Appendix F1 Geotechnical Investigation Report Industrial and Business Parks

Appendices

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PRELIMNARY GEOTECHNICAL INVESTIGATION REPORT

for

AGUA MANSA COMMERCE PARK
1500 Rubidoux Boulevard
Jurupa Valley, California

Prepared For:
Crestmore Redevelopment, LLC
1745 Shea Center Drive, Suite 190
Highlands Ranch, CO 80129

Prepared By:
Langan Engineering & Environmental Services
32 Executive Park, Suite 130
Irvine, California 92614

28 April 2017
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LANGAN

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1. INTRODUCTION

As requested by Crestmore Redevelopment, LLC, Langan Engineering and Environmental Services, Inc. (Langan) has completed a preliminary geotechnical investigation for the proposed Agua Mansa Commerce Park (the Project). The services were performed in accordance with the Langan proposal for geotechnical engineering services, dated 27 May 2016 executed by Crestmore Redevelopment, LLC on 8 September 2016 and Contract Change Order for Additional Services, dated 21 March 2017.

Our services included:

1. Review of published geotechnical and geologic data about the site and region, including California Geologic Survey publications, historic mining data, and historic aerial photographs;
2. A limited geotechnical field investigation that included borings and test pits and geophysical surveys
3. A second geotechnical field investigation to investigate for presence of eolian sand in the northern portion of the site
4. Geotechnical laboratory testing
5. Preliminary evaluation of the data, and
6. Preparation of this preliminary report.

The purposes of this report are to: summarize our understanding of the current development plans, summarize our understanding of the geological and geotechnical aspects of the project, including existing conditions; summarize the results of the subsurface investigation and findings; and provide our geotechnical recommendations in support of the project entitlement efforts.

2. PROJECT DESCRIPTION

2.1 Site Description

The Project is proposed to be located within the existing Riverside Cement Plant facility which includes associated quarries and the former Crestmore Mine (the "Site") located at 1500 Rubidoux Boulevard, Jurupa Valley, Riverside County, California. The Site is approximately 205 acres and is bounded by Rubidoux Boulevard on the west, Rivino Road on the north, Hall Avenue and an industrial development on the east, and Agua Mansa Road and an industrial development on the south. The Site is transected by railroad tracks owned and operated by Union Pacific Railroad (UPRR).The Project encompasses an area of approximately 205 acres is located in the mid to northern portion of the Site. The location of the Site and proposed Project are shown in Figure 1.

Having been in operation since 1906 until the mid-1980s, the existing Riverside Cement Plant contains the cement plant, the former quarries (Wet Weather Quarry, Lonestar Quarry, Commercial Quarry and Chino Quarry), the former Crestmore Mine and various support buildings. The former quarries and mine were used for the mining of limestone minerals for cement production. Shallow below grade chambers associated with former cement plant and deeper below grade chambers associated with former mining operations are present below portions of the Site. The northern part of the Site is overlain by fill and is vegetated with shrubs, grass and trees. The remainder of the Site contains fill stockpiles including material stockpiles, berms and filled former quarry areas. Ground surface elevations vary from

approximately 835 feet above mean sea level (amsl)[1] to approximately 985 feet amsl.

The Wet Weather Quarry is located in the south-east end of the Project and elevations within the quarry vary between 835 to 945 feet amsl. The slopes within the Wet Weather Quarry have a maximum height of approximately 110 feet and have an approximate inclination of 3:4 (horizontal to vertical) or flatter.

The Lonestar Quarry was located west and adjacent to the Wet Weather Quarry however the Lonestar Quarry was filled in prior to 1976 as interpreted from stereographic photographs. Information on the filled in depth was not found.

The Commercial Quarry is located in the south-east end of the Site and was mined in the 1960s and early 1970s. The Commercial Quarry was filled in the mid-1970s however the fill material was subsequently mined in the late 1970s and the majority was removed and recovered by the late 1980s for mill or kiln feed supplement. Information on the filled in depth was not found. Elevations within the Commercial Quarry vary between 810 to 900 feet amsl.

Chino Quarry is located south of the Site and is flooded to an elevation of approximately 815 feet amsl. The ground surface elevation at the southern end of the Project, adjacent to the Chino Quarry, is approximately 915 feet amsl. The 100 foot high slope between the southern end of the Project and Chino Quarry has an approximate slope of 1:1 (horizontal to vertical) or flatter. Underground mining below the Chino Quarry started in 1930 and was designated as Crestmore Mine. From 1930 to 1954, the Block Caving method was used in underground mining and from 1955 to 1986, the Room and Pillar Underground Mining Methods were used. Underground mining ceased in 1986 and Crestmore Mine was allowed to flood. When mining was ceased, the entrance to the mine was at an approximate elevation of 650 feet amsl and the bottom of the mine was at an approximate elevation of 60 feet below mean sea level. The approximate mapped extent of the underground mining is shown on Figure 2.

Based on the various Riverside Cement Company maps that were reviewed the shallowest mine level is at an elevation of 572 feet amsl. Based on the maps titled "Crestmore Mine Plan" and "35 Level" by Riverside Cement Company dated 25 November 1968 and 17 January 1972, respectively, the lateral extent of mining extended north past Well 88-1 and near the northern end of the Material Storage Yard.

An adit (a passage from the surface in a mine) with a beltway was used to transport materials from the mine to the rock crushing plant. The adit is located in the southern portion of the Project. Based on the map "Crestmore Mine Plan" by Riverside Cement Company dated 25 November 1968, the adit is oriented south 22 degrees west (S22°W) for an approximate length of 570 feet, then orients S62°E for an approximate length of 1,068 feet and then orients N72°E for an approximate length of 625 feet to connect to the mine. It was reported that the below grade chamber had collapsed, but the depth or length of the collapse along the below grade chamber could not be confirmed.

Two on-site wells, identified as 60-1 and 88-1, that previously provided water in support of plant operations, remain on Site. Well 88-1 is non-operational and Well 60-1 is operational, continuing to feed the on-site water lines. Documentation regarding the construction of the groundwater wells was not available for review. The locations of the groundwater wells are shown in Figure 2.

[1] Elevations are based on the National Geodetic Vertical Datum of 1929 (NGVD 1929) as referenced from DRC Engineering, Inc. "Encumbrance Map, Vacant Commercial Property, Jurupa Valley, California" dated 2 March 2016

2.2 Riverside Cement Plant Operational History

Cement manufacturing operations began in 1914 and continued through 2015. Limestone mined from the quarries and Crestmore Mine was mixed with imported materials, and burned in rotary kilns to manufacture cement clinker. The cement clinker was then crushed to create cement, which was then packaged and shipped off-site. Cement Kiln Dust (CKD) was the primary by-product generated during the cement manufacturing process, and was comprised of material accumulated within the kilns that could not be reused in the process stream. Prior to the 1970s, CKD was hauled from the kilns using end-dump trucks and deposited at several locations throughout the Site. In the 1970s, a process was implemented for incorporating CKD into the final product thus eliminating its generation as a by-product, and some of the previously deposited CKD was recovered.

2.3 Proposed Development

Our understanding of the proposed project is based on documentation and exhibits provided by Crestmore Redevelopment, LLC, including a Draft Preliminary Site Plan dated 7 September 2016. Per the Draft Proposed Site Plan, the proposed Project consists of a commercial/ industrial development that includes up to 4 single story industrial buildings with a mezzanine level and a combined footprint of approximately 3.6 million square feet. Site development will require installation of new utilities, and mass grading that could include cuts of up to 35 feet and fills of up to 100 feet. The limits of the proposed Project are shown on Figure 2.

3. GEOLOGY

3.1 Document Review

Information that was reviewed included maps and websites from the United States Geological Survey's (USGS), California Geological Survey (CGS), Geologic Map by Thomas W. Dibblee, Jr. (Dibblee) County of Riverside, Department of Water Resources, Federal Emergency Management Agency (FEMA) and Division of Oil, Gas & Geothermal Resources (DOGGR).

Stereographic aerial photographs taken between 1949 and 1999 that showed the Riverside Cement Plant and a Site Assessment Report prepared by Ryan-Murphy dated 7 July 1995 were reviewed. The results of the review are summarized in Section 3.2 to 3.7.

3.2 Regional Geologic Setting

The Project is located within the fault-bounded, northwest-southeast trending Perris Block within the Peninsular Ranges geomorphic province of California. The Perris Block is bounded in the east by the San Jacinto Fault Zone, the north by Cucamonga Fault Zone, and the west by Elsinore Fault Zone. According to the USGS maps (USGS 2006), the Perris Block is underlain by lithologically diverse prebatholithic metasedimentary rocks intruded by plutons of the Cretaceous age Peninsular Ranges batholith. Erosional depositional surfaces are developed on the Perris Block and thin to relatively thick sections of Quaternary age non-marine sediments discontinuously cover the basement rock.

3.3 Local Geologic Setting

The Project is located in the eastern end of the Jurupa Mountains on the south side of the San Bernardino Valley. The Santa Ana River drains the San Bernardino Valley towards the southwest and is approximately one-half mile east of the Project.

Based on our review of published geologic reports, maps and referenced geologic information, the Project is underlain by a variety of geologic units. USGS and CGS reports that the northeast

portion of the Project is underlain by Holocene to late Pleistocene age, eolian deposits (Qye) consisting of unconsolidated, gray to tan, massive, fine grained sand forming stabilized dunes; the northern portion of the Project is underlain by Holocene to late Pleistocene age, young alluvial fan deposits (Qyfl) consisting of unconsolidated, gray, cobbley and bouldery alluvium of Lytle Creek fan; the western, southern and eastern portion of the Project is underlain by two geologic units consisting of artificial fill and intermixed tonalite marble and schist. The artificial fill (Qaf) reportedly consists of uncompacted and undocumented fill from mining operations, cement kiln dust (CKD) and unconsolidated talus deposits. The intermixed tonalite, marble, and schist (KtPzms) are Cretaceous and Paleozoic age and consist of intermixed biotite-hornblende tonalite and coarse grained marble containing lesser amounts of biotite-quartz schist. The surficial geologic units shown within the former Riverside Cement Plant and Crestmore Mine property on Figure 3 are based on USGS and CGS maps and our interpretation of field conditions based on our field exploration.

Based on the information reviewed, quarrying and subsurface mining activities were initiated in 1906 to mine the limestone within the southern portion of the Site. Prior to quarrying, the limestone was present as two generally irregular, roughly parallel, lenticular limestone bodies dipping primarily east-northeast. The upper (shallower) and lower (deeper) limestone bodies are referred to as Sky Blue and Chino Limestones, respectively and were mineralogically similar. The limestone is coarsely crystalline, associated with metamorphosed sediments, enveloped and cut by intrusive igneous rocks and contact metamorphic minerals, including large masses of intrusive microcrystalline quartz monzonite porphyry and quartz monzonite pegmatites. Country rock within the boundary of the Site consists of Perris quartz-biotite diorite that becomes granodiorite. Quartz monzonite pegmatites occur commonly as dikes in the porphyry and country rock and extended generally less than 2 or 3 feet into the limestone. The most widespread contact rock is composed generally of grossularite garnet with and without diopside.

The shallower, Sky Blue limestone was an arcuate shaped body, enveloped and intruded by quartz diorite and intruded by quartz monzonite porphyry. The body was up to several hundred feet thick and dipped primarily east or northeast. Where the body was thinnest, the limestone was converted to contact rock. Two (2) facies were present within the limestone; a white limestone with localized yellow predazzite beds and a sky blue colored limestone present closer to the intrusive quartz monzonite porphyry and associated pegmatites.

The deeper, Chino limestone was generally composed of alternating bands of yellowish predazzite and white crystalline limestone with widely disseminated graphite flakes. The unit dipped up to 45 degrees east, was at least 2,000 feet long, and had irregular upper and lower surfaces. Banding ranged from few inches to a few feet thick.

3.4 Local Faulting

Langan reviewed the following publications and report as part of our geologic review regarding local faulting within the Site:

- Daly, John W., (1931), The Geology and Mineralogy of the Limestone Deposits at Crestmore, Riverside County, California, dated 1931 (Daly, 1931).
- Woodford, A. O., Crippen, R. A., and Garner, K. B., (1941), Section Across Commercial Quarry, Crestmore, California, American Mineralogist, Volume 26, pages 351-381 (Woodford et al, 1941).

- ERM-West, Inc., (1991), Technical Evaluation 9/30/90 EPA FIT Report, Riverside Cement Company, Crestmore Plant, dated November 1991 (ERM-West Report).

Plate 1 included in the Daly, 1931 report shows a northeast-southwest trending fault segment between the Commercial Quarry in the northeast and southwestern portion of the Chino Quarry to the southwest. The corresponding report text does not elaborate on this fault and alleges Daly (i) identified only a few small faults of which have no particular significance regarding the major geologic structure of the Site and (ii) did not find any large faults in the area mapped west of the quarries.

The Woodford, et al, 1941 report refers to "a prominent fault (?) running N50°E 70°SE" that extends into bedrock at Station 15 of Woodford, et al's Figure 3-Section Across the Commercial Quarry, 1940'. Additional information of this fault was not provided in this report.

Figures 2-1, 2-2, 2-5, and 3-2 included in the ERM-West Report shows a generally northwest-southeast trending fault in southwestern portion of the Chino Quarry. The corresponding report text does not elaborate on the nature or source of this fault.

