 50°C, and for post-IR IRSL age estimate measured at 225°C (Buylaert et al., 2009), corrected for anomalous fading, with associated 1 sigma (68%) uncertainty limits. Sample BHHS12-OSL-13 was the stratigraphically lowest sample, BHHS12-OSL-21 was the uppermost.

The presence of incomplete zeroing effects and grain translocation, as discussed above, mean that these IRSL age estimates should be treated with a degree of caution. In principle, it might be expected that the conventional IRSL values may represent a lower age estimate boundary for deposition, whilst the new post-IR IRSL age estimates measured at 225°C may represent an upper bound.

Conclusions

IRSL dating of K feldspar fractions of five sediment samples strongly suggest that these deposits were laid down in two dominant periods. The Post-IR IRSL measured at 225ºC

results are probably more reliable; the slight systematic difference in age between these and the younger IRSL results measured at 50ºC are probably caused by a subtle underestimate of the g-value for the latter group, though incomplete zeroing of the former (225ºC) signals cannot be excluded. Both data sets (50 and 225ºC IRSL measurements) have some age inversion in relation to stratigraphic position. However, for both data sets, the inversion is within the age uncertainties, and is therefore not considered significant.

The earlier depositional phase probably relates to the last interglacial (c. 135-120 ka), or the period shortly after that, and includes deposits encompassed by the lower four samples, representing most of the sediments exposed in the sampled trench. The uppermost sample appears to have been deposited around 60 ka, and may relate to MIS (marine isotope stage) 4, or early in MIS 3.

References

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Appendix - Feldspar IRSL age estimates

Sample number K-FELDSPAR	BHHS12-13 J0314	BHHS12-15 J0316	BHHS12-18 J0319	BHHS12-20 J0321	BHHS12-21 J0322
De (Gy)	358.95	368.25	336.00	385.20	214.35
uncertainty	36.34	39.54	35.53	44.09	22.91
measured	5.70	14.40	11.55	21.45	8.10
total error incl. systematic	35.895	36.825	33.600	38.520	21.435
Grain size					
Min. grain size (mm)	175	175	175	175	175
Max grain size (mm)	250	250	250	250	250
External gamma-dose (Gy/ka)	1.249	1.182	1.270	1.087	1.136
error	0.002	0.003	0.003	0.002	0.003
INTERNAL K content (%K)	12.50	12.50	12.50	12.50	12.50
error	0.13	0.13	0.13	0.13	0.13
INTERNAL Dose rate	0.73	0.73	0.73	0.73	0.73
error	0.052	0.052	0.052	0.052	0.052
Measured concentrations					
standard fractional error	0.050	0.050	0.050	0.050	0.050
% K	1.853	1.562	2.008	1.786	1.597
error (%K)	0.093	0.078	0.100	0.089	0.080
Th (ppm)	6.178	6.990	6.291	5.125	6.482
error (ppm)	0.309	0.350	0.315	0.256	0.324
U (ppm)	2.303	2.371	1.933	1.646	2.029
error (ppm)	0.115	0.119	0.097	0.082	0.101
Cosmic dose calculations					
Depth (m)	3.170	3.640	2.600	3.290	0.770
error (m)	0.500	0.500	0.500	0.500	0.100
Average overburden density (g.cm^3)	1.900	1.900	1.900	1.900	1.900
error (g.cm^3)	0.100	0.100	0.100	0.100	0.100
Latitude (deg.), north positive	34	34	34	34	34
Longditude (deg.), east positive	-118	-118	-118	-118	-118
Altitude (m above sea-level))	56	56	56	56	56
Soft Cosmic	0.000	0.000	0.000	0.000	0.000
Cosmic dose rate (Gy/ka)	0.139	0.131	0.149	0.137	0.188
error	0.024	0.020	0.031	0.023	0.028
Moisture content					
Moisture (water / wet sediment)	0.150	0.150	0.150	0.150	0.150
error	0.050	0.050	0.050	0.050	0.050
Total dose rate, Gy/ka	**3.56**	**3.33**	**3.65**	**3.27**	**3.32**
error	**0.14**	**0.13**	**0.15**	**0.13**	**0.13**
% error	**4.00**	**3.80**	**4.14**	**4.12**	**3.85**
AGE (ka)	**100.87**	**110.50**	**92.15**	**117.80**	**64.54**
error	**10.98**	**12.59**	**10.46**	**14.33**	**7.33**
% error	**10.89**	**11.39**	**11.35**	**12.17**	**11.36**

Values used to calculate feldspar age estimates based on conventional IRSL at 50°C. Sediment dose rates are based on a portable NaI gamma spectrometer reading made at each sample location.

Sample number K-FELDSPAR	BHHS 12-13 J0314	BHHS 12-15 J0316	BHHS 12-18 J0319	BHHS 12-20 J0321	BHHS 12-21 J0322
De (Gy)	490.18	471.31	415.92	416.36	196.91
uncertainty	56.44	56.09	46.94	51.30	21.84
measured	27.97	30.41	21.76	29.97	9.44
total error incl. systematic	49.018	47.131	41.592	41.636	19.691
Grain size					
Min. grain size (mm)	175	175	175	175	175
Max grain size (mm)	250	250	250	250	250
External gamma-dose (Gy/ka)	1.249	1.182	1.270	1.087	1.136
error	0.002	0.003	0.003	0.002	0.003
INTERNAL K content (%K)	12.50	12.50	12.50	12.50	12.50
error	0.13	0.13	0.13	0.13	0.13
INTERNAL Dose rate	0.73	0.73	0.73	0.73	0.73
error	0.052	0.052	0.052	0.052	0.052
Measured concentrations					
standard fractional error	0.050	0.050	0.050	0.050	0.050
% K	1.853	1.562	2.008	1.786	1.597
error (%K)	0.093	0.078	0.100	0.089	0.080
Th (ppm)	6.178	6.990	6.291	5.125	6.482
error (ppm)	0.309	0.350	0.315	0.256	0.324
U (ppm)	2.303	2.371	1.933	1.646	2.029
error (ppm)	0.115	0.119	0.097	0.082	0.101
Cosmic dose calculations					
Depth (m)	3.170	3.640	2.600	3.290	0.770
error (m)	0.500	0.500	0.500	0.500	0.100
Average overburden density (g.cm^3)	1.900	1.900	1.900	1.900	1.900
error (g.cm^3)	0.100	0.100	0.100	0.100	0.100
Latitude (deg.), north positive	34	34	34	34	34
Longditude (deg.), east positive	-118	-118	-118	-118	-118
Altitude (m above sea-level))	56	56	56	56	56
Soft Cosmic	0.000	0.000	0.000	0.000	0.000
Cosmic dose rate (Gy/ka)	0.139	0.131	0.149	0.137	0.188
error	0.024	0.020	0.031	0.023	0.028
Moisture content					
Moisture (water / wet sediment)	0.150	0.150	0.150	0.150	0.150
error	0.050	0.050	0.050	0.050	0.050
Total dose rate, Gy/ka	**3.56**	**3.33**	**3.65**	**3.27**	**3.32**
error	**0.14**	**0.13**	**0.15**	**0.13**	**0.13**
% error	**4.00**	**3.80**	**4.14**	**4.12**	**3.85**
AGE (ka)	**137.75**	**141.42**	**114.06**	**127.33**	**59.29**
error	**16.79**	**17.67**	**13.71**	**16.54**	**6.96**
% error	**12.19**	**12.49**	**12.02**	**12.99**	**11.74**

Values used to calculate feldspar age estimates based on Post-IR IRSL at 225°C. Sediment dose rates are based on a portable NaI gamma spectrometer reading made at each sample location.

APPENDIX D

Report to Leighton Consulting, Inc.:

Evaluation of Soil Microfabric in Trench FT-2 at Beverly Hills High School, California

March 6, 2012

Submitted by

Robert C. Graham, Ph.D.

Soil Scientist

On February 21, 2012, I visited the Beverly Hills High School site and Trench FT-2 was shown to me by Eldon Gath. Of particular interest were several gray "clay seams" in the vicinity of 1+26 to 1+50. The possibility of these being fault gouge had been raised and the purpose of this investigation was to determine if these features were, in fact, caused by fault movement or if they were formed by pedogenic (soil-forming) processes.

Methods

Fist-size, intact samples of the features of interest were carved from the trench face, marked to indicate orientation, and packed with paper towels in cardboard containers. These specimens were trimmed in the lab, marked for horizontal thin section orientation, and shipped to San Diego Petrographics in Emmett, Idaho. The samples were vacuum impregnated with plastic resin, which hardened to preserve the soil fabric. The samples were cut, mounted on glass slides, and ground to standard thin section thickness, finished with a cover slip, and shipped back to me. Micromorphologic observations were made using a petrographic microscope.

Macromorphologic description of the sampled features

The samples at each site consisted of a gray "seam" surrounded by a reddish matrix. Munsell colors for the gray material were in the range of 2.5Y6/2 to 5Y6/1 (dry) and 2.5Y5/2 to 5Y4/1 (moist). Munsell colors for the reddish matrix were 7.5YR5/6 (dry) and 7.5YR4/4 (moist). Field estimates of soil texture were on the border between clay loam and clay, with no certain difference between the gray and reddish zones.

The gray features were generally 2 to 10 cm wide. They were not distinct seams, but more accurately zones of gray color around a vertical plane, with the features changing width and even pinching out, both vertically and as they were exposed by excavation into the trench wall. Within the vertical zone, gray colors were found as blobs and stripes, intermixed with reddish matrix (Figure 1). No slickensides or other marks of differential movement were observed in hand specimen. Some of the gray zones were obviously centered on either side of a vertical crack, which was filled with dark reddish clay (5YR5/2 dry, 5YR4/2 moist) (Figures 1 and 2).

The gray zones at Sample Sites 3 and 4 included a 1- to 5-mm-wide white seam (Figure 3) that did not react with 1N HCl, ruling out calcite. The gray matrix surrounding the white seam would not fully slake when wetted, making hand texturing impossible. These indicators suggested that opaline silica is the compound responsible for the white seam and for cementing the gray matrix.

Micromorphologic description of the sampled features

Site 1 (sampled locations shown in Figure 1): The red and gray zones had the same texture and both were very dense with little apparent porosity (Figure 4). Both had embedded grain argillans (Brewer, 1976); that is, clay and fine micaceous grains oriented around sand grains (Figure 5). These two materials differed only in color (Figure 4). The few pores in both materials had strongly oriented, reddish clay linings (illuviation ferri-argillans; Brewer, 1976). Samples 1a and 1d from this site had concentrations of red clay centered in the gray zone. In thin section these were revealed as strongly oriented, laminated clay infillings of pores (Figure 6). In the case of Sample 1d, the infilled pore was clearly a narrow (<1 mm wide) vertical crack (Figure 7).

Site 2 (sampled location shown in Figure 8): The gray zone contained a higher proportion of sand grains compared to the red zone (Figure 9). The gray zone was also host to reddish, strongly oriented, laminated clay linings in pores (illuviation ferri-argillans) (Figure 9).

Site 3 (sampled location shown in Figure 8): Both red and gray materials were coarse grained. The most notable feature was the seam of opaline silica and clay. The silica and clay are intermingled in the seam and in linings of tubular pores (Figure 10).

Site 4 (sampled location shown in Figure 11): The sample examined had a seam of vertically interstratified white and reddish material in a gray matrix. The seam consisted of opaline silica and clay (Figure 12). The gray matrix was similar to that at Site 1 – densely packed, with embedded grain argillans.

Interpretation

The reddish colors of the general soil matrix are due to iron oxides, mainly goethite, but with some hematite. The vertical trending gray zones are redox depletions caused by the reduction and removal of the iron oxides in the vicinity of a crack that periodically preferentially transmitted meteoric water to depth in these sediments. On these water-saturated occasions, the zone around the crack became oxygen depleted and the iron oxides were dissolved, leaving the gray matrix (Turk et al., 2012).

At Site 1, no textural difference was seen between the red and gray zones, the only difference being the removal of iron oxides to produce the gray zone. At Site 2, the gray zone appeared to contain more coarse grains than the red zone. This could be due to preferential leaching of clay after the aggregating effect of iron oxides was removed or it could be due to coarser material from above falling into an open crack.

Further evidence of water movement down the cracks is found in the red clays and white opaline silica lining them. The strongly oriented clays are the result of preferential transport of very fine clays in suspension down macropores and their deposition by a filtering mechanism as the transporting water wicks into the soil matrix of the pore walls (Turk et al., 2012). The clays are red because they originated in overlying reddish argillic horizons. The opaline silica has precipitated from soil water enriched in silica that was derived from weathering of primary silicate minerals (Kendrick and Graham, 2004). Just as clay was translocated by the water moving preferentially down cracks, so was the dissolved silica. It precipitated as the soil solution became concentrated by drying. Both the clay and the silica now plug the cracks and restrict water movement in them. The fact that the clays filling the cracks are red (due to iron oxides) indicates that the water saturation that originally caused the reduction of soil iron oxides no longer occurs in the crack environments.

Soil micromorphologic indicators of stress and fault movement include induced orientation of sand grains, slickensides, and sheared lithic fragments (Lafeber, 1964;

Cetin. 1998; Douglas et al., 1983; Jeong and Cheong, 2005). No such planar features (manifested in thin section as linear features) were observed in the samples. The prevalent embedded grain argillans result from pressures caused by minor shrink-swell activity in response to drying and wetting cycles (Dalrymple and Jim, 1984; Graham and Wood, 1991), typical of southern California's Mediterranean climate. The presence of intact laminated clay and opaline silica linings in the cracks indicates that there has not been movement along the crack since they formed. These features take on the order of tens of thousands (moderately thick to thick illuviation clay linings; McFadden and Weldon, 1987; Kendrick and Graham, 2004) to hundreds of thousand of years (opaline silica seams; Kendrick and Graham, 2004) to form in southern California.

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Figures

Figure 1. *Sample Site 1:* FT-2, 1+46.5, North wall - 9'. Samples 1a, b, c were taken above the blue card, Sample 1d is held in hand and was taken below the red tape. Note blue zones within the general reddish soil matrix.

Figure 2. Sample 1d, showing the reddish matrix surrounding a vertically elongated gray zone that is centered along a crack filled with red clay.

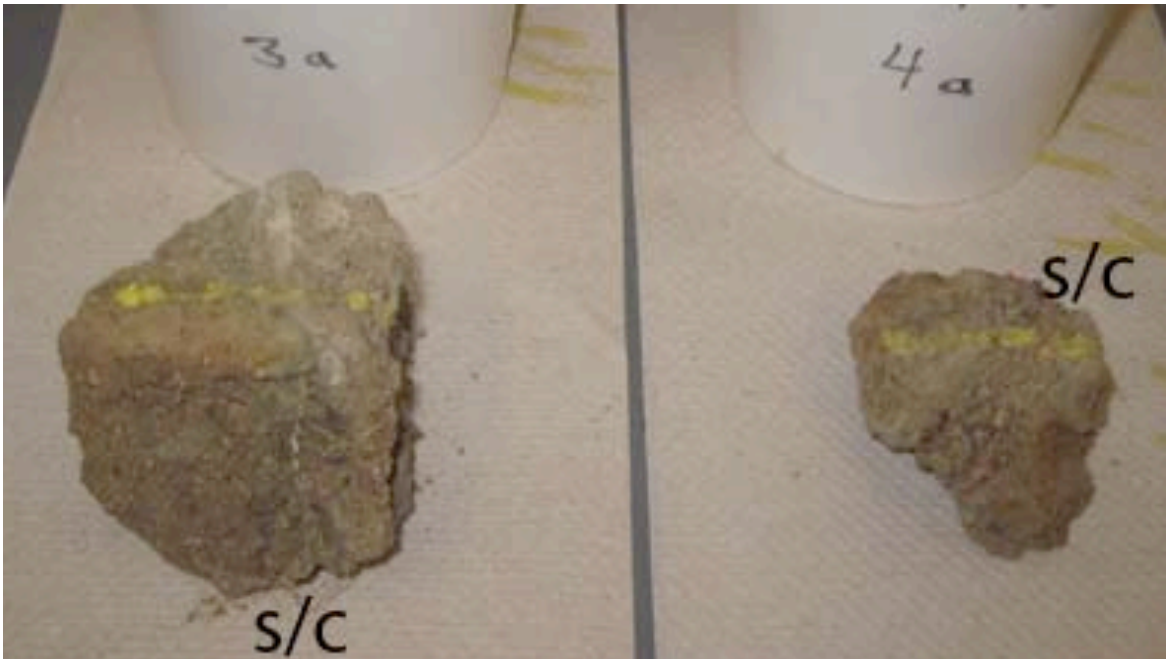


Figure 3. Samples 3a and 4a marked with yellow for thin section orientation. Note the seams of opaline silica/illuvial clay extending vertically above the “s/c’ label in 3a, and down and to the left from the “s/c” label in 4a.

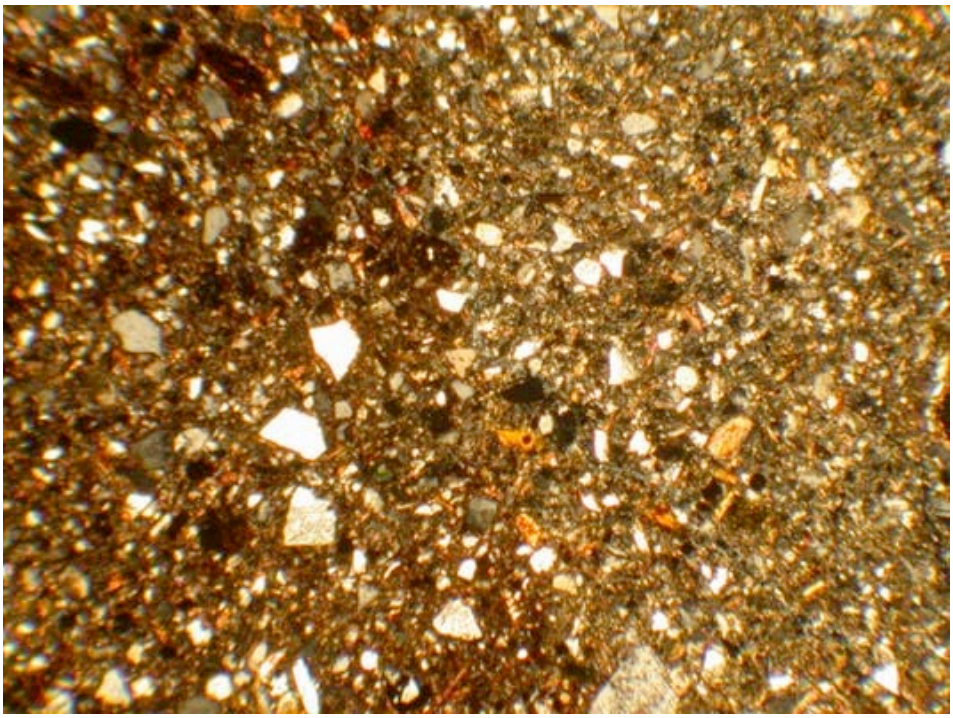
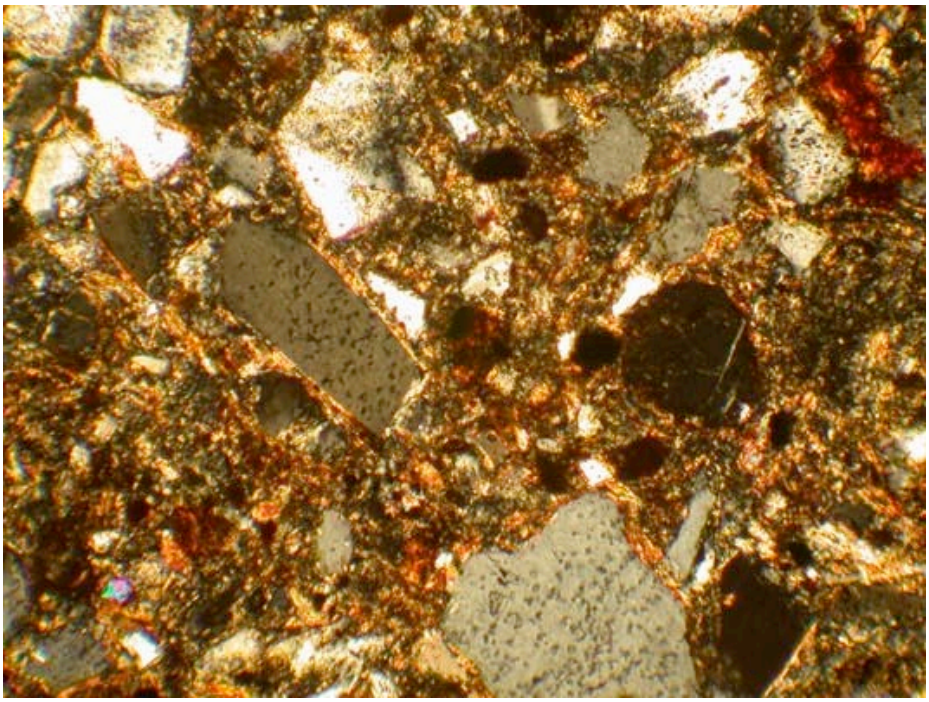
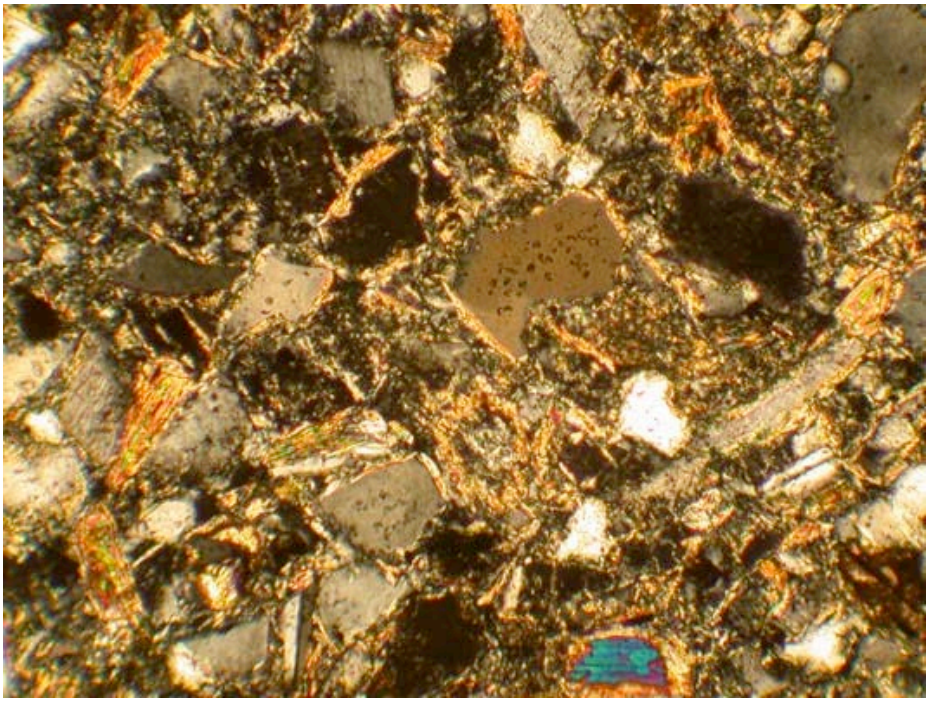


Figure 4. Thin section micrograph showing the transition between red and gray zones in Sample 1d, showing the dense matrix of both. Photo taken with cross-polarized light; long axis of image is 4.3 mm.

