APPENDIX D1

Preliminary Geotechnical Investigation

DRAFT

Geo-Logic ASSOCIATES

June 25, 2018

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Topgolf USA
8750 N. Central Expressway
Dallas, TX 75231

Subject: Preliminary Summary of Geotechnical Investigation Findings - Topgolf Burlingame Golf Center Redevelopment Project

Dear Mr. Micheli:

This letter presents a preliminary summary of findings for the proposed Topgolf USA Burlingame Golf Center Redevelopment Project that will be constructed on top of the closed Burlingame Landfill at 1001 Airport Boulevard in Burlingame, California. The landfill is owned by the City of Burlingame (City) and is bounded to the north by Airport Boulevard and the San Francisco Bay beyond that; the Doubletree Hotel on the east; and marsh and the Burlingame Lagoon, a tributary to San Francisco Bay, on the south. The landfill comprises approximately 50 acres of a larger 91-acre tract owned by the City. Facilities on the 91-acre tract include the City's Bayside Park and Wastewater Treatment Facility.

Structures currently present on the closed landfill include a baseball field, driving range and putting area, soccer field, clubhouse, parking area, and access roads. The driving range, putting area, soccer field, clubhouse, parking lot, and maintenance area were constructed on the top deck of the closed landfill and are surrounded by final slopes that are inclined about 3:1 (horizontal:vertical) and that are up to 40 feet high. The soccer field, putting area, parking lot, baseball field, and maintenance area relatively flat; the driving range slopes about 30 vertical feet over a horizontal distance of about 840 feet from the southwest end of the range towards the tee boxes to the northeast. The facilities on top of the closed landfill were designed to minimize infiltration of storm water thereby avoiding increasing leachate volumes in the landfill. Eight groundwater wells, two surface water stations, and two leachate wells are sampled as part of the postclosure self-monitoring program for the landfill.

The purpose of this letter report was to provide a summary of the conditions encountered during the geotechnical field and laboratory study for the proposed Topgolf project and to identify those geologic and geotechnical considerations for design. The summary also provides general recommendations for construction. Final geotechnical design recommendations will be included in the Geotechnical Investigation Report that will be submitted separately.

SITE BACKGROUND

The Burlingame Landfill operated between 1957 and 1987 and accepted construction debris, concrete rubble, roofing shingles, gardening debris, wood, metal, cloth, plastic, and anaerobic digester sludge. Hazardous waste or commercially-collected household waste was not accepted at the site. Early fill methods are not documented, but refuse was reportedly bulldozed into the tidal flats bordering San Francisco Bay. The approximate quantity of debris within the landfill footprint is estimated to be about 2.5 million tons that consists of about 50 percent soil, 20 to 30 percent inert material (concrete rubble, construction debris, metal, and plastic), and 20 to 30 percent non-inert debris. A landfill gas (LFG) collection system was installed at the site in 1995 and a permanent flare was installed in 1996. The approximate limits of waste in the landfill are shown in the City of Burlingame/URS Record Drawings for the closed landfill.

The facility Waste Discharge Requirements (WDRs) indicate the maximum thickness of waste in the landfill is about 30 feet.[1] Existing (pre-current field investigation) soil borings for the site are included in Appendix A and indicate the in-place waste is underlain by a soft, organics-rich, and variably thick marine clay variously identified as soft clay, silty clay, and Bay Mud.[2] The stratigraphic sequence below the Bay Mud consists of an upper clay, upper sand, lower clay, and lower sand unit. All the geologic units present at the site are water-bearing and leachate is present in the refuse fill. Two aquifers have been identified at the site including:

- An upper aquifer that extends from a few feet below the ground surface to a depth of about -70 feet NGVD. The upper aquifer consists predominantly of silt and clay alluvial and estuarine sediments with discontinuous lenses of sand and a trace of gravel. No evidence has been found of perched groundwater above the upper aquifer. The upper aquifer is saline and is not a source of drinking or irrigation water; and
- A lower aquifer that is separated from the upper aquifer by an aquitard consisting of about 80 feet of silt and clay with occasional discontinuous, thin beds or lenses of sand. The lower aquifer is a source of drinking water further inland and upgradient of the landfill.

The landfill was closed in three phases with a final cover that incorporated either a 1-foot-thick compacted clay or geosynthetic clay liner (GCL) low hydraulic conductivity barrier layer. Various fill, drainage, and protective soil layers overlie the compacted clay and GCL. Most of the drainage

[1] As described in more detail below, the borings advanced for the geotechnical investigation indicated the refuse averaged about 40 feet thick to a maximum of 53 feet thick at the boring locations.

[2] This layer is likely equivalent to a widespread, shallow clay layer located at the margins of San Francisco Bay and known locally as Young Bay Mud.

system, LFG components, and a portion of the utility lines were installed during closure construction. Postclosure development of the landfill was performed in four phases and included installation of fencing, paving, structures, irrigation systems, a dog park, and landscaping. The drainage and utility systems were completed during this phase of work. The different cover sections and their respective locations at the site are shown in the 2005 Landfill Closure Record Drawings that were prepared by the City of Burlingame and URS Consultants. These drawings are included in Appendix A and also show the locations of utilities and site improvements and represent a compilation of record drawings and information from the three closure projects and four postclosure development projects implemented at the site.

PROPOSED DEVELOPMENT AND GEOTECHNICAL CONSIDERATIONS FOR DESIGN AND CONSTRUCTION

Based on the ARCO/Murray Concept Plan, the proposed project will cover an area of about 15 acres and incorporate a two-story structure located at the southwest end of the existing range that will include a restaurant, bar, event spaces, meeting rooms, and hitting bays. Preliminary dead loads for the interior structure footings range from about 50 to 150 kips. Dead loads for bearing walls range from about 3.0 to 4.5 kips/ft. The range area will include targets, will be surrounded by netting, and will slope to the northeast. The Concept Plan for the project indicates that the targets will be up to 75 feet in diameter that are typically flush with the ground surface around the perimeter and depressed about 6 feet below the ground surface at the center. Typical Topgolf facilities require cuts and fills of 3 to 5 feet in depth/thickness. The facility will be surrounded by netting that will be secured to net poles that will be up to 170 feet high.

The project will be located on the final cover of a closed landfill that was constructed on top of soft, compressible sediments (Young Bay Mud). Based on the Record Drawings, the final cover of the landfill varies in thickness from about 3-1/2 to 4-1/2 feet thick. Site boring logs indicate the Young Bay Mud varies in thickness from about several to more than 20 feet thick. Site documents also note that the Young Bay Mud was originally continuous across the site but that excavations during fill placement may have removed this unit at various locations under the in-place waste and that it is not continuous. Based on this information, principal geotechnical and landfill-related factors important for design and construction of the facility were judged to include:

- Total and differential settlement associated with consolidation of the existing refuse and underlying Young Bay Mud;
- Maintenance of the structural integrity of the landfill final cover during construction and operation of the facility;

- Maintenance of the ancillary landfill cover facilities such as LFG piping and drainage structures during construction and operation of the facility; and
- Minimizing the potential for preferential migration pathways from the bottom of the landfill into the underlying sediments due to site improvements such as pile foundations.

GEOTECHNICAL SCOPE OF WORK

Data needed to address these factors and provide geotechnical design recommendations include (but are not limited to): (i) the thickness, characteristics, and continuity of the waste materials underlying the site; (ii) the thickness, characteristics, and continuity of the Young Bay Mud underlying the waste materials; (iii) the characteristics of the geologic units underlying the Young Bay Mud; and (iv) the occurrence of leachate and groundwater within the waste and geologic materials. The scope of work implemented for this project was intended to collect this information and to provide the geotechnical information necessary to design and construct the proposed Topgolf facility.

Task 1 Geophysical Survey

As summarized above, the refuse fill and Young Bay Mud that underlies the site probably varies in thickness and/or may not be present in some locations. The thickness and distribution of these layers were judged to be important because the soil borings would need to extend below the bottom of the Young Bay Mud and the presence or absence of Young Bay Mud was a consideration in selecting boring locations. Therefore, Task 1 of the field investigation included completion of a surface (non-invasive) electrical resistivity (ER) geophysical survey to assess the approximate thicknesses of the in-place waste and the underlying Young Bay Mud. The ER survey was performed on April 16, 2018 along two crossing transects positioned on the existing driving range: one transect was oriented along the long axis of the range and measured approximately 850-feet-long; and the second transect was oriented perpendicular to the first near the center of the driving range and was about 650 feet in length. A description of the ER survey methods, the locations of the transects, and the result of the survey are included in Appendix C.

Task 2 Soil Borings

Soil borings were advanced within the limits of the existing driving range at the site at the approximate locations shown in Figure 1. It was necessary to close the existing driving range and the work was performed over a one-week period between April 16 and April 20, 2018. Drilling permits for the work and boring logs are included in Appendix D.

The borings were advanced using 6-inch diameter sonic drilling techniques and representative samples of subsurface materials were collected from the borings using a driven split spoon sampler or Shelby tube sampler (Shelby tubes were used in the Young Bay Mud).[3] Ambient air monitoring was performed using a combustible gas monitor and multi-gas meter to assess the presence of explosive gasses as methane (CH_4), volatile organic compounds, and hydrogen sulfide (H_2S) during drilling. No potentially hazardous or explosive concentrations were measured in the ambient air in the work area or immediately above the annulus of the open boring. The borings were grouted with cement-bentonite grout immediately on completion. General drilling procedures included:

- Each drilling location was cleared to a depth of 4 to 7 feet by using a hand-auger and air knife to verify that no utilities were present at the drilling location.
- The borings were advanced using truck-mounted sonic drilling equipment and the drill cuttings were containerized for subsequent offsite disposal at a permitted landfill. The drill casing and tools were steam-cleaned between borings. The soil cuttings were transported from each drilling location to 40-yard bins that were placed along the fence at the upper west end of the driving range.
- Sonic drilling returns a relatively continuous core sample that can be used for characterizing subsurface materials and obtaining disturbed samples for laboratory testing. Relatively undisturbed subsurface samples for strength and compressibility testing were collected at selected location by lowering a split spoon or Shelby tube sampler through the drill string. The Modified California split spoon sampler used for this purpose was driven using a hydraulic slide-hammer that weighs 140 pounds and falls 30 inches. Blow counts were recorded while driving the sampler and are shown on the boring logs.

The borings were observed by professional geologists who maintained logs of the borings, collected the samples for laboratory analysis, verified that soil and waste cuttings were properly contained for disposal, and confirmed that the drilling areas are returned to pre-drilling conditions. The borings were approximately located in the field using a hand-held GPS unit. The coordinated and elevations of the borings, boring depths, and principal landfill and geologic units encountered in each boring are summarized in Table 1.

Following completion of the field work, a four-point composite sample of the containerized drill cuttings was collected and submitted to BC Analytical Laboratory (BC) and tested for: Organochlorine Pesticides; PCBs; Volatile Organic Compounds; Base Neutral and Acid Extractable Organics, Total Petroleum Hydrocarbons; Total Threshold Limit Concentrations (TTLC), and

[3] Sonic drilling was used because it is relatively fast (a one-week closure of the existing driving range was allowed for the field work), generates fewer cuttings than other drilling techniques, and returns a continuous core of subsurface materials.

leachability by STLC and TCLP procedures. The results of these analyses are included in Appendix E and showed that the materials tested did not exceed federal or state hazardous waste thresholds. Off-site disposal of the cuttings is pending.

Task 3 Laboratory Testing

Selected samples collected in the field were delivered to the Geo-Logic Associates (GLA) Grass Valley laboratory and the Cooper Geotechnical Testing laboratory for geotechnical testing in accordance with the following suite of tests:

- Moisture content (ASTM D2216);
- Dry density and moisture content (AST D7263);
- Atterberg limits (ASTM D4318);
- Particle size analysis (ASTM D6913);
- Percent passing the No. 200 sieve (ASTM D1140 or C117);
- Consolidated-undrained (CU) triaxial shear (ASTM D4767);
- Unconsolidated-undrained (UU) triaxial shear tests (ASTM D2850); and
- Consolidation (ASTM D2435).

The results of the laboratory tests are included in Appendix F and applicable test results are plotted on the boring logs in Appendix D. The results of laboratory tests are summarized in Table 2.

SUMMARY OF FINDINGS

Geologic Setting

<u>Regional Geologic Conditions</u>

San Francisco Bay and the alluvial, colluvial, and estuarine deposits that underlie much of the project site and surrounding areas occupy a structurally controlled basin in California's Coast Ranges province, which consists of 500 miles of northwest-trending ridges and valleys. Late Pleistocene and Holocene sediments (less than 1.0 million years old) were deposited in the basin as it subsided. In the project site, these sediments consist primarily of estuarine deposits of Old Bay Clay, undifferentiated sedimentary deposits, Young Bay Mud, and alluvial/colluvial deposits, all of which rest on a variety of bedrock types associated with the Franciscan Complex. The Franciscan Complex makes up much of the basement rock of the Coast Ranges and consists of an assemblage of deformed and metamorphosed rock units that formed in association with continuous east-dipping subduction at the margin of the North American and Pacific plates.

The principal near-surface geologic units in the project area include Bay Mud, alluvial deposits, and bedrock on the Franciscan Formation. General characteristics of these units include:

- Bay Mud. Bay Mud is the uppermost (youngest) geologic unit around much of the San Francisco Bay margin and is divided into younger and older deposits. Depending on location, the Young Bay Mud ranges in thickness from approximately 1 to 70 feet and consists predominantly of high plasticity clay with minor layers of lean to sandy clay, silt to clayey silt, and clayey sand, with some peat interbeds and lenses.[4] The Young Bay Mud typically is olive to dark greenish gray to blue gray, very soft to medium stiff, and contains abundant shell fragments. It generally is normally consolidated and moderately to highly compressible, although it can have moderate shear strength if consolidated. Locally, the deeper units of older Bay Mud, also known as Old Bay Clay, are overconsolidated and are composed of stiff to very stiff, silty to sandy clay, clayey silt, and clayey to silty sand.
- Alluvial Deposits. The alluvial deposits in the site area typically consist of interbedded alluvial and marine soils that underlie the Younger Bay Mud and that overlie and interfinger with older Bay Mud deposits. The alluvium typically contains some shell fragments and is mostly composed of light brown to yellowish brown, fine to medium grained, poorly graded, medium dense to very dense, clean sand to clayey sand layers that are interbedded with stiff to very stiff, lean clay.
- Bedrock. Bedrock is not exposed in the project area. However, Franciscan Formation bedrock is exposed north of the project site and is reported to be encountered at a depth of about 100 feet below the San Francisco Airport (about 2 miles north of the proposed project site). The Franciscan Complex is a mixed assemblage of distinct rock types that are interbedded and tectonically disturbed. The predominant Franciscan Complex rock types in the project area are serpentinite, sandstone, chert, shale, and greenstone

Hydrogeologic Setting

The project site lies within the San Francisco Bay hydrologic region and covers the southeasternmost part of the California Department of Water Resources (DWR) designated Westside Groundwater Basin (number 2-35) and the northwestern-most part of the Santa Clara Valley Groundwater basin, San Mateo subbasin (number 2-9.03). Water bearing formations in both basins are divided in two groups: unconsolidated Plio-Pleistocene materials overlying bedrock and Quaternary alluvial deposits. Aquifer storage coefficients typically indicate unconfined conditions at depths less than 100 feet. Natural recharge occurs by infiltration of water from streams emanating from the upland areas and rainfall percolation. Mean annual

[4] In general, the Young Bay Mud thins inland and thickens towards the San Francisco Bay.

precipitation is in the range of 20 to 24 inches. Additionally, artificial recharge includes infiltration of irrigation water and leakage from water and sewer pipes.

Regional Seismicity

The San Francisco Bay Area is in a seismically active region near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast.[5] The relatively numerous geologically young faults in the area are classified as historically active, active, sufficiently active, or inactive, in accordance with the following:

- Faults that have generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years) and faults that exhibit a seismic fault creep are classified as historically active;
- Faults that show geologic evidence of movement within Holocene time (approximately the last 11,000 years) are classified as active;
- Faults that show geologic evidence of movement during the Holocene along one or more of their segments or branches and if their traces may be identified by direct or indirect methods are classified as sufficiently active and well defined; and
- Faults that show direct geologic evidence of inactivity or lack of offset, during all of Quaternary time or longer are classified as inactive.

The California Geological Survey (CGS) does not attempt to quantify the probability that an earthquake will occur on any specific fault; instead, this classification assumes that if a fault moved during the last 11,000 years, it is likely to produce earthquakes in the future. Active faults within 100 kilometers of the proposed Topgolf Redevelopment Project are summarized in Table 3.

Site Conditions

Topography and Surface Conditions

The proposed project will be located on an active driving range that is generally flat and open with the exception of several low, irregular shaped mounds that are meant to simulate golf

[5] Since approximately 23 million years ago, about 200 miles of right-lateral slip has occurred along the San Andreas Fault Zone to accommodate the relative movement between these two plates. The relative movement between the Pacific Plate and the North American Plate generally occurs across a 50-mile zone extending from the San Gregorio Fault in the southwest to the Great Valley Thrust Belt to the northeast. In addition to the right lateral slip movement between tectonic plates, a compressional component of relative movement has developed between the Pacific Plate and a smaller segment of the North American Plate at the latitude of San Francisco Bay during the last 3.5 million years. Strain produced by the relative motions of these plates is relieved by right lateral strike slip faulting on the San Andreas and related faults, and by vertical reverse-slip displacement on the Great Valley and other thrust faults in the central California area.

course features such as greens and sand traps. In addition, there is a closed depression located near the south edge of the range that resulted from an unknown cause. At the time of the field investigation, the depression was partially filled by water left from recent rainfall. The surface of the driving range is covered by artificial turf over a layer of very dense gravel. Within the footprint of the proposed development, the ground surface rises over a distance of about 865 feet from an elevation of about 34 feet at the golf tees on the east side to about 66 feet at the west end of the range.

<u>Landfill Characteristics</u>

The site WDRs indicate that the Landfill was constructed on former San Francisco Bay tidelands. The landfill was operated from 1957 to 1987 and was used for disposal of inorganic construction debris, clean soil, concrete rubble, landscape debris, clean soil, and dried sludge from the City wastewater treatment plant. Reportedly, no household garbage or hazardous wastes were accepted at the site. The site boring logs are consistent with this information and showed that limited amounts of inert debris are present within the landfill (no municipal solid waste was encountered in any of the borings.

The site WDRs indicate the landfill soil and refuse fill had reached a maximum thickness of approximately 30 feet when the facility stopped accepting waste in 1987. However, the boring logs (Appendix D) indicate the waste is as thick as 52 feet at some locations (see Table 1) and the geophysical survey (Appendix C) indicates the waste may be as much as 60-feet thick. The geophysical survey further indicates:

- Beneath Line 1, the refuse ranges in thickness from about 30- to 60-feet. It is generally about 30-feet thick beneath the northeast half of the profile and it thickens to the southwest. The depth to the top of the refuse ranges from very shallow at the northeast end of the profile to about 50-feet near the southwest end. This information suggests that the increasing depth of the refuse to the southwest is related to the landfill ending in that direction. Along most of the profile the clay cap is relatively thin (about 10-ft thick) and not well defined (intermittent blue and green colors). However, at the southwest end of the profile there is a very well-defined zone of low resistivity (purple to blue colors) that is interpreted as clay cap. This zone is about 15-feet deep, about 20-feet thick and it extends from the beginning of the profile (Station 0-ft) to about Station 150-feet. The moderate resistivity zone shown in green colors above is interpreted as fill that was put in to extend the surface of the driving range.

- Beneath Line 2, the refuse ranges in thickness from about 10- to 55-ft. It is generally 10- to 20-ft thick beneath the southeast half of the profile but it thickens to the northwest. The refuse is thinnest at about Station 450-ft and thickest at about Station 130-ft. The top of the refuse is very shallow at both ends of the profile but reaches a maximum depth of about 20-ft at Station 470-ft. The surface depression located at Stations 590- to 620-ft coincides with an area where the refuse is very close to the surface.

The refuse samples obtained from the borings consisted primarily of clayey soil with lesser amounts of soil-like material that may be biosolids. The solid waste recovered in the samples appeared to be inert materials such as wood, carpet, ash, concrete, and miscellaneous debris. Putrescible waste materials and significant thicknesses of inert waste were not observed. The consistency of the refuse based on observation and limited Modified California sampler blow counts varied from stiff to very hard and dense.

As shown by the record drawings in Appendix B, the final cover for the driving range consisted of an approximately 2-feet thick foundation layer, 1-foot thick clay liner, a 6-inch thick layer of miscellaneous fill, a 6-inch thick layer of aggregate base, a 1- to 2-inch thick layer of sand, and artificial turf.[6] The boring logs verified the presence of these layers in the final cover, although the final cover thicknesses was greater than shown in the record drawings at some locations (see Table 1).

Geologic Conditions

As summarized above, the subsurface geology below the landfill is characterized by a series of unconsolidated sand, silt, and clay that were primarily alluvial fan, stream, and outwash plain deposits that occur as interfingering layers. The Young Bay Mud below the site consists of gray to greenish gray clay deposited during marine interglacial periods. The WDRs indicate the Bay Mud was originally continuous across the site although reworking in the southeastern area of the site may have resulted in discontinuities. The conditions encountered during drilling support an interpretation that the Young Bay Mud may not be continuous. Based on data from the borings (Table 1), the Young Bay Mud varied in thickness from 0 feet to as much as 10 feet thick at Boring TG-02. The Young Bay Mud is classified by laboratory tests as a high plasticity clay (or CH in accordance with the Unified Soil Classification System [USCS]. The Young Bay Mud was typically soft to stiff.

The WDRs indicate that the stratigraphic sequence below the Young Bay Mud consists of an upper clay, upper sand, lower clay, and lower sand unit. This stratigraphic sequence was not identified in the borings advanced for this investigation. Rather, the borings indicate the materials below the Young Bay Mud (where present) consisted predominantly of relatively thin layers of sandy clay, clayey sand, and clay, with occasional thin layers of sand. The WDRs indicate

[6] Some portions of the landfill were closed with alternative cover sections that included a thin geomembrane and/or a geosynthetic clay liner (GCL). Neither of these cover sections were encountered in the borings and neither cover section is believed to present within the limits of the proposed Topgolf facility.

the upper sand unit is discontinuous and was removed along the southern portion of the site along with the upper clay. The WDRs also indicate the lower sand consists of sandy gravel and clayey sand that varies in thickness from about 12 to 21 feet and appears to be continuous across the site. This unit was not identified in the soil borings. Because of the apparent inconsistency with the information included in the WDRs, the soils below the Young Bay Mud are identified in the boring logs as Older Bay Alluvium.

Field and laboratory data indicate the Older Bay Alluvium is classified predominantly as low plasticity clay (CL) with occasional layers of sandy clay and clayey sand (SC). Lesser amounts of gravelly clay and silty clay were also identified in the samples. The blow counts indicate the material is stiff to hard and dense. Grain size data indicate the silt and clay fraction of the soil varies from about 10 to 54 percent.

Leachate and Groundwater

The depths to first encountered groundwater during drilling are shown in the boring logs in Appendix D and are summarized in Table 1. These depths are uncertain because the sonic drilling procedure can mask the presence of low-yield water-bearing strata due to its solid casing and relatively rapid speed of advance. Fluid (leachate) was observed in the refuse in Borings TG-03 and TG-17 but was not noted in any of the other borings advanced for this study. The borings were abandoned by grouting on completion and stabilized water levels were not recorded. SCS Engineers (SCS, 2018) indicates the elevation of groundwater in the area of the existing driving range is about 5 feet MSL and that it is estimated to flow in a west-northwest and northeast direction from what has previously been identified as a groundwater divide or ridge running across the site in an estimated north-south direction. SCS also notes that groundwater under the site is tidally influenced.

Seismicity and Ground Shaking

Potential ground shaking at the site was evaluated using deterministic and probabilistic methods. The deterministic seismic hazard analysis (DSHA) was completed to characterize the shaking associated with maximum earthquakes for known Holocene-active faults within 100 kilometers of the landfill and the results of this analysis are summarized in Table 3.[7] As shown in this table, the closest fault to the project is the Northern San Andreas fault about 4.1 kilometers from the site. Based on the equally-weighted average of the four published NGA_{14} relationships, a

[7] For the purposes of analysis, the median site peak ground acceleration (PGA) associated with the characteristic earthquake on each of the faults was calculated using the equally-weighted average of the Abrahamson and Silva (2014), Boore and Atkinson (2014), Campbell and Bozorgnia (2014), and Chiou and Youngs (2014) median Next Generation Attenuation (NGA14) relationships. Where applicable, near-source directivity factors were calculated using the Abrahamson (2000)-Sommerville (1997) method. This evaluation is included in Appendix G.

maximum earthquake of moment magnitude (M_W) 8.05 on this fault will result in a site PGA of about 0.47g. The results of the probabilistic seismic hazard analysis (PSHA) are included in Appendix F and indicate a site PGA of 0.52g has a 10 percent probability of exceedance in 50 years. A magnitude-distance deaggregation of potential earthquake sources within 100 km of the site indicates the hazard is dominated by a mean magnitude 7.6 earthquake occurring about 6.4 kilometers from the site.

Geologic and Geotechnical Design Considerations

Geologic and Environmental Hazards

Principal potential geologic hazards at the site include slope instability, surface fault rupture, strong ground shaking associated with an earthquake on one of the faults close to the site, liquefaction and lateral spreading, and differential settlement. As summarized below, it is our opinion that these hazards are either not significant or that they can be addressed during design and mitigated. Therefore, it is also our opinion that the proposed project is feasible with respect to geologic hazards. However, because the project will be constructed on a closed landfill, special construction methods may be warranted to isolate the building or persons from the in-place waste or waste by-products (such as landfill gas). Special construction methods may similarly be necessary to maintain the integrity and/or the function of the landfill cover and to minimize the potential of introducing waste, leachate, or landfill gas into the above-ground environment or by cross-contamination to the subsurface.

Slope Instability

The Topgolf project will be located on the flat top deck of the closed landfill and will be set back sufficiently from the approximately 3:1 side slopes of the landfill that the potential for adverse slope stability impacts associated with the building, net poles, and targets is very low. There are no natural slopes adjacent to the project and the potential for natural slope instability affecting the site is negligible. It is understood that access roads for the project may require cuts and fills on the existing side slopes of the landfill. In this event, additional evaluation and design will be necessary to verify stability of these slopes and the final cover during and following construction of the roads.

Strong Ground Shaking, Fault Rupture, and Liquefaction

The Topgolf project will be located in the seismically active San Francisco area and strong ground shaking should be expected during the lifetime of the project. It is our opinion that the effects of strong ground motions can be mitigated by design and construction in accordance with current and applicable building codes and standards of practice. The site is not located within an Alquist-Priolo Earthquake Fault Zone and the potential for surface fault rupture affecting the site is low.[8]

The CGS Seismic Hazard Zoning Map for San Mateo was published in January 2018 and shows the project site is in a liquefaction hazard zone. The results of the field investigation program implemented for this project indicate the subsurface materials below the landfill are clayey and predominantly hard to very hard to the depths explored. Where sands are encountered, they typically occur in thin layers that do not appear to be continuous, have more than 10 percent silt and clay and are relatively dense. The site boring logs from previous studies (Appendix A), show similar conditions. Based on this information, it is our opinion that the potential for liquefaction and lateral spreading affecting the site is low.

It should be noted that the Seismic Hazards Mapping Act requires a geotechnical investigation of the site in accordance with the requirements of CGS Special Publication 117 must be conducted and appropriate mitigation measures incorporated into the project design before a development permit is granted for a site within a Seismic Hazard Zone. Although the current investigation indicates the potential for liquefaction affecting the project is low, the investigation was not intended to address the specific requirements of Special Publication 117. Therefore, it is possible that additional studies to verify the results of the current investigation could be required.

Foundations

The results of the field investigation verify that the project will be constructed on top of 30 to as much as 60 feet of refuse over 0 to 10 feet of relatively soft and compressible Young Bay Mud. Although the waste appears to be primarily soil and soil-like biosolids with lesser amounts of refuse, its consistency is variable and differential settlement under the loads of the proposed buildings, net poles, and outfield targets is likely (the potential for differential settlement, even in absence of significant loading, is shown by the existing depression near Boring TG-03). Therefore, it is assumed that the building will be founded on deep foundations such as driven or drilled piles or piers. A preliminary assessment of deep foundation requirements using the boring and lab data from this study loading requirements provided by Topgolf indicates:

[8] The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (formerly the Special Studies Zoning Act) regulates development and construction of buildings intended for human occupation to avoid the hazard of surface fault rupture.

DL Group + LL Group	Total DL+LL (kips)	Possible Foundation Types
1+1	100	1-14x14 PPC pile or 1-24” CIDH pile
2+1	150	2-12x12 PPC piles or 1-36” CIDH
2+2	200	2-14x14PPC pile or 1-42” CIDH
3+2	250	3-14x14 PPC or 1-48” CIDH
4+3	350	4-14x14 PPC or 1-60” CIDH

NOTES:
1. DL & LL Groups and loads provided by Topgolf and are assumed to be non-factored loads.
2. PPC = prestressed precast concrete pile.
3. CIDH = cast-in-drilled-hole pile, or driller pier/caisson.
4. Pile capacity is based on friction and end-bearing capacity ignored (a FS=2 used to obtain allowable pile capacity).

Approximate pile lengths of 90 to 95 feet were calculated assuming zero allowable capacity from the final cover, refuse, and Young Bay Mud and that the top of the bearing layer occurred about 59 feet below the ground surface. The calculated pile length further assumed that the refuse in the landfill has reached equilibrium and future settlement will not introduce down drag on the piles. Deep foundations could also be required for the net poles and the depth of these foundations will depend on loading and allowable settlements for the poles.

Settlement

The outfield targets could also be supported by deep foundations to minimize the potential effects of settlement, an evaluation was performed to assess the potential magnitude of potential differential settlement on the targets. The mechanisms of refuse settlement are complex and include: (1) immediate response to loading, (2) time-dependent mechanical creep, and (3) secondary compression due to biochemical activity.[9] The refuse identified in the borings for this investigation appeared relatively inert and secondary compression due to biochemical activity and decomposition is expected to be limited. However, the materials recovered from the borings were heterogeneous and locally appeared to be relatively soft and compressible. Therefore, future settlement of the landfill is likely and should be relatively greater under areas loaded by project structures.

As summarized above, it is assumed that the building and net poles will be founded on deep foundations and these structures should not introduce significant additional settlement in the landfill or underlying Young Bay Mud. Potential settlement under the targets was evaluated using

[9] In general form, the strain of MSW can be expressed as: $\varepsilon = \varepsilon_P + \varepsilon_C + \varepsilon_B$ where: $\mathcal{E}$ = strain due to all three mechanisms; $\mathcal{E}_P$ = strain due to response from loading; $\mathcal{E}_C$ = time dependent (secondary) strain due to mechanical creep; and $\mathcal{E}_B$ = time dependent (secondary) strain due to biological decomposition.

methods developed by Sowers (1973) and Marques et al. (2003) and incorporated the following general steps and assumptions:

1. Calculate additional settlement under center of the largest target proposed for the site. According to Topgolf, this target will be approximately 75 feet in diameter and its gross load can be represented by concrete slab foundation approximately 12 inches thick. Therefore, the total target load assumed for analysis was 150 pounds per square foot (lb/ft^2);
2. Assume there is no net change to the existing final cover section and that future biological decomposition in the waste is negligible;
3. Assume the target load represents a large area load and there is no stress reduction with depth (this is conservative and will overestimate the settlement);

Under these assumptions, the results of evaluation indicate total primary and secondary creep deformation under the target could be about 0.5 to 1.5 feet after a period of five years. About 0.2 to 0.5 feet of the total is primary settlement that would occur shortly after construction of the target. The remaining settlement is associated with secondary creep (the magnitude of secondary creep would be expected to decrease over time). This amount of settlement would introduce tilt over time if it were concentrated on one side of a target.

It should be noted that these calculations assume the targets will represent an increased load to the underlying waste. This increase could be mitigated by removing an equal or greater load from the landfill prior to construction of the targets so the net load acting on the underlying refuse is reduced. It also should be emphasized that these calculations are based on assumed properties and are uncertain. The results of the field investigation program indicate much of the refuse is soil or soil-like biosolids and it should be possible to collect relatively undisturbed samples and test the refuse consolidation properties in the laboratory. This information could be used to better assess potential settlement in the outfield area of the project under the target loads and the loads introduced by fill (if incorporated into the final design).

Landfill Environment Construction

The landfill was closed in accordance with regulations and requirements implemented by different agencies that require engineered improvements primarily to limit infiltration, promote drainage, and prevent migration of landfill gas to the environment. At the Burlingame Landfill these improvements generally include final grades to promote surface water drainage, internal drainage to convey water from the final cover, the final cover itself to minimize infiltration to the underlying waste, and the landfill gas collection and destruction system to capture emissions from the landfill. Design of the project should consider these features and include measures to maintain or replace them with alternatives that comply with applicable regulations and provide equal or better performance. In some cases, regulatory agency concurrence with the design may be required.

Project construction may expose and/or require excavation of the existing waste. The test performed on a four-point composite sample of the drill cuttings did not provide evidence of constituents present at concentrations that are hazardous in accordance with federal or state requirements and monitoring during drilling did not indicate significant air emissions associated with the work. These results notwithstanding, future work that exposes waste should be performed by qualified personnel working under an appropriate Health, Safety, and Monitoring Plan.

LIMITATIONS AND CLOSURE

The preceding report provides a preliminary summary of findings from the recently completed field and laboratory testing program at the closed Burlingame Landfill. Additional information and geotechnical design recommendations will be included in the Geotechnical Design Report that will be submitted separately. Subsurface exploration is necessarily confined to selected locations and conditions may, and often do, vary between these locations. Should conditions different from those described in this report be encountered during project development, we should be consulted to review the conditions and determine whether our findings and conclusions remain valid. Additional exploration, testing, and analysis may be required for such evaluation. We have employed accepted geotechnical engineering and engineering geologic procedures and our professional opinions and conclusions are made in accordance with these principles and practices. This standard is in lieu of all warranties, either expressed or implied.

We appreciate the opportunity to provide service on this project and look forward to working with you towards its successful completion. In the meantime, please contact the undersigned if you have any questions.

Very truly yours,
Geo-Logic Associates

DRAFT FOR REVIEW

Richard Mitchell, PG, CEG
Principal Engineering Geologist

DRAFT FOR REVIEW

Chalerm (Beeson) Liang, PE GE
Supervising Geotechnical Engineer

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Table 1
SUMMARY OF SOIL BORINGS
Topgolf Burlingame Golf Center Redevelopment Project

BORING	GS ELEVATION (ft MSL)	COORDINATES		TOTAL DEPTH (ft)	FINAL COVER THICKNESS (ft)	FIRST ENCOUNTERED GROUNDWATER (ft)	GROUNDWATER ELEVATION (ft MSL)	REFUSE THICKNESS (ft)	YOUNG BAY MUD THICKNESS (ft)	ALLUVIUM PENETRATION (ft)
		Northing	Easting							
TG-01	37.0	2042914.7	6024997.3	68.5	8	47	-10.0	29	3	28.5
TG-02	39.5	2042942.0	6024488.3	89.5	5	69	-29.5	29	10	45.5
TG-03	48.5	2042636.8	6024439.4	78.5	7	18	30.5	37	6	28.5
TG-04	48.2	2042939.8	6024266.0	70.2	7	Not Encountered	NA	50	Not Encountered	13.2
TG-06	58.4	2042720.6	6024028.6	88.5	6	75	-16.6	53	Not Encountered	29.5
TG-07	58.8	2042671.0	6024057.6	91.0	9	71	-12.2	50	3.5	28.5
TG-08	59.5	2042585.5	6024105.8	88.5	6	Not Encountered	NA	51	5	26.5
TG-09	55.3	2042504.9	6024252.0	90.5	6	70	-14.7	46	5	33.5
TG-10	54.5	2042708.1	6024158.8	80.5	6	69	-14.5	44.5	6	24.0
TG-14	45.8	2042706.1	6024158.8	80.5	15	67	-21.2	31.5	3.5	30.5
TG-16	39.9	2042810.5	6024341.5	78.5	10	52	-12.1	28.5	5.5	34.5
TG-17	34.9	2042825.8	6024567.4	68.5	7	17	17.9	29	1	31.5

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Table 2
SUMMARY OF GEOTECHNICAL LABORATORY TEST RESULTS
Topgolf Burlingame Golf Center Redevelopment Project

LAB	BORING	DEPTH (ft)	DESCRIPTION	WATER CONTENT (%)	DRY DENSITY (lb/ft^3)	GRAIN SIZE		PLASTICITY			
						Percent Minus #200	Percent Sand & Gravel	Liquid Limit	Plastic Limit	Plasticity Index	USCS
GLA	TG-01	44	Light Brown Clayey Gravel with Sand	15.7		15.6	84.4				
GLA	TG-01	58		25.3	100.4						
GLA	TG-01	68	Brown Lean Clay with Sand	22.4	106.5			42	17	25	CL
Cooper	TG-02	39	Greenish Gray Sandy Lean Clay	37.2	85.4			46	18	28	CL
Cooper	TG-03	47	Greenish Gray Elsatic Silt w/Shell Fragments (Bay Mud)	60.0	64.1			75	36	39	MH
GLA	TG-03	68		22.4	105.6						
GLA	TG-03	78	Brown Gravel with Sand and Clay	11.0	127.6						
GLA	TG-06	62	Brown Clayey Sand with Gravel	16.3							
GLA	TG-06	68	Blueish Brown Clayey Sand	31.1	96.0	24.6	75.4				
GLA	TG-06	72	Light Brown Clayey Sand	19.6							
GLA	TG-06	77.5	Brown Clayey Sand with Gravel	15.0		12.8	87.2				
GLA	TG-06	88	Brown Clayey Sand	18.0	115.2						
GLA	TG-07	70	Light Brown Clay	25.9	103.5						
GLA	TG-07	80	Light Brown Gravel with Sand and Clay	13.2	123.9	11.1	88.9				
GLA	TG-07	90	Gray Sand with Silty Clay	18.7		9.9	90.1				
GLA	TG-08	73	Brown Clayey Sand	17.0		14.3	85.7				
GLA	TG-08	78	Brown Clayey Sand with Gravel	14.0							
GLA	TG-08	88	Light Brown Sandy Clay	17.9	112.9						
GLA	TG-09	57	Brown Clayey Sand with Gravel	12.3							
GLA	TG-09	59.5	Brown Sandy Clay	16.2		50.7	49.3				
GLA	TG-09	67	Brown Clay	21.7							
GLA	TG-09	69.5	Brown Sandy Clay	22.1	103.9	54.3	45.7				
GLA	TG-09	70	Light Brown Sandy Clay	19.1	113.1						
GLA	TG-09	80	Blueish Brown Clayey Sand	19.8	119.8	22.7	77.3				
GLA	TG-09	90	Brown Sand with Clay & Gravel	14.8	123.0						
GLA	TG-14	50	Blue Gray Silty Clayey Sand	35.7	84.6						
GLA	TG-14	80	Light Brown Clay with Sand	25.0	109.3						
GLA	TG-16	28.5	Gray Sandy Clay w/Gravel & Organics	27.7	76.4						
GLA	TG-16	38.5	Very Dark Brown Gravelly Clay w/Organics (Oily)	59.6	54.5						
GLA	TG-16	48	Light Brown Lean Clay with Sand	19.5	110.6			30	14	16	CL

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Table 2 SUMMARY OF GEOTECHNICAL LABORATORY TEST RESULTS Topgolf Burlingame Golf Center Redevelopment Project												
LAB	BORING	DEPTH (ft)	DESCRIPTION	WATER CONTENT (%)	DRY DENSITY (lb/ft^3)	GRAIN SIZE		PLASTICITY			
						Percent Minus #200	Percent Sand & Gravel	Liquid Limit	Plastic Limit	Plasticity Index	USCS
GLA	TG-16	58	Brown Clayey Sand	15.6	119.3	49.5	50.5				
GLA	TG-16	68		38.3	82.5						
GLA	TG-16	78		27.7	96.8						
GLA	TG-17	48	Light Brown Lean Clay	20.9	109.5			44	16	28	CL
GLA	TG-17	68		37.6	82.2						

NOTES:

1. See Appendix F for complete laboratory results.
2. Unconsolidated-undrained triaxial test, consolidated-undrained triaxial, and consolidation test results not shown in this table (see Appendix F).

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Table 3
SUMMARY OF CHARACTERISTIC EARTHQUAKE MAGNITUDES AND MEDIAN PEAK GROUND ACCELERATIONS
ASSOCIATED WITH HOLOCENE- ACTIVE FAULTS WITHIN 100 KILOMETERS OF THE SITE
Topgolf Burlingame Golf Center Redevelopment Project

FAULT	DISTANCE (km)	FAULT TYPE	CHARACTERISTIC MOMENT MAGNITUDE (M_w)	EQUALLY WEIGHTED MEDIAN PEAK ACCELERATION (g)	MEDIAN PEAK GROUND ACCELERATION (g)			
					1	2	3	4
Northern San Andreas	4.1	A	8.05	0.465	0.447	0.454	0.464	0.196
San Gregorio Connected	15	B	7.50	0.236	0.231	0.226	0.239	0.249
Monte Vista-Shannon	19	B	6.50	0.124	0.110	0.122	0.148	0.118
Hayward-Rodgers Creek	25	A	7.33	0.149	0.151	0.145	0.147	0.152
Calaveras	39	A	7.03	0.088	0.091	0.086	0.087	0.085
Mount Diablo Thrust	43	B	6.70	0.078	0.089	0.064	0.080	0.078
Green Valley Connected	47	B	6.80	0.064	0.069	0.062	0.065	0.061
Greenville Connected	56	B	7.00	0.057	0.056	0.058	0.061	0.054
Point Reyes	58	B	6.90	0.052	0.049	0.052	0.055	0.051
West Napa	65	B	6.70	0.039	0.036	0.041	0.044	0.034
Zayante-Vergeles	65	B	7.00	0.048	0.045	0.049	0.051	0.045
Great Valley 5 (Pittsburg-Kirby Hills)	66	B	6.70	0.051	0.060	0.041	0.056	0.048
Great Valley 7	68	B	6.90	0.052	0.059	0.043	0.049	0.056
Great Valley 4b (Gordon Valley)	77	B	6.80	0.045	0.052	0.035	0.045	0.047
Monterey Bay-Tularcitos	77	B	7.30	0.049	0.047	0.049	0.052	0.049
Hunting Creek-Berryessa	96	B	7.10	0.031	0.030	0.031	0.033	0.031
Great Valley 8	99	B	6.80	0.029	0.032	0.024	0.027	0.032

NOTES:
1. Fault distances and MCE magnitudes based on USGS 2008 Seismic Hazard Mapping Program (Field et al., 2008; Petersen et al., 2008). The maximum (or characteristic) magnitude along a fault is estimated by using the mapped surface geology and recorded earthquake location and depth distributions to obtain fault length or area. Using the fault dimensions and, in some cases, estimates of where earthquake ruptures may initiate and terminate (segmentation models), the maximum or characteristic magnitudes are calculated from relationships that are dependent on fault length or area (Ellsworth, 2003).
2. Where applicable, near source directivity average factor calculated using the Abrahamson (2000)-Somerville (1997) method.
3. Type-A faults are well-known faults that are defined using published information on fault geometry, earthquake sequences, slip rates, and dates of previous earthquakes. In California, major strands of the San Andreas fault system including the Calaveras, Hayward– Rodgers Creek, San Jacinto, and Elsinore fault zones, the Garlock fault zone, and the Cascadia subduction zone are modeled as Type-A faults. Detailed, fault-specific models are developed for each Type-A fault. The models include characteristic earthquakes on single segments, multisegment ruptures, and earthquakes that are shifted uniformly along the fault (the "floating earthquake" or "unsegmented" model).
4. Type-B faults are characterized by published information on slip rates and fault geometry. Coastal California Type-B fault sources are modeled assuming 2/3 of the moment is released as characteristic earthquakes and 1/3 in earthquakes that follow a truncated Gutenberg-Richter model from 6.5 to the maximum magnitude.
5. Attenuation relationships :

1. Norman A. Abrahamson, Walter J. Silva, and Ronnie Kamai, Summary of the ASK14 Ground Motion Relation for Active Crustal Regions, Earthquake Spectra, Volume 30, No. 3, pages 1025-1055, August 2014.
2. David M. Boore, Jonathan P. Stewart, Emel Seyhan, and Gail M. Atkinson, NGA-West2 Equations for Predicting PGA, PGV, and 5% Damped PSA for Shallow Crustal Earthquakes, Earthquake Spectra, Volume 30, No. 3, pages 1057-1085, August 2014; © 2014.
3. Kenneth W. Campbell and Yousef Bozorgnia, NGA-West2 Ground Motion Model for the Average Horizontal Components of PGA, PGV, and 5% Damped Linear Acceleration Response Spectra, Earthquake Spectra, Volume 30, No. 3, pages 1087-1115, August 2014.
4. Brian S.-J. Chiou and Robert R. Youngs, Update of the Chiou and Youngs NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra, Earthquake Spectra, Volume 30, No. 3, pages 1117-1153, August 2014.

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FIGURE 1A

SOIL BORING LOCATIONS
PROPOSED TOPGOLF PROJECT BURLINGAME SAN MATEO COUNTY, CALIFORNIA
Geo-Logic ASSOCIATES
DRAWN BY: RM · DATE: APRIL 2018 · JOB NO. RM18.1038

Appendix A
EXISTING BORING LOGS

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample

Equipment 8" Hollow Auger

Elevation 31 feet Date 11/5/81

0 – TRASH AND RUBBLE IN A VARIABLE SOIL MATRIX

5

10

15

20

25

Water Level 12/4/81 ▽

30

Orig. Bay Bottom -2° ±

35

Addition exc. for trash fill (See Exc Topo)

40

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample

(Continuation of Log)

40

45

GRAY BROWN SANDY SILT (MH) (bay mud)

50

55

60

65

70

75

80

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring GR-3
Burlingame Disposal Site
Monitoring Wells
Burlingame, California

PLATE 9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
M.Rice	9468,013.04	BES	4-6-82		

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Equipment 8" Hollow Auger

Elevation 17.5 feet Date 11/5/81

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	Description
				0		BROWN GRAVELLY SANDY SILT (ML)
				5		TRASH AND RUBBLE IN A VARIABLE SOIL MATRIX
Water Level 12/4/81				10		
				15		Orig. Bay Bottom -1º ±
				20		GRAY BROWN GRAVELLY SANDY SILT (MH)
				25		
				30		
				35		
				40		

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	(Continuation of Log)
				40		Bottom of well -25º
				45		44 17.3 Elev. -26.7
				50		
				55		
				60		
				65		
				70		
				75		
				80		

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring GR-4
Burlingame Disposal Site
Monitoring Wells
Burlingame, California

PLATE 10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
M.Rice	9468,013.04	BES	4-6-82		

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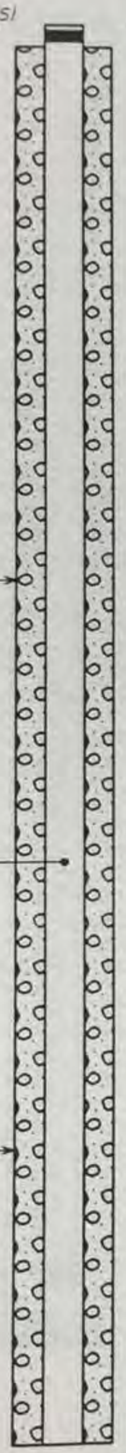
Top of Casing Elev. 9.20 ft. MSL

GROUND SURFACE (GS)

Equipment: CME 75, 10"-O.D. Hollow-Stem Auger

GS Elevation: 9.53 ft. MSL   Date: 4-9-92



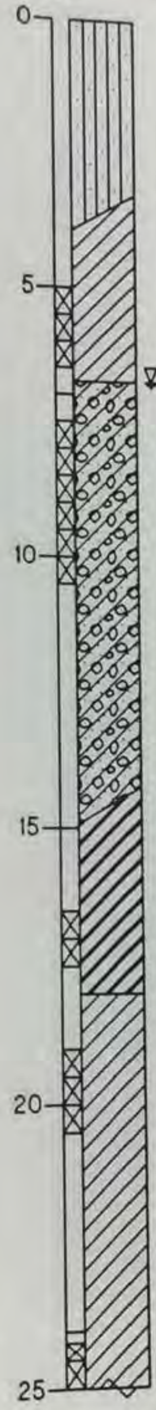
10 INCH DIA. BOREHOLE: 0 to 48.5 ft.

4 INCH DIA. SCH.40 BLANK PVC: 0 to 37 ft.

BENTONITE - CEMENT SEAL: 0.4 to 33.1 ft.

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
16	18	ND	none
NA	24	ND	none
NA	12	ND	none
NA	12	300	sulfur
NA	0		
31	18	100	sulfur
44	16	ND	none

Depth (ft.) / Sample



DARK BROWN SILTY SAND (SM) (FILL) (10YR 3/3): loose, medium dense, moist, medium to fine sand, 15-20% silt

BROWN SANDY SILTY CLAY WITH GRAVEL (CL) (FILL) (10YR 4/3): medium stiff, moist, 20% silt, 15-20% medium fine sand, 5-10% gravel

OLIVE BROWN CLAYEY GRAVEL WITH SAND (GC) (FILL) (2.5Y 4/3): stiff, wet, 25-30% clay, 15-20% medium to fine sand

DARK GREENISH GRAY SANDY FAT CLAY (CH) (5GY 4/1): soft, wet, 30-35% fine sand (bay mud)

GREENISH GRAY TO YELLOWISH BROWN SANDY LEAN CLAY (CL) (5GY 5/1 - 10YR 3/6): medium stiff, wet, 35-40% fine sand

@ 22.5': dark greenish gray (5G 4/1), medium stiff to stiff, 25-30% fine sand

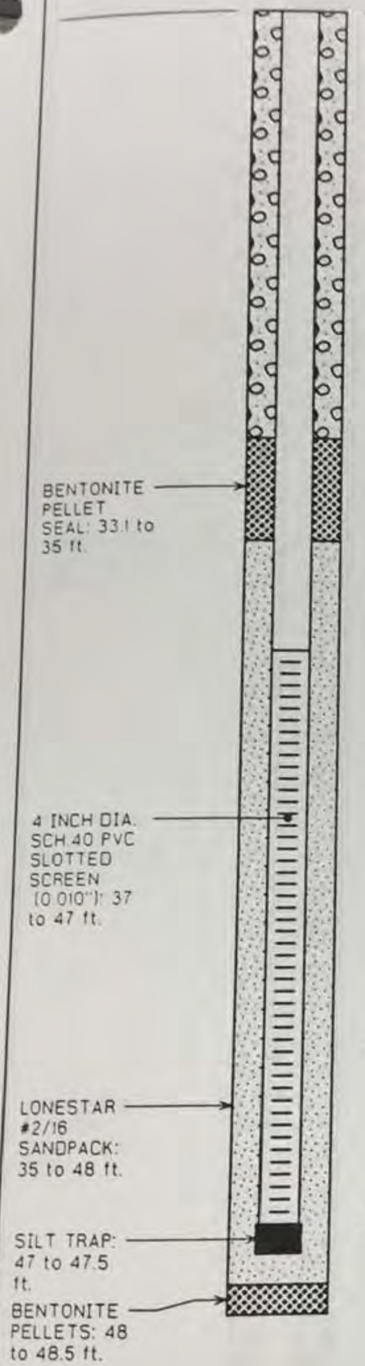
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-1A
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

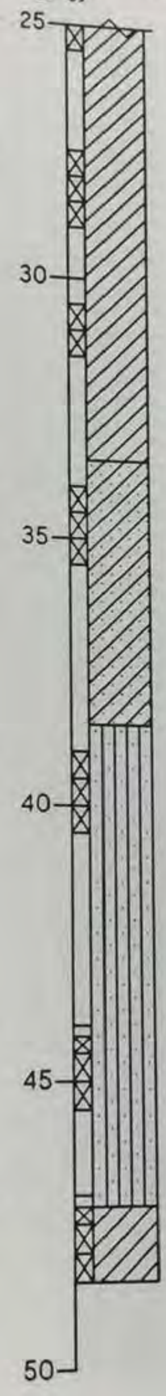
PLATE **A2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	I. Ha...	07/92	

Equipment CME 75
10"-O.D. Hollow-Stem Auger
GS Elevation 9.53 ft. MSL Date 4-9-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
20	18	ND	none
25	12		none
19	16	ND	none
61	18	ND	none
33	15	ND	none
51	17	ND	none



@ 25': yellowish brown (10YR 5/6), stiff, 30-35% medium to fine sand, 35% rounded gravel

@ 28.5': as above

@ 31': dark yellowish brown (10YR 4/6), 35-40% fine to very-fine sand

YELLOWISH BROWN CLAYEY SAND (SC) (10YR 5/6), medium dense, wet, fine to very-fine sand, 30-35% clay, trace subrounded chert gravel

DARK YELLOWISH BROWN SILTY SAND WITH GRAVEL (SM) (10YR 4/6): dense, wet, medium to fine sand, 20-25% silt, 5-10% subrounded chert and sandstone gravel

@ 43': medium to coarse sand, 15-20% silt, 3-5% gravel

LIGHT YELLOWISH BROWN SANDY LEAN CLAY (CL) (2.5Y 6/4): stiff, wet, 25-30% fine sand

Bottom of boring at 48.5 feet.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-1A
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	[illegible signature]	07/92	

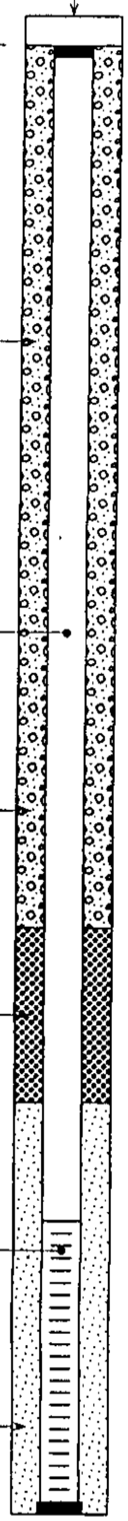
APPENDIX B

DRAFT

Top of Casing Elev. ________

CHRISTY BOX

GROUND SURFACE



- 8 INCH DIA. BOREHOLE: 0 to 75 ft.
- 2 INCH DIA. SCH. 40 BLANK PVC: 0.5 to 20 ft.
- BENTONITE -CEMENT SEAL: 1 to 15 ft.
- BENTONITE PELLET SEAL: 15 to 18 ft.
- 2 INCH DIA. SCH. 40 PVC SLOTTED SCREEN (0.010"): 20 to 25 ft.
- LONESTAR #2/16 SANDPACK: 18 to 25.5 ft.

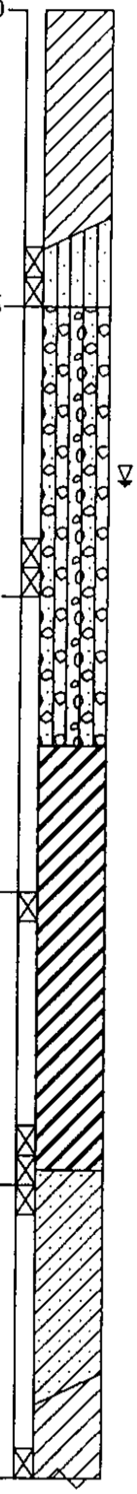
Equipment Hollow-Stem Auger 8"-diameter

Elevation 9.55 ft. MSL   Date 4-20-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
66	12	ND	none
9	14	ND	none
1	6	150	sulfur
17	18	30	sulfur
19	12	ND	none

Depth (ft.) 0, 5, 10, 15, 20, 25

Sample



DARK BROWN SANDY SILTY CLAY (CL) (FILL) (10YR 3/3): medium stiff, moist, 20-25% medium sand, 20-25% silt

BROWN SILTY SAND (SM) (FILL) (10YR 4/3): medium dense to loose, dry to moist, medium to fine sand, 30-35% silt, (fill)

DARK GRAY SILTY GRAVEL WITH SAND (GM) (FILL) (10YR 4/1): medium dense, moist, 20-25% silt, 20-25% medium to fine sand

@ 9.5': wet, trace concrete

DARK GREENISH GRAY SANDY FAT CLAY (CH) (5G 4/1): soft, wet, 15-20% fine to very fine sand, trace shell fragments (bay mud)

@ 17': soft to medium stiff, 25-30% very fine sand (bay mud)

DARK GREENISH GRAY CLAYEY SAND (SC) (5GY 4/1): medium dense, wet, medium to fine sand, 35-40% fat clay (bay mud deposit)

YELLOWISH BROWN SANDY LEAN CLAY (CL) (10YR 5/4): medium stiff, wet, 30-35% fine to very fine sand

BURL

Harding Lawson Associates
Engineering and Environmental Services

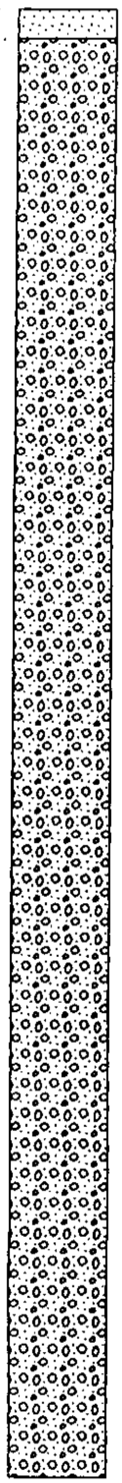
Log of Boring and Well Completion US-2A
Well reinstalled 8-23-95
(formerly constructed as Well LS-2A)
Burlingame Landfill
Burlingame, California

PLATE **C1**

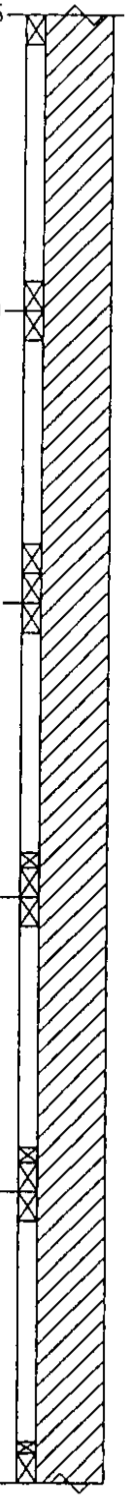
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	27883 6		7/92	9/95

Equipment Hollow-Stem Auger
8"-diameter

Elevation 9.55 ft. MSL Date 4-20-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Description
				25	
18	11	ND	none		@ 29.5': as above
				30	
20	18	ND	none		
				35	@ 35': dark yellowish brown (10YR 4/6), 15-20% fine sand, 10-15% rounded gravel
15	15	ND	none		@ 39.5': 30-35% fine sand, no gravel
				40	
16	15	ND	none		@ 44': light yellowish brown (2.5Y 6/3), 15-20% very fine sand, occasional 2" interbeds of clayey sand
				45	
17	13	ND	none		@ 49.5': as above
				50	



BURL

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-2A
Well reinstalled 8-23-95
(formerly constructed as Well LS-2A)
Burlingame Landfill
Burlingame, California

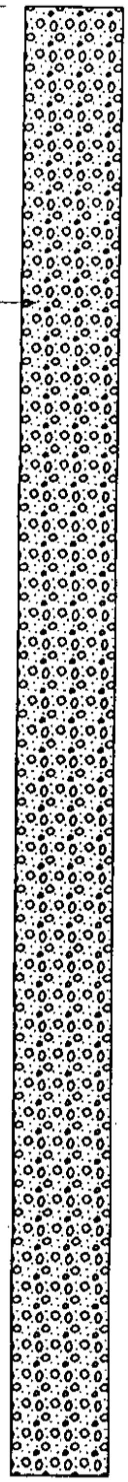
PLATE **C 1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	27883 6		7/92	9/95

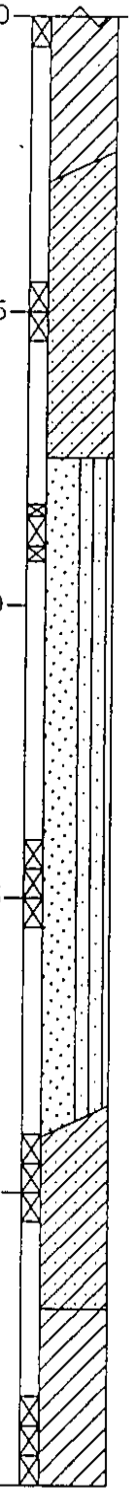
V6726, A DRAFT

Equipment Hollow-Stem Auger 8"-diameter

Elevation 9.55 ft. MSL Date 4-20-92



BENTONITE -CEMENT GROUT: 25.5 to 75 ft.



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Description
				50	
22	12	ND	none		DARK YELLOWISH BROWN-GRAYISH BROWN MOTTLED CLAYEY SAND (SC) (10YR 4/6 / 10YR 5/2): medium dense, wet, medium to very fine-grained sand, 30-35% lean clay
				55	
35	12	ND	none		DARK YELLOWISH BROWN SAND WITH SILT AND GRAVEL (SW-SM) (10YR 3/6): medium dense, wet, coarse to fine sand, 5-10% rounded gravel, 5-10% silt (gravels are mostly red chert and weathered sandstone)
				60	
52	18	ND	none		
				65	@ 64.5': as above
73	18	ND	none		YELLOWISH BROWN CLAYEY SAND WITH GRAVEL (SC) (10YR 5/4): dense, wet, coarse to fine sand, 15-20% clay, 15% rounded to subangular gravel
				70	
					LIGHT OLIVE BROWN SANDY LEAN CLAY (CL) (2.5Y 5/3): stiff, wet, 20-25% fine sand
37	18	ND	none		
				75	*Bottom of boring at 75 feet.*

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-2A
Well reinstalled 8-23-95
(formerly constructed as Well LS-2A)
Burlingame Landfill
Burlingame, California

PLATE **C1**

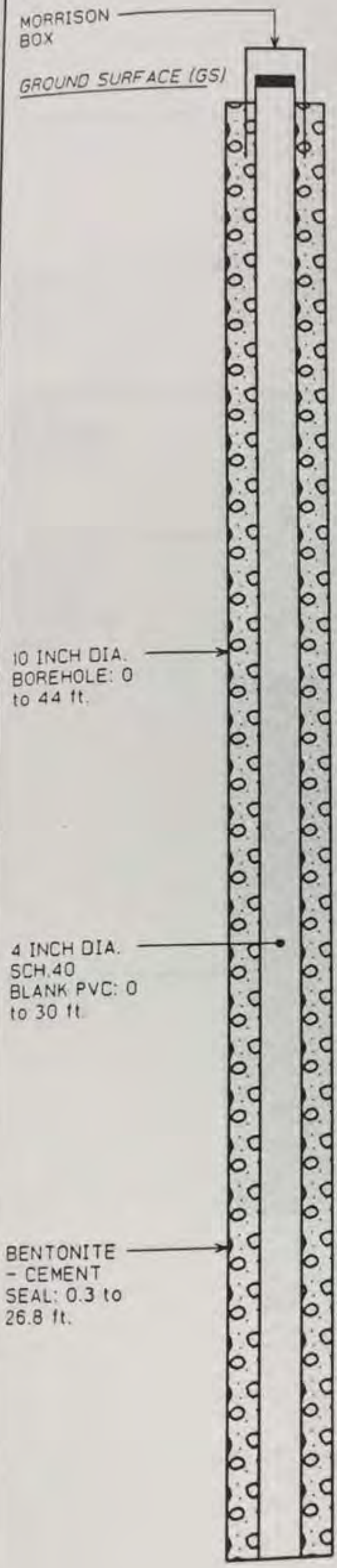
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	27883 6		7/92	9/95

DRAFT

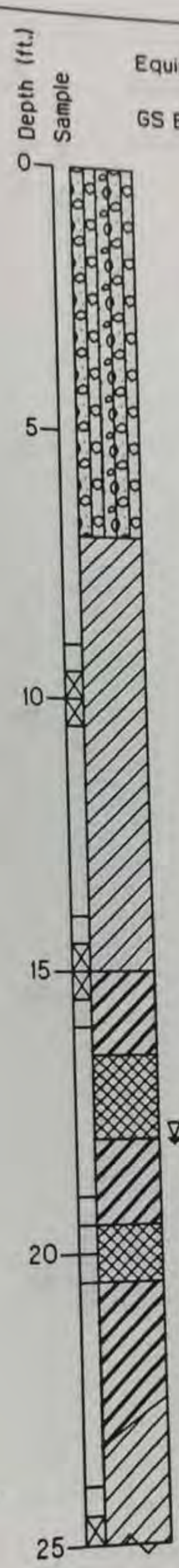
Equipment: CME 75, 10"-O.D. Hollow-Stem Auger

GS Elevation: 18.20 ft. MSL Date: 4-21-92

Top of Casing Elev. 17.98 ft. MSL



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
10	10	ND	none
3	12	100	none
10	0		
18	12	ND	none



DARK BROWN SILTY GRAVEL WITH SAND (GM) (FILL) (7.5YR 3/3), medium dense, dry to moist, 25% fine sand, 20-25% silt

BLACK SANDY SILTY CLAY (CL) (FILL) (5YR 2.5/1): soft to medium stiff, moist, lean clay, 20-25% medium sand, 20-25% silt, brick and tile fragments

@ 13.5': as above

BLACK SANDY FAT CLAY (CH) (FILL) (2.5Y 2/0): soft, wet, 30-35% fine sand, 3-5% gravel, abundant organics

RUBBLE, CONCRETE

BLACK SANDY FAT CLAY (CH) (FILL) (2.5Y 2/0): soft, saturated, 30-35% fine sand, 3-5% gravel, abundant organics

RUBBLE

BLACK SANDY FAT CLAY (CH) (2.5Y 2/0): soft, saturated, 30-35% fine sand, 3-5% gravel, abundant organics

YELLOWISH BROWN SANDY LEAN CLAY (CL) (10YR 5/6): medium stiff, wet, 35-40% fine sand, trace rounded gravel

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-3A
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

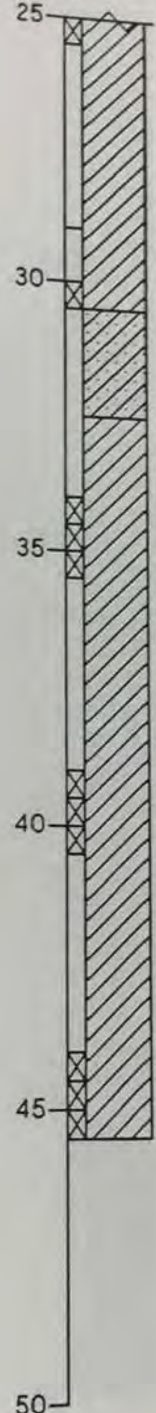
PLATE A3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	[signature]	07/92	

Equipment CME 75
10"-O.D. Hollow-Stem Auger

GS Elevation 18.20 ft. MSL   Date 4-21-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
32	3	ND	none
10	18	ND	none
36	18	ND	none
24	18	ND	none



YELLOWISH BROWN CLAYEY SAND WITH GRAVEL (SC) (10YR 5/6): wet, fine sand, 15-20% fine rounded gravel, 30-35% clay

DARK YELLOWISH BROWN SANDY CLAY (CL) (10YR 4/6): medium stiff to soft, wet, 45% clay, 45% fine sand, 10% silt

@ 37': as above, mottled (10YR 4/4), stiff, 40% fine sand, 40% clay, 20% silt

@ 43': light olive brown (2.5Y 5/6): medium stiff, 15-20% very fine sand

Bottom of boring at 45.5 feet.