Approximate locations of the faults reported by Daly and ERM-West are shown in Langan's Figure 3. The quality of Woodford, et al's Figure 3 does not allow for an accurate determination of the reported fault, thus the location of the fault reported by Woodford, et al is not shown in Langan's Figure 3.

USGS, CGS and Dibblee maps were also reviewed. No other local faults were mapped on the Site. Based on our review of the referenced publications it is our opinion active faulting (Holocene or younger) is not present within the Site.

3.5 Geologic Hazards

Our geologic hazard review was performed in general accordance with CGS "Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California", and the 2016 edition of California Building Code (2016 CBC). The following subsections present the results of our review of geologic hazards as they pertain to the Project.

- Regional Faulting – Recognized and mapped faults that are located within a 100-kilometer (km) radius of the Project based on the CGS "2010 Fault Activity Map of California" (Fault Activity Map) and "An Explanatory Text to Accompany the Fault Activity Map of California" (Explanatory Text) are shown on Figures 4a and 4b, respectively. Based on our review, the closest known fault to the Project is the Rialto-Colton Fault, located approximately 4 miles (6.4 km) northeast. The closest active fault is the San Jacinto Fault located approximately 5 miles northeast of the Project. An Inferred Fault near Fontana is located approximately 6 miles northwest of the Project. The Project's relative location to active faults is shown in Figure 4a and 4b.

  Due to the Project's proximity to several nearby active faults, moderate to strong ground shaking could occur from an earthquake on any of the nearby fault(s).

- Regional Seismicity – A search of the CGS earthquake catalog (updated through December 2016) using the *EQSearch* computer program, found that 82 earthquakes with magnitudes greater than 5.0 have occurred within a 100-km radius of the Project since 1800. In addition, a search of the USGS ANSS Comprehensive Earthquake Catalog (ComCat), updated through August 15, 2016, using a web-based Earthquake Archive Search and URL Builder tool, found that 48 earthquakes with magnitudes greater than 5.0 have occurred within a 100-km radius of the Project since 1900. A

summary of the *EQSearch* and USGS ANSS ComCat reported earthquake events are provided in Appendix A.

- Surface Rupture – Alquist-Priolo Earthquake Fault Zones (APEFZ) are regulatory zones established by the CGS around active faults with the potential to cause surface rupture. The zones vary in width, however the average is approximately ¼ mile wide. The CGS has not published an APEFZ map containing the Project.

  Per the Safety Element included in County of Riverside General Plan, Riverside County has zoned fault systems within Riverside County and require special studies be performed within the zones prior to development; per the Safety Element, the Project is not located in a County Fault Zone.

  The City of Jurupa Valley California Draft 2017 General Plan states that there are no known active faults within the City of Jurupa Valley.

- Liquefaction - Based on the County of Riverside General Plan, the Project is located in an area with shallow groundwater and susceptible sediments with low to moderate liquefaction susceptibility. The City of Jurupa Valley California Draft 2017 General Plan shows the east portion of the Project is located in an area with low liquefaction susceptibility and the western portion in an area with medium liquefaction susceptibility.

  However, information from the Department of Water Resources, Water Data Library shows State Well Number 03S03W03A001S less than 100 feet north of the Project. Groundwater data was collected from 2012 to 2016 and the groundwater elevation was reported at approximately 825 feet amsl (depth of 137 feet). Therefore, the potential for soil liquefaction at the Project is anticipated to be low under the design earthquake. The design earthquake is defined in ASCE 7-10 as the earthquake effects that are two-thirds of the corresponding Maximum Considered Earthquake effects. The Project's relative location on the County of Riverside General Plan generalized liquefaction map is shown in Figure 5.

- Lateral Spreading – Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. The surficial blocks are transported downslope or in the direction of a free face, such as a slope, by earthquake and gravitational forces. The potential for liquefaction under the design earthquake is anticipated to be low and therefore the potential for lateral spreading is considered low.

- Seismic-Induced Ground Deformations – Seismic-induced ground deformations include ground surface settlement and differential settlement resulting from liquefaction of saturated cohesionless soils and cyclic densification, or differential compaction, of unsaturated sands and gravels caused by earthquakes. The potential for liquefaction under the design earthquake is anticipated to be low however according to the geologic conditions within the Project, seismic-induced ground deformations induced by cyclic densification (dry seismic settlement) of artificial fill, young alluvial fan deposits and eolian deposits could occur. Additional information is in Section 6.2.

- Earthquake-Induced Landslide Areas – Based on the County of Riverside General Plan and City of Jurupa Valley California Draft 2017 General Plan, the Project is not located within an 'Earthquake-Induced Landslide' area. Documented evidence of historic landslides was not observed at the Project, based on our site visits and our review of aerial photographs. The Project's location on the earthquake-induced landslide map is

shown in Figure 6.

- Groundwater – The Department of Water Resources, Water Data Library shows State Well Number 03S03W03A001S less than 100 feet north of the Project. Groundwater data was collected from 2012 to 2016 and the groundwater elevation was reported at approximately 825 feet amsl (depth of 137 feet).
- Flood Mapping –According to Federal Emergency Management Agency FEMA's 'Flood Insurance Rate Map (FIRM) Number 06065C0045G', dated 28 August 2008, the Project is located in Other Areas Zone X, which is defined as an area determined to be outside the 0.2 percent annual chance floodplain.
- Tsunami and Seiche – A tsunami is a long high sea wave caused by an earthquake, submarine landslide, or other disturbance. A seiche is oscillation of surface water in an enclosed or semi-enclosed basin such as a lake, bay, or harbor. The Project is not located within a potential tsunami or seiche inundation area; however, Chino Quarry is a lake and adjacent to the Project. The lake is approximately 200 feet in depth and the Project is approximately 100 feet higher than the water elevation. The potential for a seiche to overtop the Project is considered to be low.
- Subsidence
    - Land subsidence may be induced from withdrawal of oil, gas, or water from wells. Based on a search of the Division of Oil, Gas & Geothermal Resources (DOGGR) Well Finder online tool, the Project is not within a state-designated oil field. In addition, no active oil, gas, or geothermal wells are identified within the Project. According to our review of the available information from DOGGR, the likelihood of land subsidence caused by oil, gas, or water withdrawal from oil wells is not expected and need not be considered in design.
    - The risk of subsidence from below grade adits below the proposed development will be presented in a separate report, if authorized.
- Collapsible Soils – Collapsible soils, or soils susceptible to hydroconsolidation, are geologically young, unconsolidated, low-density, loose, dry soils commonly present in arid to semi-arid regions, such as Southern California. These soils generally occur within wind deposited sands or silts, alluvial fans, colluvial soils, stream banks, or residual mudflow soils. Collapsible soils have a porous structure. Once water is introduced, the porous structure collapses and the granular particles are rearranged. A rise in groundwater or increase in surface-water infiltration, combined with the weight of a structure or fill, can cause rapid settlement, resulting in cracking of foundations and walls. Based on the reported geologic conditions and subsurface information reviewed for the Project, soils potentially susceptible to significant hydroconsolidation are anticipated, additional information and recommendations are included in Section 6.2.
- Expansive Soils – Expansive soils occur when the moisture content in the soil causes swelling or shrinking as a result of cyclic wet/dry weather cycles, installation of irrigation systems, change in landscape plantings, or changes in grading. Swelling and shrinking soils can result in differential movement of structures including floor slabs and foundations, and site work including hardscape, utilities, and sidewalks. Portions of the Site are underlain by alluvial soils which could have expansive clays, although expansive clays have not been identified on the Site yet. Additional discussion regarding expansive soil potential at the Site and recommendations are included in Section 6.3.

3.6 Aerial Photograph Review

Stereographic aerial photographs, from Continental Aerial Photo, taken between 1949 and 1999 showing the Project, Site and surrounding vicinity were reviewed for available information regarding historic conditions and any discernable topographic and/or geomorphic/geologic features. A summary of our interpretation of development within the Site based on the photographs is summarized below.

Aerial Photograph Year	Site Development Description
1949	The Site is developed with a circular tank believed to be a 6 million gallon fuel storage tank, industrial buildings, a rectangular depression believed to be the spray pond and parking lots in the north-western portion. The north-eastern and north-western corners of the Site are observed to be occupied by residential properties. The southern portion of the Site contains unpaved roads surrounding two quarries with steep slopes (Chino Quarry and the Wet Weather Quarry). The Chino Quarry is bounded by hillsides to the south-west and north-east and has irregular slopes with possible sloughing in the north and south ends. The Wet Weather Quarry is filled with water. A stockpile is observed east of the industrial buildings and is surrounded by unpaved roads and disturbed land.
1959	The Site extends past the margin of the photograph, thus the southern portion of the Site is not visible in the photograph. The Site has been developed with additional parking lots and industrial structures in the north-west and west portions. Mining in the quarries appears to have continued. The residential buildings in the north-western corner are no longer observed.
1967	The Site layout and types of equipment have been changed in the middle portion of the Site. A material storage yard, grey kilns, grey cement plant, white kilns and white cement plant are observed. The stockpile observed east of the industrial buildings in 1949 is no longer observed. A haul road is observed within Chino Quarry creating a loop in the excavation. The Wet Weather Quarry is observed to have less water and vegetation is present on the eastern slope. Some of the residential buildings in the north-eastern corner are no long observed. Mining in the quarries appears to have continued. No other significant changes are observed compared to 1959.
1968	A dark area is observed in the rectangular spray pond, mining in the quarries appears to have continued, and no other significant changes to the Site are observed from 1967.
1970	The north slope of the Chino Quarry appears to have been filled in with a gentler slope and mining in the quarries appears to have continued. No other significant changes to the Site are observed compared to 1968.
1976	A third quarry, believed to be the Commercial Quarry, is observed in the southern portion of the Site. The Commercial Quarry has haul roads creating a loop and entering into the quarry. The north-western end of the Wet Weather Quarry appears to have been filled with material and developed with a parking

Aerial Photograph Year	Site Development Description
	area and structures. The Wet Weather Quarry appears to have less water. Mining in the quarries appears to have continued. No other significant changes are observed compared to 1970.
1977	No liquid is observed in the Commercial Quarry. Mining in the western end of Chino Quarry appears to have created a steep slope. No other significant changes are observed compared to 1976.
1980	No significant changes to the Site are observed in the 1980 aerial photographs compared to 1979.
1986	The 6 million gallon fuel storage tank is no longer observed in the north-western portion of the Site, only a circular pad remains. Chino Quarry is filled with water and a stockpile is observed within the Project north of the Wet Weather Quarry. A stockpile is observed in the south end of the Commercial Quarry. A residential building is no longer observed in the north-eastern part of the Site. Grading is observed west of the Wet Weather Quarry. No other significant changes are observed compared to 1979.
1990	The stockpile south of the Commercial Quarry is no longer observed and the area appears to have been graded. The circular pad for the 6 million gallon storage tank is no longer observed and the area is vegetated. No other significant changes are observed compared to 1986.
1993	The stockpile north of the Wet Weather Quarry is observed to have vegetation. No other significant changes are observed compared to 1990. No significant changes are observed in the 1995 aerial photographs compared to 1993. In the 1999 aerial photograph, water is not observed in the Commercial Quarry. No other significant changes are observed in the 1999 aerial photograph compared to 1993.

3.7 Previous Investigation

Based on a Site Assessment Report prepared by Ryan-Murphy, nine soil borings were advanced using a Mobile B-53 drill rig and 8-inch hollow stem augers to a maximum depth of 45 feet to investigate the area of the former White Kiln Pipeline Leak. Two borings were advanced horizontally using a hand auger under the boiler building to a depth of 6 to 7 feet. Fill was encountered to a depth of 5 feet. Fill was generally underlain by alluvium consisting of clays and silty sands and was encountered to a depth that ranged from 20 to 40 feet. Decomposed granite was encountered below the fill and/or alluvium at a depth of 5 feet or greater below alluvium or fill. Standard Penetration Test (SPT) blow counts in clay varied from 5 to 48, SPT blow counts in silty sands varied from 17 to refusal and SPT blow counts in decomposed granite varied from 50 to refusal.

4. SUBSURFACE INVESTIGATION

Langan's preliminary geotechnical field investigation was performed in two phases. The first consisted of drilling thirteen (13) geotechnical borings, excavating 57 test pits, performing two (2) percolation tests, measurement of groundwater at existing wells, and a geophysical

investigation to investigate the subsurface conditions throughout the Site and obtain information about depth of filled in quarries and below grade chambers. The second phase of the investigation consisted of performing six (6) test pits in the northern portion of the Site to investigate the vertical and lateral extent of eolian sands.

Before performing the subsurface investigation, borings and test pits were located and marked by a field engineer from our office. Underground Service Alert of Southern California (DigAlert) was contacted to locate and mark known public underground utilities present within the public rights-of-way. In addition, a private utility-locating subcontractor performed subsurface utility check at the boring and test pit locations to confirm the locations were clear of subsurface utilities or obstructions. Additional details of our subsurface investigation are discussed below. See Figure 2 for approximate locations of borings, trenches and percolation tests.

- Borings – Thirteen (13) borings, identified as LB-1 through LB-12 and ALB-10, were drilled between 19 and 26 September 2016 by Martini Drilling under full-time observation of a Langan field engineer. The borings were hand-augered to 5 feet below existing grade and subsequently drilled to depths ranging between approximately 31.5 and 61.5 feet below existing grade.