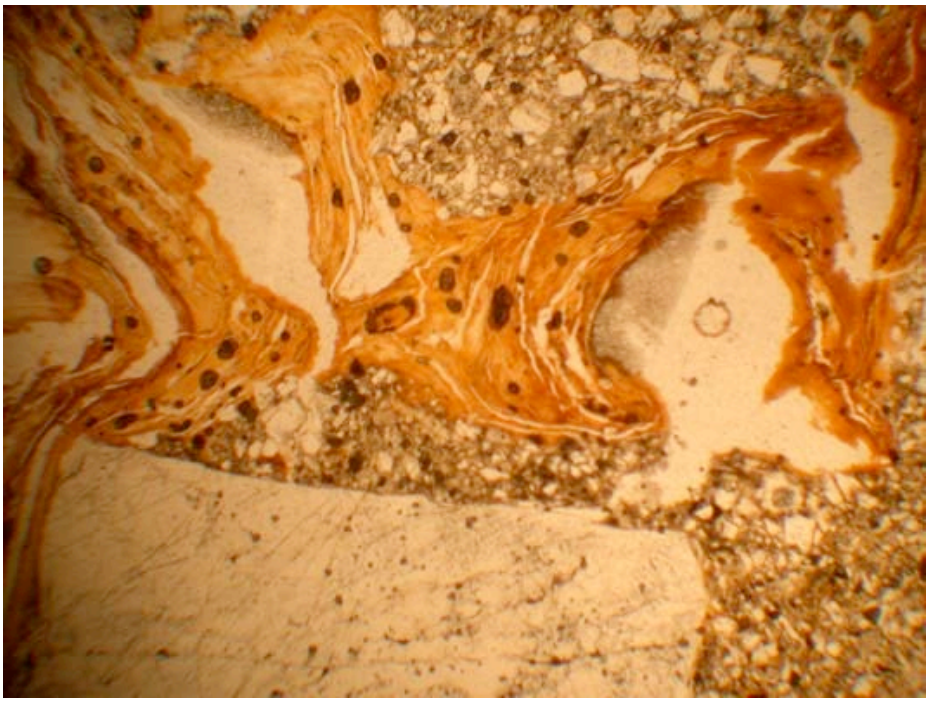


(a)



(b)

Figure 5. Thin section photomicrographs showing soil fabric in Sample 1d with embedded grain argillans (yellow-orange clay lining margins of sand grains) in (a) the red soil matrix and (b) the gray zone. Photos are taken with cross-polarized light; long axis of images is 0.83 mm.



(a)

(b)

Figure 6. Thin section photomicrographs showing strongly oriented, laminated clay lining (illuviation ferri-argillan) in a tubular pore in Sample 1a. The clay was deposited from suspension as soil water moved down the pore. Laminations are essentially vertical strata from different depositional events in the pore. Photo (a) was taken with plane-polarized light, (b) was taken with cross-polarized light; long axis of images is 0.83 mm.

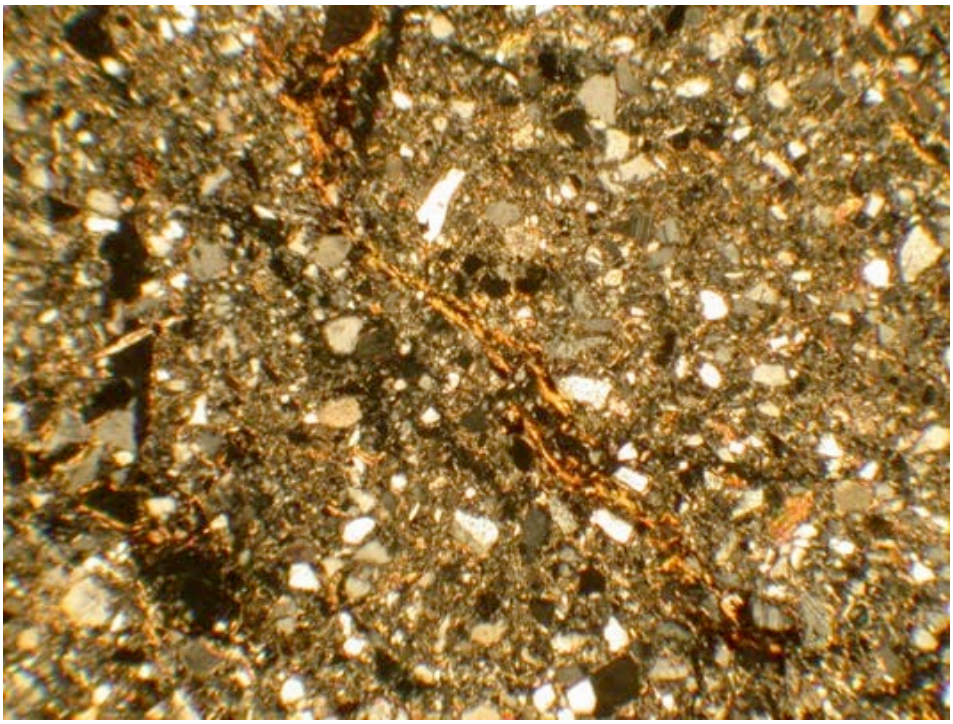


Figure 7. Thin section photomicrograph showing strongly oriented clay (illuviation ferri-argillan) lining the vertical crack in the gray zone of Sample 1d. The clay lining is the yellow-orange band running from upper left to lower right in the photo. Photo taken with cross-polarized light; long axis of image is 4.3 mm.

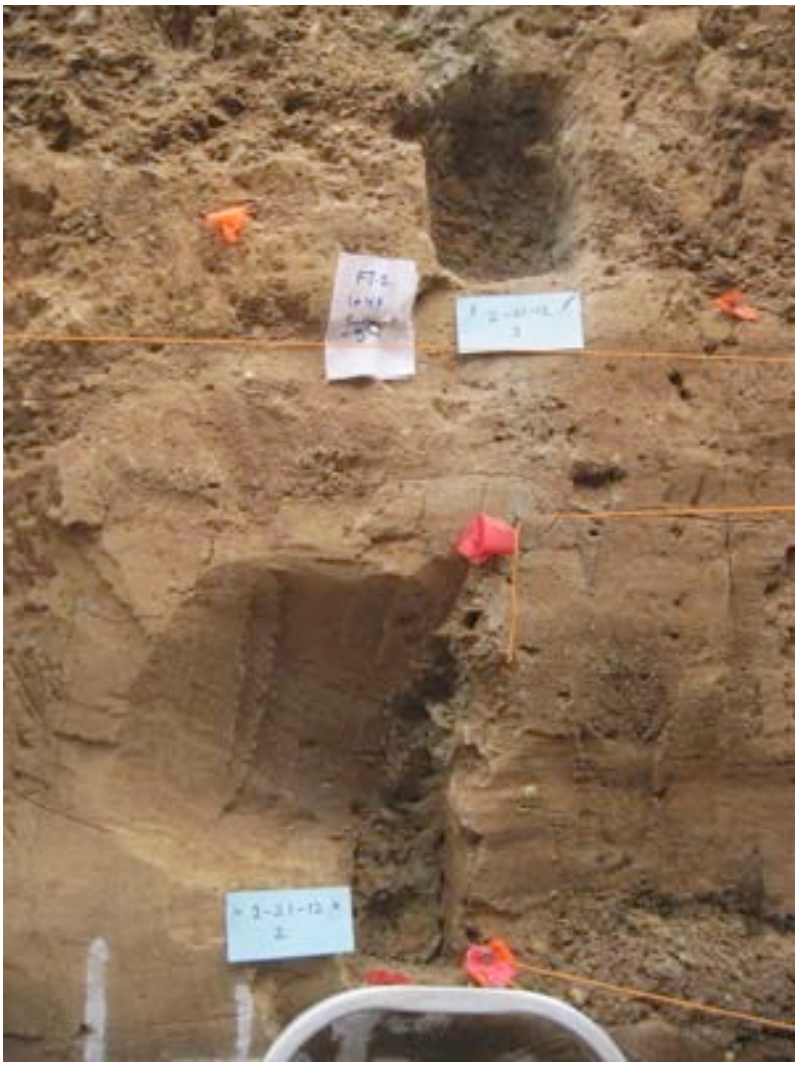
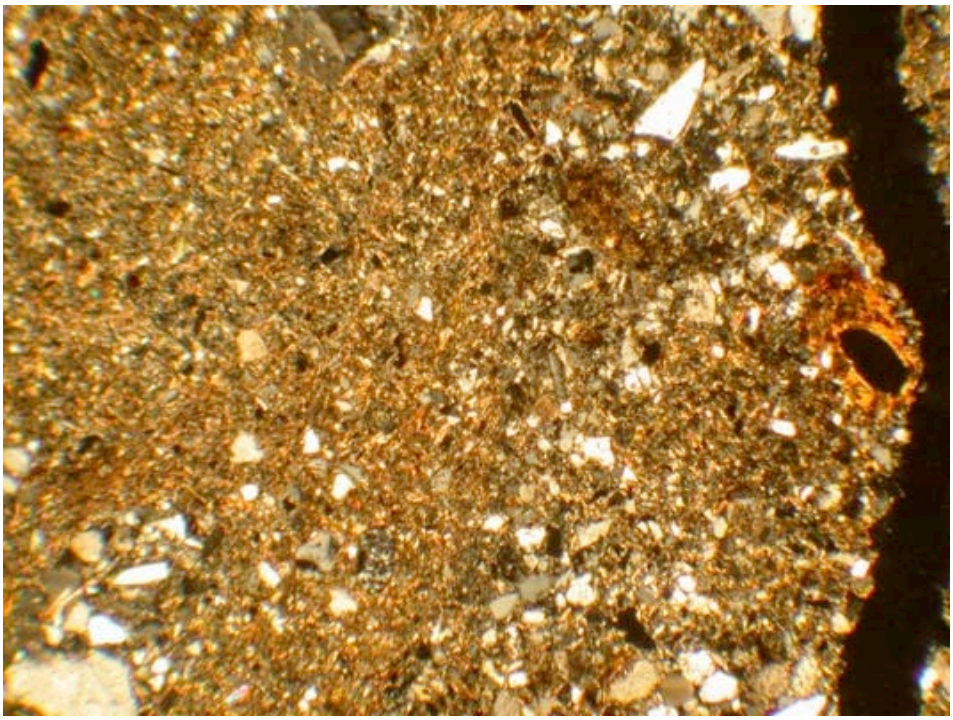
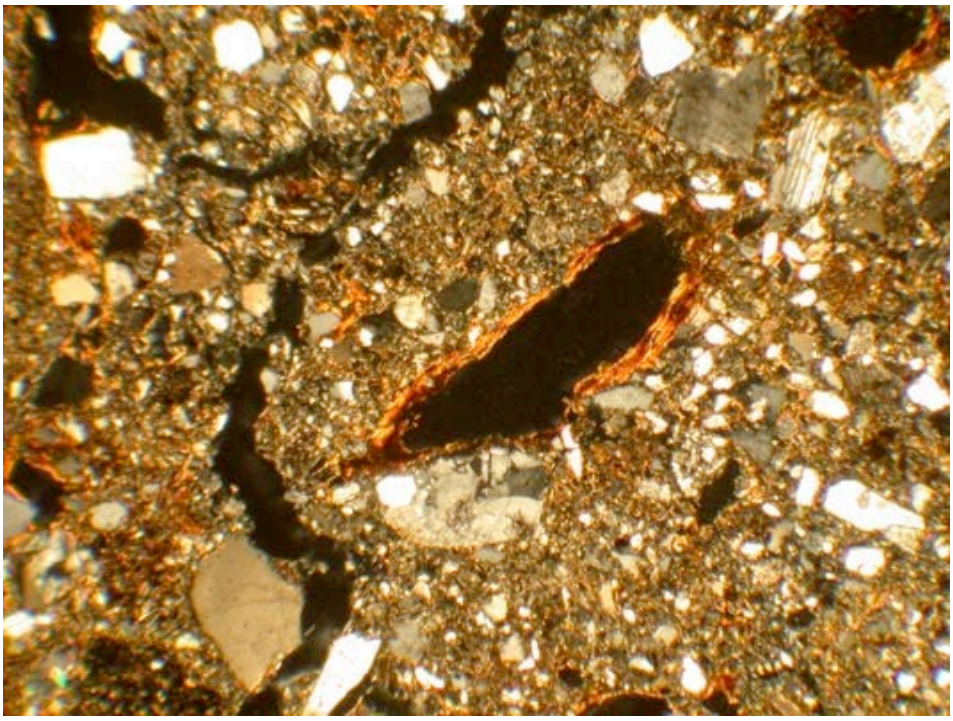


Figure 8. *Sample Sites 2* & 3:FT-2, 1+50, South wall (just below – 5). Sample Site 2 is just to the right of the lower blue card, Sample site 3 is just above the upper blue card.

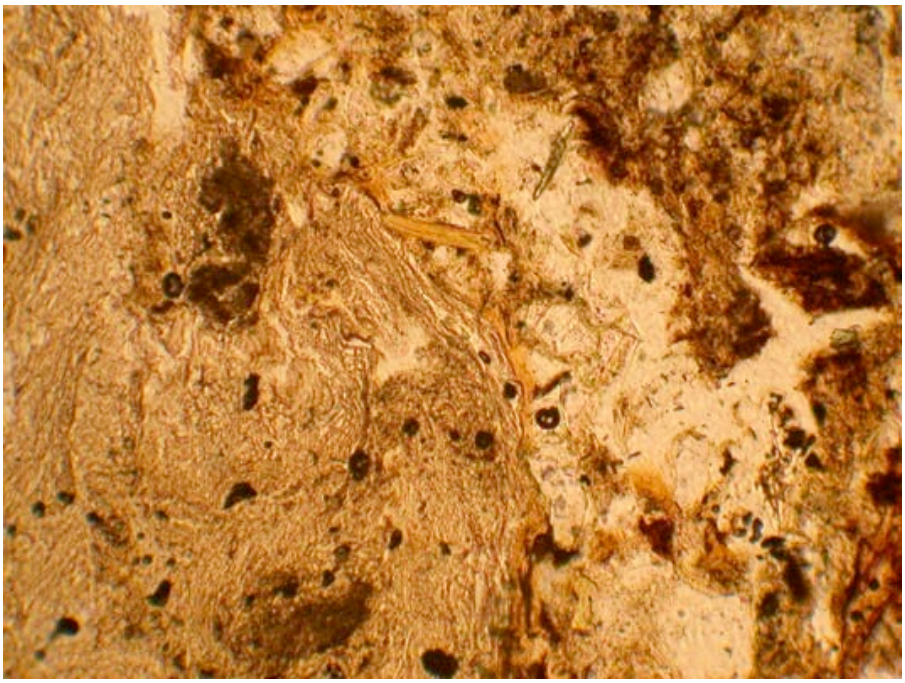


(a)

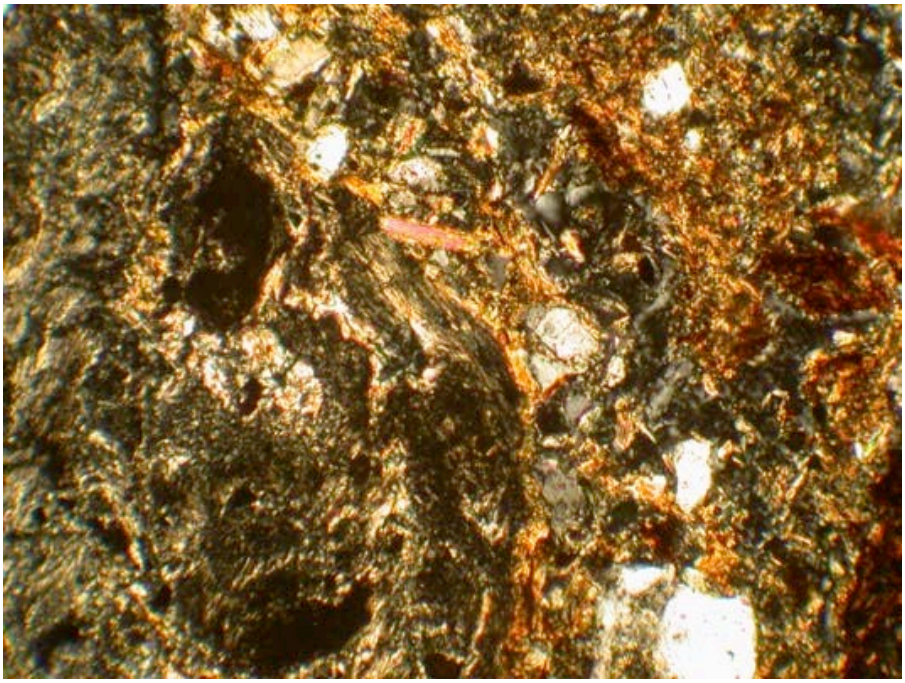


(b)

Figure 9. Thin section photomicrographs of Sample 2 showing (a) coarser grains in the gray zone (right half of photo) than the red zone (left half of photo). Also note in (a) and (b), tubular pores with reddish-orange, strongly oriented clay linings (illuviation ferri-argillans). Photos taken with cross-polarized light; long axis of images is 4.3 mm.