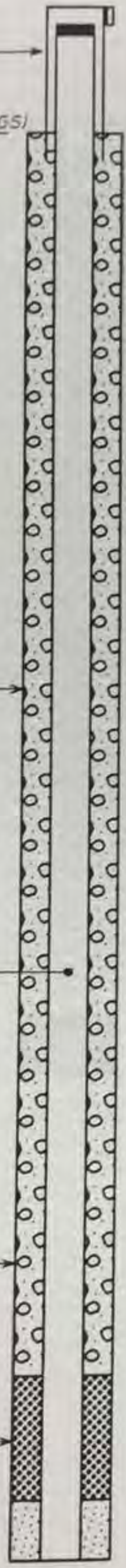
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-3A
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A3**

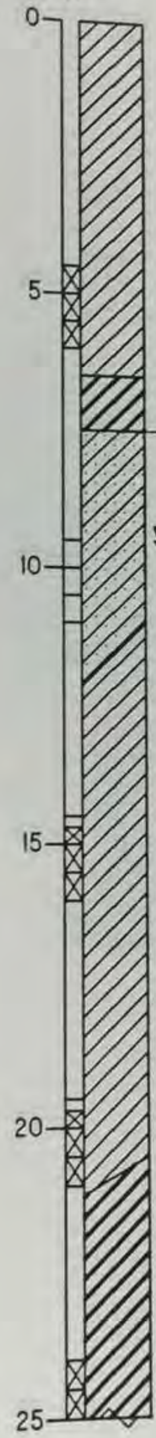
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	[signature]	07/92	

APPENDIX B



Equipment CME 75
10"-O.D. Hollow-Stem Auger
GS Elevation 17.57 ft. MSL Date 4-13-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
14	18	1	none
8	NA		
4	14	10	none
11	15	ND	none
NA	30		
NA	24	ND	none



DARK GRAYISH BROWN SANDY SILTY CLAY (CL) (FILL) (10YR 4/2): medium stiff, moist, 25-30% silt, 25-30% medium to fine sand

BLACK SANDY FAT CLAY (CH) (FILL) (2.5Y 2/0): soft, moist, 15-20% fine sand

OLIVE BROWN CLAYEY SAND WITH GRAVEL (SC) (FILL): medium dense, wet, medium to fine sand, 25-30% silt, 15-20% subrounded and rounded gravel

DARK YELLOWISH BROWN SANDY LEAN CLAY (CL) (FILL) (10YR 4/6): soft, wet, 20-35% fine sand, 3-5% gravel, trace of black roots

@ 19': dark greenish gray (5GY 4/1), 35-40% very fine sand, no gravel, no roots

DARK OLIVE GRAY SANDY FAT CLAY (CH) (5Y 3/2): soft, wet, 25-30% very fine sand, trace white shell fragments (bay mud)

APPENDIX B

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-5
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

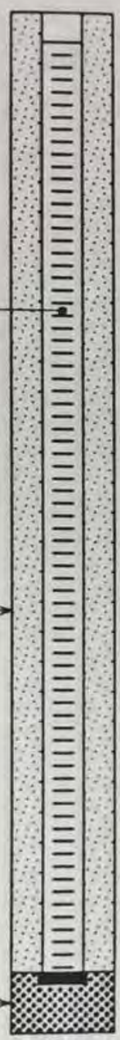
PLATE **A4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041		07/92	

DRAFT

Equipment CME 75
10"-O.D. Hollow-Stem Auger

GS Elevation 17.57 ft. MSL   Date 4-13-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
12	NA		
29	16	ND	none
45	3		none
25	13		

Depth (ft.): 25, 30, 35, 40, 45, 50

Sample

DARK YELLOWISH BROWN CLAYEY SAND (SC): medium stiff to soft, wet, fine sand, 25-30% clay

DARK GREENISH GRAY SAND (SP) (5GY 4/1): medium dense, wet, medium to coarse sand, 3-5% silt

LIGHT OLIVE BROWN SILTY SAND (SM) (2.5Y 5/4): medium dense, wet, medium to fine sand, 15-20% silt

LIGHT YELLOWISH BROWN SILTY CLAYEY SAND (SC-SM) (10YR 5/6): medium stiff, wet, medium sand, 15-20% clay, 10-15% silt, 3-5% rounded gravel

DARK YELLOWISH BROWN SANDY LEAN CLAY (CL) (10YR 4/6): stiff, wet, 35-40% fine sand

DARK YELLOWISH BROWN SILTY SAND AND SAND (SM-SP) (10YR 4/6): medium dense, wet, 35-40% silt

DARK YELLOWISH BROWN SILTY CLAYEY GRAVEL WITH SAND (GM-GC) (10YR 4/4): dense, wet, subrounded to rounded gravel, 15-20% clay, 15-20% silt, 20-25% medium to fine sand

LIGHT YELLOWISH BROWN LEAN CLAY (CL) (2.5Y 6/3): stiff, wet, 5-10% fine sand

Bottom of boring at 42 feet.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-5
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	[signature]	07/92	

DRAFT

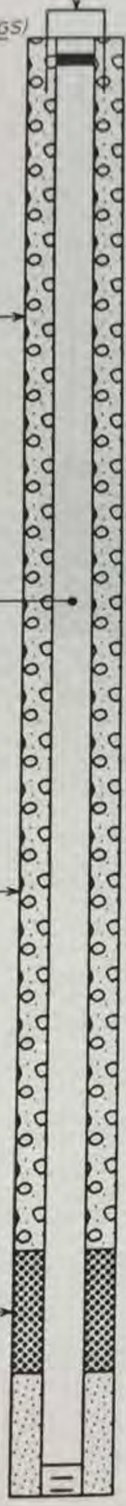
Top of Casing Elev. 9.88 ft. MSL

MORRISON BOX

GROUND SURFACE (GS)

Equipment CME 75 10"-O.D. Hollow-Stem Auger

GS Elevation 10.26 ft. MSL Date 4-14-92



10 INCH DIA. BOREHOLE: 0 to 35.5 ft.

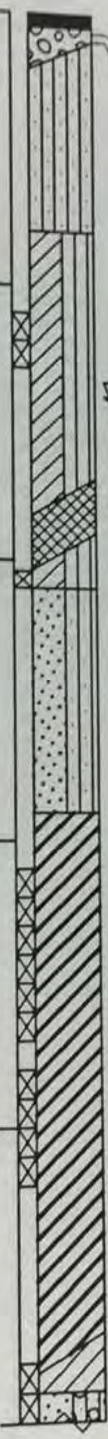
4 INCH DIA. SCH.40 BLANK PVC: 0.3 to 24.5 ft.

BENTONITE - CEMENT SEAL: 0.5 to 21 ft.

BENTONITE PELLET SEAL: 21 to 23 ft.

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)
24	14	ND	none	5
2	0			
NA	30	200		15
NA	20	300	strong sulfur	
29	18	200	strong sulfur	25

Depth (ft.) | Sample



ASPHALT

BASEROCK

DARK BROWN SILTY SAND WITH GRAVEL (SM) (FILL) (7.5YR 3/2): loose to medium dense, fine sand, 15-20% silt, 5-10% gravel

DARK OLIVE BROWN SILTY CLAY WITH GRAVEL (CL-ML) (2.5Y 3/3): medium stiff, moist, 20-25% medium to fine sand, 10-15% subangular to subrounded gravel, trace brick

CONCRETE RUBBLE AND LOOSE SOIL

@ 9.5': silty to clayey sand as above

BLACK SAND TO SILTY SAND (SW-SM) (FILL) (2.5Y 2/0): loose, wet, fine to very fine sand, 10-15% silt

DARK OLIVE GRAY SANDY FAT CLAY (CH) (5Y 3/2): soft, wet, 15-20% fine sand, trace shell fragments (bay mud)

@ 20.3': dark greenish gray (5GY 4/1),35-40% fine sand

OLIVE SANDY LEAN CLAY (CL) (5Y 4/4): medium stiff, wet, 35-40% fine sand

Log of Boring and Well Completion US-6
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A5**

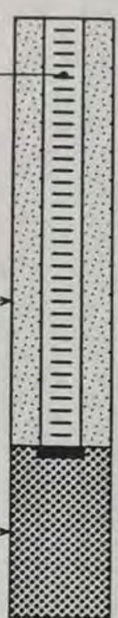
HLA Harding Lawson Associates
Engineering and Environmental Services

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041		07/92	

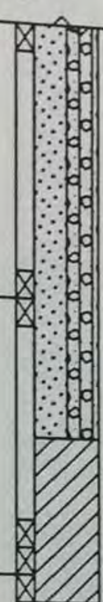
APPENDIX B

Equipment: CME 75, 10"-O.D. Hollow-Stem Auger

GS Elevation: 10.26 ft. MSL   Date: 4-14-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)
				25
25	12	ND	none	
				30
15	18	ND	none	
				35
				40
				45
				50



DARK YELLOWISH BROWN SAND (SW) WITH 2"-3" INTERBEDS OF SILTY GRAVEL WITH SAND (GM) (10YR 4/6): medium dense, wet, medium to coarse subrounded sand, 15-20% silt, (GM is subrounded gravel, 25-30% silt, 20-25% medium sand)

SANDY LEAN CLAY (CL) (10YR 4/6): medium stiff, wet, 30-35% fine to very fine sand, 1"-2" interbeds of fine to very fine sand

Bottom of boring at 35.5 feet.

Log of Boring and Well Completion US-6
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A5**

Harding Lawson Associates
Engineering and Environmental Services

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	A. Harris	07/92	

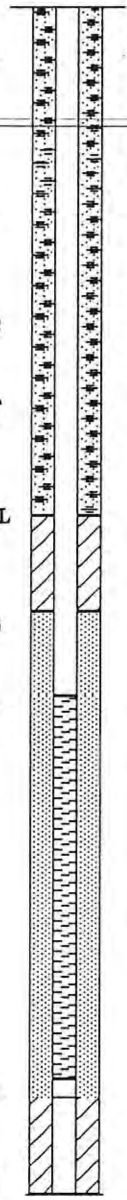
APPENDIX B

DRAFT

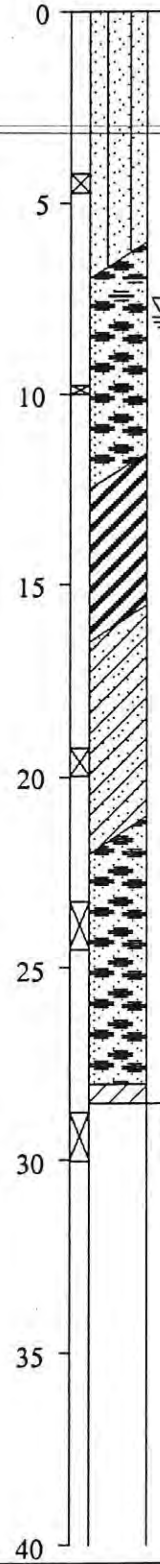
Top of Casing feet

Equipment 10"Hollow Stem Auger

Elevation ft Date 01/13/93



OVA Reading (ppm)	Odor	Blows/foot
ND	No	
ND	No	19
ND	No	4
ND	No	4
ND	No	26
ND	No	25
ND	No	16



DARK YELLOWISH-BROWN SILTY SAND (SM)(fill)
medium dense to loose, moist
medium to fine grained, 40% silt

OLIVE-BROWN WELL GRADED GRAVEL (GW)(fill)
loose, wet, 45% subrounded gravel mostly serpentinite, 30% medium to fine sand, 25% clay

BAY MUD
(based on drilling characterization and trace dark greenish gray fat clay (CH) on sampler

MOTTLED DARK YELLOWISH-BROWN TO OLIVE-BROWN INTERBEDDED CLAYEY SAND AND SANDY CLAY (SC/CL)
medium dense, wet, 50% fine sand
50% lean clay

MOTTLED YELLOWISH-BROWN TO DARK BROWN WELL GRADED GRAVEL (GW)
medium dense, wet,
35% subrounded, deeply weathered sandstone gravel, 35% medium to fine sand, 30% clay

DARK YELLOWISH BROWN SANDY LEAN CLAY (CL)
medium stiff, wet,
65% lean clay, 35% fine sand

Boring was terminated at 28.5 feet.
Groundwater was encountered at 8 feet.

Harding Lawson Associates
Engineering and Environmental Services

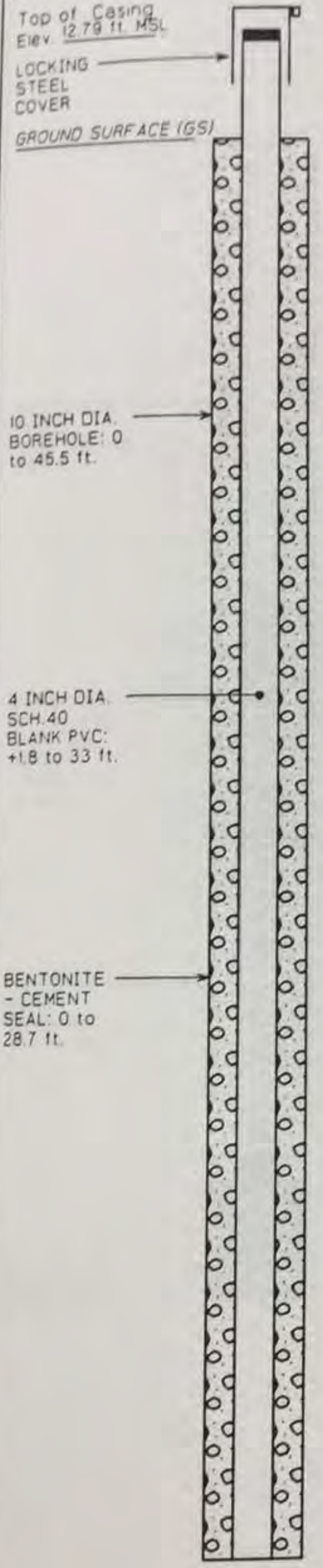
Log of Monitoring Well US-7
Burlingame Landfill
Burlingame, California

(Sheet 1 of 1) PLATE

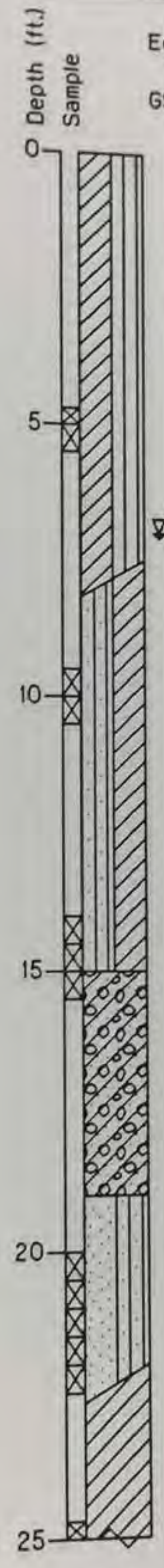
DRAWN	JOB NUMBER	APPROVED	FILE	DATE	REVISED DATE
	21367-002		16510G23		

Equipment CME 75
10"-O.D. Hollow-Stem Auger

GS Elevation 10.99 ft MSL Date 4-15-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
6	9	ND	none
16	12	ND	none
17	18	ND	none
NA	0		
NA	25	ND	none
21	10	ND	none



DARK YELLOWISH BROWN SANDY SILTY CLAY (CL-ML) (FILL) (10YR 4/4): soft to medium stiff, moist, lean clay, 20-25% silt, 20-25% fine sand, with 1"-4" layers of DARK YELLOWISH BROWN POORLY GRADED SAND WITH SILT (SP-SM) (FILL) (10YR 4/6): medium dense, moist, fine sand, 20-25% silt

DARK YELLOWISH BROWN SILTY SAND AND SANDY CLAY (SM-CL) (FILL) (10YR 4/6): medium dense to soft, wet, medium to fine sand, 25-30% clay, 15-20% silt

@ 12.5': as above

OLIVE GRAY SILTY CLAYEY GRAVEL WITH SAND (GC-GM) (FILL) (5Y 4/2): medium dense, wet, serpentinite gravel, 15-20% medium to fine sand, 10-15% silt, 10-15% clay

OLIVE GRAY SAND TO SILTY SAND (SP-SM) (5Y 4/2): loose, wet, medium to fine sand, 5-10% silt

DARK YELLOWISH BROWN SANDY LEAN CLAY (CL) (10YR 4/6): medium stiff, wet, 35-40% fine sand

Harding Lawson Associates
Engineering and Environmental Services

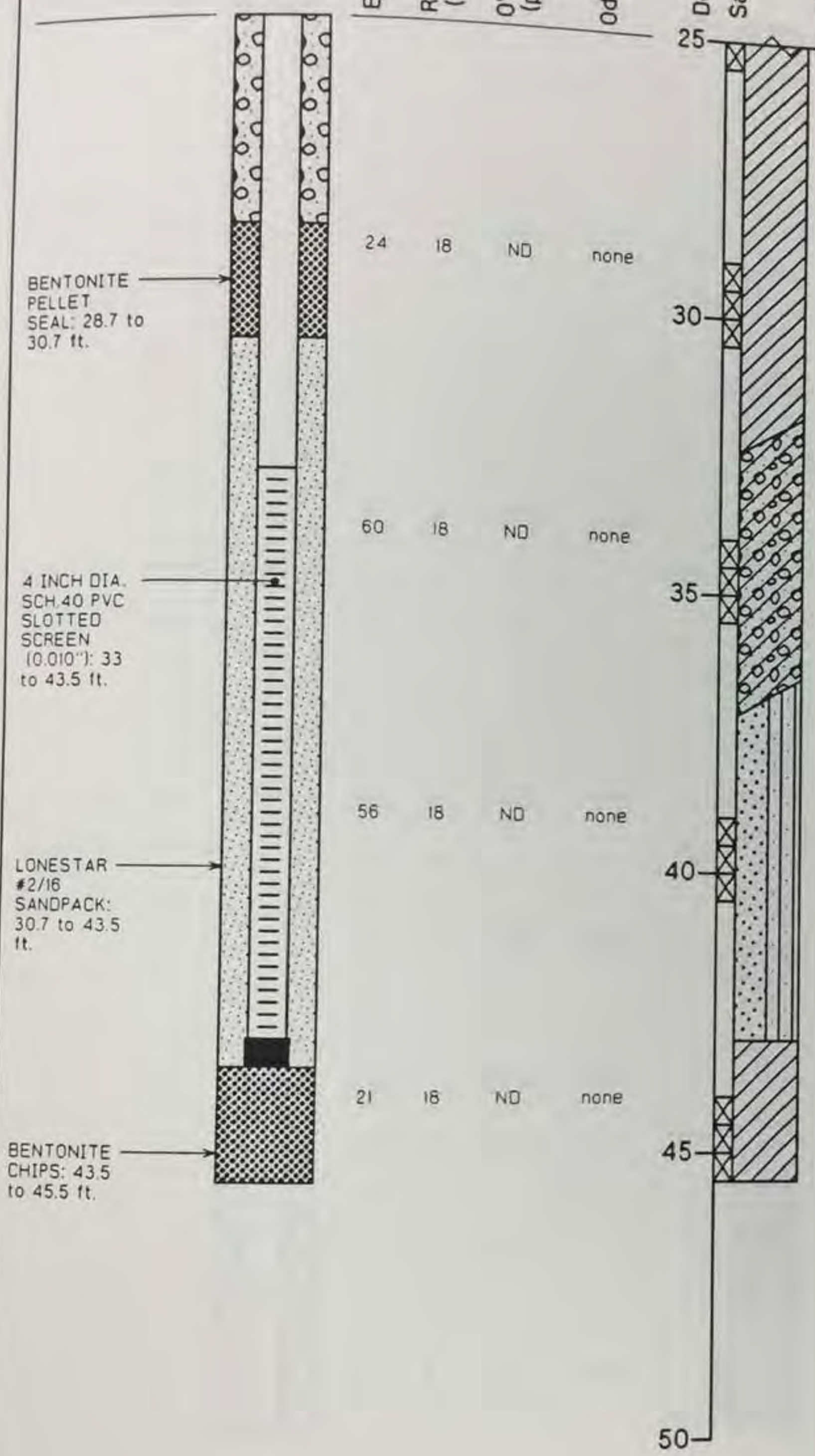
Log of Boring and Well Completion US-8
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041	[signature]	07/92	

DRAFT

Equipment CME 75
10"-O.D. Hollow-Stem Auger
GS Elevation 10.99 ft. MSL
Date 4-15-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
24	18	ND	none
60	18	ND	none
56	18	ND	none
21	18	ND	none

@ 28': sandy silty clay as above, 20-25% fine sand, 20-25% silt

DARK YELLOWISH BROWN CLAYEY GRAVEL WITH SAND (GC) (10YR 4/6): medium stiff to stiff, wet, subrounded to rounded chert gravel, 25-30% medium to fine sand, 25-30% clay

DARK BROWN INTERBEDDED SAND WITH SILT (SW-SM) AND CLAYEY GRAVEL WITH SAND (GC) (10YR 4/3): medium dense, wet, coarse to fine sand, 30-35% rounded chert and sandstone gravel to 1/2", 3-5% silt

LIGHT YELLOWISH BROWN LEAN CLAY (CL) (2.5Y 6/3): stiff, wet, 3-5% fine sand

Bottom of boring at 45.5 feet.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion US-8
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A6**

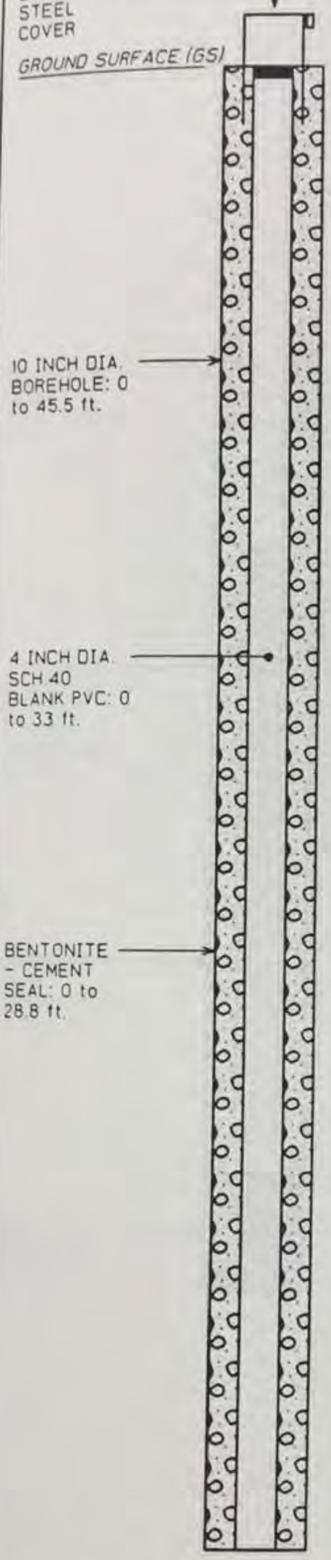
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041		07/92	

DRAFT

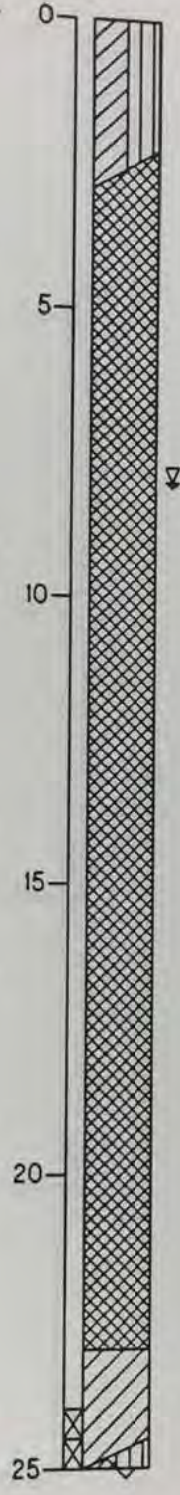
Top of Casing Elev. 18.51 ft. MSL

Equipment CME 75 10"-O.D. Hollow-Stem Auger

GS Elevation 16.45 ft. MSL Date 4-16-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
4	0	500	none
4	0	>1000	strong sulfur
NA	0	>1000	none
NA	0	>1000	none
NA	0	>1000	none
36	18	60	none



BLACK SANDY SILTY CLAY WITH GRAVEL (CL-ML) (FILL): medium dense, dry to moist, 50% clay, 20% subrounded gravel, 15% fine sand, 15% silt

LANDFILL DEPOSIT: BLACK DEBRIS WITH SILTY SANDY CLAY (CL-ML) (5Y 2.5/1): very soft, wet, wood, metal, concrete, rubble, glass

@ 9': as above

@ 13': as above, strong sulfuric odor

@ 16.5': debris as above with black sand (SP) (2.5Y 2/0): very loose, wet, very fine-grained

OLIVE GRAY SANDY CLAY (CL) (5Y 4/2): medium stiff, wet, 40-45% fine sand

Harding Lawson Associates
Engineering and Environmental Services

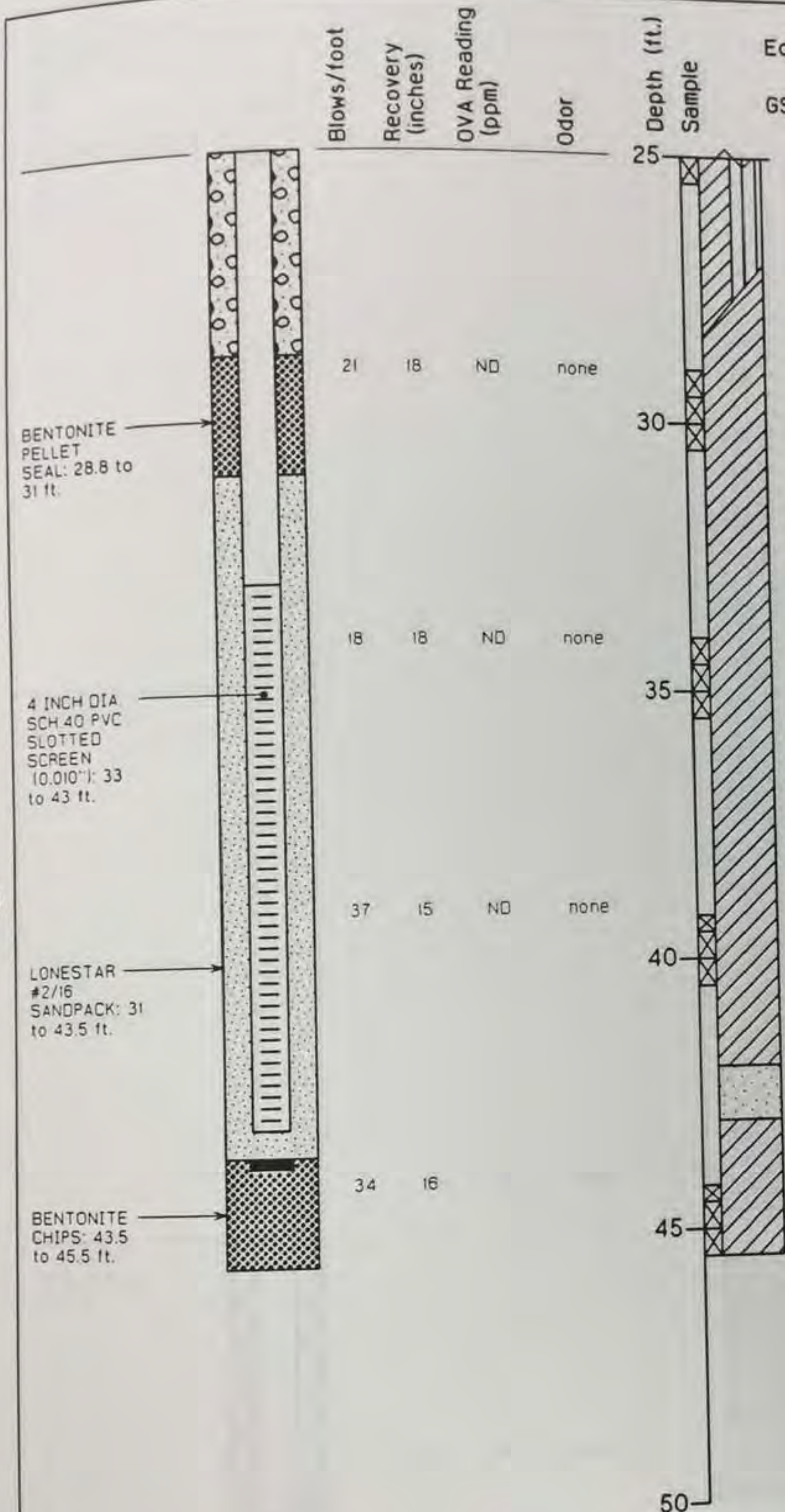
Log of Boring and Well Completion US-8
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE **A7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041		07/92	

DRAFT

Equipment CME 75
10"-O.D. Hollow-Stem Auger
GS Elevation 16.45 ft. MSL Date 4-16-92



DARK YELLOWISH BROWN SANDY SILTY CLAY (CL-ML) (10YR 4/4): medium stiff, wet, 30-35% clay, 30-35% silt, 25-30% fine sand

DARK YELLOWISH BROWN SILTY SANDY CLAY (CL) (10YR 4/4) medium stiff, wet, 35-40% clay, 15-20% silt, 35-40% fine sand

@ 34': dark yellowish brown (10YR 4/6): lean clay, 35-40% fine sand to silt

@ 40': 30-35% clay, 15-20% silt, 20-30% fine to medium sand, 10-15% rounded gravel, 1"-2" lenses of silty sand and/or clayey gravel

@ 42': loose material SAND??

DARK YELLOWISH BROWN SANDY SILTY CLAY (CL) (10YR 4/6): stiff, wet, lean clay, 25-30% fine sand, 5-10% silt, 5-10% rounded gravel

Bottom of boring at 45.5 feet.

APPENDIX B

HLA **Harding Lawson Associates**
Engineering and Environmental Services

Log of Boring and Well Completion US-9
SWAT/Amendments to Interim ROWD
Burlingame Landfill
Burlingame, California

PLATE
A7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	10881 041		07/92	

Appendix **B**
BURLINGAME LANDFILL CLOSURE RECORD DRAWINGS

DRAFT

LANDFILL CLOSURE - RECORD DRAWINGS

CITY OF BURLINGAME LANDFILL

CITY PROJECT NO's. 9117, 9117(1), 9117(2)

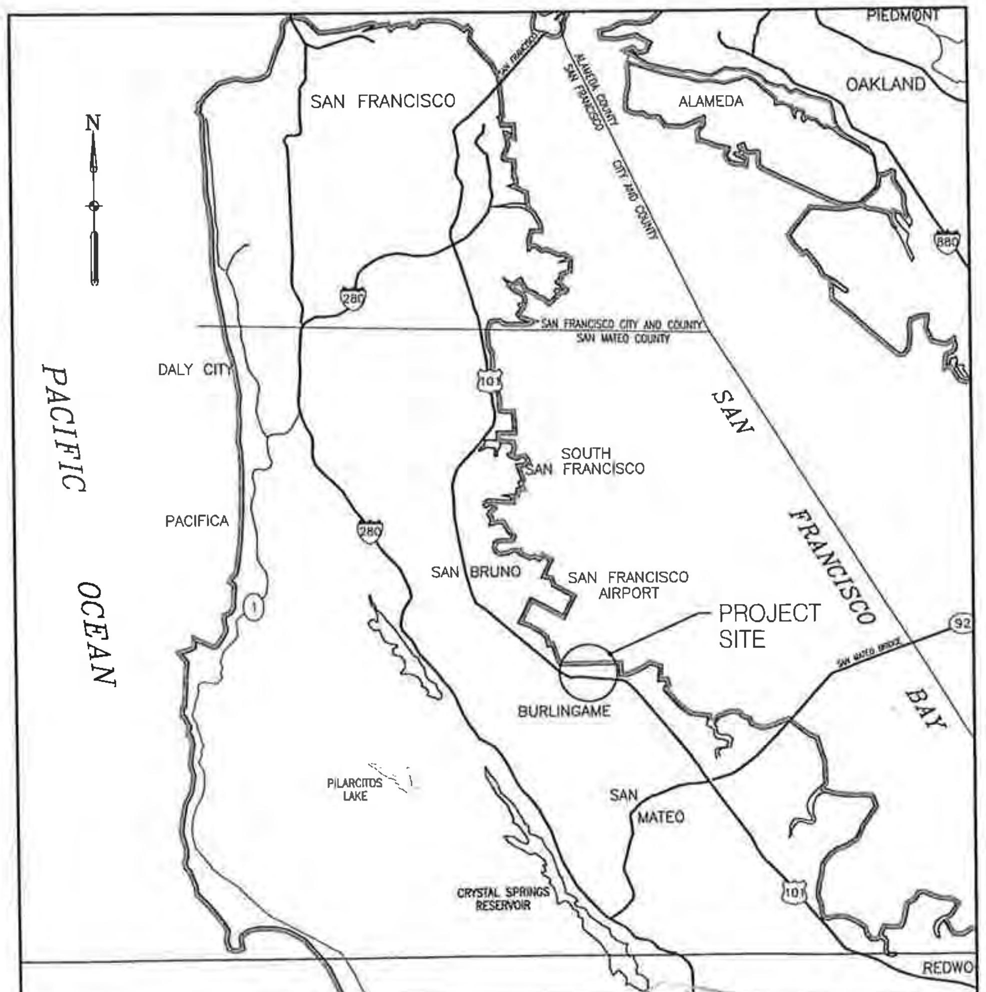
Burlingame, San Mateo County, California

REGISTERED PROFESSIONAL ENGINEER LINDA J. LOCKE NO. C-38421 Exp. 3/31/05 CIVIL STATE OF CALIFORNIA

DESIGN ENGINEER APPROVAL

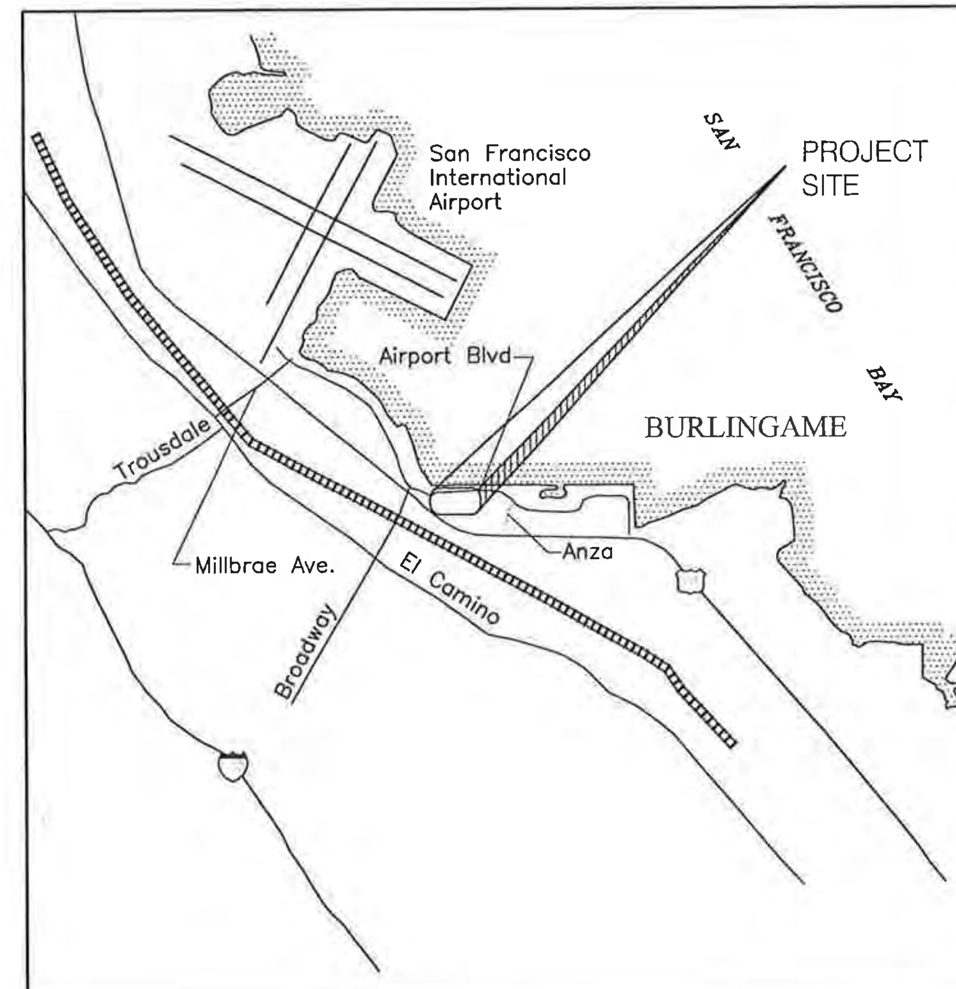
02-15-05

PROJECT MANAGER DATE



VICINITY MAP

LIST OF DRAWINGS	
SHEET NO.	DESCRIPTION
G-1	TITLE SHEET, LIST OF DRAWINGS, SITE LOCATION AND VICINITY MAP
G-2	GENERAL NOTES, LEGEND, ABBREVIATIONS AND KEY MAP
C-1	CAP EXTENT PLAN – ENTIRE LANDFILL
C-2	CAP EXTENT PLAN – SHEET 1 OF 5
C-3	CAP EXTENT PLAN – SHEET 2 OF 5
C-4	CAP EXTENT PLAN – SHEET 3 OF 5
C-5	CAP EXTENT PLAN – SHEET 4 OF 5
C-6	CAP EXTENT PLAN – SHEET 5 OF 5
C-7	UTILITY EXTENT PLAN – ENTIRE LANDFILL
C-8	UTILITY EXTENT PLAN – SHEET 1 OF 5
C-9	UTILITY EXTENT PLAN – SHEET 2 OF 5
C-10	UTILITY EXTENT PLAN – SHEET 3 OF 5
C-11	UTILITY EXTENT PLAN – SHEET 4 OF 5
C-12	UTILITY EXTENT PLAN – SHEET 5 OF 5
C-13	CAP DETAILS – SHEET 1 OF 2
C-14	CAP DETAILS – SHEET 2 OF 2
C-15	MISCELLANEOUS DETAILS – SHEET 1 OF 5
C-16	MISCELLANEOUS DETAILS – SHEET 2 OF 5
C-17	MISCELLANEOUS DETAILS – SHEET 3 OF 5
C-18	MISCELLANEOUS DETAILS – SHEET 4 OF 5
C-19	MISCELLANEOUS DETAILS – SHEET 5 OF 5



SITE LOCATION MAP

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

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URS
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Oakland, CA 94607-4014
Tel. (510) 893-3600
Fax: (510) 874-3268

WARNING: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED BML | DRAWN BML | CHECKED SKS | PEER REVIEWED HJB | PROJECT MANAGER LJL | DATE 12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

TITLE SHEET, LIST OF DRAWINGS, SITE LOCATION AND VICINITY MAP

REVISION 0 | PROJECT 26811590 | DRAWING G-1 | SHEET 1 OF 21

DRAFT

GENERAL NOTES:

1. THIS SET OF RECORD DRAWINGS WAS GENERATED FOR THE PURPOSE OF PROVIDING ONE SET OF DRAWINGS SHOWING THE EXISTING FEATURES OF THE LANDFILL AS OF XX/XX/2002. THE LANDFILL WAS CLOSED IN THREE PHASES (CITY CONTRACTS 9117, 9117(1) AND 9117(2). DURING THESE CONTRACTS, CAPPING LAYERS WERE CONSTRUCTED, THE LANDFILL GAS SYSTEM, MOST OF THE DRAINAGE SYSTEM AND A PORTION OF THE UTILITY LINES WERE INSTALLED.

   POST CLOSURE DEVELOPMENT ON THE LANDFILL WAS PERFORMED IN FOUR PHASES (CITY CONTRACTS 9117(3), 9117(4), 9117(5) AND 9117(6)). DURING DEVELOPMENT, ALL SURFACE FEATURES INCLUDING FENCING, PAVING AND STRUCTURES WERE CONSTRUCTED, LANDSCAPING WAS PLANTED, IRRIGATION SYSTEMS WERE INSTALLED AND THE DRAINAGE AND UTILITY SYSTEMS WERE COMPLETED.

   THESE RECORD DRAWINGS REPRESENT A COMPILATION OF RECORD DRAWINGS AND INFORMATION FROM THOSE SEVEN CONTRACTS.

2. THE CALIFORNIA COORDINATE SYSTEM, ZONE III, HAS BEEN USED AS THE BASIS OF GRID COORDINATES SHOWN ON THESE PLANS. FOR CLARITY, THE FOLLOWING CONVERSION WAS USED FOR THE PROJECT COORDINATES:

   CALIFORNIA COORDINATE: N 402500 = PROJECT COORDINATE: N 2500
   CALIFORNIA COORDINATE: E 1463500 = PROJECT COORDINATE: E 3500

3. BASIS OF BEARINGS: HORIZONTAL CONTROL IS BASED ON THE SECTION CORNER MONUMENT AT APPROXIMATELY STATION 126+98, 36' LT, (CITY OF BURLINGAME PLANS AIRPORT BOULEVARD REHABILITATION PHASE 1, DATED 8/21/91), N 2929.94, E 3887.38 AND A MONUMENT AT APPROXIMATELY STATION 109+93, 49 LT. (CITY OF BURLINGAME PLANS AIRPORT BOULEVARD REHABILITATION PHASE 1, DATED 8/21/91), N 2982.04, E 2175.40.

   ELEVATIONS ARE BASED ON USC & GS 1929 ADJUSTED MEAN SEA LEVEL DATUM, WHICH IS ALSO CITY OF BURLINGAME DATUM. THE PROJECT BENCHMARK IS A SQUARE CUT IN THE SOUTHWEST CORNER OF THE WALL OF AERATION TANK D AT THE BURLINGAME WASTEWATER TREATMENT PLANT. THE ELEVATION OF THE SQUARE WAS DETERMINED WITH THE USE OF BURLINGAME BENCHMARK 300, (BURLINGAME PLANS AIRPORT BOULEVARD REHABILITATION PHASE 1, DATED 8/21/91) PRIOR TO BENCHMARK 300'S DESTRUCTION. SQUARE CUT ELEVATION: 21.45

4. EXISTING TOPOGRAPHY:

   THE TOPOGRAPHY WITHIN THE LANDFILL AREAS WAS AS RECORDED AT THE TIME OF POST-CLOSURE DEVELOPMENT CONSTRUCTION. TOPOGRAPHY OF SURROUNDING AREAS WERE DEVELOPED BASED ON SURVEY DATA PROVIDED BY: 1) GEO CAD SURVEYS, INC. PREPARED FEBRUARY 24, 1994 AND 2) SANDIS, HUMBER, JONES ON AUGUST 07, 1998 (ARIAL SURVEY).

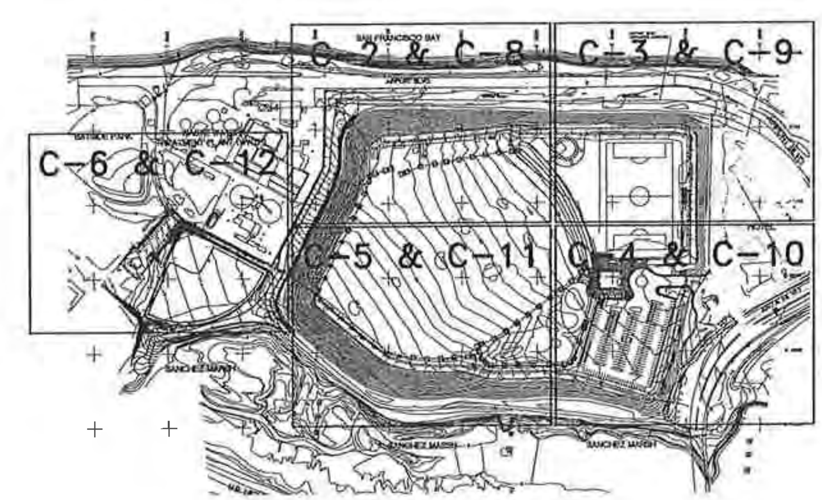
LEGEND:

D / C-4 / C-7	DETAIL OR SECTION NUMBER SHEET NUMBER WHERE DETAIL OR SECTION CAN BE FOUND SHEET NUMBER WHERE DETAIL OR SECTION IS CUT
1.0%	SLOPE INDICATOR
	POWER TRANSMISSION LINE SUPPORT FOOTING
	DRIVING RANGE FENCE POLE FOOTING
	FENCES
	MANHOLE
POW	ELECTRICAL POLE
	VALVE
	CATCH BASIN
	LANDFILL GAS SYSTEM VALVE BOX
SD	STORM DRAIN PIPE
SB	SUB-DRAIN PIPE
	SUB-DRAIN PIPE, SLOTTED
	LFG HORIZONTAL COLLECTOR WELLS
W	POTABLE WATER
FM	SANITARY SEWER FORCE MAIN
RW	RECLAIMED WATER
	LANDFILL GAS SYSTEM PIPING
	LEACHATE CONTAINMENT BARRIER
	BCDC BOUNDARY/ PROTECTION AREA
	LIMITS OF CAP TYPE
	LIMITS OF CLOSED LANDFILL AREA
	LIMITS OF SUB AREAS WITHIN CAP
	GEOTEXTILE FABRIC
	HDPE GEOMEMBRANE
	GCL
	AGGREGATE BASE
	GRASS
	INFIELD MIX
	CONCRETE
	ASPHALT PAVEMENT
	DECOMPOSED GRANITE
	CLAY
	FOUNDATION LAYER
	REFUSE
	SELECT FILL (MISCELLANEOUS FILL WITH PLANTING MIX)
	MISCELLANEOUS FILL
	DRAINAGE GRAVEL
	INTERMEDIATE FILL
	TOPSOIL

ABBREVIATIONS:

AC	ASPHALT CONCRETE
ACP	AC PIPE
BC	BEGINNING OF CURVE
BCDC	BAY CONSERVATION AND DEVELOPMENT COMMISSION
CB	CATCH BASIN
CMP	CORREGATED METAL PIPE
CO	CLEANOUT
CT	CONDENSATE TRAP (LFG)
CPLG	COUPLING
DG	DECOMPOSED GRANITE
DI	DROP INLET
EC	END OF CURVE
EF	EACH FACE
EW	EACH WAY
EWEF	EACH WAY – EACH FACE
FM	FORCE MAIN
GCL	GEOSYNTHETIC CLAY LINER
HC	HORIZONTAL COLLECTOR (LFG)
HDPE	HIGH-DENSITY POLYETHYLENE
H.P.	HIGH POINT
IE	INVERT ELEVATION
LFG	LANDFILL GAS
LT	LEFT
MH	MANHOLE
N/D	NOT DETERMINED
O.C.	ON CENTER
P5	LFG MONITORING POINT 5
PVC	POLYVINYL CHLORIDE
RN	DRIVING RANGE NETTING
RW	RECLAIMED WATER
SD	STORM DRAIN
SS	STAINLESS STEEL
SB	SUBDRAIN
T.O.	TOP OF
U.O.N.	UNLESS OTHERWISE NOTED
US,	MONITORING WELLS
W	WATER
W7	LFG WELL 7

KEY MAP:



NOTE:

C-2 THROUGH C-6	CAP MATERIALS
C-8 THROUGH C-12	UTILITIES

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

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WARNING
0 ½ 1
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DESIGNED	BML
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PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

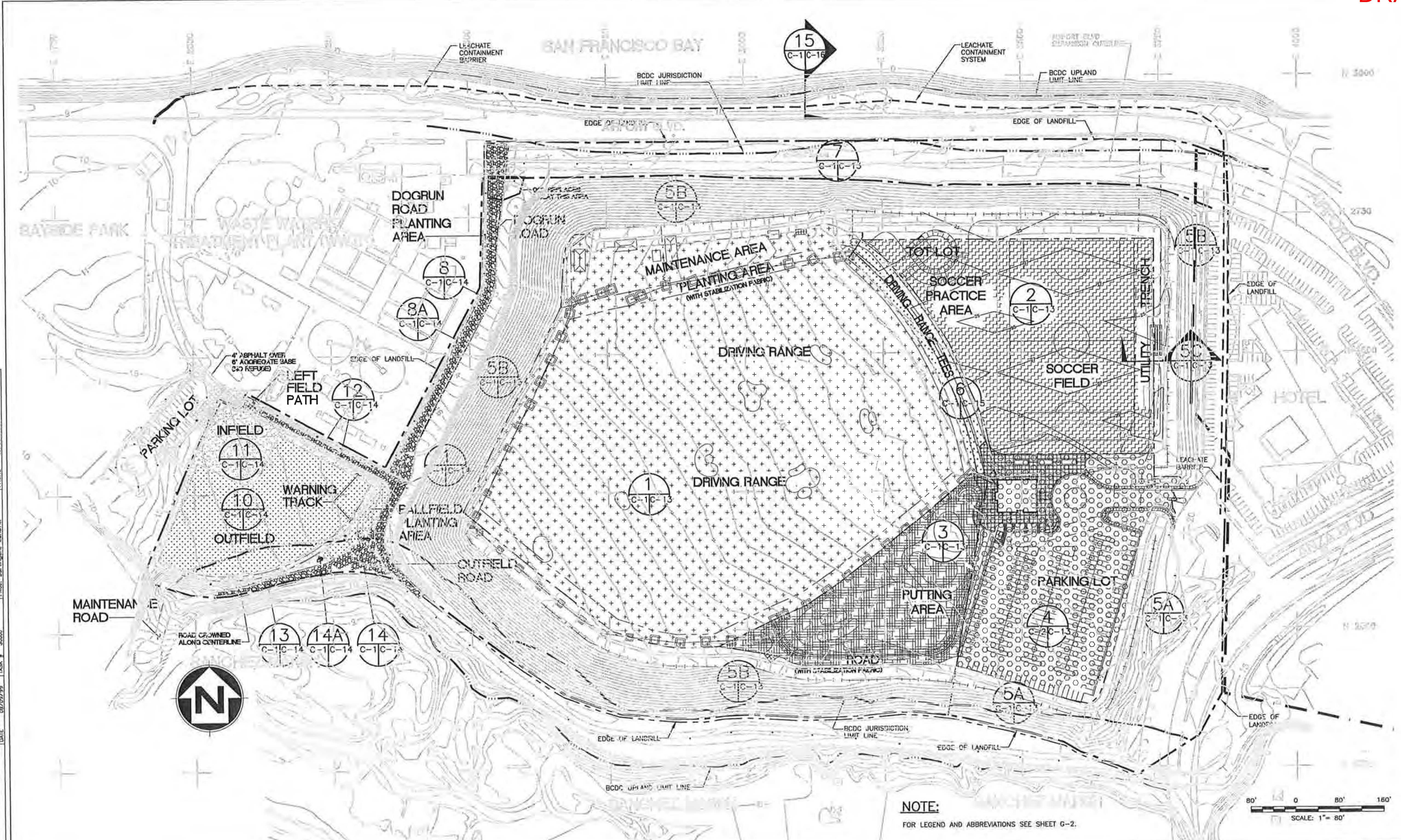
LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

GENERAL NOTES, LEGEND, ABBREVIATIONS AND KEY MAP

REVISION 0
PROJECT 26811590
DRAWING G-2
SHEET 2 OF 21

FILE #		OPER.	BML	PROJ. #	26811590	LOC.	Oakland	SEND TO	
SCALE	1:1	DATE	08/09/99	TASK #	30000	PROJ.	Burlingame Landfill	PHONE	510.893.3600

DRAFT



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CHECKED SKS
PEER REVIEWED HJB
PROJECT MANAGER LJL
DATE 12/05/03

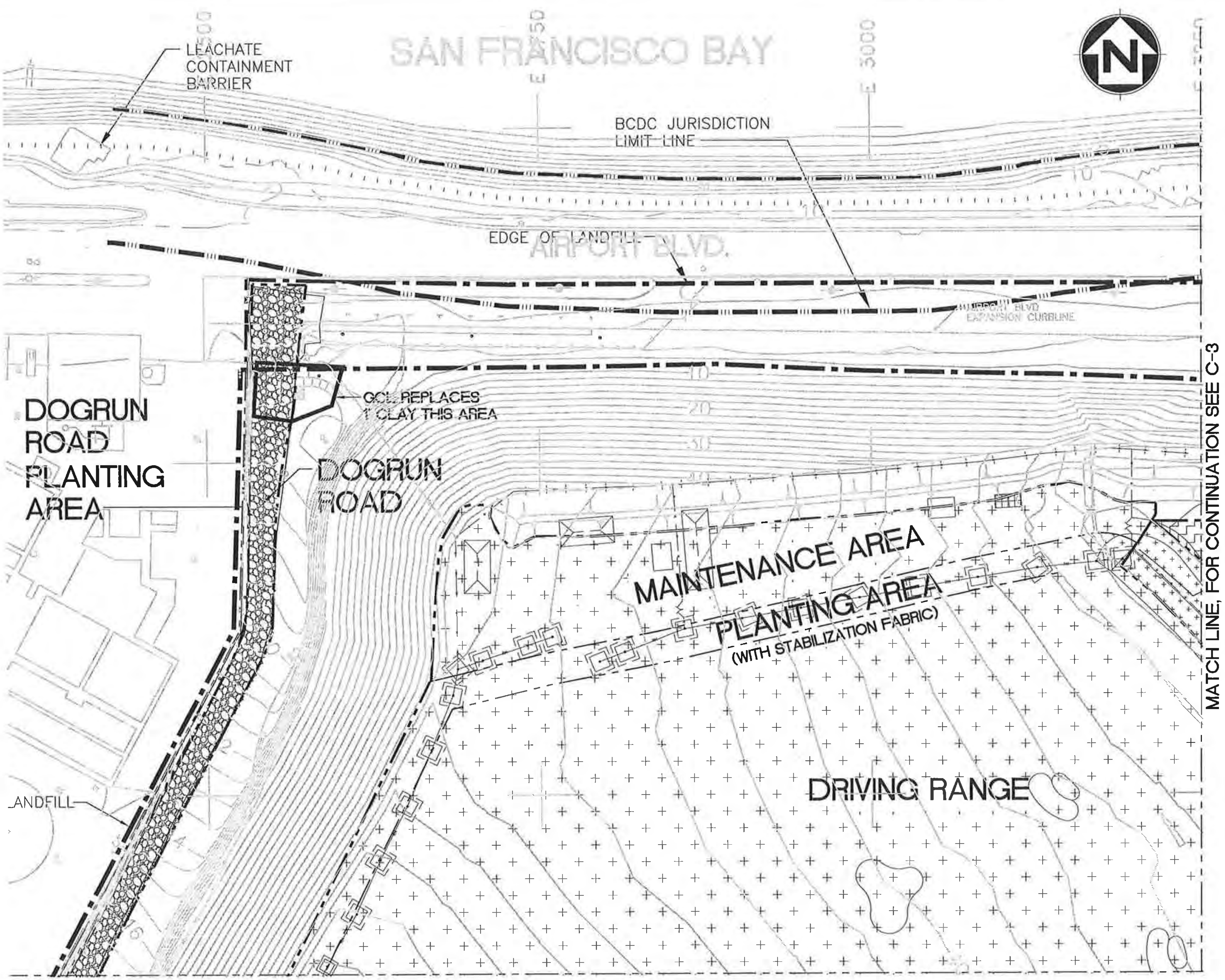
LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP EXTENT PLAN
ENTIRE LANDFILL

REVISION 0
PROJECT 26811590
DRAWING C-1
SHEET 3 OF 21

OPER. BML | DATE 08/09/99 | PROJ. # 26811590 | TASK # 30000 | LOC. Oakland | PROJ. Burlingame Landfill | SEND TO | PHONE 510.893.3600 | FILE # | SCALE 1:1

DRAFT



NOTE:

FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

40' 0 40' 80'

SCALE: 1"= 40'

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
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DESIGNED	BML
DRAWN	BML
CHECKED	SKS
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP EXTENT PLAN
SHEET 1 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-2
SHEET 4 OF 21

FILE # 14 | SCALE | OPER. BML | DATE 08/09/99 | PROJ. # 26811590 | TASK # 30000 | LOC. Oakland | PROJ. Burlingame Landfill | SEND TO | PHONE 510.893.3600

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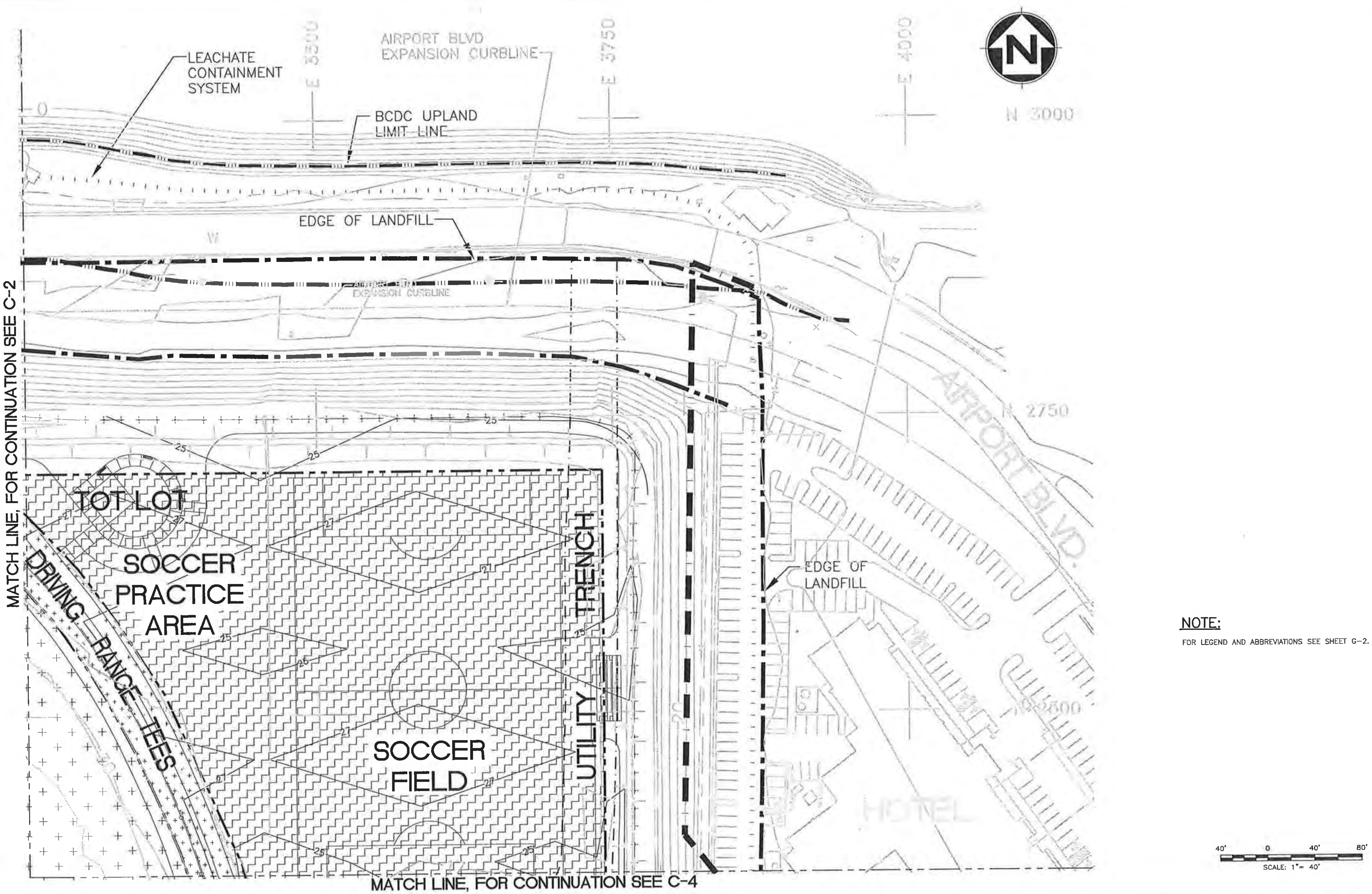

NOTE:

FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
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DRAWN	BML
CHECKED	SKS
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP EXTENT PLAN
SHEET 2 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-3
SHEET 5 OF 21

SEND TO / PHONE 510.893.3600
LOC. Oakland / PROJ. Burlingame Landfill
PROJ. # 26811590 / TASK # 3000
OPER. BML / DATE 08/09/99
FILE # / SCALE 1:1

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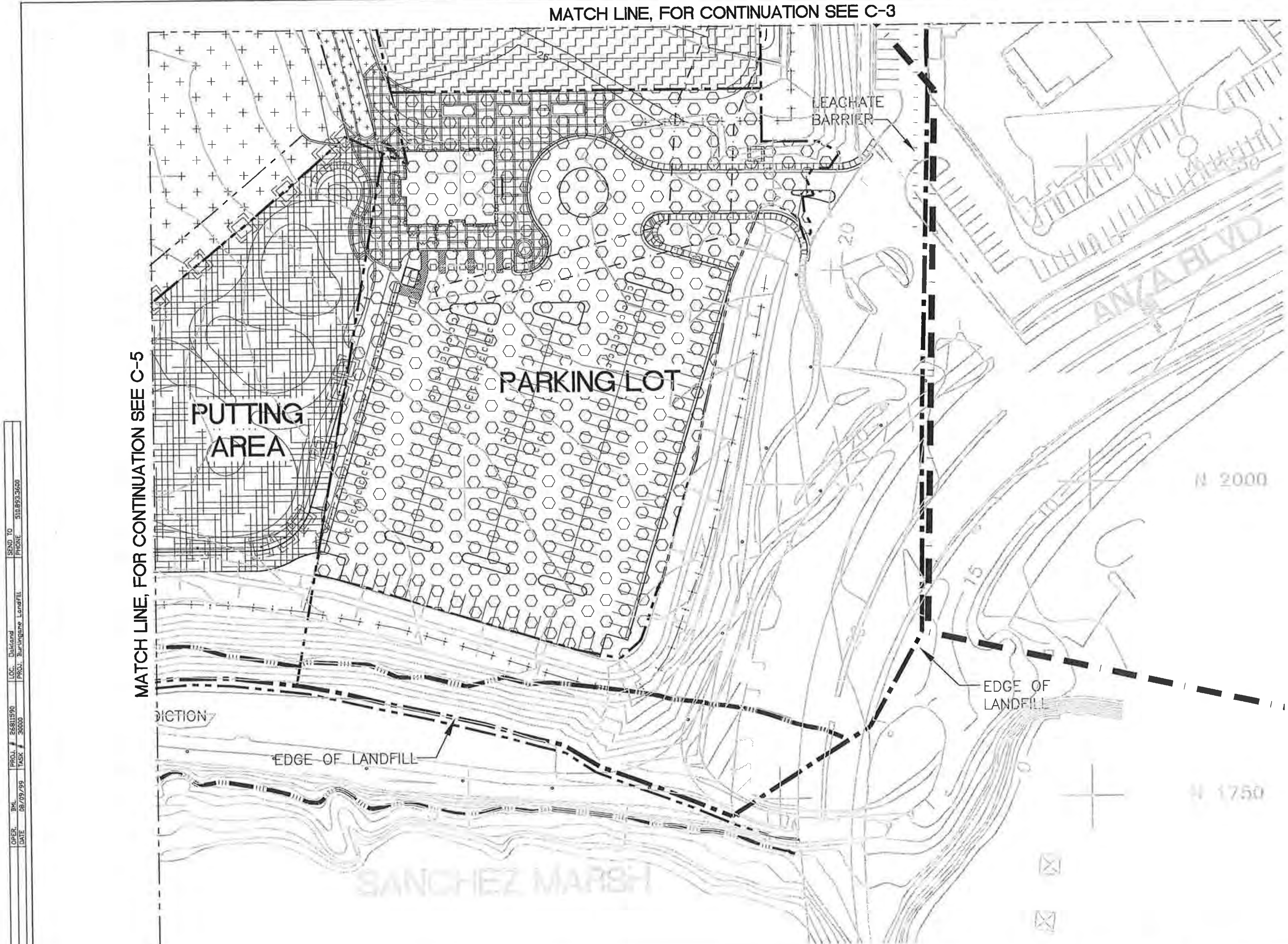

NOTE:

FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

40' 0 40' 80'

SCALE: 1"= 40'

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
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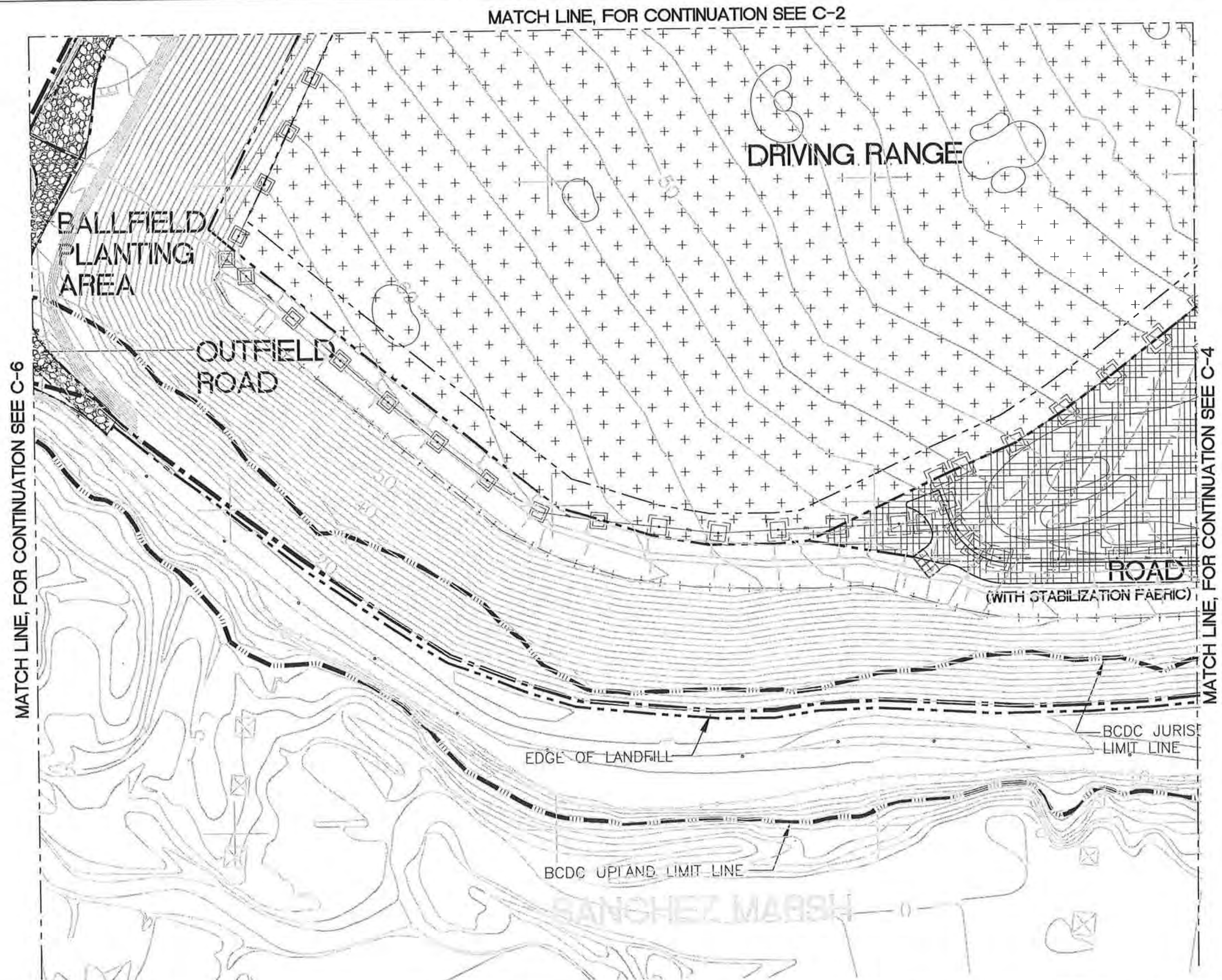
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP EXTENT PLAN
SHEET 3 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-4
SHEET 6 OF 21