  A truck-mounted drill rig and hollow-stem augers were used to advance the boreholes using conventional soil drilling techniques. Standard Penetration Tests (SPT)[2] and split spoon sampling were performed at select locations. California ring samples were collected at select locations using a 3.0-inch-outer-diameter split-barrel California sampler lined with 2.42-inch-inner-diameter brass rings in accordance with ASTM D3550. Soil samples were visually examined and classified in the field in accordance with the Unified Soil Classification System (USCS); classifications were confirmed by re-examination in our office. Boring logs are attached in Appendix B. Excess cuttings were placed at the Site near each boring and borings were backfilled with cement grout. Borings that were drilled on top of pavement were patched with quick-dry concrete and dyed black.

- Percolation Testing – Percolation tests were performed in borings LB-4 and LB-9 at depths of 40 feet and 30 feet, respectively. The percolation tests were performed in general accordance with the methods presented in the "Design Handbook for Low Impact Development, Best Management Practices" by Riverside County Flood Control, Water Conservation District, dated September 2011. Percolation test results are attached in Appendix C.

- Tests Pits – Fifty-seven test pits, identified as LT-2, LT-4, LT-5 through LT-6, LT-8 through LT-24, LT-26 through LT-36, LT-39 through LT-47, LT-CBermA, LT-MW1A, LT-MW1B, LT-MW1C, LT-SBermA, LT-SBermB, LT-EBermC, LT-EBermD, LT-NBermA, LT-NBermB, and LT-Sewer were excavated and logged as part of a Phase II Environmental Investigation at the Site. Test pits were excavated to depths that ranged from approximately 5 to 16 feet. The test pits were excavated by Dennis A. Lorton & Associates, Inc., using a Caterpillar 321C Excavator between 19 and 30 September

[2] The Standard Penetration Test is a measure of the soil density and consistency. The SPT N-value is defined as the number of blows required to drive a 2-inch outer diameter split-barrel sampler 12-inches or 3.0-inch-outer-diameter split-barrel California sampler lined with 2.42-inch-inner-diameter brass rings, after an initial penetration of 6 inches, using a 140-pound automatic hammer free falling of a height of 30-inches (ASTM D1586).

2016 under the full-time observation of a Langan field engineer. An additional six (6) test pits, identified as TP-1 through TP-6, were excavated to delineate eolian sand, if any in the northern portion of the Project. Test pits were excavated by Dennis A. Lorton & Associates, Inc., using a Caterpillar 321C Excavator on 10 April 2017 under the full-time observation of a Langan field geologist. Following completion of logging, the test pits were backfilled in lifts with excavated soil using the excavator. The tests areas will need to be re-excavated and backfilled as controlled fill as part of remedial grading. Refer to Figure 2 for approximate test pit locations. Test pit logs are attached in Appendix D.

- Groundwater Measurements – The depth to groundwater was measured at two wells on 4 October 2016, an off-site well identified as MW-3 and a "Monitoring Well" in the northern portion of the Project. A summary of the groundwater measurements is provided in Section 5.1.
- Geophysical Investigation – A geophysical investigation was performed by Spectrum Geophysics, Inc., to investigate the alignment and depth of the former conveyor below grade chamber and potential for below grade chamber(s) south of the proposed footprint of Building 1.

  A p-wave seismic refraction study was performed in the area of the Wet Weather Quarry and Lonestar Quarry to identify the depth to bedrock. The geophysical investigation was performed on 3 to 6 October 2016. The geophysical investigation results are summarized in Section 5.3 and attached in Appendix E.

4.1 Laboratory Testing

A laboratory test program performed on select soil samples included the following tests:

- Expansion Index – ASTM D4829
- Consolidation – ASTM D2435
- Direct Shear – ASTM D3080
- Sieve Analyses – ASTM D422
- Percent Passing #200 Sieve Analyses – ASTM D1140
- Moisture Content and Density – ASTM D2937
- Electrical Resistivity – CTM 643
- Chloride Content – CTM 422
- Sulfate Content – CTM 417
- Soil pH – CTM 643
- Modified Proctor Compaction – ASTM D1557

Laboratory test results are included in Appendix F.

5. SUBSURFACE INVESTIGATION RESULTS

Borings and test pits generally indicated that subsurface conditions consisted of artificial fill, alluvial deposits, and weathered granitic rock. Generalized subsurface cross-sections are presented in Figure 7. Our interpretation of the subsurface conditions based on borings, test pits and laboratory test results is summarized below. Boring logs are attached in Appendix B.

- artificial fill (Qaf): Artificial fill was observed throughout the Project extending from the ground surface to a depth of approximately 13 feet. Fill material consists of dry to moist, brown, silty fine to coarse sand with varying proportions of gravel and clay. In addition, fill stockpiles are present throughout the Site.
- eolian deposits (Qye): As stated in Section 3.3, USGS and CGS maps showed eolian deposits in the northeastern portion of the Project. Eolian sand was not observed in the north and northeastern portion of the Project.

As stated in Section 3.3, USGS and CGS maps showed eolian deposits in the northeastern portion of the Project. Eolian sands are dune sand deposits which typically have a grain sizes in the fine to very fine sand range, with minimal fines. Sieve analyses of the sands encountered in the referenced area reported fines contents (% passing a #200 sieve) ranging from approximately 21 to 38 percent, which is outside the range that would be anticipated in an eolian sand. Therefore, eolian sand was not observed in the north and northeastern portion of the Site.

- alluvial deposits: Alluvial deposits generally underlie artificial fill and are white-tan to brown, moist, medium dense to very dense, fine to coarse sand and silty fine sand. Brown to orange-brown, firm to hard, sandy silt, silt and clay were also observed. Alluvial deposits were observed at depths that ranged from approximately 2.5 to 61.5 feet. SPT N-values typically ranged from 12 to 48 blows/foot.
- weathered granitic rock: Weathered granitic rock generally underlies the artificial fill and was white-gray to white-pink with some brown, dense to very dense, fine to coarse sand with some fine to coarse gravel. Weathered granitic rock was observed at depths that ranged from approximately 3 to 61.5 feet.

5.1 Groundwater Measurements

On October 4, 2016, field personnel measured the depth to groundwater at two on-site wells, identified as Monitoring Well and off-site well number MW-3. The locations of the wells are shown in Figure 2. The groundwater elevation at the Monitoring Well was approximately 818 feet amsl (approximate depth of 134 feet) and at well MW-3 the elevation was approximately 806 feet amsl (approximate depth of 84 feet). The elevations were recorded using a water level meter, the wells were not bailed prior to collecting measurements. Groundwater elevations may vary with time and season.

5.2 Percolation Testing

Based on the results of the percolation test, the calculated infiltration rate for each test is listed below.

Boring ID	Test Depth (feet)	Soil Type	Infiltration Rate (inches/hour)
LB-4	35-40	SM-SW	14.4
LB-9	25-30	CL-SW	0.8

Percolation test results are attached in Appendix C.

5.3 Geophysical Evaluation/Results

Based on the geophysical evaluation, high resistivity was detected along transect Lines 1RS, 2RS and 3RS. High values of resistivity can be an indication of a void space, such as below grade chambers, because essentially there is no path for the electrical current to travel across the void space. Therefore, electrical resistivity within a void space is very high (infinite) unless the void space is completely filled with water.

High values of electrical resistivity can also be an indication of an increase in grain size (e.g. coarse-grained materials such as gravel or cobbles have higher resistivity values than finer grained materials such as fine sands and silts). The station and depth at which high values of

resistivity were detected are listed below for each transect line along with an interpretation for each.

Transect Line	Station	Depth (Feet)	Interpretation
1RS	263 to 330	30 to 160	Based on the map titled "Air Flow Diagram Crestmore Mine" by Riverside Cement Company dated 10 January 1968, that shallowest mines were at an elevation of 440 feet amsl. The surface elevation along transect Line 1RS varies from 930 to 950. Therefore, the high value of resistivity is not believed to be associated with a below grade chamber. The high value of resistivity is possibly associated with debris such as concrete or a granitic intrusion.
	582 to 687	30	Based on the map titled "Air Flow Diagram Crestmore Mine" by Riverside Cement Company dated 10 January 1968, that shallowest mines were at an elevation of 440 feet amsl. The surface elevation along transect Line 1RS varies from 930 to 950. Therefore, the high value of resistivity is not believed to be associated with a below grade chamber. The high value of resistivity is possibly associated with debris such as concrete or a granitic intrusion.
2RS	40 to 70	10	As shown in Figure 2, an adit is located north of transect Line 2RS and the below grade chamber extends in a south west direction. The high value of resistivity is believed to have indicated the position of the below grade chamber.
	160 to 200	15 to 80	Based on field observations, the high value of resistivity is believed to have indicated the position of manholes and associated pipes.
	200 to 300	40	Based on field observations, the high value of resistivity is believed to have indicated the position of manholes and associated pipes.
3RS	65 to 167	5	Based on field observations, the high value of resistivity is believed to have indicated the position of manholes and associated pipes.
	234 to 334	66	Based on field observations, the high value of resistivity is believed to have indicated the position of manholes and associated pipes.
	372 to 390	30	Based on field observations, the high value of resistivity is believed to have indicated the position of manholes and associated pipes.
	401 to 460	20	Based on field observations, the high value of resistivity is believed to have indicated the position of manholes and associated pipes.

The results of the seismic refraction investigation are summarized in the table below.

Transect Line	Layer	Approximate Depth (Feet)	P-Wave Velocity (feet/second)
1RF	1	0 to 45	1,400
	2	20 to 100	2,400
	3	Greater than 90	4,150
2RF	1	0 to 130	1,100 to 1,700
	2	Greater than 50	4,200
		Greater than 130	11,000

The geophysical investigation report is attached in Appendix E.

6. GEOTECHNICAL EVALUATION

Below is our evaluation of the following geotechnical issues:

- Seismic evaluation,
- Collapsible soils,
- Expansive soils and,
- Historic below grade chambers.

6.1 Seismic Evaluation

We understand the project's seismic structural design will be in accordance with the 2016 CBC and ASCE 7-10. The following seismic parameters are based on the 2016 CBC and ASCE 7-10. Based on the available subsurface information, and in accordance with the seismic provisions of these codes, the following parameters are recommended for preliminary seismic design:

- Mapped Spectral Accelerations S_s and S_1 of 1.500g and 0.608g, respectively.
- Site Class D
- Site Coefficients F_A and F_V of 1.0 and 1.5, respectively.
- Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters at short periods, S_{MS}, and at one-second period, S_{M1}, of 1.500g and 0.912g, respectively.
- Design Earthquake (DE) spectral response acceleration parameters at short period, S_{DS}, and at one-second period, S_{D1}, of 1.000g and 0.608g, respectively.
- MCE_R Geometric Mean Peak Ground Acceleration PGA_M of 0.561g.

Using the deaggregation of the probabilistic seismic hazard spectrum from the USGS 2008 Hazard Maps, the mean and modal earthquakes for the 2 percent probability of exceedance in 50 year event are 7.10M and 7.80M, respectively.

Based on the subsurface investigation results, the depth to groundwater was measured to be greater than 50 feet below the proposed building foundation elevations and therefore the potential for liquefaction is considered low.

An analysis was performed for dry seismic settlement at Boring LB-6 due to the thickness of loose sands. The analysis was based on the measured ground water depth of 137 feet. SPT N-values based on automatic hammers were corrected for theoretical hammer efficiency, fines contents and overburden pressure for this evaluation. A peak horizontal ground acceleration

(PGA) and maximum magnitude of 0.561g and 7.1, respectively were used in our analysis. Based on this evaluation, settlement of 0.35 inch is anticipated under seismic loading.

6.2 Collapsible Soil Evaluation

Potentially collapsible soils were encountered during drilling and samples were collected using a driven split-barrel California sampler. Collected samples may have higher values of collapse potential due to being disturbed with a driven sampler. Select samples were sent to a laboratory for measurement of collapse potential in accordance with ASTM D5333.

Based on the laboratory results, the collapse potential varies between 0.2 to 1.5 percent within the upper 20 feet and less than 0.5 percent for samples collected at greater depths. Samples that had a collapse potential greater than 1 percent were located in LB-4 and LB-8, approximately in the center of the proposed Project at depths of approximately 5 to 6½ feet and 15 to 16½ feet, respectively. Remedial grading should be performed as described in Section 9.0 to reduce the potential for settlement from collapsible soils. Remedial grading is anticipated to minimize settlement to approximately 0.8 inches in LB-8, assuming remedial grading of the upper 5 feet of alluvial deposits.

6.3 Expansive Soil Evaluation

Based on the field investigation, cohesive soil was not encountered within the upper 15 feet of borings. Cohesive soil was encountered in boring LB-5 at a depth of 15 to 16.5 feet and based on laboratory results, the material has a medium expansive potential. Boring LB-5 is within the proposed footprint of Building 1 however the proposed building pad elevation is approximately 14 feet higher than the potentially expansive soil and therefore has a low potential to affect building foundations. Although not encountered in the preliminary investigation, expansive soils are often found at sites underlain by alluvial soils; also, grading operations could result potentially expansive soils beneath the building pads. Further testing and evaluation should be performed during final design and following rough grading.