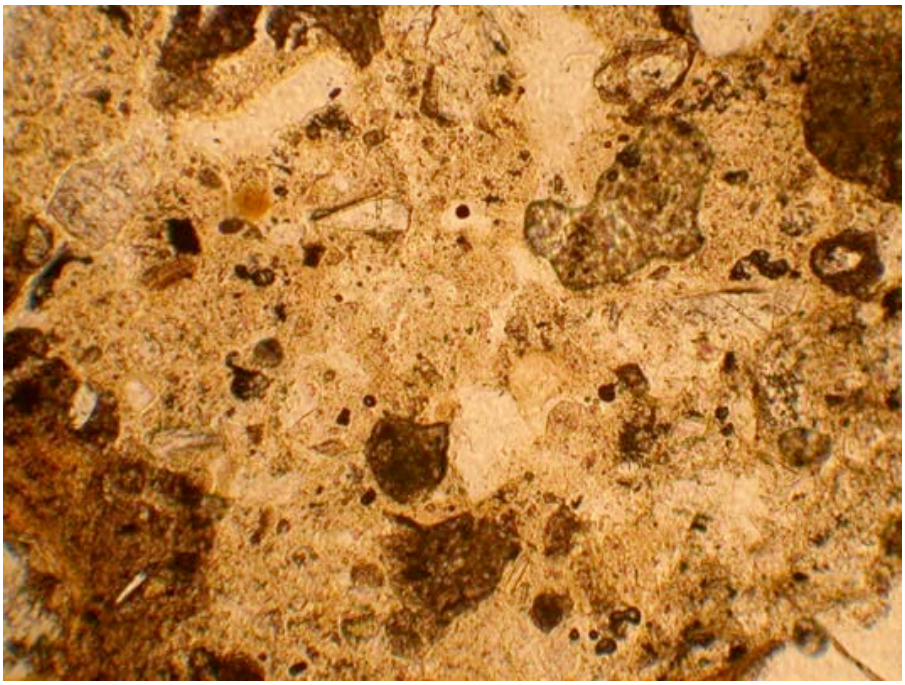
(a)



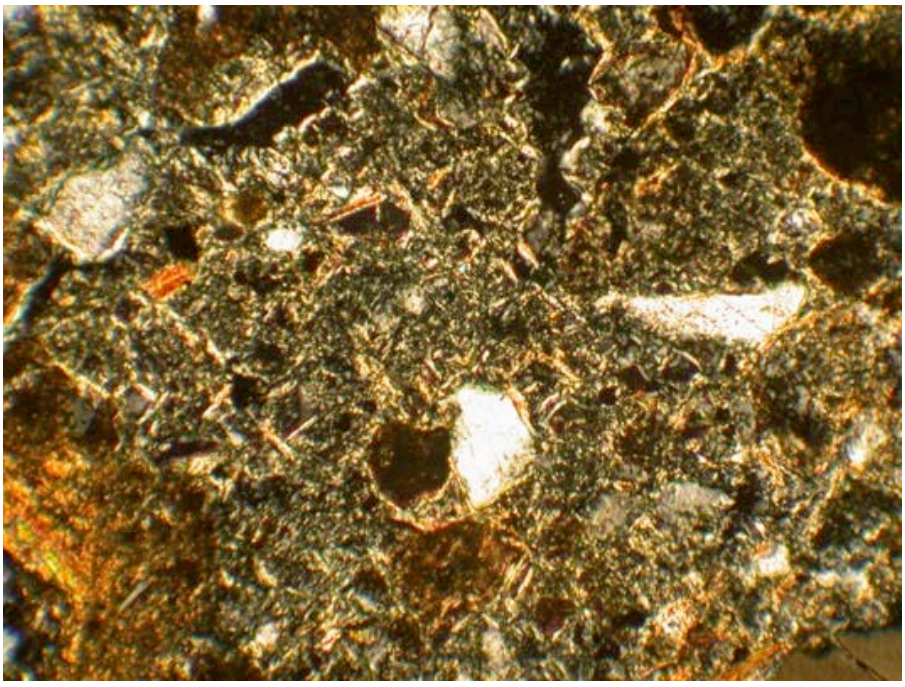
(b)

Figure 10. Thin section photomicrographs of Sample 3a showing part of the seam of opaline silica and clay on the left abutting the soil matrix on the right, in (a) plane-polarized light and (b) cross-polarized light. Long axis of images is 0.83 mm.

Figure 11. *Sample Site 4*: FT-2, 1+50, South wall near surface. Sample was taken from the gray zone above the blue card.



(a)



(b)

Figure 12. Thin section photomicrographs of opaline silica and clay of the seam in Sample 4a, shown in (a) plane-polarized light and (b) cross-polarized light. Long axis of images is 0.83 mm.

Report to Leighton Consulting, Inc.:

Evaluation of Soil Microfabric in Trench FT-5 at Beverly Hills High School, California

November 17, 2012

Submitted by

Robert C. Graham, Ph.D.

Soil Scientist

On September 13, 2012, I visited the Beverly Hills High School site and Trench FT-5 was shown to me by Joe Roe, Eldon Gath, Phil Buchiarelli, Tim Buresh, and Jeff Johnson. Questions centered on: (1) Were faults at depth active within the last 10,000 years? and (2) Have the gray seams close to the surface experienced displacement (are they faults) or are they simple cracks?

Methods

Sample locations and field descriptions are presented in Table 1, with references to field photos (Figures 1-13). In summary, two faults and nearby materials were sampled. One fault environment (FAULT 1) was explored with Samples 1 - 4, 7, 8, and 13. A second fault environment (FAULT 2) was represented by Samples 5 & 6. Samples 9 & 10 were used to explore an elongated, gray, vertical feature, possibly an infilled rodent burrow (krotovina). This feature was not considered a fault because it did not continue back into the trench face more than about 10 cm. Two samples (11 & 12) were taken of soil profile horizons.

Fist-size, intact samples of the features of interest were carved from the trench face, marked to indicate orientation, and packed with paper towels in cardboard containers. These specimens were trimmed in the lab, marked for horizontal thin section orientation, and shipped to San Diego Petrographics in Emmett, Idaho. The samples were vacuum impregnated with plastic resin, which hardened to preserve the soil fabric. The samples were cut, mounted on glass slides, and ground to standard thin section thickness, finished with a cover slip, and shipped back to me. Micromorphologic observations were made using a petrographic microscope.

Micromorphology

Indicators of fault movement that may be observed in soil thin sections include orientation of sand grains, slickensides, and sheared lithic fragments (Lafeber, 1964; Cetin, 1998; Douglas et al., 1983; Jeong and Cheong, 2005). Some of the elongated coarse sand and fine gravel grains in the fill material of FAULT 1 were subparallel to the plane of the fault, but grains were not deformed where they touched each other. Other

than this, no broadly oriented features were observed. All of the materials sampled had a dense matrix with no orientation of fabric (e.g. slickensides) or sheared grains. The widely occurring embedded grain argillans (Figure 14) are orientations of clay and fine micaceous particles around sand grains (Brewer, 1976). They are caused by shrink-swell pressures generated by drying and wetting cycles (Dalrymple and Jim, 1984; Graham and Wood, 1991) characteristic of California's Mediterranean climate.

FAULT 1: @ 0+51.2 (measured on East Wall)

At the bottom of the trench, the infilling material in the fault contained intact laminated clay linings (strongly oriented illuviation argillans; Brewer, 1976) plugging pores between sand grains and lining tubular pores (Samples 1 & 2; Table 1, Figures 15 & 16). These clay linings were mostly 0.03 mm thick, but ranged up to 0.3 mm thick. Materials to the right (Sample 3) and left (Sample 4) contained fewer and thinner illuviation argillans (Table 1), presumably because infiltrating water (which carries the clay in suspension) moves preferentially down the fault compared to the regolith on either side of it.

Sample 13 was taken along a crack closer to the surface (10.5 ft. from bottom of trench, ~5 ft. below the surface). The fault traces up toward the crack, but apparent vertical displacement ends 40 cm below the sampled location. Thin, discontinuous, moderately oriented stress argillans were present on planar voids (Table 1; Figure 17). These features, also known as "pressure faces", form where soil structural units press against each other when moist soil swells during shrink-swell cycles. They are a pedogenic feature and, as such, are more prevalent in the B horizons of the soil profile (Samples 11 & 12; Table 1, Figure 18).

On the West Wall, within a meter of the surface, a zone of gray seams is vertically aligned with FAULT 1, but shows no vertical displacement. In the lower sample from this zone (Sample 7), stress argillans along planar voids (pressure faces) reflect pedogenic shrink-swell activity (Table 1). Intact feldspar grains have been pseudomorphically weathered to clay minerals. In Sample 8, strongly oriented illuviation argillans up to 0.2 mm thick were present (Table 1, Figure 19).

FAULT 2: @ 0+46.7 (measured on East Wall)

The fault, sampled in gray material at the bottom of the trench, contains strongly oriented illuviation argillans in voids between sand grains and in tubular and planar pores (Sample 5; Table 1, Figure 20). These clay linings are mostly 0.01 to 0.05 mm thick, but are up to 0.5 mm thick. As with FAULT 1, the material adjacent to the fault (Sample 6) had fewer and thinner clay linings (Table 1).

Interpretation

FAULT 1: The presence of strongly oriented illuviation argillans in the infilling material suggests stability since these fragile features formed. The lack of deformation of the soil matrix is consistent with physical preservation of the illuviation argillans. The orientation of some coarse sand grains and fine gravels may have occurred during emplacement of the fill material.

ZONE OF GRAY SEAMS ABOVE FAULT 1: Strongly oriented Illuviation argillans in the upper part (Sample 8) are undisrupted, although they show signs of in situ “erosion”; that is, some of the deposited clay has been remobilized and lost. This can happen due to increased water flux through this zone of the soil profile (Birkeland, 1999). Depletion of Fe-oxides by reduction causes the gray zone. The clay-enriched zone in Sample 7 formed through accumulation of illuvial clay and weathering of feldspars, clay pseudomorphs of which remain intact. The intact weathered feldspar grains also attest to stability since formation, despite minor stresses from shrink-swell activity. This zone of seams and cracks is a zone of enhanced pedogenic weathering.

FAULT 2: Strongly oriented illuviation argillans and lack of matrix deformation indicate lack of physical disruption.

Intact laminated clay linings (illuviation argillans; Brewer, 1976) in cracks sampled in FT-2 were used to interpret that the cracks have not been physically disturbed since the clay linings were deposited by water percolating downward through the soil (Turk et al., 2012; Graham, 2012). In FT-5 the sampled fault features were broader zones (over the

scale of several centimeters), rather than discrete cracks as in FT-2. Nevertheless, the presence of intact illuviation argillans suggests stability since formation.

Moderately thick to thick (~0.1 to 0.3 mm) illuviation argillans, as found in the samples from FT-5, are also reported in Fallbrook soils on stable geomorphic surfaces in the tonalite terrain of San Diego and western Riverside counties (Nettleton et al., 1968). They take on the order of tens of thousands of years to form (McFadden and Weldon, 1987; Kendrick and Graham, 2004).

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Table 1. Micromorphological characteristics of samples taken from FT-5.

Sample, field photo	Location	Description	Matrix[1]	Clay linings[2]
1, 2 Fig. 1, 2	**E. wall** 0+51.2 bottom	Infilled coarse material in fault.	Dense; no matrix orientation. Common EGA. Some grains 1-5 mm subparallel to fault.	Strongly oriented IA plugging intergranular pores & lining tubular pores, mostly 0.03 mm thick, up to 0.3 mm thick.
3 Fig. 1, 2	Same as #1 & 2	Gray material to right of fault.	Dense, no orientation. EGA on most grains.	Strongly oriented IA in intergranular pores & planar voids, 0.01-0.1 mm thick.
4 Fig. 3	**E. wall** 0+ 53 bottom	Reddish material to left of fault.	Dense, no orientation. Fewer & less distinct EGA than in #3.	Pores mostly unlined. Few or no IA.
5 Fig. 4, 5	**E. wall** 0 + 46.7 1.1 ft above bottom	Fault; gray material.	Dense; no orientation; abundant EGA; some planar voids.	Strongly oriented IA in intergranular, tubular, & planar voids, mostly 0.01 to 0.05 mm, but up to 0.5 mm thick.
6 Fig. 5	**E. wall** 0 + 47.7 3.8 ft above bottom	Reddish material to left of fault.	Dense, no orientation; EGA on most grains. No planar or tubular voids.	Abundant strongly oriented IA in intergranular pores, 0.01 to 0.2 mm thick.
7 Fig. 6, 7	**W. wall** 0 + 48.9 10.7 ft above bottom	Gray seams within 1 m of the surface. Same structure as #1; no vertical offset.	Dense, no orientation; ubiquitous EGA. Clay-enriched zone 1-4 mm thick perp. to long axis of slide with highly weathered, but intact feldspar grains, few EGA.	Moderately oriented, striated argillans along planar voids & in clay-enriched zone. No strongly oriented IA.
8 Fig. 6, 7	30 cm above #7	Same as #7. 50 cm below surface.	Dense, no orientation; EGA on many grains. Gray zone, 4-5 mm wide across long axis at an angle -- Fe oxides depleted & IA degraded, but otherwise same.	Strongly oriented IA in planar & tubular voids, up to 0.2 mm thick. In gray zone, IA edges are not sharp and extinction bands are faded.
9 Fig. 8	**W. wall** 0 + 62 4.8 ft above bottom	Gray clay zone ~10 cm diam, 60 cm long; krotovina (?)	Dense, no orientation; ubiquitous EGA. Fine-text., brown zone with micro sbk structure 2-5 mm diam.	Strongly oriented IA in tubular (0.02-0.05 mm thick) & planar (<0.02 mm thick) voids.

Sample	Location	Description	Matrix	Clay linings
10 Fig. 8	20 cm to left of #9	Reddish sandy clay loam material.	Dense, no orientation. Zones of Fe depletion amid reddish color; boundaries btwn zones indistinct. EGA on ≤10% of grains.	Strongly oriented IA in tubular & planar voids, 0.1 to 0.3 mm thick.
11 Fig. 9, 11	**E. wall** 0 + 82.6	Soil profile 3BCb	Dense, most grains have EGA. Fine texture with blocky structure (2-4 mm diam) separated by planar voids. Mostly reddish-brown, but gray around voids.	Strongly oriented IA in tubular voids (~0.01 mm thick); moderately oriented SA on ped faces (planar voids).
12 Fig. 9, 10	Same as #11	Soil profile 2Btb2	Similar to #11, but structural units are larger (~5 mm) & color is more yellow-brown and gray.	Similar to #11
13 Fig. 12, 13	E. wall 0 + 51.8 10.5 ft. above bottom	Fault from #1 traces up to ~40 cm below this sample. Crack & gley here, but no vertical displacement.	Dense, no orientation; ubiquitous EGA.	Thin (≤0.02 mm), discontinuous, moderately oriented SA on planar voids.

[1]EGA = embedded grain argillans

[2]IA = illuviation argillans; SA = stress argillans

Figure 1. Sample Sites 1 – 3: FT-5, 1+51.2, East wall, 1.8’ from bottom. Sample 1 -- infilled coarse material in fault; Sample 2 -- just below Sample 1; Sample 3 -- gray material to right of fill/fault.

Figure 2. Sample Sites 1 – 3, as in Figure 1, after taking Samples 1 & 2.

Figure 3. Sample Site 4: FT-5, 1+53, East wall. Samples 1, 2, & 3 were taken to the right.

Figure 4. Sample Site 5: FT-5, 0+46.7, East wall, 1.1’ from bottom of trench.

Figure 5. Sample Sites 5 & 6: FT-5, 0+46.7, East wall. Sample Site 5 is at bottom.

Figure 6. Sample Sites 7 & 8: FT-5, 0+48.9, West wall, 10.7’ above bottom of trench. Gray seams around cracks within 1 m of the surface. Sample 8 is 30 cm above Sample 7.

Figure 7. Sample sites 7 & 8 (as in Figure 6) after sampling.

Figure 8. Sample Sites 9 & 10: FT-5, 0+62, West wall, 4.8’ above bottom of trench. Sample 9 is from gray material. Gray material extends back only about 10 cm into the trench wall. The feature may be a krotovina (back-filled rodent burrow). Sample 10 is 20 cm to left of Sample 9.

Figure 9. Sample Sites 11 & 12: FT-5, 0+82.6, East wall. Soil profile.

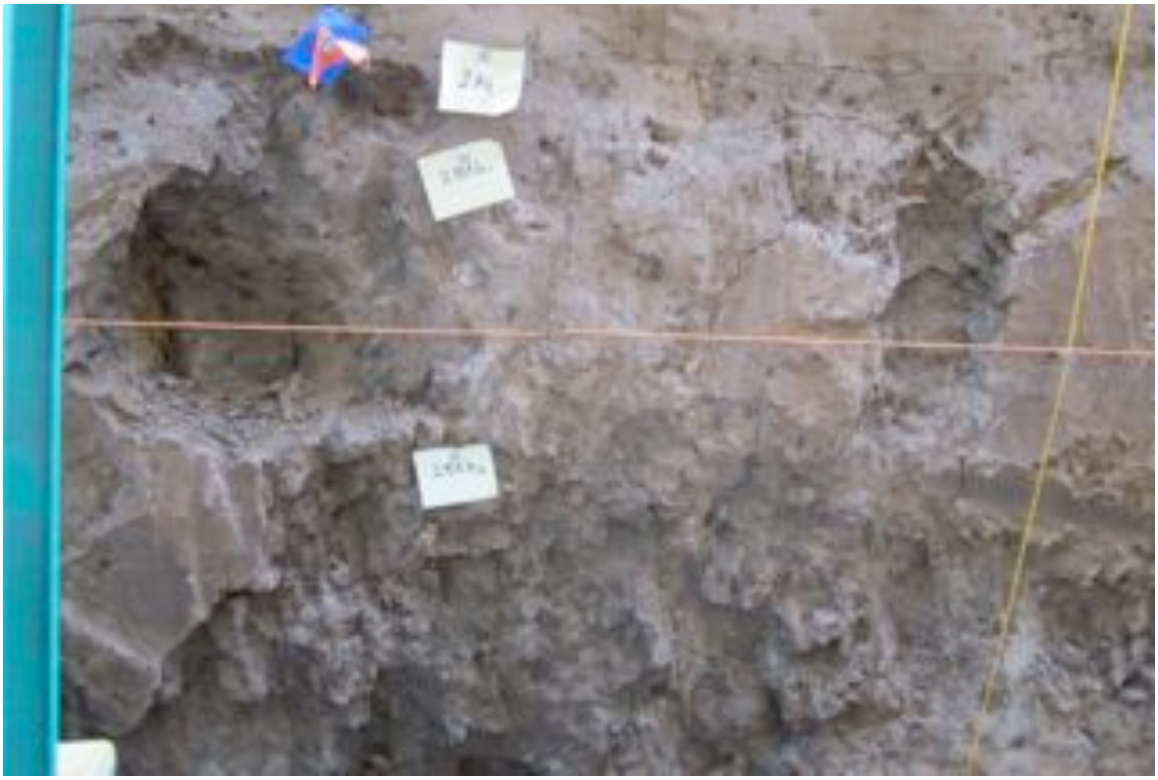


Figure 10. Sample Site 12 (as in Figure 9): 2Btb2 horizon.

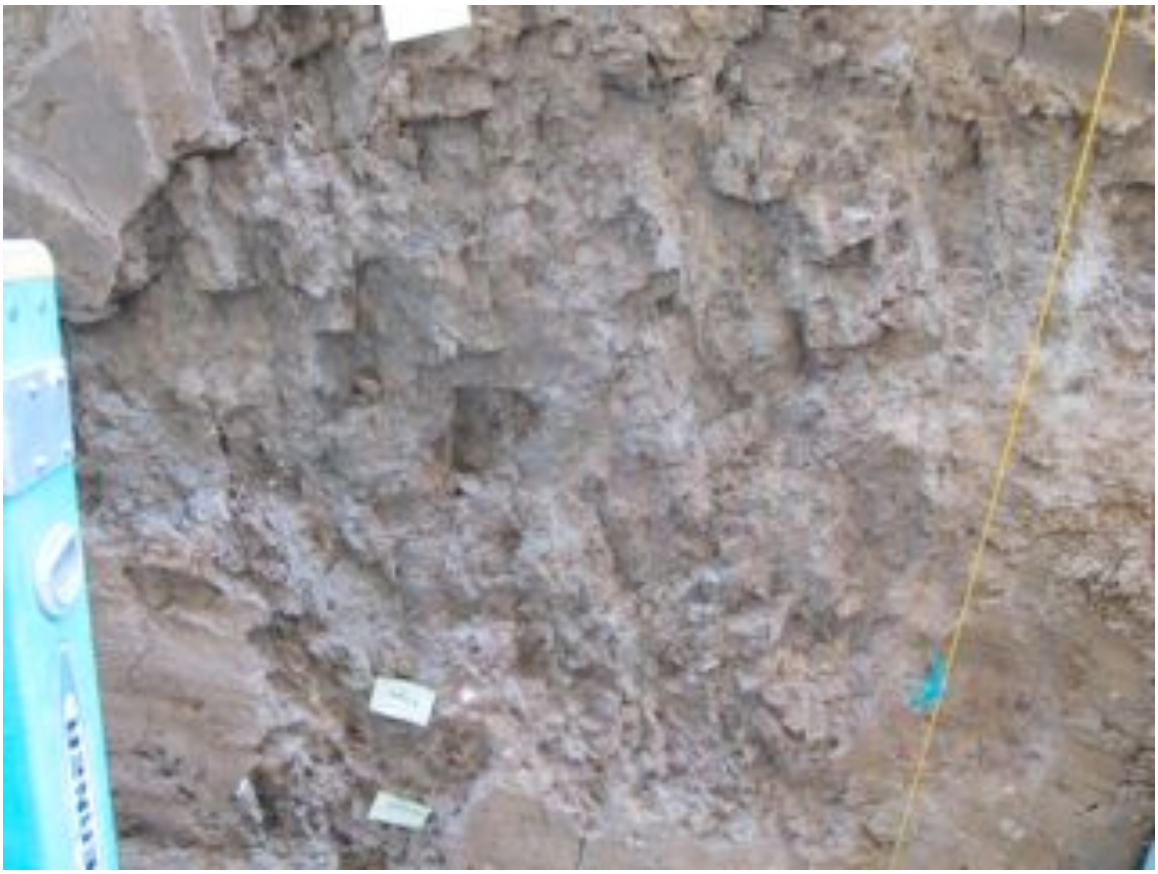


Figure 11. Sample Site 11 (as in Figure 9): 3BCb horizon.