DRAFT



NOTE:

FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

40' 0 40' 80'

SCALE: 1"= 40'

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

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WARNING
0 1/2 1
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DESIGNED	BML
DRAWN	BML
CHECKED	SKS
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP EXTENT PLAN
SHEET 4 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-5
SHEET 7 OF 21

OPER. BML DATE 08/09/99 PROJ. # 26811590 TASK # 30000 LOC. Oakland PROJ. Burlingame Landfill SEND TO PHONE 510.893.3600 FILE # SCALE 1:1

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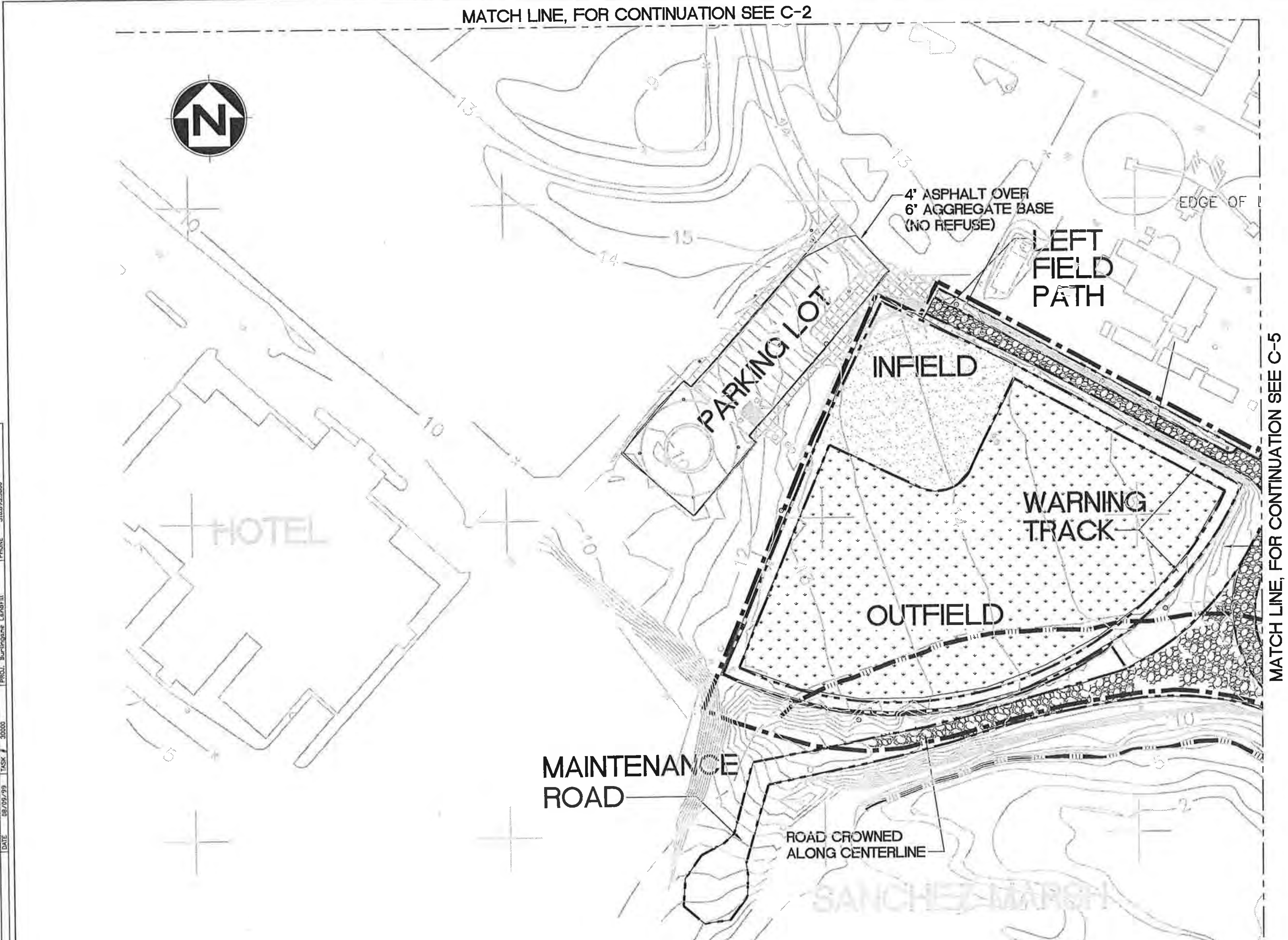

NOTE:

FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

40' 0 40' 80'

SCALE: 1"= 40'

OPER.	BML	PROJ. #	26811590	LOC.	Oakland	SEND TO	
DATE	08/09/99	TASK #	30000	PROJ.	Burlingame Landfill	PHONE	510.893.3600

FILE #

SCALE 1:1

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

The City of Burlingame

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BURLINGAME, CALIFORNIA 94010

URS

500 12th Street, Suite 200
Oakland, CA 94607–4014

Tel. (510) 893–3600
Fax: (510) 874–3268

WARNING

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED	BML
DRAWN	BML
CHECKED	SKS
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS

Burlingame, California

CAP EXTENT PLAN
SHEET 5 OF 5

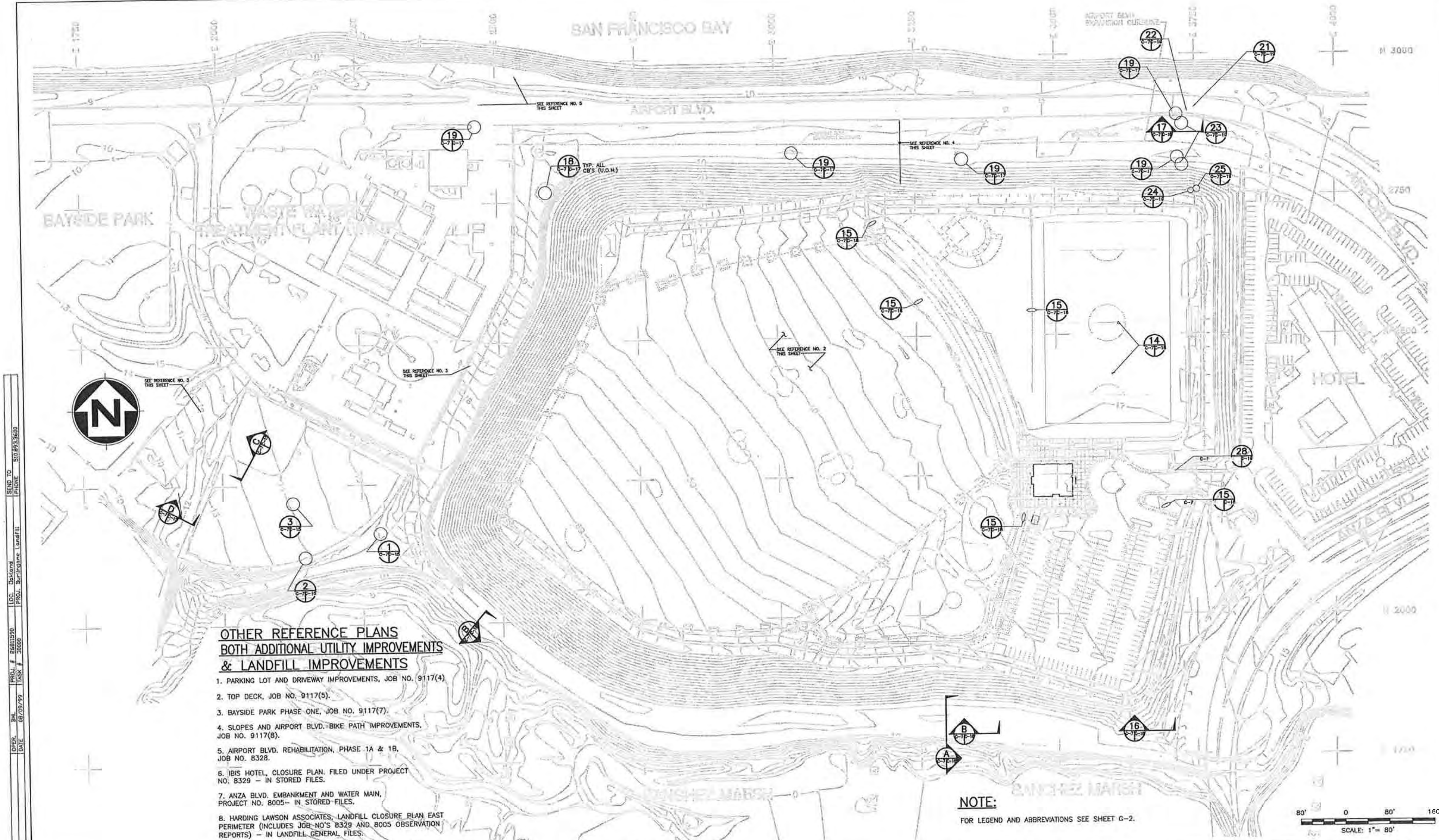
REVISION 0

PROJECT 26811590

DRAWING C-6

SHEET 8 OF 21

DRAFT



OTHER REFERENCE PLANS BOTH ADDITIONAL UTILITY IMPROVEMENTS & LANDFILL IMPROVEMENTS

1. PARKING LOT AND DRIVEWAY IMPROVEMENTS, JOB NO. 9117(4).
2. TOP DECK, JOB NO. 9117(5).
3. BAYSIDE PARK PHASE ONE, JOB NO. 9117(7).
4. SLOPES AND AIRPORT BLVD. BIKE PATH IMPROVEMENTS, JOB NO. 9117(8).
5. AIRPORT BLVD. REHABILITATION, PHASE 1A & 1B, JOB NO. 8328.
6. IBIS HOTEL, CLOSURE PLAN. FILED UNDER PROJECT NO. 8329 – IN STORED FILES.
7. ANZA BLVD. EMBANKMENT AND WATER MAIN, PROJECT NO. 8005– IN STORED FILES.
8. HARDING LAWSON ASSOCIATES, LANDFILL CLOSURE PLAN EAST PERIMETER (INCLUDES JOB NO'S 8329 AND 8005 OBSERVATION REPORTS) – IN LANDFILL GENERAL FILES.
9. SOCCER FIELD DRAINAGE ADDITIONS, JOB NO. 9117(1).

NOTE:
FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

80' 0 80' 160'
SCALE: 1"= 80'

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

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WARNING
0 1/2 1
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DESIGNED	BML
DRAWN	BML
CHECKED	SKS
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

UTILITIES EXTENT PLAN
ENTIRE LANDFILL

REVISION 0
PROJECT 26811590
DRAWING C-7
SHEET 9 OF 21

OPER. BML DATE 08/09/99 PROJ. # 26811590 TASK # 30000 LOC. Oakland PROJ. Burlingame Landfill SEND TO PHONE 510.893.3600 FILE # SCALE 1:1

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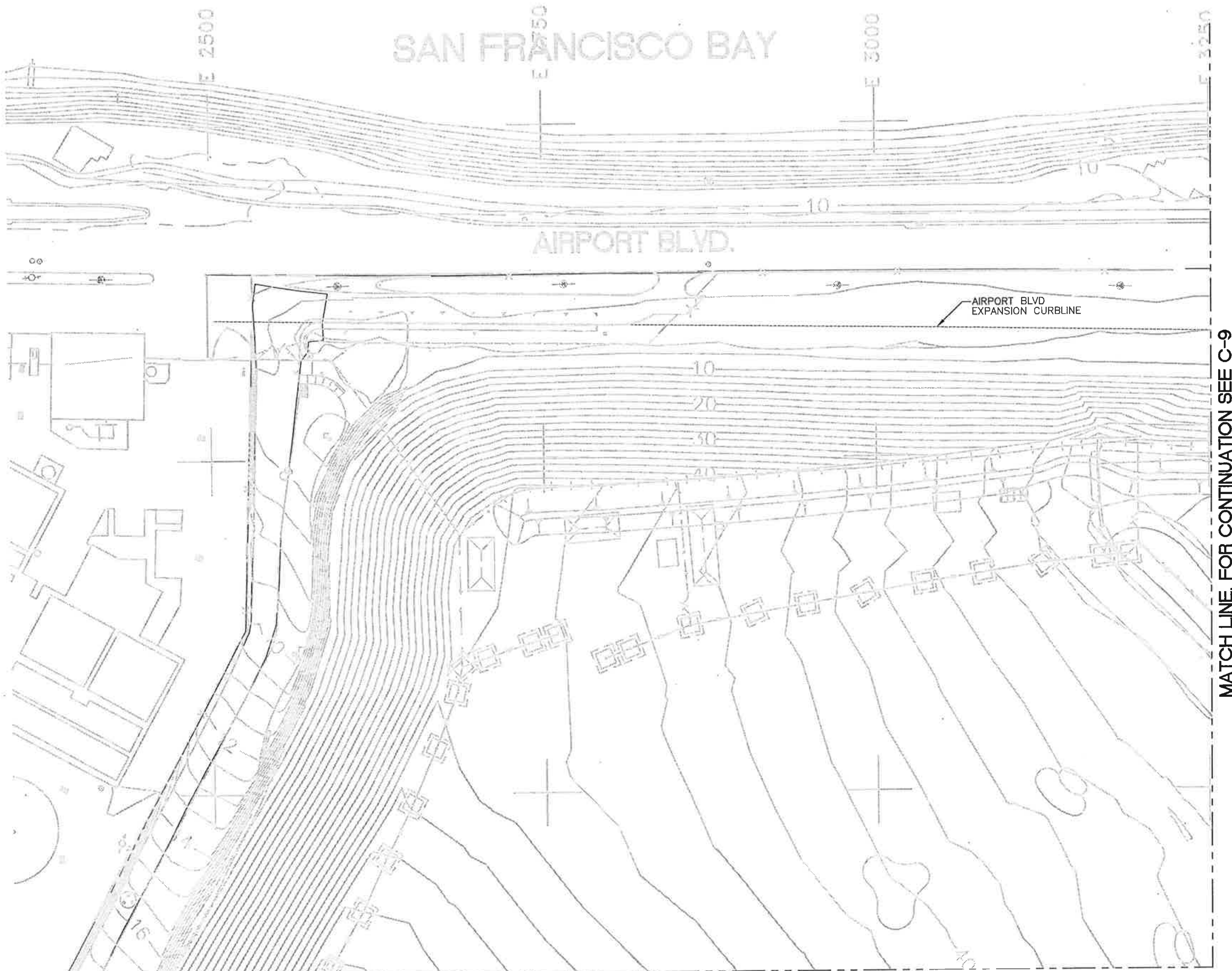


NOTE:
FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

40' 0 40' 80'
SCALE: 1"= 40'

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

The City of Burlingame
CITY HALL – 501 PRIMROSE ROAD BURLINGAME, CALIFORNIA 94010

URS
500 12th Street, Suite 200
Oakland, CA 94607–4014
Tel. (510) 893–3600
Fax: (510) 874–3268

WARNING
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED	BML
DRAWN	BML
CHECKED	SKS
PEER REVIEWED	HJB
PROJECT MANAGER	LJL
DATE	12/05/03

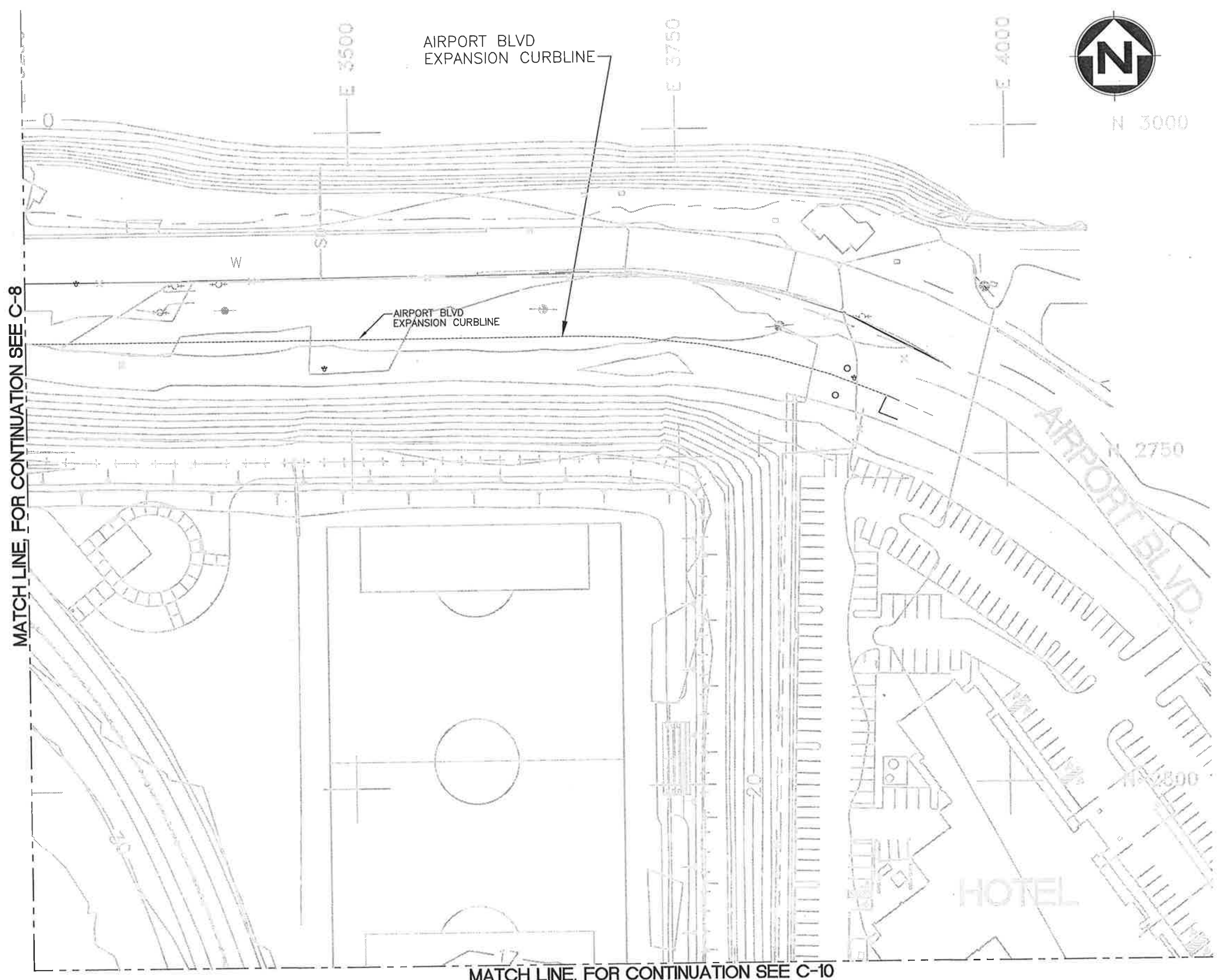
LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

UTILITY EXTENT PLAN
SHEET 1 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-8
SHEET 10 OF 21

FILE # SCALE 1:1 | OPER. BML DATE 08/09/99 | PROJ. # 26811590 TASK # 30000 | LOC. Oakland PROJ. Burlingame Landfill | SEND TO PHONE 510.893.3600

DRAFT



NOTE:

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40' 0 40' 80'

SCALE: 1"= 40'

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PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS

Burlingame, California

UTILITY EXTENT PLAN
SHEET 2 OF 5

REVISION 0

PROJECT 26811590

DRAWING C-9

SHEET 11 OF 21

MATCH LINE, FOR CONTINUATION SEE C-9

MATCH LINE, FOR CONTINUATION SEE C-11

NOTE:

FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.

40' 0 40' 80'

SCALE: 1"= 40'

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PEER REVIEWED HJB
PROJECT MANAGER LJL
DATE 12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS

Burlingame, California

UTILITY EXTENT PLAN
SHEET 3 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-10
SHEET 12 OF 21

FILE #
SCALE 14
OPER. BML
DATE 08/09/99
PROJ. # 26811590
TASK # 30000
LOC. Oakland
PROJ. Burlingame Landfill
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LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

UTILITY EXTENT PLAN
SHEET 4 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-11
SHEET 13 OF 21

FILE # | SCALE 1:1 | OPER. BML | DATE 08/09/99 | PROJ. # 26811590 | TASK # 30000 | LOC. Oakland | PROJ. Burlingame Landfill | SEND TO | PHONE 510.893.3600

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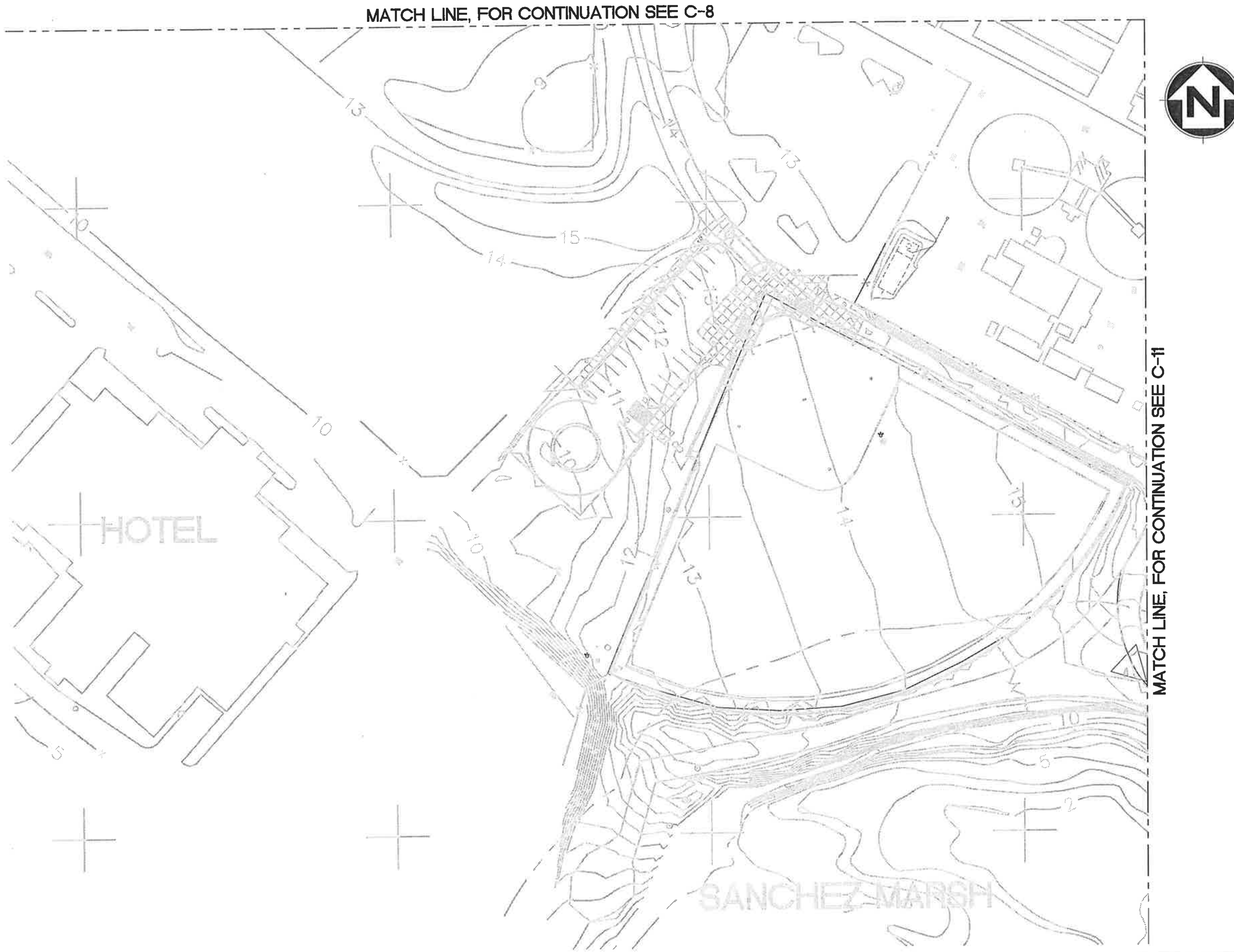

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LANDFILL CLOSURE – RECORD DRAWINGS

Burlingame, California

UTILITY EXTENT PLAN
SHEET 5 OF 5

REVISION 0

PROJECT 26811590

DRAWING C-12

SHEET 14 OF 21

FILE #	OPER. BML	PROJ. # 26811590	LOC. Oakland	SEND TO
SCALE 1:1	DATE 08/09/99	TASK # 30000	PROJ. Burlingame Landfill	PHONE 510.893.3600

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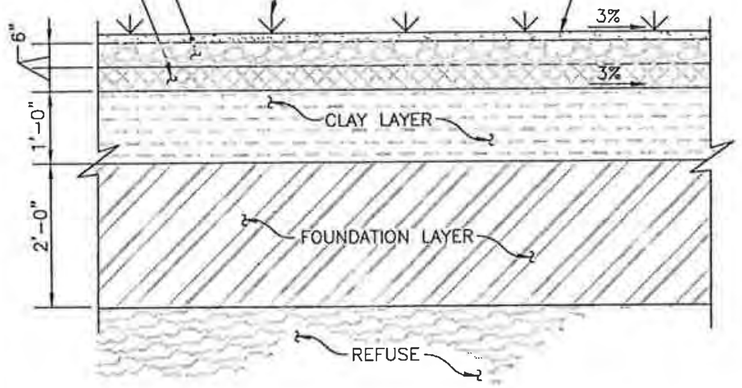
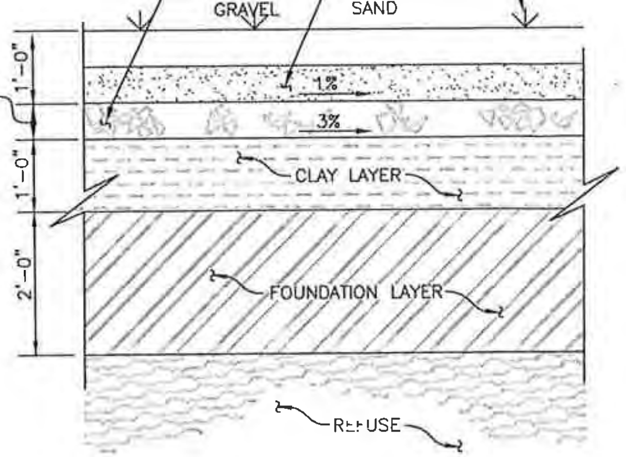


DRIVING RANGE, PLANTING AREA AND MAINTENANCE AREA

DETAIL 1 C-1 C-13

SCALE: NONE

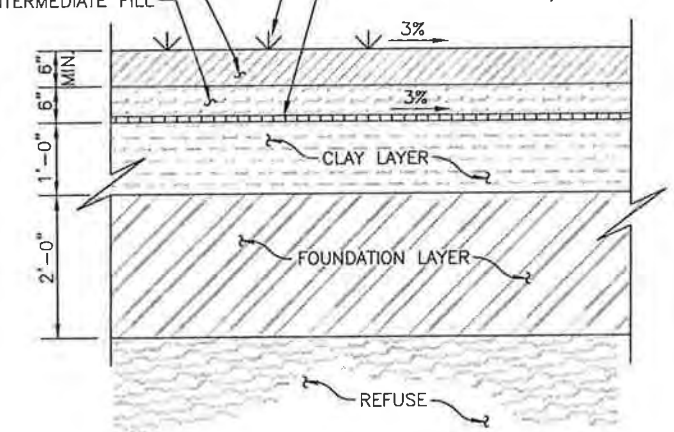
NOTE: MIRIFI 500X STABILIZATION FABRIC PLACED UNDER AGGREGATE BASE IN 24 FOOT PLANTING AREA STRIP INSIDE FENCE OF DRIVING RANGE



SOCCER FIELD AND SOCCER PRACTICE AREA

DETAIL 2 C-1 C-13

SCALE: NONE

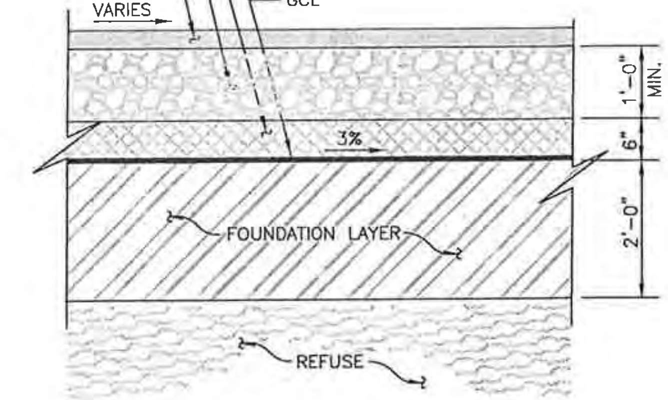


NOTE: ADDITIONAL FILL ADDED FOR PUTTING GREENS AND LANDSCAPE FEATURES

PUTTING AREA

DETAIL 3 C-1 C-13

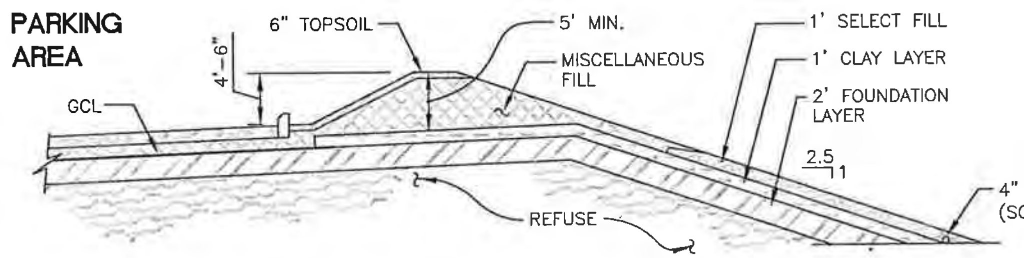
SCALE: NONE



BUILDING, SIDEWALK, ACCESS ROAD AND PARKING AREA

DETAIL 4 C-1 C-13

SCALE: NONE

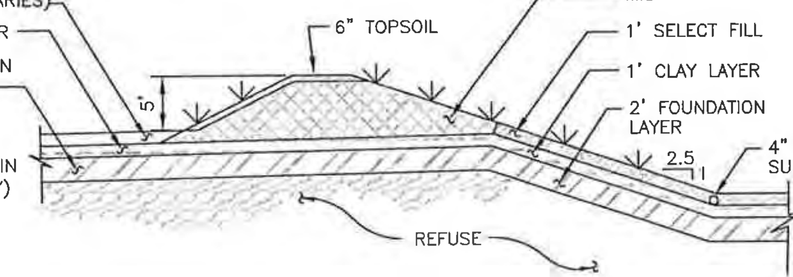


PARKING LOT BERM AND SLOPES

DETAIL 5A C-1 C-13

SCALE: NONE

NOTE: CLAY CONTINUES TO LIMIT OF LANDFILL ON EAST SIDE (SIMILAR TO DETAIL 5B)



OTHER BERMS AND SLOPES

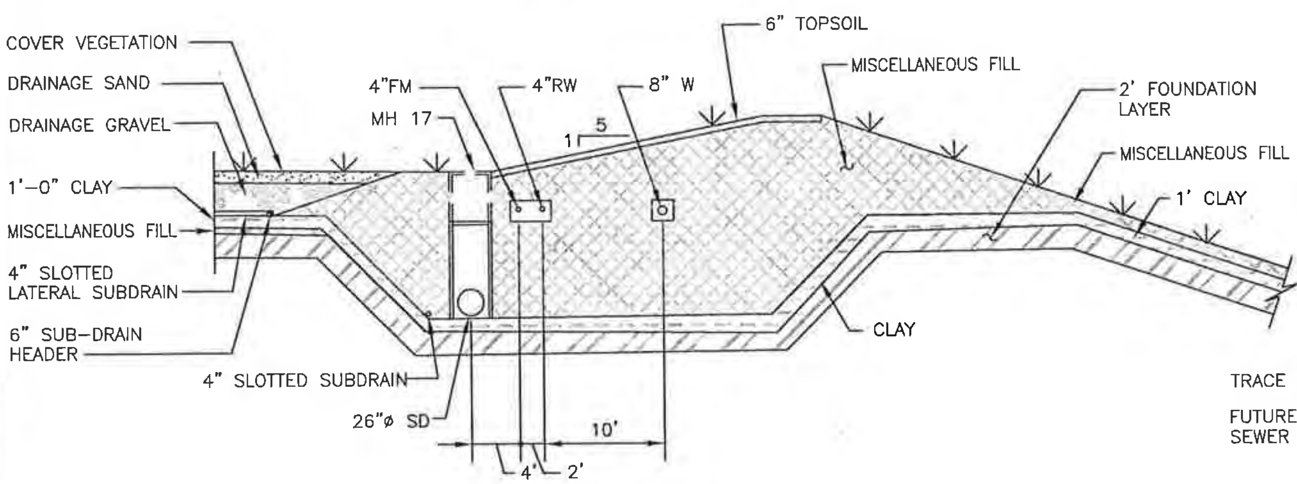
DETAIL 5B C-1 C-14

SCALE: NONE

NOTES:
1. NO BERM ON WEST SLOPE.
2. CLAY STOPS AT TOE OF SOUTH SLOPE (SIMILAR TO DETAIL 5A).
3. HDPE AT TOE OF NORTH SLOPE (SEE DETAIL 7).

NOTES:

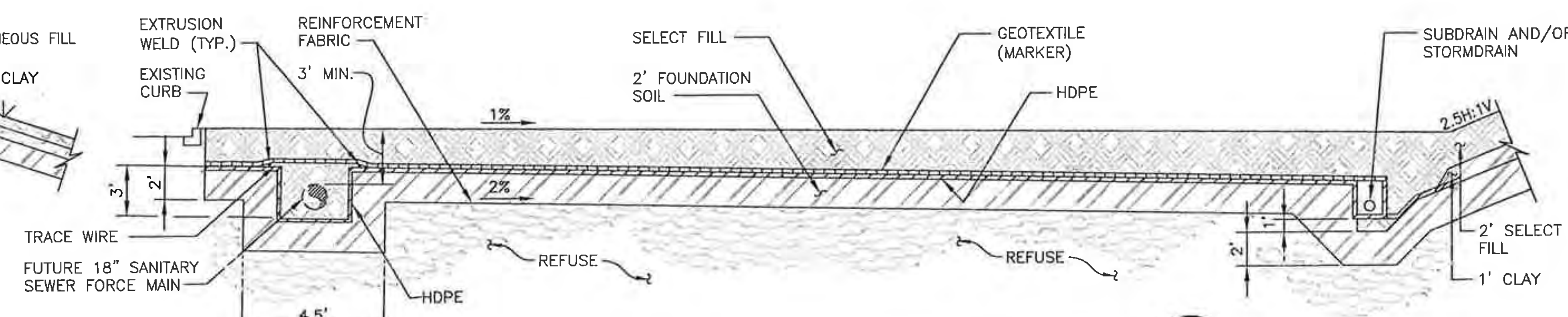
1. FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.
2. FOUNDATION LAYER IS COMPACTED MISC. FILL AND MAY CONTAIN REFUSE.



UTILITY TRENCH–EAST SLOPE SOCCER FIELD

SECTION 5C C-1 C-13

SCALE: NONE



TYPICAL AIRPORT BOULEVARD CAP SECTION 7 C-1 C-13

SCALE: NONE

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PROJECT MANAGER LJL
DATE 12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP DETAILS
SHEET 1 OF 2

REVISION 0
PROJECT 26811590
DRAWING C-13
SHEET 15 OF 21

OPER. BML DATE 08/09/99 PROJ. 26811590 TASK # 30000 LOC. Oakland PROJ. Burlingame Landfill SEND TO PHONE 510.893.3600 FILE # SCALE 1:1

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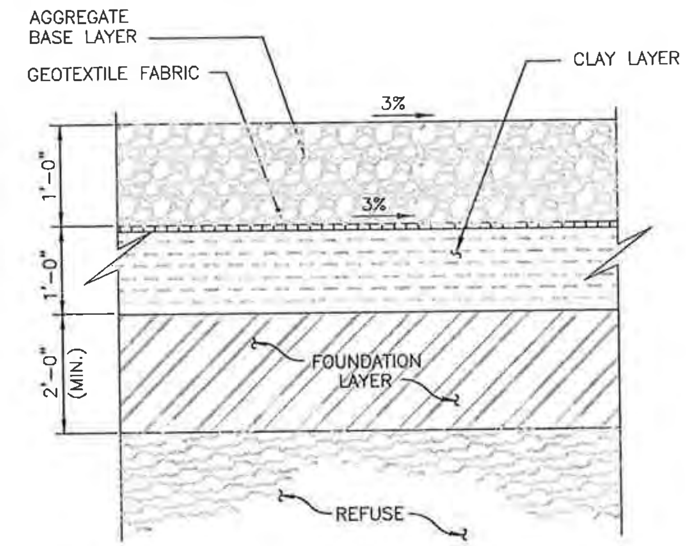
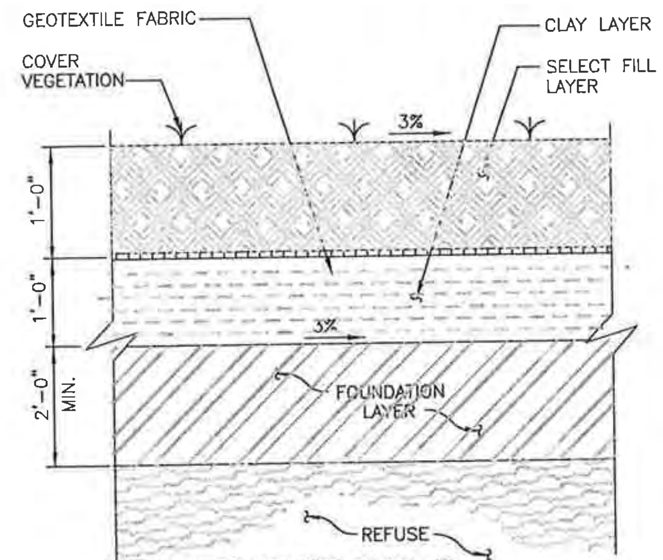


DOGRUN ROAD

DETAIL 8 C-2 C-14

SCALE: NONE

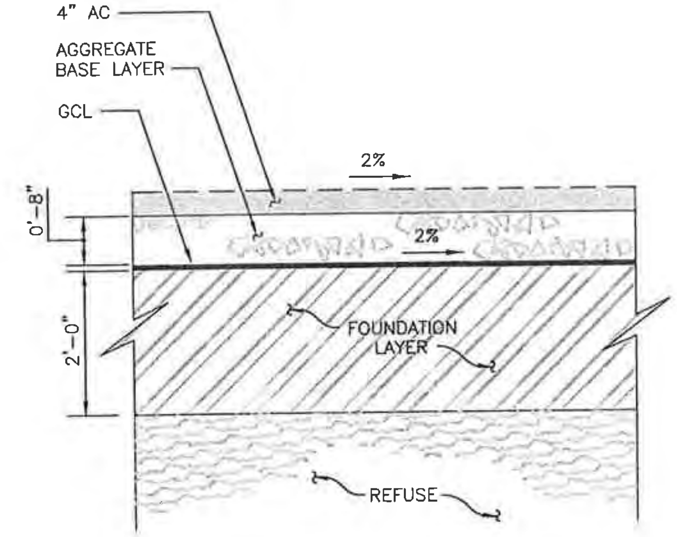


NOTE: 1' CLAY LAYER REPLACED BY GCL AT NORTH END. SEE DWG. C-2 FOR LOCATION

DOGRUN PLANTING AREA

DETAIL 8A C-2 C-14

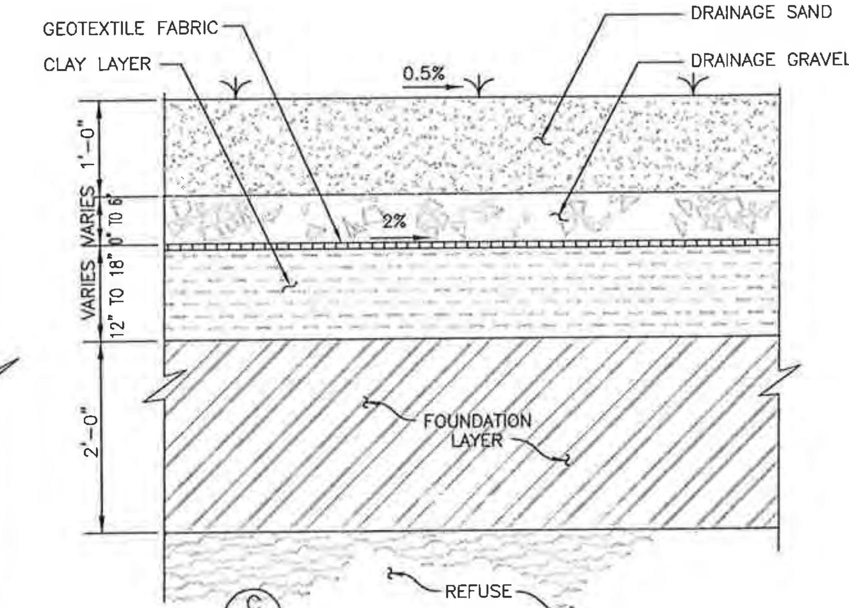
SCALE: NONE



OUTFIELD ROAD AND LEFT FIELD PATH

DETAIL 9 C-2 C-14

SCALE: NONE

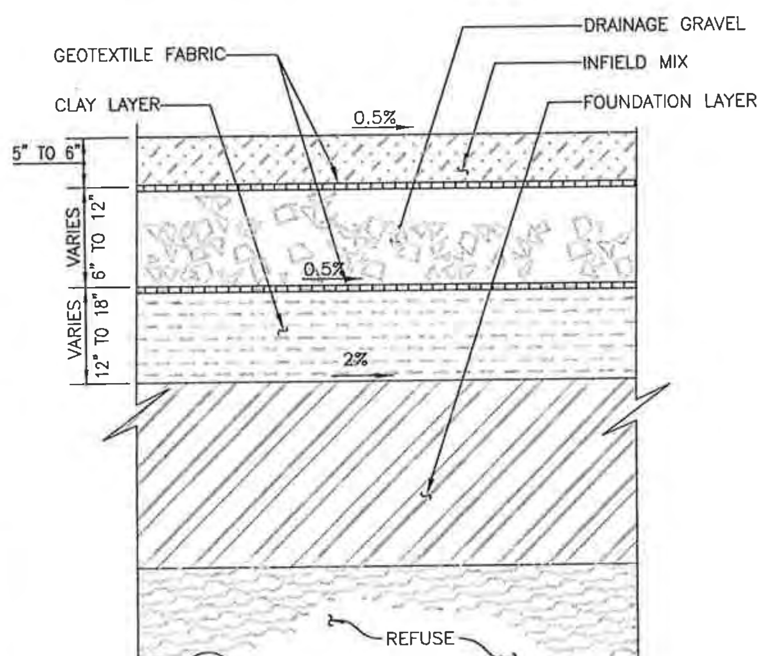


NOTE: SEE C C-12 C-15 FOR CLAY/DRAINAGE GRAVEL CONFIGURATION

OUTFIELD

DETAIL 10 C-2 C-14

SCALE: NONE

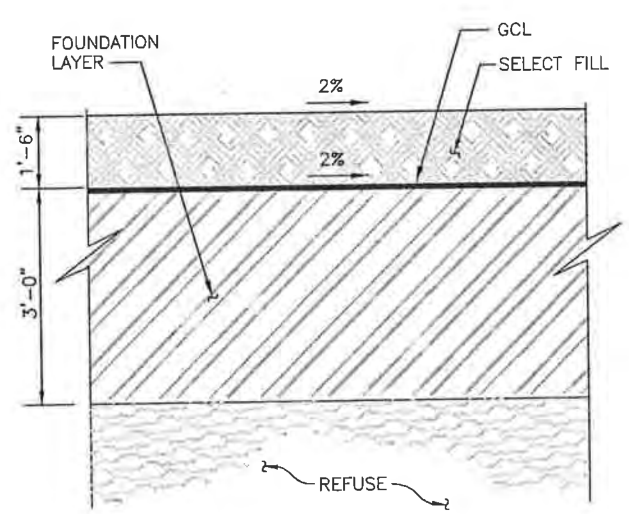


NOTE: SEE C C-12 C-15 FOR CLAY/DRAINAGE GRAVEL CONFIGURATION

INFIELD AND WARNING TRACK

DETAIL 11 C-2 C-14

SCALE: NONE

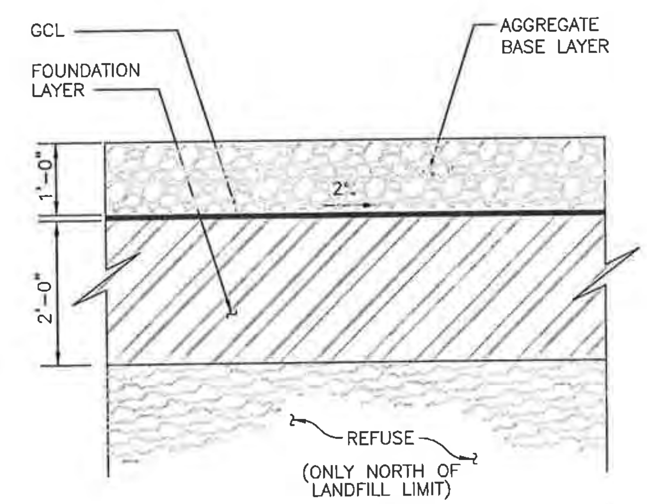


PLANTING AREA AT LEFT FIELD PATH

DETAIL 12 C-2 C-14

SCALE: NONE

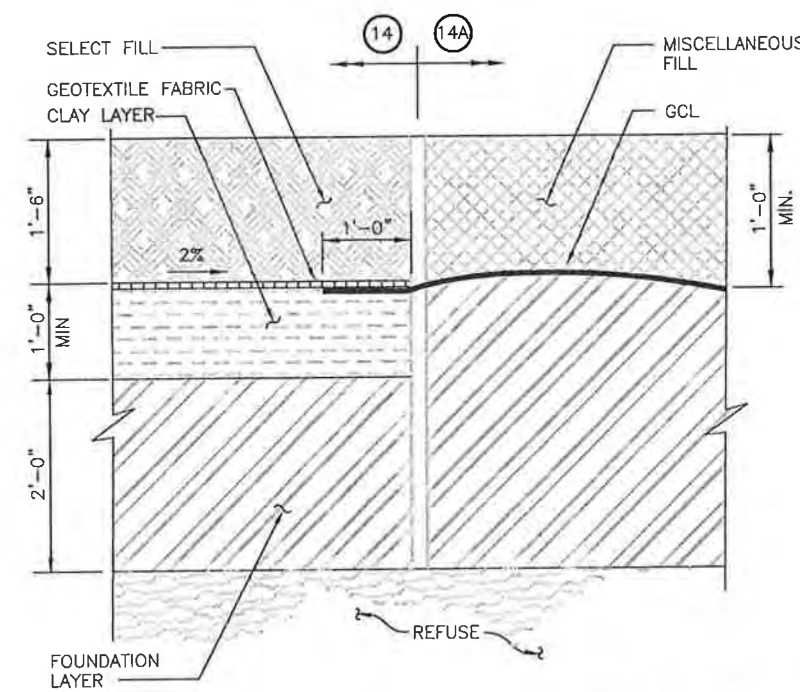
2%



MAINTENANCE ROAD

DETAIL 13 C-2 C-14

SCALE: NONE



BALLFIELD PLANTING AREA 14 C-2 C-14 14A C-2 C-14

SCALE: NONE

NOTES:

1. FOR LEGEND AND ABBREVIATIONS SEE SHEET G-2.
2. FOUNDATION LAYER IS COMPACTED MISC. FILL AND MAY CONTAIN REFUSE.

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
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WARNING
0 1/2 1
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DESIGNED	BML
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DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

CAP DETAILS
SHEET 2 OF 2

REVISION 0
PROJECT 26811590
DRAWING C-14
SHEET 16 OF 21

OPER. BML DATE 08/09/99 PROJ. # 26811590 TASK # 30000 LOC. Oakland PROJ. Burlingame Landfill SEND TO PHONE 510.893.3600 FILE # SCALE 1:1

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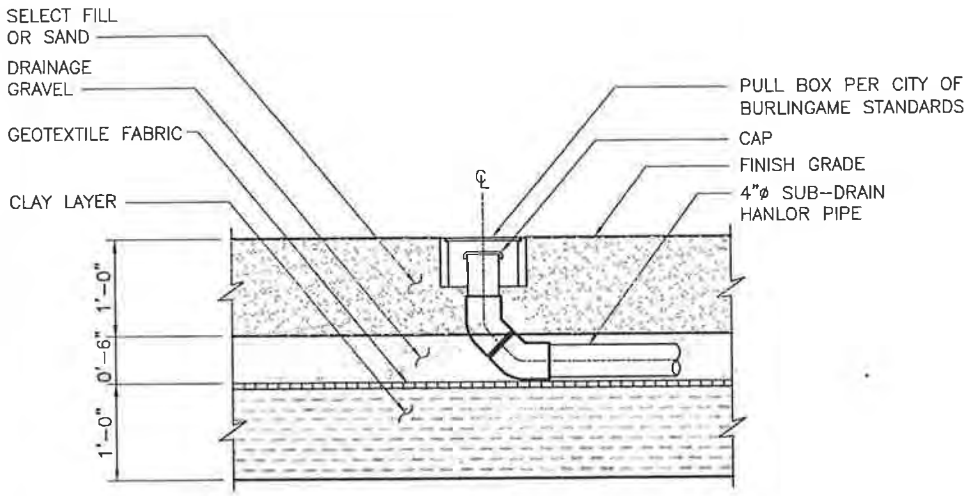
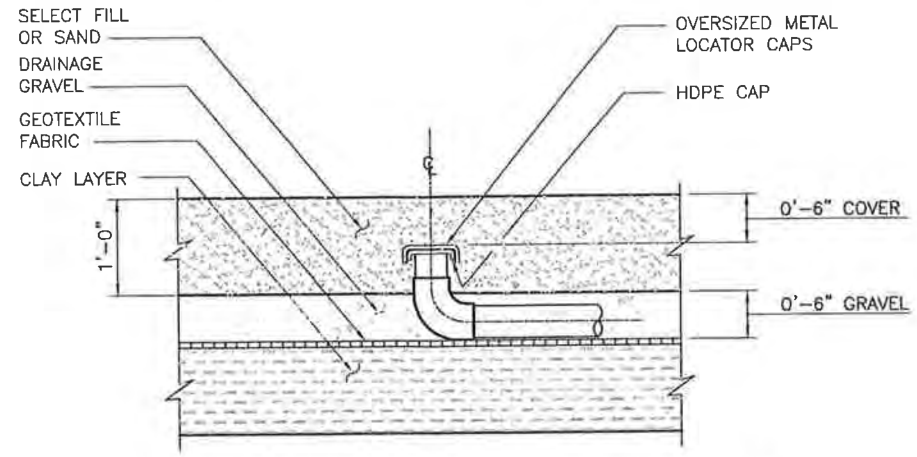


TYPE 1 CLEANOUT (AT GRADE) 1 C-7 C-15

SIMILAR TO TERMINAL RISER CALTRANS D87C

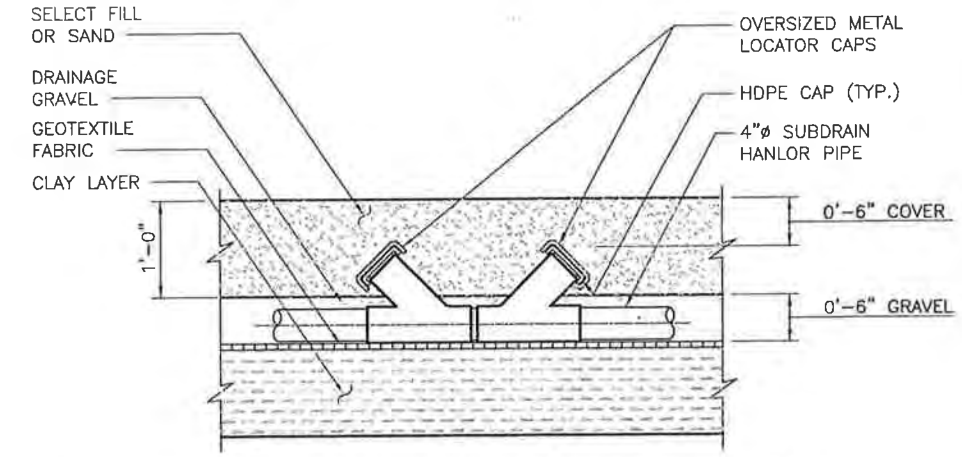
SCALE: 1" = 1'-0"



TYPE 2 CLEANOUT (BELOW GRADE) 2 C-7 C-15

SIMILAR TO TERMINAL RISER CALTRANS D87C

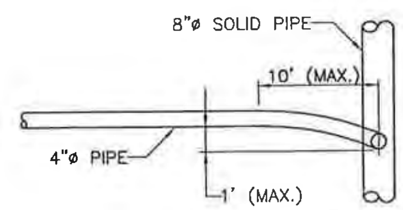
SCALE: 1" = 1'-0"



TYPE 3 CLEANOUT (BELOW GRADE) 3 C-7 C-15

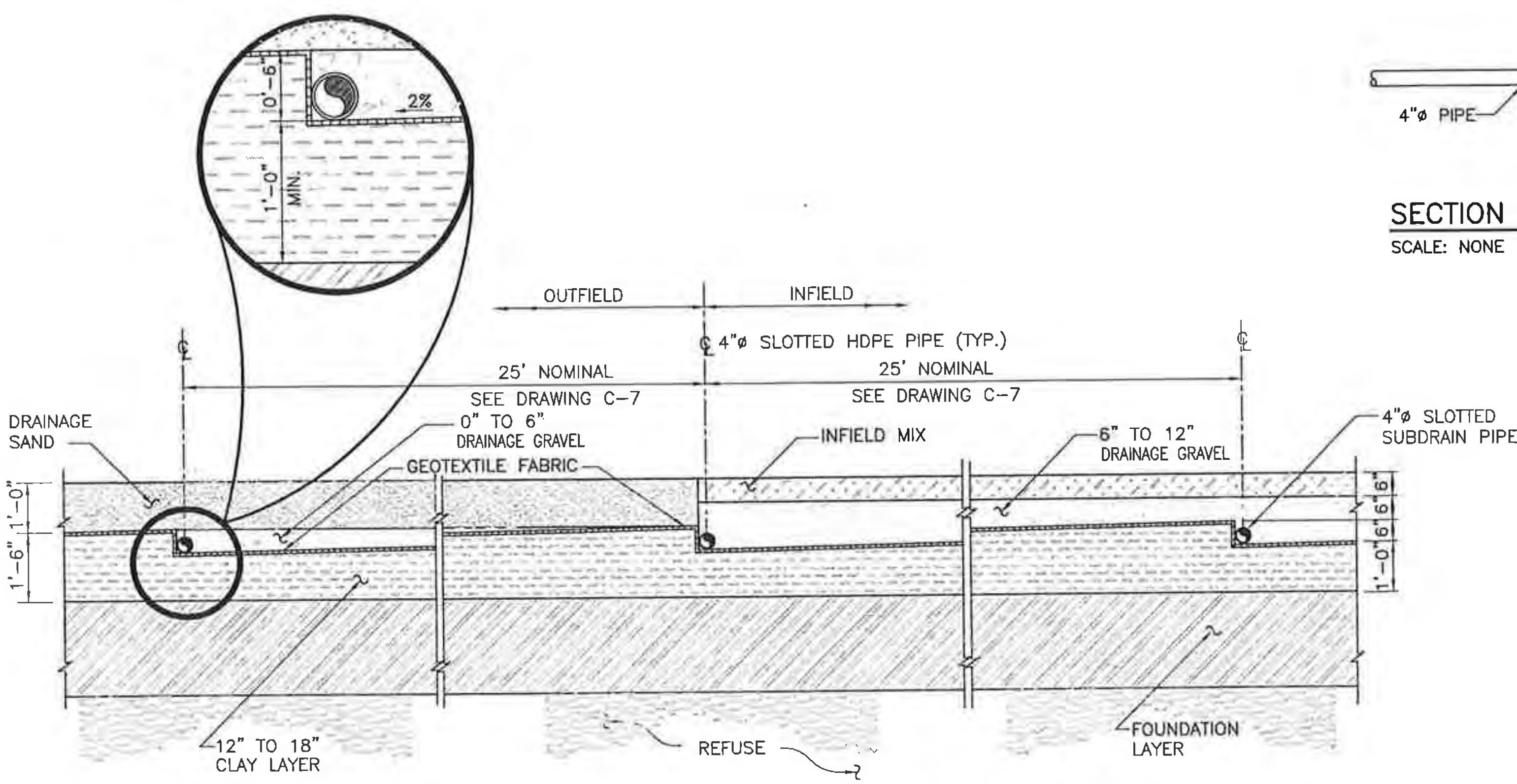
SIMILAR TO 45° UNDERDRAIN RISER CALTRANS D87C

SCALE: 1" = 1'-0"



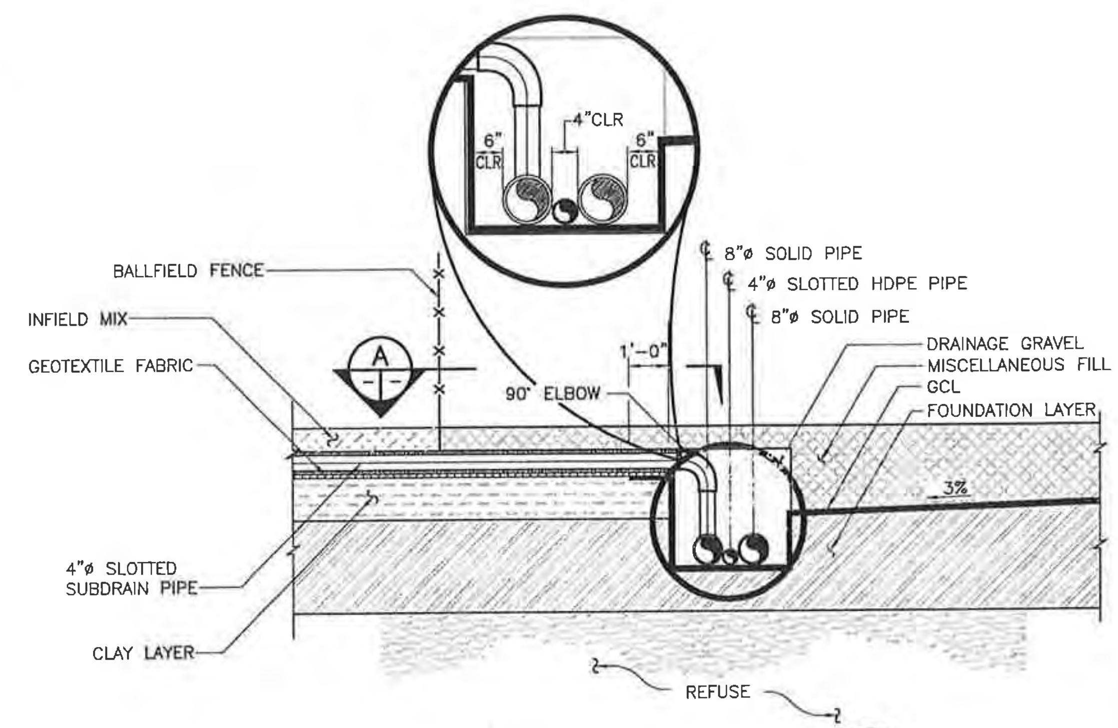
SECTION A

SCALE: NONE



SECTION C C-7 C-15

SCALE: NONE



SECTION D C-7 C-15

SCALE: NONE

NOTE:

REFER TO SPECIFICATION SECTION 02200 FOR TEST FILL REQUIREMENTS

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LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

MISCELLANEOUS DETAILS
SHEET 1 OF 3

REVISION 0
PROJECT 26811590
DRAWING C-15
SHEET 17 OF 21

SEND TO
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LOC. Oakland
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OPER. BML
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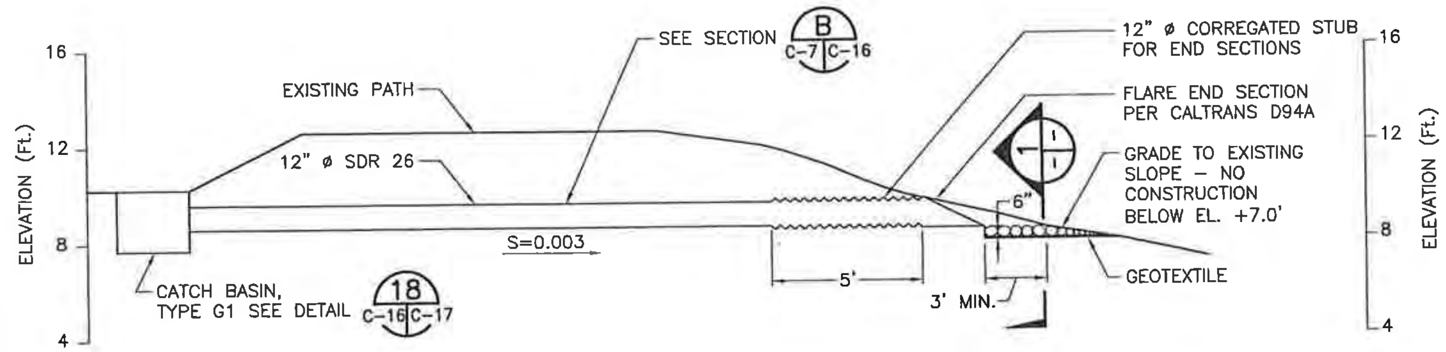
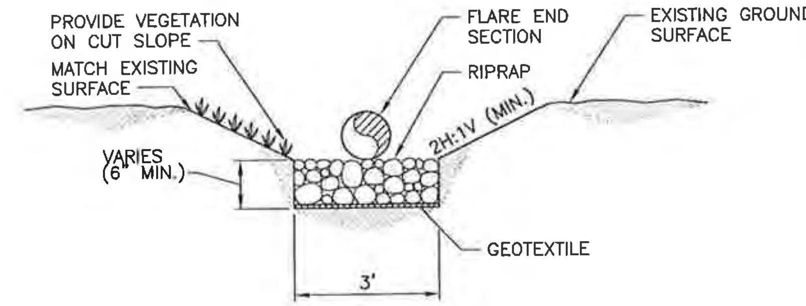


SECTION

SCALE: NONE

A
C-7 C-16



FLARED CULVERT DISCHARGE PROTECTION

SCALE: NONE

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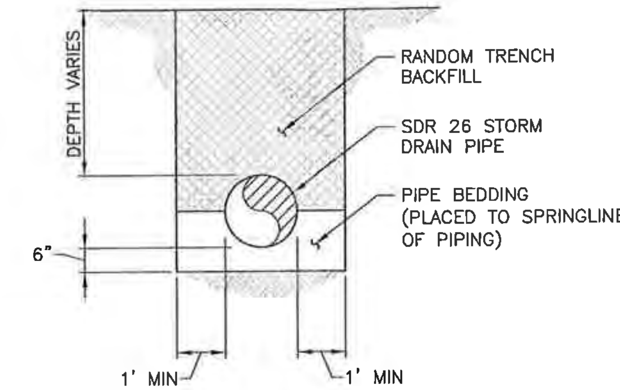
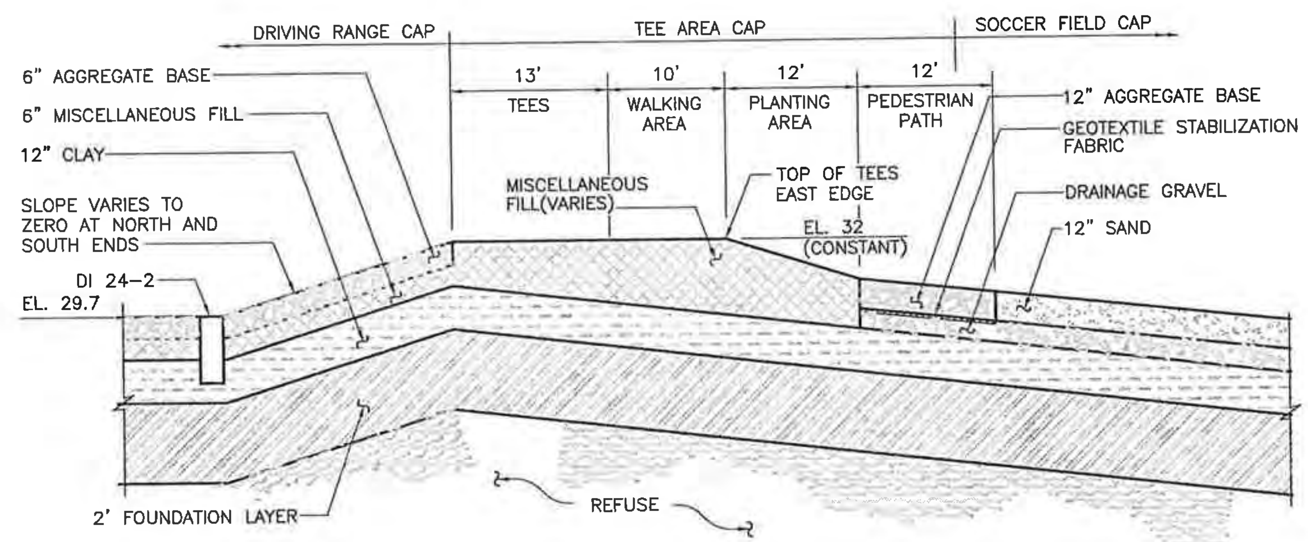


TYPICAL STORMDRAIN PIPE TRENCH

SCALE: NONE

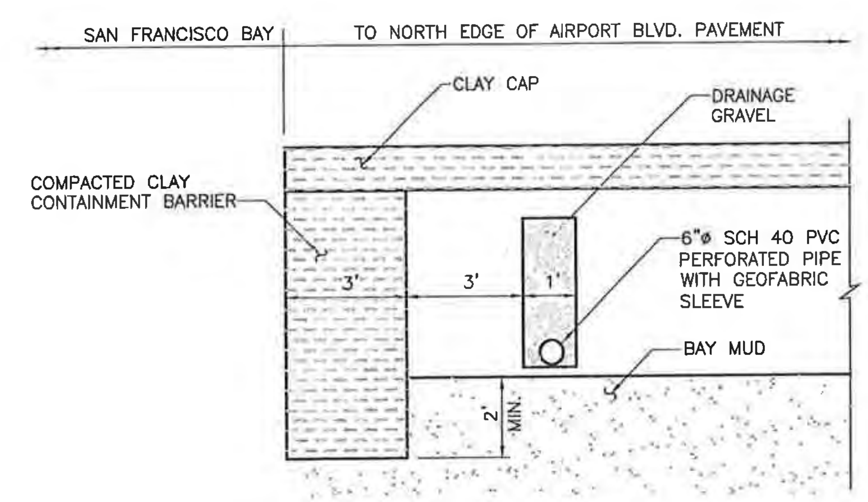
B
C-7 C-16



DRIVING RANGE TEES CAP

SCALE: NONE

6
C-1 C-16



LEACHATE CONTAINMENT BARRIER SYSTEM
(PER HLA CONTAINMENT BARRIER REPORT JUNE 1991)