Boring	Depth (Feet)	Expansion Index	Sample Elevation (Feet)	Proposed Pad Elevation of Building 1 (Feet)
LB-5	15 to 16.5	79	928	942

6.4 Historic Below Grade Chambers

As stated in Section 2.1, the lateral extent of mining is shown to extend beneath the proposed footprint of Building 1. The mines were excavated in limestone rock with the shallowest at an elevation of 440 feet amsl and the deepest at an elevation of 60 feet below sea level. Further evaluation of the below grade chambers with respect to the proposed developed is planned for a separate study.

7. PRELIMINARY FOUNDATION RECOMMENDATIONS

From a geotechnical point of view, the Project is considered feasible provided the development is designed and constructed in accordance with the recommendations presented herein.

In general, any existing artificial fill, and the upper 5 feet of alluvial soils are considered unsuitable in their present state for support of the proposed structures and other improvements. Based on the preliminary boring and test pit observations and the conceptual grading plan, artificial fill could extend up to 15 feet below existing grade in portions of the Site.

These soils should be overexcavated and the proposed structures could be supported on shallow foundations bearing on compacted engineered fill. Overexcavated soil may be reused in the compacted engineered fill. As an alternative to overexcavation, alternative ground improvement methods, such as Rapid Impact Compaction, geopiers, or other methods could be evaluated.

7.1 Shallow Foundations

Provided grading is performed as recommended herein, a bearing value of 2,500 pounds per square foot (psf) may be used for continuous and isolated footings founded at a minimum depth of 24 inches below the lowest adjacent grade and having a minimum width of 12 inches and 24 inches, respectively. The bearing value may be increased by 250 psf and 500 psf for each additional foot in width and depth, respectively, up to a maximum value of 4,000 psf. Recommended allowable bearing values include both dead and live loads, and may be increased by one-third for wind and seismic forces.

Footing settlement of less than 1 inch and differential settlements of less than ½-inch over 50 feet is anticipated with foundations bearing on controlled compacted fill soil as described above. Based on Section 6.2, an estimated 1.3 percent collapse strain was calculated if 5 feet of alluvial deposits, within LB-8, became saturated with an estimated potential hydrocollapse of less than 1 inch. Seismic induced settlements are anticipated to be less than 1 inch.

Footing excavations should be performed using a backhoe bucket fitted with a smooth steel plate welded across the bucket teeth to minimize disturbance during excavation and to provide a smooth bearing surface.

The footing subgrades should be firm and unyielding inspected and approved by a qualified geotechnical engineer prior to steel placement or concrete placement.

Foundations should be constructed as soon as possible following subgrade approval. The contractor shall be responsible for maintaining the subgrade in its as approved condition (i.e. free of water, debris, etc.) until the footing is constructed.

Foundations bearing on appropriately prepared engineered fills can be designed to resist lateral sliding using a coefficient of friction equal, to 0.39. If the sliding resistance calculated using the above coefficient of friction is deemed insufficient, shear keys can be provided in the bearing material to provide supplemental sliding resistance. Should additional lateral resistance be required, we should be notified so we can perform additional analyses and develop supplemental recommendations to resist the intended loads.

7.2 Corrosion

Samples for corrosion testing were collected from the upper 5 feet of soil borings. Corrosion test results are listed and summarized below:

Sample ID	Resistivity (ohm-cm)		pH		Soluble Sulfate (ppm)	Chloride Content (ppm)	
LB-1/B-1	11,000	Mildly	7.9	Basic	165	54	Low
LB-2/B-1	6,000	Moderately	6.9	Acidic	103	148	Low
LB-6/B-1	1,500	Corrosive	7.9	Basic	239	116	Low
LB-8/B-1	4,000	Moderately	7.3	Basic	91	104	Low
ALB-10/B-1	2,000	Corrosive	9.8	Basic	128	1,534	High

Based on the laboratory results, soluble sulfate concentration in soil is considered negligible and therefore concrete anticipated to be exposed to soil should be designed for negligible corrosive conditions according to the guidelines presented in the 2015 edition of American Concrete Institute Reinforced Concrete Design Manual (ACI 2015).

The upper 5 feet of soil has a high to low resistivity therefore ferrous metals anticipated to be exposed to soil should be designed for mildly to corrosive conditions. In general, results show that pH and chloride concentrations in the upper 5 feet are generally not corrosive except at ALB-10 where the pH is equal to 9.8 and chloride concentration exceeds 500 ppm and is therefore corrosive to steel (CalTrans 2015). A corrosion engineer should be consulted to review the test results, provide concrete corrosion protection recommendations or alternative piping material and confirm the suitability of on-site soils as compacted artificial fill for metallic subsurface utilities.

The upper 5 feet of soil near ALB-10 should not be used as fill within the upper 5 feet of the proposed building footprint to avoid corrosive soils affecting foundations and other structures.

8. ADDITIONAL STUDIES

Additional studies are recommended to confirm the following:

- Subsidence from below grade chambers and
- A final geotechnical study to confirm geotechnical recommendations.

9. CONSTRUCTION RECOMMENDATIONS

Prior to the commencement of mass excavation and grading, a meeting should be held at the Project with the owner, city inspector, excavation/grading contractor, civil engineer, and geotechnical consultant to discuss the work schedule and geotechnical aspects of the grading.

All vegetation and deleterious materials should be disposed of off-site prior to initiation of grading operations.

Soil overexcavation should extend laterally a distance equal to the depth of removal but no less than 5 feet beyond the limits of the structures. In addition, within building limits, existing soil should be removed and replaced as engineered fill (overexcavated) to a depth of at least 5 feet below bottom of the building foundations, to the bottom of artificial fill, or 5 feet below existing grade whichever is the greater depth. Beyond building limits, existing soil should be removed and replaced as engineered fill (overexcavated) to a depth of at least 2 feet below proposed grade. The actual depths of removal should be evaluated in the field by a representative of the geotechnical consultant based on actual conditions exposed during grading.

All surficial units consisting of artificial fill, upper 5 feet of alluvial soils, soil with roots and loose surficial soil are considered unsuitable for support of the proposed fills and improvements following removal of vegetation and deleterious materials. These materials should be over-excavated to expose competent soil. Environmentally unsuitable soils encountered during the excavation process should be properly disposed of off-site in accordance with all state and local regulations. Over-excavated soils, free of deleterious and environmentally unsuitable materials, may be reused as compacted fill. These surficial soil materials are anticipated to be relatively easy to excavate with conventional heavy earthmoving equipment. Most of these materials are below optimum moisture content and will require the addition of water to achieve proper compaction. On-site materials to be overexcavated are not anticipated to bulk and are anticipated to shrink approximately 10 percent.

All excavations should conform to the requirements of CAL/OSHA. Over-excavated materials, free of deleterious materials and approved by the geotechnical consultant, may be reused as compacted fill.

All over-excavation bottoms should be observed by the geotechnical consultant prior to fill placement. Prior to placement of fill material, the over-excavation bottom should be scarified to a depth of at least six inches, moisture conditioned to within 1 to 2 percent of optimum moisture content, and proof-rolled.

The geotechnical consultant should be provided with appropriate survey staking during grading to verify that depths and locations of recommended over-excavations have been achieved. Observations and detailed geologic mapping of over-excavations should be performed by the engineering geologist or geotechnical engineer to verify the anticipated conditions.

Any foundation remnants or construction debris associated with former structures or developments encountered within excavations should be fully removed, and any void spaces that may be created should be backfilled with approved compacted structural fill. Private sewage systems, if encountered during grading should be properly removed or abandoned in place in accordance with local codes. If sewages pits are abandoned in-place, they should be pumped clean, backfilled with gravel or clean sand and capped with a minimum of two feet of 2-sack slurry. The top of the slurry cap should be at 5 feet below proposed grade.

On-site excavated materials to be used as compacted fill should be placed in uniform lifts restricted to about 6 inches in thickness, moisture conditioned to near optimum moisture content, and then mechanically compacted. Compacted fill to be 50 feet thick or less should be compacted to at least 90 percent of maximum dry density as determined by ASTM Test Method D1557 (Modified Proctor compaction). Per the County of Riverside, Transportation and Land Management Agency compacted fill placed at depths greater than 50 feet thick should be compacted to at least 95 percent of maximum dry density as determined by ASTM Test Method D1557 (Modified Proctor compaction) and require a settlement monitoring program. Fill placement should be subject to controlled engineering inspection by the engineer. No fill material should be placed on areas where free water is standing or on surfaces which have not been approved by the engineer.

Fill slopes should be designed at a slope ratio of 2:1 (H:V) or flatter and be overbuilt and subsequently cut back to a compacted core. Fill slopes should be constructed with keyways, backcuts, and backdrains. Keyways should be a minimum of 15 feet wide for slopes up to 30 feet high and a minimum of ½ the slope height for slopes higher than 30 feet. Keyways should be tilted a minimum 2 percent towards the back of the keyway and embedded a minimum of 3 feet into competent material at the toe. Backcut benches should be excavated to expose competent material where fill is placed on slopes steeper than approximately 5:1 (horizontal:vertical).

If removals are limited by existing improvements or property lines, special grading techniques, such as slot cuttings or other acceptable design criteria may be required. Under such conditions, specific recommendations should be provided by the geotechnical consultant during review of final grading plan.

10. OWNER AND CONTRACTOR OBLIGATIONS

The Contractor is responsible for construction quality control, which includes satisfactorily constructing the foundation system and any associated temporary works to achieve the design

intent while not adversely impacting or causing loss of support to neighboring property, structures, utilities, roadways, etc. Construction activities that can alter the existing ground conditions such as excavation, fill placement, foundation construction, ground improvement, pile driving/drilling, dewatering, etc. can also induce stresses, vibrations, and movements in nearby structures and utilities, and disturb occupants. Contractors are solely responsible to ensure that their activities will not adversely affect the structures and utilities, and will not disturb occupants. Contractors must also take all necessary measures to protect the existing structures, utilities, etc. during construction.

11. LIMITATIONS

The conclusions and recommendations provided in this report result from our interpretation of the geotechnical conditions existing at the Site inferred from a limited number of borings, trenches, as well as architectural, and historical information provided by others. Actual subsurface conditions may vary. Recommendations provided are dependent upon one another and no recommendation should be followed independent of the others.

Any proposed changes in structures or their locations should be brought to Langan's attention as soon as possible so that we can determine whether such changes affect our recommendations. Information on subsurface strata shown on the logs and groundwater levels measured represent conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to Langan's attention for evaluation, as they may affect our recommendations.

This report has been prepared to assist the Owner, architect, and structural engineer in the design process and is only applicable to the design of the specific project identified. The information in this report cannot be utilized or depended on by engineers or contractors who are involved in evaluations or designs of facilities (including underpinning, grouting, stabilization, etc.) on adjacent properties which are beyond the limits of that which is the specific subject of this report.

Environmental issues (such as permitting or potentially contaminated soil and groundwater) are outside the scope of this study and should be addressed in a separate evaluation.

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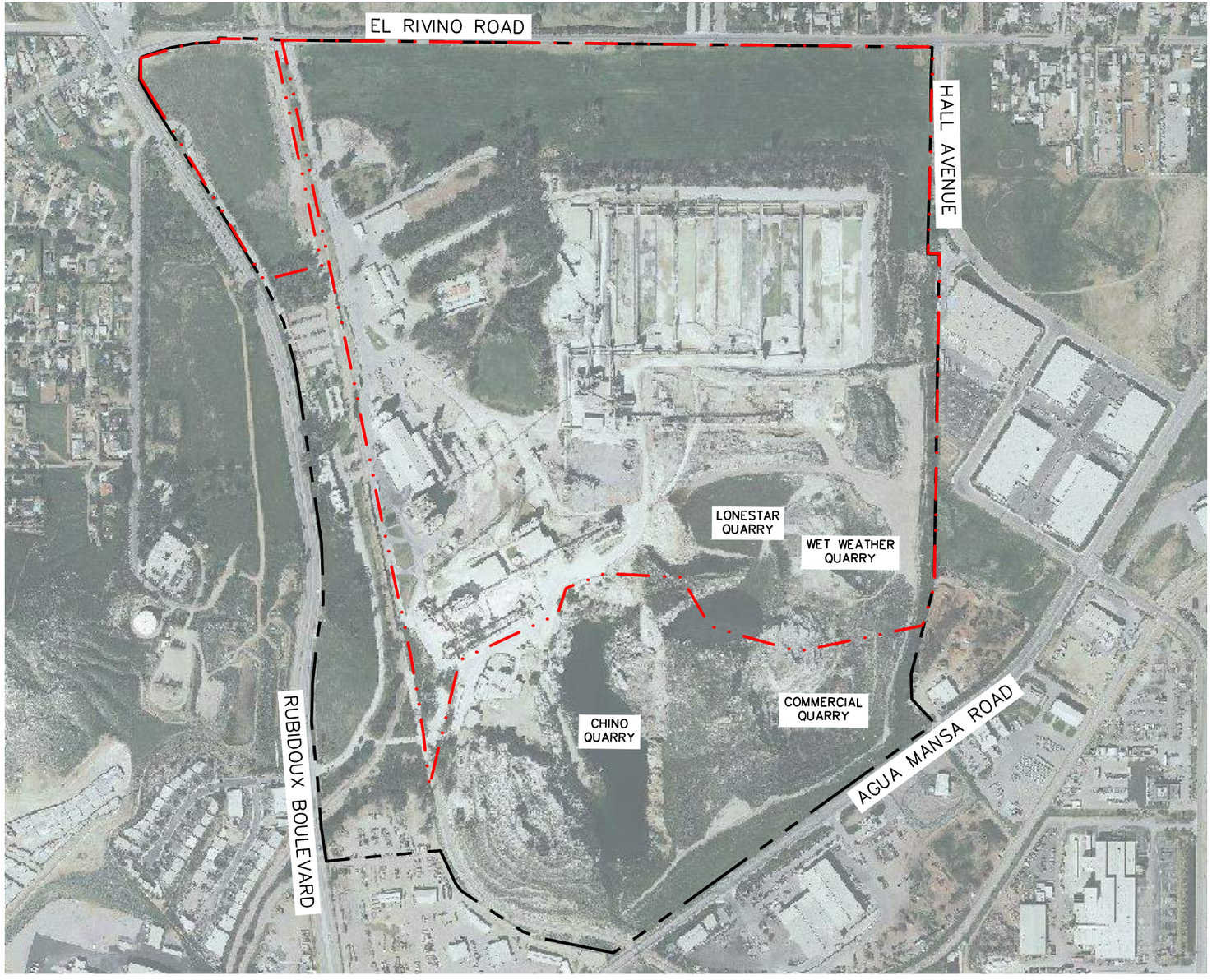
FIGURES



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NOTES:

1. BACKGROUND IMAGE REFERENCED FROM AERIAL DATADOORS DESKTOP ON 28 APRIL 2016.
2. APPROXIMATE SITE AND PROJECT LIMITS REFERENCED FROM PLAN TITLED "CRESTMORE REDEVELOPMENT, JURUPA VALLEY, CA – PRELIMINARY SITE PLAN – SCHEME A.01," PREPARED BY RGA OFFICE OF ARCHITECTURAL DESIGN, DATED 11 MAY 2016.