Figure 12. Sample Site 13: FT-5, 0+51.8, East wall, 10.5’ above bottom of trench.

Figure 13. Sample Site 13 (as in Figure 12): Close up.

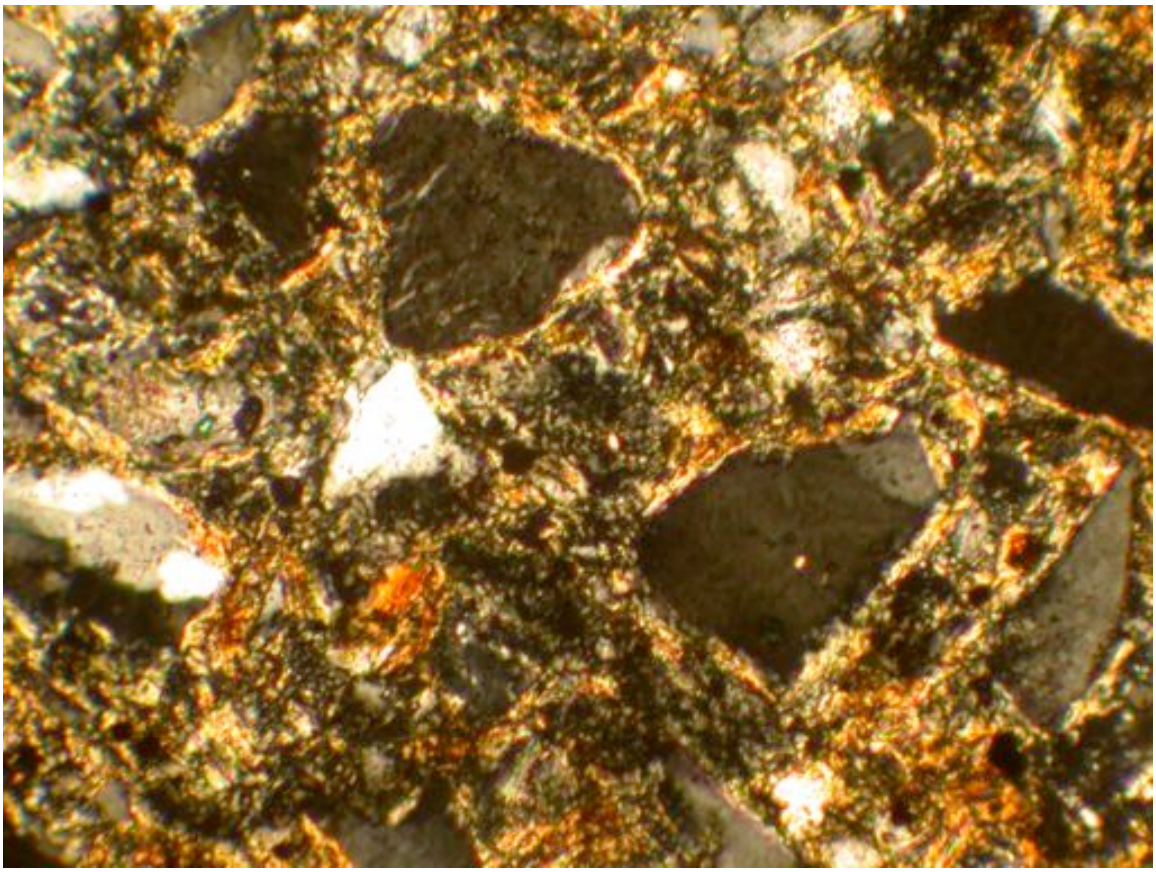
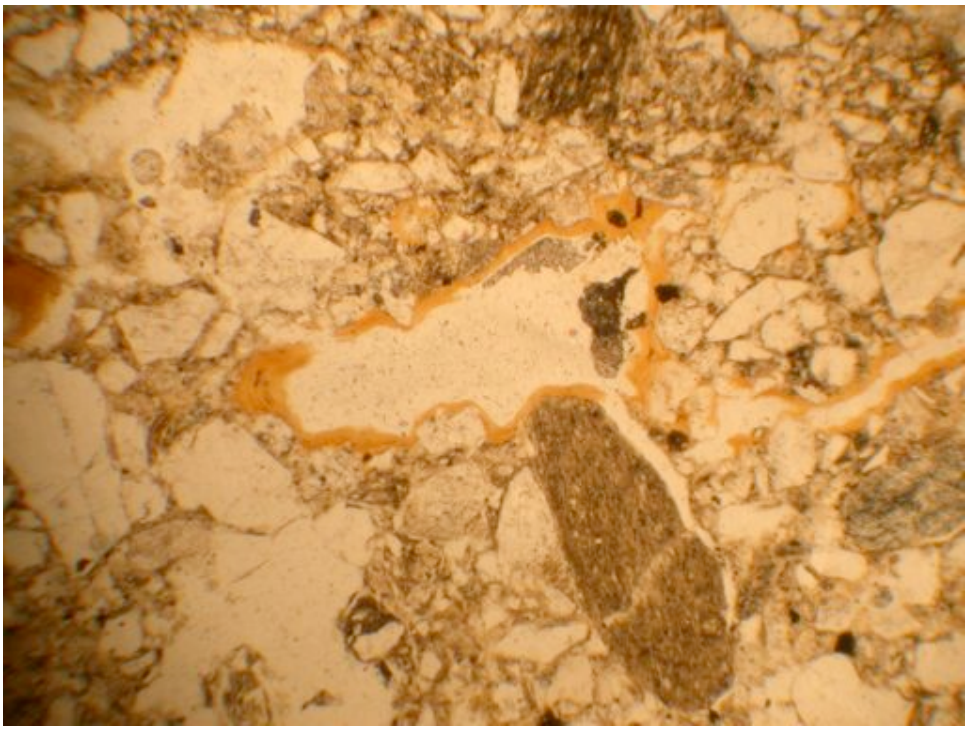
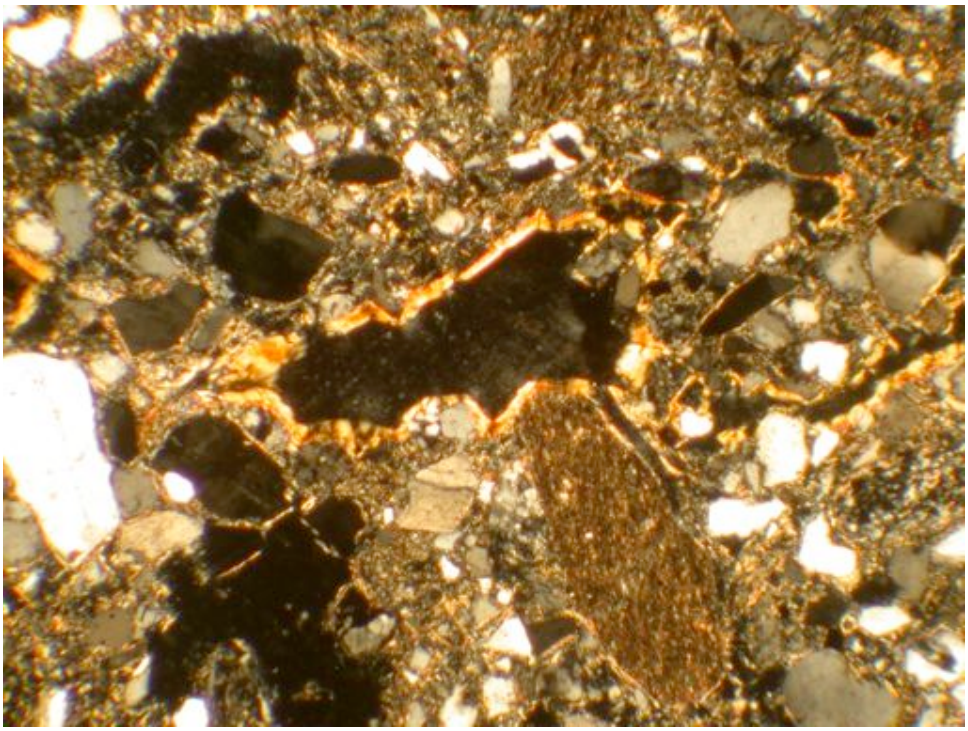


Figure 14. Thin section photomicrograph showing soil fabric in Sample 13 with embedded grain argillans (yellow-orange clay lining margins of sand grains). Photos are taken with cross-polarized light; long axis of image is 0.57 mm.

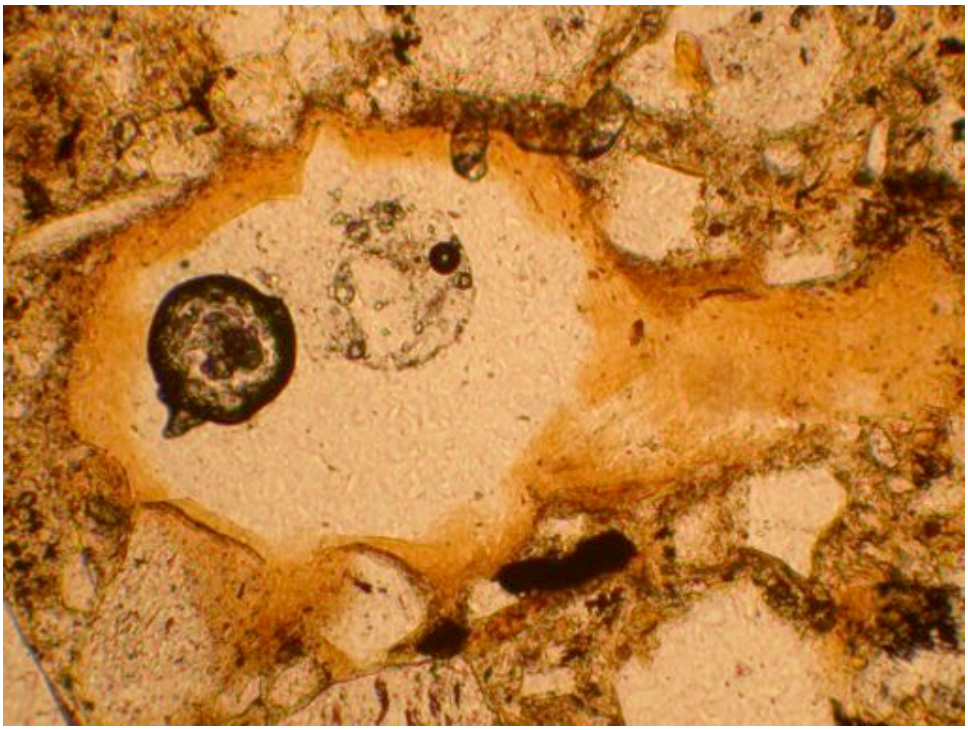


(a)

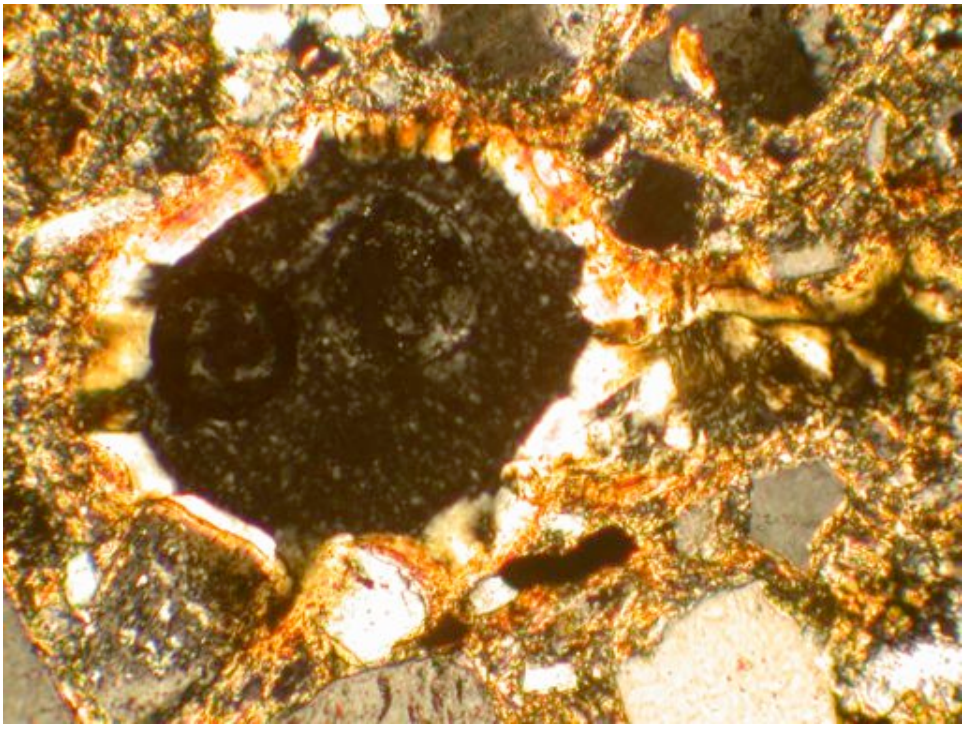


(b)

Figure 15. Thin section photomicrographs showing strongly oriented illuviation argillans (yellow-orange clay linings) in a tubular pore in Sample 2. Photo (a) was taken with plane-polarized light, (b) was taken with cross-polarized light; long axis of images is 3.9 mm.

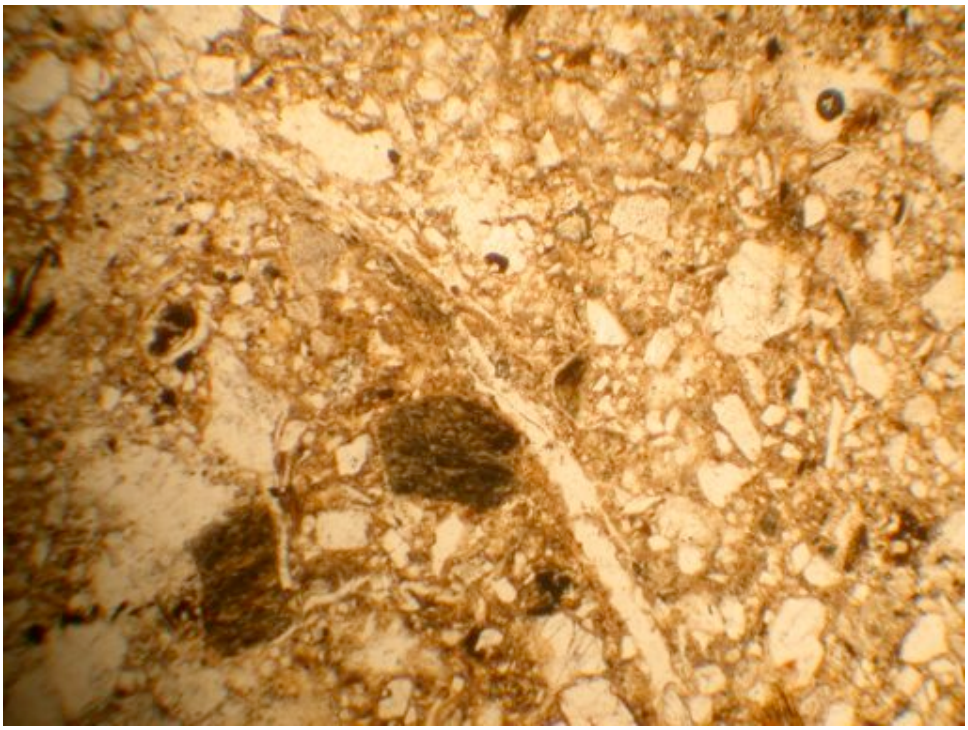


(a)

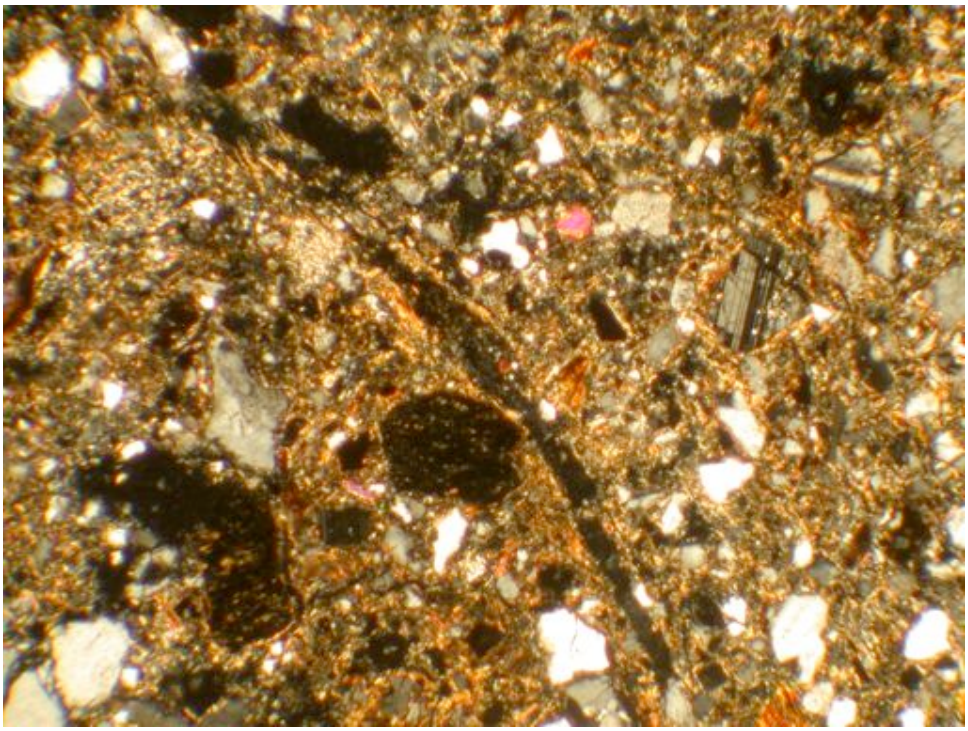


(b)

Figure 16. Thin section photomicrographs showing a strongly oriented illuviation argillan (yellow-orange clay linings) in a tubular pore in Sample 2. Photo (a) was taken with plane-polarized light, (b) was taken with cross-polarized light; long axis of images is 0.57 mm. Pore contains grinding compound debris from thin section preparation (a).