SCALE: NONE

15
C-1 C-16

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DATE 12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

MISCELLANEOUS DETAILS
SHEET 2 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-16
SHEET 18 OF 21

SEND TO | PHONE 510.893.3600
LOC. Oakland | PROJ. Burlingame Landfill
PROJ. # 26811590 | TASK # 30000
OPER. BML | DATE 08/09/99
FILE # | SCALE 1:1

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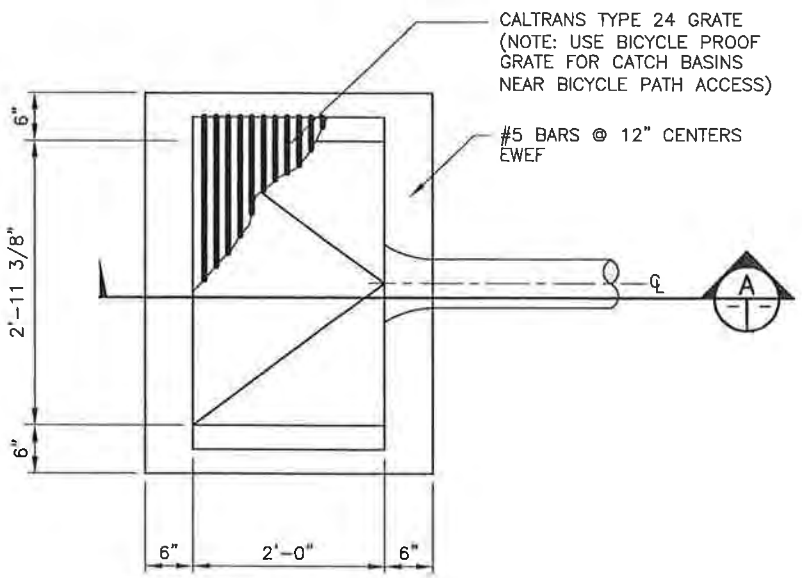
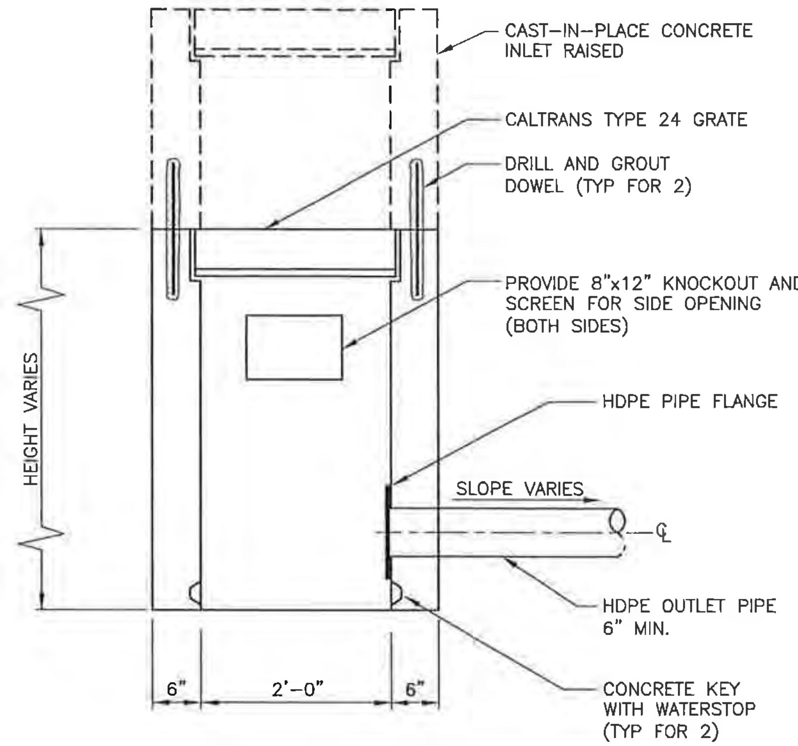


TYPICAL CATCH BASIN DETAIL – CALTRANS TYPE "G1"

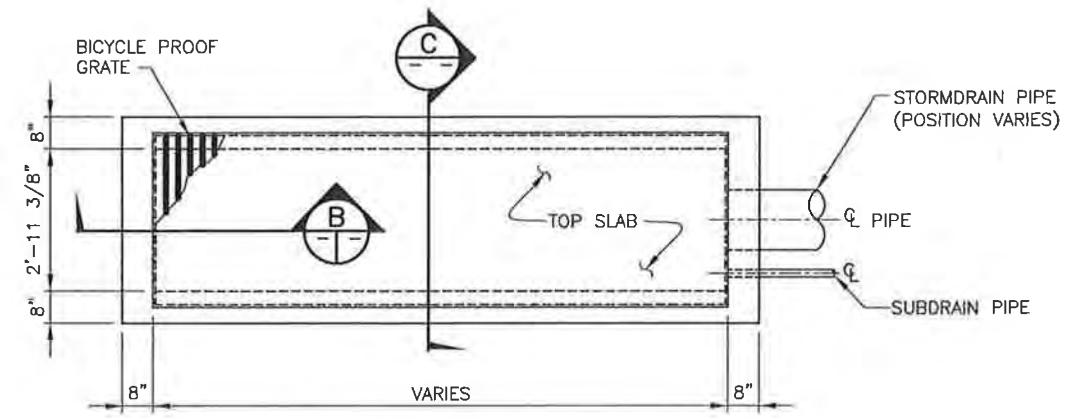
SCALE: NONE PLAN VIEW

18 C-7 C-17



SECTION A

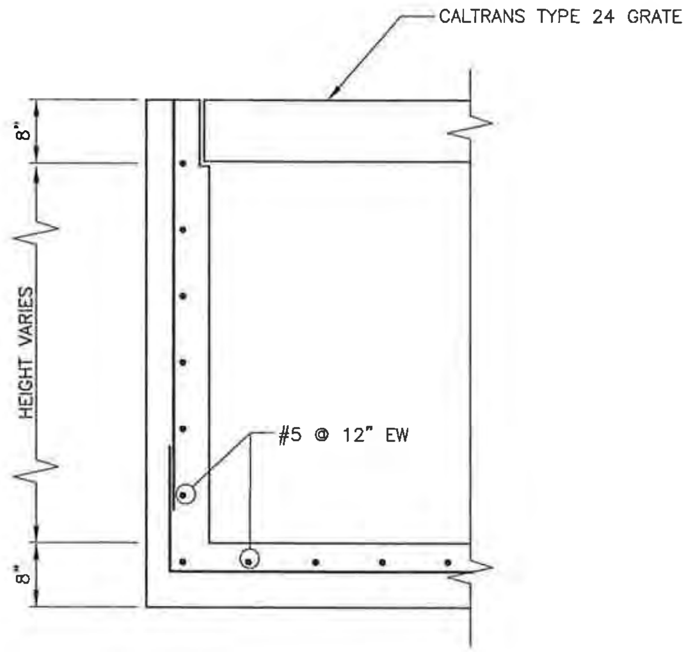
SCALE: NONE



TYPICAL OVERSIZE CATCH BASIN

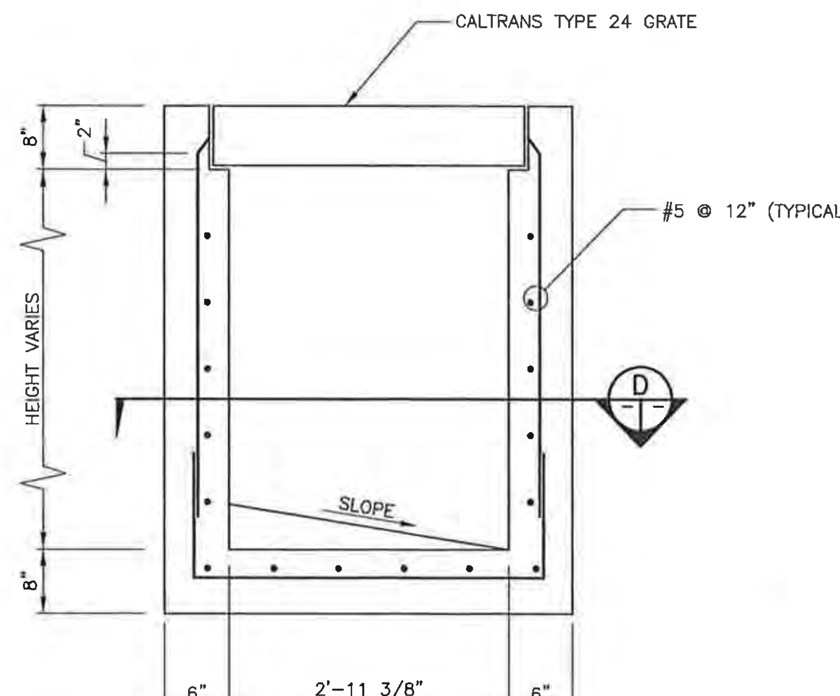
SCALE: NONE PLAN VIEW

19 C-7 C-17



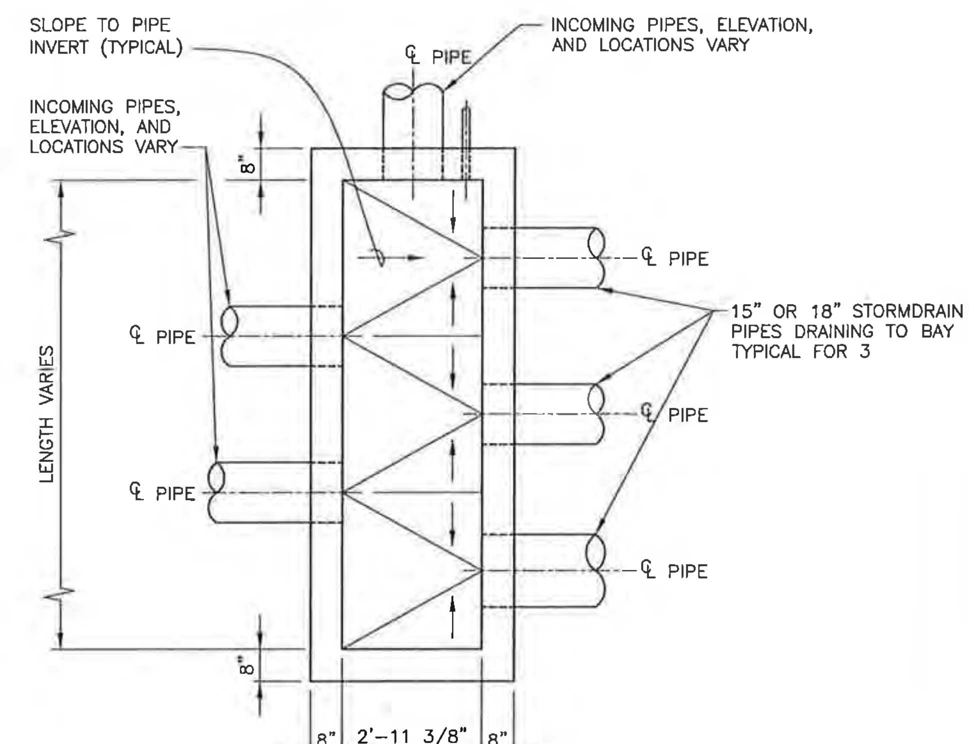
SECTION B

SCALE: NONE



SECTION C

SCALE: NONE



SECTION D

SCALE: NONE

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
0	ISSUED FOR RECORD	LJL/SKS	BML	12/05/03

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Oakland, CA 94607-4014
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Fax: (510) 874-3268

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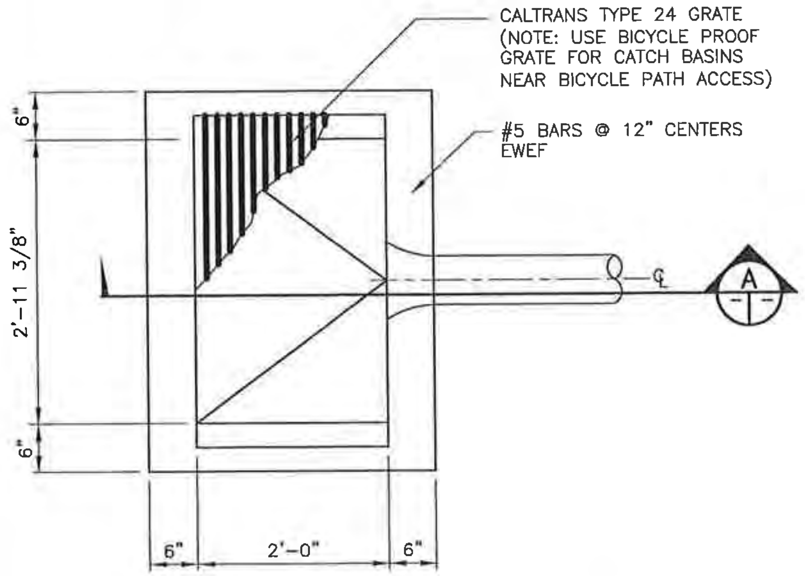
DRAWN BML
CHECKED SKS
PEER REVIEWED HJB
PROJECT MANAGER LJL
DATE 12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

MISCELLANEOUS DETAILS
SHEET 3 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-17
SHEET 19 OF 21

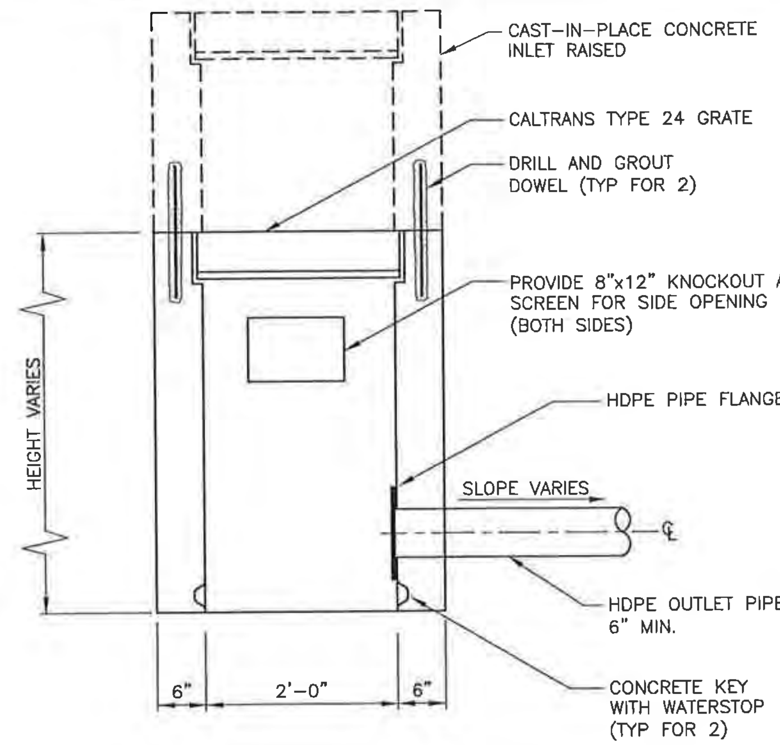
DRAFT



TYPICAL CATCH BASIN DETAIL – CALTRANS TYPE "G1"

SCALE: NONE PLAN VIEW

18 C-7 C-17



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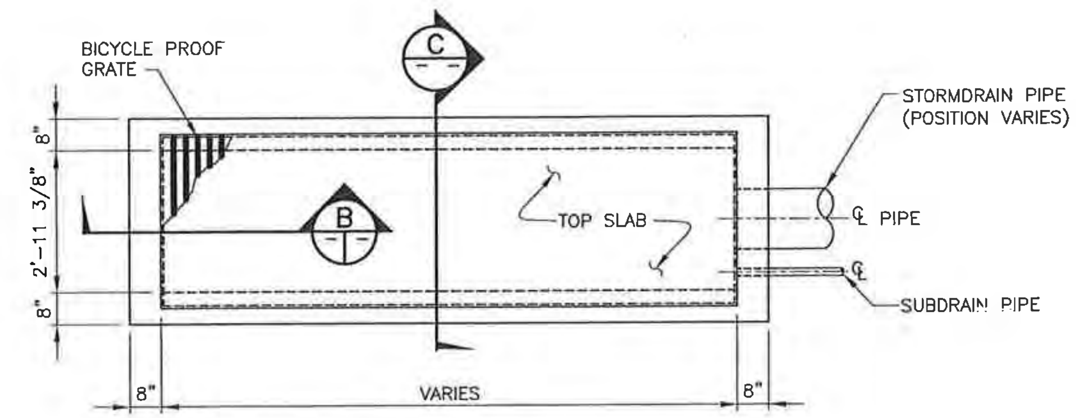
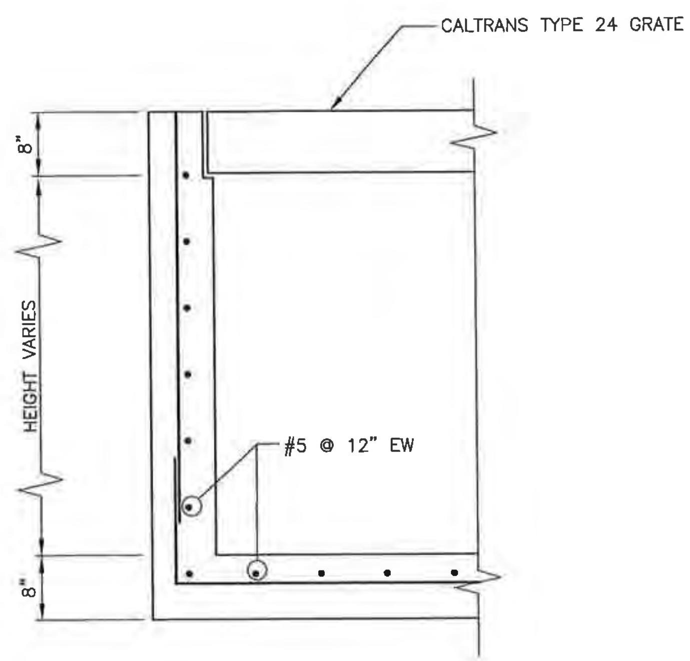


TYPICAL OVERSIZE CATCH BASIN

SCALE: NONE PLAN VIEW

19 C-7 C-17



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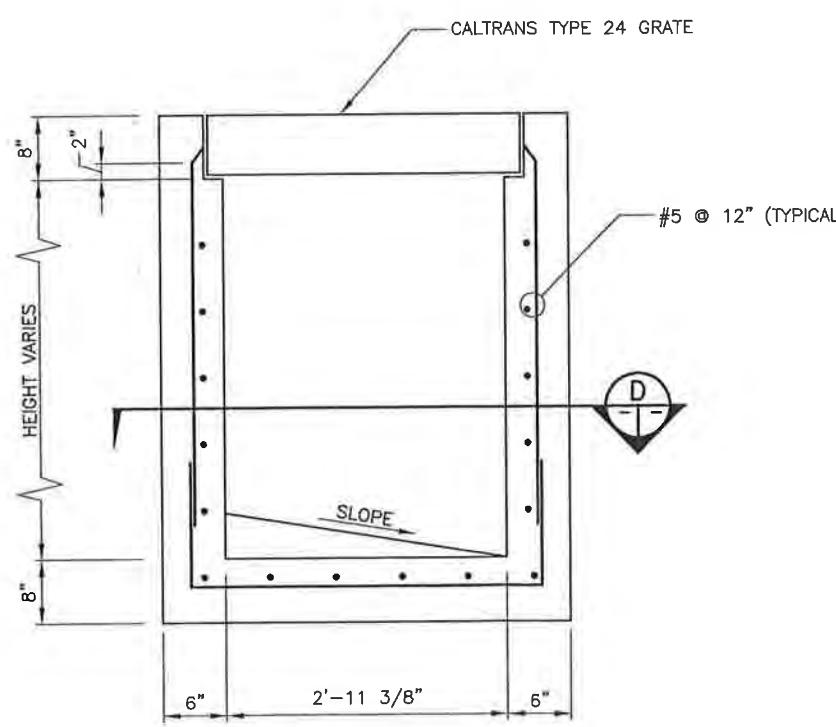
SCALE: NONE



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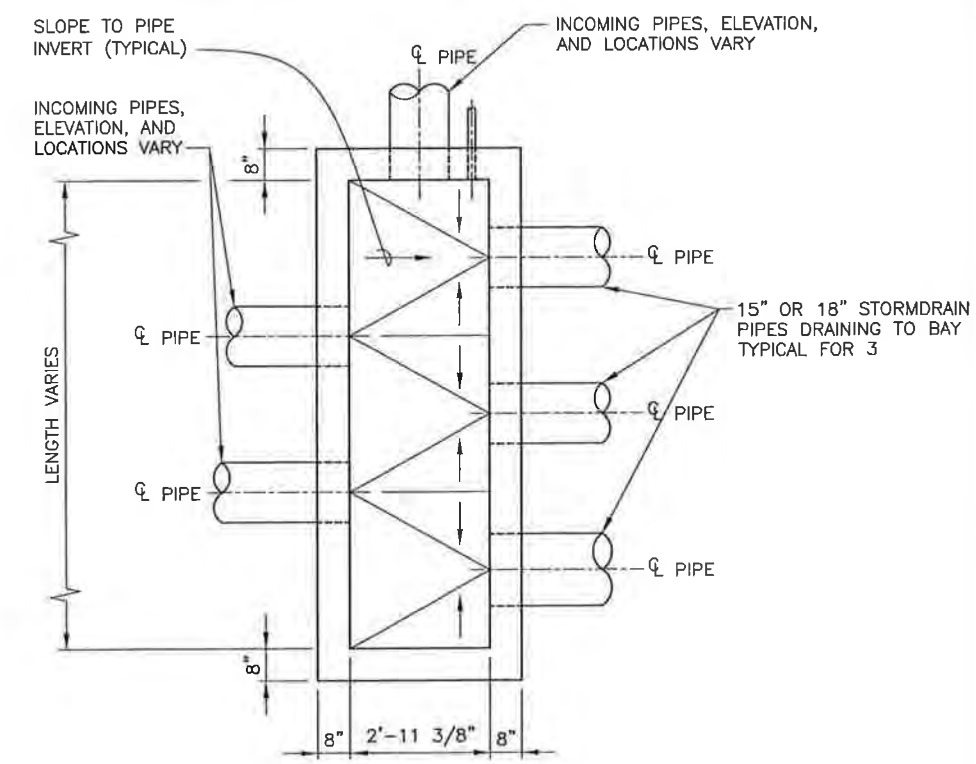
SCALE: NONE



SECTION D

SCALE: NONE

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
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PROJECT MANAGER	LJL
DATE	12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS

Burlingame, California

MISCELLANEOUS DETAILS
SHEET 3 OF 5

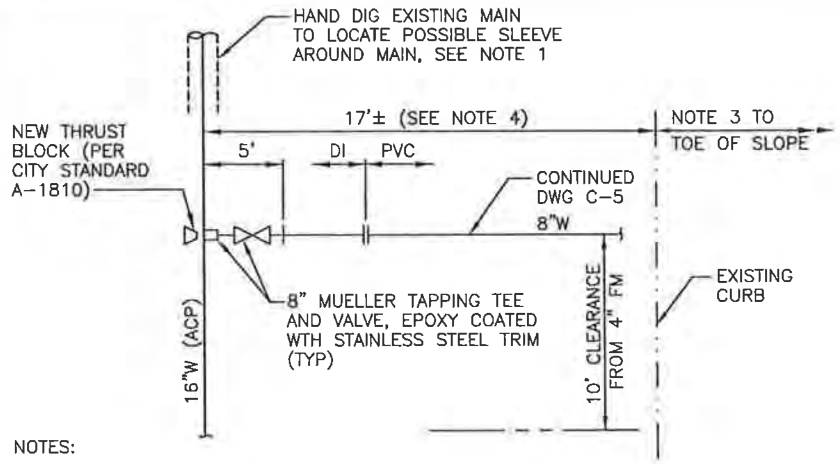
REVISION 0

PROJECT 26811590

DRAWING C-17

SHEET 19 OF 21

DRAFT



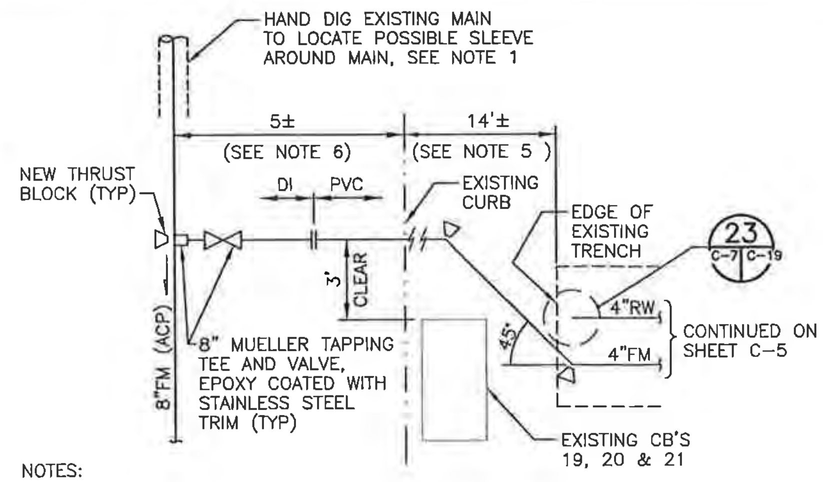
NOTES:

1. RESTORE AIRPORT BLVD PER CITY STANDARD A-2608.
2. REPAIR EXISTING TRACER WIRE OVER 16" WATER MAIN. PLACE NEW WIRE ALONG BOTH 4" AND 8' PIPES. CONNECT ALL WIRES TO VALVE BOX.
3. LINED TRENCH SIMILAR TO DETAIL 15.
4. TRENCH PER CITY STANDARD A-2608.

CONNECTION TO EXISTING WATER MAIN

DETAIL 21 C-7 C-19

SCALE: NONE



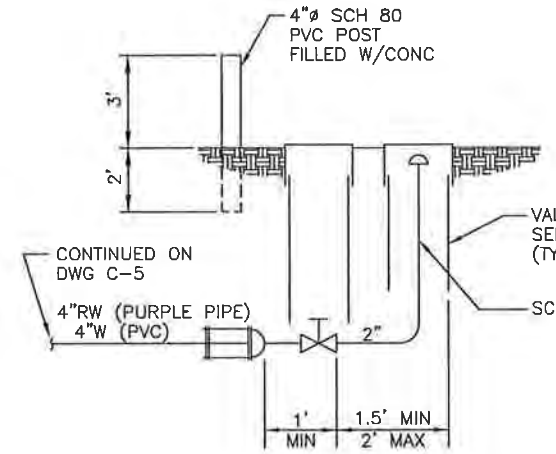
NOTES:

1. RESTORE AIRPORT BLVD PER CITY STANDARD A-2608.
2. CONTRACTOR SHALL INFORM CITY OF BURLINGAME SEWER DEPARTMENT 48 HOURS PRIOR TO TAPPING EXISTING MAIN.
3. REPAIR EXISTING TRACER WIRE OVER 8" FORCE MAIN. PLACE NEW WIRE ALONG BOTH 4" PIPES. CONNECT ALL WIRES TO VALVE BOX.
4. WILL REQUIRE EXTENSION OF EXISTING LINED TRENCH.
5. LINED TRENCH SIMILAR TO DETAIL 15.
6. TRENCH PER CITY STANDARD A-2608.
7. THRUST BLOCKS PER CITY STANDARD A-1810.

CONNECTION TO EXISTING FORCE MAIN

DETAIL 22 C-7 C-19

SCALE: NONE



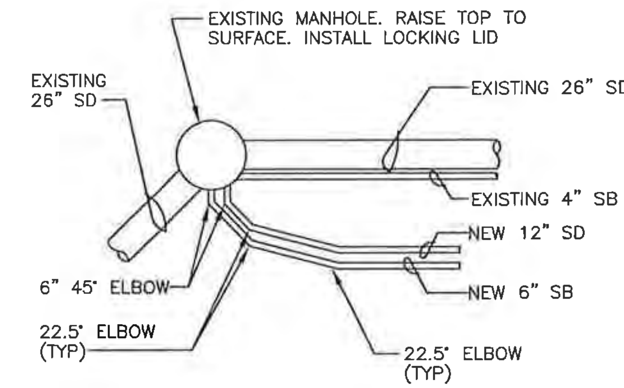
NOTES:

1. ALL WORK PER CITY STANDARDS A-1111.
2. RW MID-LINE BLOWOFF SIMILAR DETAIL.
3. COVERS MARKED "WATER" AND "RECLAIMED WATER" AS APPROPRIATE.

RECLAIMED WATER AND WATER BLOWOFF

DETAIL 23 C-7 C-19

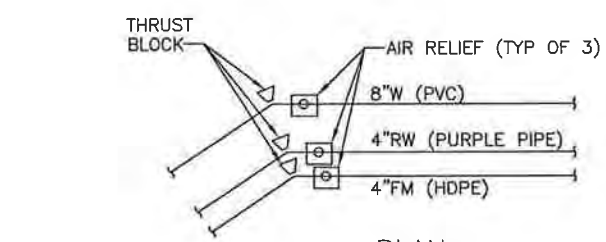
SCALE: NONE



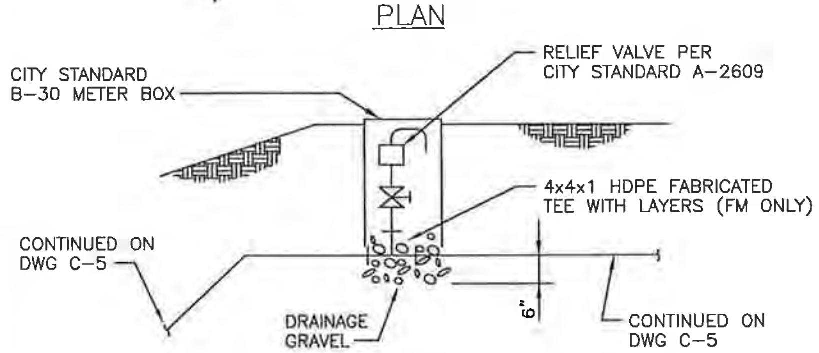
SUBDRAIN CONNECTION

DETAIL 24 C-7 C-19

SCALE: NONE



PLAN



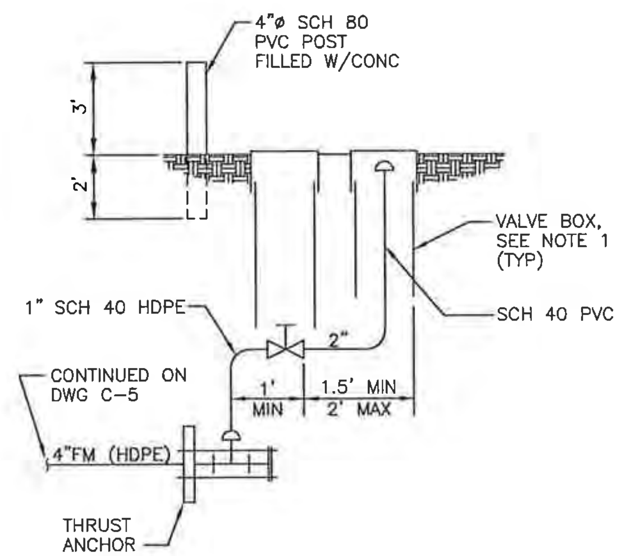
SECTION

NOTES:

1. FOR FORCE MAIN SERVICE, INSTALL AIR RELIEF VALVE MANUFACTURED FOR SEWER SERVICE.
2. PER CITY STANDARD A-1810 FOR THRUST BLOCKS.
3. ALL FITTINGS EPOXY COATED WITH STAINLESS STEEL TRIM. SEE SPECIFICATIONS.

DETAIL 25 C-7 C-19

SCALE: NONE



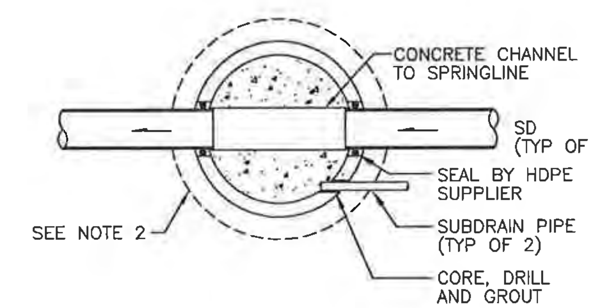
NOTES:

1. VALVE BOX COVER TO BE MARKED WITH THE WORD "SEWER".
2. FITTING PER CITY STANDARD A-1111 EXCEPT AS NOTED.

FORCEMAIN BLOWOFF

DETAIL 26 C-7 C-19

SCALE: NONE



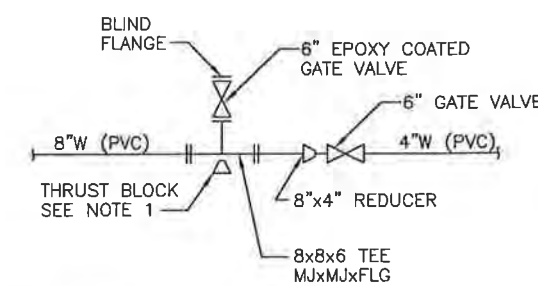
NOTES:

1. 96" ID PRECAST CONCRETE MANHOLE WITH TOP SLAB (WITH 36" DIAMETER OPENING)
2. CAST IN PLACE 8 INCH BASE SLAB, REINFORCED WITH 6x6 WWF. SET ON 6 INCH DRAINAGE GRAVEL.

MANHOLE

DETAIL 27 C-7 C-19

SCALE: NONE



NOTES:

1. THRUST BLOCK PER CITY STANDARD A-1810.

FIRE HYDRANT CONNECTION

DETAIL 28 C-7 C-19

SCALE: NONE

REV	DESCRIPTION OF REVISION	REVIEWED BY	REVISED BY	DATE
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CHECKED SKS
PEER REVIEWED HJB
PROJECT MANAGER LJL
DATE 12/05/03

LANDFILL CLOSURE – RECORD DRAWINGS
Burlingame, California

MISCELLANEOUS DETAILS
SHEET 5 OF 5

REVISION 0
PROJECT 26811590
DRAWING C-19
SHEET 21 OF 21

FILE # 14 SCALE | OPER. BML DATE 08/09/99 | PROJ # 26811590 TASK # 30000 | LOC. Oakland PROJ. Burlingame Landfill | SEND TO PHONE 510.893.3600

Appendix **C**
GEOPHYSICAL SURVEY

DRAFT

NORCAL GEOPHYSICAL CONSULTANTS INC.
A Terracon COMPANY

April 26, 2018

RMC Geoscience, Inc.
405 East D Street, Suite N
Petaluma, California 94952

Subject: Electrical Resistivity Imaging Survey
Burlingame Landfill
Burlingame, California
NORCAL Job No. NS187008

Attention: Mr. Richard Mitchell

This report presents the findings of an electrical resistivity imaging (ERI) survey performed by NORCAL Geophysical Consultants, Inc. for RMC Geoscience, Inc. at the subject location. The survey was authorized under NORCAL Agreement for Services, Reference No. NS187008, dated March 4, 2018. NORCAL California Professional Geophysicists William E. Black (PGp No. 843), Donald J. Kirker (PGp No. 997) and David J. Bissiri (PGp No. 1009) conducted the field work on April 16, 2018. RMC Principal Engineering Geologist Richard Mitchell provided background information and site logistical support.

1.0 SITE DESCRIPTION

The project site is a golf driving range located 0.2-miles west of the intersection of Anza Boulevard and Airport Boulevard in Burlingame, California, as shown on the Vicinity Map included on Plate 1. The driving range covers an area of approximately 10-acres and is bordered by Airport Boulevard and San Francisco Bay on the north, a hotel and Anza Boulevard on the east, a slough on the south and a solid waste treatment plant on the west. The surface of the driving range is generally flat and open with the exception of several low, irregular shaped mounds that are meant to simulate golf course features such as greens and sand traps. In addition, there is a small depression located near the south edge of the range. It is speculated that this depression may be caused by a sinkhole. At the time of the ERI survey the depression was partially filled by water left from recent rainfall, as shown in Figure 1.

The surface of the driving range is covered by artificial turf over a layer of very dense gravel. The turf has the appearance of a grassy rope mesh. The ground surface rises gently to the west, from an elevation of about 34-ft above mean sea level (msl) at the golf tees on the east side of the range to about 66-ft at the west end. This rise is over a distance of 865-ft. The interior of the driving range was accessed through a locked gate from a service road on the south side of the range.

Figure 1: *Driving range interior viewed from the southeast side looking northwest along Line 2. Resistivity cable (yellow) connects 56-electrodes (metal stakes) to instrumentation housed in the vehicle in the distance. The area with standing water is a surface depression that may be caused by a sinkhole.*

2.0 PURPOSE

Information provided by RMC indicates that the driving range is situated above the abandoned Burlingame Landfill. Apparently, the subsurface below the range consists of a clay cap over landfill over Bay Mud. The purpose of the geophysical investigation is to estimate the approximate thickness of the landfill.

3.0 GEOPHYSICAL APPROACH

Electrical resistivity (ER) is a measure of the resistance of a volume of material to the flow of electrical current. In unconsolidated materials, physical properties such as grain size, porosity, permeability and moisture content affect ER values. Fine-grained materials such as silts and clays tend to have the lowest ER values. Coarse-grained materials such as sands and gravels tend to have the highest. This is because ER generally increases with increasing grain size. Rock tends to have higher ER values than unconsolidated materials, especially when the degree of weathering is low.

Electrical Resistivity Imaging (ERI) provides a contoured cross-section (profile) depicting variations in ER versus depth and distance beneath a traverse (line). These images are often valuable as an indication of subsurface conditions. We selected ERI for this survey because our experience indicates that the clay cap and underlying bay mud should have ER values that are significantly lower than that of the landfill refuse. Detailed descriptions of the ERI methodology, our data acquisition and analysis procedures, the instrumentation we used and the limitations of the ERI method are provided in Appendix A.

4.0 SCOPE OF WORK

The scope of work for the ERI survey consisted of collecting ERI data along two mutually perpendicular lines traversing the full width of the driving range. One line was oriented approximately east-west and the other approximately north-south. The ERI traverses, labeled Line 1 and Line 2, are depicted by solid red lines shown on Plate 1. Line 1 was 830-ft long and Line 2 was 690-ft in length. Our scope of work also consisted of processing and interpreting the ERI data and presenting our findings in a written report.

5.0 RESULTS

The results of the ERI survey are illustrated by the profiles shown on Plate 2. The profiles depict variations in electrical resistivity both laterally and with depth beneath each line. On each profile, the black line at the top of the contoured area represents the ground surface. The horizontal axis represents the distance (Station) in feet from the beginning of the line and the vertical axis represents elevation in feet (above msl). The ER values are in ohm-ft and are represented by color shading according to the color bar shown at the bottom of the plate.

6.0 INTERPRETATION

The electrical resistivity values range from about 5- to 50 ohm-ft. We interpret the low end of the range, as represented by purple to blue colors (5- to 13 ohm-ft) as clay cap near the surface and bay mud at depth. We interpret the green to yellow to red colors (13 to 50 ohm-ft) as landfill. Herein we will refer to the landfill material as refuse in order to distinguish it from ordinary fill that comprises part of the cap. The interpreted boundary of the refuse is depicted by a dark dashed line. The variation in ER within the refuse, as indicated by the various colors probably relates to the nature of the refuse. The higher resistivity areas (yellow to red) probably indicate the preference of materials such as wood, concrete, paper, plastics, etc. The lower resistivity areas (green) probably indicate metallic materials, bio-waste, etc. The bay mud underlying the refuse (purple to blue colors) is very continuous and well defined. Our interpretation of each profile is described in the following sections.

6.1 LINE 1

Beneath Line 1, the refuse ranges in thickness from about 30- to 60-ft. It is generally about 30-ft thick beneath the northeast half of the profile but it thickens to the southwest. The refuse is thinnest at about Station 700-ft and thickest at Station 250-ft. The depth to the top of the refuse ranges from very shallow at the northeast end of the profile to about 50-ft near the southwest end. We assume that the increasing depth of the refuse to the southwest is related to the landfill coming to an end in that direction. Along most of the profile the clay cap is relatively thin (about 10-ft thick) and not well defined (intermittent blue and green colors). However, at the southwest end of the profile there is a very well defined zone of low resistivity (purple to blue colors) that we interpret as clay cap. This zone is about 15-ft deep, about 20-ft thick and it extends from the beginning of the profile (Station 0-ft) to about Station 150-ft. We interpret the moderate resistivity zone above it (green colors) as fill that was put in to extend the surface of the driving range.

6.2 LINE 2

Beneath Line 2, the refuse ranges in thickness from about 10- to 55-ft. It is generally 10- to 20-ft thick beneath the southeast half of the profile but it thickens to the northwest. The refuse is thinnest at about Station 450-ft and thickest at about Station 130-ft. The top of the refuse is very shallow at both ends of the profile but reaches a maximum depth of about 20-ft at Station 470-ft. The surface depression located at Stations 590- to 620-ft coincides with an area where the refuse is very close to the surface.

7.0 STANDARD CARE

The scope of NORCAL's services for this project consisted of using the electrical resistivity imaging (ERI) method to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to this technique. We performed our services in a manner consistent with the level of skill ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate the opportunity to provide our services to RMC Geoscience, Inc. for this project. Should you require additional geophysical services or have questions regarding this survey, please do not hesitate to reach out to us.

Sincerely,

NORCAL Geophysical Consultants, Inc.

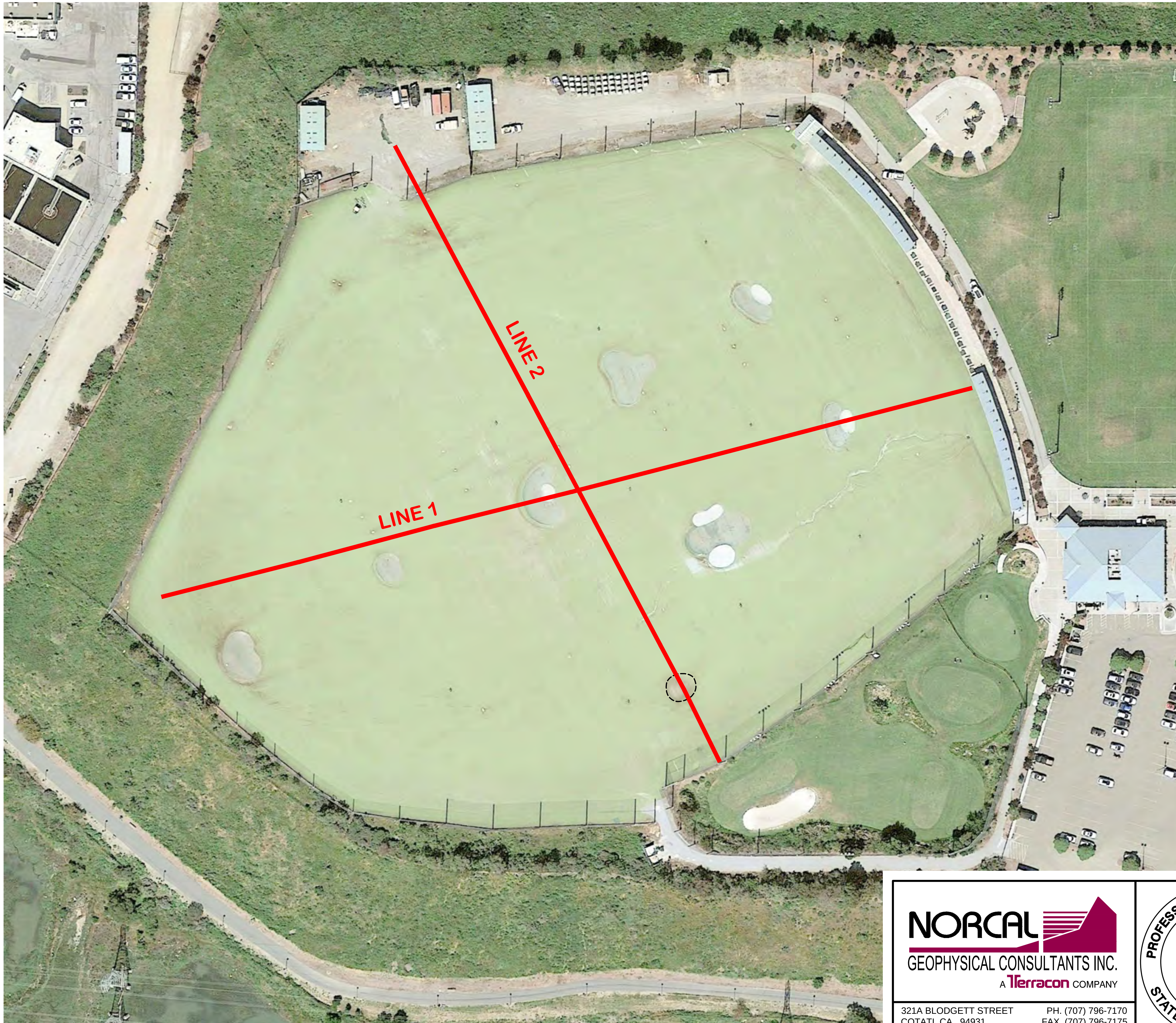
W Black

PROFESSIONAL GEOPHYSICIST
4-26-18
WILLIAM
ERNEST
BLACK
No. 843
STATE OF CALIFORNIA

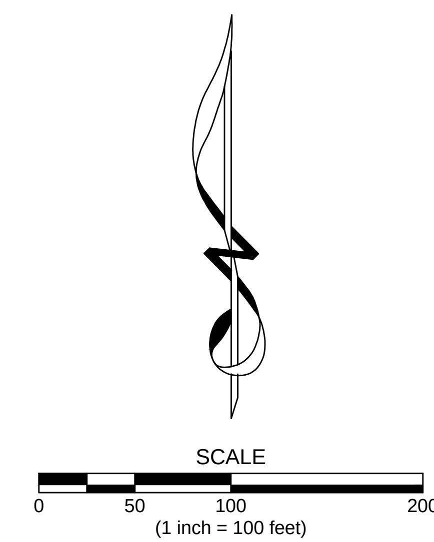
William E. Black
California Professional Geophysicist, PGp No. 843
WEB/tt

Enclosures: Plates 1 and 2
Appendix A – Electrical Resistivity Method

DRAFT



VICINITY MAP



LEGEND

(red line)	ELECTRICAL RESISTIVITY LINE
(dashed ellipse)	DEPRESSION

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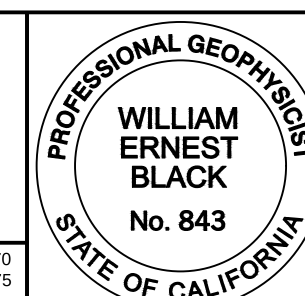
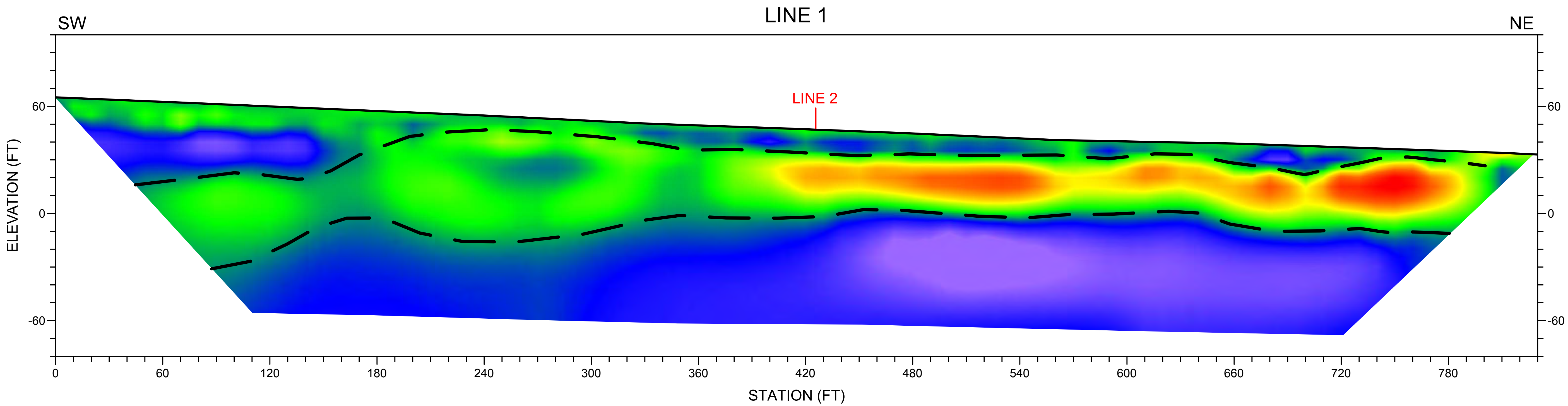
FAX. (707) 796-7175
www.norcalgeophysical.com

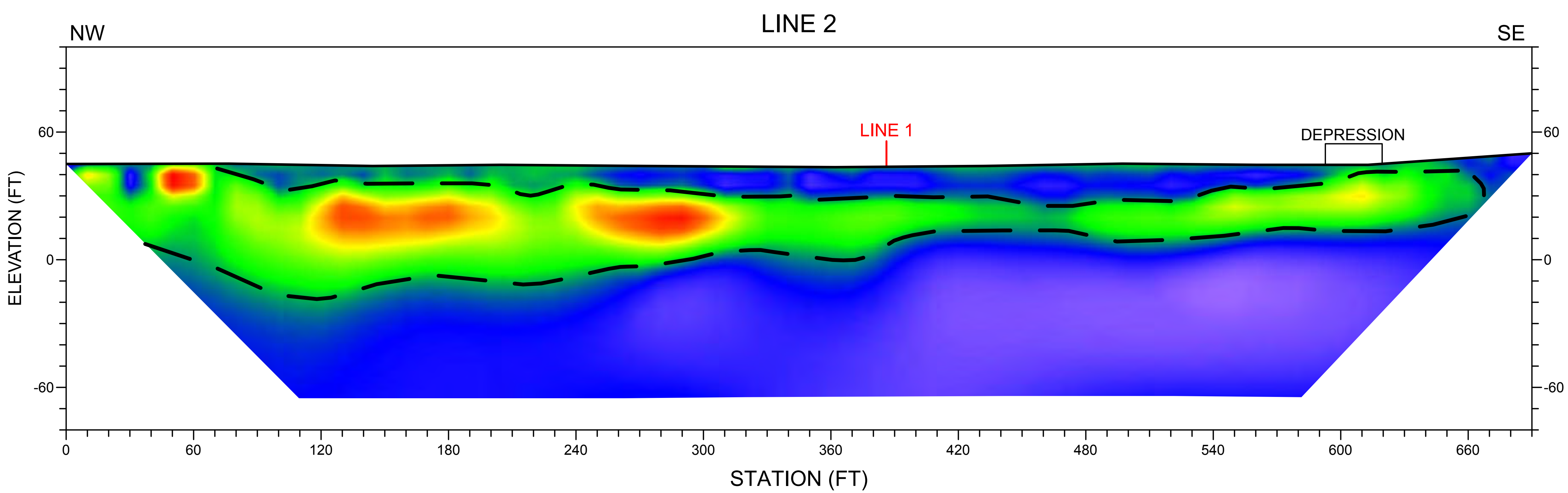


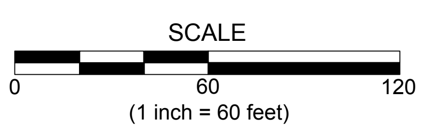
SITE LOCATION MAP
ELECTRICAL RESISTIVITY IMAGING SURVEY
BURLINGAME LANDFILL

LOCATION: BURLINGAME, CALIFORNIA		
CLIENT: RMC GEOSCIENCE		
JOB #. NS187008	DATE: APRIL 2018	PLATE 1
DRAWN BY: G.RANDALL	APPROVED BY: WEB	
William E. Black 4/26/2018		

DRAFT

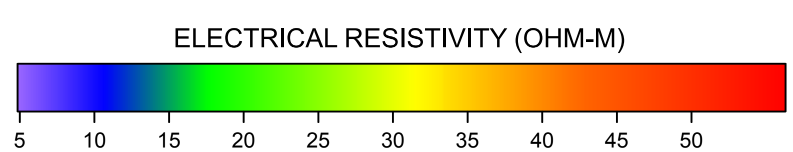






LEGEND

— —	INTERPRETED LANDFILL BOUNDARY



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PROFESSIONAL GEOPHYSICIST
WILLIAM ERNEST BLACK
No. 843
STATE OF CALIFORNIA

ERI PROFILES
ELECTRICAL RESISTIVITY IMAGING SURVEY
BURLINGAME LANDFILL

LOCATION: BURLINGAME, CALIFORNIA

CLIENT: RMC GEOSCIENCE

JOB #: NS187008	DATE: APRIL 2018	PLATE
DRAWN BY: G.RANDALL	APPROVED BY: WEB	2

William E. Black 4/26/2018

DRAFT

NORCAL GEOPHYSICAL CONSULTANTS INC.
A Terracon COMPANY

Appendix A

ELECTRICAL RESISTIVITY METHOD

APPENDIX A

ELECTRICAL RESISTIVITY (ER) SURVEY

1.0 METHODOLOGY

Electrical resistivity (ER) is the resistance of a volume of material to the flow of electrical current. The ER method is often used to measure the variation in ER with depth beneath a fixed point or along a line. This information can be valuable in determining stratigraphic and lithologic variations and other subsurface conditions that may relate to the depth and thickness of groundwater aquifers and permeable layers, the thickness of landfills, the delineation of fault traces and in some cases, the depth to bedrock.

There are a number of electrode configurations (arrays) that can be used to measure ER beneath a line. For this survey, we used one of the most commonly used configurations, the dipole-dipole array. In its simplest form, this consists of four electrodes distributed at even intervals in a collinear fashion. For each reading, electrical current (***I***) is input to the ground through one pair of electrodes (transmitter dipole) and the resulting potential drop (***V***) is measured across a second pair of electrodes (receiver dipole). The separation between electrodes (***a***) is the same for both dipoles and the separation between dipoles is always a multiple (***n***) of that distance. A simplified diagram of the dipole-dipole array is shown in Figure 1.

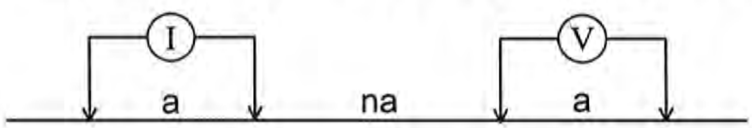


Figure 1: *Dipole-Dipole Diagram*

The values measured using this configuration are termed "apparent" resistivity (ρa) because they represent the resistance to the flow of electricity of a volume of material rather than a discrete layer. With the dipole-dipole array, apparent resistivity is calculated according to the following equation:

$$\rho a = \frac{V}{I} \pi a n(n+1)(n+2)$$

Moving the array along a line and measuring ρa at even intervals (multiples of ***a***) results in a data set that can be used to construct a cross-section (profile) depicting variations in ER versus depth and distance. The depth of investigation of the profile can be increased by increasing both ***a*** and ***n*** by even multiples of ***a***.

Modern geophysical instrumentation makes it possible to collect dipole-dipole data using a large number of closely spaced electrodes and a wide range of ***a*** and ***n*** values. An example of how dipole-dipole data are obtained is illustrated by the three dipole-dipole diagrams shown in Figure 2. The rectangles at the top of each diagram represent electrode locations (42 in this case). The red and blue rectangles represent the transmitter dipole used for a particular measurement and the green rectangles represent the electrodes used as receiver dipoles for that measurement. The dark blue circles represent the data points obtained when the dipole length (***l***) is equal to the electrode separation (***a***), the red circles represent data points obtained when ***l*** is equal to 2***a*** and the light blue circles represent the data points obtained when ***l*** is equal to 3***a***. In each diagram, the farthest right (diagonal) column of circles represents data points obtained from the active (colored) dipoles shown at the top of the diagram. Note how the matrix of data points is being filled-in from left to right and top to bottom with each successive diagram. Note also that as the dipole length and spacing increases the depth of investigation also increases but with a corresponding decrease in resolution.

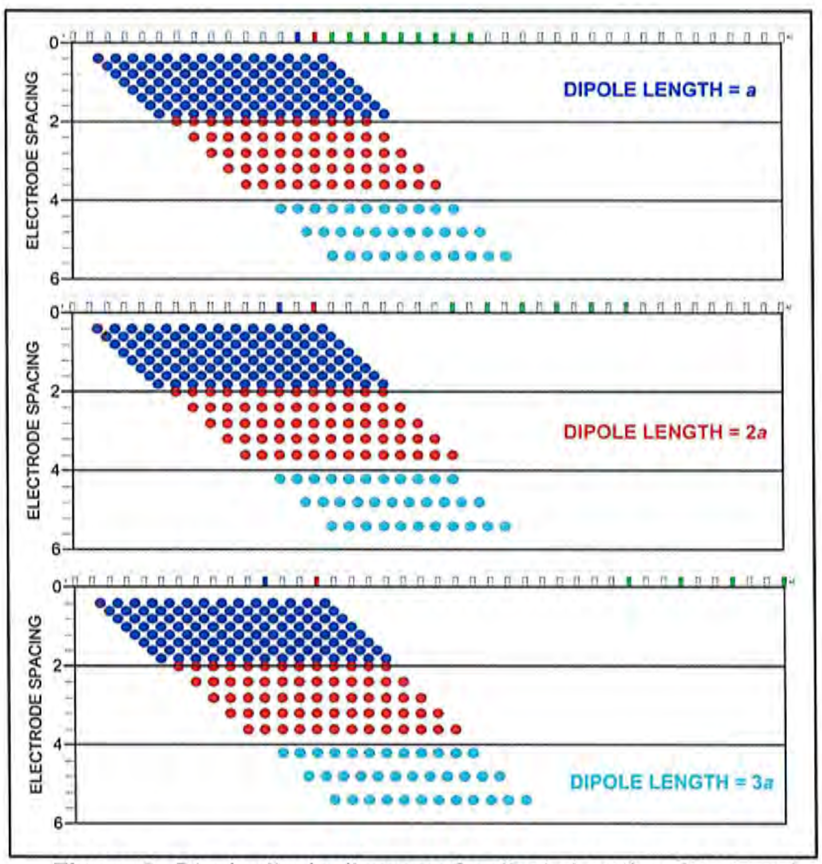


Figure 2: *Dipole-dipole diagrams for dipole lengths of 1, 2, and 3 times the electrode separation (a).*

2.0 DATA ACQUISITION

We collected ER data using the dipole-dipole array described above. A total of 70- to 84-stainless steel stakes (electrodes) were distributed along each traverse at 10-ft intervals resulting in total array lengths of 690- to 830-ft. At each electrode station, the 10-inch long electrode was driven into the ground and attached to the appropriate connector (take-out) on a multi-conductor cable that was, in turn, connected to the ER instrumentation (Section 3.0). Since the instrumentation has the capacity for only 56-electrodes at a time, it was necessary to move the first 14-electrodes to the end of the line once the readings with the first 56 were completed. Additional readings were then taken with the relocated electrodes to extend the coverage of the line. This is referred to as a “roll”. Two rolls were required to complete Line 1 and one to complete Line 2.

3.0 INSTRUMENTATION

We collected the ER data using a ***SuperSting R8*** resistivity meter (see photo below). This system was configured with a 56-electrode switch box, four cables with 14 connectors (take-outs) per cable, and 56 stainless-steel electrodes. All of the instrumentation and cables comprising this system were manufactured by Advanced Geosciences Incorporated (AGI).

The ***SuperSting R8*** is a micro-processor controlled instrument that transmits current at outputs ranging from 1 to 1250 milliamps (mA). The instrument measures the potential drop (voltage) caused by the current influx and converts the data to values of apparent resistivity. A command file programmed into the instrument directs the switch box to activate certain electrodes for each reading according to electrode configuration and a number of other parameters that are selected by the operator. The resulting data are stored in the instrument internal memory and can be downloaded to a computer for subsequent processing and archival.

4.0 DATA PROCESSING

Once data acquisition was complete, the ER data were downloaded from the ***SuperSting R8*** to a computer using the computer program ***AGISSADMIN*** by AGI. The data were archived and then inverted using the computer program ***EarthImager 2D,*** also by AGI. We used this program to produce a 2D cross-section (profile) depicting the variation in ER versus elevation and distance beneath the line. The surface elevations were determined by correlating the GPS data we obtained along the line (Section 2.0) with elevations displayed on a topographic map provided by C2 Earth, Inc.

The resistivity data inversion proceeded as follows:

1) A starting resistivity model was constructed based on the apparent resistivity (ρa) distribution.

2) A virtual survey (forward modeling) was carried out for a predicted data set over the starting model and the initial root mean squared (RMS) error at the zero-th iteration was calculated.

3) A linearized inverse problem was solved based on the current model and data misfit for a model update ($\Delta\mathbf{m}$).

4) The resistivity model was updated using the formula: $\boldsymbol{m}_{i+1} = \mathbf{m}_i + \Delta\mathbf{m}$, where **m** consists of electrical conductivity of all model blocks in the finite element mesh and *i* is the iteration number.

5) A forward model (virtual survey) was run based on the updated model for an updated predicted data set.

6) A new RMS was calculated for the error between the predicted data and the measured data.

7) Steps (3) to (6) were repeated until the programmed stop criteria were satisfied, at which point the inversion was stopped.

Following each run of the inversion routine we reviewed the inversion diagrams produced by the software (not shown) to determine the degree of fit. If the RMS was considered to be too high, we would use routines included in ***EarthImager*** to filter the data by removing noisy data points. Typically, we removed no more than 10% at a time. We would then rerun the inversion process. This procedure was continued until an inverted model with acceptably low RMS was produced.

5.0 ELECTRICAL RESISTIVITY PROFILES

We used the computer program ***Surfer 13.0*** by Golden Software to create color contoured cross-sections (profiles) illustrating the results produced by ***EarthImager*** (Section 4.0) for Line 1 and Line 2. Both profiles were plotted at a scale of 1'=60-ft, vertical and horizontal. The horizontal axis on each profile represents distance (Station) in feet from the beginning of the line. The vertical axis represents elevation above mean sea level (msl) in feet, as determined by our GPS survey. Variations in electrical resistivity are represented by color shading according to the color bar shown beneath the two profiles. The dark line at the top of the color contoured section represents the ground surface. The locations of pertinent features, such as line intersections and certain surface features are annotated above the surface.

6.0 LIMITATIONS

A common feature of all electrical methods is that the models derived from the electric imaging are not unique. That is, depending on the subsurface geo-electric structure, there may be many models that will produce essentially the same apparent resistivities. This is known as the *principal of equivalence*. To overcome this limitation, computer software programs include routines for evaluating the equivalence of a given model relative to the observed resistivity values, resulting in a model that provides the closest fit to the observed data. Additionally, if the ground surface is too resistive, the system may have problems transmitting current into the subsurface (this situation can be remedied through the application of salt water at the base of each electrode). Conversely, if the ground surface is highly conductive, the potentials measured become negligible, resulting in a very low signal-to-noise ratio and therefore unreliable data.

Appendix **D**
BORING LOGS

APPENDIX A

FIELD PROCEDURE FOR SOIL SAMPLE COLLECTION

Bulk Samples: Bulk samples of subsurface earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

Standard Penetration Test (SPT) Samples: Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test (SPT) sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1⅜ inches. The sampler was driven into the ground up to 18 inches with a 140 pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed, and transported to the laboratory for testing.