LEGEND:

APPROXIMATE LIMITS OF PROPOSED PROJECT

APPROXIMATE LIMITS OF SITE

600 0 300 600

SCALE IN FEET

LANGAN
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Langan Engineering & Environmental Services, Inc.

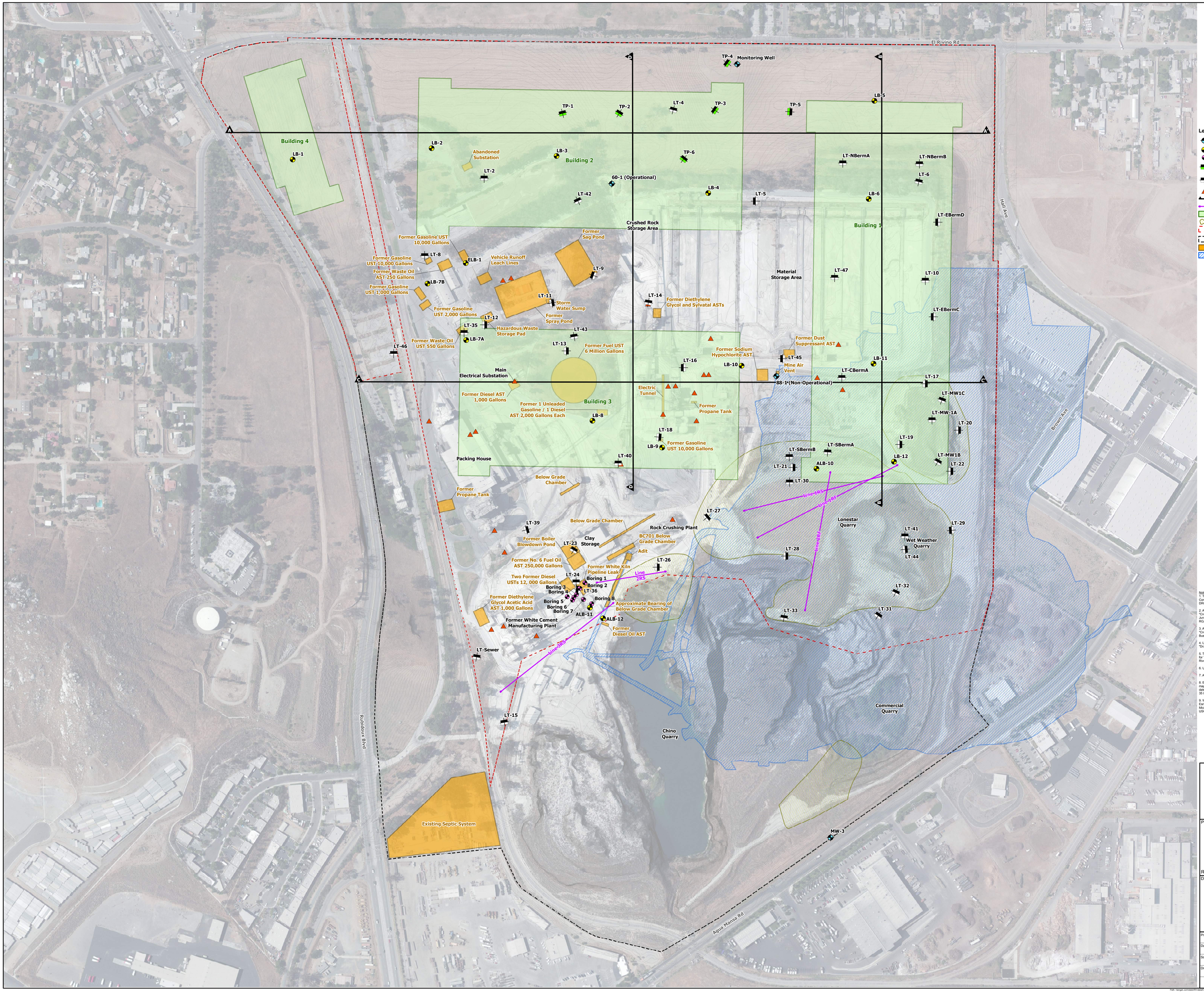
Project
AGUA MANSA COMMERCE PARK
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Figure Title
SITE LOCATION MAP

Project No. 700045403
Date 28 APRIL 2017
Scale 1" = 600'
Drawn By djh

Figure No. 1

Filename: \\langan.com\data\IRV\data4\700045401\Cadd Data - 700045401\2D-DesignFiles\Geotech\ARCHIVE\2016-10-26 ALL FILES\Site Location Map.dwg Date: 4/26/2017 Time: 13:22 User: jbaron Style Table: Langan.stb Layout: Site Location Map



Legend

- Monitoring Well (MW-3)
- Approximate Boring Locations (LB-1 and ALB-10)
- Approximate Previous Boring Locations by Ryan Murphy
- Approximate Trench Location (2017)
- Approximate Trench Locations (2016)
- Approximate Transformer Locations
- Cross Section
- Approximate Geophysical Line Locations
- Proposed Building Footprint
- Approximate Limits of Possible CKD Landfill Areas
- Approximate Limits of Proposed Project
- Approximate Limits of Former Riverside Cement Manufacturing Plant
- Approximate Location of Environmental Locations
- Approximate Extent of Crestmore Mines

Notes:

1. Topographic contours referenced from plan titled "Encumbrance Map, Vacant Commercial Property, Jurupa Valley, California, Topographic Information by DRC Engineering, Inc., Dated 2 March 2016.

2. Approximate project, site limits, and building limits referenced from plan titled "Crestmore Redevelopment, Jurupa Valley, CA - Preliminary Site Plan - Scheme A.01," Prepared by RGA Office of Architectural Design, Dated 11 May 2016.

3. Approximate limits of areas are referenced from "Crestmore Plant, Hazardous Material Business Plan (HMBP)" by Riverside TXI Cement, Dated 2009.

4. Limits of Cement Kiln Dust (CKD) Disposal Areas area referenced from "Draft Technical Memorandum No.1" by Sector, Dated 25 January 2001.

5. Transformer locations referenced from "Figure 2 - Site Map, for TXI Riverside Cement Crestmore Plant, 1500 Rubidoux Boulevard, Riverside, California 92509" by Stantec, Dated 26 July 2013.

6. Underground Storage Tank (UST)

7. Above Ground Storage Tank (AST)

8. Extent of below grade chambers referenced from maps Riverside Cement Company, Crestmore Mine Plan, dated 25 November 1968 and Riverside Cement Company, 35 Level, dated 17 January 1972.

9. World aerial imagery basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online. Source of aerial imagery is Microsoft from 2011. Credits: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community.

0 140 280

SCALE IN FEET

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Collectively known as Langan

Project

AGUA MANSA COMMERCE PARK

JURUPA VALLEY

RIVERSIDE COUNTY CALIFORNIA

Drawing Title

BORING AND TRENCH LOCATION PLAN

Project No. 700045407	Figure No. 2
Date 28 APRIL 2017	
Scale 1"= 140'	
Drawn By BJS	

Path: I:\langan.com\data\IRV\data\700\045\407\Arch\GIS\ArcMap_Documents\Geotech_Figures\Boring_Trench_Location_Plan_20170412_grading.mxd

600 0 300 600

SCALE IN FEET

LEGEND:

- APPROXIMATE LIMITS OF SITE
- APPROXIMATE LIMITS OF PROPOSED PROJECT
- APPROXIMATE GEOLOGIC CONTACT
- APPROXIMATE LOCATION OF REPORTED FAULT (DOTTED WHERE BURIED) (ERM-WEST, 1991)
- APPROXIMATE LOCATION OF REPORTED FAULT (DALY, 1931)
- D — D' CROSS SECTION

GEOLOGIC UNITS:

Qaf	ARTIFICIAL FILL
Qyfl	YOUNG ALLUVIAL-FAN DEPOSITS OF LYTLE CREEK
Qof1	OLD ALLUVIAL-FAN DEPOSITS, UNIT 1
Kt	TONALITE
Psm	MARBLE
KtPzs	INTERMIXED HETEROGENOUS TONALITE AND SCHIST
KtPzms	INTERMIXED TONALITE, MARBLE AND SCHIST

NOTES:

1. BACKGROUND IMAGE OBTAINED FROM "ENCUMBRANCE MAP, VACANT COMMERCIAL PROPERTY, JURUPA VALLEY, CALIFORNIA, TOPOGRAPHIC INFORMATION", PROVIDED BY DRC ENGINEERING, INC., DATED 2 MARCH 2016.
2. GEOLOGIC UNITS REFERENCED FROM "UNITED STATES GEOLOGIC SURVEY (1999), PRELIMINARY GEOLOGIC MAP OF THE FONTANA 7.5' QUADRANGLE, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA, VERSION 1.0, OPEN-FIELD REPORT 03-418" AND INTERPRETED FROM LANGAN'S OBSERVATIONS OF GEOTECHNICAL BORINGS AND TEST PITS PERFORMED IN SEPTEMBER 2016 AND APRIL 2017.
3. FAULT LOCATION REFERENCED FROM REPORT "ERM-WEST, INC., TECHNICAL EVALUATION 9/30/90 EPA FIT REPORT, RIVERSIDE CEMENT COMPANY, CRESTMORE PLANT", by ERM-WEST, INC., DATED NOVEMBER 1991.
4. FAULT LOCATION REFERENCED FROM REPORT "THE GEOLOGY AND MINERALOGY OF THE LIMESTONE DEPOSITS AT CRESTMORE, RIVERSIDE COUNTY, CALIFORNIA," THESIS BY JOHN W. DALY DATED 1931.