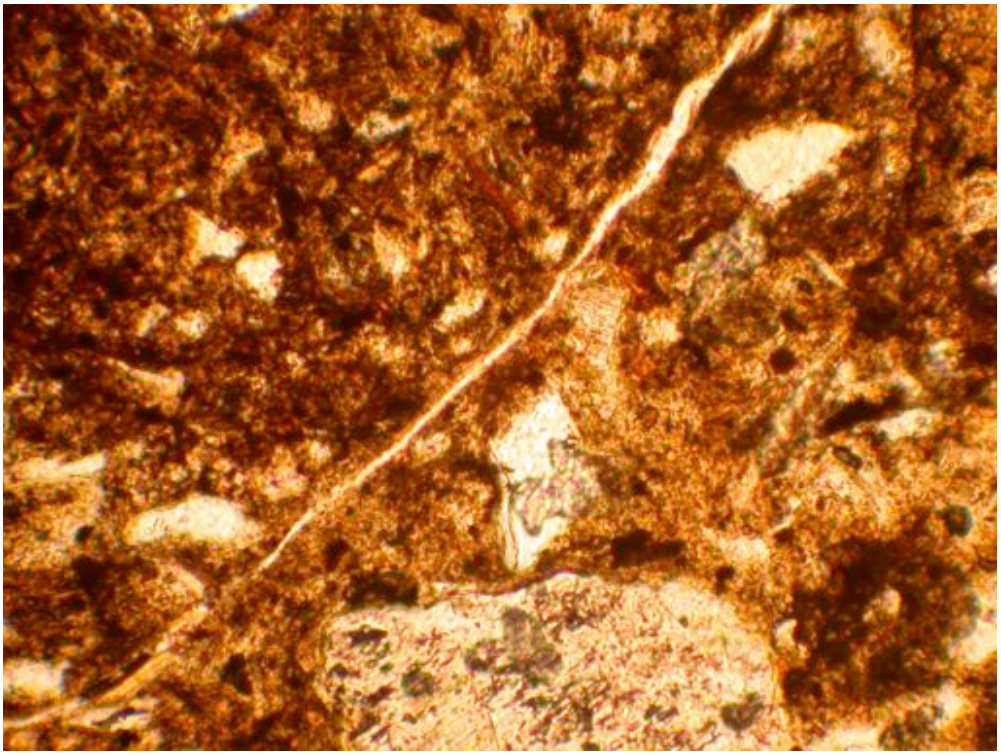


(a)

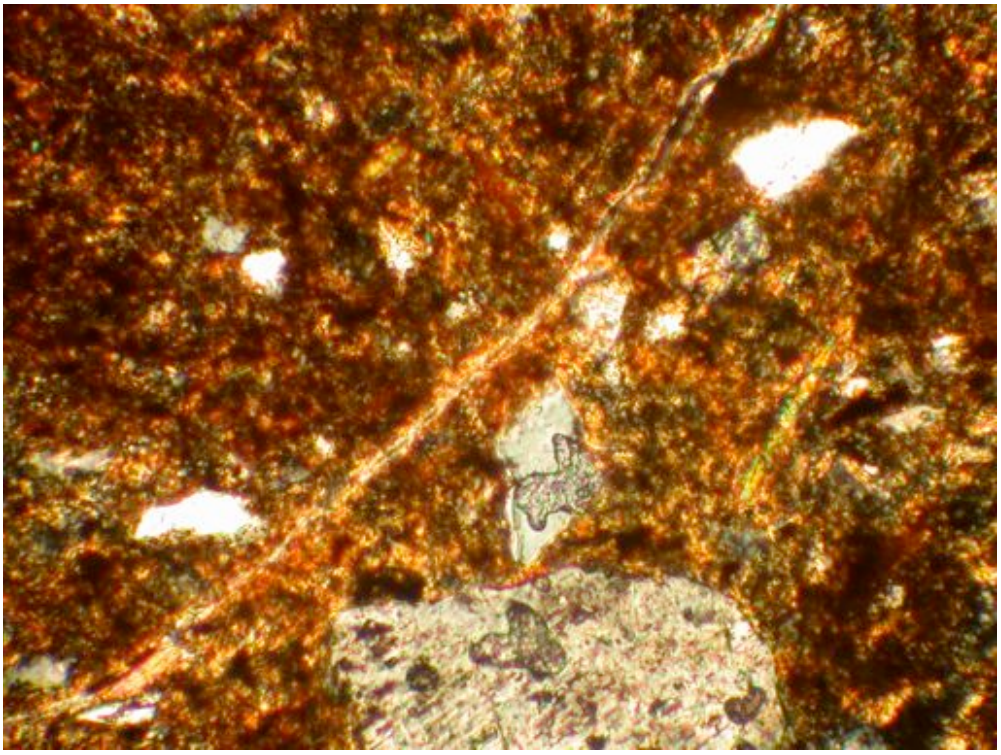


(b)

Figure 17. Thin section photomicrographs showing moderately oriented stress argillans (yellow-orange clay linings) on walls of a planar void in Sample 13. Photo (a) was taken with plane-polarized light, (b) was taken with cross-polarized light; long axis of images is 3.9 mm.



(a)



(b)

Figure 18. Thin section photomicrographs showing moderately oriented stress argillans (yellow-orange clay linings) on walls of a planar void bounding a soil structural unit in Sample 11. Photo (a) was taken with plane-polarized light, (b) was taken with cross-polarized light; long axis of images is 3.9 mm.

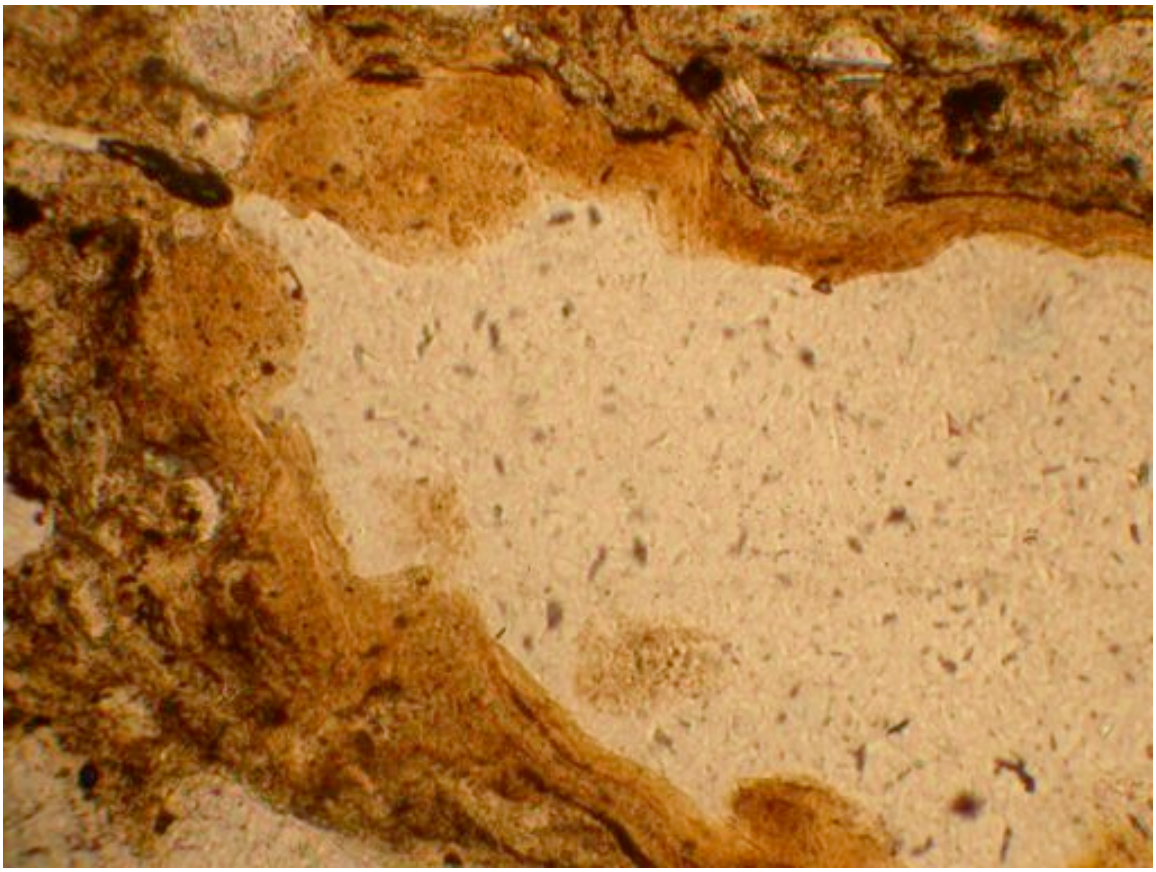
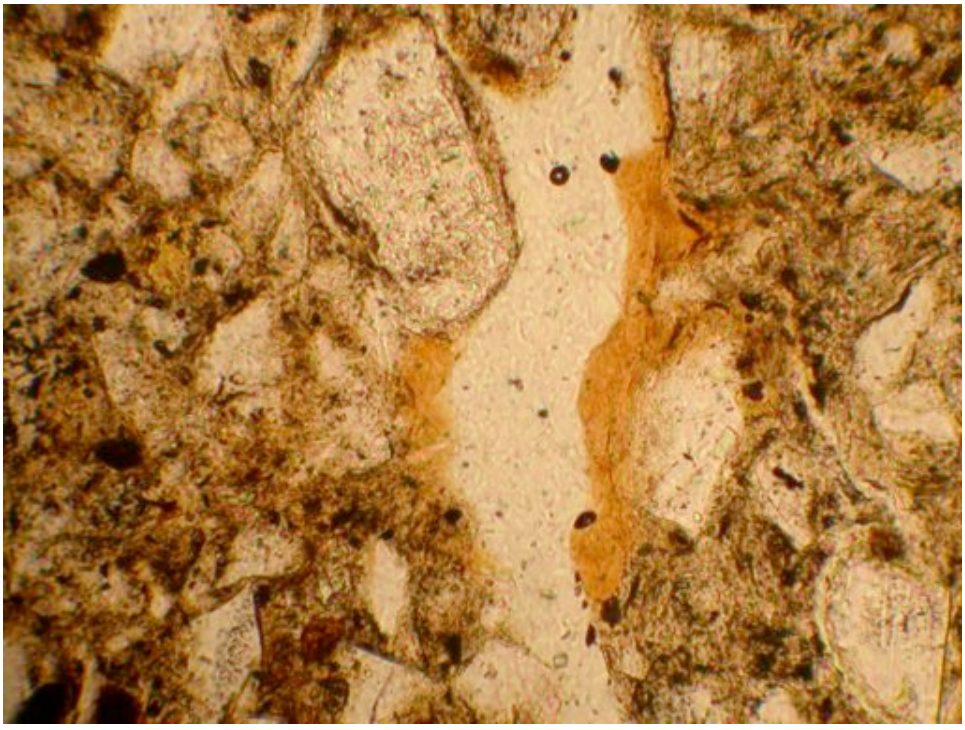
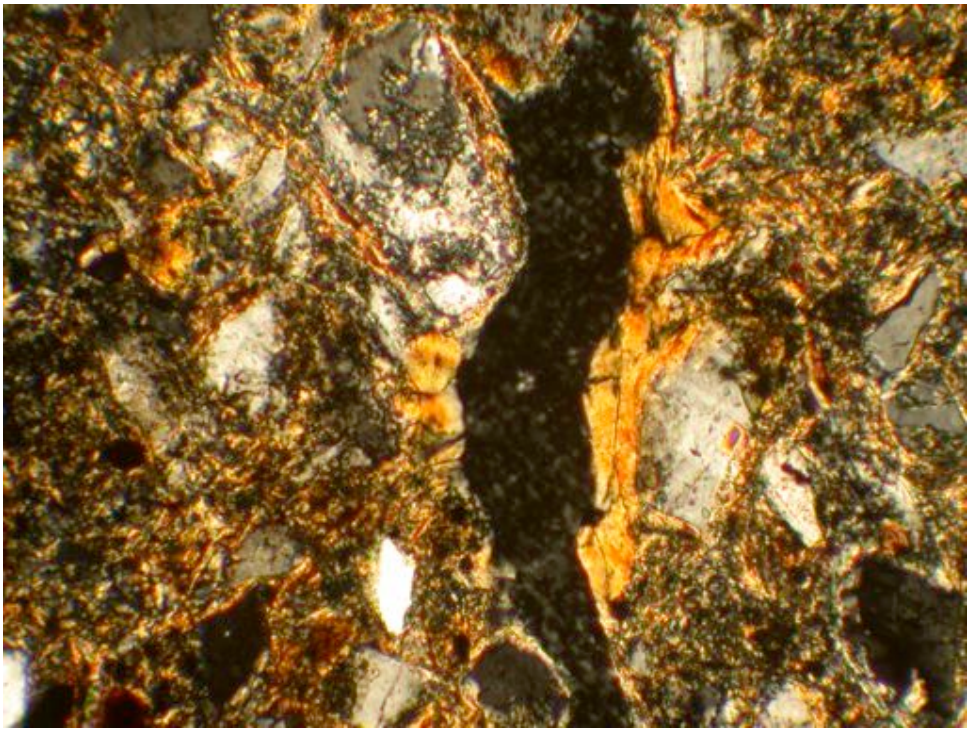


Figure 19. Thin section photomicrograph showing a strongly oriented illuviation argillan (yellow-orange clay lining) in a tubular pore in Sample 8. Photo was taken with plane-polarized light; long axis of images is 0.57 mm. The clay was deposited from suspension as soil water moved down the pore. Laminations are essentially strata resulting from different depositional events in the pore.



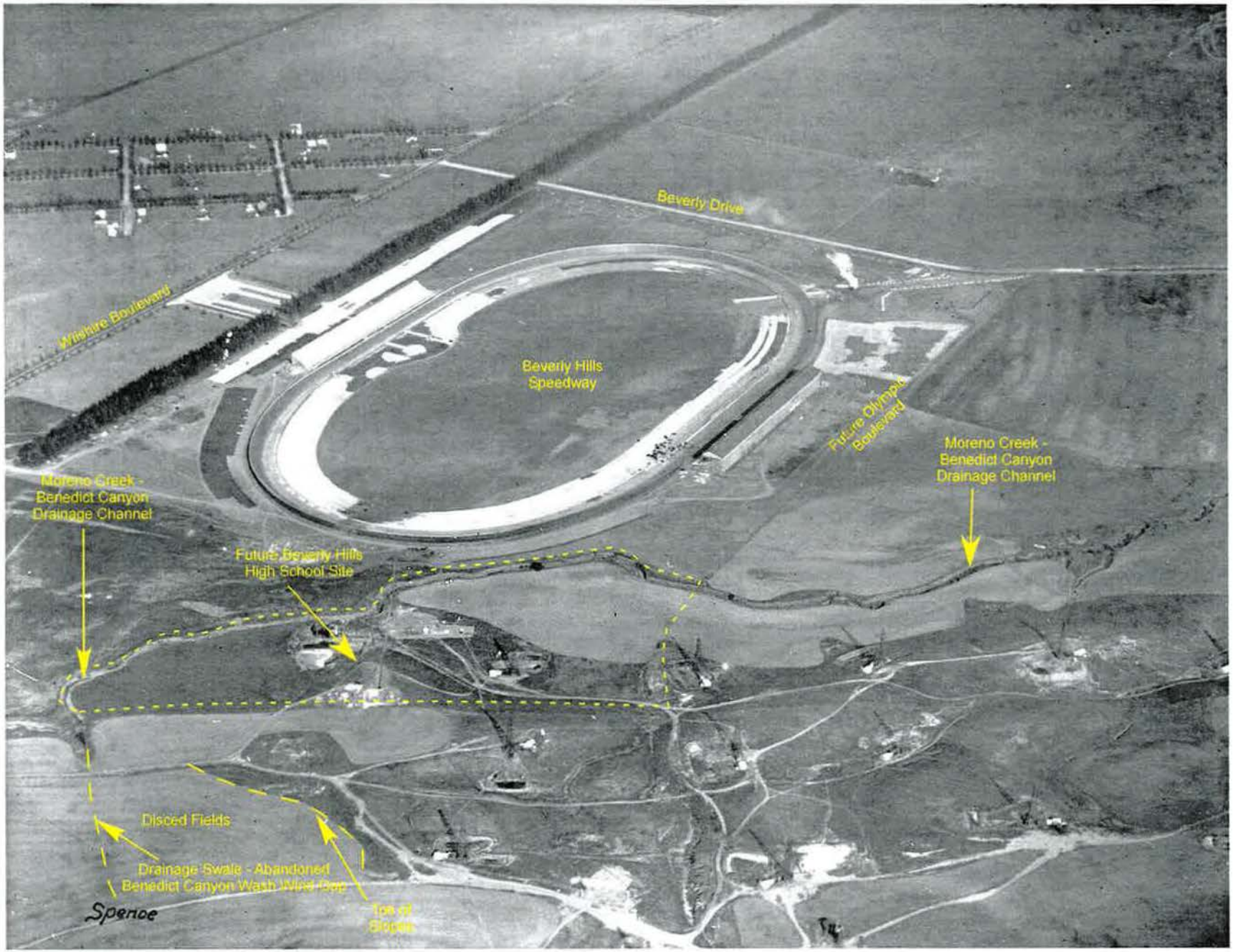
(a)



(b)

Figure 20. Thin section photomicrographs showing strongly oriented illuviation argillans (yellow-orange clay linings) in a tubular pore in Sample 5. Photo (a) was taken with plane-polarized light, (b) was taken with cross-polarized light; long axis of images is 0.57 mm.

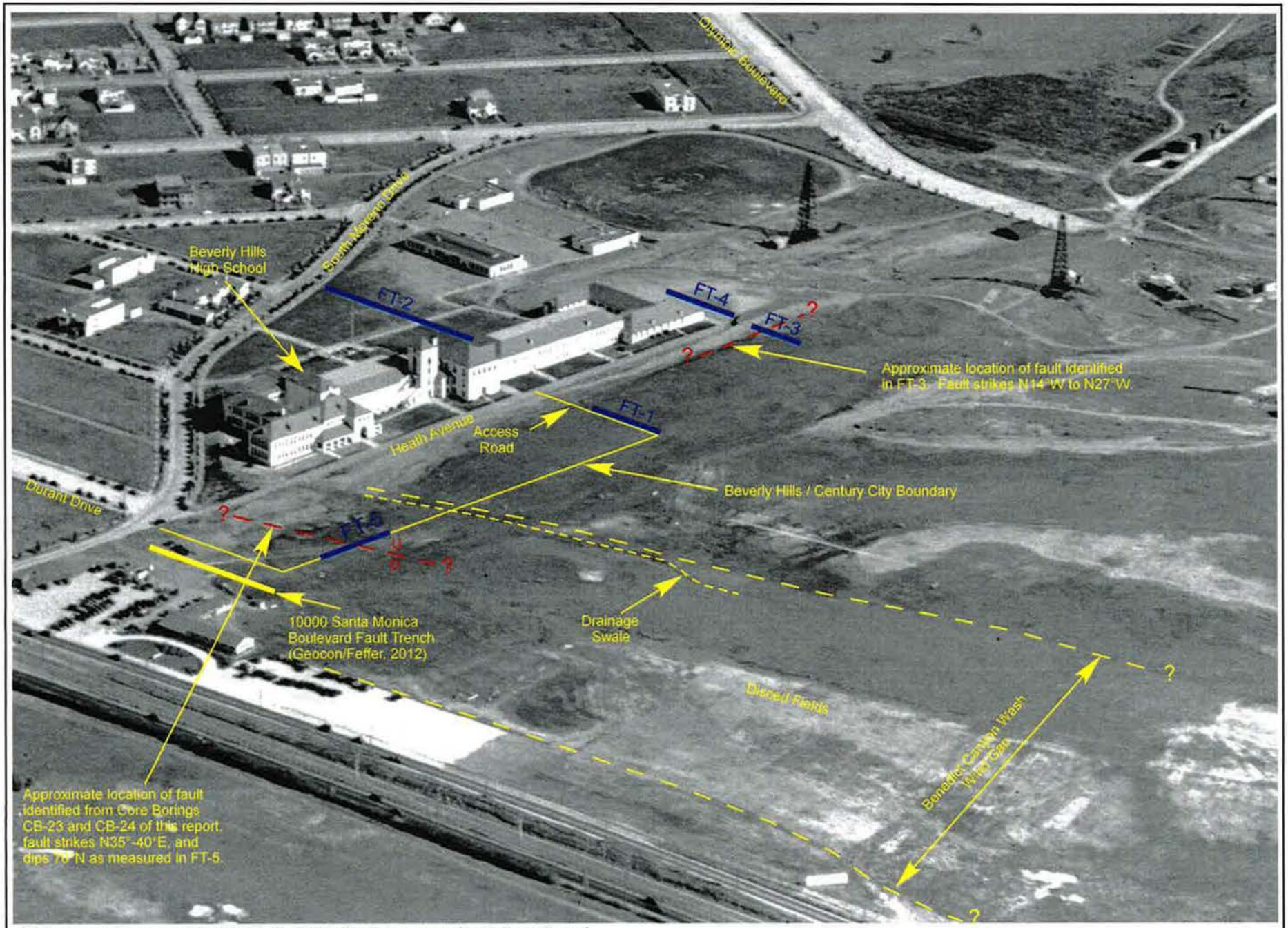
APPENDIX E



Reference: Spence, Unknown date (early 1920's), 4232

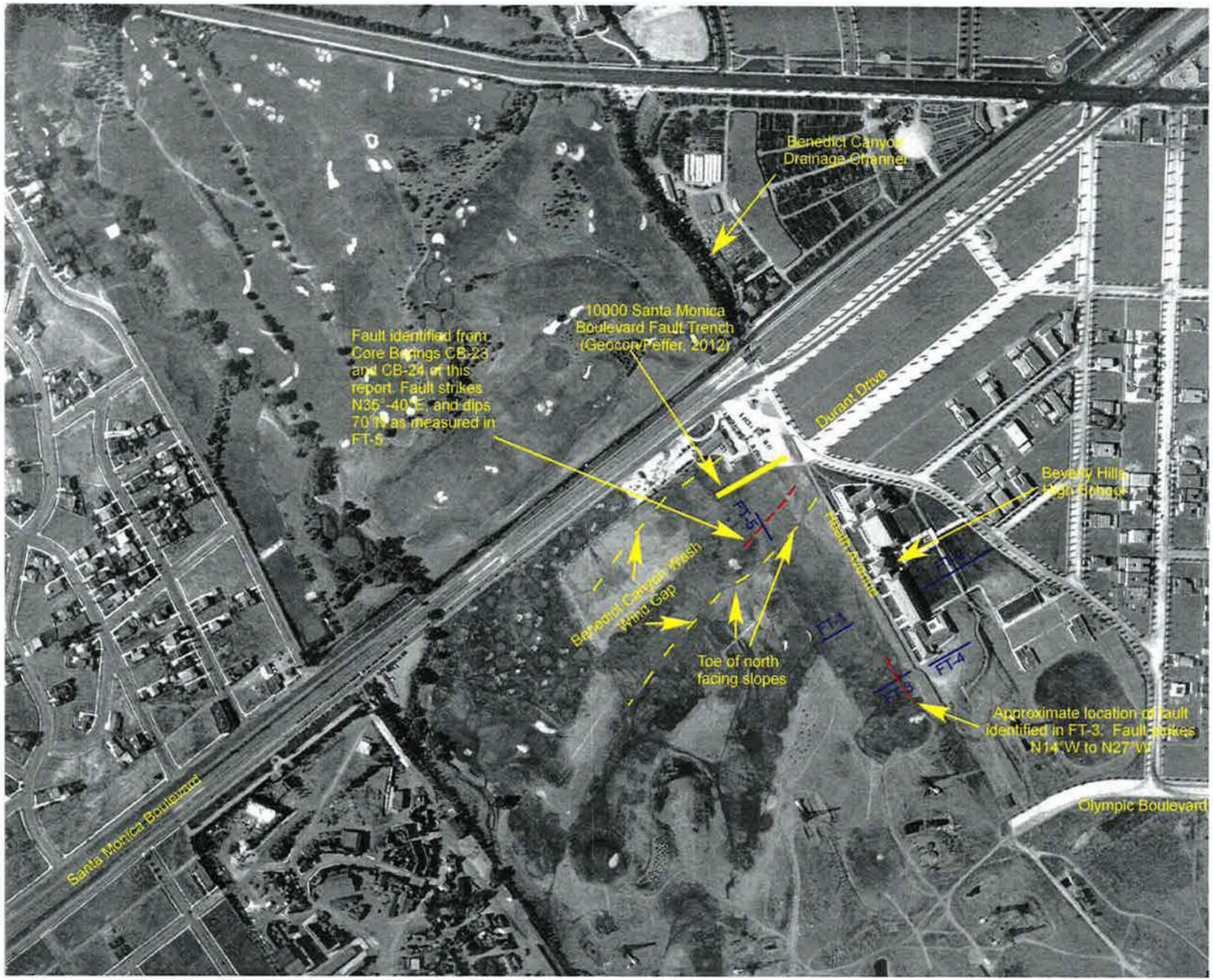
Leighton Consulting, Inc. 603314-008

Figure E-8



Reference: Spence, 2/17/1930, E-4064; Depicts approximate location of Leighton Fault Trenches FT-1 through FT-5