Modified California Split Barrel Drive Samples: The sampler, with an external diameter of 3 inches, was lined with 1 inch-long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer or the kelly bar of the drill rig in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer or bar, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

DRAFT

Geo-Logic ASSOCIATES

PROJECT: LB WRP Proposed Electrical Building (TAF-7)
PROJECT LOCATION: Long Beach, California
PROJECT NUMBER: SO18.1023.00

KEY SHEET - CLASSIFICATIONS AND SYMBOLS

FORM: Key Sheet Geo-Logic

EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES *

FINE GRAINED SOILS

N VALUE * (BLOWS/FT)	CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS/SQ FT)
< 1	VERY SOFT	<0.25
1 - 3	SOFT	0.25 - 0.50
4 - 5	FIRM	0.50 - 1.00
6 - 10	STIFF	1.00 - 2.00
11 - 20	VERY STIFF	2.00 - 4.00
> 20	HARD	>4.00

COARSE GRAINED SOILS

N VALUE * (BLOWS/FT)	RELATIVE DENSITY
≤ 3	VERY LOOSE
4 - 7	LOOSE
8 - 20	MEDIUM DENSE
21 - 33	DENSE
> 33	VERY DENSE

* - NUMBER OF BLOWS OF A 140-POUND AUTOMATIC TRIP HAMMER FALLING 30 INCHES TO DRIVE A 2 IN. O.D., 1-3/8 IN. I.D. SAMPLER ONE FOOT

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

MAJOR DIVISIONS			SYMBOLS	DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL COARSER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL -SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO.4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL FINER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

NOTE: DUAL SYMBOLS USED FOR BORDERLINE CLASSIFICATIONS

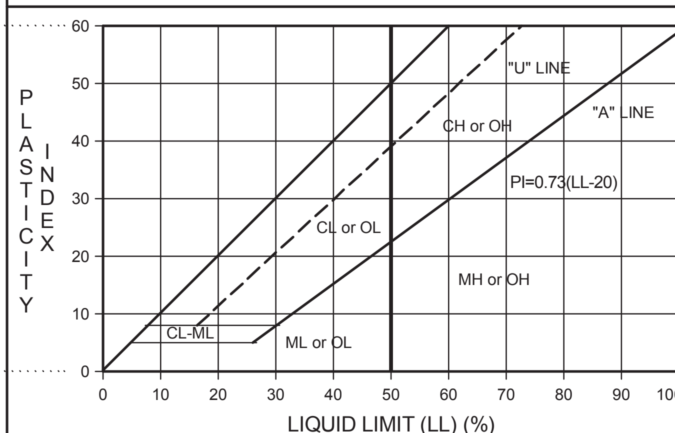
PARTICLE SIZE IDENTIFICATION

BOULDERS	>300 mm
COBBLES	75 - 300 mm
GRAVEL: COARSE	19.0 - 75 mm
GRAVEL: FINE	4.75 - 19 mm
SAND: COARSE	2.00 - 4.75 mm
SAND: MEDIUM	0.425 - 2.00 mm
SAND: FINE	0.075 - 0.425 mm
SILT	0.075 - 0.002 mm
CLAY	<0.002 mm

WELL GRADED - HAVING WIDE RANGE OF GRAIN SIZES AND APPRECIABLE AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES

POORLY GRADED - PREDOMINANTLY ONE GRAIN SIZE, OR HAVING A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING

PLASTICITY CHART



OTHER MATERIAL SYMBOLS

Siltstone	Sand
Sandstone	Silt
Siltstone/Claystone	Silty Sand
Claystone	Clay
Shale	Fill
Siltstone/Sandstone	Refuse
Limestone	
Granite	

WELL SYMBOLS

- GROUT
- BENTONITE SEAL
- SAND/GRAVEL PACK
- SLOTTED SCREEN
- SAND IN HOLE
- NATIVE SOIL IN HOLE

SAMPLER AND OTHER SYMBOLS

- BULK SAMPLE
- MODIFIED CALIFORNIA SAMPLE
- n/a DRILL CUTTINGS
- n/a CORE SAMPLE
- STANDARD PENETRATION TEST

- Water Level at Time Drilling, or as Shown
- Static Water Level
- MSL: Mean Sea Level
- AGS: Above Ground Surface
- BGS: Below Ground Surface

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–01

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/20/18
DATE FINISHED: 4/20/18
ELEVATION: 37.0
NORTHING: 2042914.7
EASTING: 6024667.3

GW DEPTH: ~47 feet
TOTAL DEPTH: 68.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	37.0	SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	Dry. ...(0'–8') – cleared by hand auger and air knife.
									GP	Aggregate base rock.	
							5	32.0	CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	Dry to moist.
										REFUSE: Black (10YR 2/1) CLAY with very little waste. Concrete and wood.	Moist.
							10	27.0			
							15	22.0			
							20	17.0		...(21') – increase in refuse.	
							25	12.0			
							30	7.0			
							35	2.0			...(35'–37') – no sample return.
									CH	YOUNG BAY MUD: Dark greenish gray (5GY 4/1), fossillferous, fat CLAY.	
							40	–3.0	CL	OLD BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) SANDY CLAY with GRAVEL and iron–oxide staining.	
						BULK					Bulk sample collected.
84.4	15.6		15.7			BULK	45	–8.0	CL/SC	Dark yellowish brown (10YR 4/4) SANDY CLAY to CLAYEY SAND with GRAVEL.	Bulk sample collected.
						BULK			SC	Dark yellowish brown (10YR 4/4), fine SAND with minor CLAY.	Bulk sample collected.
					26	MC			CL/SC	Dark yellowish brown (10YR 4/4), very stiff, fine SANDY CLAY to medium dense, fine CLAYEY SAND with iron–oxide staining.	No sample collected. Material in drive sample does not appear representative. Lots of water in boring. Wet.
							50	–13.0	CL	Dark yellowish brown (10YR 4/4) SANDY CLAY with fine subrounded GRAVEL and iron–oxide staining.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

Geo-Logic Associates
Boring Log

BORING NO.: TG-01

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/20/18
DATE FINISHED: 4/20/18
ELEVATION: 37.0
NORTHING: 2042914.7
EASTING: 6024667.3

GW DEPTH: ~47 feet
TOTAL DEPTH: 68.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	-13.0		CL	Dark yellowish brown (10YR 4/4) SANDY CLAY with fine subrounded GRAVEL and iron-oxide staining.	
							55	-18.0		CL	Dark yellowish brown (10YR 4/4), fine to medium SANDY CLAY.	
			25.3	100.4	29	MC				CL	Olive (5Y 4/3), very stiff CLAY with iron- and manganese-oxide staining. ...(59') – no manganese-oxide staining.	
							60	-23.0				
							65	-28.0				
			22.4	106.5	44	MC				CL	Olive (5Y 4/3) hard CLAY with iron-oxide staining.	
							70	-33.0				
							75	-38.0				
							80	-43.0				
							85	-48.0				
							90	-53.0				
							95	-58.0				
							100	-63.0				

Notes:

1. Total depth of boring 68.5 feet below ground surface (bgs).
2. Groundwater encountered at ~47 feet bgs.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

JOB NO.:	RM18.1038	DATE STARTED:	4/17/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/17/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	39.5
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042942.0
LOGGED BY:	K. WELCHANS	EASTING:	6024488.3

GW DEPTH: ~69 feet
TOTAL DEPTH: 89.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	39.5	SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	Dry. ...(0'–5') – cleared by hand auger and air knife.
									GP	Aggregate base rock.	
									CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	Dry to moist.
							5	34.5			
										REFUSE: Black (10YR 2/1) CLAY with refuse. Rubber, wood, plastic.	Wet (boring left open overnight).
							10	29.5			
										...(11') – plus carpet.	Moist.
										...(13') – plus wood and metal.	Dry.
							15	24.5			
					16	MC				...(17') – very stiff.	Sample discarded (loose material and carpet).
										...(19') – plus carpet and wood.	Moist.
							20	19.5			
										...(21') – metal wire.	
							25	14.5		...(25') – ash.	
										...(27') – mostly ash.	
					50/3"	MC				...(29') – mostly wood waste.	
							30	9.5			
									CH	YOUNG BAY MUD: Dark greenish gray (5GY 4/1), fat CLAY with minor fossils (shells).	
							35	4.5			
			37.2	85.4		Shelby Tube	40	–0.5			
									CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) SANDY CLAY with fine, subrounded GRAVEL and minor iron–oxide staining.	
							45	–5.5			
					20	MC				...(49') – very stiff.	No sample recovery.
							50	–10.5			
										...(51') – significantly more GRAVEL.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–02

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/17/18
DATE FINISHED: 4/17/18
ELEVATION: 39.5
NORTHING: 2042942.0
EASTING: 6024488.3

GW DEPTH: ~69 feet
TOTAL DEPTH: 89.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	–10.5		CL	...same as above. ...(51') – significantly more GRAVEL.	
							55	–15.5				
					50/3'	MC					...(59') – hard.	
							60	–20.5		CL	Olive (5Y 4/3) CLAY with minor SAND and subrounded GRAVEL. ...(63') – iron–oxide staining.	
							65	–25.5				
					50/6"	MC					...(69') – hard.	Drive sample is very wet.
							70	–30.5		CL	Dark yellowish brown (10YR 4/4) SANDY CLAY with GRAVEL and minor iron–oxide staining.	
										CL	Dark yellowish brown (10YR 4/4), plastic CLAY with minor SAND and iron–oxide staining.	
							75	–35.5				
					50/2"	MC					...(79') – hard.	
							80	–40.5				
							85	–45.5		CL	Dark yellowish brown (10YR 4/4) SANDY/GRAVELLY CLAY. GRAVEL is subrounded.	
										CL	Olive (5Y 4/3) CLAY with minor SAND.	
					50/4"	MC				SW	Dark yellowish brown (10YR 4/4) to dark gray, very dense, fine SAND with rounded GRAVEL and iron– and manganese–oxide staining.	
							90	–50.5				
							95	–55.5				
							100	–60.5				

Notes:

1. Total depth of boring 89.5 feet below ground surface (bgs).
2. Groundwater encountered at ~69 feet bgs.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–03

JOB NO.:	RM18.1038	DATE STARTED:	4/17/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/17/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	46.5
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042636.8
LOGGED BY:	K. WELCHANS	EASTING:	6024439.4

GW DEPTH: ~18 feet
TOTAL DEPTH: 78.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	46.5		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	Dry.
										GP	Aggregate base rock.	...(0'–7') – cleared by hand auger and air knife.
							5	41.5		CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	Dry to moist.
											REFUSE: Black (10YR 2/1) CLAY with wood waste.	Moist.
							10	36.5				
							15	31.5				
												Wet.
												Moist to wet.
							20	26.5				
							25	21.5				Moist.
					16	MC					...(27') – hard.	Wet.
							30	16.5				
												Moist.
							35	11.5				
					52	MC					...(37') – hard.	Wet.
							40	6.5				
												Moist.
							45	1.5		CH	YOUNG BAY MUD: Dark greenish gray (5GY 4/1), fossiliferous, fat CLAY.	
			60.0	64.1		Shelby Tube						Shelby Tube 800 psi.
							50	–3.5		CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) CLAY with fine SAND and minor iron– and manganese–oxide staining.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–03

JOB NO.:	RM18.1038	DATE STARTED:	4/17/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/17/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	46.5
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042636.8
LOGGED BY:	K. WELCHANS	EASTING:	6024439.4

GW DEPTH: ~18 feet
TOTAL DEPTH: 78.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	-3.5		CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) CLAY with fine SAND and minor iron– and manganese–oxide staining. ...(53') – significant iron–oxide staining and minor manganese–oxide staining.	
							55	-8.5				
					45	MC					...(57') – hard; staining absent.	Sample may not be representative.
											...(59') – minor iron–oxide staining.	
							60	-13.5				
										CL	Dark yellowish brown (10YR 4/4) SANDY CLAY with subrounded GRAVEL and minor iron–oxide staining.	
							65	-18.5				
			22.4	105.6	48	MC				CL	Dark yellowish brown (10YR 4/4), hard, well–graded SANDY CLAY.	
							70	-23.5		CL/SC	Dark yellowish brown (10YR 4/4), well–graded SANDY CLAY to CLAYEY SAND with GRAVEL.	
										CL/SC	Olive (5Y 4/3), fine SANDY CLAY.	
							75	-28.5			...(75') – minor iron–oxide staining.	
			11.0	127.6	70	MC					...(77') – hard.	
											Notes: 1. Total depth of boring 78.5 feet below ground surface (bgs). 2. Groundwater encountered at ~18 feet bgs. 3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.	
							80	-33.5				
							85	-38.5				
							90	-43.5				
							95	-48.5				
							100	-53.5				

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

Geo-Logic Associates
Boring Log

BORING NO.: TG-04

JOB NO.:	RM18.1038	DATE STARTED:	4/19/18	GW DEPTH:	NA
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/19/18	TOTAL DEPTH:	70.5 feet
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	48.2		
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042939.8		
LOGGED BY:	B. TREECE	EASTING:	6024266.0		

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	48.2		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	...(0'–7') – cleared by hand auger and air knife.
										GP	Aggregate base rock.	
										CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	
							5	43.2				
											REFUSE: Greenish black (2.5Y/10Y), firm CLAY with abundant debris/trash.	Moist.
							10	38.2				
							15	33.2				
							20	28.2				
							25	23.2				
					43	MC	30	18.2				
												...(30.5'–47') – no recovery.
							35	13.2				
							40	8.2				
							45	3.2				
											...(47') – color change to black (GLEY1 2.5/N).	Moist.
							50	–1.8				
											...(51') – color change to dark yellowish brown (10YR 4/4).	Moist.

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–04

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/19/18
DATE FINISHED: 4/19/18
ELEVATION: 48.2
NORTHING: 2042939.8
EASTING: 6024266.0

GW DEPTH: NA
TOTAL DEPTH: 70.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	-1.8			...same as above.	
											...(51') – color change to dark yellowish brown (10YR 4/4).	Moist.
		4.0									...(54') – very stiff.	...(54') – moist. 4.0 tsf (pocket pen).
							55	-6.8				
		1.75								CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/6), very stiff SANDY CLAY.	...(57') – moist. 1.75 tsf (pocket pen).
		2.75			22	MC	60	-11.8		CL	Strong brown (7.5YR 4/6), very stiff CLAY with SAND.	...(60') – 2.75 tsf (pocket pen). No sample recovered (slough).
		1.5				BULK				SC	Strong brown (7.5YR 4/6), very stiff CLAYEY SAND.	...(61') – moist. Bulk sample collected.
										CL	Strong brown (7.5YR 4/6), very stiff CLAY with SAND.	...(62') – moist. 1.5 tsf (pocket pen).
						BULK	65	-16.8		CL	Strong brown (7.5YR 4/6), very stiff SANDY CLAY.	...(65') – moist. Bulk sample collected.
		>4.5								CL	Strong brown (7.5YR 4/6), very stiff CLAY with SAND.	...(68') – moist. 4.5+ tsf (pocket pen).
					43	MC	70	-21.8				
							75	-26.8				
							80	-31.8				
							85	-36.8				
							90	-41.8				
							95	-46.8				
							100	-51.8				

Notes:

1. Total depth of boring 70.5 feet below ground surface (bgs).
2. No groundwater encountered.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–06

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/18/18
DATE FINISHED: 4/18/18
ELEVATION: 58.4
NORTHING: 2042720.6
EASTING: 6024028.6

GW DEPTH: ~75 feet
TOTAL DEPTH: 88.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	58.4		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	Dry.
										GP	Aggregate base rock.	...(0'–6') – cleared by hand auger and air knife.
							5	53.4		CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	Dry to moist.
											REFUSE: Black (10YR 2/1) CLAY with waste. Wood and concrete. ...(8') – mostly wood waste.	
							10	48.4				
							15	43.4				
					24	MC					...(17') – very stiff.	No sample collected.
							20	38.4			...(20') – brick. ...(21') – mostly wood.	
							25	33.4			...(26') – concrete. ...(27') – mostly wood.	
							30	28.4			...(30') – decrease in refuse.	
							35	23.4			...(35') – mostly wood; minor brick.	
							40	18.4				
							45	13.4			...(47') – mix of wood and brick; minor plastic.	
							50	8.4			...(51'–53') – more CLAY than refuse.	

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DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–06

JOB NO.:	RM18.1038	DATE STARTED:	4/18/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/18/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	58.4
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042720.6
LOGGED BY:	K. WELCHANS	EASTING:	6024028.6

GW DEPTH: ~75 feet
TOTAL DEPTH: 88.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	8.4			...same as above. ...(51'–53') – more CLAY than refuse.	
							55	3.4				
											...(58') – dark gray, well-graded SANDY CLAY with GRAVEL.	Moist.
							60	–1.6		CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) CLAYEY SAND with GRAVEL.	
			16.3			BULK				CL	Dark yellowish brown (10YR 4/4) GRAVELLY CLAY with SAND.	Bulk sample collected.
							65	–6.6		SC	Dark yellowish brown (10YR 4/4) CLAYEY SAND.	
										CL	Dark yellowish brown (10YR 4/4), coarse SANDY to fine GRAVELLY CLAY.	
75.4	24.6		31.1	96.0	31 46	MC MC				CL	Dark yellowish brown (10YR 4/4, hard, fine SANDY CLAY. ...(68') – increase in CLAY.	No sample return on 1st attempt. Add sand catcher and collect sample on 2nd attempt.
							70	–11.6		CL	Dark yellowish brown (10YR 4/4), fine to coarse, well-graded SANDY CLAY.	
			19.6			BULK				CL/SC	Dark yellowish brown (10YR 4/4), fine to coarse SANDY CLAY to CLAYEY SAND with GRAVEL.	Bulk sample collected.
							75	–16.6		CL	Dark yellowish brown (10YR 4/4), fine SANDY CLAY.	
87.2	12.8		15.0		50/4"	MC				CL	Dark yellowish brown (10YR 4/4), fine to coarse SANDY CLAY with GRAVEL.	...(75') – wet. Sample fell out of casing before it could be logged. ...(77'–82') – very wet.
							80	–21.6				
										CL	Dark yellowish brown (10YR 4/4) SANDY CLAY with GRAVEL.	Wet.
						BULK				CL/GC	Dark yellowish brown (10YR 4/4) GRAVELLY CLAY to CLAYEY GRAVEL with SAND.	Bulk sample collected.
							85	–26.6				
			18.0	115.2	35	MC					...(87') – hard.	
							90	–31.6			Notes: 1. Total depth of boring 88.5 feet below ground surface (bgs). 2. Groundwater encountered at ~75 feet bgs. 3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.	
							95	–36.6				
							100	–41.6				

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DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–07

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE/G. REESE

DATE STARTED: 4/18/18
DATE FINISHED: 4/18/18
ELEVATION: 58.8
NORTHING: 2042671.0
EASTING: 6024057.6

GW DEPTH: ~71 feet
TOTAL DEPTH: 91 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	58.8	SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	
									GP	Aggregate base rock.	Moist.
									CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	
							5	53.8			
		3.25									...(7.5') – 3.25 tsf (pocket pen).
										REFUSE: Greenish black, stiff CLAYEY matrix, with some trash (mostly wood debris with some concrete/asphalt) and minor SAND and fine GRAVEL.	Moist.
							10	48.8			
							15	43.8			
							20	38.8			
							25	33.8			
					18	MC	30	28.8			
							35	23.8			
							40	18.8			
										...(41.5') – variable amounts of construction debris (wood and concrete rubble); interbedded SAND and GRAVEL up to 1" in size.	...(41.5') – moist.
		1.0									...(43') – 1.0 tsf (pocket pen).
							45	13.8			
		2.5									...(48.5') – 2.5 tsf (pocket pen).
							50	8.8			

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Geo-Logic Associates

Boring Log

BORING NO.: TG-07

JOB NO.:	RM18.1038	DATE STARTED:	4/18/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/18/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	58.8
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042671.0
LOGGED BY:	B. TREECE/G. REESE	EASTING:	6024057.6

GW DEPTH: ~71 feet
TOTAL DEPTH: 91 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	8.8			...same as above.	
							55	3.8				
		0.75								CH	YOUNG BAY MUD: Black (2.5/N), soft, fat CLAY with minor seashells.	...(59') – moist. 0.75 tsf (pocket pen).
		1.5					60	-1.2		CL	Greenish black, firm CLAY. ...(62') – abundant shells.	...(60.5') – 1.5 tsf (pocket pen).
						BULK				CL	OLDER BAY ALLUVIUM: Bluish black SANDY CLAY with GRAVEL.	Bulk sample collected.
							65	-6.2		SC	Dark yellowish brown (10YR 4/4), dense CLAYEY SAND with abundant fine to coarse GRAVEL up to 1" in size. 30–50% CLAY; oxidized.	Moist.
		2.5	25.9	10.3.5	35	MC				CL	Dark yellowish brown (10YR 4/5), very stiff to hard CLAY with SAND. ~15% fine to medium SAND with minor fine GRAVEL.	...(67') – moist. 2.5 tsf (pocket pen). Moist.
							70	-11.2		CL	Dark yellowish brown (10YR 4/4), stiff SANDY CLAY with GRAVEL. 5–10% fine to coarse GRAVEL.	Wet.
							75	-16.2		SC	Dark yellowish brown (10YR 3/4), dense CLAYEY SAND with abundant fine to coarse GRAVEL up to 1" in size. 30–50% CLAY.	Wet.
										SC	Dark yellowish brown (10YR 3/3), very dense CLAYEY SAND with abundant fine to coarse GRAVEL up to 1.5" in size. 15–25% CLAY.	Wet.
88.9	11.1		13.2	123.9	78	MC	80	-21.2		SC	Dark yellowish brown (10YR 3/6), very dense CLAYEY SAND. 50% CLAY.	Wet.
										SC	Dark yellowish brown (10YR 3/6), dense CLAYEY SAND. 30–50% CLAY.	Wet. Bulk sample collected.
							85	-26.2		CL	Dark greenish gray (GLEY1 4/10GY), very stiff, lean CLAY.	Wet.
90.1	9.9		18.7		21	MC BULK	90	-31.2		SW	Olive brown (2.5Y 4/4), medium dense, fine to medium SAND.	Moist. Bulk sample collected.
							95	-36.2				
							100	-41.2				

Notes:

1. Total depth of boring 91 feet below ground surface (bgs).
2. Groundwater encountered at ~71 feet bgs.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

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DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–08

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/19/18
DATE FINISHED: 4/19/18
ELEVATION: 59.5
NORTHING: 2042582.5
EASTING: 6024105.8

GW DEPTH: NA
TOTAL DEPTH: 88.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	59.5		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	Dry. ...(0'–6') – cleared by hand auger and air knife.
										GP	Aggregate base rock.	
										CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	Dry to moist.
							5	54.5				
											REFUSE: Black (10YR 2/1) CLAY with waste (wood).	...(7'–16') – no sample return.
							10	49.5				
							15	44.5				
											...(16') – mostly wood with lesser brick, concrete, and metal.	Moist.
							20	39.5				
							25	34.5				
							30	29.5				
							35	24.5				
					44	MC					...(37') – hard.	...(37'–45') – no sample return.
							40	19.5				
							45	14.5			...(45') – mostly wood.	
							50	9.5				

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DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–08

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/19/18
DATE FINISHED: 4/19/18
ELEVATION: 59.5
NORTHING: 2042582.5
EASTING: 6024105.8

GW DEPTH: NA
TOTAL DEPTH: 88.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	9.5		...same as above.	
							55	4.5			
									CH	YOUNG BAY MUD: Dark greenish gray (5Y 4/1), fossiliferous, fat CLAY.	
							60	–0.5			
									CL	Dark greenish gray (5Y 4/1), fine SANDY CLAY.	
									CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) CLAY with minor fine SAND. ...(65') – minor subangular, fine GRAVEL and very minor iron–oxide staining.	
							65	–5.5			
			17.0		38	MC			CL	Dark yellowish brown (10YR 4/4), hard, coarse SANDY CLAY with GRAVEL.	
							70	–10.5			
85.7	14.3					BULK			CL/ SC	Dark yellowish brown (10YR 4/4), coarse SANDY CLAY to CLAYEY SAND with subrounded GRAVEL.	Bulk sample collected.
							75	–15.5			
			14.0		50/5"	MC			SC	Dark yellowish brown (10YR 4/4,) coarse CLAYEY SAND with GRAVEL. ...(78') – very dense.	
							80	–20.5	CL	Dark yellowish brown (10YR 4/4) CLAY with minor SAND and iron–oxide staining. ...(84') – minor fine GRAVEL. ...(85') – increase in iron– and manganese–oxide staining. ...(87') – hard.	
							85	–25.5			
			17.9	112.9	50	MC					
							90	–30.5			
							95	–35.5			
							100	–40.5			

Notes:

1. Total depth of boring 88.5 feet below ground surface (bgs).
2. No groundwater encountered.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–09

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/19/18
DATE FINISHED: 4/19/18
ELEVATION: 55.3
NORTHING: 2042504.9
EASTING: 6024252.0

GW DEPTH: ~70 feet
TOTAL DEPTH: 90.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	55.3		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	...(0'–6') – cleared by hand auger and air knife.
										GP	Aggregate base rock.	
							5	50.3		CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	
		1.75									REFUSE: Greenish black (2.5Y/10Y), firm CLAY matrix with construction debris/trash (wood, concrete, plastic, bricks).	Moist. ...(6.5') – 1.75 tsf (pocket pen).
		1.25					10	45.3				...(10.5') – 1.25 tsf (pocket pen).
							15	40.3				
		1.75										...(16.5') – 1.75 tsf (pocket pen). Wet.
							20	35.3				
		1.25										Wet. ...(22') – 1.25 tsf (pocket pen).
		1.25										...(24') – 1.25 tsf (pocket pen).
							25	30.3				
		1.25										...(26') – 1.25 tsf (pocket pen).
					76	MC	30	25.3			...(29.5') – some newspaper.	
							35	20.3				
							40	15.3				
							45	10.3				
							50	5.3		CH	YOUNG BAY MUD: Dark greenish gray (3/10Y), stiff, fat CLAY with minor GRAVEL and seashells.	Moist.

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG-09

JOB NO.:	RM18.1038	DATE STARTED:	4/19/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/19/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	55.3
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042504.9
LOGGED BY:	B. TREECE	EASTING:	6024252.0

GW DEPTH: ~70 feet
TOTAL DEPTH: 90.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET
							50	5.3
		2.0						
		2.0					55	0.3
		2.0	12.3			BULK		
49.3	50.7		16.2		26	MC		
							60	-4.7
		3.0						
		1.5						
		>4.5					65	-9.7
		2.5	21.7			BULK		
45.7	54.3	1.5	22.1 19.1	103.9 113.1	41	MC		
							70	-14.7
		2.0						
						BULK		
		1.25						
						BULK	75	-19.7
		2.0						
		3.5						
						BULK		
77.3	22.7		19.8	119.8	49	MC		
							80	-24.7
		3.0						
		2.0						
		>4.5					85	-29.7
		>4.5						
						BULK		
			14.8	123.0	67	MC		
							90	-34.7
							95	-39.7
							100	-44.7

USCS SYMBOL	DESCRIPTION	COMMENTS
	...same as above.	
CH	YOUNG BAY MUD: Dark greenish gray (3/10Y), stiff, fat CLAY with minor GRAVEL and seashells. ...(55') – no GRAVEL.	Moist. ...(52.5') – 2.0 tsf (pocket pen). ...(55') – moist. 2.0 tsf (pocket pen).
CL	Dark greenish gray (4/5GY), stiff, fine to coarse SANDY CLAY with GRAVEL up to 1" in size.	...(57') – moist. 2.0 tsf (pocket pen). Bulk sample collected.
CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4), medium dense, fine to coarse CLAYEY SAND with GRAVEL up to 1.5" in size.	Moist. ...(61') – moist. 3.0 tsf (pocket pen).
CL	Brown (10YR 4/3), stiff CLAY with fine to medium SAND. ...(61') – some fine GRAVEL.	...(63') – moist. 1.5 tsf (pocket pen). ...(65') – moist. 4.5+ tsf (pocket pen).
CL	Brown (10YR 4/3), stiff CLAY with minor coarse SAND and fine GRAVEL up to 3/8" in size. ...(67') – color change to dark yellowish brown (10YR 4/4); minor fine SAND. ...(69') – moderate fine SAND.	...(67') – moist. 2.5 tsf (pocket pen). Bulk sample collected. ...(69') – moist. 1.5 tsf (pocket pen).
SW	Dark yellowish brown (10YR 4/4), dense, fine to medium SAND.	Wet.
CL	Dark yellowish brown (10YR 4/4), dense, fine to medium SANDY CLAY.	Wet. ...(71.5') – 2.0 tsf (pocket pen) ...(72') – wet. Bulk sample collected.
SW	Dark yellowish brown (10YR 4/4), dense, fine to medium SAND.	
SC	Dark yellowish brown (10YR 4/4), dense, fine to medium CLAYEY SAND.	Wet.
CL	Dark yellowish brown (10YR 4/4), dense CLAY with fine to medium SAND.	Wet. ...(74.5') – wet. 1.25 tsf (pocket pen). ...(75') – bulk sample.
SC	Dark blueish gray (GLEY2 4/1), dense, fine to medium CLAYEY SAND.	
CL	Dark blueish gray (GLEY2 4/1), dense, fine to medium SANDY CLAY.	...(76.5') – wet. 2.0 tsf (pocket pen).
CL	Olive (5Y 4/3), very stiff CLAY; oxidation banding.	...(77') – moist. Bulk sample collected.
CL	Dark greenish gray (4/5GY), dense, fine to medium SAND with CLAY.	...(77.5') – 3.5 tsf (pocket pen)
CL	Mottled with olive and bluish gray CLAY with SAND. Stiff to hard. Abundant fine SAND to fine GRAVEL.	...(78') – bulk sample. ...(79.5') – wet. ...(81') – 3.0 tsf (pocket pen).
CL	Olive gray (5Y 4/2), hard CLAY with adundant fine SAND to coarse GRAVEL up to 3" in size. ...(88.5') – abundant medium SAND to fine GRAVEL; oxidation banding.	...(82') – moist. ...(83') – 2.0 tsf (pocket pen) ...(84') – moist. ...(85') – 4.5+ tsf (pocket pen) ...(88') – 4.5+ tsf (pocket pen) Bulk sample collected. ...(88.5') – moist. ...(90') – wet.
SC	Dark yellowish brown, dense CLAYEY SAND.	

Notes:

1. Total depth of boring 90.5 feet below ground surface (bgs).
2. Groundwater encountered at ~70 feet bgs.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG-10

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/20/18
DATE FINISHED: 4/20/18
ELEVATION: 54.5
NORTHING: 2042708.1
EASTING: 6024158.8

GW DEPTH: ~69 feet
TOTAL DEPTH: 80.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	54.5		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	...(0'-6') - cleared by hand auger and air knife.
										GP	Aggregate base rock.	
		1.25					5	49.5		CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	...(5') - 1.25 tsf (pocket pen).
							10	44.5			REFUSE: Greenish black (5GY 2.5/1) CLAY with variable amounts of trash/debris (wood, concrete, rubble, plastic, etc).	
							15	39.5				
							20	34.5				
							25	29.5			...(25') - minor trash/debris.	
		1.75										...(27') - 1.75 tsf (pocket pen).
							30	24.5				...(29'-36') - no sample return.
							35	19.5				
							40	14.5				
							45	9.5				
							50	4.5		CH	YOUNG BAY MUD: Dark greenish gray (5GY 3/1), medium dense SANDY CLAY. Abundant fine to coarse SAND with minor shells.	Moist to wet.
		1.75								CL	Dark greenish gray (5GY 3/1), firm, lean CLAY; abundant shells.	Moist. ...(52') - 1.75 tsf (pocket pen).

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG-10

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/20/18
DATE FINISHED: 4/20/18
ELEVATION: 54.5
NORTHING: 2042708.1
EASTING: 6024158.8

GW DEPTH: ~69 feet
TOTAL DEPTH: 80.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET
							50	4.5
		1.75						
						BULK		
							55	-0.5
		>4.5						
		>4.5						
					33	MC		
							60	-5.5
		2.5						
		3.0						
		3.0				BULK		
							65	-10.5
		1.75						
		1.5				BULK		
					43	MC		
							70	-15.5
		2.75						
		3.25						
						BULK		
							75	-20.5
					11	MC		
							80	-25.5
							85	-30.5
							90	-35.5
							95	-40.5
							100	-45.5

USCS SYMBOL	DESCRIPTION	COMMENTS
	...same as above.	Moist to wet.
CH	YOUNG BAY MUD: Dark greenish gray (5GY 3/1), medium dense SANDY CLAY. Abundant fine to coarse SAND with minor shells.	Moist. ...(52') – 1.75 tsf (pocket pen).
CL	Dark greenish gray (5GY 3/1), firm, lean CLAY; abundant shells. ...(54') – few shells.	Bulk sample collected.
SC	Dark greenish gray (5GY 3/1), medium dense CLAYEY SAND with GRAVEL.	Wet.
CL	OLDER BAY ALLUVIUM: Dark greenish gray (5GY 4/1), hard SANDY CLAY. Abundant fine SAND. CLAYEY SAND with GRAVEL at base.	Moist. ...(57') – 4.5+ tsf (pocket pen).
CL	Dark yellowish brown, hard SANDY CLAY with GRAVEL up to 1" in size. Abundant fine to coarse SAND.	...(57.5') – moist. ...(58') – 4.5+ tsf (pocket pen).
SC	Dark yellowish brown (10YR 4/4), dense, fine to medium CLAYEY SAND.	Wet. No liners in split spoon.
SW	Dark yellowish brown (10YR 4/4), dense, fine to medium SAND.	Wet.
CL	Dark yellowish brown (10YR 4/6), stiff CLAY with fine to coarse SAND and minor fine GRAVEL.	...(62') – moist. 2.5 tsf (pocket pen).
CL	Dark yellowish brown (10YR 4/6), very stiff CLAY with abundant fine SAND. ...(67') – siff; abundant fine SAND.	...(64') – moist. 3.0 tsf (pocket pen). ...(65') – bulk sample. ...(65.5') – 3.0 tsf (pocket pen) ...(67') – moist. 1.75 tsf (pocket pen).
SW CL	Interbedded SAND/CLAY.	
SC	Dark yellowish brown, dense CLAYEY SAND.	...(68') – 1.5 tsf (pocket pen). Bulk sample collected.
CL	Dark yellowish brown, stiff CLAY with SAND.	...(69') – wet.
CL	Light olive brown (2.5Y 5/3), very stiff CLAY with minor fine to medium SAND.	...(72') – moist. 2.75 tsf (pocket pen).
CL	Light olive brown (2.5Y 5/3), very stiff SANDY CLAY with minor fine to medium SAND.	...(74') – moist. 3.25 tsf (pocket pen). Bulk sample. ...(79') – slough, no sample recovered.

Notes:

1. Total depth of boring 80.5 feet below ground surface (bgs).
2. Groundwater encountered at ~69 feet bgs.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

Geo-Logic Associates
Boring Log

BORING NO.: TG-14

JOB NO.:	RM18.1038	DATE STARTED:	4/17/18	GW DEPTH:	~67 feet
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/17/18	TOTAL DEPTH:	90.5 feet
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	45.8		
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2042810.5		
LOGGED BY:	B. TREECE	EASTING:	6024341.5		

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	45.8		SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	
										GP	Aggregate base rock.	Moist.
										CL	Low Permeability Barrier Layer: Very dark gray (2.5Y 3/1), stiff CLAY.	
							5	40.8				
							10	35.8		CL	Foundation Layer: Very dark grayish brown (2.5Y 3/2), stiff SANDY CLAY. Abundant fine to medium SAND and GRAVEL.	Moist.
										CL	Foundation Layer: Very dark greenish gray (2.5/5G), firm SANDY CLAY.	Moist.
							15	30.8			REFUSE: Wood, concrete, and plastic debris in a dark greenish gray to black CLAYEY matrix.	
											...(18') – mostly peat-like; woody debris.	
					50/4"	MC						
							20	25.8			...(21.5') – mostly greenish black, fat CLAY matrix around minor amounts of woody debris. Minor SAND and GRAVEL.	
							25	20.8				
												...(29') – no sample recovered.
							30	15.8			...(30') – mostly woody debris in a greenish black CLAYEY matrix. Minor SAND and GRAVEL.	
							35	10.8				
					78/9"	MC						
							40	5.8			...(39.5') – woody debris in SANDY CLAY matrix. Minor SAND and GRAVEL.	
							45	0.8			YOUNG BAY MUD:	
		0.75								CH	Greenish black (2.5/10GY), soft, fat CLAY. ...(47'–47.5') – SAND lens.	...(46.5') – moist. 0.75 tsf (pocket pen).
		2.5								CL	Dark greenish gray (4/5GY), stiff, lean CLAY with minor fine SAND.	...(48') – moist. 2.5 tsf (pocket pen).
			35.7	84.6	14	MC	50	-4.2		CL	OLDER BAY ALLUVIUM:	...(50') – moist.
		2.5									Yellowish brown (10YR 5/4), stiff, lean CLAY; oxidized.	...(50.5') – 2.5 tsf (pocket pen).

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG-14

PAGE: 2 OF 2

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/17/18
DATE FINISHED: 4/17/18
ELEVATION: 45.8
NORTHING: 2042810.5
EASTING: 6024341.5

GW DEPTH: ~67 feet
TOTAL DEPTH: 90.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
		2.5 2.0 4.0					50 55	-4.2 -9.2	CL	OLDER BAY ALLUVIUM: Yellowish brown (10YR 5/4), stiff, lean CLAY; oxidized. ...(52.5') – color change to yellowish brown (2.5Y 6/3).	...(50') – moist. ...(50.5') – 2.5 tsf (pocket pen). ...(52.5') – moist. ...(53') – 2.0 tsf (pocket pen). ...(55') – 4.0 tsf (pocket pen).
									CL	Yellowish brown (10YR 5/6), hard CLAY with fine to medium SAND.	Moist.
					50	MC	60	-14.2	CL	Yellowish brown (10YR 5/6), hard, lean CLAY; oxidized.	Moist to wet. ...(59') – no sample recovered.
					20	MC	65	-19.2	CL	Yellowish brown (10YR 5/6), hard SANDY CLAY with GRAVEL. ...(67') – more GRAVEL than above; stiff; fine to coarse SAND and GRAVEL up to 1" in size.	Moist. Wet.
							70	-24.2	SW/CL	Brown (10YR 4/3), medium dense, well-graded, fine to coarse SAND with CLAY. ...(71.5') – minor GRAVEL.	Moist to wet. Moist to wet.
		2.5 2.5	25.0	109.3	44	MC	75 80	-29.2 -34.2	CL	Olive (2.5Y 5/4), stiff LEAN CLAY; minor oxidation.	...(72.5') – moist to wet. 2.5 tsf (pocket pen). ...(75.5') – 2.5 tsf (pocket pen). Wet.
							85 90 95 100	-39.2 -44.2 -49.2 -54.2		Notes: 1. Total depth of boring 80.5 feet below ground surface (bgs). 2. Groundwater encountered at ~67 feet bgs. 3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.	

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DRAFT

Geo-Logic Associates
Boring Log

BORING NO.: TG–16

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/17/18
DATE FINISHED: 4/17/18
ELEVATION: 39.9
NORTHING: 2042825.8
EASTING: 6024567.4

GW DEPTH: ~52 feet
TOTAL DEPTH: 78.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	39.9	SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	
									GP	Aggregate base rock.	
									CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Dark olive brown, very stiff CLAY.	Moist.
							5	34.9			
							10	29.9		REFUSE: Greenish black (2.5/5GY), stiff CLAY with wood debris, carpet, concrete.	Moist.
							15	24.9			
					41	MC				...(17.5') – greenish black (2.5/5GY), stiff SANDY CLAY with wood debris, carpet, concrete.	Moist.
										...(19') – greenish black (2.5/5GY), stiff, fat CLAY with wood debris, carpet, concrete.	Moist.
							20	19.9			
										...(20.5') – same as above with abundant concrete/bricks.	Moist.
							25	14.9			
			27.7	76.4	45	MC				...(28') – same as above with wood chunks.	...(28') – free water in sample.
							30	9.9			Moist.
							35	4.9			
			59.6	54.5	45	MC				...(38') – more CLAY than above.	Moist.
		1.0							CH	YOUNG BAY MUD: Greenish black (2.5/5GY), firm CLAY with abundant seashells and minor fine SAND.	...(39') – 1.0 tsf (pocket pen).
							40	–0.1			
		2.75							CL	OLDER BAY ALLUVIUM: Dark greenish gray (4/5GY), stiff, fat CLAY with abundant fine to coarse SAND.	...(43') – moist. 2.75 tsf (pocket pen).
		2.25							CL	Brown (10YR 5/3), very stiff CLAY with minor subrounded to subangular, fine to coarse SAND up to 1/8"in size; oxidized.	...(44') – moist. 2.25 tsf (pocket pen).
							45	–5.1			
		3.5	19.5	110.6	40	MC					...(48') – 3.5 tsf (pocket pen)
									CL	Brown (10YR 5/3), firm CLAY; oxidized; little to no SAND.	...(49.5') – moist. ...(50') – 1.25 tsf (pocket pen).
							50	–10.1			
		2.0							CL	Brown (10YR 5/3), firm to stiff CLAY with minor fine to coarse SAND; oxidized.	...(52') – moist to wet. 2.0 tsf (pocket pen).

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Geo-Logic Associates
Boring Log

BORING NO.: TG-16

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: B. TREECE

DATE STARTED: 4/17/18
DATE FINISHED: 4/17/18
ELEVATION: 39.9
NORTHING: 2042825.8
EASTING: 6024567.4

GW DEPTH: ~52 feet
TOTAL DEPTH: 78.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	-10.1		CL	...same as above.	...(50') – 1.25 tsf (pocket pen).
		1.0								CL	Brown (10YR 5/3), firm to stiff CLAY with minor fine to coarse SAND; oxidized.	...(52') – moist to wet. 2.0 tsf (pocket pen).
							55	-15.1		SC	Brown (10YR 5/3), dense, fine to medium CLAYEY SAND with minor fine GRAVEL.	Moist to wet.
										CL	Brown (10YR 5/3), dense SANDY CLAY. Fine to medium SAND and minor fine GRAVEL.	Moist to wet.
50.5	49.5	>4.5 >4.5	15.6	119.3	67	MC	60	-20.1		CL	Dark yellowish brown (10YR 4/6), hard CLAY with abundant fine to coarse SAND and minor fine GRAVEL.	Moist. ...(58') – 4.5+ tsf (pocket pen). ...(59.5') – 4.5+ tsf (pocket pen).
							65	-25.1		CL	Olive (5Y 5/3), hard CLAY; rare medium SAND.	Moist.
		2.5	38.3	82.5	33	MC				CL	Dark yellowish brown (10YR 3/4), hard CLAY with minor fine to coarse SAND.	Moist.
		2.0								CL	Olive (5Y 5/3), stiff CLAY.	...(67.5') – moist. 2.5 tsf (pocket pen). ...(68.5') – 2.0 tsf (pocket pen).
		3.25					70	-30.1		CL	Olive (5Y 5/3), very stiff CLAY; oxidized.	...(70') – moist.
		4.0								CL	Yellowish brown (10YR 3/4), very stiff, fine to coarse SANDY CLAY with GRAVEL up to 3/4" in size; oxidized.	...(70.5') – 3.25 tsf (pocket pen). ...(71') – moist. ...(73.5') – 4.0 tsf (pocket pen).
		2.0 1.5 1.5 3.0	27.7	96.8	69	MC	75	-35.1		CL	Yellowish brown (10YR 3/4), hard CLAY. Oxidation banding. ...(76.5') – color change to olive brown. ...(77.5') – color change to yellowish brown (10YR 3/4).	...(74') – moist. ...(75.5') – 2.0 tsf (pocket pen) ...(76.5') – moist. 1.5 tsf (pocket pen). ...(77.5') – moist. 1.5 tsf (pocket pen). ...(78') – 3.0 tsf (pocket pen).
							80	-40.1				
							85	-45.1				
							90	-50.1				
							95	-55.1				
							100	-60.1				

Notes:

1. Total depth of boring 78.5 feet below ground surface (bgs).
2. Groundwater encountered at ~52 feet bgs.
3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.

Geo-Logic Associates
Boring Log

BORING NO.: TG-17

JOB NO.:	RM18.1038	DATE STARTED:	4/19/18
SITE LOCATION:	TOPGOLF BURLINGAME	DATE FINISHED:	4/19/18
DRILLING METHOD:	6" ø SONIC (LS 600)	ELEVATION:	34.9
CONTRACTOR:	CASCADE DRILLING	NORTHING:	2043069.7
LOGGED BY:	K. WELCHANS	EASTING:	6024505.3

GW DEPTH: ~17 feet
TOTAL DEPTH: 68.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							0	34.9	SM	FINAL COVER: Synthetic turf on top of gray, poorly graded, fine SILTY SAND.	Dry. ...(0'–7') – cleared by hand auger and air knife.
									GP	Aggregate base rock.	
									CL	Low Permeability Barrier Layer and Foundation Layer (Undifferentiated): Black (10YR 2/1) CLAY.	Dry to moist.
							5	29.9			
										REFUSE: Black (10YR 2/1) CLAY with very little refuse.	Wet (boring left open overnight).
							10	24.9			
										...(11') – increase in refuse. Mostly wood, lesser tile and concrete.	Moist.
							15	19.9			
										...(17') – minimal refuse.	Wet.
										...(19') – mostly wood.	Moist.
							20	14.9			
							25	9.9			
					13	MC				...(27') – stiff.	Wet.
							30	4.9			Moist.
							35	-0.1			Wet.
									CH	YOUNG BAY MUD: Dark greenish gray (5GY 4/1), fossiliferous, fat CLAY.	
									CL	OLDER BAY ALLUVIUM: Dark yellowish brown (10YR 4/4) SANDY CLAY with abundant GRAVEL and iron-oxide staining.	
							40	-5.1			
									SC	Dark yellowish brown (10YR 4/4) CLAYEY SAND with GRAVEL.	
									CL/SC	Dark yellowish brown (10YR 4/4) CLAYEY SAND to SANDY CLAY.	
							45	-10.1			
									CL	Dark yellowish brown (10YR 4/4) CLAY with SAND and iron-oxide staining.	
			20.9	109.5	46	MC				...(47') – hard; minor GRAVEL.	
							50	-15.1	CL	Dark yellowish brown (10YR 4/4) SANDY CLAY with subrounded GRAVEL. ...(51') – iron-oxide staining.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

Geo-Logic Associates
Boring Log

BORING NO.: TG–17

JOB NO.: RM18.1038
SITE LOCATION: TOPGOLF BURLINGAME
DRILLING METHOD: 6" ø SONIC (LS 600)
CONTRACTOR: CASCADE DRILLING
LOGGED BY: K. WELCHANS

DATE STARTED: 4/19/18
DATE FINISHED: 4/19/18
ELEVATION: 34.9
NORTHING: 2043069.7
EASTING: 6024505.3

GW DEPTH: ~17 feet
TOTAL DEPTH: 68.5 feet

SAND & GRAVEL	SILT & CLAY	POCKET PEN (TSF)	MOISTURE (%)	DRY DENSITY (LBS/CU. FT.)	BLOWS (COUNT/FT.)	SAMPLE TYPE	DEPTH IN FEET	ELEVATION IN FEET	USCS SYMBOL	DESCRIPTION	COMMENTS
							50	-15.1	CL	...same as above.	
										...(51') – iron–oxide staining.	
										...(53') – increase in GRAVEL content.	
							55	-20.1			
					16	MC				...(57') – very stiff.	No sample return. Sand catcher used.
							60	-25.1	CL	Olive (5Y 4/3) CLAY.	
										...(63') – iron–oxide staining.	
							65	-30.1			
			37.6	82.2	22	MC				...(67') – very stiff.	
							70	-35.1		Notes: 1. Total depth of boring 68.5 feet below ground surface (bgs). 2. Groundwater encountered at ~17 feet bgs. 3. Boring backfilled with bentonite grout to the top of trash. Bentonite chips placed on top of the slurry to one foot below ground surface. Top one foot backfilled with SANDY CLAY.	
							75	-40.1			
							80	-45.1			
							85	-50.1			
							90	-55.1			
							95	-60.1			
							100	-65.1			

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

DRAFT

DRILLING NOTIFICATION FORM FOR ANNUAL GEOTECHNICAL DRILLING PERMIT

SAN MATEO COUNTY ENVIRONMENTAL HEALTH SERVICES DIVISION
2000 ALAMEDA DE LAS PULGAS, SUITE 100, SAN MATEO, CA. 94403
VOICE (650) 372-6200 FAX (650) 627-8244 WWW.SMCHEALTH.ORG

An accurate & correct map of proposed boring locations must be included with notification.

Notification is hereby given under Annual Geotechnical Drilling Permit No. AGDP-17-0737 with expiration date April 21, 2018 that Geo-Logic Associates will be drilling for soil boring geotechnical investigation only, not permanent structures or for environmental investigations, as described below.

ALL DRILLING MUST BE SCHEDULED WITH COUNTY STAFF (drilling@smcgov.org) AT LEAST TWO (2) WORKING DAYS (48 HOURS) IN ADVANCE

DRILLING WILL BEGIN ON: 4/16/2018 AT: 0900AM (AM/PM) NO. OF BORINGS 19

BORING DESIGNATIONS# TG-01 Through TG-19

DRILLING INFORMATION **(MUST BE FILLED OUT COMPLETELY)**

SITE NAME Burlingame Golf Center ASSESSOR'S PARCEL # (REQUIRED) 02629038 (one per permit)

DRILLING LOCATION ADDRESS 250 Anza Blvd CITY Burlingame ZIP 94010

Borings To Be Constructed In: ☐ Public Property ☒ Private Property ☒ Refuse ☐ Other

Maximum Proposed Depth Wells/Borings 80 (feet) Drilling Method Sonic

Boring Diameter 8" Grout Material: use 6 gallons water max per 94 lb cement, can add up to 5% bentonite

BORING OWNER **(BORING OWNER NAME OR CONTACT NAME SHOULD MATCH SIGNATURE)**

NAME City of Burlingame CONTACT PERSON Margaret Glomstad

ADDRESS 850 Burlingame Ave CITY, STATE, ZIP Burlingame, CA, 94010

TELEPHONE 6505587307 EMAIL mglomstad@burlingame.org

(Letter signed by boring owner attesting to knowledge of all permit requirements and conditions, may be substituted for signature on permit application.)

Boring Owner's Signature **Date** 4/11/18

PROPERTY OWNER **(NAME AS APPEARS ON ASSESSOR'S ROLES SHOULD MATCH SIGNATURE)**

NAME City of Burlingame CONTACT PERSON Margaret Glomstad

ADDRESS 850 Burlingame Ave CITY, STATE, ZIP Burlingame, CA, 94010

TELEPHONE 6505587307 EMAIL mglomstad@burlingame.org

I understand that a boring(s) is being installed on my property. *(Letter signed by property owner, containing previous language, or encroachment permit may be substituted for signature on permit application.)*

Property Owner's Signature **Date** 4/11/18

DRILLING COMPANY

DRILLING COMPANY Cascade Drilling CONTACT PERSON Ken Phillips

ADDRESS 3000 Duluth Street CITY, STATE, ZIP West Sacramento, CA 95691

TELEPHONE 916-638-1169 C 57 LICENSE # 938110 E-MAIL kphillips@cascade-env.com

I certify that borings under this notification will be constructed/destroyed in compliance with the conditions of the Annual Geotechnical Drilling Permit listed above, the San Mateo County Ordinance, and the State Water Well Standards, and that the license listed above is considered current and active by the Contractor's State License Board.

Driller's Signature **Date** 4/12/2018

CONSULTANT COMPANY

CONSULTANT COMPANY Geo-Logic Associates PROJECT MANAGER Bret Treece

ADDRESS 16055 Caputo Drive Spc D TELEPHONE # 4087782818

CITY,STATE, ZIP Morgan Hill, CA, 95037 E-MAIL btreece@geo-logic.com

I certify that this notification is correct to the best of my knowledge. I certify that the geotechnical borings under this notification will be constructed/destroyed in compliance with the conditions of the Annual Geotechnical Drilling Permit listed above, the San Mateo County Ordinance, and the State Water Well Standards. I certify if I indicated the purpose of drilling is geotechnical, then no one will use the boring to collect any samples for environmental analyses. *(Responsible Professional must be a California Professional Geologist or Civil Engineer.)*

Responsible Professional's Name (Please print legibly) Bret Treece

Responsible Professional's Signature **Date** 4/12/2018

California Professional Geologist (PG) No. 9265 **or Civil Engineer (PE) No.**

Revised every January 1

DRAFT

ORDINANCE: 04023

ENVIRONMENTAL HEALTH
SAN MATEO COUNTY

Protecting Our Health and Environment

PERMIT 17- 0737

PE: 2013 GEOTECHNICAL - ANNUAL SOIL BORING PERMIT

FACILITY:
SAN MATEO COUNTY 48 HOUR NOTICE

OWNER:
GEO-LOGIC ASSOCIATES
16055 CAPUTO DR D
MORGAN HILL

SR0020720
AMOUNT PAID: $857.00

CONTRACTOR:

CONSULTANT:
TREECE, BRET

TERMS & CONDITIONS:
ANNUAL GEOTECHNICAL PERMIT

COUNTY OF SAN MATEO
FOUNDED 1856

KIAN ATKINSON

ENVIRONMENTAL HEALTH SPECIALIST

DATE ISSUED: 4/21/2017

EXPIRATION DATE: 4/21/2018

THIS PERMIT IS NONTRANSFERABLE AND MUST BE POSTED ON-SITE IN A CONSPICUOUS PLACE

DRAFT

PAID
857.
CC VISA

2017 ANNUAL GEOTECHNICAL DRILLING PERMIT APPLICATION

SAN MATEO COUNTY ENVIRONMENTAL HEALTH
APR 19 2017
RECEIVED

SAN MATEO COUNTY ENVIRONMENTAL HEALTH SERVICES DIVISION
2000 ALAMEDA DE LAS PULGAS, SUITE 100, SAN MATEO, CA 94403
VOICE (650) 372-6200 FAX (650) 627-8244 SMCHEALTH.ORG

2017
As of 8/1/16
Fee: $857

ALLOW THREE (3) WORKING DAYS FOR PROCESSING PERMIT **ALL DRILLING MUST BE SCHEDULED WITH COUNTY STAFF (drilling@smcgov.org) AT LEASTTWO (2) WORKING DAYS (48 HOURS) IN ADVANCE, ONE APPLICATION PER OFFICE LOCATION**

Consultant Company: (one per office) Geo-Logic Associates

Primary Contact: Bret Treece Email: BTreece@geo-logic.com

Mailing Address 16055 Caputo Drive Spc. D

City, State, Zip Morgan Hill, CA 95037 Telephone: (408) 778 2818

GENERAL CONDITIONS:

1. Only **GEOTECHNICAL** investigations will be performed under this permit. Other investigations including, but not limited to, environmental investigations and grab soil or water sampling for activities other than geotechnical investigation, require a Subsurface Drilling Permit Application with the appropriate fee.
2. Any well installations, including wells for geotechnical investigations, require a separate Subsurface Drilling Permit Application with the appropriate fee.
3. Written notification to Groundwater Protection Program (GPP) staff, on GPP-supplied forms, must occur at least two (2) working days prior to each drilling event.
4. An accurate & correct map of proposed boring locations must be included with the written notification. The boring location map must be to scale and include north arrow, existing site features, approximate property lines and any other pertinent existing & historic features and information.
5. Boring construction and destruction under this permit is subject to the Standards for the Construction of Wells in San Mateo County, County Groundwater Protection Program (GPP) Guidelines, Policies & Procedures, the State Water Well Standards, and any instructions by County GPP staff.
6. All borings must be properly destroyed (grouted/sealed), using neat cement grout with maximum of 5% bentonite or sand cement (as specified in California Well Standards), within 24 hours of drilling unless special conditions are approved in writing as part of this permit.
7. Drilling under this permit must be under the supervision of a California Professional Geologist or Civil Engineer.
8. If contamination is discovered during drilling, verbal notification to County GPP by the Responsible Professional is required within 72 hours of discovery. A written report is required within 30 days.
9. The consultant company named above assumes responsibility for all activities and uses under the permit, including compliance with Workmen's Compensation Laws, and indemnifies, defends and saves the County of San Mateo, its' officers, agents and employees, free and harmless from any and all expense, cost, or liability in connection with or resulting from work or stopped-work associated with the permit, including, but not limited to, property damage, personal injury, wrongful death, and loss of income.
10. Permit is valid for one calendar year only from the permit issue date.
11. Violation of any requirement or general or special permit condition as listed on this permit application or on the ANNUAL GEOTECHNICAL PERMIT DRILLING NOTIFICATION may result in an order by GPP staff to cease work under this permit and correct the violation. An office hearing may be held to determine if Consulting Company will be allowed to continue to have and apply for future Annual Geotechnical Drilling Permits.
12. If there is a change in Responsible Professional, I will notify San Mateo County GPP staff.

Responsible Professional's Signature

Responsible Professional's Name Bret Treece

California Professional Geologist (PG) No. 9265 or Civil Engineer (PE) No.

County Approval: 1GAA Date: 4/19/17

DRAFT

Appendix **E**
CUTTINGS DISPOSAL

Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Date of Report: 06/15/2018

Rick Mitchell

Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Client Project:	RM18.1038
BCL Project:	Top Golf
BCL Work Order:	1813132
Invoice ID:	B303578, B305187, B306851

Enclosed are the results of analyses for samples received by the laboratory on 4/24/2018. If you have any questions concerning this report, please feel free to contact me.

Revised Report: This report supercedes Report ID 1000758021

Sincerely,

Contact Person: Natalie Serda
Client Service Rep

Stuart Buttram
Technical Director

Table of Contents

BC Laboratories, Inc.

Environmental Testing Laboratory Since 1949

Chain of Custody and Cooler Receipt Form for 1813132 Page 1 of 2

BC LABORATORIES, INC.

18-13132

Chain of Custody Form

Page 1 of 1

Report To: Client: GLA	Project #: RM18.1038
Attn: Bret Treece	Project Name: Top Golf
Street Address: 16055 caputo Dr #D	
City, State, Zip: M.H. CA 95037	Sampler(s): BT
Phone: 408 778 2818 Fax:	
Email: BTreece@geo-logic.com	
Work Order #:	

Analysis Requested

Please refer to the back of this page for completion and method legend.

Comments: 4 point composite

Sample #	Description	Date Sampled	Time Sampled	VOCs 8260	SVOCs 8270	TPH G/D/MO	Pesticides/PCBs	CAM 17 Metals	Soil	Sludge	Drinking Water	Ground Water	Waste Water	Other	Result Request **Surcharge: ☑ STD (10 Days) ☐ 5 Day** ☐ 2 Day** ☐ 1 Day** — Notes
1-2	Composite 1 (-1)	4/20/18	1530	X	X	X	X	X	X						
2-3	Composite 2			X	X	X	X	X	X						
3-4	Composite 3			X	X	X	X	X	X						
4-5	Composite 4			X	X	X	X	X	X						

CHK BY: [illegible] DISTRIBUTION: [illegible] SUB OUT ☐

Billing ☑ Same as above

Client:

Address:

City: State Zip

Attn:

P.O. #:

EDF Required? Geotracker ☑ Yes ☐ No

Send Copy to State of CA? (EDT) ☐ Yes ☐ No

Global ID (Needed for EDF)

System # (Needed for EDT)

Relinquished By	Date	Time	Received By	Date	Time
1. Relinquished By: [signature]	4/23/18	1200	1. Received By: [signature]	4.24.18	1045
2. Relinquished By:			2. Received By:		
3. Relinquished By:			3. Received By:		

BC Laboratories, Inc. – 4100 Atlas Ct. – Bakersfield, CA 93308 – 661.327.4911 – Fax: 661.327.1918 – www.bclabs.com

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Chain of Custody and Cooler Receipt Form for 1813132 Page 2 of 2

BC LABORATORIES INC. COOLER RECEIPT FORM Page 1 Of 1

Submission #: 18-13132

SHIPPING INFORMATION
Fed Ex ☑ UPS ☐ Ontrac ☐ Hand Delivery ☐
BC Lab Field Service ☐ Other ☐ (Specify)

SHIPPING CONTAINER
Ice Chest ☑ None ☐ Box ☐
Other ☐ (Specify)

FREE LIQUID
YES ☐ NO ☐
W / S

Refrigerant: Ice ☐ Blue Ice ☐ None ☑ Other ☐ Comments:

Custody Seals Ice Chest ☐ Intact? Yes ☐ No ☐ Containers ☐ Intact? Yes ☐ No ☐ None ☑ Comments:

All samples received? Yes ☑ No ☐ All samples containers intact? Yes ☑ No ☐ Description(s) match COC? Yes ☑ No ☐

COC Received ☑ YES ☐ NO

Emissivity: 0.98 Container: Clear glass Thermometer ID: 274 Date/Time 4-24-18 1045

Temperature: (A) 20.3 °C / (C) 21.3 °C 4/24/18 Analyst Init KJ

SAMPLE CONTAINERS	2	3	4	5	6	7	8	9	10
QT PE UNPRES									
4oz / 8oz / 16oz PE UNPRES									
2oz Cr+6									
QT INORGANIC CHEMICAL METALS									
INORGANIC CHEMICAL METALS 4oz / 8oz / 16oz									
PT CYANIDE									
PT NITROGEN FORMS									
PT TOTAL SULFIDE									
2oz. NITRATE / NITRITE									
PT TOTAL ORGANIC CARBON									
PT CHEMICAL OXYGEN DEMAND									
PtA PHENOLICS									
40ml VOA VIAL TRAVEL BLANK									
40ml VOA VIAL									
QT EPA 1664									
PT ODOR									
RADIOLOGICAL									
BACTERIOLOGICAL									
40 ml VOA VIAL- 504									
QT EPA 508/608/8080									
QT EPA 515.1/8150									
QT EPA 525									
QT EPA 525 TRAVEL BLANK									
40ml EPA 547									
40ml EPA 531.1									
8oz EPA 548									
QT EPA 549									
QT EPA 8015M									
QT EPA 8270									
8oz / 16oz / 32oz AMBER									
8oz / 16oz / 32oz JAR	A	A	A	A					
SOIL SLEEVE									
PCB VIAL									
PLASTIC BAG									
TEDLAR BAG									
FERROUS IRON									
ENCORE									
SMART KIT									
SUMMA CANISTER									

Comments:
Sample Numbering Completed By: [signature] Date/Time: 4-24-18 1507
A = Actual / C = Corrected

Rev 21 05/23/2016

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill		**Reported:**	06/15/2018 9:35
16055-D Caputo Drive		Project:	Top Golf
Morgan Hill, CA 95037		Project Number:	RM18.1038
		Project Manager:	Rick Mitchell

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1813132-01	**COC Number:**	---	**Receive Date:**	04/24/2018 10:45
	Project Number:	---	**Sampling Date:**	04/20/2018 15:30
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	4 Point Composite 1-4	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1813132-02	**COC Number:**	---	**Receive Date:**	04/24/2018 10:45
	Project Number:	---	**Sampling Date:**	04/20/2018 15:30
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Composite 1	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1813132-03	**COC Number:**	---	**Receive Date:**	04/24/2018 10:45
	Project Number:	---	**Sampling Date:**	04/20/2018 15:30
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Composite 2	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1813132-04	**COC Number:**	---	**Receive Date:**	04/24/2018 10:45
	Project Number:	---	**Sampling Date:**	04/20/2018 15:30
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Composite 3	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil
1813132-05	**COC Number:**	---	**Receive Date:**	04/24/2018 10:45
	Project Number:	---	**Sampling Date:**	04/20/2018 15:30
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Composite 4	**Lab Matrix:**	Solids
	Sampled By:	---	**Sample Type:**	Soil

Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Organochlorine Pesticides (EPA Method 8081A)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
Aldrin	ND	mg/kg	0.00050	0.000049	EPA-8081A	1.4		1
alpha-BHC	ND	mg/kg	0.00050	0.000064	EPA-8081A			1
beta-BHC	ND	mg/kg	0.00050	0.000048	EPA-8081A			1
delta-BHC	ND	mg/kg	0.00050	0.00013	EPA-8081A			1
gamma-BHC (Lindane)	ND	mg/kg	0.00050	0.000086	EPA-8081A	4.0		1
Chlordane (Technical)	ND	mg/kg	0.050	0.0014	EPA-8081A	2.5		1
4,4'-DDD	**0.0021**	**mg/kg**	**0.00050**	**0.000083**	**EPA-8081A**	1.0		1
4,4'-DDE	**0.0022**	**mg/kg**	**0.00050**	**0.000038**	**EPA-8081A**	1.0		1
4,4'-DDT	**0.0020**	**mg/kg**	**0.00050**	**0.00014**	**EPA-8081A**	1.0		1
Dieldrin	**0.00087**	**mg/kg**	**0.00050**	**0.000042**	**EPA-8081A**	8.0		1
Endosulfan I	ND	mg/kg	0.00050	0.000028	EPA-8081A			1
Endosulfan II	ND	mg/kg	0.00050	0.000073	EPA-8081A			1
Endosulfan sulfate	ND	mg/kg	0.00050	0.00024	EPA-8081A			1
Endrin	ND	mg/kg	0.00050	0.000073	EPA-8081A	0.2		1
Endrin aldehyde	ND	mg/kg	0.00050	0.000077	EPA-8081A			1
Heptachlor	ND	mg/kg	0.00050	0.000099	EPA-8081A	4.7		1
Heptachlor epoxide	ND	mg/kg	0.00050	0.000030	EPA-8081A			1
Methoxychlor	ND	mg/kg	0.00050	0.00012	EPA-8081A	100		1
Toxaphene	ND	mg/kg	0.050	0.0019	EPA-8081A	5		1
TCMX (Surrogate)	132	%	20 - 130 (LCL - UCL)		EPA-8081A		S09	1
Decachlorobiphenyl (Surrogate)	28.8	%	40 - 130 (LCL - UCL)		EPA-8081A		S09	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8081A	05/01/18 09:00	05/01/18 19:31	HKS	GC-17	0.997	B012546

Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

PCB Analysis (EPA Method 8082)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
PCB-1016	ND	mg/kg	0.010	0.0026	EPA-8082	50		1
PCB-1221	ND	mg/kg	0.010	0.0024	EPA-8082	50		1
PCB-1232	ND	mg/kg	0.010	0.0044	EPA-8082	50		1
PCB-1242	ND	mg/kg	0.010	0.0059	EPA-8082	50		1
PCB-1248	ND	mg/kg	0.010	0.0037	EPA-8082	50		1
PCB-1254	**0.0067**	**mg/kg**	**0.010**	**0.0030**	**EPA-8082**	50	**J**	1
PCB-1260	ND	mg/kg	0.010	0.0056	EPA-8082	50		1
Total PCB's (Summation)	**0.0067**	**mg/kg**	**0.010**	**0.0050**	**EPA-8082**	50	**J**	1
Decachlorobiphenyl (Surrogate)	16.7	%	40 - 120 (LCL - UCL)		EPA-8082		S09	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8082	05/01/18 15:00	05/08/18 13:34	HKS	GC-15	1.007	B012686

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill		**Reported:**	06/15/2018 9:35
16055-D Caputo Drive		Project:	Top Golf
Morgan Hill, CA 95037		Project Number:	RM18.1038
		Project Manager:	Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
Benzene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
Bromobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
Bromochloromethane	ND	mg/kg	0.0050	0.00092	EPA-8260B			1
Bromodichloromethane	ND	mg/kg	0.0050	0.00084	EPA-8260B			1
Bromoform	ND	mg/kg	0.0050	0.0015	EPA-8260B			1
Bromomethane	ND	mg/kg	0.0050	0.0016	EPA-8260B			1
n-Butylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260B			1
sec-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260B			1
tert-Butylbenzene	ND	mg/kg	0.0050	0.0012	EPA-8260B			1
Carbon tetrachloride	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
Chlorobenzene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
Chloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
Chloroform	ND	mg/kg	0.0050	0.00063	EPA-8260B			1
Chloromethane	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
2-Chlorotoluene	ND	mg/kg	0.0050	0.0018	EPA-8260B			1
4-Chlorotoluene	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
Dibromochloromethane	ND	mg/kg	0.0050	0.00099	EPA-8260B			1
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.0050	0.0017	EPA-8260B			1
1,2-Dibromoethane	ND	mg/kg	0.0050	0.0010	EPA-8260B			1
Dibromomethane	ND	mg/kg	0.0050	0.0018	EPA-8260B			1
1,2-Dichlorobenzene	ND	mg/kg	0.0050	0.00081	EPA-8260B			1
1,3-Dichlorobenzene	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
1,4-Dichlorobenzene	ND	mg/kg	0.0050	0.0015	EPA-8260B			1
Dichlorodifluoromethane	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
1,1-Dichloroethane	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
1,2-Dichloroethane	ND	mg/kg	0.0050	0.00085	EPA-8260B			1
1,1-Dichloroethene	ND	mg/kg	0.0050	0.0012	EPA-8260B			1
cis-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
trans-1,2-Dichloroethene	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
Total 1,2-Dichloroethene	ND	mg/kg	0.010	0.0026	EPA-8260B			1
1,2-Dichloropropane	ND	mg/kg	0.0050	0.00081	EPA-8260B			1
1,3-Dichloropropane	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
2,2-Dichloropropane	ND	mg/kg	0.0050	0.0013	EPA-8260B			1

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
1,1-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260B			1
cis-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
trans-1,3-Dichloropropene	ND	mg/kg	0.0050	0.0012	EPA-8260B			1
Total 1,3-Dichloropropene	ND	mg/kg	0.010	0.0020	EPA-8260B			1
Ethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260B			1
Hexachlorobutadiene	ND	mg/kg	0.0050	0.0017	EPA-8260B			1
Isopropylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
p-Isopropyltoluene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
Methylene chloride	ND	mg/kg	0.010	0.0024	EPA-8260B			1
Methyl t-butyl ether	ND	mg/kg	0.0050	0.00050	EPA-8260B			1
Naphthalene	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
n-Propylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
Styrene	ND	mg/kg	0.0050	0.0014	EPA-8260B			1
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
Tetrachloroethene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
Toluene	ND	mg/kg	0.0050	0.0012	EPA-8260B			1
1,2,3-Trichlorobenzene	ND	mg/kg	0.0050	0.0021	EPA-8260B			1
1,2,4-Trichlorobenzene	ND	mg/kg	0.0050	0.0020	EPA-8260B			1
1,1,1-Trichloroethane	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
1,1,2-Trichloroethane	ND	mg/kg	0.0050	0.00077	EPA-8260B			1
Trichloroethene	ND	mg/kg	0.0050	0.0011	EPA-8260B	2040		1
Trichlorofluoromethane	ND	mg/kg	0.0050	0.0011	EPA-8260B			1
1,2,3-Trichloropropane	ND	mg/kg	0.0050	0.0016	EPA-8260B			1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
1,2,4-Trimethylbenzene	ND	mg/kg	0.0050	0.0013	EPA-8260B			1
1,3,5-Trimethylbenzene	ND	mg/kg	0.0050	0.0015	EPA-8260B			1
Vinyl chloride	ND	mg/kg	0.0050	0.0016	EPA-8260B			1
Total Xylenes	ND	mg/kg	0.010	0.0034	EPA-8260B			1
t-Amyl Methyl ether	ND	mg/kg	0.0050	0.00056	EPA-8260B			1
t-Butyl alcohol	ND	mg/kg	0.050	0.017	EPA-8260B			1
Diisopropyl ether	ND	mg/kg	0.0050	0.00080	EPA-8260B			1
Ethanol	ND	mg/kg	1.0	0.066	EPA-8260B			1