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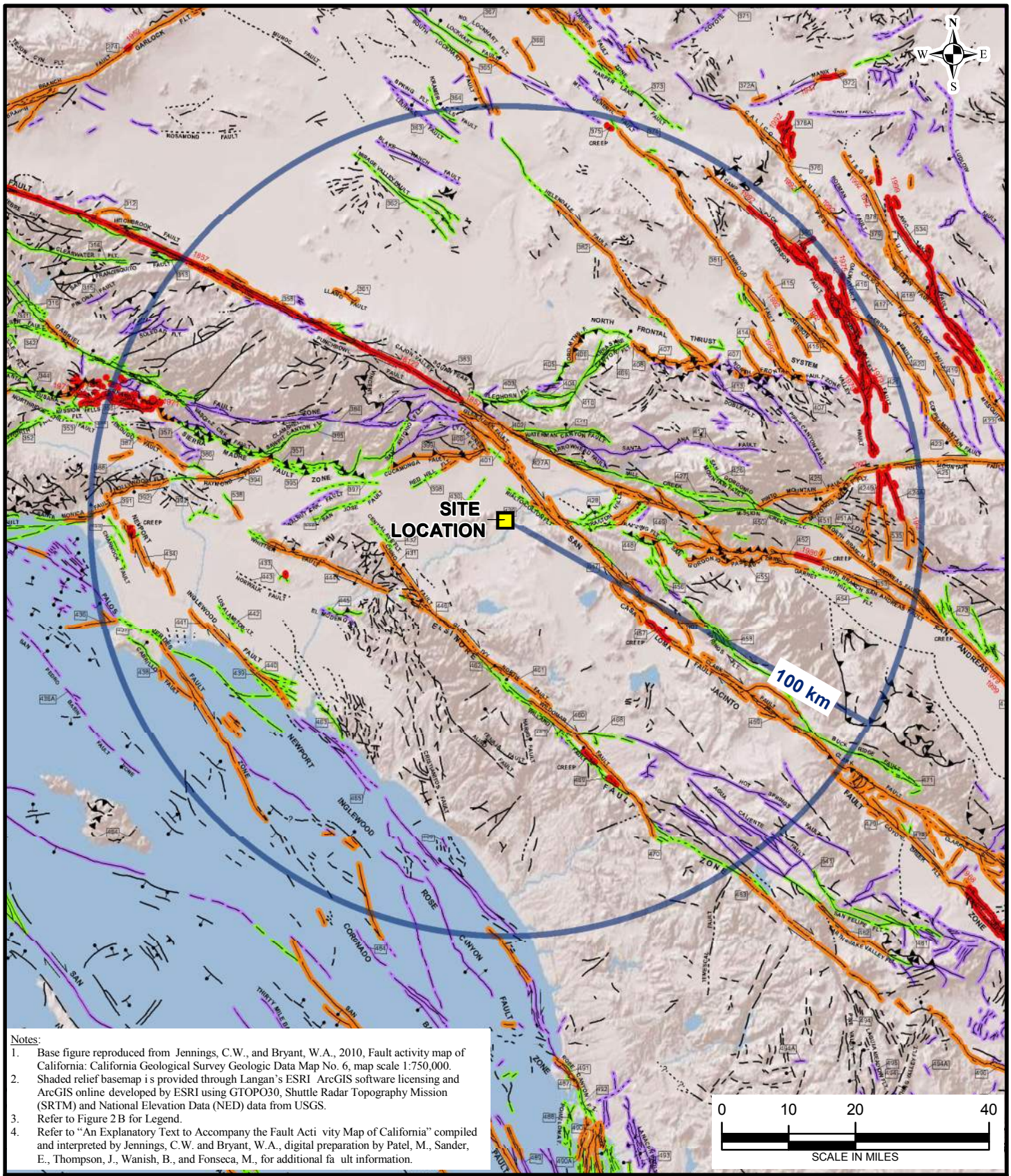
RIVERSIDE COUNTY CALIFORNIA

Figure Title: GEOLOGIC MAP

Project No. 700045407
Date 28 APRIL 2017
Scale 1" = 600'
Drawn By SS

Figure No. 3

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\SheetFiles\Figures\FG03-700045403-BI003-0101.dwg Date: 4/26/2017 Time: 13:20 User: jbaron Style Table: Langan.stb Layout: FIG 8 - GEOLO



Notes:

1. Base figure reproduced from Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California: California Geological Survey Geologic Data Map No. 6, map scale 1:750,000.
2. Shaded relief basemap i s provided through Langan's ESRI ArcGIS software licensing and ArcGIS online developed by ESRI using GTOPO30, Shuttle Radar Topography Mission (SRTM) and National Elevation Data (NED) data from USGS.
3. Refer to Figure 2 B for Legend.
4. Refer to "An Explanatory Text to Accompany the Fault Acti vity Map of California" compiled and interpreted by Jennings, C.W. and Bryant, W.A., digital preparation by Patel, M., Sander, E., Thompson, J., Wanish, B., and Fonseca, M., for additional fa ult information.

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Figure Title
CGS FAULT ACTIVITY MAP OF CALIFORNIA LEGEND

Project No.	700045403
Date	28 APRIL 2017
Scale	1 inch = 20 miles
Drawn By	BJS

Figure
4A

Path: \\langan.com\data\IRV\data4\700045401\ArcGIS\ArcMap_Documents\Fault_Map\CGS_Fault_Map.mxd Date: 10/21/2016 User: bsaylor Time: 12:09:46 AM

LEGEND:

Site Location

Fault Age

The age classifications are based on geologic evidence to determine the youngest faulted unit and the oldest unfaulted unit along each fault of fault seciton

- Historic
- Holocene
- Late Quaternary
- Quaternary
- 100 km

Pre Quaternary Faults

- fault, certain
- fault, approx. located
- fault, concealed
- thrust fault, certain
- thrust fault, approx. located
- thrust fault, approx. located, queried
- fault, certain, barball
- fault, concealed, barball
- fault, approx. located, barball

Quaternary Faults

- fault, certain
- fault, approx. located
- fault, approx. located, queried
- fault, inferred, queried
- fault, concealed
- fault, concealed, queried
- thrust fault, certain
- thrust fault, approx. located
- thrust fault, concealed
- dextral fault, certain
- dextral fault, approx. located
- dextral fault, concealed
- sinistral fault, certain
- sinistral fault, approx. located
- sinistral fault, concealed
- thrust fault, certain (2)
- thrust fault, approx. located (2)
- thrust fault, concealed (2)
- fault, solid, barball
- fault, dashed, barball
- fault, dotted, barball
- dextral fault, solid, barball
- fault, dotted, queried, ballbar
- fault, dotted, queried, ballbar (2)
- fault, solid, dip
- fault, dashed, dip
- fault, dotted, dip
- reverse fault, solid
- reverse fault, dashed
- reverse fault, dotted

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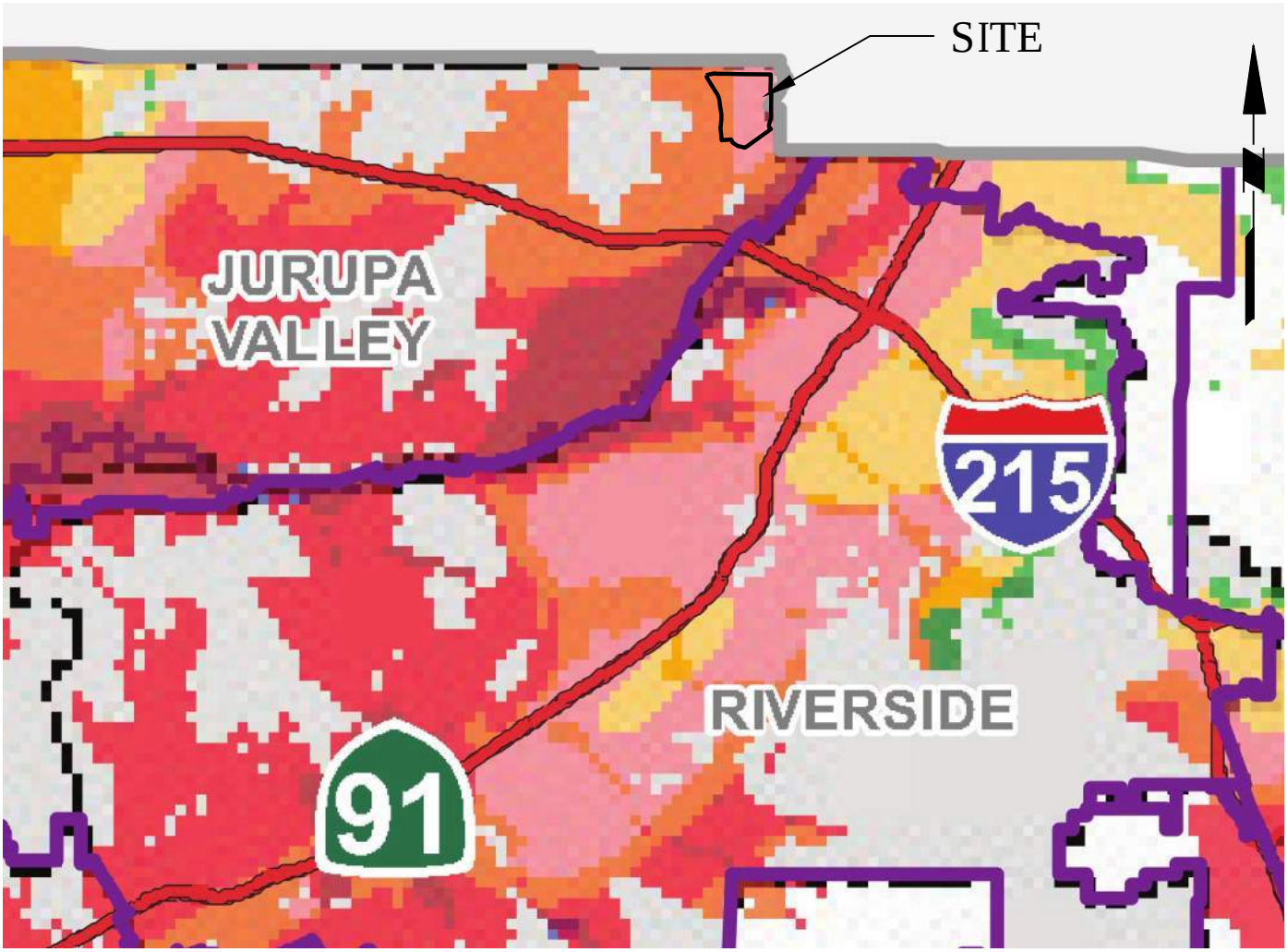
Figure Title: CGS FAULT ACTIVITY MAP OF CALIFORNIA LEGEND

Project No.: 700045403
Date: 28 APRIL 2017
Scale: NOT TO SCALE
Drawn By: BJS

Figure: 4B

Path: \\langan.com\data\IRV\data4\700045401\ArcGIS\ArcMap_Documents\Fault_Map\CGS Fault Map Legend.mxd Date: 10/21/2016 User: bsaylor Time: 12:09:48 AM



NOTES:

1. BACKGROUND REFERENCED FROM "COUNTY OF RIVERSIDE GENERAL PLAN, SAFETY ELEMENT, GENERALIZED LIQUEFACTION – FIGURE S-3", DATED ON 8 DECEMBER 2015.

LEGEND:

Liquefaction Susceptibility

Shallow Groundwater Susceptible Sediments	Deep Groundwater Susceptible Sediments	No Groundwater Data Susceptible Sediments
Very High	Moderate	Moderate
High	Low	Low
Moderate	Very Low	Very Low
Low		
Very Low		

- Highways
- Area Plan Boundary
- City Boundary
- Waterbodies

California Geological Survey Seismic Hazard Zones

- Murrieta Quad

(See detail in Elsinore, Southwest, Sun City / Menifee Valley Area Plans)

2 0 1 2

SCALE IN MILES

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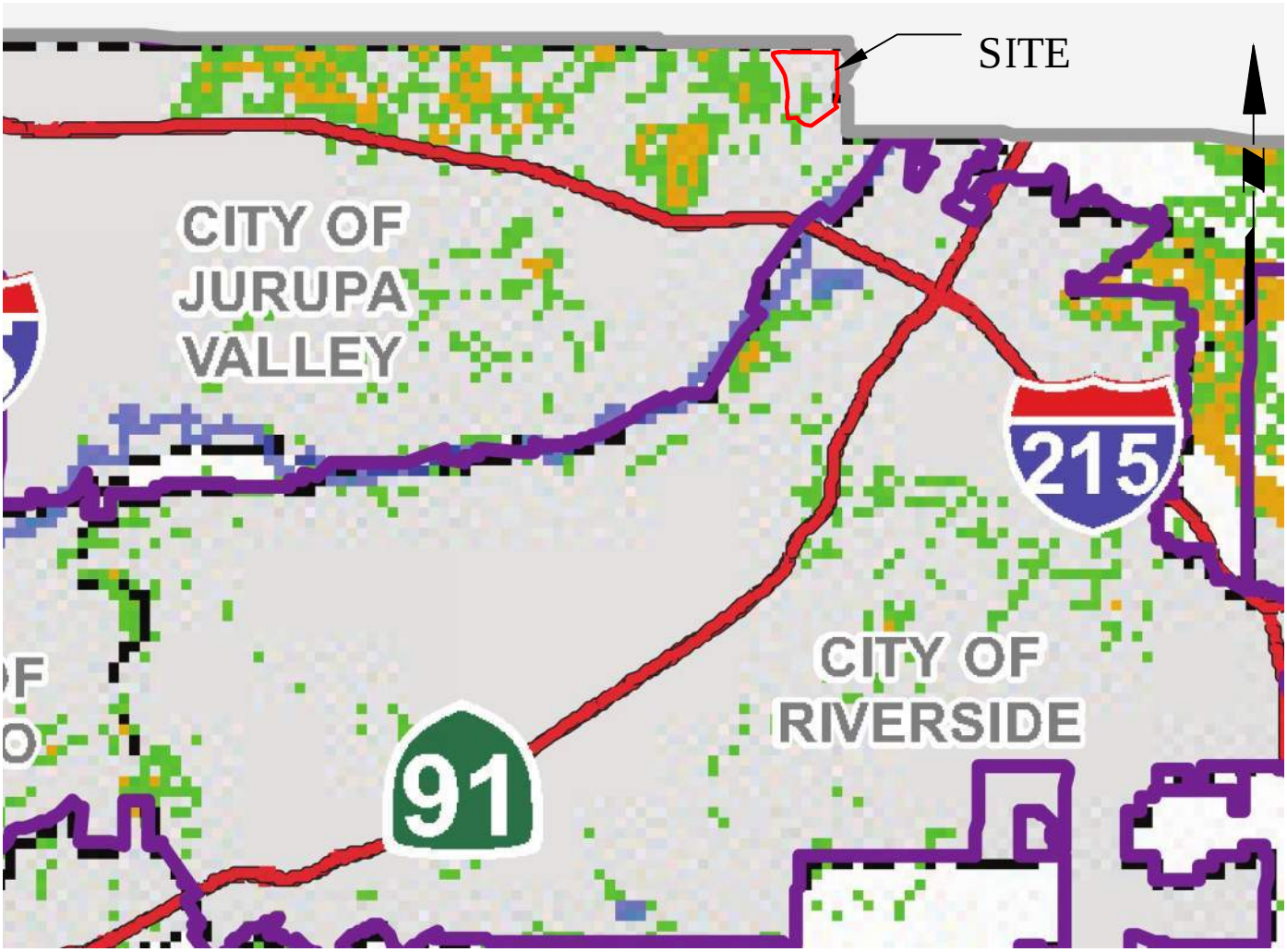
Figure Title
GENERALIZED LIQUEFACTION MAP

Project No.	Figure No.
700045403	5
Date: 28 APRIL 2017	
Scale: 1" = 2 MILES	
Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Liquefaction.dwg



NOTES:

1. BACKGROUND REFERENCED FROM "COUNTY OF RIVERSIDE GENERAL PLAN, SAFETY ELEMENT, FIGURE S-4 – EARTHQUAKE-INDUCED SLOPE INSTABILITY MAP", DATED ON 8 DECEMBER 2015.