Leighton Consulting, Inc. 603314-008 Figure E-9



Reference: Spence, 8/23/1931, E-57; Depicts approximate location of Leighton Fault Trenches FT-1 through FT-5

Leighton Consulting, Inc. 603314-008

Figure E-10

APPENDIX F

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

SCHOOL REVIEW UNIT • 801 K STREET, MS 12-32 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-7324 • **FAX** 916 / 322-4765 • **TDD** 916 / 324-2555 • **WEB SITE** conservation.ca.gov/cgs

Mr. Nelson Cayabyab
Chief Facilities Official
Beverly Hills Unified School District
255 S. Laskey Drive
Beverly Hills, CA 90212

May 21, 2012

Subject: **Fault Rupture Hazard Review**
Beverly Hills High School
241 S. Moreno Drive, Beverly Hills, CA
CGS Application No. 03-CGS0960

Dear Mr. Cayabyab:

In accordance with your request and transmittal of documents on April 24, 2012, the California Geological Survey (CGS) reviewed the campus-wide fault rupture study report prepared for Beverly Hills High School. It is our understanding future improvements are planned for the campus but no definite site plan is currently available. It should be noted the submitted report addresses only the fault-rupture potential at the high school site and does not address other geologic/seismic hazards that need to be considered for acceptance of school construction projects. As such, this review is only for the assessment of fault rupture issues at the site. The following report was provided for our review:

> **Fault Hazard Assessment of the West Beverly Hills Lineament, Beverly Hills High School, 241 South Moreno Drive, Beverly Hills, CA:** Leighton Consulting, Inc., 10532 Acacia Street, #B-6, Rancho Cucamonga, CA, 91730, dated April 22, 2012, Project No. 603314-002, 23 pages, appendices and figures attached.

The above referenced report documents an investigation to evaluate the presence or absence of active or potentially active faulting associated with the West Beverly Hills Lineament (WBHL) at the school site. The consultants reviewed published geologic maps, literature, and aerial photos, as well as the recently completed fault investigation report for the proposed MTA Westside Subway Extension (Parsons Brinkerhoff, 2011). Parsons Brinkerhoff suggested the presence of several northwest-southeast trending faults extending through the school site based on three transects of closely spaced CPTs and borings.

Overview

The subject fault study was performed to assess the potential presence of active faulting associated with the WBHL. The consultants state this report does not purport to address hazards

from other potential fault systems (i.e. the Santa Monica Fault Zone). The WBHL is described as a north-northwest trending series of "continuous east-facing escarpments", which separate elevated older alluvium to the west and a gently sloping, younger alluvial plain to the east. They also report it is unclear whether the WBHL is related to faulting or other surficial geologic processes; however, various tectonic models have been postulated to explain it. North of its intersection with the east-west trending Santa Monica Fault Zone (SMFZ), the WBHL appears to represent a fault that transfers slip from the SMFZ to the east-west trending Hollywood Fault (Dolan and Sieh, 1992; Dolan et al., 1997). Dolan et al., (1997) suggest, alternatively, the WBHL may represent an east-dipping normal fault, a right-lateral strike-slip fault that is the northernmost extension of the Newport-Inglewood Fault zone to the south, or a "complex, oblique reverse-right-lateral, north-northwest-trending fault system, encompassing both the Newport-Inglewood right-lateral strike-slip fault system and a northern extension of the Compton blind thrust system."

Fault Investigation and Discussion

As part of the fault investigation, the consultants excavated and geologically logged four fault trenches, advanced 12 CPTs, and drilled 21 borings in the school property to evaluate fault rupture hazard. Detailed observations were made of the soil types, textures and colors, as well as any fractures or other discontinuities. The consultants also provide interpretations of depositional environment and estimated ages of the sedimentary deposits and paleosols exposed in the trenches. Representatives from CGS visited the fault trenches on five occasions between January 27 and February 14, 2012 to observe successive trench exposures. Subsequent to submittal of the report, CGS representatives returned to the school site on April 30, May 1, and May 10, 2012 to review rock core samples taken from the borings drilled at the site.

In addition to the subsurface data provided by the consultants, CGS reviewed pertinent logs of borings and CPTs from the MTA fault study (Parsons Brinkerhoff, 2011). The samples from two of these continuous core borings (T4-B-1 and T4-B10) from the western edge of the northern transect were also made available for our inspection.

A-A' (central transect)

In the central portion of the campus, the consultants drilled 15 continuous core borings and excavated two fault trenches (FT-1 and FT-2), which were approximately 135 feet and 360 feet long, respectively along a southwest-northeast trending profile. According to the plates provided in the report, there is a gap of about 215 feet between FT-1 and FT-2 due to existing utilities in Heath Avenue. There is also a gap of approximately 15 feet within FT-2 because of a buried utility line. These trenches also did not extend far enough to the east to cover that portion of the campus. Section A-A' depicts the graphic logs of both trenches, as well as the subsurface data and interpreted correlations from the core borings. The consultants state both trench locations "would have intercepted interpreted faults" from the MTA study; however, this assumes the trend of the suggested faults is well understood.

Based on soil development in the older alluvium at the western trench (FT-1), the sediments underlying this elevated surface were estimated to range from 70,000 to 100,000 years old. No

faulting or offsets within the older alluvium were observed in this trench. This conclusion appears reasonable based on our observations in the field and the data provided in the report.

The eastern trench (FT-2) exposed older alluvium in its western portion and younger alluvium in the lower, eastern portion. Several "clay filled fractures or cracks" were observed and documented in the western half of this trench (between stations 1+45 to 1+70). The consultants state these "fractures showed apparent vertical offset of up to ½ inch, east side up...and several of the fractures extended to the trench surface (in areas where the near surface soils had been removed)." They also noted the displacements along the fractures did not increase with depth and, "locally, some appeared to die out." Based on this evidence, the consultants "rule out a fault origin for these fractures." Additionally, the consultants note station 2+00 represents the base of the east-facing topographic escarpment, which defines the WBHL. Based on their trench observations they indicate the older alluvial deposits are not folded or faulted at this location, but instead they are laterally truncated, which indicates an erosional origin for this slope. The erosional contact between the older alluvium and the younger alluvium of Benedict Canyon forms a 'buttress unconformity', which the consultants state can be followed below the trench exposure and observed in their core borings along this portion of their subsurface profile. In the older alluvium, a moderately well developed paleosol with strong angular blocky structure was exposed just west of this erosional contact. Between stations 2+10 to 2+28 the ped faces within the argillic horizon are tilted to the east up to 22 degrees from vertical. The measured tilt increases from west to east in proximity to the erosional contact with the younger alluvium. We observed another paleosol above this that also appeared tilted, but to a lesser degree.

The consultants propose a model where the east-side up fractures and tilted ped surfaces are related to "outward dilation" and "downslope creep" of the older alluvial soils along the paleo-margin of the Benedict Canyon drainage channel. They provide a soil microfabric analysis (Appendix D of the consultants' report), which concludes the fractures are filled with translocated clay that is "demonstrably not sheared and is on the order of tens to thousands of years old." With regard to the proposed model, CGS has several concerns. *The conclusion that a fault origin can be ruled out for the observed fractures based on lack of increased displacement with depth or fractures dying out near the surface is not justified.* Bonilla & Lienkaemper (1991) document circumstances where active faults observed in trench exposures die out upward and/or downward. Also, CGS notes our field measurements of these fractures indicated up to 4-5 cm (about 2 inches) of apparent vertical offset and some thickness variations within corresponding layers on either side of some fractures, which may be indicative of a lateral slip component. At station 1+65 (north wall), CGS representatives observed a fracture that consisted of several sub-parallel shears, which could be traced to the bottom of the trench. The consultants logged this feature upward to the base of the disturbed zone at the top of the trench wall. This zone had approximately 1 inch of vertical separation and rotated clasts within the shear zone. These observations, including indications of lateral offset, are inconsistent with a slope extension model but may be suggestive of faulting. Also, it appears the microfabric study only analyzed samples from one clay-filled fracture (collected at 1+46.5 on the north wall and 1+50 on the south wall) where no offset was reported. Therefore, the basis for conclusions and application to other clay-filled fractures that have offset appears unwarranted. CGS also observed other fractures in FT-2 with measurable offset, which were not clay-lined.

In the vicinity of station 2+20, where paleosols indicate tilting or folding, an elevation difference of three to five feet between marker beds in borings CB-8 and CB-9 is compatible with an interpretation of fault offset at depth. The proximity to a zone of possible faults immediately to the west invites such consideration. The consultant's interpretation of continuity of the lower sedimentary units, while valid, is not a unique explanation of the data. The presence of a fault in this area is not adequately addressed by the other transects. The consultants should provide additional detailed logging of the trench between stations 1+20 to 2+40 (if available) or provide additional subsurface data to demonstrate an unbroken horizontal stratigraphic sequence below the fractures and tilted ped surfaces.

CGS is also concerned with the gaps between the fault trenches at the site. The consultants state their trenches "sufficiently overlapped to provide continuous exposure from the crest of BHHS to its eastern boundary." CGS notes that, considering the uncertainty of potential fault trends, the trench locations and transect lines are too far apart to provide continuous exposure in order to adequately address the potential for surface faulting at the site. *Some discrepancies in some sedimentary unit elevations were evident in the core samples we reviewed from borings within the gap between FT-1 and FT-2.* Specifically, between CB-3 and CB-4 an elevation drop of approximately six to seven feet is noted between paleosols (i.e. B_t horizons), the base of a unique varved sequence, and the San Pedro Formation contact.

B-B' (northern transect)

The consultants drilled six continuous core borings and advanced 12 CPTs to generate a subsurface profile (B-B') along Durant Drive at the far northern end of the campus. The consultants' profile essentially follows the same alignment as "Transect 4" from the MTA fault study (Parsons Brinkerhoff, 2011), but did not extend as far east and therefore does not cover the eastern side of the campus. Along this transect, the MTA consultants postulated the existence of eight faults as depicted on Leighton's boring and trench location base map.

The district's consultants defined several paleosols, other marker beds, and the contact with the underlying San Pedro Formation in their core borings, which they trace along the entire transect. The consultants also include the data from boring T-4 B-10, which was drilled immediately west of the school property by the MTA consultants. The consultants indicate "the traceable paleosols and marker beds document unbroken stratigraphy across the entire transect" and "[n]o discernable offset is noted in the paleosols, nor in the San Pedro Formation." The interpretation of continuous stratigraphy is a valid explanation of the data, but the spacing of the borings and the presence of faulting exposed in FT-3 (see below) allow for other valid interpretations such as fault offset. Based on our review of the core samples and the data provided in the boring logs and cross section B-B', it appears there is some vertical separation of the markers beds between borings. *Various marker beds and the San Pedro Formation contact appear to be offset five to ten feet vertically between borings T-4 B-10 and CB-13, as well as between CB-17 and CB-18. Interpreted variations in thickness of sedimentary units might imply a lateral slip component as well. Although these anomalies may represent faulting, if the consultants could demonstrate continuous unbroken and undeformed sediments in the near surface Pleistocene soils above*

them, the unbroken Pleistocene layers would demonstrate than any faults are inactive, similar to those exposed in FT-3.

Trenches FT-3 and FT-4 (southern transect)

These two fault trenches were excavated in the southern portion of the campus. FT-3 was located immediately south of the lacrosse field in the "zone of interpreted faulting [by the MTA consultants]". Two "zones of minor faulting" were observed by the consultants in this trench. The two faults branch vertically and are part of a zone of faults about one foot wide. Attitudes on the subvertical faults ranged from N14°W to N27°W and the consultants report there is approximately 4 inches of apparent vertical displacement across this zone. The log shows these faults abruptly truncated by a channel deposit, the irregular base of which is explained as having eroded preferentially into the upper portion of the fault zone. The consultants note in addition to the prospect of erosion, "it is possible to interpret the fault as displacing the lowermost 1-inch of the channel bottom", but go on to state "the remaining two feet of channel deposits are unaffected by the fault." Based on the approximate date of the soil encountered in FT-1, located on the same geomorphic surface as FT-3, the consultants conclude the capping channel deposit is older than 70,000 to 100,000 years and thus these faults are not active. This conclusion appears reasonable based on the data provided in the report. However, CGS notes the trench log for FT-3 (as well as our field observations) shows Unit 1c to the west of the fault zone and Unit 4 to the right. To achieve this juxtapositioning of alluvial units appears to require significantly more than 4 inches of vertical offset, suggesting this is not a minor fault as reported by the consultants. This trench indicates offsets along NNW-trending faults have occurred at this site in the past and there may be other similar faults in the vicinity that are not yet fully discovered. Such faults may explain some of the apparent stratigraphic offsets noted elsewhere in the boring transects.

Trench FT-4 was located approximately 70 feet to the east of FT-3. The consultants report several clay-filled fractures were observed between stations 0+58 and 0+68. According to the report, these fractures "showed apparent vertical offset of about ¼ inch, east side up" but said they did not extend up to the buried soil and "showed no recognizable offset lower in the trench." CGS notes our field measurements indicate up to 1.25 inch of apparent vertical offset on a fracture at 0+62. The fractures and sense of offset are nearly identical to those observed in FT-2 between stations 1+60 and 1+80. The consultants conclude these fractures are surficial features related to slope movement during strong seismic shaking, not faulting. The area to the east of FT-4 is not explored and is not necessarily covered by the central transect due to distance (almost 400 feet) and uncertainty of fault orientation.

CGS notes none of the alluvial units from FT-3 can be correlated across to FT-4 because the bottom of the FT-3 trench exposure is located at approximately the same elevation as the top of the FT-4 exposure. Also, unlike profile A-A', there are no borings drilled along the FT-3/FT-4 alignment to supplement the surficial trench exposures. *Small faults in FT-4 (similar to those exposed in FT-2), and gaps in the data, including lack of any data to the east of these trenches, leaves open the question of both presence and activity of related faults on site.*

Conclusions

Based on our review of the data provided in the report and our observations at the site, the consultants do not provide sufficient evidence to preclude active faulting at the site. The consultants excavated four fault trenches across the site; however, the gaps between these trenches and the uncertain strike of potential faults result in uncertainties with regard to age constraint on those faults observed in the trenches and the possibility of faulting between trench exposures. Some significant marker bed and geologic contact elevation changes were noted in borings that spanned the trench gap between FT-1 and FT-2. Additionally, the soils exposed in FT-3 and FT-4 could not be correlated due to notable elevation differences. The borings and CPTs performed by the consultants are helpful in determining larger vertical offsets, but are insufficient to preclude smaller-scale vertical offsets, or larger horizontal offsets due to strike-slip faulting. **The consultants should evaluate and discuss the potential for faulting between borings T4 B-10/CB-13, CB-3/CB-4, CB-8/CB-9 and CB-17/CB-18. Additionally, they should adequately address the gaps between trenches and the area east of FT-4, Finally, they should provide additional data to address the potential for strike-slip faulting at the site.**

On page 22 of the report, the consultants state their fault study "did not focus on possible east-west trending faults through the school campus (such as may be associated with the SMFZ)." *Based on the boring logs provided in the report, the contact between the older alluvium and the San Pedro Formation bedrock drops approximately 100 feet in elevation from the central portion of the campus (at A-A') to the northern portion (at B-B').* CGS notes this sharp drop in elevation of the bedrock surface *towards* the Santa Monica Mountains appears anomalous. **Therefore, the consultants should address this anomaly and evaluate the potential for all possible faults, not just those associated with the WBHL, at the school site. Further studies should include the southeastern portion of the campus, which is not yet explored.**

In conclusion, ***the fault rupture hazard issues at this site are not adequately assessed in the referenced report.*** Additional information should be provided as requested. The consultants are reminded that one copy of all supplemental documents should be submitted directly to CGS, and should include the CGS application number. If you have any questions about this review letter, please telephone the California Geological Survey at (213) 239-0893.

Respectfully submitted,

Brian Olson
Engineering Geologist
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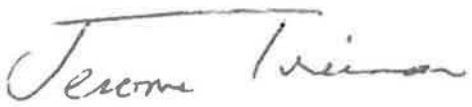

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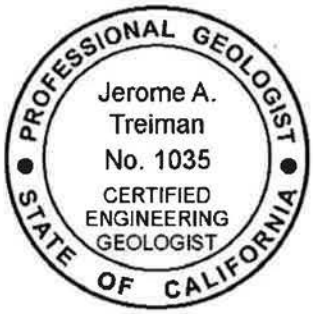

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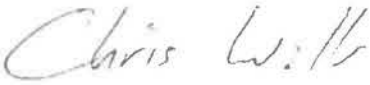

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Selected References

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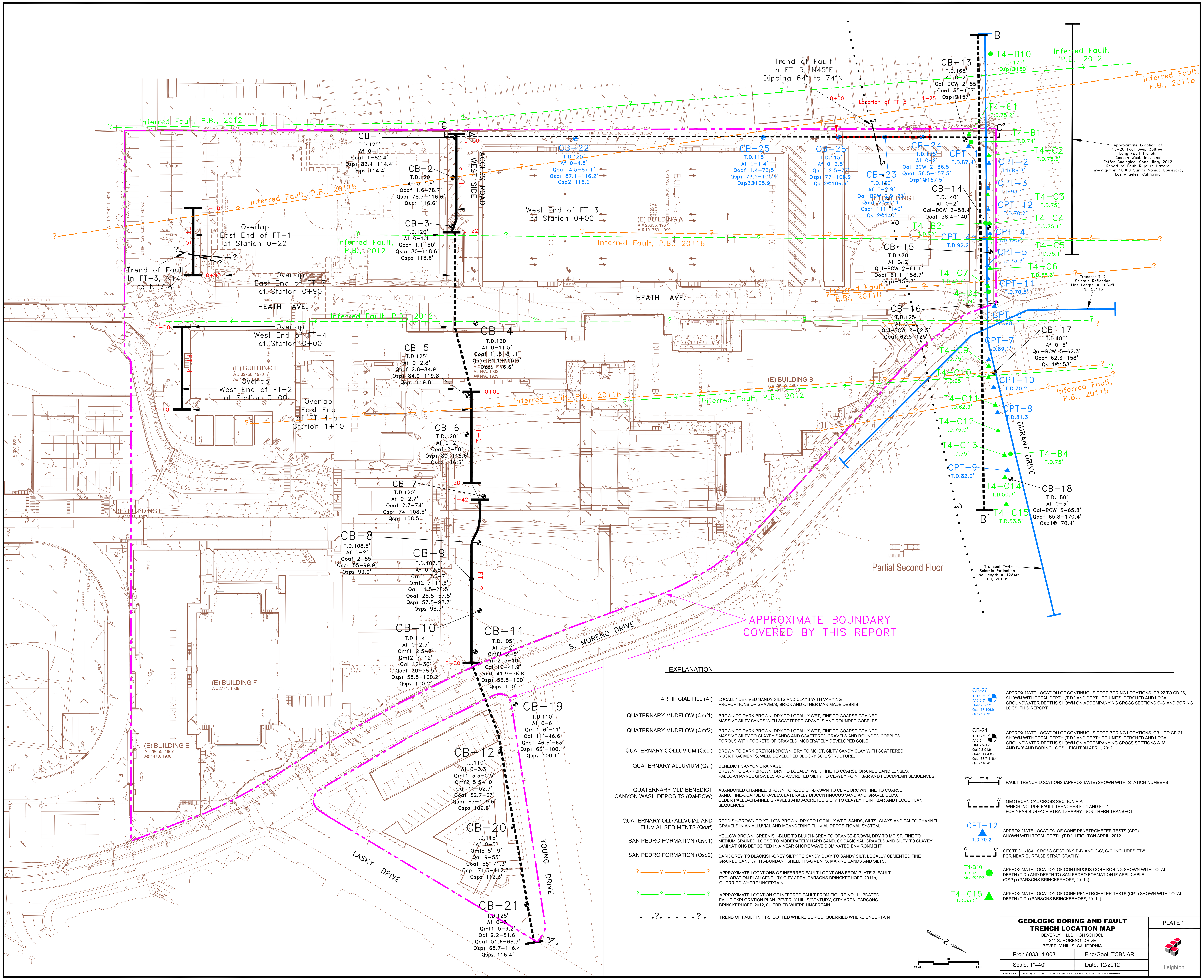