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
Ethyl t-butyl ether	ND	mg/kg	0.0050	0.00022	EPA-8260B			1
Methyl ethyl ketone	ND	mg/kg	0.010	0.0038	EPA-8260B			1
1,2-Dichloroethane-d4 (Surrogate)	103	%	70 - 121 (LCL - UCL)		EPA-8260B			1
Toluene-d8 (Surrogate)	103	%	81 - 117 (LCL - UCL)		EPA-8260B			1
4-Bromofluorobenzene (Surrogate)	98.9	%	74 - 121 (LCL - UCL)		EPA-8260B			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8260B	04/26/18 16:43	04/27/18 01:36	BEP	MS-V3	1	B012041

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Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
Acenaphthene	ND	mg/kg	1.0	0.092	EPA-8270C		A01	1
Acenaphthylene	ND	mg/kg	1.0	0.18	EPA-8270C		A01	1
Aldrin	ND	mg/kg	1.0	0.16	EPA-8270C	1.4	A01	1
Aniline	ND	mg/kg	2.0	0.16	EPA-8270C		A01	1
Anthracene	ND	mg/kg	1.0	0.50	EPA-8270C		A01	1
Benzidine	ND	mg/kg	30	0.58	EPA-8270C		A01	1
Benzo[a]anthracene	ND	mg/kg	1.0	0.41	EPA-8270C		A01	1
Benzo[b]fluoranthene	ND	mg/kg	1.0	0.094	EPA-8270C		A01	1
Benzo[k]fluoranthene	ND	mg/kg	1.0	0.17	EPA-8270C		A01	1
Benzo[a]pyrene	ND	mg/kg	1.0	0.26	EPA-8270C		A01	1
Benzo[g,h,i]perylene	ND	mg/kg	1.0	0.11	EPA-8270C		A01	1
Benzoic acid	ND	mg/kg	5.0	0.57	EPA-8270C		A01	1
Benzyl alcohol	ND	mg/kg	1.0	0.073	EPA-8270C		A01	1
Benzyl butyl phthalate	ND	mg/kg	1.0	0.33	EPA-8270C		A01	1
alpha-BHC	ND	mg/kg	1.0	0.35	EPA-8270C		A01	1
beta-BHC	ND	mg/kg	1.0	0.40	EPA-8270C		A01	1
delta-BHC	ND	mg/kg	1.0	0.18	EPA-8270C		A01	1
gamma-BHC (Lindane)	ND	mg/kg	1.0	0.25	EPA-8270C	4.0	A01	1
bis(2-Chloroethoxy)methane	ND	mg/kg	1.0	0.45	EPA-8270C		A01	1
bis(2-Chloroethyl) ether	ND	mg/kg	1.0	0.26	EPA-8270C		A01	1
bis(2-Chloroisopropyl)ether	ND	mg/kg	1.0	0.15	EPA-8270C		A01	1
bis(2-Ethylhexyl)phthalate	ND	mg/kg	2.0	0.32	EPA-8270C		A01	1
4-Bromophenyl phenyl ether	ND	mg/kg	1.0	0.26	EPA-8270C		A01	1
4-Chloroaniline	ND	mg/kg	1.0	0.15	EPA-8270C		A01	1
2-Chloronaphthalene	ND	mg/kg	1.0	0.12	EPA-8270C		A01	1
4-Chlorophenyl phenyl ether	ND	mg/kg	1.0	0.11	EPA-8270C		A01	1
Chrysene	ND	mg/kg	1.0	0.16	EPA-8270C		A01	1
4,4'-DDD	ND	mg/kg	1.0	0.32	EPA-8270C	1.0	A01	1
4,4'-DDE	ND	mg/kg	1.0	0.33	EPA-8270C	1.0	A01	1
4,4'-DDT	ND	mg/kg	1.0	0.52	EPA-8270C	1.0	A01	1
Dibenzo[a,h]anthracene	ND	mg/kg	1.0	0.19	EPA-8270C		A01	1
Dibenzofuran	ND	mg/kg	1.0	0.13	EPA-8270C		A01	1
1,2-Dichlorobenzene	ND	mg/kg	1.0	0.084	EPA-8270C		A01	1

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Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
1,3-Dichlorobenzene	ND	mg/kg	1.0	0.12	EPA-8270C		A01	1
1,4-Dichlorobenzene	ND	mg/kg	1.0	0.18	EPA-8270C		A01	1
3,3-Dichlorobenzidine	ND	mg/kg	2.0	0.24	EPA-8270C		A01	1
Dieldrin	ND	mg/kg	1.0	0.31	EPA-8270C	8.0	A01	1
Diethyl phthalate	ND	mg/kg	1.0	0.073	EPA-8270C		A01	1
Dimethyl phthalate	ND	mg/kg	1.0	0.091	EPA-8270C		A01	1
Di-n-butyl phthalate	ND	mg/kg	1.0	0.19	EPA-8270C		A01	1
2,4-Dinitrotoluene	ND	mg/kg	1.0	0.30	EPA-8270C		A01	1
2,6-Dinitrotoluene	ND	mg/kg	1.0	0.16	EPA-8270C		A01	1
Di-n-octyl phthalate	ND	mg/kg	1.0	0.13	EPA-8270C		A01	1
1,2-Diphenylhydrazine	ND	mg/kg	1.0	0.16	EPA-8270C		A01	1
Endosulfan I	ND	mg/kg	2.0	0.62	EPA-8270C		A01	1
Endosulfan II	ND	mg/kg	2.0	0.62	EPA-8270C		A01	1
Endosulfan sulfate	ND	mg/kg	1.0	0.56	EPA-8270C		A01	1
Endrin	ND	mg/kg	2.0	0.53	EPA-8270C	0.2	A01	1
Endrin aldehyde	ND	mg/kg	5.0	0.44	EPA-8270C		A01	1
Fluoranthene	ND	mg/kg	1.0	0.11	EPA-8270C		A01	1
Fluorene	ND	mg/kg	1.0	0.13	EPA-8270C		A01	1
Heptachlor	ND	mg/kg	1.0	0.24	EPA-8270C	4.7	A01	1
Heptachlor epoxide	ND	mg/kg	1.0	0.65	EPA-8270C		A01	1
Hexachlorobenzene	ND	mg/kg	1.0	0.12	EPA-8270C		A01	1
Hexachlorobutadiene	ND	mg/kg	1.0	0.20	EPA-8270C		A01	1
Hexachlorocyclopentadiene	ND	mg/kg	1.0	0.29	EPA-8270C		A01	1
Hexachloroethane	ND	mg/kg	1.0	0.32	EPA-8270C		A01	1
Indeno[1,2,3-cd]pyrene	ND	mg/kg	1.0	0.13	EPA-8270C		A01	1
Isophorone	ND	mg/kg	1.0	0.099	EPA-8270C		A01	1
2-Methylnaphthalene	ND	mg/kg	1.0	0.082	EPA-8270C		A01	1
Naphthalene	ND	mg/kg	1.0	0.085	EPA-8270C		A01	1
2-Naphthylamine	ND	mg/kg	30	0.39	EPA-8270C		A01	1
2-Nitroaniline	ND	mg/kg	1.0	0.27	EPA-8270C		A01	1
3-Nitroaniline	ND	mg/kg	2.0	0.37	EPA-8270C		A01	1
4-Nitroaniline	ND	mg/kg	2.0	0.37	EPA-8270C		A01	1
Nitrobenzene	ND	mg/kg	1.0	0.098	EPA-8270C		A01	1

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Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

BCL Sample ID: 1813132-01 | **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
N-Nitrosodimethylamine	ND	mg/kg	1.0	0.77	EPA-8270C		A01	1
N-Nitrosodi-N-propylamine	ND	mg/kg	1.0	0.13	EPA-8270C		A01	1
N-Nitrosodiphenylamine	ND	mg/kg	1.0	0.18	EPA-8270C		A01	1
Phenanthrene	ND	mg/kg	1.0	0.34	EPA-8270C		A01	1
Pyrene	ND	mg/kg	1.0	0.27	EPA-8270C		A01	1
1,2,4-Trichlorobenzene	ND	mg/kg	1.0	0.16	EPA-8270C		A01	1
4-Chloro-3-methylphenol	ND	mg/kg	2.0	0.17	EPA-8270C		A01	1
2-Chlorophenol	ND	mg/kg	1.0	0.15	EPA-8270C		A01	1
2,4-Dichlorophenol	ND	mg/kg	1.0	0.21	EPA-8270C		A01	1
2,4-Dimethylphenol	ND	mg/kg	1.0	0.19	EPA-8270C		A01	1
4,6-Dinitro-2-methylphenol	ND	mg/kg	5.0	0.30	EPA-8270C		A01	1
2,4-Dinitrophenol	ND	mg/kg	5.0	1.8	EPA-8270C		A01	1
2-Methylphenol	ND	mg/kg	1.0	0.086	EPA-8270C		A01	1
3- & 4-Methylphenol	ND	mg/kg	2.0	0.34	EPA-8270C		A01	1
Total Methylphenol	ND	mg/kg	2.0	0.43	EPA-8270C		A01	1
2-Nitrophenol	ND	mg/kg	1.0	0.25	EPA-8270C		A01	1
4-Nitrophenol	ND	mg/kg	2.0	0.34	EPA-8270C		A01	1
Pentachlorophenol	ND	mg/kg	2.0	0.31	EPA-8270C	17	A01	1
Phenol	ND	mg/kg	1.0	0.15	EPA-8270C		A01	1
2,4,5-Trichlorophenol	ND	mg/kg	2.0	0.17	EPA-8270C		A01	1
2,4,6-Trichlorophenol	ND	mg/kg	2.0	0.28	EPA-8270C		A01	1
Pyridine	ND	mg/kg	5.0	0.36	EPA-8270C		A01	1
2-Fluorophenol (Surrogate)	60.6	%	20 - 130 (LCL - UCL)		EPA-8270C		A01	1
Phenol-d5 (Surrogate)	53.9	%	30 - 130 (LCL - UCL)		EPA-8270C		A01	1
Nitrobenzene-d5 (Surrogate)	44.2	%	30 - 130 (LCL - UCL)		EPA-8270C		A01	1
2-Fluorobiphenyl (Surrogate)	36.3	%	30 - 140 (LCL - UCL)		EPA-8270C		A01	1
2,4,6-Tribromophenol (Surrogate)	33.0	%	20 - 150 (LCL - UCL)		EPA-8270C		A01	1
p-Terphenyl-d14 (Surrogate)	50.4	%	30 - 150 (LCL - UCL)		EPA-8270C		A01	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8270C	05/03/18 14:20	05/08/18 12:29	MK1	MS-B2	9.564	B013245

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Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Total Petroleum Hydrocarbons

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
TPH - Gasoline	ND	mg/kg	20	5.0	EPA-8015B/FFP	ND		1
TPH - Diesel (FFP)	**9.1**	**mg/kg**	**10**	**1.2**	**EPA-8015B/FFP**	ND	**J,A52**	1
TPH - Motor Oil	**43**	**mg/kg**	**20**	**6.5**	**EPA-8015B/FFP**	ND		1
Tetracosane (Surrogate)	85.8	%	20 - 145 (LCL - UCL)		EPA-8015B/FFP			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-8015B/FFP	04/30/18 17:00	05/01/18 19:58	RCC	GC-2	0.984	B012359

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

WET Test (STLC)

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	STLC Limits	Lab Quals	Run #
Chromium	**1.1**	**mg/L**	**0.10**	**0.0092**	**EPA-6010B**	5.0		1
Lead	**1.3**	**mg/L**	**0.50**	**0.16**	**EPA-6010B**	5.0		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	05/24/18 16:00	05/25/18 13:12	KDF	PE-OP3	1	B014758

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

TCLP Toxicity

BCL Sample ID: 1813132-01 **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TCLP Limits	Lab Quals	Run #
Chromium	**0.013**	**mg/L**	**0.10**	**0.0075**	**EPA-6010B**	5.0	**J**	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	05/24/18 14:30	05/25/18 14:12	JRG	PE-OP2	1	B014703

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Total Concentrations (TTLC)

BCL Sample ID: 1813132-01 | **Client Sample Name:** 4 Point Composite 1-4, 4/20/2018 3:30:00PM

Constituent	Result	Units	PQL	MDL	Method	TTLC Limits	Lab Quals	Run #
Antimony	ND	mg/kg	5.0	0.33	EPA-6010B	500		1
Arsenic	**9.2**	**mg/kg**	**1.0**	**0.40**	**EPA-6010B**	500		2
Barium	**170**	**mg/kg**	**0.50**	**0.18**	**EPA-6010B**	10000		1
Beryllium	**0.37**	**mg/kg**	**0.50**	**0.047**	**EPA-6010B**	75	**J**	1
Cadmium	**2.1**	**mg/kg**	**0.50**	**0.052**	**EPA-6010B**	100		2
Chromium	**120**	**mg/kg**	**0.50**	**0.050**	**EPA-6010B**	2500		2
Cobalt	**14**	**mg/kg**	**2.5**	**0.098**	**EPA-6010B**	8000		1
Copper	**86**	**mg/kg**	**1.0**	**0.050**	**EPA-6010B**	2500		1
Lead	**55**	**mg/kg**	**2.5**	**0.28**	**EPA-6010B**	1000		1
Mercury	**0.12**	**mg/kg**	**0.16**	**0.019**	**EPA-7471A**	20	**J**	3
Molybdenum	**0.32**	**mg/kg**	**2.5**	**0.050**	**EPA-6010B**	3500	**J**	1
Nickel	**110**	**mg/kg**	**0.50**	**0.15**	**EPA-6010B**	2000		1
Selenium	ND	mg/kg	1.0	0.98	EPA-6010B	100		2
Silver	**3.3**	**mg/kg**	**0.50**	**0.067**	**EPA-6010B**	500		2
Thallium	ND	mg/kg	5.0	0.64	EPA-6010B	700		1
Vanadium	**49**	**mg/kg**	**0.50**	**0.11**	**EPA-6010B**	2400		1
Zinc	**81**	**mg/kg**	**2.5**	**0.087**	**EPA-6010B**	5000		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-6010B	05/02/18 18:20	05/03/18 22:26	KDF	PE-OP3	0.980	B012605
2	EPA-6010B	05/02/18 18:20	05/04/18 19:59	KDF	PE-OP3	0.980	B012605
3	EPA-7471A	05/03/18 14:30	05/04/18 13:06	JP1	CETAC2	1.008	B012684

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Organochlorine Pesticides (EPA Method 8081A)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B012546						
Aldrin	B012546-BLK1	ND	mg/kg	0.00050	0.000049	
alpha-BHC	B012546-BLK1	ND	mg/kg	0.00050	0.000064	
beta-BHC	B012546-BLK1	ND	mg/kg	0.00050	0.000048	
delta-BHC	B012546-BLK1	ND	mg/kg	0.00050	0.00013	
gamma-BHC (Lindane)	B012546-BLK1	ND	mg/kg	0.00050	0.000086	
Chlordane (Technical)	B012546-BLK1	ND	mg/kg	0.050	0.0014	
4,4'-DDD	B012546-BLK1	ND	mg/kg	0.00050	0.000083	
4,4'-DDE	B012546-BLK1	ND	mg/kg	0.00050	0.000038	
4,4'-DDT	B012546-BLK1	ND	mg/kg	0.00050	0.00014	
Dieldrin	B012546-BLK1	ND	mg/kg	0.00050	0.000042	
Endosulfan I	B012546-BLK1	ND	mg/kg	0.00050	0.000028	
Endosulfan II	B012546-BLK1	ND	mg/kg	0.00050	0.000073	
Endosulfan sulfate	B012546-BLK1	ND	mg/kg	0.00050	0.00024	
Endrin	B012546-BLK1	ND	mg/kg	0.00050	0.000073	
Endrin aldehyde	B012546-BLK1	ND	mg/kg	0.00050	0.000077	
Heptachlor	B012546-BLK1	ND	mg/kg	0.00050	0.000099	
Heptachlor epoxide	B012546-BLK1	ND	mg/kg	0.00050	0.000030	
Methoxychlor	B012546-BLK1	ND	mg/kg	0.00050	0.00012	
Toxaphene	B012546-BLK1	ND	mg/kg	0.050	0.0019	
TCMX (Surrogate)	**B012546-BLK1**	**103**	%	**20 - 130 (LCL - UCL)**		
Decachlorobiphenyl (Surrogate)	**B012546-BLK1**	**101**	%	**40 - 130 (LCL - UCL)**		

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Organochlorine Pesticides (EPA Method 8081A)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B012546										
Aldrin	B012546-BS1	LCS	0.0046660	0.0049505	mg/kg	94.3		70 - 130		
gamma-BHC (Lindane)	B012546-BS1	LCS	0.0049251	0.0049505	mg/kg	99.5		60 - 140		
4,4'-DDT	B012546-BS1	LCS	0.0038277	0.0049505	mg/kg	77.3		60 - 140		
Dieldrin	B012546-BS1	LCS	0.0047257	0.0049505	mg/kg	95.5		70 - 130		
Endrin	B012546-BS1	LCS	0.0043017	0.0049505	mg/kg	86.9		60 - 140		
Heptachlor	B012546-BS1	LCS	0.0044931	0.0049505	mg/kg	90.8		60 - 140		
TCMX (Surrogate)	B012546-BS1	LCS	0.0094211	0.0099010	mg/kg	95.2		20 - 130		
Decachlorobiphenyl (Surrogate)	B012546-BS1	LCS	0.018774	0.019802	mg/kg	94.8		40 - 130		

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Organochlorine Pesticides (EPA Method 8081A)

Quality Control Report - Precision & Accuracy

QC Batch ID: B012546 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Aldrin	MS	1807882-20	ND	0.0047165	0.0050505	mg/kg		93.4		50 - 140	
	MSD	1807882-20	ND	0.0047191	0.0049342	mg/kg	0.1	95.6	30	50 - 140	
gamma-BHC (Lindane)	MS	1807882-20	ND	0.0049943	0.0050505	mg/kg		98.9		50 - 140	
	MSD	1807882-20	ND	0.0049638	0.0049342	mg/kg	0.6	101	30	50 - 140	
4,4'-DDT	MS	1807882-20	ND	0.0035266	0.0050505	mg/kg		69.8		50 - 140	
	MSD	1807882-20	ND	0.0036128	0.0049342	mg/kg	2.4	73.2	30	50 - 140	
Dieldrin	MS	1807882-20	ND	0.0047791	0.0050505	mg/kg		94.6		40 - 140	
	MSD	1807882-20	ND	0.0047599	0.0049342	mg/kg	0.4	96.5	30	40 - 140	
Endrin	MS	1807882-20	ND	0.0041357	0.0050505	mg/kg		81.9		50 - 150	
	MSD	1807882-20	ND	0.0042020	0.0049342	mg/kg	1.6	85.2	30	50 - 150	
Heptachlor	MS	1807882-20	ND	0.0044532	0.0050505	mg/kg		88.2		60 - 140	
	MSD	1807882-20	ND	0.0044181	0.0049342	mg/kg	0.8	89.5	30	60 - 140	
TCMX (Surrogate)	MS	1807882-20	ND	0.0092970	0.010101	mg/kg		92.0		20 - 130	
	MSD	1807882-20	ND	0.0091730	0.0098684	mg/kg	1.3	93.0		20 - 130	
Decachlorobiphenyl (Surrogate)	MS	1807882-20	ND	0.018188	0.020202	mg/kg		90.0		40 - 130	
	MSD	1807882-20	ND	0.018345	0.019737	mg/kg	0.9	92.9		40 - 130	

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

PCB Analysis (EPA Method 8082)

Quality Control Report - Method Blank Analysis

QC Batch ID: B012686

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
PCB-1016	B012686-BLK1	ND	mg/kg	0.010	0.0026	
PCB-1221	B012686-BLK1	ND	mg/kg	0.010	0.0024	
PCB-1232	B012686-BLK1	ND	mg/kg	0.010	0.0044	
PCB-1242	B012686-BLK1	ND	mg/kg	0.010	0.0059	
PCB-1248	B012686-BLK1	ND	mg/kg	0.010	0.0037	
PCB-1254	B012686-BLK1	ND	mg/kg	0.010	0.0030	
PCB-1260	B012686-BLK1	ND	mg/kg	0.010	0.0056	
Total PCB's (Summation)	B012686-BLK1	ND	mg/kg	0.010	0.0050	
Decachlorobiphenyl (Surrogate)	**B012686-BLK1**	**107**	%	**65 - 120 (LCL - UCL)**		

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

PCB Analysis (EPA Method 8082)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B012686										
PCB-1016	B012686-BS1	LCS	0.085714	0.083056	mg/kg	103		60 - 120		
PCB-1260	B012686-BS1	LCS	0.087375	0.083056	mg/kg	105		60 - 120		
Decachlorobiphenyl (Surrogate)	B012686-BS1	LCS	0.018937	0.019934	mg/kg	95.0		65 - 120		

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

PCB Analysis (EPA Method 8082)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: B012686	Used client sample: N										
PCB-1016	MS	1810833-27	ND	0.081208	0.083893	mg/kg		96.8		60 - 120	
	MSD	1810833-27	ND	0.083775	0.082781	mg/kg	3.1	101	30	60 - 120	
PCB-1260	MS	1810833-27	ND	0.087584	0.083893	mg/kg		104		60 - 120	
	MSD	1810833-27	ND	0.091391	0.082781	mg/kg	4.3	110	30	60 - 120	
Decachlorobiphenyl (Surrogate)	MS	1810833-27	ND	0.020805	0.020134	mg/kg		103		65 - 120	
	MSD	1810833-27	ND	0.021192	0.019868	mg/kg	1.8	107		65 - 120	

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B012041						
Benzene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
Bromobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
Bromochloromethane	B012041-BLK1	ND	mg/kg	0.0050	0.00092	
Bromodichloromethane	B012041-BLK1	ND	mg/kg	0.0050	0.00084	
Bromoform	B012041-BLK1	ND	mg/kg	0.0050	0.0015	
Bromomethane	B012041-BLK1	ND	mg/kg	0.0050	0.0016	
n-Butylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0015	
sec-Butylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0012	
tert-Butylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0012	
Carbon tetrachloride	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
Chlorobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
Chloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
Chloroform	B012041-BLK1	ND	mg/kg	0.0050	0.00063	
Chloromethane	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
2-Chlorotoluene	B012041-BLK1	ND	mg/kg	0.0050	0.0018	
4-Chlorotoluene	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
Dibromochloromethane	B012041-BLK1	ND	mg/kg	0.0050	0.00099	
1,2-Dibromo-3-chloropropane	B012041-BLK1	ND	mg/kg	0.0050	0.0017	
1,2-Dibromoethane	B012041-BLK1	ND	mg/kg	0.0050	0.0010	
Dibromomethane	B012041-BLK1	ND	mg/kg	0.0050	0.0018	
1,2-Dichlorobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.00081	
1,3-Dichlorobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
1,4-Dichlorobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0015	
Dichlorodifluoromethane	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
1,1-Dichloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
1,2-Dichloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.00085	
1,1-Dichloroethene	B012041-BLK1	ND	mg/kg	0.0050	0.0012	
cis-1,2-Dichloroethene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
trans-1,2-Dichloroethene	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
Total 1,2-Dichloroethene	B012041-BLK1	ND	mg/kg	0.010	0.0026	
1,2-Dichloropropane	B012041-BLK1	ND	mg/kg	0.0050	0.00081	
1,3-Dichloropropane	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
2,2-Dichloropropane	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
1,1-Dichloropropene	B012041-BLK1	ND	mg/kg	0.0050	0.0012	

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B012041						
cis-1,3-Dichloropropene	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
trans-1,3-Dichloropropene	B012041-BLK1	ND	mg/kg	0.0050	0.0012	
Total 1,3-Dichloropropene	B012041-BLK1	ND	mg/kg	0.010	0.0020	
Ethylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0015	
Hexachlorobutadiene	B012041-BLK1	ND	mg/kg	0.0050	0.0017	
Isopropylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
p-Isopropyltoluene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
Methylene chloride	B012041-BLK1	ND	mg/kg	0.010	0.0024	
Methyl t-butyl ether	B012041-BLK1	ND	mg/kg	0.0050	0.00050	
Naphthalene	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
n-Propylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
Styrene	B012041-BLK1	ND	mg/kg	0.0050	0.0014	
1,1,1,2-Tetrachloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
1,1,2,2-Tetrachloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
Tetrachloroethene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
Toluene	B012041-BLK1	ND	mg/kg	0.0050	0.0012	
1,2,3-Trichlorobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0021	
1,2,4-Trichlorobenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0020	
1,1,1-Trichloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
1,1,2-Trichloroethane	B012041-BLK1	ND	mg/kg	0.0050	0.00077	
Trichloroethene	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
Trichlorofluoromethane	B012041-BLK1	ND	mg/kg	0.0050	0.0011	
1,2,3-Trichloropropane	B012041-BLK1	ND	mg/kg	0.0050	0.0016	
1,1,2-Trichloro-1,2,2-trifluoroethane	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
1,2,4-Trimethylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0013	
1,3,5-Trimethylbenzene	B012041-BLK1	ND	mg/kg	0.0050	0.0015	
Vinyl chloride	B012041-BLK1	ND	mg/kg	0.0050	0.0016	
Total Xylenes	B012041-BLK1	ND	mg/kg	0.010	0.0034	
t-Amyl Methyl ether	B012041-BLK1	ND	mg/kg	0.0050	0.00056	
t-Butyl alcohol	B012041-BLK1	ND	mg/kg	0.050	0.017	
Diisopropyl ether	B012041-BLK1	ND	mg/kg	0.0050	0.00080	
Ethanol	B012041-BLK1	ND	mg/kg	1.0	0.066	
Ethyl t-butyl ether	B012041-BLK1	ND	mg/kg	0.0050	0.00022	
Methyl ethyl ketone	B012041-BLK1	ND	mg/kg	0.010	0.0038	

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Project Number: RM18.1038
Project Manager: Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B012041						
1,2-Dichloroethane-d4 (Surrogate)	B012041-BLK1	98.7	%	70 - 121 (LCL - UCL)		
Toluene-d8 (Surrogate)	B012041-BLK1	99.5	%	81 - 117 (LCL - UCL)		
4-Bromofluorobenzene (Surrogate)	B012041-BLK1	99.6	%	74 - 121 (LCL - UCL)		

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Geologic - Morgan Hill		**Reported:**	06/15/2018 9:35
16055-D Caputo Drive		Project:	Top Golf
Morgan Hill, CA 95037		Project Number:	RM18.1038
		Project Manager:	Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B012041										
Benzene	B012041-BS1	LCS	0.12331	0.12500	mg/kg	98.6		70 - 130		
Bromodichloromethane	B012041-BS1	LCS	0.11003	0.12500	mg/kg	88.0		70 - 130		
Chlorobenzene	B012041-BS1	LCS	0.11251	0.12500	mg/kg	90.0		70 - 130		
Chloroethane	B012041-BS1	LCS	0.11904	0.12500	mg/kg	95.2		70 - 130		
1,4-Dichlorobenzene	B012041-BS1	LCS	0.10364	0.12500	mg/kg	82.9		70 - 130		
1,1-Dichloroethane	B012041-BS1	LCS	0.11718	0.12500	mg/kg	93.7		70 - 130		
1,1-Dichloroethene	B012041-BS1	LCS	0.11744	0.12500	mg/kg	94.0		70 - 130		
Toluene	B012041-BS1	LCS	0.11312	0.12500	mg/kg	90.5		70 - 130		
Trichloroethene	B012041-BS1	LCS	0.10650	0.12500	mg/kg	85.2		70 - 130		
1,2-Dichloroethane-d4 (Surrogate)	B012041-BS1	LCS	0.050570	0.050000	mg/kg	101		70 - 121		
Toluene-d8 (Surrogate)	B012041-BS1	LCS	0.049750	0.050000	mg/kg	99.5		81 - 117		
4-Bromofluorobenzene (Surrogate)	B012041-BS1	LCS	0.048020	0.050000	mg/kg	96.0		74 - 121		

Geologic - Morgan Hill
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Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Volatile Organic Analysis (EPA Method 8260B)

Quality Control Report - Precision & Accuracy

QC Batch ID: B012041 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Benzene	MS	1810833-91	ND	0.12323	0.12500	mg/kg		98.6		70 - 130	
	MSD	1810833-91	ND	0.12138	0.12500	mg/kg	1.5	97.1	20	70 - 130	
Bromodichloromethane	MS	1810833-91	ND	0.11919	0.12500	mg/kg		95.4		70 - 130	
	MSD	1810833-91	ND	0.11851	0.12500	mg/kg	0.6	94.8	20	70 - 130	
Chlorobenzene	MS	1810833-91	ND	0.11500	0.12500	mg/kg		92.0		70 - 130	
	MSD	1810833-91	ND	0.11753	0.12500	mg/kg	2.2	94.0	20	70 - 130	
Chloroethane	MS	1810833-91	ND	0.12034	0.12500	mg/kg		96.3		70 - 130	
	MSD	1810833-91	ND	0.12353	0.12500	mg/kg	2.6	98.8	20	70 - 130	
1,4-Dichlorobenzene	MS	1810833-91	ND	0.11566	0.12500	mg/kg		92.5		70 - 130	
	MSD	1810833-91	ND	0.11346	0.12500	mg/kg	1.9	90.8	20	70 - 130	
1,1-Dichloroethane	MS	1810833-91	ND	0.11908	0.12500	mg/kg		95.3		70 - 130	
	MSD	1810833-91	ND	0.11647	0.12500	mg/kg	2.2	93.2	20	70 - 130	
1,1-Dichloroethene	MS	1810833-91	ND	0.12002	0.12500	mg/kg		96.0		70 - 130	
	MSD	1810833-91	ND	0.11962	0.12500	mg/kg	0.3	95.7	20	70 - 130	
Toluene	MS	1810833-91	ND	0.11768	0.12500	mg/kg		94.1		70 - 130	
	MSD	1810833-91	ND	0.11964	0.12500	mg/kg	1.7	95.7	20	70 - 130	
Trichloroethene	MS	1810833-91	ND	0.11162	0.12500	mg/kg		89.3		70 - 130	
	MSD	1810833-91	ND	0.11311	0.12500	mg/kg	1.3	90.5	20	70 - 130	
1,2-Dichloroethane-d4 (Surrogate)	MS	1810833-91	ND	0.048860	0.050000	mg/kg		97.7		70 - 121	
	MSD	1810833-91	ND	0.045360	0.050000	mg/kg	7.4	90.7		70 - 121	
Toluene-d8 (Surrogate)	MS	1810833-91	ND	0.048820	0.050000	mg/kg		97.6		81 - 117	
	MSD	1810833-91	ND	0.051220	0.050000	mg/kg	4.8	102		81 - 117	
4-Bromofluorobenzene (Surrogate)	MS	1810833-91	ND	0.050580	0.050000	mg/kg		101		74 - 121	
	MSD	1810833-91	ND	0.048860	0.050000	mg/kg	3.5	97.7		74 - 121	

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Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B013245						
Acenaphthene	B013245-BLK1	ND	mg/kg	0.10	0.0092	
Acenaphthylene	B013245-BLK1	ND	mg/kg	0.10	0.018	
Aldrin	B013245-BLK1	ND	mg/kg	0.10	0.016	
Aniline	B013245-BLK1	ND	mg/kg	0.20	0.016	
Anthracene	B013245-BLK1	ND	mg/kg	0.10	0.050	
Benzidine	B013245-BLK1	ND	mg/kg	3.0	0.058	
Benzo[a]anthracene	B013245-BLK1	ND	mg/kg	0.10	0.041	
Benzo[b]fluoranthene	B013245-BLK1	ND	mg/kg	0.10	0.0094	
Benzo[k]fluoranthene	B013245-BLK1	ND	mg/kg	0.10	0.017	
Benzo[a]pyrene	B013245-BLK1	ND	mg/kg	0.10	0.026	
Benzo[g,h,i]perylene	B013245-BLK1	ND	mg/kg	0.10	0.011	
Benzoic acid	B013245-BLK1	ND	mg/kg	0.50	0.057	
Benzyl alcohol	B013245-BLK1	ND	mg/kg	0.10	0.0073	
Benzyl butyl phthalate	B013245-BLK1	ND	mg/kg	0.10	0.033	
alpha-BHC	B013245-BLK1	ND	mg/kg	0.10	0.035	
beta-BHC	B013245-BLK1	ND	mg/kg	0.10	0.040	
delta-BHC	B013245-BLK1	ND	mg/kg	0.10	0.018	
gamma-BHC (Lindane)	B013245-BLK1	ND	mg/kg	0.10	0.025	
bis(2-Chloroethoxy)methane	B013245-BLK1	ND	mg/kg	0.10	0.045	
bis(2-Chloroethyl) ether	B013245-BLK1	ND	mg/kg	0.10	0.026	
bis(2-Chloroisopropyl)ether	B013245-BLK1	ND	mg/kg	0.10	0.015	
bis(2-Ethylhexyl)phthalate	B013245-BLK1	ND	mg/kg	0.20	0.032	
4-Bromophenyl phenyl ether	B013245-BLK1	ND	mg/kg	0.10	0.026	
4-Chloroaniline	B013245-BLK1	ND	mg/kg	0.10	0.015	
2-Chloronaphthalene	B013245-BLK1	ND	mg/kg	0.10	0.012	
4-Chlorophenyl phenyl ether	B013245-BLK1	ND	mg/kg	0.10	0.011	
Chrysene	B013245-BLK1	ND	mg/kg	0.10	0.016	
4,4'-DDD	B013245-BLK1	ND	mg/kg	0.10	0.032	
4,4'-DDE	B013245-BLK1	ND	mg/kg	0.10	0.033	
4,4'-DDT	B013245-BLK1	ND	mg/kg	0.10	0.052	
Dibenzo[a,h]anthracene	B013245-BLK1	ND	mg/kg	0.10	0.019	
Dibenzofuran	B013245-BLK1	ND	mg/kg	0.10	0.013	
1,2-Dichlorobenzene	B013245-BLK1	ND	mg/kg	0.10	0.0084	
1,3-Dichlorobenzene	B013245-BLK1	ND	mg/kg	0.10	0.012	

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Geologic - Morgan Hill	**Reported:**	06/15/2018 9:35
16055-D Caputo Drive	Project:	Top Golf
Morgan Hill, CA 95037	Project Number:	RM18.1038
	Project Manager:	Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B013245						
1,4-Dichlorobenzene	B013245-BLK1	ND	mg/kg	0.10	0.018	
3,3-Dichlorobenzidine	B013245-BLK1	ND	mg/kg	0.20	0.024	
Dieldrin	B013245-BLK1	ND	mg/kg	0.10	0.031	
Diethyl phthalate	B013245-BLK1	ND	mg/kg	0.10	0.0073	
Dimethyl phthalate	B013245-BLK1	ND	mg/kg	0.10	0.0091	
Di-n-butyl phthalate	B013245-BLK1	ND	mg/kg	0.10	0.019	
2,4-Dinitrotoluene	B013245-BLK1	ND	mg/kg	0.10	0.030	
2,6-Dinitrotoluene	B013245-BLK1	ND	mg/kg	0.10	0.016	
Di-n-octyl phthalate	B013245-BLK1	ND	mg/kg	0.10	0.013	
1,2-Diphenylhydrazine	B013245-BLK1	ND	mg/kg	0.10	0.016	
Endosulfan I	B013245-BLK1	ND	mg/kg	0.20	0.062	
Endosulfan II	B013245-BLK1	ND	mg/kg	0.20	0.062	
Endosulfan sulfate	B013245-BLK1	ND	mg/kg	0.10	0.056	
Endrin	B013245-BLK1	ND	mg/kg	0.20	0.053	
Endrin aldehyde	B013245-BLK1	ND	mg/kg	0.50	0.044	
Fluoranthene	B013245-BLK1	ND	mg/kg	0.10	0.011	
Fluorene	B013245-BLK1	ND	mg/kg	0.10	0.013	
Heptachlor	B013245-BLK1	ND	mg/kg	0.10	0.024	
Heptachlor epoxide	B013245-BLK1	ND	mg/kg	0.10	0.065	
Hexachlorobenzene	B013245-BLK1	ND	mg/kg	0.10	0.012	
Hexachlorobutadiene	B013245-BLK1	ND	mg/kg	0.10	0.020	
Hexachlorocyclopentadiene	B013245-BLK1	ND	mg/kg	0.10	0.029	
Hexachloroethane	B013245-BLK1	ND	mg/kg	0.10	0.032	
Indeno[1,2,3-cd]pyrene	B013245-BLK1	ND	mg/kg	0.10	0.013	
Isophorone	B013245-BLK1	ND	mg/kg	0.10	0.0099	
2-Methylnaphthalene	B013245-BLK1	ND	mg/kg	0.10	0.0082	
Naphthalene	B013245-BLK1	ND	mg/kg	0.10	0.0085	
2-Naphthylamine	B013245-BLK1	ND	mg/kg	3.0	0.039	
2-Nitroaniline	B013245-BLK1	ND	mg/kg	0.10	0.027	
3-Nitroaniline	B013245-BLK1	ND	mg/kg	0.20	0.037	
4-Nitroaniline	B013245-BLK1	ND	mg/kg	0.20	0.037	
Nitrobenzene	B013245-BLK1	ND	mg/kg	0.10	0.0098	
N-Nitrosodimethylamine	B013245-BLK1	ND	mg/kg	0.10	0.077	
N-Nitrosodi-N-propylamine	B013245-BLK1	ND	mg/kg	0.10	0.013	

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B013245						
N-Nitrosodiphenylamine	B013245-BLK1	ND	mg/kg	0.10	0.018	
Phenanthrene	B013245-BLK1	ND	mg/kg	0.10	0.034	
Pyrene	B013245-BLK1	ND	mg/kg	0.10	0.027	
1,2,4-Trichlorobenzene	B013245-BLK1	ND	mg/kg	0.10	0.016	
4-Chloro-3-methylphenol	B013245-BLK1	ND	mg/kg	0.20	0.017	
2-Chlorophenol	B013245-BLK1	ND	mg/kg	0.10	0.015	
2,4-Dichlorophenol	B013245-BLK1	ND	mg/kg	0.10	0.021	
2,4-Dimethylphenol	B013245-BLK1	ND	mg/kg	0.10	0.019	
4,6-Dinitro-2-methylphenol	B013245-BLK1	ND	mg/kg	0.50	0.030	
2,4-Dinitrophenol	B013245-BLK1	ND	mg/kg	0.50	0.18	
2-Methylphenol	B013245-BLK1	ND	mg/kg	0.10	0.0086	
3- & 4-Methylphenol	B013245-BLK1	ND	mg/kg	0.20	0.034	
Total Methylphenol	B013245-BLK1	ND	mg/kg	0.20	0.043	
2-Nitrophenol	B013245-BLK1	ND	mg/kg	0.10	0.025	
4-Nitrophenol	B013245-BLK1	ND	mg/kg	0.20	0.034	
Pentachlorophenol	B013245-BLK1	ND	mg/kg	0.20	0.031	
Phenol	B013245-BLK1	ND	mg/kg	0.10	0.015	
2,4,5-Trichlorophenol	B013245-BLK1	ND	mg/kg	0.20	0.017	
2,4,6-Trichlorophenol	B013245-BLK1	ND	mg/kg	0.20	0.028	
Pyridine	B013245-BLK1	ND	mg/kg	0.50	0.036	
2-Fluorophenol (Surrogate)	**B013245-BLK1**	**63.9**	%	**20 - 130 (LCL - UCL)**		
Phenol-d5 (Surrogate)	**B013245-BLK1**	**58.9**	%	**30 - 130 (LCL - UCL)**		
Nitrobenzene-d5 (Surrogate)	**B013245-BLK1**	**56.7**	%	**30 - 130 (LCL - UCL)**		
2-Fluorobiphenyl (Surrogate)	**B013245-BLK1**	**53.8**	%	**30 - 140 (LCL - UCL)**		
2,4,6-Tribromophenol (Surrogate)	**B013245-BLK1**	**34.0**	%	**20 - 150 (LCL - UCL)**		
p-Terphenyl-d14 (Surrogate)	**B013245-BLK1**	**53.2**	%	**30 - 150 (LCL - UCL)**		

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B013245										
Acenaphthene	B013245-BS1	LCS	1.1241	1.6722	mg/kg	67.2		50 - 130		
1,4-Dichlorobenzene	B013245-BS1	LCS	1.0793	1.6722	mg/kg	64.5		50 - 130		
2,4-Dinitrotoluene	B013245-BS1	LCS	0.91304	1.6722	mg/kg	54.6		50 - 130		
Hexachlorobenzene	B013245-BS1	LCS	0.81739	1.3378	mg/kg	61.1		40 - 130		
Hexachlorobutadiene	B013245-BS1	LCS	0.88562	1.6722	mg/kg	53.0		50 - 130		
Hexachloroethane	B013245-BS1	LCS	1.1967	1.6722	mg/kg	71.6		50 - 130		
Nitrobenzene	B013245-BS1	LCS	1.0893	1.6722	mg/kg	65.1		50 - 130		
N-Nitrosodi-N-propylamine	B013245-BS1	LCS	1.1625	1.6722	mg/kg	69.5		40 - 120		
Pyrene	B013245-BS1	LCS	1.3756	1.6722	mg/kg	82.3		40 - 150		
1,2,4-Trichlorobenzene	B013245-BS1	LCS	0.94582	1.6722	mg/kg	56.6		50 - 120		
4-Chloro-3-methylphenol	B013245-BS1	LCS	0.86120	1.6722	mg/kg	51.5		50 - 130		
2-Chlorophenol	B013245-BS1	LCS	1.0120	1.6722	mg/kg	60.5		50 - 130		
2-Methylphenol	B013245-BS1	LCS	0.95786	1.6722	mg/kg	57.3		50 - 130		
3- & 4-Methylphenol	B013245-BS1	LCS	1.9712	3.3445	mg/kg	58.9		50 - 130		
4-Nitrophenol	B013245-BS1	LCS	0.57224	1.6722	mg/kg	34.2		30 - 130		
Pentachlorophenol	B013245-BS1	LCS	0.55318	1.3378	mg/kg	41.4		20 - 130		
Phenol	B013245-BS1	LCS	1.1933	1.6722	mg/kg	71.4		40 - 120		
2,4,6-Trichlorophenol	B013245-BS1	LCS	0.78629	1.6722	mg/kg	47.0		50 - 130		L21
Pyridine	B013245-BS1	LCS	0.38629	1.6722	mg/kg	23.1		10 - 110		J
2-Fluorophenol (Surrogate)	B013245-BS1	LCS	1.1288	1.3378	mg/kg	84.4		20 - 130		
Phenol-d5 (Surrogate)	B013245-BS1	LCS	1.0465	1.3378	mg/kg	78.2		30 - 130		
Nitrobenzene-d5 (Surrogate)	B013245-BS1	LCS	0.98227	1.3378	mg/kg	73.4		30 - 130		
2-Fluorobiphenyl (Surrogate)	B013245-BS1	LCS	0.81605	1.3378	mg/kg	61.0		30 - 140		
2,4,6-Tribromophenol (Surrogate)	B013245-BS1	LCS	0.69097	1.3378	mg/kg	51.6		20 - 150		
p-Terphenyl-d14 (Surrogate)	B013245-BS1	LCS	0.42074	0.66890	mg/kg	62.9		30 - 150		

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

QC Batch ID: B013245 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Acenaphthene	MS	1804625-25	ND	1.1225	1.6949	mg/kg		66.2		30 - 140	
	MSD	1804625-25	ND	1.1709	1.6556	mg/kg	4.2	70.7	30	30 - 140	
1,4-Dichlorobenzene	MS	1804625-25	ND	1.0836	1.6949	mg/kg		63.9		50 - 130	
	MSD	1804625-25	ND	1.1136	1.6556	mg/kg	2.7	67.3	30	50 - 130	
2,4-Dinitrotoluene	MS	1804625-25	ND	0.93847	1.6949	mg/kg		55.4		50 - 130	
	MSD	1804625-25	ND	0.96258	1.6556	mg/kg	2.5	58.1	30	50 - 130	
Hexachlorobenzene	MS	1804625-25	ND	0.84612	1.3559	mg/kg		62.4		50 - 130	
	MSD	1804625-25	ND	0.89305	1.3245	mg/kg	5.4	67.4	30	50 - 130	
Hexachlorobutadiene	MS	1804625-25	ND	0.89562	1.6949	mg/kg		52.8		50 - 130	
	MSD	1804625-25	ND	0.92781	1.6556	mg/kg	3.5	56.0	30	50 - 130	
Hexachloroethane	MS	1804625-25	ND	1.1909	1.6949	mg/kg		70.3		50 - 130	
	MSD	1804625-25	ND	1.2536	1.6556	mg/kg	5.1	75.7	30	50 - 130	
Nitrobenzene	MS	1804625-25	ND	1.1302	1.6949	mg/kg		66.7		30 - 120	
	MSD	1804625-25	ND	1.1530	1.6556	mg/kg	2.0	69.6	30	30 - 120	
N-Nitrosodi-N-propylamine	MS	1804625-25	ND	1.1212	1.6949	mg/kg		66.2		20 - 130	
	MSD	1804625-25	ND	1.2152	1.6556	mg/kg	8.1	73.4	30	20 - 130	
Pyrene	MS	1804625-25	ND	1.3630	1.6949	mg/kg		80.4		40 - 140	
	MSD	1804625-25	ND	1.3556	1.6556	mg/kg	0.5	81.9	30	40 - 140	
1,2,4-Trichlorobenzene	MS	1804625-25	ND	0.97734	1.6949	mg/kg		57.7		50 - 130	
	MSD	1804625-25	ND	0.98411	1.6556	mg/kg	0.7	59.4	30	50 - 130	
4-Chloro-3-methylphenol	MS	1804625-25	ND	0.90426	1.6949	mg/kg		53.4		50 - 130	
	MSD	1804625-25	ND	0.92351	1.6556	mg/kg	2.1	55.8	30	50 - 130	
2-Chlorophenol	MS	1804625-25	ND	1.0199	1.6949	mg/kg		60.2		50 - 130	
	MSD	1804625-25	ND	1.0639	1.6556	mg/kg	4.2	64.3	30	50 - 130	
2-Methylphenol	MS	1804625-25	ND	0.93449	1.6949	mg/kg		55.1		50 - 130	
	MSD	1804625-25	ND	0.98245	1.6556	mg/kg	5.0	59.3	30	50 - 130	
3- & 4-Methylphenol	MS	1804625-25	ND	1.8461	3.3898	mg/kg		54.5		50 - 130	
	MSD	1804625-25	ND	2.0623	3.3113	mg/kg	11.1	62.3	30	50 - 130	
4-Nitrophenol	MS	**1804625-25**	**ND**	**0.44947**	**1.6949**	**mg/kg**		**26.5**		**30 - 140**	**Q03**
	MSD	**1804625-25**	**ND**	**0.47748**	**1.6556**	**mg/kg**	**6.0**	**28.8**	**30**	**30 - 140**	**Q03**
Pentachlorophenol	MS	1804625-25	ND	0.60328	1.3559	mg/kg		44.5		30 - 130	
	MSD	1804625-25	ND	0.56457	1.3245	mg/kg	6.6	42.6	30	30 - 130	
Phenol	MS	1804625-25	ND	1.1677	1.6949	mg/kg		68.9		40 - 150	
	MSD	1804625-25	ND	1.2281	1.6556	mg/kg	5.0	74.2	30	40 - 150	
2,4,6-Trichlorophenol	MS	**1804625-25**	**ND**	**0.84679**	**1.6949**	**mg/kg**		**50.0**		**50 - 130**	
	MSD	**1804625-25**	**ND**	**0.81093**	**1.6556**	**mg/kg**	**4.3**	**49.0**	**30**	**50 - 130**	**Q03**

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Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Base Neutral and Acid Extractables Organic Analysis (EPA Method 8270C)

Quality Control Report - Precision & Accuracy

QC Batch ID: B013245 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Pyridine	MS	1804625-25	ND	0.52721	1.6949	mg/kg		31.1		10 - 110	
	MSD	1804625-25	ND	0.39073	1.6556	mg/kg	29.7	23.6	30	10 - 110	J
2-Fluorophenol (Surrogate)	MS	1804625-25	ND	1.1451	1.3559	mg/kg		84.5		20 - 130	
	MSD	1804625-25	ND	1.1844	1.3245	mg/kg	3.4	89.4		20 - 130	
Phenol-d5 (Surrogate)	MS	1804625-25	ND	1.0235	1.3559	mg/kg		75.5		30 - 130	
	MSD	1804625-25	ND	1.0689	1.3245	mg/kg	4.3	80.7		30 - 130	
Nitrobenzene-d5 (Surrogate)	MS	1804625-25	ND	1.0052	1.3559	mg/kg		74.1		30 - 130	
	MSD	1804625-25	ND	1.0364	1.3245	mg/kg	3.1	78.2		30 - 130	
2-Fluorobiphenyl (Surrogate)	MS	1804625-25	ND	0.84878	1.3559	mg/kg		62.6		30 - 140	
	MSD	1804625-25	ND	0.84073	1.3245	mg/kg	1.0	63.5		30 - 140	
2,4,6-Tribromophenol (Surrogate)	MS	1804625-25	ND	0.73849	1.3559	mg/kg		54.5		20 - 150	
	MSD	1804625-25	ND	0.69272	1.3245	mg/kg	6.4	52.3		20 - 150	
p-Terphenyl-d14 (Surrogate)	MS	1804625-25	ND	0.43519	0.67797	mg/kg		64.2		30 - 150	
	MSD	1804625-25	ND	0.44238	0.66225	mg/kg	1.6	66.8		30 - 150	

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Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Total Petroleum Hydrocarbons

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B012359						
TPH - Gasoline	B012359-BLK1	ND	mg/kg	20	5.0	
TPH - Diesel (FFP)	B012359-BLK1	ND	mg/kg	10	1.2	
TPH - Motor Oil	B012359-BLK1	ND	mg/kg	20	6.5	
Tetracosane (Surrogate)	**B012359-BLK1**	**118**	%	**20 - 145 (LCL - UCL)**		

Geologic - Morgan Hill	**Reported:**	06/15/2018 9:35
16055-D Caputo Drive	Project:	Top Golf
Morgan Hill, CA 95037	Project Number:	RM18.1038
	Project Manager:	Rick Mitchell

Total Petroleum Hydrocarbons

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B012359										
TPH - Diesel (FFP)	B012359-BS1	LCS	77.198	83.612	mg/kg	92.3		64 - 124		
Tetracosane (Surrogate)	B012359-BS1	LCS	3.6151	3.3445	mg/kg	108		20 - 145		

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Total Petroleum Hydrocarbons

Quality Control Report - Precision & Accuracy

QC Batch ID: B012359 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
TPH - Diesel (FFP)	MS	1807882-98	ND	80.083	82.508	mg/kg		97.1		52 - 131	
	MSD	1807882-98	ND	87.078	84.459	mg/kg	8.4	103	30	52 - 131	
Tetracosane (Surrogate)	MS	1807882-98	ND	3.7515	3.3003	mg/kg		114		20 - 145	
	MSD	1807882-98	ND	3.9515	3.3784	mg/kg	5.2	117		20 - 145	

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

WET Test (STLC)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B014758						
Chromium	B014758-BLK1	ND	mg/L	0.10	0.0092	
Lead	B014758-BLK1	ND	mg/L	0.50	0.16	

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

WET Test (STLC)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B014758										
Chromium	B014758-BS1	LCS	22.747	20.000	mg/L	114		85 - 115		
Lead	B014758-BS1	LCS	20.955	20.000	mg/L	105		85 - 115		

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill		**Reported:**	06/15/2018 9:35
16055-D Caputo Drive		Project:	Top Golf
Morgan Hill, CA 95037		Project Number:	RM18.1038
		Project Manager:	Rick Mitchell

WET Test (STLC)

Quality Control Report - Precision & Accuracy

QC Batch ID: B014758 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Chromium	DUP	1814818-06	0.21728	0.22085		mg/L	1.6		20		
	MS	1814818-06	0.21728	23.034	20.408	mg/L		112		75 - 125	
	MSD	1814818-06	0.21728	23.240	20.408	mg/L	0.9	113	20	75 - 125	
Lead	DUP	1814818-06	3.1115	3.1634		mg/L	1.7		20		
	MS	1814818-06	3.1115	24.099	20.408	mg/L		103		75 - 125	
	MSD	1814818-06	3.1115	24.082	20.408	mg/L	0.1	103	20	75 - 125	

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Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

TCLP Toxicity

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B014703						
Chromium	**B014703-BLK1**	**0.0085106**	**mg/L**	**0.10**	**0.0075**	**J**

Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

TCLP Toxicity

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B014703										
Chromium	B014703-BS1	LCS	19.280	20.000	mg/L	96.4		85 - 115		

Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill		**Reported:**	06/15/2018 9:35
16055-D Caputo Drive		Project:	Top Golf
Morgan Hill, CA 95037		Project Number:	RM18.1038
		Project Manager:	Rick Mitchell

TCLP Toxicity

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: B014703	Used client sample: N										
Chromium	DUP	**1815010-23**	**0.017355**	**0.024336**		**mg/L**	**33.5**		**20**		**J,A02**
	MS	**1815010-23**	**0.017355**	**20.135**	**20.000**	**mg/L**		**101**		**75 - 125**	
	MSD	**1815010-23**	**0.017355**	**19.942**	**20.000**	**mg/L**	**1.0**	**99.6**	**20**	**75 - 125**	

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Total Concentrations (TTLC)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B012605						
Antimony	B012605-BLK1	ND	mg/kg	5.0	0.33	
Arsenic	B012605-BLK2	ND	mg/kg	1.0	0.40	
Barium	B012605-BLK1	ND	mg/kg	0.50	0.18	
Beryllium	B012605-BLK1	ND	mg/kg	0.50	0.047	
Cadmium	B012605-BLK2	ND	mg/kg	0.50	0.052	
Chromium	**B012605-BLK2**	**0.053772**	**mg/kg**	**0.50**	**0.050**	**J**
Cobalt	B012605-BLK1	ND	mg/kg	2.5	0.098	
Copper	**B012605-BLK1**	**0.10878**	**mg/kg**	**1.0**	**0.050**	**J**
Lead	B012605-BLK1	ND	mg/kg	2.5	0.28	
Molybdenum	**B012605-BLK1**	**0.36586**	**mg/kg**	**2.5**	**0.050**	**J**
Nickel	B012605-BLK1	ND	mg/kg	0.50	0.15	
Selenium	B012605-BLK2	ND	mg/kg	1.0	0.98	
Silver	B012605-BLK2	ND	mg/kg	0.50	0.067	
Thallium	B012605-BLK1	ND	mg/kg	5.0	0.64	
Vanadium	B012605-BLK1	ND	mg/kg	0.50	0.11	
Zinc	**B012605-BLK1**	**0.20234**	**mg/kg**	**2.5**	**0.087**	**J**
QC Batch ID: B012684						
Mercury	B012684-BLK1	ND	mg/kg	0.16	0.019	

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill	**Reported:** 06/15/2018 9:35
16055-D Caputo Drive	Project: Top Golf
Morgan Hill, CA 95037	Project Number: RM18.1038
	Project Manager: Rick Mitchell

Total Concentrations (TTLC)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: B012605										
Antimony	B012605-BS1	LCS	108.08	100.00	mg/kg	108		75 - 125		
Arsenic	B012605-BS2	LCS	9.3321	10.000	mg/kg	93.3		75 - 125		
Barium	B012605-BS1	LCS	109.58	100.00	mg/kg	110		75 - 125		
Beryllium	B012605-BS1	LCS	10.152	10.000	mg/kg	102		75 - 125		
Cadmium	B012605-BS2	LCS	10.071	10.000	mg/kg	101		75 - 125		
Chromium	B012605-BS2	LCS	106.05	100.00	mg/kg	106		75 - 125		
Cobalt	B012605-BS1	LCS	108.22	100.00	mg/kg	108		75 - 125		
Copper	B012605-BS1	LCS	102.31	100.00	mg/kg	102		75 - 125		
Lead	B012605-BS1	LCS	101.77	100.00	mg/kg	102		75 - 125		
Molybdenum	B012605-BS1	LCS	105.99	100.00	mg/kg	106		75 - 125		
Nickel	B012605-BS1	LCS	109.22	100.00	mg/kg	109		75 - 125		
Selenium	B012605-BS2	LCS	9.4384	10.000	mg/kg	94.4		75 - 125		
Silver	B012605-BS2	LCS	9.8684	10.000	mg/kg	98.7		75 - 125		
Thallium	B012605-BS1	LCS	119.27	100.00	mg/kg	119		75 - 125		
Vanadium	B012605-BS1	LCS	103.20	100.00	mg/kg	103		75 - 125		
Zinc	B012605-BS1	LCS	105.75	100.00	mg/kg	106		75 - 125		
QC Batch ID: B012684										
Mercury	B012684-BS1	LCS	0.86336	0.80000	mg/kg	108		80 - 120		

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill 16055-D Caputo Drive Morgan Hill, CA 95037	**Reported:** 06/15/2018 9:35 Project: Top Golf Project Number: RM18.1038 Project Manager: Rick Mitchell

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

QC Batch ID: B012605 Used client sample: N

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Antimony	DUP	1813644-02	ND	ND		mg/kg			20		
	MS	1813644-02	ND	16.077	100.00	mg/kg		16.1		16 - 119	
	MSD	1813644-02	ND	17.795	100.00	mg/kg	10.1	17.8	20	16 - 119	
Arsenic	DUP	1813644-02	5.4014	5.7666		mg/kg	6.5		20		
	MS	1813644-02	5.4014	13.638	10.000	mg/kg		82.4		75 - 125	
	MSD	1813644-02	5.4014	13.888	10.000	mg/kg	1.8	84.9	20	75 - 125	
Barium	DUP	1813644-02	118.07	113.15		mg/kg	4.3		20		
	MS	1813644-02	118.07	193.91	100.00	mg/kg		75.8		75 - 125	
	MSD	1813644-02	118.07	193.69	100.00	mg/kg	0.1	75.6	20	75 - 125	
Beryllium	DUP	1813644-02	0.36786	0.36309		mg/kg	1.3		20		J
	MS	1813644-02	0.36786	8.1196	10.000	mg/kg		77.5		75 - 125	
	MSD	1813644-02	0.36786	8.1684	10.000	mg/kg	0.6	78.0	20	75 - 125	
Cadmium	DUP	1813644-02	0.11272	0.12524		mg/kg	10.5		20		J
	MS	1813644-02	0.11272	8.3251	10.000	mg/kg		82.1		75 - 125	
	MSD	1813644-02	0.11272	8.2054	10.000	mg/kg	1.4	80.9	20	75 - 125	
Chromium	DUP	1813644-02	17.653	17.407		mg/kg	1.4		20		
	MS	1813644-02	17.653	97.959	100.00	mg/kg		80.3		75 - 125	
	MSD	1813644-02	17.653	97.312	100.00	mg/kg	0.7	79.7	20	75 - 125	
Cobalt	DUP	1813644-02	7.5921	7.5945		mg/kg	0.0		20		
	MS	1813644-02	7.5921	88.168	100.00	mg/kg		80.6		75 - 125	
	MSD	1813644-02	7.5921	91.152	100.00	mg/kg	3.3	83.6	20	75 - 125	
Copper	DUP	1813644-02	33.112	37.271		mg/kg	11.8		20		
	MS	1813644-02	33.112	119.33	100.00	mg/kg		86.2		75 - 125	
	MSD	1813644-02	33.112	124.90	100.00	mg/kg	4.6	91.8	20	75 - 125	
Lead	DUP	**1813644-02**	**17.953**	**18.782**		**mg/kg**	**4.5**		**20**		
	MS	**1813644-02**	**17.953**	**92.259**	**100.00**	**mg/kg**		**74.3**		**75 - 125**	**Q03**
	MSD	**1813644-02**	**17.953**	**96.678**	**100.00**	**mg/kg**	**4.7**	**78.7**	**20**	**75 - 125**	
Molybdenum	DUP	1813644-02	0.46850	0.38628		mg/kg	19.2		20		J
	MS	1813644-02	0.46850	79.896	100.00	mg/kg		79.4		75 - 125	
	MSD	1813644-02	0.46850	83.070	100.00	mg/kg	3.9	82.6	20	75 - 125	
Nickel	DUP	**1813644-02**	**11.798**	**11.649**		**mg/kg**	**1.3**		**20**		
	MS	**1813644-02**	**11.798**	**86.398**	**100.00**	**mg/kg**		**74.6**		**75 - 125**	**Q03**
	MSD	**1813644-02**	**11.798**	**89.802**	**100.00**	**mg/kg**	**3.9**	**78.0**	**20**	**75 - 125**	
Selenium	DUP	**1813644-02**	**ND**	**ND**		**mg/kg**			**20**		
	MS	**1813644-02**	**ND**	**6.6815**	**10.000**	**mg/kg**		**66.8**		**75 - 125**	**Q03**
	MSD	**1813644-02**	**ND**	**6.8044**	**10.000**	**mg/kg**	**1.8**	**68.0**	**20**	**75 - 125**	**Q03**
Silver	DUP	1813644-02	ND	ND		mg/kg			20		
	MS	1813644-02	ND	7.8513	10.000	mg/kg		78.5		75 - 125	
	MSD	1813644-02	ND	7.9210	10.000	mg/kg	0.9	79.2	20	75 - 125	

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Geologic - Morgan Hill
16055-D Caputo Drive
Morgan Hill, CA 95037

Reported: 06/15/2018 9:35
Project: Top Golf
Project Number: RM18.1038
Project Manager: Rick Mitchell

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: B012605	Used client sample: N										
Thallium	DUP	1813644-02	1.2368	1.1569		mg/kg	6.7		20		J
	MS	1813644-02	1.2368	79.886	100.00	mg/kg		78.6		75 - 125	
	MSD	1813644-02	1.2368	82.067	100.00	mg/kg	2.7	80.8	20	75 - 125	
Vanadium	DUP	1813644-02	38.683	37.931		mg/kg	2.0		20		
	MS	1813644-02	38.683	122.42	100.00	mg/kg		83.7		75 - 125	
	MSD	1813644-02	38.683	125.30	100.00	mg/kg	2.3	86.6	20	75 - 125	
Zinc	DUP	**1813644-02**	**59.687**	**59.218**		**mg/kg**	**0.8**		**20**		
	MS	**1813644-02**	**59.687**	**132.57**	**100.00**	**mg/kg**		**72.9**		**75 - 125**	**Q03**
	MSD	**1813644-02**	**59.687**	**135.62**	**100.00**	**mg/kg**	**2.3**	**75.9**	**20**	**75 - 125**	
QC Batch ID: B012684	Used client sample: N										
Mercury	DUP	**1814219-01**	**0.055714**	**0.071111**		**mg/kg**	**24.3**		**20**		**J,A02**
	MS	**1814219-01**	**0.055714**	**0.94810**	**0.79365**	**mg/kg**		**112**		**80 - 120**	
	MSD	**1814219-01**	**0.055714**	**0.95302**	**0.79365**	**mg/kg**	**0.5**	**113**	**20**	**80 - 120**	

Geologic - Morgan Hill		**Reported:**	06/15/2018 9:35
16055-D Caputo Drive		Project:	Top Golf
Morgan Hill, CA 95037		Project Number:	RM18.1038
		Project Manager:	Rick Mitchell

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected
PQL	Practical Quantitation Limit
A01	Detection and quantitation limits are raised due to sample dilution.
A02	The difference between duplicate readings is less than the quantitation limit.
A52	Chromatogram not typical of diesel.
L21	The Laboratory Control Sample Soil (LCSS) recovery is not within laboratory established control limits.
Q03	Matrix spike recovery(s) is(are) not within the control limits.
S09	The surrogate recovery on the sample for this compound was not within the control limits.

DRAFT

REPUBLIC SERVICES **SPECIAL WASTE PROFILE**

Requested Disposal Facility: 4227 Ox Mountain LF CA

Waste Profile #
Sales Rep #:

Saveable fill-in form. Restricted printing until all required (yellow) fields are completed.

I. Generator Information

Generator Name: City of Burlingame			
Generator Site Address: 1001 S Airport Road			
City: Burlingame	County: San Mateo	State: California	Zip: 94010
State ID/Reg No:	State Approval/Waste Code: (if applicable)		NAICS # :
Generator Mailing Address (if different): ☑ 501 Primrose Road			
City: Burlingame	County: San Mateo	State: California	Zip: 94010
Generator Contact Name: Art Morimoto		Email:	
Phone Number: (650) 558-7246	Ext:	Fax Number:	

II. Billing Information

Bill To: Bradley Tanks, Inc.		Contact Name: Kelly Graser	
Billing Address: 402 Hartz Ave., Bld C		Email: kgraser@btienvironmental.com	
City: Danville	State: CA	Zip: 94526	Phone: (925) 229-2900

III. Waste Stream Information

Name of Waste:	non-hazardous soil cuttings
Process Generating Waste:	Installation of groundwater monitoring wells at former City of Burlingame Landfill site
Type of Waste:	☐ INDUSTRIAL PROCESS WASTE ☑ POLLUTION CONTROL WASTE
Physical State:	☑ SOLID ☐ SEMI-SOLID ☐ POWDER ☐ LIQUID
Method of Shipment:	☑ BULK ☐ DRUM ☐ BAGGED ☐ OTHER:
Estimated Annual Volume:	50 Cubic Yards
Frequency:	☑ ONE TIME ☐ ONGOING
Disposal Consideration:	☑ LANDFILL ☐ SOLIDIFICATION ☐ BIOREMEDIATION

IV. Representative Sample Certification

☐ NO SAMPLE TAKEN

Is the representative sample collected to prepare this profile and laboratory analysis, collected in accordance with U.S. EPA 40 CFR 261.20(c) guidelines or equivalent rules?	☑ YES or ☐ NO
Type of Sample: ☑ COMPOSITE SAMPLE ☐ GRAB SAMPLE	
Sample Date: 4/20/2018	
Sample ID Numbers: 4 Point Composite 1-4,	

DRAFT

REPUBLIC SERVICES **SPECIAL WASTE PROFILE**

Waste Profile #

V. Physical Characteristics of Waste

Characteristic Components	% by Weight (range)
1. Soil	95-100
2. Debris, Trash, Plastic, PPE	0-5
3.	
4.	
5.	

Color	Odor (describe)	Does Waste Contain Free Liquids?	% Solids	pH:	Flash Point
Brown	none	☐ YES or ☑ NO	100	N/A	N/A °F

Attach Laboratory Analytical Report (and/or Material Safety Data Sheet) Including Chain of Custody and Required Parameters Provided for this Profile

Does this waste or generating process contain regulated concentrations of the following Pesticides and/or Herbicides: Chlordane, Endrin, Heptachlor (and its epoxides), Lindane, Methoxychlor, Toxaphene, 2,4-D, or 2,4,5-TP Silvex as defined in 40 CFR 261.33?	☐ Yes or ☑ No
Does this waste contain reactive sulfides (greater than 500 ppm) or reactive cyanide (greater than 250 ppm)[reference 40 CFR 261.23(a)(5)]?	☐ Yes or ☑ No
Does this waste contain regulated concentrations of Polychlorinated Biphenyls (PCBs) as defined in 40 CFR Part 761?	☐ Yes or ☑ No
Does this waste contain concentrations of listed hazardous wastes defined in 40 CFR 261.31, 261.32, 261.33, including RCRA F-Listed Solvents?	☐ Yes or ☑ No
Does this waste exhibit a Hazardous Characteristic as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Does this waste contain regulated concentrations of 2,3,7,8-Tetrachlorodibenzodioxin (2,3,7,8-TCCD), or any other dioxin as defined in 40 CFR 261.31?	☐ Yes or ☑ No
Is this a regulated Radioactive Waste as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Is this a regulated Medical or Infectious Waste as defined by Federal and/or State regulations?	☐ Yes or ☑ No
Is this waste a reactive or heat generating waste?	☐ Yes or ☑ No
Does the waste contain sulfur or sulfur by-products?	☐ Yes or ☑ No
Is this waste generated at a Federal Superfund Clean Up Site?	☐ Yes or ☑ No
Is this waste from a TSD facility, TSD like facility or consolidator?	☐ Yes or ☑ No

VI. Certification

I hereby certify that to the best of my knowledge and belief, the information contained herein is a true, complete and accurate description of the waste material being offered for disposal and all known or suspected hazards have been disclosed. All Analytical Results/Material Safety Data Sheets submitted are truthful and complete and are representative of the waste.