LEGEND:

Slope Instability

- Existing Landslides
- High susceptibility to seismically induced landslides and rockfalls.
- Low to locally moderate susceptibility to seismically induced landslides and rockfalls.
- Highways
- Area Plan Boundary
- City Boundary
- Waterbodies

California Geological Survey
Seismic Hazard Zones
- Murrieta Quad
  (See detail in Elsinore, Southwest, Sun City / Menifee Valley Area Plans)

2 0 1 2
SCALE IN MILES

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Figure Title
EARTHQUAKE INDUCED LANDSLIDE MAP

Project No.	Figure No.
700045403	6
Date: 28 APRIL 2017	
Scale: 1" = 2 MILES	
Drawn By: DJJ	

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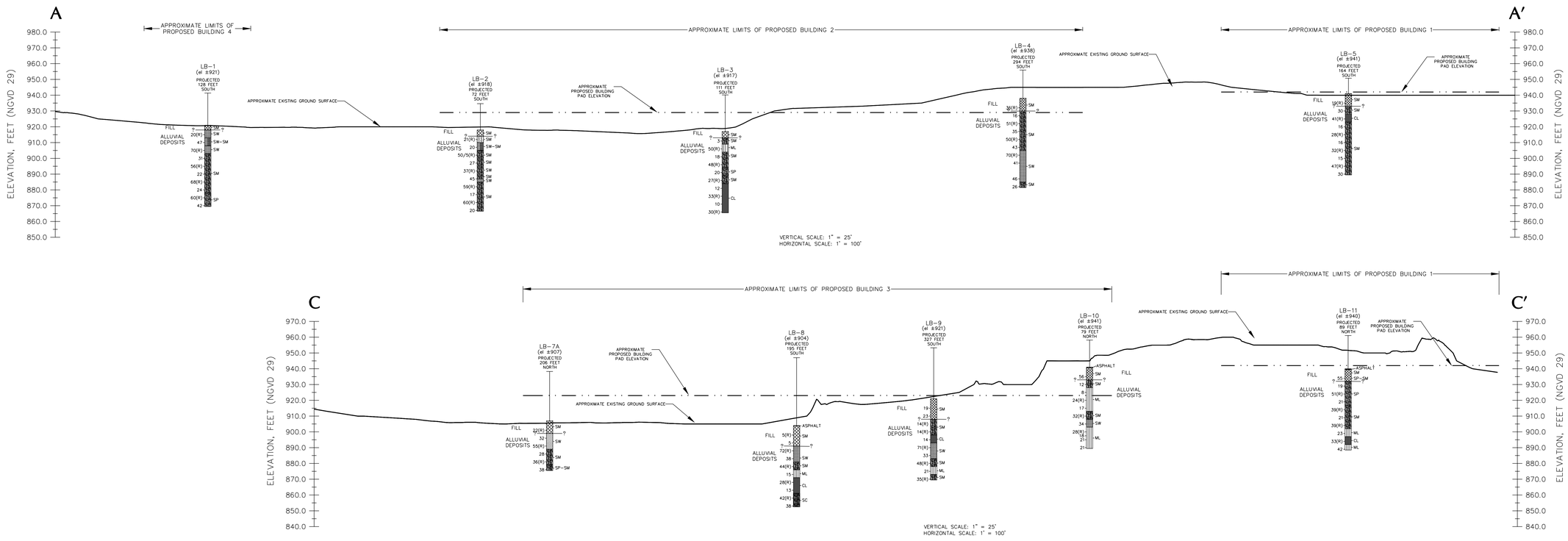

LEGEND:

LB-1 (el±940)	LB-1	BORING IDENTIFICATION
	(el±940)	INFERRED GROUND SURFACE ELEVATION (FEET) AT TIME OF BORING
N	N	STANDARD PENETRATION RESISTANCE; NUMBER OF BLOWS OF A 140 LB AUTOMATIC HAMMER FREE FALLING 30 INCHES TO DRIVE A 2-INCH-O.D. SPLIT SPOON SAMPLER 12 INCHES AFTER 6 INCHES OF INITIAL PENETRATION.
N(R)	N(R)	NUMBER OF BLOWS A 140 LB AUTOMATIC HAMMER FREE FALLING 30 INCHES TO DRIVE A 3-INCH-O.D. CALIFORNIA MODIFIED SAMPLER 12 INCHES AFTER 6 INCHES OF INITIAL PENETRATION.

KEY TO SYMBOLS:

FILL; WELL-GRADED SAND (SW); WELL-GRADED SAND WITH SILT (SW-SM); SILTY SAND (SM); POORLY-GRADED SAND (SP); POORLY-GRADED SAND WITH SILT (SP-SM); LOW PLASTICITY CLAY (CL); SILT (ML); ASPHALT

NOTES:

1. THE FIGURE SHOWS GENERALIZED SUBSURFACE CONDITIONS AT THE RESPECTIVE BORINGS. VARIATIONS IN CONDITIONS SHOULD BE EXPECTED BETWEEN BORINGS. FOR A DETAILED DESCRIPTION OF CONDITIONS ENCOUNTERED SEE BORING LOGS.
2. LANGAN BORINGS LB-1 THROUGH LB-12 AND ALB-10 WERE PERFORMED BETWEEN 19 AND 26 SEPTEMBER 2016 UNDER FULL-TIME ENGINEERING OBSERVATION BY A LANGAN FIELD ENGINEER.
3. TOP OF BORING ELEVATIONS ARE APPROXIMATE AND BASED ON "ENCUMBRANCE MAP, VACANT COMMERCIAL PROPERTY, JURUPA VALLEY, CALIFORNIA, TOPOGRAPHIC INFORMATION", PROVIDED BY DRC ENGINEERING, INC, DATED 2 MARCH 2016.

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Project	AGUA MANSA COMMERCE PARK JURUPA VALLEY RIVERSIDE COUNTY CALIFORNIA
Figure Title	SUBSURFACE CROSS-SECTIONS
Project No.	700045403
Date	28 APRIL 2017
Scale	AS SHOWN
Drawn By	SS
Figure No.	7

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TABLES

TABLE 1

BORING NO.	SAMPLE NO.	SAMPLE DEPTH (FT)	SAMPLE TYPE	FIELD BLOW COUNT (BLOW/FT)	INDEX TESTS							STRENGTH						EXPANSION /COLLAPSE (%)[2]	REMARKS
					WATER CONTENT (%)	GRAIN SIZE			USCS SYMBOL[1]	MINUS NO. 200 SIEVE (%)	DRY UNIT WEIGHT (PCF)	LOADING SCHEDULE (KSF)	PERCENT REMOLDED (%)	DIRECT SHEAR (PEAK STRENGTH)		DIRECT SHEAR (ULTIMATE STRENGTH)			
						GRAVEL %	SAND %	FINES %						PEAK FRICTION ANGLE (φ)	PEAK COHESION (c)	ULTIMATE FRICTION ANGLE (φ)	ULTIMATE COHESION (c)		
LB-1	S-2	10	SPT	47						10									
LB-1	S-3	15	CR	70	1.5						121.6	1, 2, 4	Not Remolded	46	0	46	0		
LB-1	S-5	25	CR	56	6.5						126.8								
LB-1	S-7	35	CR	68	6.8						126.5								
LB-2	S-1	5	CR	21	3.8														
LB-2	S-2	10	SPT	20						8									
LB-2	S-3	15	CR	50/5"	1.3						118.5								
LB-2	S-4	20	SPT	27						16									
LB-2	S-5	25	CR	37	1.8						115.5								
LB-2	S-6	30	SPT	45		17	56	27	SM										
LB-3	S-1	5	SPT	3						18									
LB-3	S-2	10	CR	50	8.3						88.0								
LB-3	S-3	15	SPT	18						49									
LB-3	S-4	20	CR	48	17.1					66	110.3								
LB-3	S-8	30	CR	33	26.4						98.4								
LB-4	S-1	5	CR	36	2.5	0	65	35	SM		109.3							-1.2	
LB-4	S-2	10	SPT	16		0	65	35	SM										
LB-4	S-3	15	CR	51	2.9						105.3	1, 2, 4	Not Remolded	34	100	32	0	-0.2	
LB-4	S-5	25	CR	50	3.6						108.9								
LB-4	S-7	35	CR	70	0.6						99.9								
LB-5	S-1	5	CR	19	3.3						111.4							-0.9	
LB-5	S-3	15	CR	41	28.3					93	94.4	1, 2, 4	Not Remolded	28	300	27	0	7.9	
LB-5	S-5	25	CR	28	3.6						102.0							-0.2	
LB-5	S-7	35	CR	32	7.5						112.0								
LB-6	S-1	5	SPT	6						48									
LB-6	S-2	10	CR	21	2.3						117.1								
LB-6	S-4	20	CR	30	3.0						111.9	1, 2, 4	Not Remolded	33	0	33	0		
LB-6	S-5	25	CR	29						29								-0.3	
LB-6	S-7	35	CR	49	15.4						105.0								
LB-6	S-8	40	CR	36						70									
LB-7A	S-1	5	CR	22	4.3						117.5								
LB-7A	S-3	15	CR	55	1.1						120.0								
LB-7A	S-5	25	CR	36	4.7						110.8								
LB-7A	S-6	30	SPT	38		0	92	8	SP-SM										
LB-8	S-1	5	CR	5	16.4						100.8								
LB-8	S-3	15	CR	72	2.0						112.6	1, 2, 4	Not Remolded	36	400	36	0	-1.3	
LB-8	S-5	25	CR	44	1.9						111.1								
LB-8	S-6	30	SPT	15		0	19	81	ML										
LB-9	S-3	5	CR	14	2.8						103.5								
LB-9	S-4	15	CR	14	3.6						105.4	1, 2, 4	Not Remolded	32	100	32	0		
LB-9	S-9	45	SPT	21		9	11	80	ML										
LB-10	S-4	20	CR	24	8.9						110.5								
LB-10	S-8	40	CR	28	18.3					87	108.3								
LB-11	S-1	5	SPT	55		0	90	10	SP-SM										
LB-11	S-5	25	CR	39	2.4						101.5								
LB-11	S-7	35	CR	39	5.4						99.4								
LB-12	S-5	25	CR	40	2.8						104.4	1, 2, 4	Not Remolded	36	200	33	0		
ALB-10	S-3	15	CR	14	6.3					16	94.7								
ALB-10	S-7	35	CR	34	4.6						100.8								
TP-1	Sample B	1	Bulk			1	61	38	SM										
TP-3	Sample A	3	Bulk			0	79	21	SM										
TP-6	Sample A	5	Bulk			0	50	50	CL										

Notes:
1. USCS symbol is based on results from sieve analysis, atterberg limits or visual classificaiton.
2. Samples with expansion potential have positive values (+) and collapse potential have negative values (-).
3. Laboratory results are attached in Appendix F.