EXPLANATION

ARTIFICIAL FILL (Af)	LOCALLY DERIVED SANDY SILTS AND CLAYS WITH VARYING PROPORTIONS OF GRAVELS, BRICK AND OTHER MAN MADE DEBRIS
QUATERNARY MUDFLOW (Qmf1)	BROWN TO DARK BROWN, DRY TO LOCALLY WET, FINE TO COARSE GRAINED, MASSIVE SILTY SANDS WITH SCATTERED GRAVELS AND ROUNDED COBBLES
QUATERNARY MUDFLOW (Qmf2)	BROWN TO DARK BROWN, DRY TO LOCALLY WET, FINE TO COARSE GRAINED, MASSIVE SILTY TO CLAYEY SANDS AND SCATTERED GRAVELS AND ROUNDED COBBLES. POROUS WITH POCKETS OF GRAVELS. MODERATELY DEVELOPED SOILS.
QUATERNARY COLLUVIUM (Qcol)	BROWN TO DARK GREYISH-BROWN, DRY TO MOIST, SILTY SANDY CLAY WITH SCATTERED ROCK FRAGMENTS. WELL DEVELOPED BLOCKY SOIL STRUCTURE.
QUATERNARY ALLUVIUM (Qal)	BENEDICT CANYON DRAINAGE: BROWN TO DARK BROWN, DRY TO LOCALLY WET, FINE TO COARSE GRAINED SAND LENSES, PALEO-CHANNEL GRAVELS AND ACCRETED SILTY TO CLAYEY POINT BAR AND FLOODPLAIN SEQUENCES.
QUATERNARY OLD BENEDICT CANYON WASH DEPOSITS (Qal-BCW)	ABANDONED CHANNEL. BROWN TO REDDISH-BROWN TO OLIVE BROWN FINE TO COARSE SAND, FINE-COARSE GRAVELS, LATERALLY DISCONTINUOUS SAND AND GRAVEL BEDS. OLDER PALEO-CHANNEL GRAVELS AND ACCRETED SILTY TO CLAYEY POINT BAR AND FLOOD PLAN SEQUENCES.
QUATERNARY OLD ALLVUIAL AND FLUVIAL SEDIMENTS (Qoaf)	REDDISH-BROWN TO YELLOW BROWN, DRY TO LOCALLY WET, SANDS, SILTS, CLAYS AND PALEO CHANNEL GRAVELS IN AN ALLUVIAL AND MEANDERING FLUVIAL DEPOSITIONAL SYSTEM.
SAN PEDRO FORMATION (Qsp1)	YELLOW BROWN, GREENISH-BLUE TO BLUISH-GREY TO ORANGE-BROWN, DRY TO MOIST, FINE TO MEDIUM GRAINED, LOOSE TO MODERATELY HARD SAND. OCCASIONAL GRAVELS AND SILTY TO CLAYEY LAMINATIONS DEPOSITED IN A NEAR SHORE WAVE DOMINATED ENVIRONMENT.
SAN PEDRO FORMATION (Qsp2)	DARK GREY TO BLACKISH-GREY SILTY TO SANDY CLAY TO SANDY SILT. LOCALLY CEMENTED FINE GRAINED SAND WITH ABUNDANT SHELL FRAGMENTS. MARINE SANDS AND SILTS.
? —— ? —— ? —— ? (orange)	APPROXIMATE LOCATIONS OF INFERRED FAULT LOCATIONS FROM PLATE 3, FAULT EXPLORATION PLAN CENTURY CITY AREA, PARSONS BRINCKERHOFF, 2011b, QUERRIED WHERE UNCERTAIN
? —— ? —— ? —— ? (green)	APPROXIMATE LOCATION OF INFERRED FAULT FROM FIGURE NO. 1 UPDATED FAULT EXPLORATION PLAN, BEVERLY HILLS/CENTURY, CITY AREA, PARSONS BRINCKERHOFF, 2012, QUERRIED WHERE UNCERTAIN
. .?. . . . .?.	TREND OF FAULT IN FT-5, DOTTED WHERE BURIED, QUERRIED WHERE UNCERTAIN
CB-26 T.D.115' Af 0-2.5' Qoaf 2.5-77' Qsp1 77-106.9' Qsp2 106.9'	APPROXIMATE LOCATION OF CONTINUOUS CORE BORING LOCATIONS, CB-22 TO CB-26, SHOWN WITH TOTAL DEPTH (T.D.) AND DEPTH TO UNITS. PERCHED AND LOCAL GROUNDWATER DEPTHS SHOWN ON ACCOMPANYING CROSS SECTIONS C-C' AND BORING LOGS, THIS REPORT
CB-21 T.D.125' Af 0-5' QMF1 5-9.2' Qal 9.2-51.6' Qoaf 51.6-68.7' Qsp1 68.7-116.4' Qsp2 116.4'	APPROXIMATE LOCATION OF CONTINUOUS CORE BORING LOCATIONS, CB-1 TO CB-21, SHOWN WITH TOTAL DEPTH (T.D.) AND DEPTH TO UNITS. PERCHED AND LOCAL GROUNDWATER DEPTHS SHOWN ON ACCOMPANYING CROSS SECTIONS A-A' AND B-B' AND BORING LOGS, LEIGHTON APRIL, 2012
0+00 FT-5 1+50	FAULT TRENCH LOCATIONS (APPROXIMATE) SHOWN WITH STATION NUMBERS
A - - - A'	GEOTECHNICAL CROSS SECTION A-A' WHICH INCLUDE FAULT TRENCHES FT-1 AND FT-2 FOR NEAR SURFACE STRATIGRAPHY - SOUTHERN TRANSECT
CPT-12 T.D.70.2'	APPROXIMATE LOCATION OF CONE PENETROMETER TESTS (CPT) SHOWN WITH TOTAL DEPTH (T.D.), LEIGHTON APRIL, 2012
C - - - C'	GEOTECHNICAL CROSS SECTIONS B-B' AND C-C', C-C' INCLUDES FT-5 FOR NEAR SURFACE STRATIGRAPHY
T4-B10 T.D.175' Qsp1-0@150'	APPROXIMATE LOCATION OF CONTINUOUS CORE BORING SHOWN WITH TOTAL DEPTH (T.D.) AND DEPTH TO SAN PEDRO FORMATION IF APPLICABLE (QSP1) (PARSONS BRINCKERHOFF, 2011b)
T4-C15 T.D.53.5'	APPROXIMATE LOCATION OF CORE PENETROMETER TESTS (CPT) SHOWN WITH TOTAL DEPTH (T.D.) (PARSONS BRINCKERHOFF, 2011b)

SCALE 0 40 80 FEET

GEOLOGIC BORING AND FAULT TRENCH LOCATION MAP

BEVERLY HILLS HIGH SCHOOL
241 S. MORENO DRIVE
BEVERLY HILLS, CALIFORNIA

Proj: 603314-008	Eng/Geol: TCB/JAR
Scale: 1"=40'	Date: 12/2012

Drafted By: BQT | Checked By: BQT | P:\DRAFTING\603314\008\OF_2012-09-06\PLATE1.DWG (12-24-12 2:09:24PM) Plotted by: btran

PLATE 1

Leighton

MAP EXPLANATION

- Perched Groundwater (GW)
- Local GW Table
- Seashells
- CaCO3 Concretions
- Contact, Fine Grained Sand Bed
- Clay Bed
- Contact, Gravel Bed
- K – Krotovina–Bioturbation
- Indicates light seepage
- Geologic contact, solid where abrupt, dashed where approximate, queried where uncertain. Dotted and queried where gradational or buried
- Discontinuous to continuous (trench bottom) ground fractures, clay lined, gleyed along crack and within locally adjacent soil unit. generally 2–10cm wide
- Indicates poor to moderately well developed blocky structure
- OSL-6 Location of samples collected for optically stimulated luminescent age dating
- CaCO3 Stringers
- C-6 Location of samples collected for carbon (C14) analysis in FT-1
- EC-6 Location of samples collected for carbon (C14) analysis in FT-2.

SOIL GRAPHICS

- CLAY (CL–CH)
- Sandy CLAY (CL)
- Clayey SAND (SC)
- Silty SAND (SM) to Sandy SILT (ML)
- SAND (SP to Sand with Gravel)
- Silty Sandy GRAVEL (GP–GM)
- Clayey GRAVEL (GC)
- SILT (ML)

PALEOSURFACE

MARKER BED–MB1 – Sandy Clayey SILT to Silty Sandy CLAY; olive brown, moist, moderately developed soil horizon with clay lined pedogenic face. Strong coarse angular blocky to subangular blocky soil structure. Many thick clay films bridging grains.

MARKER BED MB2 – Silty Sandy CLAY, reddish–brown to olive greenish brown to yellowish–brown, moist, well developed blocky soil structure with iron oxide precipitated along soil boundaries with varying proportions of CaCO3

MARKER BED MB3 – Sandy SILTY CLAY to SANDY CLAYEY SILT, olive–green to bluish–grey to greenish white, moist, moderate to well developed blocky soil structure, calcareous sands as thin beds, varying proportions of CaCO3 as vertical and horizontal stringers and fine nodules, very plastic when wet, mangenese nodules vary in abundance.

EARTH UNITS – FT–1

ARTIFICIAL FILL: (Af)

Unit No. 1: Silty CLAY to Sandy CLAY (CL), brown, moist, fine sand with fine angular to subangular gravels

QUATERNARY OLD ALLUVIAL AND FLUVIAL SEDIMENTS: (Qoaf):

Unit No. 2: Silty SAND (SM), very dark greyish–brown, (10YR 3/2), in broken hand sample–dark reddish–brown, (5yr 3/4), fine grained, moist, porous, pinhole sized voids, minor oxidation of pinhole, developing soil, clay leaching

Unit No. 3: Clayey SAND to Sandy CLAY (SC–CL), very dark brown, (7.5YR 2.5/3), predominately fine grained sand, some coarse sand in matrix, trace gravels, moderately hard, pinhole porosity, unlined voids, moderate blocky structure, gradational contact from unit 2 to unit 3.

Unit No. 4: Fat CLAY (CH–CL), very dark grey (2.5YR 3/1), very moist, some fine grained sand, trace fine subangular to angular gravels to 1.5 inches in size. At Station 0+62 becomes Unit No. 4a; mottled Sandy CLAY (CL), orange brown, (10YR 4/3), moist, moderately hard, abundant coarse grained sand and fine sub–rounded gravels composed predominately of weathered slate clasts (Jsm), and gradational changes in proportions of sand from unit 4 to 4a.

Unit No. 5: Silty SAND (SM), brown, (7.5YR 4/4), moist, predominately fine grained sand with trace coarse grains and some fine sub–angular, elongated and flattened weathered slaty gravels (Jsm), moderate blocky soil structure with minor clay development on parting surfaces. Gradational changes from unit 5 to unit 5a in proportional amounts of sand within matrix unit and occurrence of coarse gravels from 2–4 inches in size, nearing channel margin. Possible debris flow.

Unit No. 6: Clayey SAND with Gravels (SC), brown, (7.5YR 4/4), chaotic assemblage of sub–angular, weathered slaty (Jsm) gravels, mottled, bluish–grey, light tan to mild orange brown, in appearance due to varying colors of clayey sand matrix and weather rock fragments and gravels

Unit No. 7: Silty SAND (SM), dark greyish–brown, (2.5y 4/2), moist, fine grained, trace gravel.

Unit No. 8: Clayey SAND with Gravel (SC), dark reddish–brown, (5YR 3/3), very moist to wet, sub–angular, highly weathered slaty to peddyly gravels.

Unit No. 9: Clayey SAND (SC), brown, (10YR 4/3), moist, medium to coarse grained sand, sub–angular to pebbly slaty gravels.

Unit No 10: Fluvial sands and gravels (SP–GP), dark yellowish–brown (10YR 4/4), moist, fine to coarse sands, fine to coarse gravels. Gravels are rounded to sub–angular with thinly layered sand and imbricated gravelly beds, unconsolidated, paleo–channel orientation is north–south.

EARTH UNITS – FT–2

QUATERNARY MUD FLOW: (Qmf)

Qmf1: Silty SAND (SM); lite brown to dark brown, (7.5YR 2.5/3), dry, fine to coarse sandy matrix with scattered, sub–angular slaty gravels with sparse siltstone and granite rock fragments. Massive unit, porous, friable, With strong subangular blocky structure and few clay films in pores.

Qmf2: Silty to Clayey SAND (SM–SC); dark brown, (5YR 3/3); with sandy clay (CL); moist, fine to coarse slaty sand, fine, sub–rounded to sub–angular pebbles and gravels to angular rock clasts, 1–2mm unlined voids. Contains pockets of clast supported gravels and small cobbles. Unit is massive. Soil is moderately developed blocky to prismatic structure with clay films coating peds and angular slate clasts.

QUATERNARY ALLUVIUM: BENEDICT CANYON DRAINAGE: (Qal)

Qal Silty SANDS to SANDS and Channel GRAVELS (SM–SP–GM–GP) dry to moist near surface to wet with depth, lite brown to greyish brown fine to coarse unconsolidated sands and gravels with thin beds of very fine grained sandy silts and clays.

QUATERNARY OLD ALLUVIAL AND FLUVIAL SEDIMENTS: (Qoaf) AND QUATERNARY COLLUVIUM: (Qcol)

Unit No. 1: Silty SAND (SM), grey to orange brown, (7.5YR 4/1), slightly moist, abundant coarse sand and fine gravels, moderately indurated, pinhole porosity

Unit No. 2: Pleistocene age colluvium. Dark brown to brown sandy Silty CLAY (CL), well developed blocky structure, laterally discontinuous.

Unit No. 3: Pleistoscene age colluvium. Dark brown to dark greyish–brown Sandy Silty CLAY (CL); well developed blocky structure, laterally discontinuous. Many films on ped faces.

Unit No. 4: Fluvial SANDS and GRAVELS (SP–GP), strong brown, (5YR 5/6), thinly layered, channel cross bedding, medium to coarse sands and fine to coarse subrounded gravels, moist, CaCO3 observed on surface grains as moisture evaporates, unconsolidated, friable to cemented along basal contract.

Unit No. 5: Clayey SANDS and GRAVELS (SC–GC), reddish–brown, (5YR 3/3), chaotic assembelage of angular to sub–angular rock clasts and fragments, very hard, locally friable with sandy matrix. Predominately slaty gravels (Jsm), possible debris flow deposits.

Unit No. 6: Fluvial SANDS and GRAVELS (SP–GP), brown to reddish–brown, (7.5YR 5/8), interbedded sands and gravel lenses throughout paleo channel, friable to locally cemented along basal channel boundary, CaCO3 and Feo as partial cement, fine to coarse sands, fine to coarse sub–angular to sub–rounded gravels, few cobbles, stratified. Well defined channel boundary to west, lateral channel boundaries to east become flattened and gradational. Paleo channel orientation approximately north–south

Unit No. 7: Sandy SILT to Silty SAND (ML–SM), brown to yellow–brown, (7.5YR 4/4) to (10YR 4/6), moist, fine grained, porous, some gleying along soil surfaces, partial clay lining of soil faces, trace coarse sand and fine gravels, few interbedded minor channel deposits of sands and gravels within unit.

Unit No. 8: Silty SAND (SM), yellowish–brown to olive–brown, (10YR 5/4) to (2.5YR 4/3), dry to moist, fine grained sand, contains clay in matrix, trace fine gravels, and lenses of channel gravel, slightly porous, 1–2 mm unlined to partially clay lined voids. Some voids mineralized with manganese and iron oxide along pore boundaries. Moderate blocky fracture. Contains moderately developed paleo channel (8a), channel structure evident within main channel, grades laterally with varying proportions of sands.

Unit No. 8a is wet, light seepage at base of trench. Heavy CaCO3 mineralization on fresh grains as evaproration of seepage continues. Channel is unconsolidated and friable.

Unit No. 9: Clayey SAND (SC), reddish–brown to dark yellow–brown, (10YR 4/6), moist, moderate amounts of thinly bedded sand lenses, consists predominately of fine grained sands and fine subrounded siltstone (Tm) and slaty gravel (Jsm), unit is oxidized porous, 1–3 mm voids, unlined to partially clay lined. Lower boundary marked by paleo surface P2.

Unit No. 10: Sandy CLAY to Silty CLAY (SC–CL), reddish brown, (10YR 4/4) to (7.5YR 4/6) with olive grey blebs throughout (5Y 5/2), very moist, fine grained sands, trace amounts of slaty (Jsm) fine, subrounded sand grains, poorly developed blocky structure, well oxidized, Silty SAND to Sandy CLAY (SM–CL), strong brown, (7.5YR 4/6), very moist, generally fine grained sand, trace coarse sand scattered gleying along horizontal surface.

Unit No. 11: Fluvial to overbank SANDS and GRAVELS (SP–GP), strong brown, (7.5YR 5/6), main channel displays yellow brown to orange brown thinly bedded to laminated fine to coarse sands. Sands are friable with subrounded to rounded slaty (Jsm) and siltstone (Tm) gravels and rock fragments. Grades laterally away from main channel into massive silty sands with occasional sand lenses.

Unit No 12: Silty CLAY (CL), lite olive–brown, (2.5y 5/3) upper portion, grades to dark yellowish brown (10YR 4/4) lower portion, moderate blocky structure, lack of siltstone rock fragments, abundance of oxidized sand along erosional contact with fluvial Unit 11. Contains pocket of fine grained layered sand, possible krotovina infill.

Unit No. 13: Silty CLAY (CL), olive–green (10YR 4/6), hard, well developed blocky structure, abundant angular siltstone (Tm) rock fragments and angular slaty (Jsm) gravels at contact with unit no. 12 Managnese staining along soil faces.