I further certify that by utilizing this profile, neither myself nor any other employee of the company will deliver for disposal or attempt to deliver for disposal any waste which is classified as toxic waste, hazardous waste or infectious waste, or any other waste material this facility is prohibited from accepting by law. I shall immediately give written notice of any change or condition pertaining to the waste not provided herein. Our company hereby agrees to fully indemnify this disposal facility against any damages resulting from this certification being inaccurate or untrue.

I further certify that the company has not altered the form or content of this profile sheet as provided by Republic Services Inc.

Art Morimoto, Project Manager	City of Burlingame
Authorized Representative Name And Title (Type or Print)	Company Name
Art Morimoto	5/31/2018
Authorized Representative Signature	Date

Appendix F
LABORATORY TESTING

DRAFT

Geo-Logic ASSOCIATES

Geo-**L**ogic **A**ssociates
143E Spring Hill Drive
Grass Valley, CA 95945
USA
T+1 530 272 2448
F+1 530 272 8533
www.geo-logic.com

DATE: May 30, 2018

TO: Richard Mitchell

JOB NO: RM18.1038.003
LAB LOG: 4365.0

e-mail: rmitchell@rmcgeoscience.com, btreece@geo-logic.com

RE: **Lab Report: Top Golf Burlingame**

Enclosed are results for: Samples Received - May 15, 2018

Code	Item	Quantity
2500	Moisture Content - ASTM D-2216	11
1850	Dry Density / Moisture Content - ASTM D-7263	17
1000	Atterberg Limits, wet or dry prep - ASTM D-4318	3
3000	Particle Size Analysis, w/ Gravel no Hydro - ASTM D-6913 (D-422)	5
3150	Percent Passing # 200 - ASTM C-117 or D-1140	10
4150	Triaxial Shear CU, 2-3" / pt - ASTM D-4767	6

Thank you for consulting Geo-Logic Associates for your material testing requirements. We look forward to working with you again. If you have any questions or require any additional information, please call us at 1-530-272-2448. This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job. This report shall not be reproduced except in full without written approval of Geo-Logic Associates.

Sincerely,

Prepared By: Kindra Hillman
Laboratory Manager

Reviewed By: Kenneth R. Criley
Technical Director

Geo-Logic ASSOCIATES

WATER CONTENT & DRY DENSITY

DRAFT

Client : RMC Geoscience, Inc.

Project No: RM18.1038.003

Lab Log: **4365**

Project Name: Top Golf Burlingame

Report Date: May 21, 2018

LSN	Sample ID	Soil Classification **	Water Content %	Dry Density pcf			
4365A	TG-01 @ 44'	Light Brown Clayey Gravel with Sand	16.2				
4365C	TG-01 @ 68-68.5'	Brown Lean Clay with Sand	22.4	106.5			
4365E	TG-03 @ 78-78.5'	Brown Gravel with Sand and Clay	11.0	127.6			
4365F	TG-06 @ 62'	Brown Clayey Sand with Gravel	16.3				
4365G	TG-06 @ 68-68.5'	Blueish Brown Clayey Sand	31.1	96.0			
4365H	TG-06 @ 72'	Light Brown Clayey Sand	19.6				
4365I	TG-06 @ 77.5-78'	Brown Clayey Gravel with Sand	15.0				
4365J	TG-06 @ 88-88.5'	Brown Clayey Sand	18.0	115.2			
4365K	TG-07 @ 70'	Light Brown Clay	25.9	103.5			
4365L	TG-07 @ 80'	Light Brown Gravel with Sand and Clay	13.2	123.9			

Notes: ** Classifications are based on ASTM D-2487 when appropriate test results are available and per ASTM D-2488 when visual

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

Geo-Logic ASSOCIATES

WATER CONTENT & DRY DENSITY

DRAFT

Client : RMC Geoscience, Inc.
Project No: RM18.1038.003
Lab Log: **4365**

Project Name: Top Golf Burlingame
Report Date: May 21, 2018

LSN	Sample ID	Soil Classification **	Water Content %	Dry Density pcf			
4365M	TG-07 @ 90-90.5'	Gray Sand with Silty Clay	18.7				
4365N	TG-08 @ 73'	Brown Clayey Sand	17.0				
4365O	TG-08 @ 78-78.5'	Brown Clayey Sand with Gravel	14.0				
4365P	TG-08 @ 88-88.5'	Light Brown Sandy Clay	17.9	112.9			
4365Q	TG-09 @ 57-58'	Brown Clayey Sand with Gravel	12.3				
4365R	TG-09 @ 59.5-60'	Brown Sandy Clay	16.2				
4365S	TG-09 @ 67'	Brown Clay	21.7				
4365T	TG-09 @ 69.5'	Brown Sandy Clay	22.3	103.9			
4365U	TG-09 @ 70'	Light Brown Sandy Clay	19.1	113.1			
4365V	TG-09 @ 80'	Blueish Brown Clayey Sand	19.8	119.8			

Notes: ** Classifications are based on ASTM D-2487 when appropriate test results are available and per ASTM D-2488 when visual

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

Geo-Logic ASSOCIATES

WATER CONTENT & DRY DENSITY DRAFT

Client : RMC Geoscience, Inc.

Project No: RM18.1038.003

Lab Log: **4365**

Project Name: Top Golf Burlingame

Report Date: May 21, 2018

LSN	Sample ID	Soil Classification **	Water Content %	Dry Density pcf			
4365W	TG-09 @ 88'	Gray Brown Clay with Gravel	14.5				
4365X	TG-09 @ 90'	Brown Sand with Clay & Gravel	14.8	123.0			
4365Y	TG-14 @ 50'	Blue Gray Silty Clayey Sand	35.7	84.6			
4365Z	TG-14 @ 80'	Light Brown Clay with Sand	25.0	109.3			
4365AA	TG-16 @ 28.5'	Gray Sandy Clay w/ Gravel & Organics	27.7	76.4			
4365AB	TG-16 @ 38.5'	Very Dark Brown Gravelly Clay w/ Organics (Oily)	59.6	54.5			
4365AD	TG-16 @ 58'	Brown Clayey Sand	15.6	119.3			
4365AG	TG-17 @ 48-48.5'	Light Brown Lean Clay	20.9	109.5			

Notes: ** Classifications are based on ASTM D-2487 when appropriate test results are available and per ASTM D-2488 when visual

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

Geo-Logic ASSOCIATES

WATER CONTENT & MINUS # 200 % DRAFT

ASTM D1140, Method B

Client : RMC Geoscience, Inc.
Project No: RM18.1038.003
Lab Log: **4365**

Project Name: Top Golf Burlingame
Report Date: May 22, 2018

LSN	Sample ID	Soil Classification **	Water Content (%)	Percent Minus #200	Percent Sand & Gravel	
4365A	TG-01 @ 44'	Light Brown Clayey Gravel with Sand	15.7	15.6	84.4	
4365G	TG-06 @ 68-68.5'	Blueish Brown Clayey Sand	29.2	24.6	75.4	
4365I	TG-06 @ 77.5-78'	Brown Clayey Gravel with Sand	15.0	12.8	87.2	
4365L	TG-07 @ 80'	Light Brown Gravel with Sand and Clay	13.2	11.1	88.9	
4365M	TG-07 @ 90-90.5'	Gray Sand with Silty Clay	18.7	9.9	90.1	
4365N	TG-08 @ 73'	Brown Clayey Sand	17.0	14.3	85.7	
4365R	TG-09 @ 59.5-60'	Brown Sandy Clay	16.2	50.7	49.3	
4365T	TG-09 @ 69.5'	Brown Sandy Clay	22.1	54.3	45.7	
4365V	TG-09 @ 80'	Blueish Brown Clayey Sand	19.5	22.7	77.3	
4365AD	TG-16 @ 58'	Brown Clayey Sand	15.6	49.5	50.5	

Notes: ** Classifications are based on ASTM D-2487 when appropriate test results are available and per ASTM D-2488 when visual
Samples are soaked for 4 hours unless otherwise noted.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

L: / ILbexcel / FORMS / GLA Forms / Reports / / -#200-ck
DCN: 200-qc(rev. 06/27/12)

Print Date: 5/24/2018
Entered By: JL
Reviewed By: KH
LLN: **4365**

DRAFT

ATTERBERG LIMITS

Summary Report

ASTM D-4318

Geo-Logic ASSOCIATES

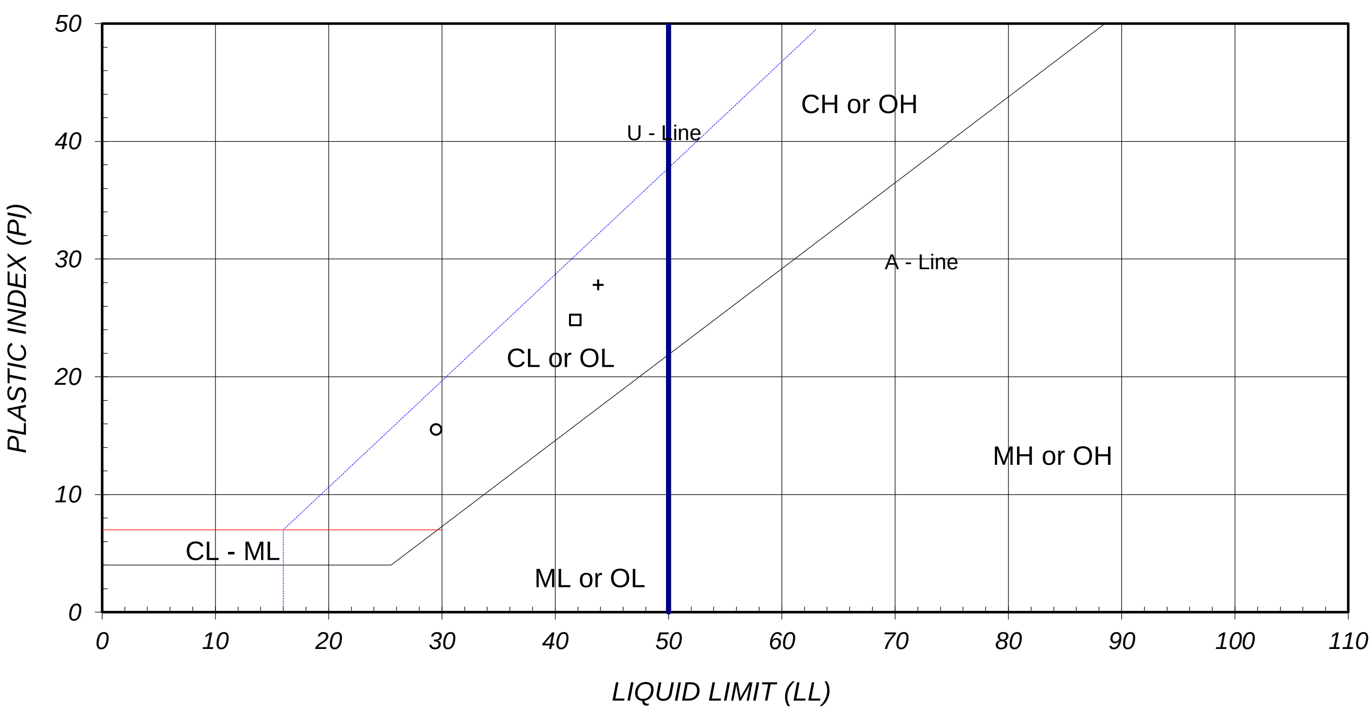
Client :	Project No:	Lab Log No.:
RMC Geoscience, Inc.	RM18.1038.003	4365

Project Name:	Report Date:
Top Golf Burlingame	May 30, 2018

LSN	SYMBOL	SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX
4365C	□	TG-01 @ 68-68.5'	Light Brown Lean Clay with Sand	42	17	25
4365AC	○	TG-16 @ 48'	Brown Lean Clay	30	14	16
4365AG	+	TG-17 @ 48-48.5'	Light Brown Lean Clay	44	16	28

* Visual Classification based on ASTM D-2488

PLASTICITY CHART



This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

DRAFT

Geo-Logic ASSOCIATES

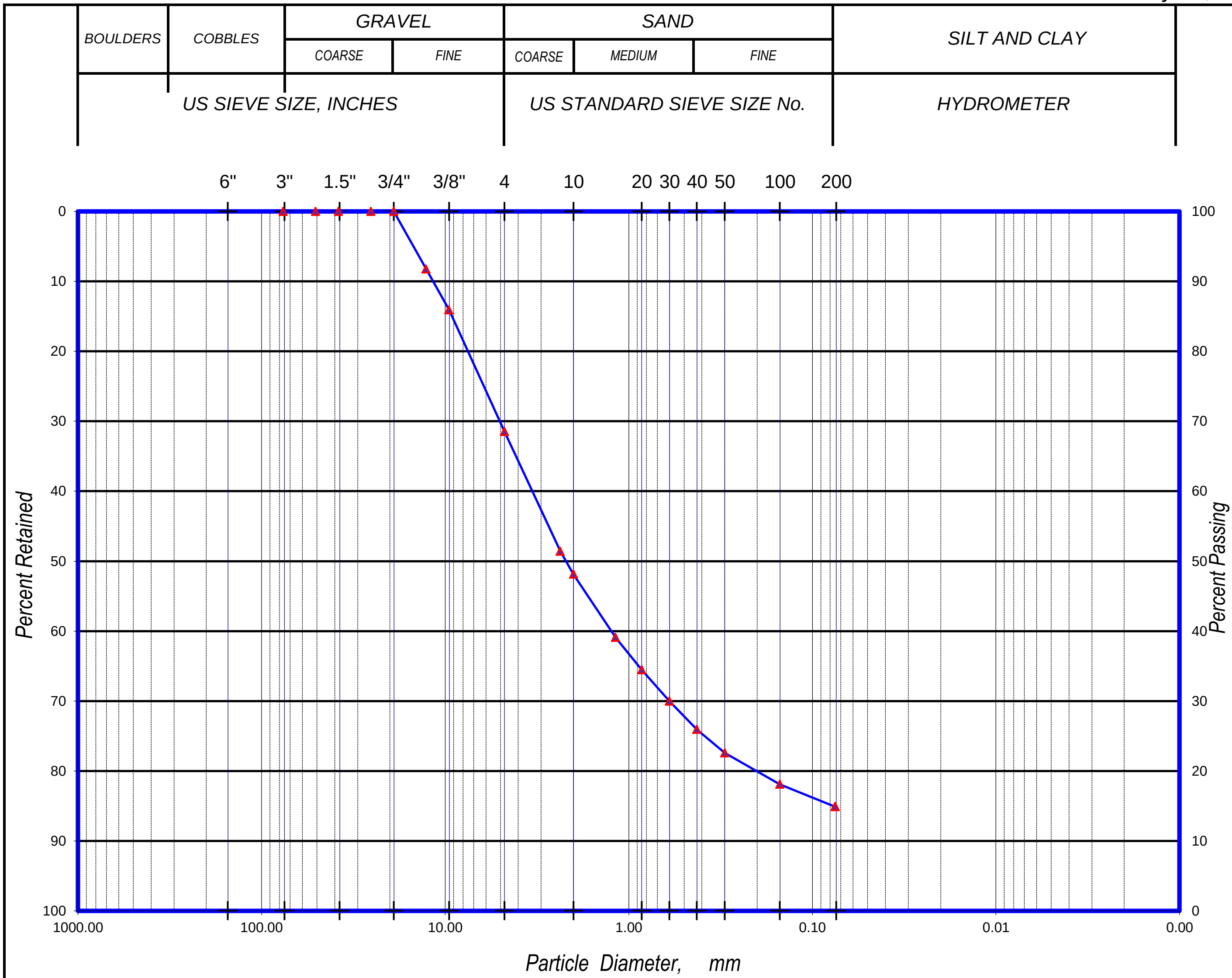
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client :	Project No:	Lab Sample No:
RMC GEOSCIENCE, INC.	RM18.1038.003	**4365F**

Project Name:	Report Date:
TOP GOLF BURLINGAME	May 24, 2018



Symbol	Sample ID	* Description	% Gravel	% Sand	% Silt - Clay
▲	TG-06 @ 62'	Brown Clayey Sand with Gravel	31.5	53.6	14.9

Size Passing, mm D_{60} = 3.56 D_{30} = 0.60 D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 3.84

* Visual Classification based on ASTM D-2488

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

DRAFT

PARTICLE SIZE ANALYSIS

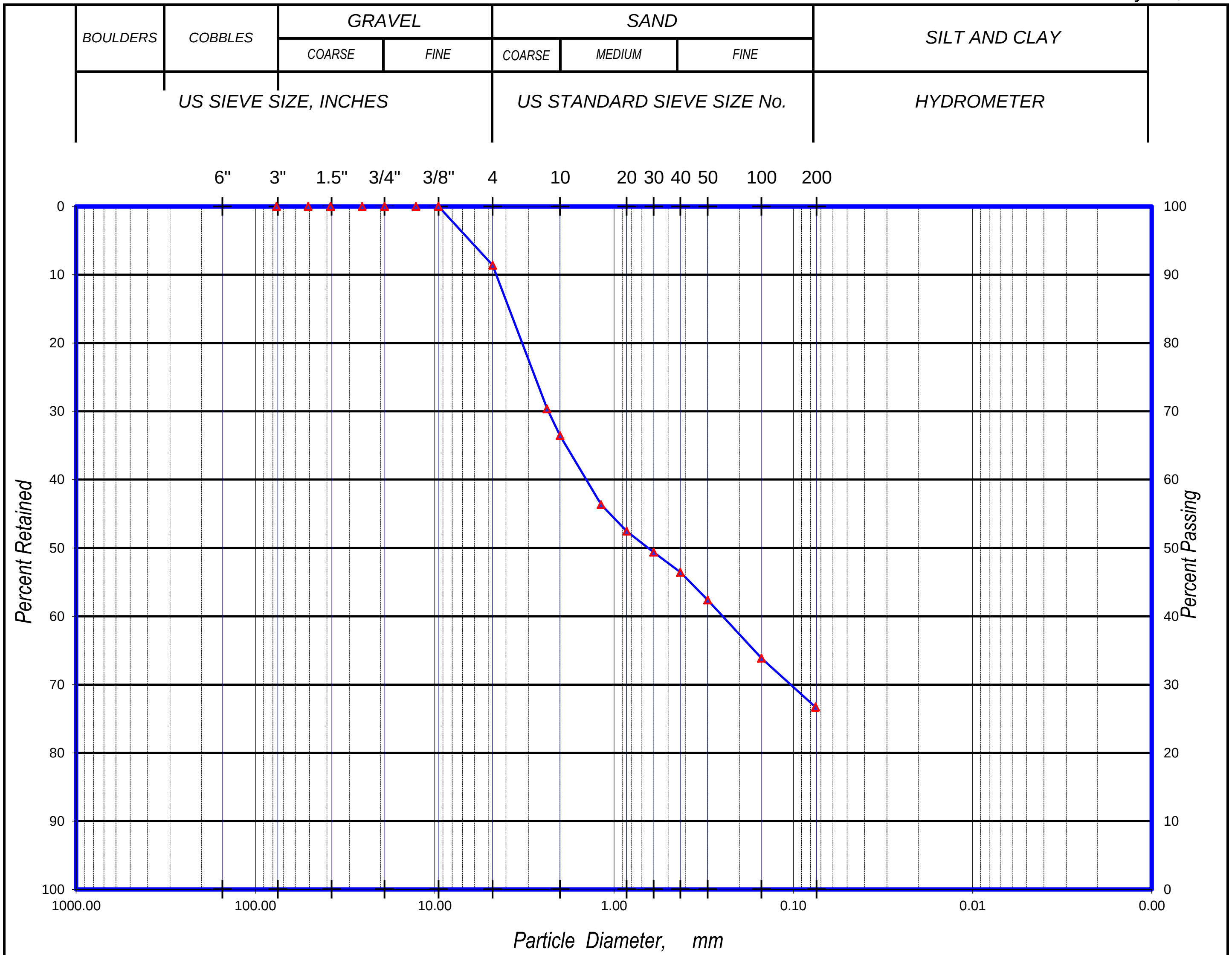
Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Geo-Logic ASSOCIATES

Client :	Project No:	Lab Sample No:
RMC GEOSCIENCE, INC.	RM18.1038.003	**4365H**

Project Name:	Report Date:
TOP GOLF BURLINGAME	May 24, 2018



Symbol	Sample ID	* Description	% Gravel	% Sand	% Silt - Clay
▲	TG-06 @ 72'	Light Brown Clayey Sand	8.6	64.7	26.7

Size Passing, mm D_{60} = 1.48 D_{30} = 0.11 D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 2.56

* Visual Classification based on ASTM D-2488

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

L : Labexcel \ Projects \ Client \ Client Name \ 4365 \ 4365H-ma	Print Date:	Entered By:	Reviewed By:	LSN:
DCN: MA-rp (rev. 6/27/12)	05/24/18	KH	JL	**4365H**

DRAFT

PARTICLE SIZE ANALYSIS

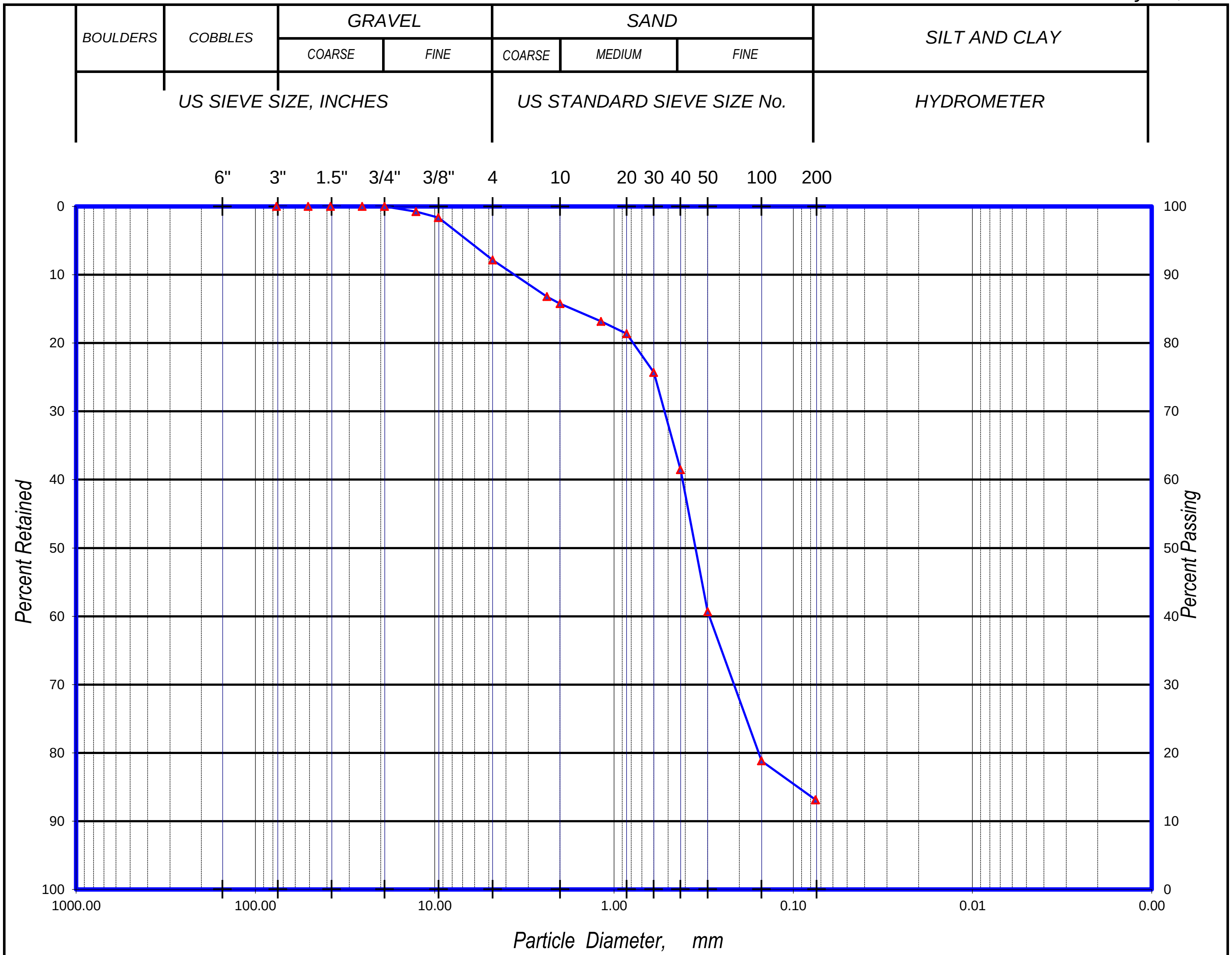
Geo-Logic ASSOCIATES

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client:	Project No:	Lab Sample No:
RMC GEOSCIENCE, INC.	RM18.1038.003	**4365J**

Project Name:	Report Date:
TOP GOLF BURLINGAME	May 24, 2018



Symbol	Sample ID	* Description	% Gravel	% Sand	% Silt - Clay
▲	TG-06 @ 88-88.5'	Brown Clayey Sand	7.8	79.1	13.1

Size Passing, mm D_{60} = 0.42 D_{30} = 0.23 D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 2.04

* Visual Classification based on ASTM D-2488

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

L : Labexcel \ Projects \ Client \ Client Name \ 4365 \ 4365J-ma

Print Date:	Entered By:	Reviewed By:	LSN:
05/24/18	KH	JL	**4365J**

DCN: MA-rp (rev. 6/27/12)

DRAFT

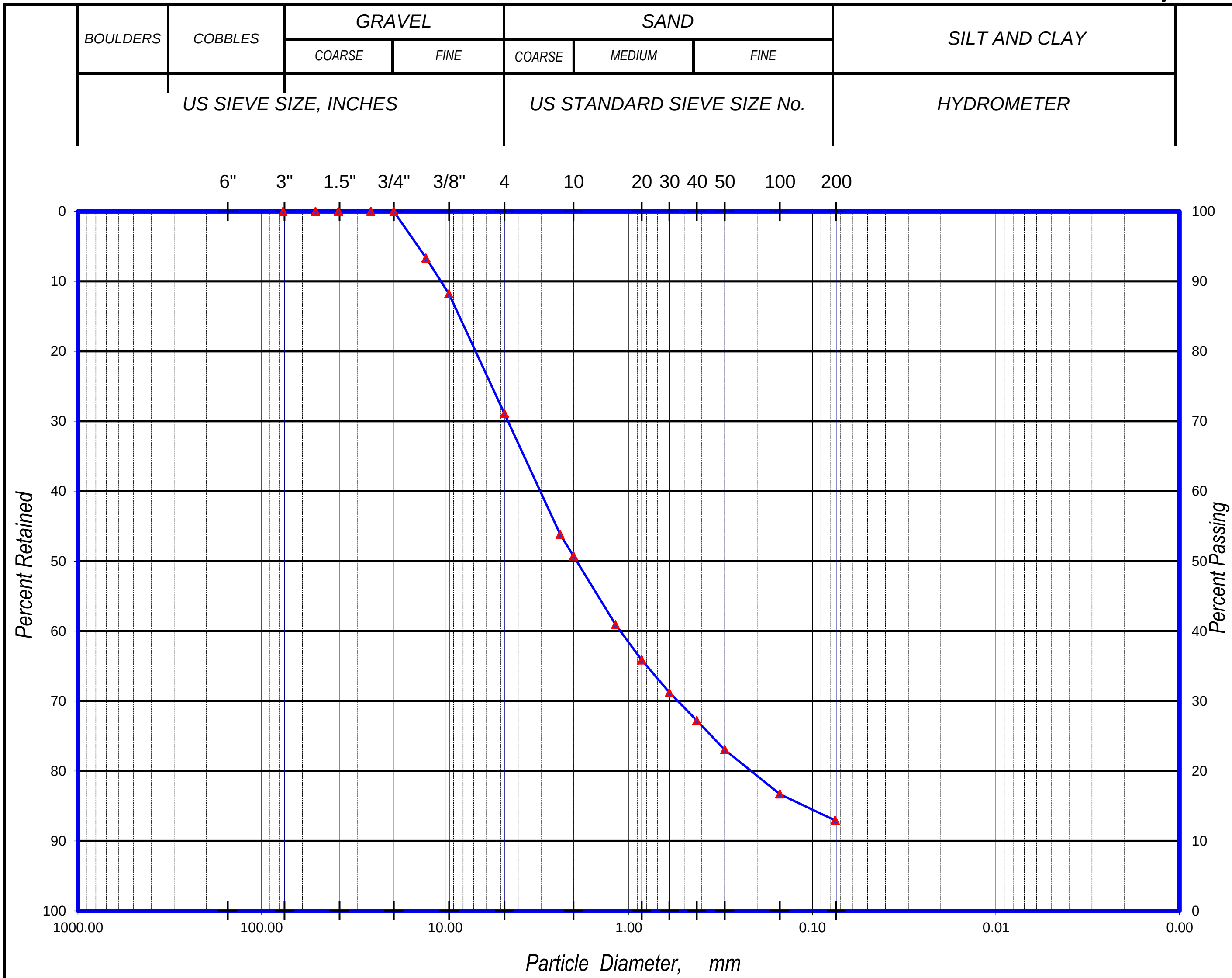
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client : RMC GEOSCIENCE, INC. | Project No: RM18.1038.003 | Lab Sample No: **4365O**

Project Name: TOP GOLF BURLINGAME | Report Date: May 24, 2018



Symbol	Sample ID	* Description	% Gravel	% Sand	% Silt - Clay
▲	TG-08 @ 78-78.5'	Brown Clayey Sand with Gravel	28.9	58.2	12.9

Size Passing, mm D_{60} = 3.22 D_{30} = 0.55 D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 3.75

* Visual Classification based on ASTM D-2488

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

DRAFT

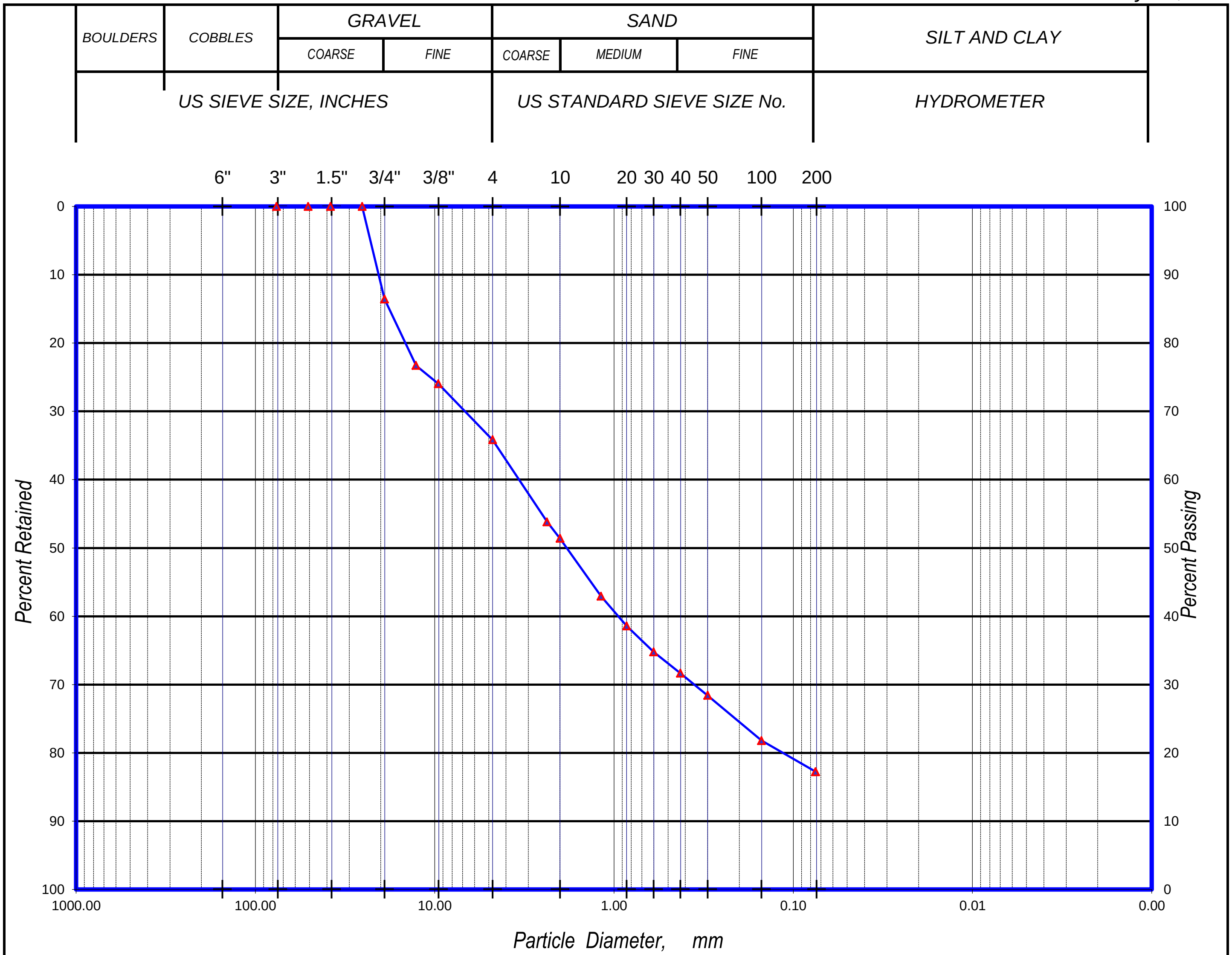
PARTICLE SIZE ANALYSIS

Test Report

ASTM D-6913 / D-7928, (replacing D-422)
Method A: (+/-1%)

Client :	Project No:	Lab Sample No:
RMC GEOSCIENCE, INC.	RM18.1038.003	**4365Q**

Project Name:	Report Date:
TOP GOLF BURLINGAME	May 24, 2018



Symbol	Sample ID	* Description	% Gravel	% Sand	% Silt - Clay
▲	TG-09 @ 57-58'	Brown Clayey Sand with Gravel	34.2	48.6	17.2

Size Passing, mm D_{60} = 3.59 D_{30} = 0.36 D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 3.92

* Visual Classification based on ASTM D-2488

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

DRAFT

Geo-Logic ASSOCIATES

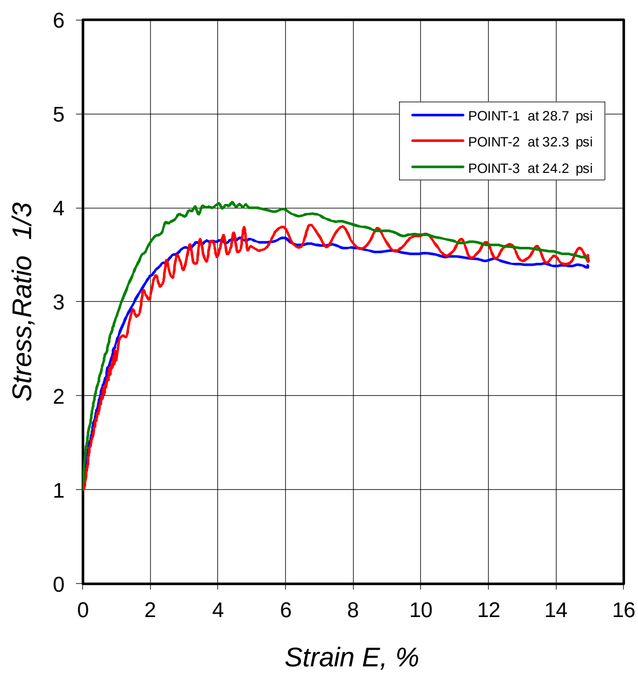
TRIAXIAL SHEAR TEST

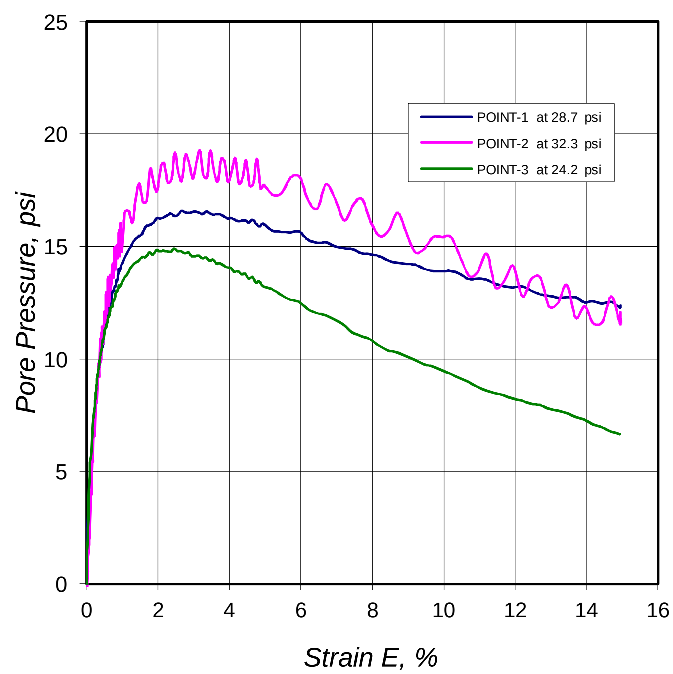
Consolidated-Undrained

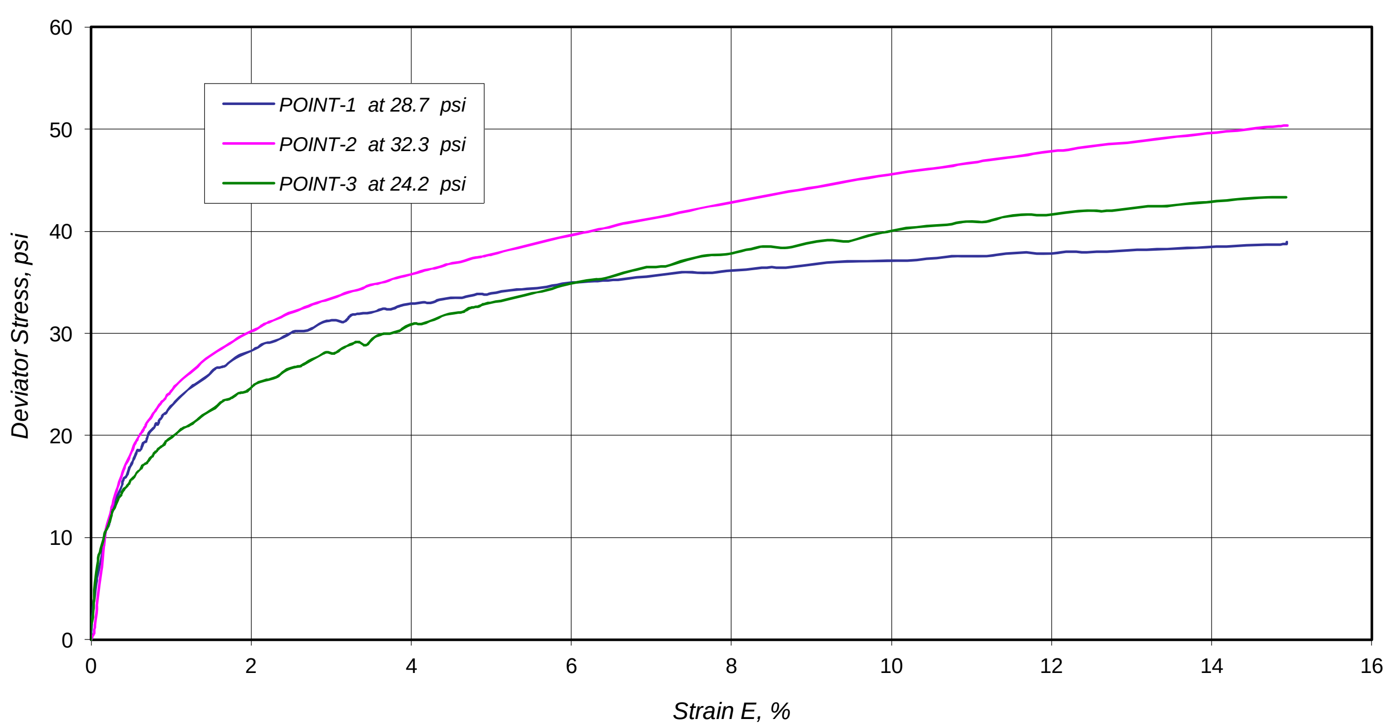
ASTM D-4767

Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	**RM18.1038.003**	**4365AI**

Sample ID:	Description:	Report Date:
TXCU Composite 1	**Brown Clay**	**May 30, 2018**







Effective Consolidation Stresses, psi: Point 1: 29 Point 2: 32 Point 3: 24

L : Labexcel \ Projects \ Client \ Client Name \ 4365AI-TXCU	Print Date:	5/30/2018	Entered By:	Reviewed By:	LSN:
DCN: Triaxial Shear-RP (rev. 06/27/12)	**GRAPH - 1**		KH	krc	**4365AI**

Geo-Logic ASSOCIATES

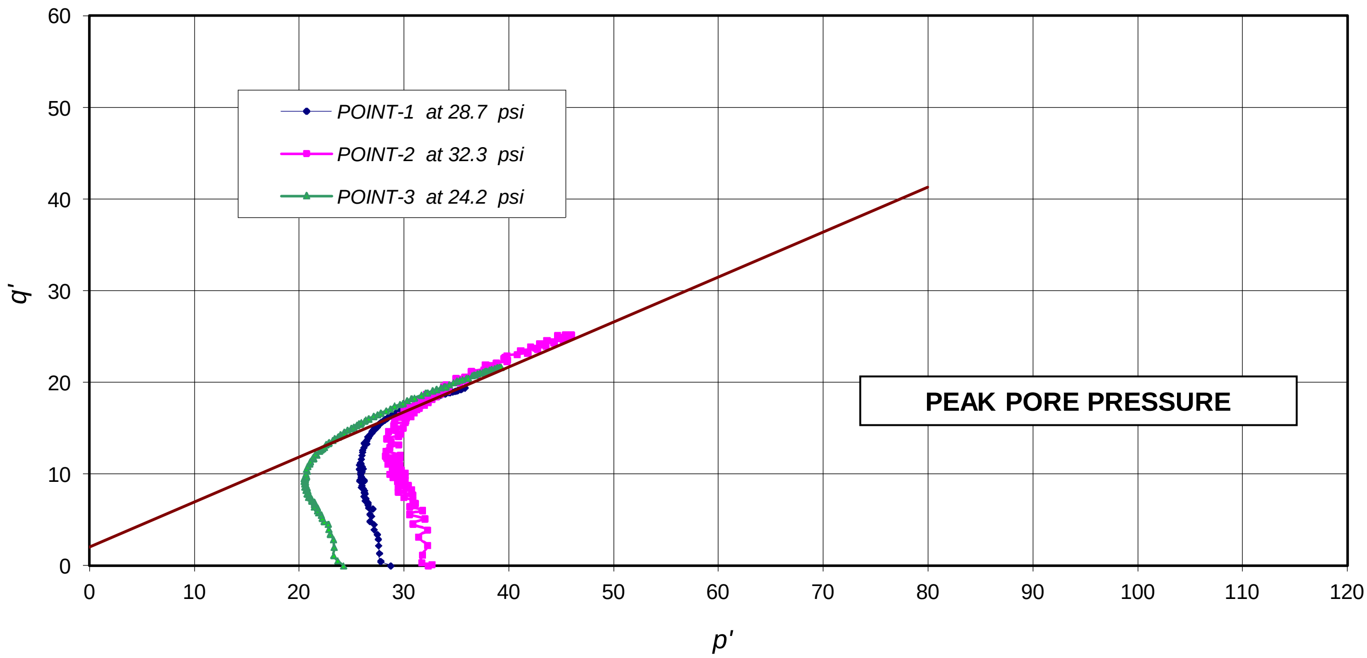
TRIAXIAL SHEAR TEST

Consolidated-Undrained

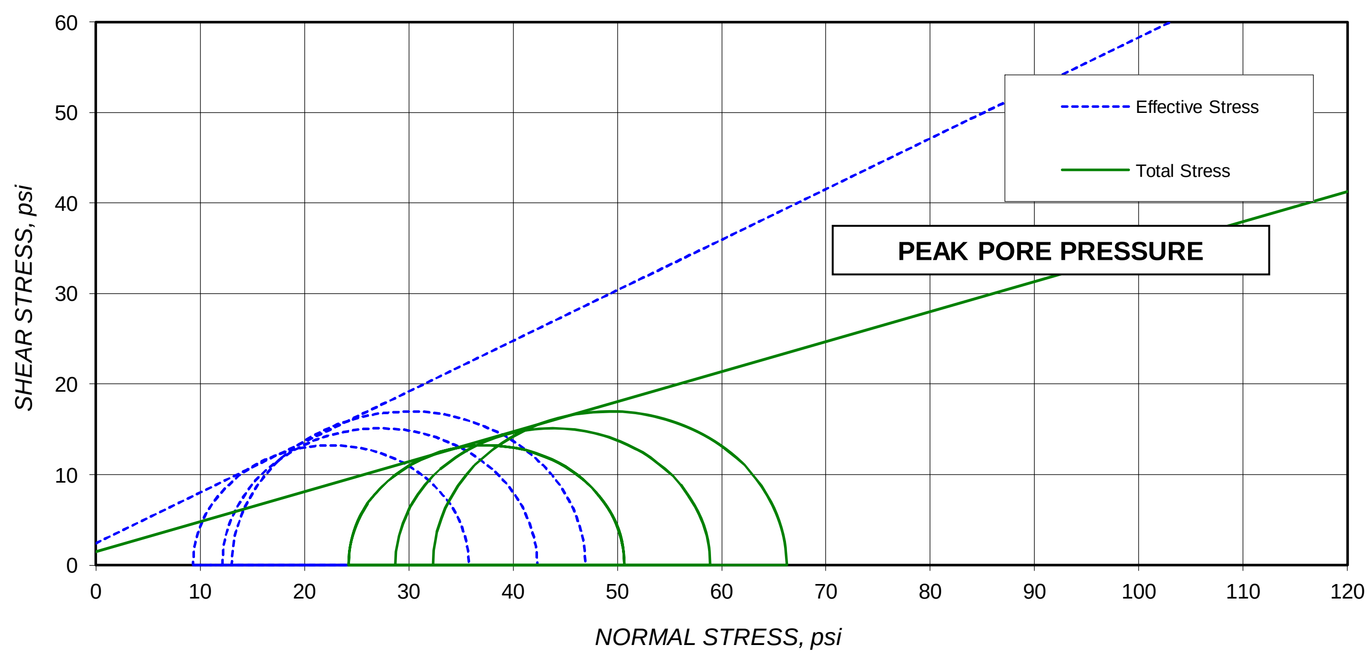
ASTM D-4767

Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	**RM18.1038.003**	**4365AI**

Sample ID:	Description:	Report Date:
TXCU Composite 1	**Brown Clay**	**May 30, 2018**



a (deg) = **26.1** **phi = 29.4** **c = 2**



EFFECTIVE STRESS : phi = 29.2 ° C (psi) = 3 **TOTAL STRESS: phi = 18.3 ° C (psi) = 2**

DRAFT

Geo-Logic ASSOCIATES

TRIAXIAL SHEAR TEST

Consolidated-Undrained

ASTM D-4767

Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	**RM18.1038.003**	**4365AI**

Sample ID:	Description:	Report Date:
TXCU Composite 1	**Brown Clay**	**May 30, 2018**

Point No	Lab ID	Sample ID	Depth	Initial Water Content %	Initial Dry Density pcf
1	4365B	TG-01	58-58.5	25.3	100.4
2	4365D	TG-03	68-68.5	22.4	105.6
3	4365AC	TG-16	48	19.5	110.6

Final water contents are: 1) 23.7 % 2) 21.6 % 3) 18.7 %

SHEAR VALUES AT APPROXIMATELY : PEAK PORE PRESSURE

SEE NOTES BELOW

	Total Confining Stress psi	Strain %	Deviator Stress psi	Pore Pressure psi	Effective Axial Stress psi	Effective Lateral Stress psi	p psi	q psi
1	28.7	2.7	30.2	16.6	42.3	12.1	27.2	15.1
2	32.3	3.2	33.9	19.3	46.9	13.0	30.0	17.0
3	24.2	2.4	26.5	14.9	35.8	9.3	22.5	13.2

GENERAL TEST NOTES:

1) This test was performed using a single 2.4" diameter by 5" tall specimen for each point.
2) The strain rates were 0.0003, 0.0002, and 0.0007 inches/minute, for points 1-3 respectively.
3) Skempton "B" Parameters were measured at 0.99, 0.98, and 0.97 prior to Consolidation and shear.
4) No visible shear plane was noted at end of test.
5) Friction and cohesion values plotted are based on certain criteria selected by the laboratory.
6) Friction and cohesion values must be evaluated by a qualified geotechnical engineer familiar with the specific site conditions and project requirements.

Geo-Logic ASSOCIATES

PHOTO LOG

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Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	RM18.1038.003	**4365AI**

Sample ID:	Description:	Report Date:
TXCU Composite 1	Brown Clay	May 30, 2018

DRAFT

Geo-Logic ASSOCIATES

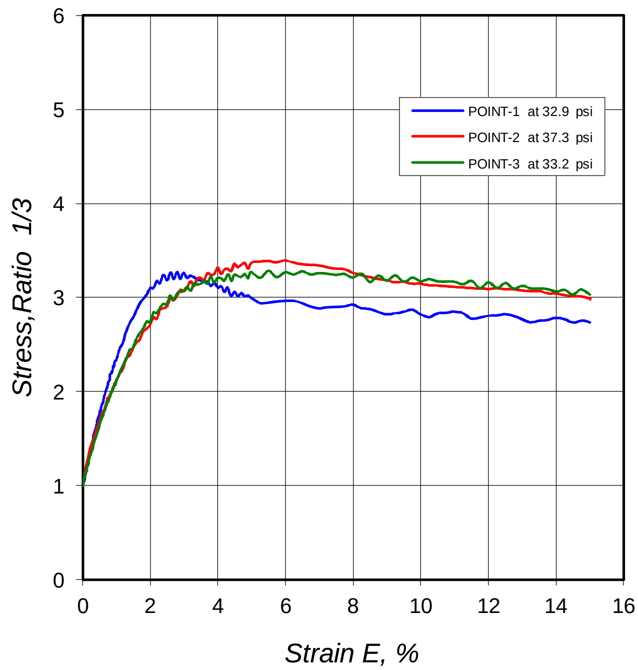
TRIAXIAL SHEAR TEST

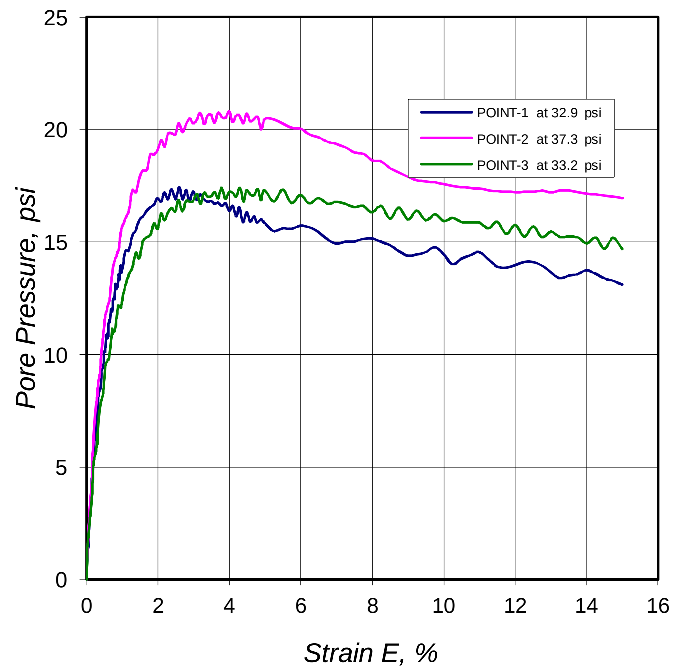
Consolidated-Undrained

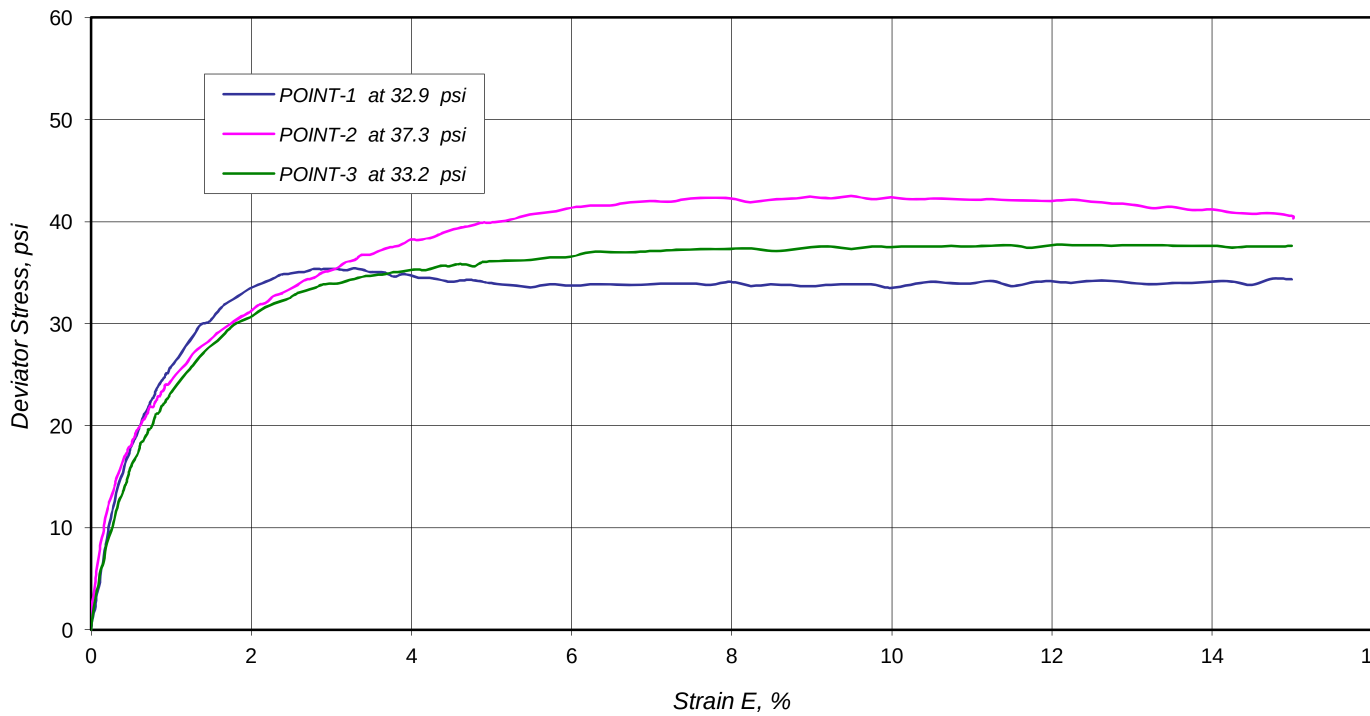
ASTM D-4767

Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	**RM18.1038.003**	**4365AJ**

Sample ID:	Description:	Report Date:
TXCU Composite 2	**Gray Brown Clay**	**May 30, 2018**







Effective Consolidation Stresses, psi: Point 1: 33 Point 2: 37 Point 3: 33

L : Labexcel \ Projects \ Client \ Client Name \ 4365AJ-TXCU	Print Date: 5/30/2018	Entered By:	Reviewed By:	LSN:
DCN: Triaxial Shear-RP (rev. 06/27/12)	**GRAPH - 1**	KH	krc	**4365AJ**

DRAFT

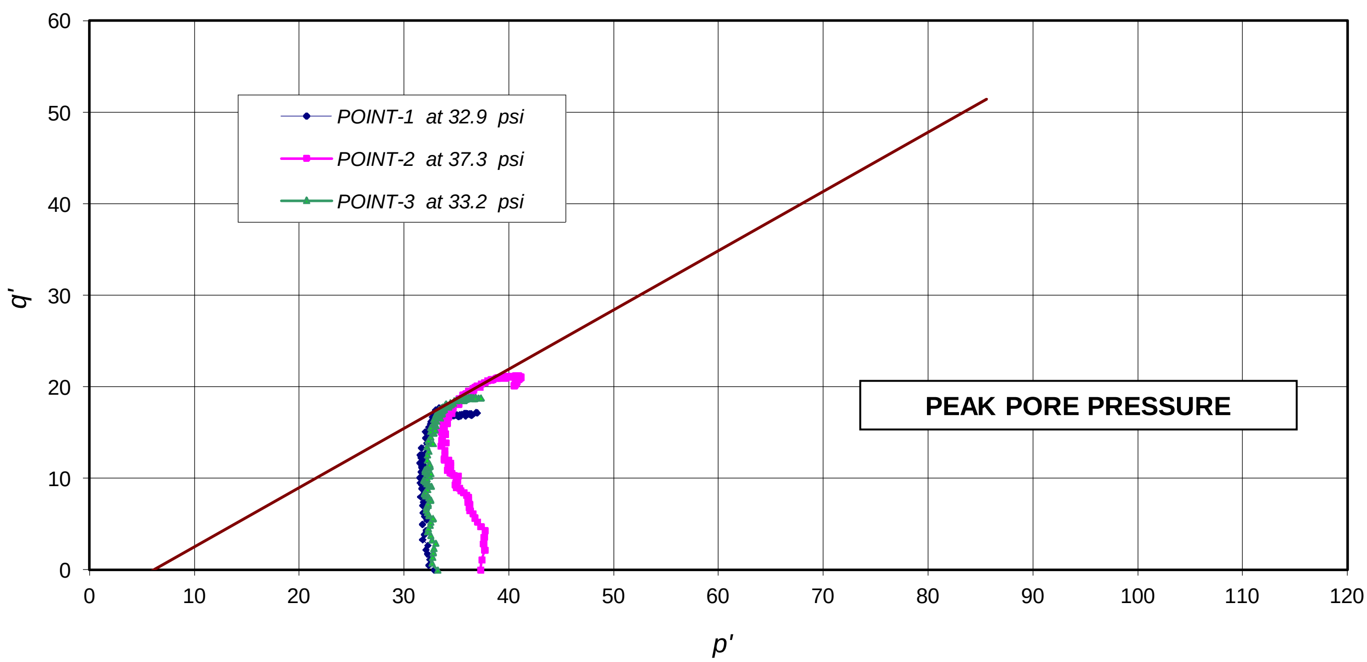
TRIAXIAL SHEAR TEST

Consolidated-Undrained

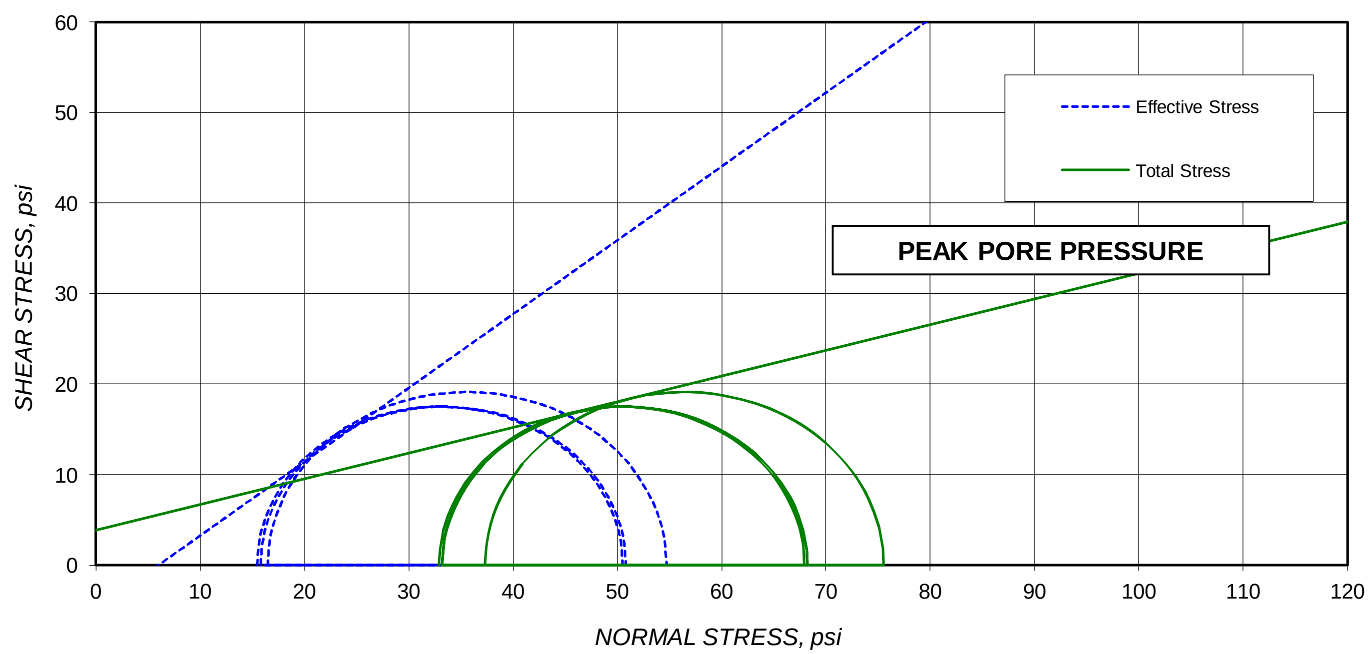
ASTM D-4767

Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	**RM18.1038.003**	**4365AJ**

Sample ID:	Description:	Report Date:
TXCU Composite 2	**Gray Brown Clay**	**May 30, 2018**



a (deg) = **32.9** **phi =** **40.3** **c =** **-5**



EFFECTIVE STRESS : phi = 39.2 ° C (psi) = -5 **TOTAL STRESS: phi = 15.8 ° C (psi) = 4**

DRAFT

Geo-Logic ASSOCIATES

TRIAXIAL SHEAR TEST

Consolidated-Undrained

ASTM D-4767

Client / Project Name:	Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame	***RM18.1038.003***	***4365AJ***

Sample ID:	Description:	Report Date:
TXCU Composite 2	***Gray Brown Clay***	***May 30, 2018***

Point No	Lab ID	Sample ID	Depth	Initial Water Content %	Initial Dry Density pcf
1	4365AE	TG-16	68	38.3	82.5
2	4365AF	TG-16	78	27.7	96.8
3	4365AH	TG-17	68-68.5	37.6	82.2

Final water contents are: 1) 37.8 % 2) 26.5 % 3) 35.8 %

SHEAR VALUES AT APPROXIMATELY : PEAK PORE PRESSURE

SEE NOTES BELOW

	Total Confining Stress psi	Strain %	Deviator Stress psi	Pore Pressure psi	Effective Axial Stress psi	Effective Lateral Stress psi	p psi	q psi
1	32.9	2.6	35.0	17.4	50.5	15.5	33.0	17.5
2	37.3	4.0	38.2	20.8	54.7	16.5	35.6	19.1
3	33.2	3.8	35.0	17.4	50.8	15.8	33.3	17.5

GENERAL TEST NOTES:

1) This test was performed using a single 2.4" diameter by 5" tall specimen for each point.
2) The strain rates were 0.0003, 0.001, and 0.0007 inches/minute, for points 1-3 respectively.
3) Skempton "B" Parameters were measured at 1.0, 0.98, and 0.98 prior to Consolidation and shear.
4) The shear angles were approxiamately 55º, 60º, and 55º for points 1-3, respectively.
5) Friction and cohesion values plotted are based on certain criteria selected by the laboratory.
6) Friction and cohesion values must be evaluated by a qualified geotechnical engineer familiar with the specific site conditions and project requirements.