PALEO SURFACE FT–2 ONLY

P–1 – Paleo surface, dark red baked clay 1–2 inches thick, undulatory and uneven surface

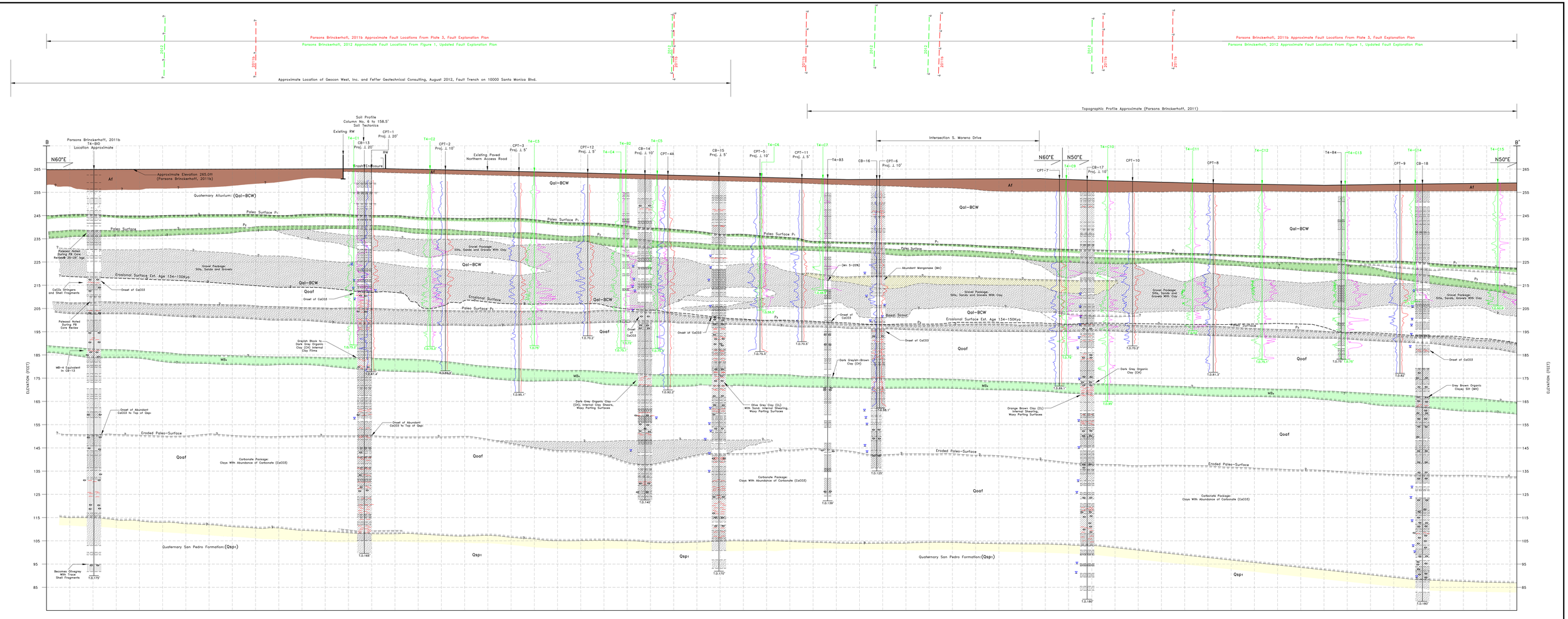
P–2 – Paleo surface, erosional contact within lateral boundaries of channel to overbank deposition. Abrupt to gradational transition from very fine sandy silt to clean fluvial sands

P–3 – Paleo surface, dark red baked clay 1–2 inches thick interrupted by channel erosion

CROSS SECTION A-A' FAULT TRENCH FT-1 AND FT-2 BEVERLY HILLS HIGH SCHOOL 241 S. MORENO DRIVE BEVELY HILLS, CALIFORNIA	PLATE 2
Proj: 603314-008	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 12/2012
Drafted By: BQT	Checked By: BQT

P:\DRAFTING\603314\008\OF_2012-09-06\PLATES-3-7 FAULT TRENCHES-COMBINED.DWG (12-24-12 2:23:16PM) Plotted by: btran

Leighton



MAP EXPLANATION

- Perched Groundwater (GW)
- Local GW Table
- Seashells
- CaCO3 Concretions
- Contact, Fine Grained Sand Bed
- Clay Bed
- Contact, Gravel Bed
- K = Krotovina-Bioturbation
- Indicates light seepage
- Geologic contact, solid where abrupt, dashed where approximate, quarried where uncertain. Dotted and quarried where gradational or buried
- Discontinuous to continuous (trench bottom) ground fractures, clay lined, gravel along creek and within locally adjacent soil unit, generally 2-10cm wide
- Indicates poor to moderately well developed soil with pedogenic related blocky structure and clay lined pedogenic faces.
- CaCO3 Stringers

SOIL GRAPHICS

- CLAY (CL-CH)
- Sandy CLAY (CL)
- Clayey SAND (SC)
- Silty SAND (SM) to Sandy SILT (ML)
- SAND (SP to Sand with Gravel)
- Silty Sandy GRAVEL (GP-GM)
- Clayey GRAVEL (GC)
- SILT (ML)
- Clayey Silt to Silty Clay (CL-ML)

PALEOSURFACE SECTION B-B' AND C-C' ONLY

P-1 – Sandy to Silty CLAY, yellow-brown to orange-brown, predominately fine grained sand, well developed blocky structure.

P-2 – Silty SAND to Sandy CLAY, reddish-brown, fine grained sand and trace fine gravels, well developed blocky structure with clay lined pedogenic faces.

P-3 – CLAY, orangish-brown, oxidized, well developed blocky structure.

MB-4 – Organic Clay to Organic Silt (CH-MH-CL), dark grey to olive grey internally sheared, clay films on wavy parting surfaces, blocky to hoisky structure with CaCO3 in matrix.

CPT DATA

Sleeve Stress | Tip Stress

(tsf)

CROSS SECTION B-B'	PLATE 3
BEVERLY HILLS HIGH SCHOOL 241 S. MORENO DRIVE BEVERLY HILLS, CALIFORNIA	
Proj: 603314-008	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 12/2012

Leighton

MAP EXPLANATION

- Perched Groundwater (GW)
- Local GW Table
- Seashells
- CaCO3 Concretions
- Contact, Fine Grained Sand Bed
- Clay Bed
- Contact, Gravel Bed
- K – Krotovina–Bioturbation
- Indicates light seepage
- Geologic contact, solid where abrupt, dashed where approximate, queried where uncertain. Dotted and queried where gradational or buried
- Discontinuous to continuous (trench bottom) ground fractures, clay lined, gleyed along crack and within locally adjacent soil unit. generally 2–10cm wide
- Indicates poor to moderately well developed soil with pedogenic related blocky structure and clay lined pedogenic faces.
- (21) Location of samples collected for optically stimulated luminescent age dating, OSL–13 through OSL–21, FT–5 only, East and West Walls. (See Plate 5).
- CaCO3 Stringers

SOIL GRAPHICS

- CLAY (CL–CH)
- Sandy CLAY (CL)
- Clayey SAND (SC)
- Silty SAND (SM) to Sandy SILT (ML)
- SAND (SP to Sand with Gravel)
- Silty Sandy GRAVEL (GP–GM)
- Clayey GRAVEL (GC)
- SILT (ML)

PALEOSURFACE

MARKER BED–MB1 – Sandy Clayey SILT to Silty Sandy CLAY; olive brown, moist, moderately developed soil horizon with clay lined pedogenic face. Strong coarse angular blocky to subangular blocky soil structure. Many thick clay films bridging grains.

MARKER BED MB2 – Silty Sandy CLAY, reddish–brown to olive greenish brown to yellowish–brown, moist, well developed blocky soil structure with iron oxide precipitated along soil boundaries with varying proportions of CaCO3

MARKER BED MB3 – Sandy SILTY CLAY to SANDY CLAYEY SILT, olive–green to bluish–grey to greenish white, moist, moderate to well developed blocky soil structure, calcareous sands as thin beds, abundant CaCO3 as vertical and horizontal stringers and fine nodules, very plastic when wet, manganese nodules vary in abundance.

P–1 – Sandy to Silty CLAY, yellow–brown to orange–brown, predominately fine grained sand, well developed blocky structure.

P–2 – Silty SAND to Sandy CLAY, reddish–brown, fine grained sand and trace fine gravels, well developed blocky structure with clay lined pedogenic faces.

P–3 – CLAY, orangish–brown, oxidized, well developed blocky structure.

MB–4 – Organic Clay to Organic Silt (CH–MH–CL), dark grey to olive grey internally sheared, clay films on waxy parting surfaces, blocky to hackly structure with CaCO3 in matrix.

CROSS SECTION C-C'

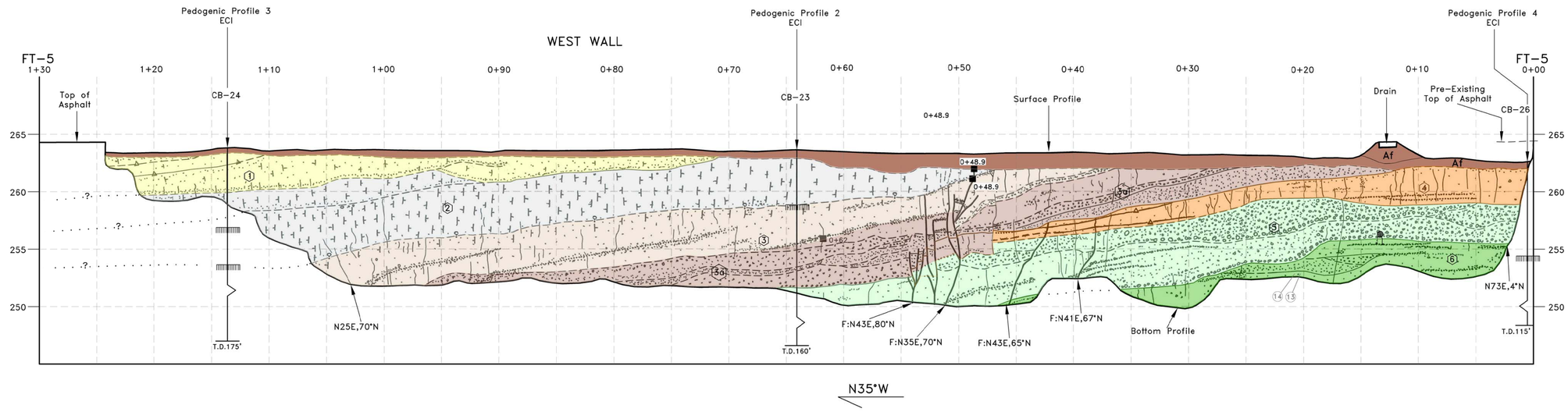
BEVERLY HILLS HIGH SCHOOL
241 S. MORENO DRIVE
BEVELY HILLS, CALIFORNIA

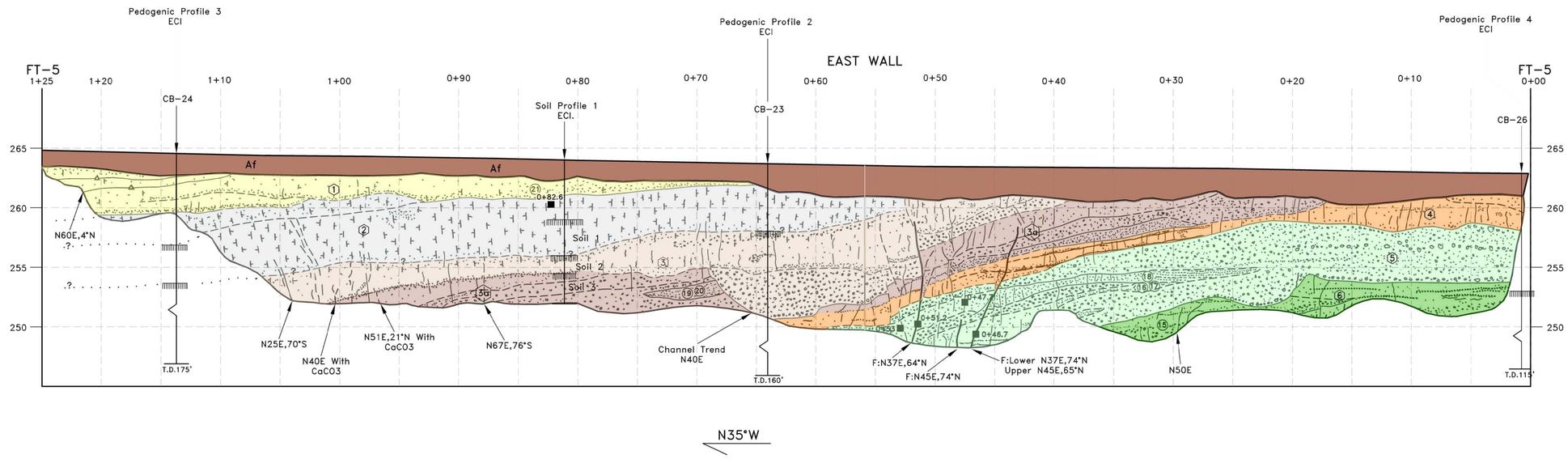
Proj: 603314-008	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 12/2012

Drafted By: BQT | Checked By: BQT | P:\DRAFTING\603314\008\OF_2012-09-06\PLATES-3-7 FAULT TRENCHES-COMBINED.DWG (12-27-12 12:40:51PM) Plotted by: murphy

PLATE 4

Leighton





MAP EXPLANATION

- Indicates light seepage
- Geologic contact, solid where abrupt, dashed where approximate, queried where uncertain. Dotted and queried where gradational or buried
- Discontinuous to continuous ground fractures, clay lined, [2.5Y Gleying] along cracks and within locally adjacent soil unit. generally 2–10cm wide
- ⑥ Indicates earth unit numbering
- ㉑ Location of samples 13 through 21 collected for optically stimulated luminescent age dating. See Appendix C
- 0+82.6 ■ Location of samples collected for microfabric analysis. See Appendix D for Results.
- Indicates soil development horizons within EC1 soil profiles. See Appendix C
- Indicates strong, fine to medium prismatic breaking to fine angular blocky soil structure with common clay films and mangenese staining on soil faces
- N67°E,76°S Strike and dip of various cracks, bedding and paleochannel trend as indicated
- F37°E,74°N strike and dip of faults as indicated
- Clay bed, typically dark red, very thin as noted in Unit No. 4 to several inches thick as noted in unit no. 1
- Af Artificial fill, locally derived, predominately 13–inch thick re-inforced concrete footing over subgrade
- CB–26 Location of Leighton core borings shown with total depth (T.D.)

EARTH UNITS FT–5

Quaternary Alluvium; Benedict Canyon Drainage: (Qal)

Unit No.1: Silty SAND to Sandy SILT (SM–ML), lite brown to olive brown, (10YR ¾), moist, hard to friable with 2–1/2 inch thick bedded, dark grey (10YR 3/1) clays. Fine to coarse grained, rounded to subrounded quartz sand occurs in thinly bedded, laterally discontinuous lenses that grade laterally into massive sandy silt. Overall unit displays fining upward sequence. Moderately developed structure with very fine, rounded quartz sand lining irregular shaped pedogenic faces. Abrupt, wavy erosional boundary with below. Formerly identified as Qya, Section BB', Leighton 2012a. Lies unconformably above well developed paleosol.

Old Benedict Canyon Wash Deposits (Qalscw)

Unit No. 2: Sandy CLAY to CLAY (CL), well developed paleosol, dark brown to dark greyish–brown to mottled reddish–brown to olive brown, (10YR 3/3 and 7.5YR 4/6), gleyed, moist, hard, strong fine to medium prismatic breaking to fine angular blocky soil structure. Plastic, with many common clay films on ped faces, manganese oxide staining, scattered gravels, and gradual to wavy boundary with parent material below. (correlative to PB, 2011b Marker bed Me)

Unit No. 3: Silty SAND with gravel to Sandy CLAY (SM–CL) of unit 3, brown to dark brown, (10YR 3/3 and 7.5YR 3/3), hard to soft when dry, few thin clay films on pad faces, few thin clay coatings on clasts. Scattered gravels in matrix (approx. 4%), contains thickly bedded sand with silt, fine to coarse sand (approx. 81%) with fine gravel (approx. 9%) Parent material for Unit No. 2.

Unit 3a: Contains thickly bedded fine to coarse gravel beds composed of approximately 80% subangular to rounded slaty gravels, trace basalt and abundant siltstone rock fragments, gradational to abrupt with unit below. Displays multiple fining upwards sequences within unit. Heavily dissected and incised by Unit No. 3.

Unit No. 4: Sandy SILT with Clay (ML, ML–CL), orange brown, (2.5YR 3/3), hard, very fine grained sand with lenses of subangular sands and slaty rock fragments. Abundant gleyed soil fractures, trace gravels with manganese oxide staining, porous with iron oxide and clay lined pores. Contains two distinct, laminated, thinly bedded, dark reddish–brown clay beds (baked clays). Sharp contact with below. Massive with few thin beds of fine to coarse sands, fining upward.

Unit No. 5: Paleochannel GRAVELS (GP, GM–GC), dark brown to reddish–brown, (7.5YR 3/3 and 2.5YR 3/3), subrounded to subangular to well–rounded gravels, imbricated, clasts consist of Santa Monica slate, siltstone, weathered occasional granitic cobble and rare basalt. Matrix consists fine to coarse well graded sands, clay content secondary as a result of translocation. Gravels range in size up to 4–1/2 inches in diameter with occasional cobbles. Contact erosional and distinct with below.

Quaternary Old Alluvial and Fluvial Deposits: (Qoaf)

Unit No. 6: Silty CLAY to Sandy CLAY and Clayey SAND with gravel (CL–SC), brown to dark reddish–brown to olive grey (7.5YR 4/4 and 10YR 3/6), fine to coarse subrounded sand, fine to coarse gravels, gleyed, gravel composed of yellowish white, laminated siltstone; orange brown to dark greenish black, well cemented and rounded sandstone; and flattened, subrounded slaty gravel. Sands and gravels occur as lenses and minor channels. Sharp contact with above.

FAULT TRENCH FT-5
(EAST WALL AND WEST WALL)

BEVERLY HILLS HIGH SCHOOL
241 S. MORENO DRIVE
BEVELY HILLS, CALIFORNIA

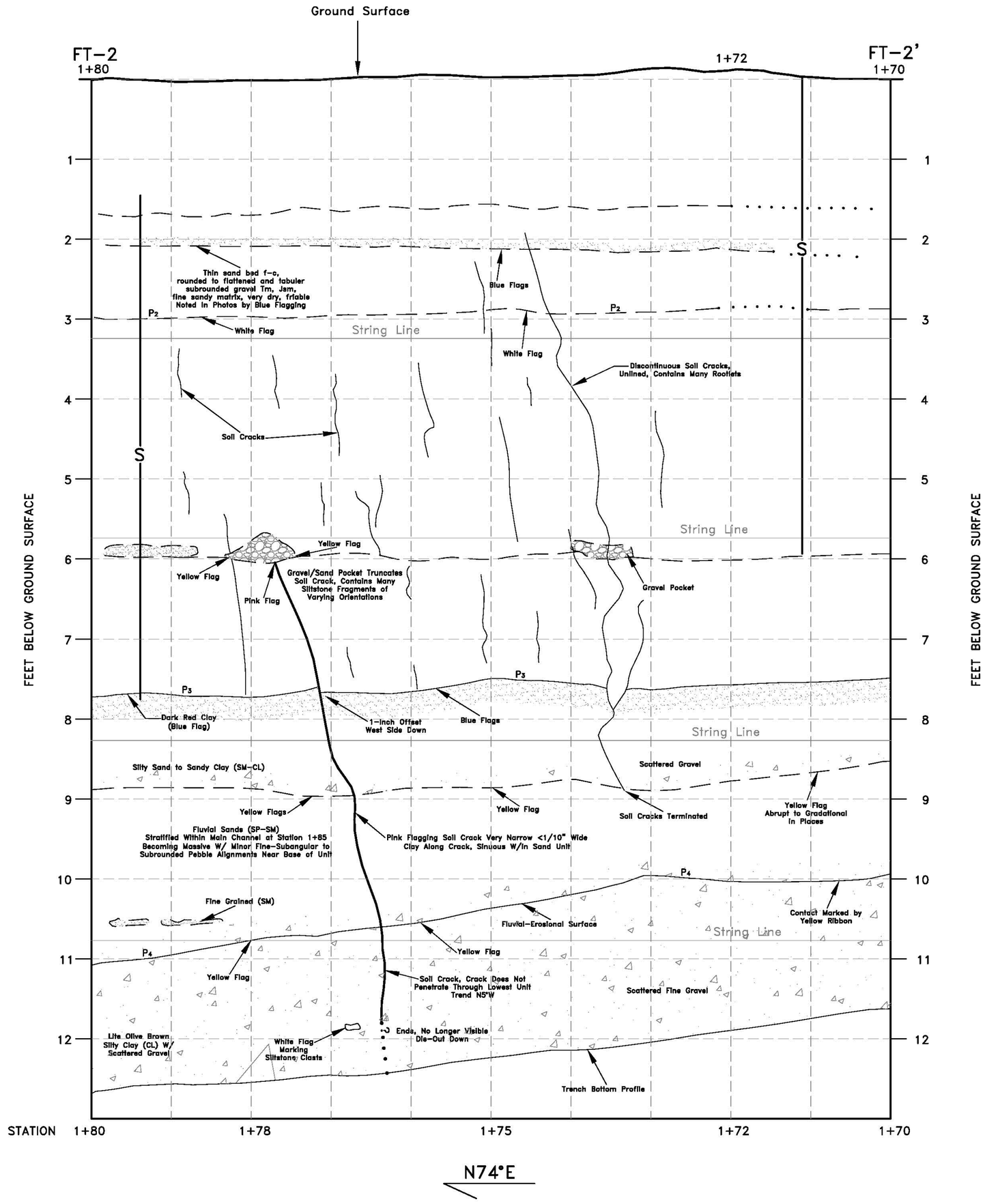
PLATE 5

Proj: 603314-008	Eng/Geol: TCB/JAR
Scale: 1"=10'	Date: 12/2012

Drafted By: BQT | Checked By: BQT | P:\DRAFTING\603314008\DP_2012-09-06\PLATES\5-7 FAULT TRENCHES-COMBINED.DWG (12-27-12 11:54:32AM) Plotted by: bmurphy

Leighton

FAULT TRENCH FT-2
SOUTH WALL 1"=1'



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FAULT TRENCH FT-2 STA. 1+70 TO 1+80 BEVERLY HILLS HIGH SCHOOL 241 S. MORENO DRIVE BEVERLY HILLS, CALIFORNIA	PLATE 6
Proj: 603314-008	Eng/Geol: JAR
Scale: 1"=1'	Date: 12/2012
Drafted By: BQT | Checked By: BQT | P:\DRAFTING\603314\008\OF_2012-09-06\PLATE-6-FT-2.DWG (12-27-12 9:31:10AM) Plotted by: mmurphy	Leighton