Geo-Logic ASSOCIATES

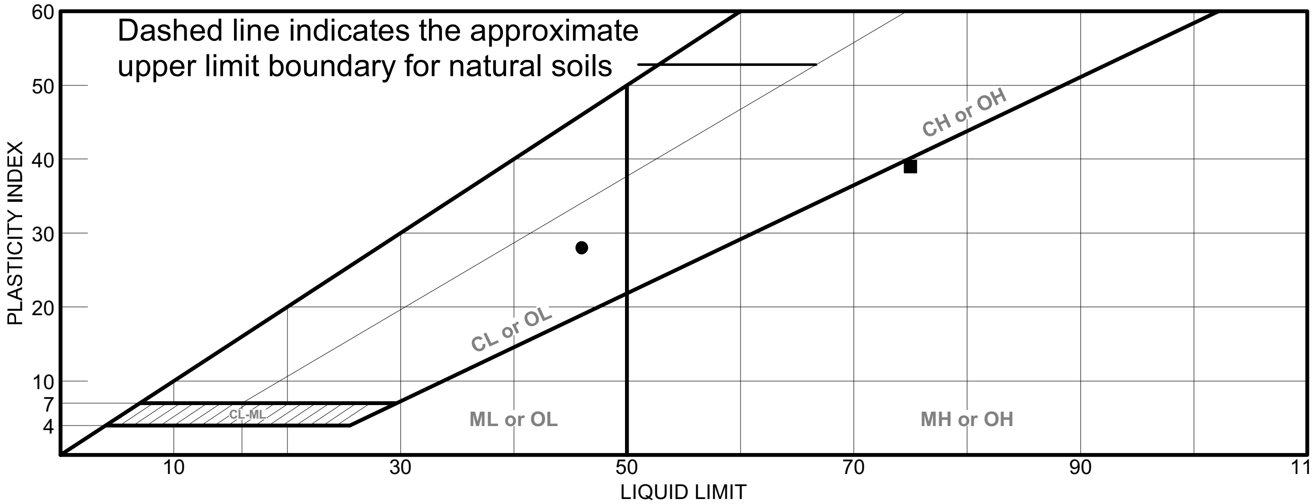
PHOTO LOG

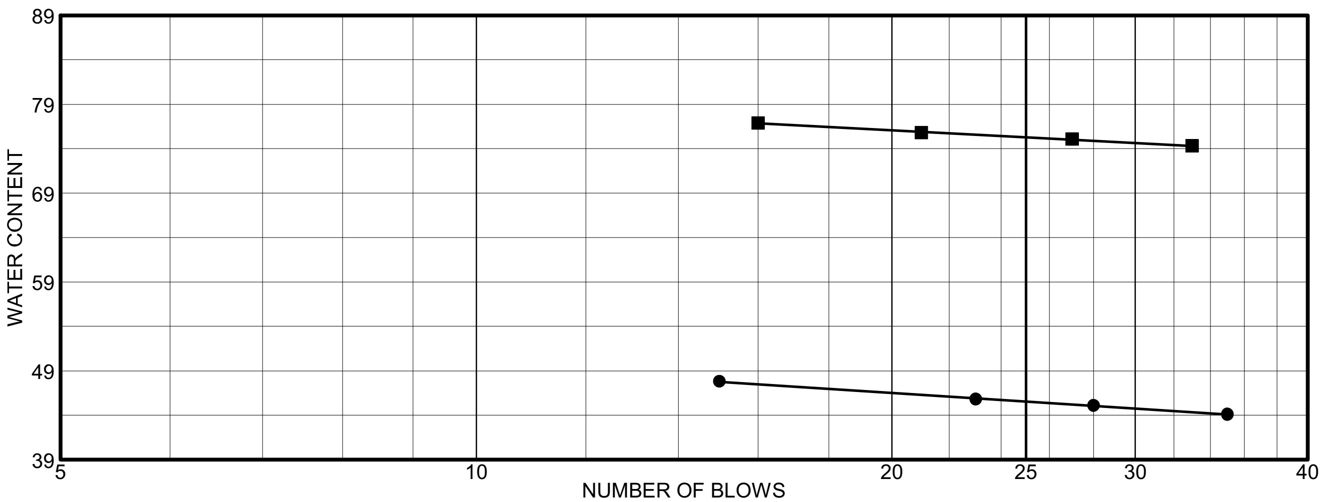
DRAFT

Client / Project Name:		Project No:	Lab Sample Number:
RMC Geoscience, Inc. / Top Golf Burlingame		RM18.1038.003	4365AJ
Sample ID:	Description:		Report Date:
TXCU Composite 2	Gray Brown Clay		May 30, 2018

DRAFT

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish Gray Sandy Lean CLAY	46	18	28			
■	Greenish Gray Elastic SILT w/ shell fragments (Bay Mud)	75	36	39			

Project No. 516-037 **Client:** GeoLogic Associates

Project: Top Golf Burlingame - RM18.1038

● **Source:** TG-02 **Elev./Depth:** 39'

■ **Source:** TG-03 **Elev./Depth:** 47'

Remarks:

●

■

LIQUID AND PLASTIC LIMITS TEST REPORT

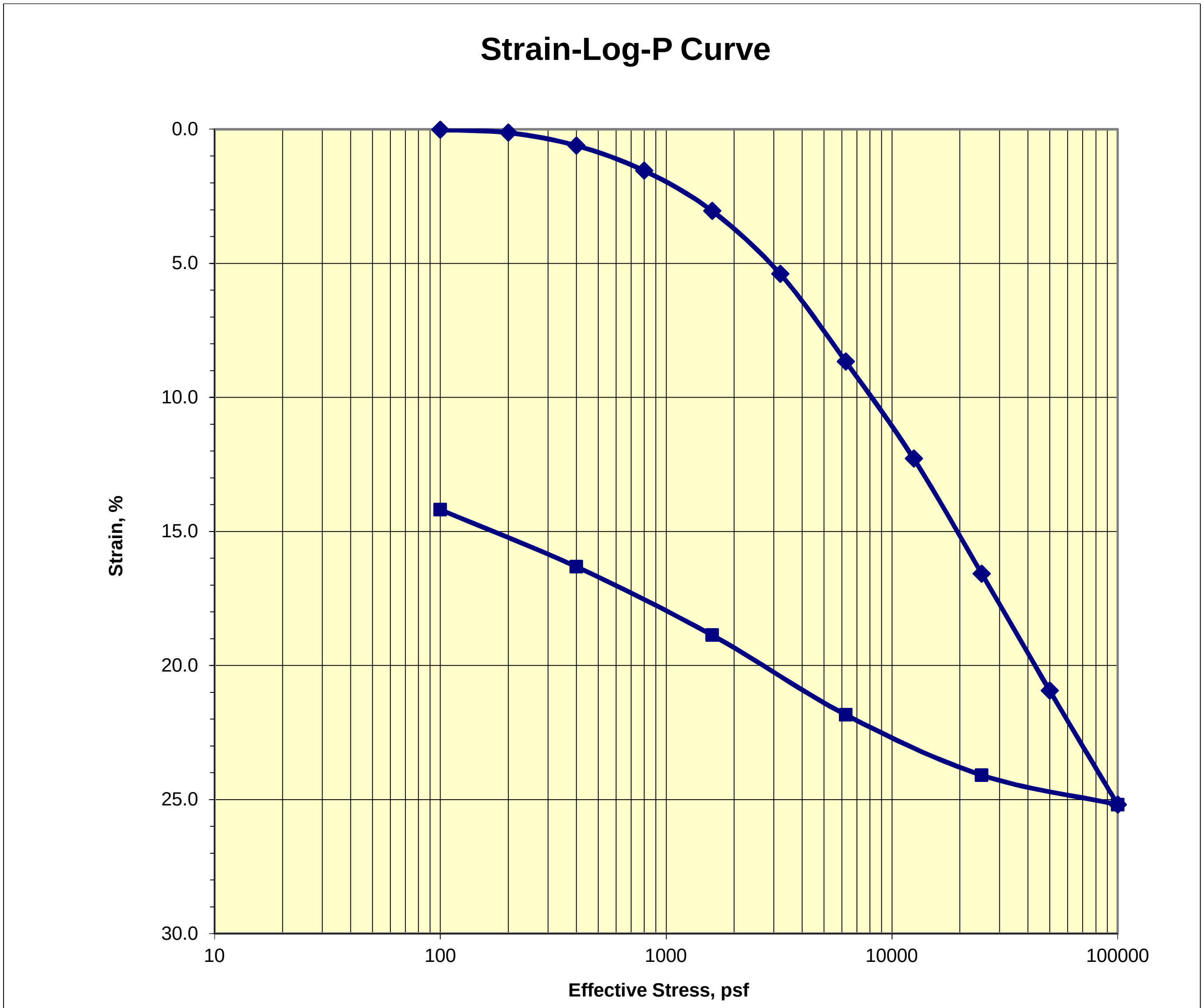
COOPER TESTING LABORATORY

Figure

DRAFT

Consolidation Test
ASTM D2435

Job No.:	516-037	**Boring:**	TG-02	**Run By:**	MD
Client:	Geo-Logic Associates	**Sample:**		**Reduced:**	PJ
Project:	RM18-1038	**Depth, ft.:**	39(Tip-3")	**Checked:**	PJ/DC
Soil Type:	Greenish Gray Sandy Lean CLAY			**Date:**	5/29/2018



Assumed Gs 2.8	**Initial**	**Final**
Moisture %:	30.2	23.3
Dry Density, pcf:	91.4	105.8
Void Ratio:	0.913	0.652
% Saturation:	92.5	100.0

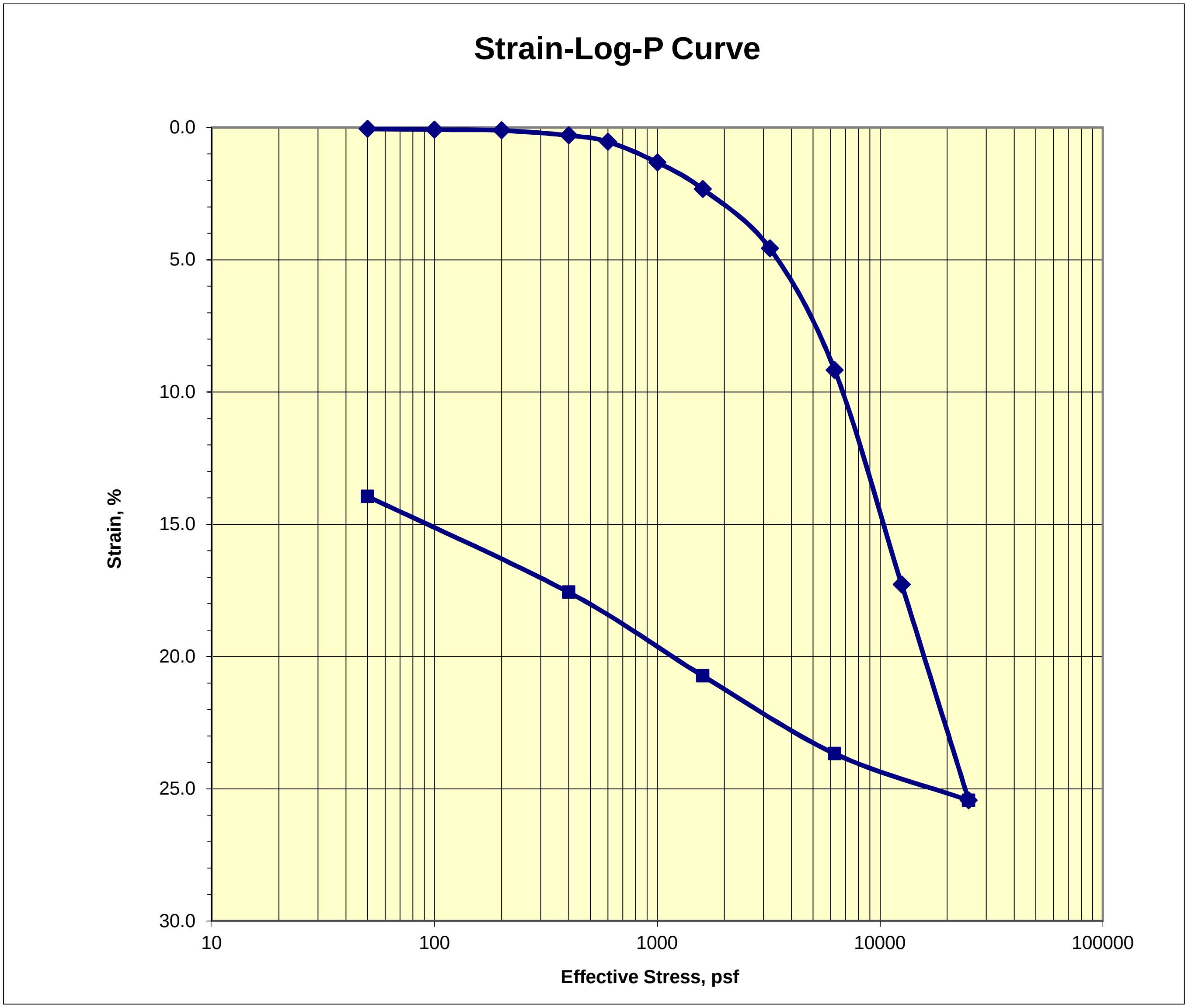
Remarks:

DRAFT

Consolidation Test

ASTM D2435

Job No.:	516-037	**Boring:**	TG-03	**Run By:**	MD
Client:	Geo-Logic Associates	**Sample:**		**Reduced:**	PJ
Project:	RM18.1038	**Depth, ft.:**	47(Tip-6")	**Checked:**	PJ/DC
Soil Type:	Greenish Gray Elastic SILT w/ shell fragments (Bay Mud)			**Date:**	6/1/2018



Assumed Gs 2.8	Initial	Final
Moisture %:	63.5	51.7
Dry Density, pcf:	61.7	71.4
Void Ratio:	1.835	1.447
% Saturation:	96.9	100.0

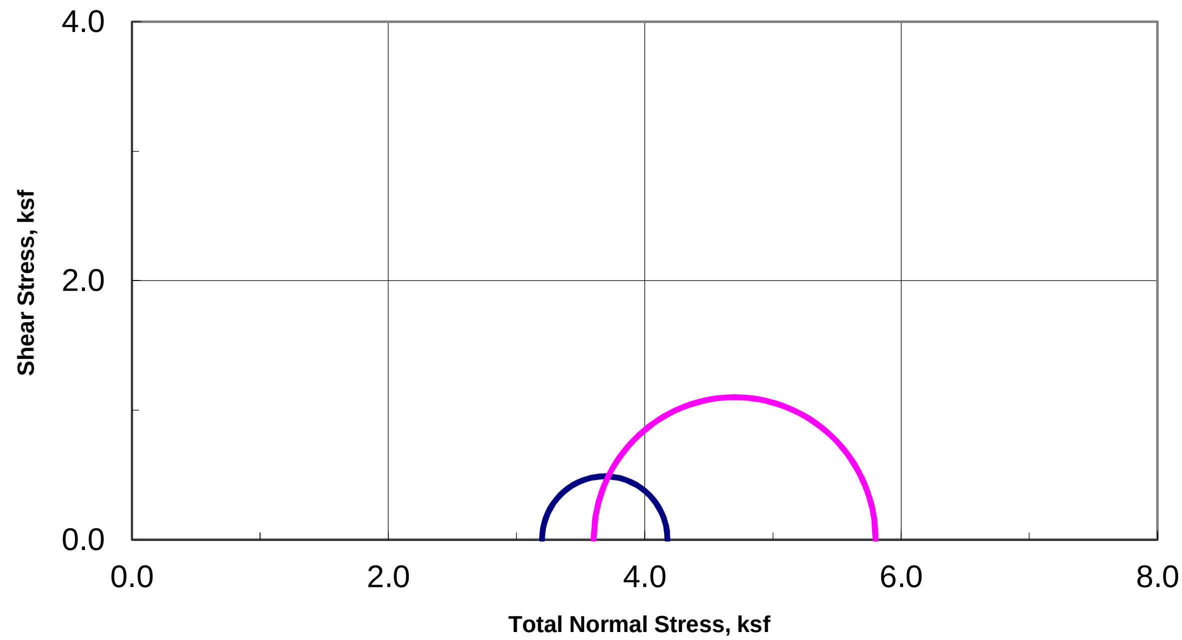
Remarks:

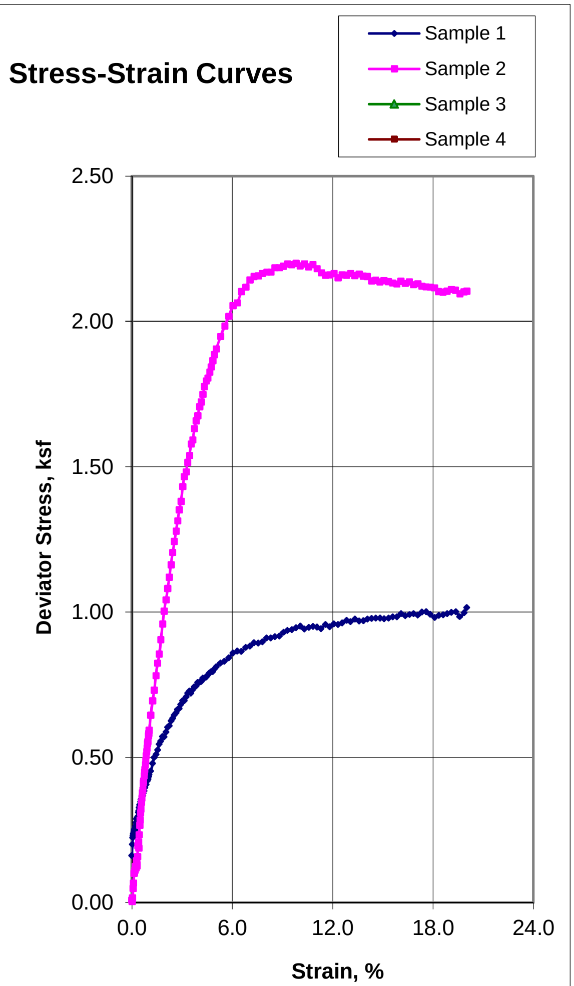
DRAFT

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

COOPER TESTING LABORATORY

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data	1	2	3	4
Moisture %	37.2	60.0		
Dry Den,pcf	85.4	64.1		
Void Ratio	1.047	1.726		
Saturation %	99.6	97.4		
Height in	5.97	6.00		
Diameter in	2.85	2.85		
Cell psi	22.2	25.0		
Strain %	15.00	9.81		
Deviator, ksf	0.978	2.200		
Rate %/min	1.00	1.00		
in/min	0.059	0.060		
Job No.:	516-037			
Client:	Geo-Logic Associates			
Project:	RM18.1038			
Boring:	TG-02	TG-03		
Sample:				
Depth ft:	39(Tip-5")	47(Tip-8")		

Visual Soil Description

Sample #	
1	Greenish Gray Sandy Lean CLAY
2	Greenish Gray Elastic SILT w/ shell fragments (Bay Mud)
3	
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Appendix G
SEISMIC HAZARD ANALYSIS

Deterministic Spectra Results using EZ-FRISK 7.65 Build 004

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations

Amplitude Units: Acceleration (g)

Fractile: 0.5

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	4.651e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	6.648e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	9.251e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	1.036e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	8.898e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	7.733e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	6.759e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	5.239e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	4.399e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	2.682e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	2.079e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	1.746e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	8.404e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	1.236e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	1.765e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	1.967e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	1.694e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

0.4	1.484e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	1.314e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	1.038e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	8.737e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	5.240e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	4.011e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	3.302e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Largest Amplitudes of Ground Motions Considering Sources Calculated with Abrahamson-et al (2014) NGA West 2
Amplitude Units: Acceleration (g)

Fractile: 0.5

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	4.467e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	5.517e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	8.588e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	1.101e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	8.742e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	6.894e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	5.851e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	4.522e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	3.735e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	2.152e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	1.588e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	1.329e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Fractile: 0.84

Period	Amplitude	Magnitude	Closest	Region	Controlling Source

			Distance(km)		
PGA	8.378e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	1.024e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	1.610e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	2.144e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	1.724e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	1.371e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	1.173e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	9.122e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	7.565e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	4.340e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	3.137e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	2.579e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Largest Amplitudes of Ground Motions Considering Sources Calculated with Boore-et al (2014) NGA West 2
Amplitude Units: Acceleration (g)

Fractile: 0.5

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	4.537e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	6.022e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	8.366e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	9.897e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	8.907e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	7.991e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	7.097e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	5.610e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	4.737e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

2	2.983e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	2.455e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	2.201e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	8.294e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	1.186e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	1.693e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	1.836e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	1.627e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	1.476e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	1.340e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	1.092e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	9.283e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	5.765e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	4.724e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	4.197e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Largest Amplitudes of Ground Motions Considering Sources Calculated with Campbell-Bozorgnia (2014) NGA West 2
Amplitude Units: Acceleration (g)

Fractile: 0.5

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	4.639e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	7.878e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	9.339e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

0.2	8.769e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	7.515e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	6.905e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	6.014e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	4.652e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	4.270e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	3.099e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	2.593e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	2.215e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	8.235e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	1.439e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	1.785e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	1.669e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	1.423e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	1.317e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	1.165e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	9.378e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	8.603e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	6.056e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	5.011e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	4.121e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Largest Amplitudes of Ground Motions Considering Sources Calculated with Chiou-Youngs (2014) NGA West 2
Amplitude Units: Acceleration (g)

Fractile: 0.5

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	4.963e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	7.175e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	1.071e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	1.175e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	1.043e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	9.142e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	8.074e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	6.174e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	4.855e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	2.494e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	1.678e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
4	1.237e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

Fractile: 0.84

Period	Amplitude	Magnitude	Closest Distance(km)	Region	Controlling Source
PGA	8.708e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.05	1.297e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.1	1.972e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.2	2.219e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.3	2.000e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.4	1.773e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.5	1.578e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
0.75	1.212e+000	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
1	9.495e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
2	4.801e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas
3	3.171e-001	8.05 Mw	4.07	USGS 2008 California	Northern San Andreas

4 2.311e-001 8.05 Mw 4.07 USGS 2008 California Northern San Andreas

Largest Amplitudes of Ground Motions for Each Source

Source: Calaveras
Region: USGS 2008 California
Closest Distance: 38.84 km
Amplitude Units: Acceleration (g)
Magnitude: 7.03 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	8.729e-002	9.110e-002	8.606e-002	8.723e-002	8.479e-002
0.05	1.208e-001	1.145e-001	1.099e-001	1.321e-001	1.266e-001
0.1	1.698e-001	1.721e-001	1.608e-001	1.653e-001	1.811e-001
0.2	1.875e-001	2.077e-001	1.906e-001	1.640e-001	1.877e-001
0.3	1.589e-001	1.716e-001	1.611e-001	1.466e-001	1.565e-001
0.4	1.329e-001	1.412e-001	1.330e-001	1.290e-001	1.286e-001
0.5	1.124e-001	1.211e-001	1.110e-001	1.096e-001	1.077e-001
0.75	8.037e-002	8.750e-002	7.842e-002	7.913e-002	7.643e-002
1	6.199e-002	6.797e-002	5.976e-002	6.217e-002	5.805e-002
2	3.200e-002	3.504e-002	2.887e-002	3.513e-002	2.896e-002

3	2.111e-002	2.264e-002	1.989e-002	2.402e-002	1.788e-002
4	1.587e-002	1.689e-002	1.586e-002	1.884e-002	1.192e-002

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.584e-001	1.709e-001	1.573e-001	1.563e-001	1.489e-001
0.05	2.272e-001	2.155e-001	2.164e-001	2.477e-001	2.292e-001
0.1	3.284e-001	3.284e-001	3.255e-001	3.248e-001	3.351e-001
0.2	3.565e-001	4.044e-001	3.536e-001	3.122e-001	3.559e-001
0.3	3.028e-001	3.383e-001	2.943e-001	2.777e-001	3.010e-001
0.4	2.555e-001	2.807e-001	2.457e-001	2.461e-001	2.498e-001
0.5	2.189e-001	2.428e-001	2.096e-001	2.124e-001	2.108e-001
0.75	1.600e-001	1.769e-001	1.529e-001	1.598e-001	1.505e-001
1	1.240e-001	1.383e-001	1.176e-001	1.258e-001	1.141e-001
2	6.342e-002	7.146e-002	5.641e-002	6.942e-002	5.641e-002
3	4.141e-002	4.538e-002	3.883e-002	4.711e-002	3.430e-002
4	3.060e-002	3.334e-002	3.077e-002	3.566e-002	2.264e-002

Source: Great Valley 4b, Gordon Valley
Region: USGS 2008 California
Closest Distance: 76.75 km

Amplitude Units: Acceleration (g)
Magnitude: 6.80 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	4.463e-002	5.161e-002	3.482e-002	4.488e-002	4.722e-002
0.05	5.868e-002	6.333e-002	4.056e-002	6.331e-002	6.754e-002
0.1	8.150e-002	9.017e-002	6.325e-002	8.070e-002	9.187e-002
0.2	9.314e-002	1.104e-001	8.046e-002	8.616e-002	9.552e-002
0.3	8.427e-002	9.577e-002	7.368e-002	8.519e-002	8.244e-002
0.4	7.130e-002	8.160e-002	6.206e-002	7.211e-002	6.944e-002
0.5	6.036e-002	7.050e-002	5.118e-002	6.051e-002	5.927e-002
0.75	4.147e-002	4.667e-002	3.396e-002	4.358e-002	4.167e-002
1	2.988e-002	3.287e-002	2.442e-002	3.146e-002	3.078e-002
2	1.283e-002	1.379e-002	9.645e-003	1.368e-002	1.419e-002
3	7.179e-003	7.680e-003	5.570e-003	8.314e-003	7.151e-003
4	4.651e-003	5.002e-003	3.903e-003	5.632e-003	4.065e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2

Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	8.115e-002	9.742e-002	6.365e-002	8.053e-002	8.298e-002
0.05	1.104e-001	1.201e-001	7.988e-002	1.193e-001	1.224e-001
0.1	1.578e-001	1.737e-001	1.280e-001	1.594e-001	1.702e-001
0.2	1.777e-001	2.162e-001	1.492e-001	1.640e-001	1.813e-001
0.3	1.612e-001	1.899e-001	1.346e-001	1.614e-001	1.587e-001
0.4	1.376e-001	1.632e-001	1.146e-001	1.375e-001	1.350e-001
0.5	1.180e-001	1.422e-001	9.667e-002	1.172e-001	1.160e-001
0.75	8.320e-002	9.532e-002	6.655e-002	8.847e-002	8.246e-002
1	6.055e-002	6.801e-002	4.861e-002	6.439e-002	6.119e-002
2	2.612e-002	2.902e-002	1.935e-002	2.775e-002	2.838e-002
3	1.460e-002	1.603e-002	1.126e-002	1.689e-002	1.422e-002
4	9.350e-003	1.035e-002	7.892e-003	1.111e-002	8.049e-003

Source: Great Valley 5, Pittsburg Kirby Hills
Region: USGS 2008 California
Closest Distance: 65.95 km
Amplitude Units: Acceleration (g)
Magnitude: 6.70 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.111e-002	6.027e-002	4.053e-002	5.569e-002	4.794e-002
0.05	6.797e-002	7.450e-002	5.014e-002	7.750e-002	6.975e-002
0.1	9.525e-002	1.077e-001	7.507e-002	1.023e-001	9.592e-002
0.2	1.095e-001	1.302e-001	9.420e-002	1.145e-001	9.922e-002
0.3	9.696e-002	1.093e-001	8.131e-002	1.130e-001	8.420e-002
0.4	8.010e-002	9.025e-002	6.717e-002	9.290e-002	7.006e-002
0.5	6.707e-002	7.647e-002	5.573e-002	7.681e-002	5.926e-002
0.75	4.570e-002	4.932e-002	3.762e-002	5.481e-002	4.106e-002
1	3.281e-002	3.437e-002	2.698e-002	3.987e-002	3.001e-002
2	1.358e-002	1.400e-002	1.083e-002	1.604e-002	1.345e-002
3	7.571e-003	7.520e-003	6.566e-003	9.599e-003	6.599e-003
4	4.878e-003	4.823e-003	4.768e-003	6.170e-003	3.751e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	9.308e-002	1.141e-001	7.409e-002	9.989e-002	8.424e-002
0.05	1.282e-001	1.417e-001	9.874e-002	1.458e-001	1.264e-001
0.1	1.848e-001	2.080e-001	1.519e-001	2.018e-001	1.777e-001
0.2	2.092e-001	2.558e-001	1.747e-001	2.179e-001	1.883e-001
0.3	1.855e-001	2.175e-001	1.485e-001	2.140e-001	1.621e-001
0.4	1.546e-001	1.810e-001	1.241e-001	1.772e-001	1.362e-001

0.5	1.312e-001	1.547e-001	1.053e-001	1.488e-001	1.160e-001
0.75	9.182e-002	1.010e-001	7.372e-002	1.113e-001	8.124e-002
1	6.658e-002	7.131e-002	5.372e-002	8.162e-002	5.965e-002
2	2.767e-002	2.955e-002	2.172e-002	3.254e-002	2.690e-002
3	1.541e-002	1.574e-002	1.328e-002	1.950e-002	1.312e-002
4	9.811e-003	1.001e-002	9.640e-003	1.217e-002	7.428e-003

Source: Great Valley 7
Region: USGS 2008 California
Closest Distance: 67.73 km
Amplitude Units: Acceleration (g)
Magnitude: 6.90 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.169e-002	5.888e-002	4.310e-002	4.872e-002	5.607e-002
0.05	6.881e-002	7.269e-002	5.072e-002	7.075e-002	8.108e-002
0.1	9.582e-002	1.048e-001	7.856e-002	8.813e-002	1.118e-001
0.2	1.079e-001	1.282e-001	9.781e-002	8.974e-002	1.159e-001
0.3	9.599e-002	1.103e-001	8.868e-002	8.594e-002	9.904e-002
0.4	8.139e-002	9.355e-002	7.448e-002	7.474e-002	8.281e-002
0.5	6.902e-002	8.094e-002	6.143e-002	6.342e-002	7.030e-002

0.75	4.743e-002	5.463e-002	4.073e-002	4.531e-002	4.905e-002
1	3.435e-002	3.911e-002	2.933e-002	3.292e-002	3.606e-002
2	1.519e-002	1.690e-002	1.180e-002	1.552e-002	1.654e-002
3	8.732e-003	9.711e-003	6.940e-003	9.623e-003	8.654e-003
4	5.872e-003	6.603e-003	4.934e-003	6.895e-003	5.057e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	9.387e-002	1.108e-001	7.878e-002	8.741e-002	9.852e-002
0.05	1.294e-001	1.374e-001	9.989e-002	1.332e-001	1.469e-001
0.1	1.853e-001	2.012e-001	1.590e-001	1.740e-001	2.070e-001
0.2	2.056e-001	2.503e-001	1.814e-001	1.708e-001	2.200e-001
0.3	1.834e-001	2.181e-001	1.620e-001	1.628e-001	1.907e-001
0.4	1.569e-001	1.866e-001	1.375e-001	1.425e-001	1.610e-001
0.5	1.348e-001	1.628e-001	1.160e-001	1.229e-001	1.376e-001
0.75	9.503e-002	1.113e-001	7.982e-002	9.198e-002	9.705e-002
1	6.954e-002	8.068e-002	5.839e-002	6.738e-002	7.168e-002
2	3.093e-002	3.547e-002	2.367e-002	3.148e-002	3.308e-002
3	1.775e-002	2.021e-002	1.403e-002	1.955e-002	1.720e-002
4	1.180e-002	1.362e-002	9.976e-003	1.360e-002	1.001e-002

Source: Great Valley 8
Region: USGS 2008 California
Closest Distance: 99.31 km
Amplitude Units: Acceleration (g)
Magnitude: 6.80 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	2.881e-002	3.220e-002	2.391e-002	2.731e-002	3.183e-002
0.05	3.695e-002	3.891e-002	2.680e-002	3.813e-002	4.394e-002
0.1	4.991e-002	5.362e-002	4.160e-002	4.633e-002	5.811e-002
0.2	5.801e-002	6.673e-002	5.522e-002	4.894e-002	6.115e-002
0.3	5.452e-002	6.125e-002	5.245e-002	4.995e-002	5.444e-002
0.4	4.795e-002	5.533e-002	4.506e-002	4.443e-002	4.696e-002
0.5	4.157e-002	4.940e-002	3.756e-002	3.847e-002	4.083e-002
0.75	2.931e-002	3.375e-002	2.532e-002	2.859e-002	2.958e-002
1	2.137e-002	2.404e-002	1.835e-002	2.082e-002	2.227e-002
2	9.568e-003	1.049e-002	7.384e-003	9.658e-003	1.074e-002
3	5.463e-003	5.956e-003	4.266e-003	5.883e-003	5.747e-003
4	3.608e-003	3.938e-003	2.996e-003	4.144e-003	3.352e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations

Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.236e-002	6.077e-002	4.370e-002	4.904e-002	5.595e-002
0.05	6.958e-002	7.390e-002	5.280e-002	7.198e-002	7.965e-002
0.1	9.702e-002	1.035e-001	8.518e-002	9.170e-002	1.077e-001
0.2	1.108e-001	1.307e-001	1.034e-001	9.315e-002	1.162e-001
0.3	1.042e-001	1.215e-001	9.581e-002	9.461e-002	1.049e-001
0.4	9.248e-002	1.107e-001	8.322e-002	8.472e-002	9.132e-002
0.5	8.127e-002	9.962e-002	7.095e-002	7.455e-002	7.996e-002
0.75	5.879e-002	6.895e-002	4.962e-002	5.805e-002	5.854e-002
1	4.329e-002	4.974e-002	3.652e-002	4.263e-002	4.428e-002
2	1.949e-002	2.208e-002	1.481e-002	1.959e-002	2.147e-002
3	1.111e-002	1.243e-002	8.627e-003	1.195e-002	1.142e-002
4	7.255e-003	8.148e-003	6.058e-003	8.176e-003	6.638e-003

Source: Green Valley Connected
Region: USGS 2008 California
Closest Distance: 47.25 km
Amplitude Units: Acceleration (g)
Magnitude: 6.80 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2

Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	6.434e-002	6.934e-002	6.248e-002	6.484e-002	6.068e-002
0.05	8.834e-002	8.687e-002	7.930e-002	9.701e-002	9.019e-002
0.1	1.244e-001	1.291e-001	1.180e-001	1.231e-001	1.275e-001
0.2	1.384e-001	1.546e-001	1.431e-001	1.243e-001	1.318e-001
0.3	1.178e-001	1.280e-001	1.211e-001	1.122e-001	1.100e-001
0.4	9.835e-002	1.056e-001	9.944e-002	9.799e-002	9.041e-002
0.5	8.276e-002	9.017e-002	8.238e-002	8.270e-002	7.578e-002
0.75	5.776e-002	6.244e-002	5.680e-002	5.883e-002	5.297e-002
1	4.320e-002	4.666e-002	4.203e-002	4.461e-002	3.949e-002
2	2.048e-002	2.215e-002	1.838e-002	2.272e-002	1.867e-002
3	1.263e-002	1.335e-002	1.183e-002	1.461e-002	1.072e-002
4	8.954e-003	9.213e-003	8.959e-003	1.091e-002	6.730e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.170e-001	1.309e-001	1.142e-001	1.163e-001	1.066e-001
0.05	1.666e-001	1.646e-001	1.562e-001	1.824e-001	1.634e-001
0.1	2.414e-001	2.482e-001	2.388e-001	2.425e-001	2.360e-001

0.2	2.637e-001	3.028e-001	2.655e-001	2.367e-001	2.500e-001
0.3	2.249e-001	2.539e-001	2.213e-001	2.125e-001	2.117e-001
0.4	1.893e-001	2.111e-001	1.836e-001	1.869e-001	1.757e-001
0.5	1.615e-001	1.819e-001	1.556e-001	1.603e-001	1.483e-001
0.75	1.154e-001	1.272e-001	1.110e-001	1.191e-001	1.045e-001
1	8.692e-002	9.590e-002	8.312e-002	9.071e-002	7.797e-002
2	4.107e-002	4.590e-002	3.630e-002	4.536e-002	3.674e-002
3	2.516e-002	2.728e-002	2.343e-002	2.906e-002	2.085e-002
4	1.757e-002	1.859e-002	1.767e-002	2.100e-002	1.300e-002

Source: Greenville Connected
Region: USGS 2008 California
Closest Distance: 56.20 km
Amplitude Units: Acceleration (g)
Magnitude: 7.00 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.734e-002	5.632e-002	5.808e-002	6.111e-002	5.385e-002
0.05	7.779e-002	7.019e-002	7.217e-002	8.997e-002	7.882e-002
0.1	1.077e-001	1.030e-001	1.056e-001	1.116e-001	1.105e-001
0.2	1.199e-001	1.252e-001	1.280e-001	1.120e-001	1.146e-001

0.3	1.049e-001	1.078e-001	1.099e-001	1.052e-001	9.674e-002
0.4	8.903e-002	9.265e-002	9.122e-002	9.203e-002	8.024e-002
0.5	7.592e-002	8.138e-002	7.620e-002	7.833e-002	6.775e-002
0.75	5.340e-002	5.820e-002	5.223e-002	5.591e-002	4.724e-002
1	3.955e-002	4.370e-002	3.817e-002	4.148e-002	3.484e-002
2	1.865e-002	2.095e-002	1.674e-002	2.070e-002	1.622e-002
3	1.171e-002	1.289e-002	1.086e-002	1.323e-002	9.840e-003
4	8.439e-003	9.275e-003	8.324e-003	9.767e-003	6.391e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.040e-001	1.056e-001	1.062e-001	1.096e-001	9.462e-002
0.05	1.466e-001	1.323e-001	1.421e-001	1.692e-001	1.428e-001
0.1	2.089e-001	1.971e-001	2.138e-001	2.200e-001	2.046e-001
0.2	2.280e-001	2.437e-001	2.374e-001	2.133e-001	2.175e-001
0.3	1.997e-001	2.126e-001	2.007e-001	1.992e-001	1.862e-001
0.4	1.710e-001	1.842e-001	1.684e-001	1.755e-001	1.560e-001
0.5	1.479e-001	1.632e-001	1.439e-001	1.518e-001	1.326e-001
0.75	1.068e-001	1.181e-001	1.023e-001	1.134e-001	9.339e-002
1	7.986e-002	8.973e-002	7.583e-002	8.475e-002	6.912e-002
2	3.779e-002	4.366e-002	3.343e-002	4.178e-002	3.228e-002
3	2.364e-002	2.659e-002	2.183e-002	2.670e-002	1.944e-002
4	1.683e-002	1.894e-002	1.671e-002	1.913e-002	1.256e-002

Source: Greenville Connected U
Region: USGS 2008 California
Closest Distance: 56.20 km
Amplitude Units: Acceleration (g)
Magnitude: 7.00 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.734e-002	5.632e-002	5.808e-002	6.111e-002	5.385e-002
0.05	7.779e-002	7.019e-002	7.217e-002	8.997e-002	7.882e-002
0.1	1.077e-001	1.030e-001	1.056e-001	1.116e-001	1.105e-001
0.2	1.199e-001	1.252e-001	1.280e-001	1.120e-001	1.146e-001
0.3	1.049e-001	1.078e-001	1.099e-001	1.052e-001	9.674e-002
0.4	8.903e-002	9.265e-002	9.122e-002	9.203e-002	8.024e-002
0.5	7.592e-002	8.138e-002	7.620e-002	7.833e-002	6.775e-002
0.75	5.340e-002	5.820e-002	5.223e-002	5.591e-002	4.724e-002
1	3.955e-002	4.370e-002	3.817e-002	4.148e-002	3.484e-002
2	1.865e-002	2.095e-002	1.674e-002	2.070e-002	1.622e-002
3	1.171e-002	1.289e-002	1.086e-002	1.323e-002	9.840e-003
4	8.439e-003	9.275e-003	8.324e-003	9.767e-003	6.391e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.040e-001	1.056e-001	1.062e-001	1.096e-001	9.462e-002
0.05	1.466e-001	1.323e-001	1.421e-001	1.692e-001	1.428e-001
0.1	2.089e-001	1.971e-001	2.138e-001	2.200e-001	2.046e-001
0.2	2.280e-001	2.437e-001	2.374e-001	2.133e-001	2.175e-001
0.3	1.997e-001	2.126e-001	2.007e-001	1.992e-001	1.862e-001
0.4	1.710e-001	1.842e-001	1.684e-001	1.755e-001	1.560e-001
0.5	1.479e-001	1.632e-001	1.439e-001	1.518e-001	1.326e-001
0.75	1.068e-001	1.181e-001	1.023e-001	1.134e-001	9.339e-002
1	7.986e-002	8.973e-002	7.583e-002	8.475e-002	6.912e-002
2	3.779e-002	4.366e-002	3.343e-002	4.178e-002	3.228e-002
3	2.364e-002	2.659e-002	2.183e-002	2.670e-002	1.944e-002
4	1.683e-002	1.894e-002	1.671e-002	1.913e-002	1.256e-002

Source: Hayward-Rodgers Creek
Region: USGS 2008 California
Closest Distance: 25.23 km
Amplitude Units: Acceleration (g)
Magnitude: 7.33 Mw
Fractile: 0.50

Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.491e-001	1.512e-001	1.454e-001	1.473e-001	1.524e-001
0.05	2.087e-001	1.905e-001	1.879e-001	2.283e-001	2.279e-001
0.1	2.940e-001	2.911e-001	2.695e-001	2.834e-001	3.320e-001
0.2	3.233e-001	3.558e-001	3.123e-001	2.772e-001	3.479e-001
0.3	2.718e-001	2.897e-001	2.650e-001	2.408e-001	2.917e-001
0.4	2.281e-001	2.348e-001	2.221e-001	2.140e-001	2.414e-001
0.5	1.938e-001	2.008e-001	1.878e-001	1.831e-001	2.035e-001
0.75	1.423e-001	1.509e-001	1.376e-001	1.334e-001	1.473e-001
1	1.139e-001	1.219e-001	1.090e-001	1.105e-001	1.141e-001
2	6.446e-002	6.794e-002	5.960e-002	7.082e-002	5.946e-002
3	4.573e-002	4.694e-002	4.463e-002	5.239e-002	3.896e-002
4	3.645e-002	3.687e-002	3.782e-002	4.360e-002	2.750e-002

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6

PGA	2.701e-001	2.836e-001	2.658e-001	2.634e-001	2.676e-001
0.05	3.914e-001	3.574e-001	3.701e-001	4.257e-001	4.123e-001
0.1	5.663e-001	5.532e-001	5.454e-001	5.536e-001	6.131e-001
0.2	6.145e-001	6.926e-001	5.793e-001	5.276e-001	6.586e-001
0.3	5.180e-001	5.712e-001	4.841e-001	4.561e-001	5.606e-001
0.4	4.385e-001	4.669e-001	4.101e-001	4.082e-001	4.688e-001
0.5	3.776e-001	4.027e-001	3.547e-001	3.548e-001	3.980e-001
0.75	2.826e-001	3.045e-001	2.677e-001	2.690e-001	2.894e-001
1	2.266e-001	2.468e-001	2.137e-001	2.226e-001	2.232e-001
2	1.263e-001	1.370e-001	1.152e-001	1.384e-001	1.145e-001
3	8.838e-002	9.271e-002	8.587e-002	1.013e-001	7.366e-002
4	6.903e-002	7.154e-002	7.211e-002	8.112e-002	5.136e-002

Source: Hunting Creek-Berryessa
Region: USGS 2008 California
Closest Distance: 96.92 km
Amplitude Units: Acceleration (g)
Magnitude: 7.10 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	3.143e-002	2.971e-002	3.145e-002	3.315e-002	3.142e-002

0.05	4.063e-002	3.599e-002	3.642e-002	4.672e-002	4.339e-002
0.1	5.368e-002	4.977e-002	5.241e-002	5.466e-002	5.789e-002
0.2	6.147e-002	6.265e-002	6.732e-002	5.515e-002	6.075e-002
0.3	5.781e-002	5.945e-002	6.135e-002	5.674e-002	5.370e-002
0.4	5.150e-002	5.604e-002	5.263e-002	5.118e-002	4.614e-002
0.5	4.539e-002	5.180e-002	4.479e-002	4.491e-002	4.006e-002
0.75	3.311e-002	3.843e-002	3.129e-002	3.362e-002	2.909e-002
1	2.459e-002	2.884e-002	2.297e-002	2.458e-002	2.198e-002
2	1.196e-002	1.413e-002	1.040e-002	1.242e-002	1.087e-002
3	7.594e-003	8.775e-003	6.798e-003	7.878e-003	6.924e-003
4	5.508e-003	6.363e-003	5.274e-003	5.812e-003	4.585e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.699e-002	5.572e-002	5.749e-002	5.952e-002	5.523e-002
0.05	7.661e-002	6.794e-002	7.172e-002	8.813e-002	7.865e-002
0.1	1.045e-001	9.547e-002	1.072e-001	1.081e-001	1.073e-001
0.2	1.170e-001	1.220e-001	1.257e-001	1.050e-001	1.154e-001
0.3	1.100e-001	1.172e-001	1.121e-001	1.075e-001	1.034e-001
0.4	9.899e-002	1.114e-001	9.720e-002	9.760e-002	8.973e-002
0.5	8.848e-002	1.039e-001	8.461e-002	8.701e-002	7.844e-002
0.75	6.630e-002	7.806e-002	6.132e-002	6.825e-002	5.757e-002
1	4.977e-002	5.935e-002	4.573e-002	5.032e-002	4.369e-002

2	2.434e-002	2.958e-002	2.087e-002	2.519e-002	2.174e-002
3	1.543e-002	1.821e-002	1.375e-002	1.600e-002	1.376e-002
4	1.108e-002	1.309e-002	1.066e-002	1.147e-002	9.080e-003

Source: Monte Vista-Shannon
Region: USGS 2008 California
Closest Distance: 19.34 km
Amplitude Units: Acceleration (g)
Magnitude: 6.50 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.242e-001	1.095e-001	1.222e-001	1.477e-001	1.175e-001
0.05	1.772e-001	1.394e-001	1.569e-001	2.327e-001	1.798e-001
0.1	2.587e-001	2.154e-001	2.494e-001	3.067e-001	2.631e-001
0.2	2.837e-001	2.497e-001	3.009e-001	3.104e-001	2.738e-001
0.3	2.329e-001	1.937e-001	2.599e-001	2.520e-001	2.260e-001
0.4	1.914e-001	1.521e-001	2.127e-001	2.169e-001	1.840e-001
0.5	1.578e-001	1.265e-001	1.727e-001	1.793e-001	1.529e-001
0.75	1.042e-001	8.359e-002	1.125e-001	1.185e-001	1.021e-001
1	7.548e-002	6.085e-002	8.001e-002	8.897e-002	7.210e-002
2	3.097e-002	2.687e-002	2.847e-002	3.966e-002	2.890e-002

3	1.760e-002	1.523e-002	1.545e-002	2.370e-002	1.603e-002
4	1.164e-002	1.023e-002	1.016e-002	1.666e-002	9.497e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	2.256e-001	2.087e-001	2.234e-001	2.641e-001	2.063e-001
0.05	3.336e-001	2.661e-001	3.091e-001	4.338e-001	3.254e-001
0.1	5.017e-001	4.165e-001	5.048e-001	5.992e-001	4.861e-001
0.2	5.403e-001	4.935e-001	5.581e-001	5.908e-001	5.186e-001
0.3	4.436e-001	3.877e-001	4.747e-001	4.773e-001	4.345e-001
0.4	3.677e-001	3.068e-001	3.929e-001	4.136e-001	3.574e-001
0.5	3.075e-001	2.573e-001	3.262e-001	3.474e-001	2.991e-001
0.75	2.088e-001	1.722e-001	2.205e-001	2.405e-001	2.019e-001
1	1.529e-001	1.270e-001	1.593e-001	1.821e-001	1.433e-001
2	6.309e-002	5.704e-002	5.711e-002	8.044e-002	5.777e-002
3	3.583e-002	3.206e-002	3.125e-002	4.815e-002	3.185e-002
4	2.339e-002	2.134e-002	2.054e-002	3.286e-002	1.881e-002

Source: Monterey Bay-Tularcitos
Region: USGS 2008 California
Closest Distance: 77.19 km

Amplitude Units: Acceleration (g)
Magnitude: 7.30 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	4.902e-002	4.727e-002	4.869e-002	5.155e-002	4.859e-002
0.05	6.483e-002	5.802e-002	5.786e-002	7.458e-002	6.885e-002
0.1	8.677e-002	8.256e-002	8.230e-002	8.790e-002	9.433e-002
0.2	9.689e-002	1.033e-001	1.006e-001	8.537e-002	9.832e-002
0.3	8.842e-002	9.457e-002	8.927e-002	8.488e-002	8.497e-002
0.4	7.725e-002	8.599e-002	7.584e-002	7.537e-002	7.180e-002
0.5	6.736e-002	7.817e-002	6.438e-002	6.533e-002	6.154e-002
0.75	4.860e-002	5.810e-002	4.474e-002	4.777e-002	4.378e-002
1	3.608e-002	4.395e-002	3.289e-002	3.487e-002	3.263e-002
2	1.775e-002	2.159e-002	1.539e-002	1.830e-002	1.571e-002
3	1.149e-002	1.360e-002	1.043e-002	1.196e-002	9.983e-003
4	8.510e-003	9.954e-003	8.332e-003	9.049e-003	6.704e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2

Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	8.888e-002	8.866e-002	8.901e-002	9.247e-002	8.538e-002
0.05	1.221e-001	1.094e-001	1.140e-001	1.404e-001	1.248e-001
0.1	1.682e-001	1.581e-001	1.665e-001	1.735e-001	1.748e-001
0.2	1.842e-001	2.011e-001	1.866e-001	1.625e-001	1.866e-001
0.3	1.685e-001	1.865e-001	1.631e-001	1.608e-001	1.636e-001
0.4	1.486e-001	1.710e-001	1.400e-001	1.437e-001	1.396e-001
0.5	1.314e-001	1.568e-001	1.216e-001	1.266e-001	1.205e-001
0.75	9.733e-002	1.180e-001	8.768e-002	9.698e-002	8.663e-002
1	7.304e-002	9.043e-002	6.547e-002	7.139e-002	6.486e-002
2	3.615e-002	4.519e-002	3.088e-002	3.712e-002	3.142e-002
3	2.337e-002	2.822e-002	2.110e-002	2.430e-002	1.984e-002
4	1.711e-002	2.048e-002	1.685e-002	1.785e-002	1.328e-002

Source: Mount Diablo Thrust
Region: USGS 2008 California
Closest Distance: 43.05 km
Amplitude Units: Acceleration (g)
Magnitude: 6.70 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	7.782e-002	8.948e-002	6.411e-002	8.015e-002	7.756e-002
0.05	1.060e-001	1.122e-001	7.901e-002	1.167e-001	1.161e-001
0.1	1.526e-001	1.675e-001	1.246e-001	1.538e-001	1.646e-001
0.2	1.717e-001	1.996e-001	1.517e-001	1.656e-001	1.697e-001
0.3	1.467e-001	1.605e-001	1.331e-001	1.519e-001	1.413e-001
0.4	1.201e-001	1.277e-001	1.096e-001	1.274e-001	1.158e-001
0.5	9.950e-002	1.063e-001	8.930e-002	1.056e-001	9.675e-002
0.75	6.643e-002	6.857e-002	5.829e-002	7.325e-002	6.562e-002
1	4.779e-002	4.832e-002	4.154e-002	5.408e-002	4.720e-002
2	1.975e-002	1.992e-002	1.569e-002	2.307e-002	2.031e-002
3	1.095e-002	1.085e-002	8.879e-003	1.395e-002	1.010e-002
4	7.056e-003	7.038e-003	6.090e-003	9.393e-003	5.705e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	1.416e-001	1.694e-001	1.172e-001	1.436e-001	1.362e-001
0.05	1.995e-001	2.130e-001	1.556e-001	2.190e-001	2.103e-001
0.1	2.954e-001	3.226e-001	2.521e-001	3.026e-001	3.045e-001
0.2	3.276e-001	3.921e-001	2.814e-001	3.151e-001	3.219e-001
0.3	2.805e-001	3.192e-001	2.432e-001	2.877e-001	2.719e-001
0.4	2.316e-001	2.561e-001	2.024e-001	2.430e-001	2.250e-001

0.5	1.944e-001	2.151e-001	1.687e-001	2.047e-001	1.893e-001
0.75	1.333e-001	1.405e-001	1.142e-001	1.487e-001	1.298e-001
1	9.687e-002	1.002e-001	8.270e-002	1.107e-001	9.382e-002
2	4.023e-002	4.205e-002	3.147e-002	4.679e-002	4.061e-002
3	2.227e-002	2.271e-002	1.796e-002	2.834e-002	2.008e-002
4	1.419e-002	1.460e-002	1.231e-002	1.853e-002	1.130e-002

Source: Northern San Andreas
Region: USGS 2008 California
Closest Distance: 4.07 km
Amplitude Units: Acceleration (g)
Magnitude: 8.05 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	4.651e-001	4.467e-001	4.537e-001	4.639e-001	4.963e-001
0.05	6.648e-001	5.517e-001	6.022e-001	7.878e-001	7.175e-001
0.1	9.251e-001	8.588e-001	8.366e-001	9.339e-001	1.071e+000
0.2	1.036e+000	1.101e+000	9.897e-001	8.769e-001	1.175e+000
0.3	8.898e-001	8.742e-001	8.907e-001	7.515e-001	1.043e+000
0.4	7.733e-001	6.894e-001	7.991e-001	6.905e-001	9.142e-001
0.5	6.759e-001	5.851e-001	7.097e-001	6.014e-001	8.074e-001

0.75	5.239e-001	4.522e-001	5.610e-001	4.652e-001	6.174e-001
1	4.399e-001	3.735e-001	4.737e-001	4.270e-001	4.855e-001
2	2.682e-001	2.152e-001	2.983e-001	3.099e-001	2.494e-001
3	2.079e-001	1.588e-001	2.455e-001	2.593e-001	1.678e-001
4	1.746e-001	1.329e-001	2.201e-001	2.215e-001	1.237e-001

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	8.404e-001	8.378e-001	8.294e-001	8.235e-001	8.708e-001
0.05	1.236e+000	1.024e+000	1.186e+000	1.439e+000	1.297e+000
0.1	1.765e+000	1.610e+000	1.693e+000	1.785e+000	1.972e+000
0.2	1.967e+000	2.144e+000	1.836e+000	1.669e+000	2.219e+000
0.3	1.694e+000	1.724e+000	1.627e+000	1.423e+000	2.000e+000
0.4	1.484e+000	1.371e+000	1.476e+000	1.317e+000	1.773e+000
0.5	1.314e+000	1.173e+000	1.340e+000	1.165e+000	1.578e+000
0.75	1.038e+000	9.122e-001	1.092e+000	9.378e-001	1.212e+000
1	8.737e-001	7.565e-001	9.283e-001	8.603e-001	9.495e-001
2	5.240e-001	4.340e-001	5.765e-001	6.056e-001	4.801e-001
3	4.011e-001	3.137e-001	4.724e-001	5.011e-001	3.171e-001
4	3.302e-001	2.579e-001	4.197e-001	4.121e-001	2.311e-001

Source: Point Reyes
Region: USGS 2008 California
Closest Distance: 57.56 km
Amplitude Units: Acceleration (g)
Magnitude: 6.90 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	5.167e-002	4.866e-002	5.154e-002	5.507e-002	5.143e-002
0.05	6.973e-002	6.065e-002	6.159e-002	8.146e-002	7.520e-002
0.1	9.775e-002	8.886e-002	9.554e-002	1.015e-001	1.051e-001
0.2	1.089e-001	1.075e-001	1.172e-001	1.017e-001	1.093e-001
0.3	9.617e-002	9.267e-002	1.050e-001	9.454e-002	9.248e-002
0.4	8.186e-002	7.996e-002	8.768e-002	8.300e-002	7.681e-002
0.5	6.947e-002	7.034e-002	7.211e-002	7.054e-002	6.490e-002
0.75	4.806e-002	4.986e-002	4.763e-002	4.979e-002	4.497e-002
1	3.516e-002	3.709e-002	3.424e-002	3.645e-002	3.286e-002
2	1.592e-002	1.745e-002	1.369e-002	1.765e-002	1.488e-002
3	9.615e-003	1.056e-002	8.049e-003	1.100e-002	8.852e-003
4	6.688e-003	7.455e-003	5.713e-003	8.052e-003	5.533e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations

Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	9.373e-002	9.155e-002	9.421e-002	9.878e-002	9.037e-002
0.05	1.314e-001	1.147e-001	1.213e-001	1.533e-001	1.362e-001
0.1	1.897e-001	1.707e-001	1.933e-001	2.002e-001	1.947e-001
0.2	2.070e-001	2.098e-001	2.175e-001	1.935e-001	2.074e-001
0.3	1.830e-001	1.832e-001	1.918e-001	1.791e-001	1.780e-001
0.4	1.572e-001	1.594e-001	1.619e-001	1.583e-001	1.493e-001
0.5	1.353e-001	1.415e-001	1.362e-001	1.367e-001	1.271e-001
0.75	9.623e-002	1.016e-001	9.332e-002	1.011e-001	8.897e-002
1	7.116e-002	7.653e-002	6.816e-002	7.461e-002	6.533e-002
2	3.241e-002	3.663e-002	2.747e-002	3.579e-002	2.976e-002
3	1.955e-002	2.197e-002	1.628e-002	2.235e-002	1.759e-002
4	1.344e-002	1.538e-002	1.155e-002	1.589e-002	1.096e-002

Source: San Gregorio Connected
Region: USGS 2008 California
Closest Distance: 14.75 km
Amplitude Units: Acceleration (g)
Magnitude: 7.50 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2

Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	2.362e-001	2.312e-001	2.262e-001	2.388e-001	2.489e-001
0.05	3.345e-001	2.905e-001	2.960e-001	3.810e-001	3.704e-001
0.1	4.724e-001	4.489e-001	4.206e-001	4.737e-001	5.463e-001
0.2	5.212e-001	5.548e-001	4.884e-001	4.611e-001	5.807e-001
0.3	4.365e-001	4.448e-001	4.199e-001	3.875e-001	4.938e-001
0.4	3.687e-001	3.552e-001	3.583e-001	3.468e-001	4.146e-001
0.5	3.149e-001	3.020e-001	3.072e-001	2.969e-001	3.534e-001
0.75	2.332e-001	2.289e-001	2.301e-001	2.151e-001	2.587e-001
1	1.891e-001	1.864e-001	1.856e-001	1.839e-001	2.006e-001
2	1.091e-001	1.051e-001	1.055e-001	1.225e-001	1.034e-001
3	7.932e-002	7.429e-002	8.087e-002	9.358e-002	6.853e-002
4	6.430e-002	5.958e-002	6.939e-002	7.904e-002	4.917e-002

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	4.274e-001	4.336e-001	4.135e-001	4.258e-001	4.369e-001
0.05	6.252e-001	5.430e-001	5.830e-001	7.051e-001	6.698e-001
0.1	9.064e-001	8.490e-001	8.511e-001	9.181e-001	1.007e+000

0.2	9.904e-001	1.080e+000	9.059e-001	8.776e-001	1.098e+000
0.3	8.316e-001	8.771e-001	7.671e-001	7.340e-001	9.482e-001
0.4	7.084e-001	7.062e-001	6.616e-001	6.612e-001	8.045e-001
0.5	6.130e-001	6.057e-001	5.803e-001	5.753e-001	6.909e-001
0.75	4.628e-001	4.617e-001	4.478e-001	4.336e-001	5.081e-001
1	3.760e-001	3.776e-001	3.638e-001	3.705e-001	3.923e-001
2	2.136e-001	2.121e-001	2.038e-001	2.394e-001	1.991e-001
3	1.532e-001	1.467e-001	1.556e-001	1.809e-001	1.295e-001
4	1.217e-001	1.156e-001	1.323e-001	1.471e-001	9.182e-002

Source: West Napa
Region: USGS 2008 California
Closest Distance: 64.57 km
Amplitude Units: Acceleration (g)
Magnitude: 6.70 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	3.865e-002	3.572e-002	4.101e-002	4.368e-002	3.418e-002
0.05	5.225e-002	4.436e-002	5.078e-002	6.423e-002	4.964e-002
0.1	7.257e-002	6.436e-002	7.604e-002	8.123e-002	6.864e-002
0.2	8.172e-002	7.732e-002	9.532e-002	8.277e-002	7.149e-002

0.3	7.176e-002	6.703e-002	8.220e-002	7.696e-002	6.084e-002
0.4	6.104e-002	5.829e-002	6.789e-002	6.723e-002	5.073e-002
0.5	5.185e-002	5.133e-002	5.631e-002	5.678e-002	4.299e-002
0.75	3.592e-002	3.583e-002	3.800e-002	3.999e-002	2.987e-002
1	2.611e-002	2.638e-002	2.725e-002	2.898e-002	2.185e-002
2	1.159e-002	1.223e-002	1.093e-002	1.340e-002	9.797e-003
3	6.907e-003	7.078e-003	6.629e-003	8.126e-003	5.794e-003
4	4.762e-003	4.795e-003	4.813e-003	5.816e-003	3.625e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

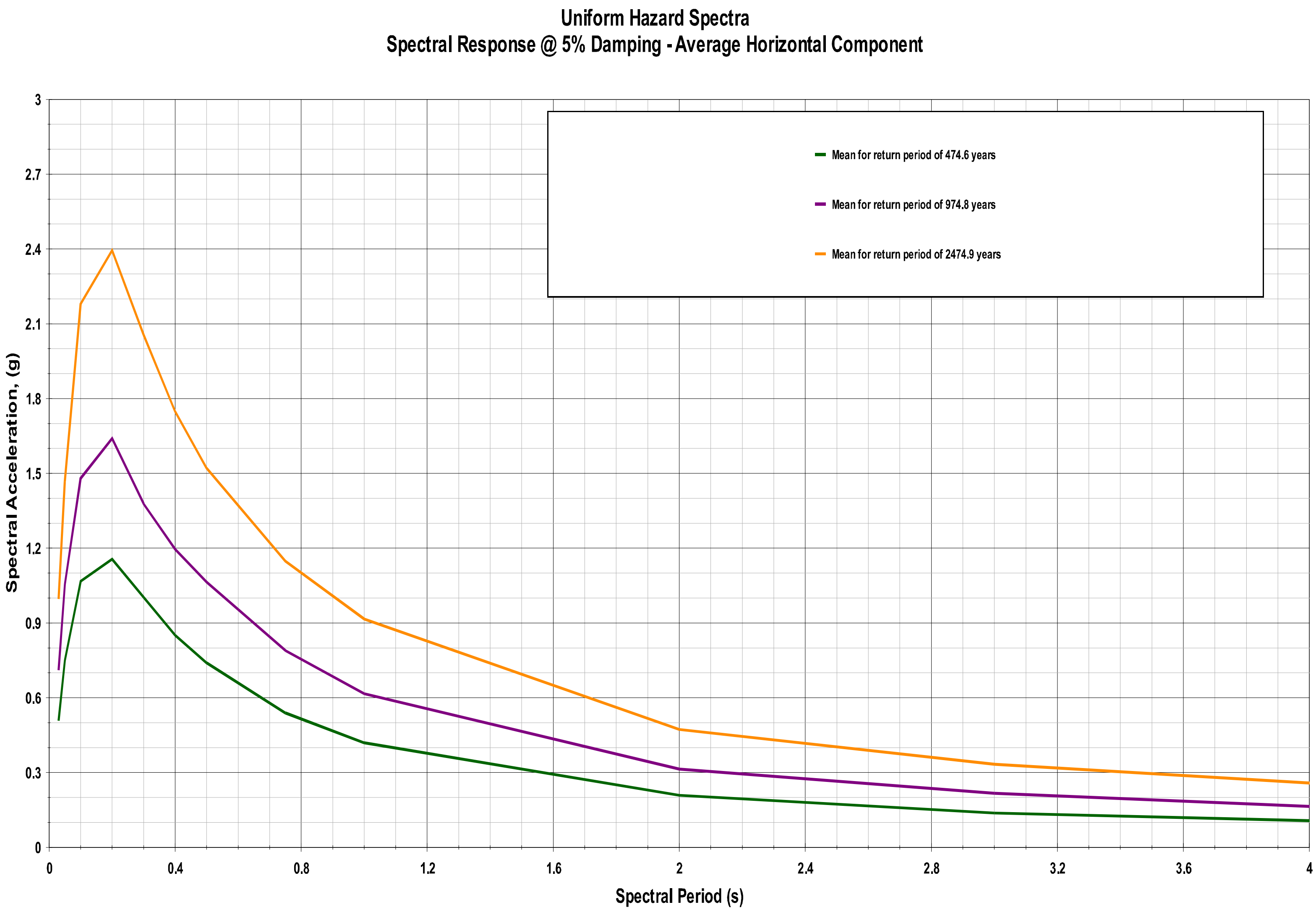
1	2	3	4	5	6
PGA	7.026e-002	6.764e-002	7.496e-002	7.838e-002	6.007e-002
0.05	9.887e-002	8.449e-002	1.000e-001	1.210e-001	8.997e-002
0.1	1.415e-001	1.245e-001	1.539e-001	1.605e-001	1.272e-001
0.2	1.555e-001	1.519e-001	1.768e-001	1.575e-001	1.358e-001
0.3	1.366e-001	1.333e-001	1.502e-001	1.458e-001	1.172e-001
0.4	1.173e-001	1.169e-001	1.254e-001	1.282e-001	9.864e-002
0.5	1.011e-001	1.038e-001	1.064e-001	1.100e-001	8.418e-002
0.75	7.204e-002	7.339e-002	7.447e-002	8.118e-002	5.912e-002
1	5.294e-002	5.473e-002	5.425e-002	5.932e-002	4.344e-002
2	2.363e-002	2.581e-002	2.192e-002	2.718e-002	1.959e-002
3	1.406e-002	1.481e-002	1.340e-002	1.651e-002	1.152e-002
4	9.583e-003	9.949e-003	9.731e-003	1.147e-002	7.179e-003

Source: Zayante-Vergeles
Region: USGS 2008 California
Closest Distance: 65.17 km
Amplitude Units: Acceleration (g)
Magnitude: 7.00 Mw
Fractile: 0.50
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

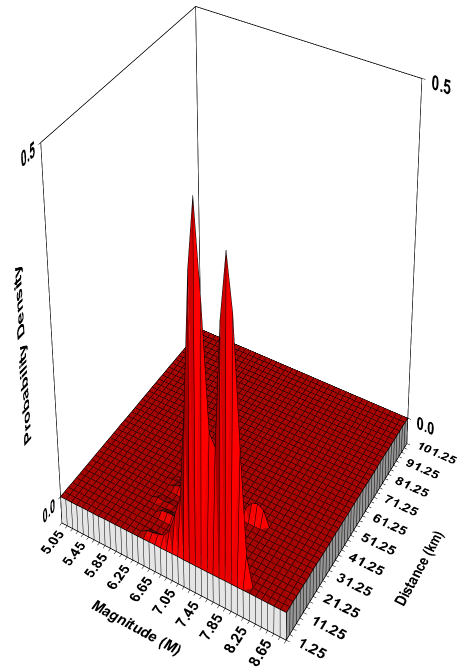
1	2	3	4	5	6
PGA	4.758e-002	4.543e-002	4.904e-002	5.116e-002	4.469e-002
0.05	6.401e-002	5.630e-002	6.006e-002	7.503e-002	6.464e-002
0.1	8.775e-002	8.158e-002	8.779e-002	9.202e-002	8.961e-002
0.2	9.805e-002	9.972e-002	1.077e-001	9.157e-002	9.316e-002
0.3	8.697e-002	8.785e-002	9.355e-002	8.711e-002	7.937e-002
0.4	7.458e-002	7.726e-002	7.806e-002	7.672e-002	6.628e-002
0.5	6.399e-002	6.875e-002	6.538e-002	6.557e-002	5.627e-002
0.75	4.507e-002	4.946e-002	4.465e-002	4.683e-002	3.933e-002
1	3.312e-002	3.696e-002	3.238e-002	3.419e-002	2.895e-002
2	1.547e-002	1.762e-002	1.398e-002	1.688e-002	1.341e-002
3	9.651e-003	1.078e-002	8.960e-003	1.064e-002	8.221e-003
4	6.933e-003	7.723e-003	6.816e-003	7.848e-003	5.344e-003

Fractile: 0.84
Column 1: Spectral Period
Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations
Column 3: Acceleration (g) for: Abrahamson-et al (2014) NGA West 2
Column 4: Acceleration (g) for: Boore-et al (2014) NGA West 2
Column 5: Acceleration (g) for: Campbell-Bozorgnia (2014) NGA West 2
Column 6: Acceleration (g) for: Chiou-Youngs (2014) NGA West 2

1	2	3	4	5	6
PGA	8.629e-002	8.520e-002	8.965e-002	9.178e-002	7.854e-002
0.05	1.207e-001	1.062e-001	1.183e-001	1.412e-001	1.171e-001
0.1	1.704e-001	1.563e-001	1.776e-001	1.816e-001	1.660e-001
0.2	1.863e-001	1.941e-001	1.999e-001	1.743e-001	1.769e-001
0.3	1.655e-001	1.732e-001	1.709e-001	1.650e-001	1.528e-001
0.4	1.432e-001	1.536e-001	1.442e-001	1.463e-001	1.289e-001
0.5	1.246e-001	1.379e-001	1.235e-001	1.271e-001	1.102e-001
0.75	9.021e-002	1.005e-001	8.750e-002	9.506e-002	7.783e-002
1	6.701e-002	7.605e-002	6.447e-002	7.000e-002	5.754e-002
2	3.149e-002	3.688e-002	2.804e-002	3.423e-002	2.681e-002
3	1.961e-002	2.237e-002	1.812e-002	2.162e-002	1.634e-002
4	1.393e-002	1.589e-002	1.378e-002	1.548e-002	1.058e-002


Uniform Hazard Spectra
Spectral Response @ 5% Damping - Average Horizontal Component
Mean for return period of 474.6 years
Mean for return period of 974.8 years
Mean for return period of 2474.9 years
Spectral Acceleration, (g)
Spectral Period (s)
0
0.3
0.6
0.9
1.2
1.5
1.8
2.1
2.4
2.7
3
0
0.4
0.8
1.2
1.6
2
2.4
2.8
3.2
3.6
4

Magnitude-Distance Deaggregation
Spectral Response @ 5% Damping - Average Horizontal Component



Period: PGA
Amplitude: 0.5156
Hazard: 0.00210687
Mean Magnitude: 7.61
Mean Distance: 6.36