APPENDIX A
EQSearch and USGS Reported Earthquakes

```
*************************
*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
*************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 700045403

DATE: 01-09-2017

JOB NAME: Agua Mansa Commerce Park

EARTHQUAKE-CATALOG-FILE NAME: C:\Program Files (x86)\EQSEARCH\December 2016 Update\ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE: 5.00
   MAXIMUM MAGNITUDE: 9.00

SITE COORDINATES:
   SITE LATITUDE: 34.0302
   SITE LONGITUDE: 117.3850

SEARCH DATES:
           START DATE: 1800
           END DATE: 2016

SEARCH RADIUS:
           62.1 mi
           99.9 km

ATTENUATION RELATION: 14) Campbell & Bozorgnia (1997 Rev.) - Alluvium
   UNCERTAINTY (M=Median, S=Sigma): M   Number of Sigmas: 0.0
   ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND: 0 Depth Source: A
   Basement Depth: 5.00 km   Campbell SSR: 0   Campbell SHR: 0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 3.0

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.157	VIII	6.8(11.0)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.432	X	6.9(11.1)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.277	IX	8.0(12.9)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.102	VII	11.8(18.9)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.123	VII	13.9(22.4)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.051	VI	18.8(30.2)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.041	V	19.5(31.4)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.113	VII	19.7(31.8)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.076	VII	20.1(32.3)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.033	V	20.1(32.4)
GSG	33.9530	117.7610	07/29/2008	184215.7	14.0	5.30	0.037	V	22.2(35.7)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.065	VI	22.3(35.9)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.028	V	22.8(36.7)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.063	VI	22.8(36.7)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.028	V	22.8(36.7)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.040	V	24.0(38.6)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.068	VI	27.2(43.7)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.103	VII	27.9(44.9)
DMG	34.1800	116.9200	01/16/1930	02433.9	0.0	5.20	0.024	V	28.5(45.9)
DMG	34.1800	116.9200	01/16/1930	034 3.6	0.0	5.10	0.022	IV	28.5(45.9)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.030	V	28.9(46.6)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.083	VII	29.3(47.2)
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.020	IV	29.3(47.2)
GSP	34.2900	116.9460	02/10/2001	210505.8	9.0	5.10	0.020	IV	30.8(49.6)
DMG	33.9500	116.8500	09/28/1946	719 9.0	0.0	5.00	0.018	IV	31.1(50.1)
GSP	33.9325	117.9158	03/29/2014	040942.2	5.1	5.10	0.020	IV	31.1(50.1)
GSP	34.1630	116.8550	06/28/1992	144321.0	6.0	5.30	0.023	IV	31.7(50.9)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.027	V	31.7(51.0)
GSP	34.1950	116.8620	08/17/1992	204152.1	11.0	5.30	0.022	IV	32.0(51.5)
DMG	34.1000	116.8000	10/24/1935	1448 7.6	0.0	5.10	0.018	IV	33.8(54.4)
GSN	34.2030	116.8270	06/28/1992	150530.7	5.0	6.70	0.063	VI	34.1(54.8)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.016	IV	34.4(55.4)
GSP	34.2390	116.8370	07/09/1992	014357.6	0.0	5.30	0.020	IV	34.5(55.5)
GSP	34.3400	116.9000	11/27/1992	160057.5	1.0	5.30	0.020	IV	35.0(56.3)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.015	IV	35.3(56.7)
GSG	34.3100	116.8480	02/22/2003	121910.6	1.0	5.20	0.017	IV	36.2(58.3)
GSP	34.3690	116.8970	12/04/1992	020857.5	3.0	5.30	0.019	IV	36.4(58.5)
DMG	33.9760	116.7210	06/12/1944	104534.7	10.0	5.10	0.015	IV	38.2(61.5)
DMG	33.9940	116.7120	06/12/1944	111636.0	10.0	5.30	0.017	IV	38.6(62.1)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.019	IV	38.7(62.3)
DMG	34.1000	116.7000	02/07/1889	520 0.0	0.0	5.30	0.017	IV	39.5(63.5)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.027	V	39.8(64.0)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.016	IV	40.9(65.8)

MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.035	V	41.2(66.3)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.032	V	43.9(70.7)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.012	III	44.4(71.5)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.012	III	44.4(71.5)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.014	IV	44.4(71.5)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.011	III	44.4(71.5)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.011	III	44.4(71.5)
PAS	33.9980	116.6060	07/08/1986	92044.5	11.7	5.60	0.018	IV	44.6(71.8)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.016	IV	45.0(72.5)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.012	III	45.3(72.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.012	III	45.3(72.8)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.011	III	46.1(74.2)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.015	IV	46.1(74.2)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.012	III	46.5(74.9)
T-A	34.0000	118.2500	09/23/1827	0 0 0.0	0.0	5.00	0.009	III	49.5(79.7)
T-A	34.0000	118.2500	01/10/1856	0 0 0.0	0.0	5.00	0.009	III	49.5(79.7)
T-A	34.0000	118.2500	03/26/1860	0 0 0.0	0.0	5.00	0.009	III	49.5(79.7)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.009	III	50.2(80.7)
DMG	34.0170	116.5000	07/25/1947	04631.0	0.0	5.00	0.009	III	50.6(81.5)
DMG	34.0170	116.5000	07/24/1947	221046.0	0.0	5.50	0.014	IV	50.6(81.5)
DMG	34.0170	116.5000	07/25/1947	61949.0	0.0	5.20	0.011	III	50.6(81.5)
DMG	34.0170	116.5000	07/26/1947	24941.0	0.0	5.10	0.010	III	50.6(81.5)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.009	III	52.0(83.7)
MGI	34.0000	118.3000	09/03/1905	540 0.0	0.0	5.30	0.011	III	52.4(84.3)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.012	III	52.4(84.4)
GSP	34.3410	116.5290	06/28/1992	124053.5	6.0	5.20	0.010	III	53.4(85.9)
GSP	34.1390	116.4310	06/28/1992	123640.6	10.0	5.10	0.009	III	55.1(88.6)
GSN	34.2010	116.4360	06/28/1992	115734.1	1.0	7.60	0.064	VI	55.5(89.3)
GSP	34.1080	116.4040	06/29/1992	141338.8	9.0	5.40	0.011	III	56.4(90.7)
GSP	34.3320	116.4620	07/01/1992	074029.9	9.0	5.40	0.011	III	56.7(91.2)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.008	II	57.4(92.3)
PAS	34.3270	116.4450	03/15/1979	21 716.5	2.5	5.20	0.009	III	57.5(92.5)
DMG	33.9330	116.3830	12/04/1948	234317.0	0.0	6.50	0.026	V	57.8(92.9)
GSP	33.5290	116.5720	06/12/2005	154146.5	14.0	5.20	0.009	III	58.1(93.5)
GSP	34.2680	116.4020	06/16/1994	162427.5	3.0	5.00	0.007	II	58.5(94.2)
GSP	34.0640	116.3610	09/15/1992	084711.3	9.0	5.20	0.009	III	58.6(94.3)
DMG	34.0670	116.3330	05/18/1940	55120.2	0.0	5.20	0.008	III	60.2(96.9)
DMG	34.0670	116.3330	05/18/1940	72132.7	0.0	5.00	0.007	II	60.2(96.9)
PAS	34.5160	116.4950	06/01/1975	13849.2	4.5	5.20	0.008	III	60.9(97.9)
GSP	34.0290	116.3210	08/21/1993	014638.4	9.0	5.00	0.007	II	60.9(98.0)
GSP	33.9610	116.3180	04/23/1992	045023.0	12.0	6.10	0.017	IV	61.3(98.6)
GSP	33.5080	116.5140	10/31/2001	075616.6	15.0	5.10	0.008	II	61.6(99.2)
PAS	33.5010	116.5130	02/25/1980	104738.5	13.6	5.50	0.010	III	62.0(99.7)

****

-END OF SEARCH- 86 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2016

LENGTH OF SEARCH TIME: 217 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 6.8 MILES (11.0 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.6

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.432 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.342
b-value= 0.399
beta-value= 0.920

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	86	0.39631
4.5	86	0.39631
5.0	86	0.39631
5.5	25	0.11521
6.0	16	0.07373
6.5	7	0.03226
7.0	3	0.01382
7.5	1	0.00461

TABLE A.1 - USGS ANSS COMPREHENSIVE CATALOG SEARCH RESULTS

Date	Latitude	Longitude	Approximate Magnitude (Magnitude Type)		Approximate Distance from Site (km)
3/29/2014	33.933	-117.916	5.1	(Mw)	50
7/29/2008	33.949	-117.766	5.4	(Mw)	36
6/12/2005	33.533	-116.567	5.2	(Mw)	95
10/31/2001	33.508	-116.514	5.0	(Mw)	100
10/16/1999	34.240	-117.040	5.6	(Mb)	40
8/21/1993	34.029	-116.321	5.0	(Ml)	99
12/4/1992	34.369	-116.898	5.3	(Ml)	59
11/27/1992	34.340	-116.900	5.3	(Ml)	57
9/15/1992	34.064	-116.361	5.3	(Ml)	95
8/17/1992	34.195	-116.863	5.2	(Ml)	52
7/1/1992	34.330	-116.464	5.3	(Ml)	92
6/29/1992	34.105	-116.390	5.1	(Mc)	93
6/29/1992	34.105	-116.403	5.7	(Ml)	92
6/28/1992	34.255	-116.912	5.3	(Ml)	51
6/28/1992	34.203	-116.827	6.3	(Mw)	55
6/28/1992	34.162	-116.852	5.5	(Ml)	52
6/28/1992	34.341	-116.511	5.4	(Ml)	88
6/28/1992	34.115	-116.426	5.5	(Ml)	90
6/28/1992	34.103	-116.425	5.0	(Mh)	90
6/28/1992	34.061	-116.473	5.0	(Mh)	85
6/28/1992	34.120	-116.323	5.7	(Ml)	99
6/28/1992	34.131	-116.408	5.8	(Ml)	91
6/28/1992	34.200	-116.437	7.3	(Mw)	90
4/23/1992	33.960	-116.317	6.1	(Mw)	100
6/28/1991	34.270	-117.993	5.8	(Mw)	61
2/28/1990	34.144	-117.697	5.5	(Ml)	31
12/16/1988	33.979	-116.681	5.0	(Ml)	66
12/3/1988	34.151	-118.130	5.0	(Ml)	70
10/4/1987	34.074	-118.098	5.3	(Ml)	66
10/1/1987	34.061	-118.079	5.9	(Mw)	64
7/8/1986	33.999	-116.608	6.0	(Mw)	73
3/15/1979	34.326	-116.416	5.2	(Ml)	96
6/1/1979	34.512	-116.488	5.3	(Ml)	99
9/12/1970	34.255	-117.534	5.2	(Ml)	28
9/23/1963	33.704	-116.938	5.3	(Ml)	56
12/4/1948	33.983	-116.331	6.0	(Mw)	98
7/25/1947	34.030	-116.406	5.2	(Ml)	91
7/24/1947	33.994	-116.481	5.3	(Ml)	85
6/12/1944	34.002	-116.699	5.2	(Ml)	64
6/12/1944	33.989	-116.731	5.1	(Ml)	62
8/29/1943	34.268	-116.968	5.3	(Ml)	47
11/14/1941	33.791	-118.264	5.1	(Ml)	86
5/18/1940	34.037	-116.307	5.2	(Ml)	100
5/31/1938	33.699	-117.511	5.2	(Ml)	39
3/11/1933	33.624	-118.001	5.3	(Mh)	73
3/11/1933	33.767	-117.985	5.0	(Mh)	63
3/11/1933	33.631	-118.000	6.4	(Mw)	72
4/21/1918	33.647	-117.433	6.7	(Mw)	43

Notes:

1. Earthquake Catalog Search results obtained from USGS ANSS Comprehensive Catalog on 11 October 2016.

APPENDIX B
Boring Logs

LANGAN

Log of Boring **ALB-10** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 939 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/23/16 — Date Finished: 9/23/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 61.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 13 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+939.0	**FILL** Tan, silty fine to coarse SAND, some gravel, (SM), dry	0	B-1	HA			
		Dense, white-tan, fine to coarse SAND, trace silt, fine to coarse gravel, (SW), dry	5	S-1	SPT	14	33 18 15	
	+931.0	**ALLUVIAL DEPOSITS**	8					Concrete debris encountered at 7.5 feet
		Loose, brown, silty fine to coarse SAND, trace fine gravel, (SM), moist	10	S-2	SPT	17	1 2 2	
		Medium dense, brown, trace pink, silty fine to medium SAND, trace rock fragments, (SM), moist	15	S-3	CR	18	4 9 5	
	+921.0		18					
			20					

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Log of Boring **ALB-10** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 939 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, tan-brown, fine SAND, (SP), moist	20	S-4	SPT	18	3 6 8	
			21					
			22					
			23					
			24					
		Medium dense, tan-brown, fine SAND, (SP), moist	25	S-5	CR	18	4 10 18	
			26					
			27					
			28					
			29					
		Medium dense, tan-brown, fine SAND, (SP), moist	30	S-6	SPT	18	4 7 11	
			31					
			32					
	+906.0		33					
			34					
		Medium dense, tan-brown,silty fine to medium SAND, (SM), moist	35	S-7	CR	18	8 14 20	
			36					
			37					
	+901.0		38					
			39					
		Very stiff, brown, CLAY, some silt, trace fine sand, (CL), moist	40	S-8	SPT	18	4 7 13	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **ALB-10** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 939 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very stiff, brown, CLAY, some silt, trace fine sand, (CL), moist	45	S-9	CR	18	4 13 22	Pocket Penetrometer (PP) = 2.75 tsf
	+891.0		46					
		Very stiff, brown, SILT, trace fine sand, (ML), moist	47					
			48					
			49					
			50	S-10	SPT	18	4 6 19	
			51					
			52					
			53					
			54					
			55	S-11	SPT	18	5 12 12	
		Very stiff, brown, SILT, trace fine sand, (ML), moist	56					
			57					
			58					
			59					
		Very stiff, brown, SILT, trace fine sand, (ML), moist	60	S-12	SPT	18	8 14 17	
	+877.5		61					
		End of boring at 61.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **ALB-11** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 897 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/26/16 — Date Finished: 9/26/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 6-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 14 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Jeff Frazer
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+897.0		0					
	+896.6	5 inch - Asphalt						
		FILL	1					
		Brown, fine to coarse SAND, some silt, (SM), moist	2	B-1	HA			
	+894.0		3					
		WEATHERED GRANITIC ROCK	4					
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), dry	5	S-1	CR	-	22 50/6"	
			6					
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), dry	7					
			8	S-2	SPT	16	17 44 50/4"	
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), dry	9					
			10	S-3	CR	-	35 50/3"	
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	11					
			12					
			13	S-4	SPT	11	45 50/5"	
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	14					
			15	S-5	CR	-	50/4"	
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	16					
			17					
			18	S-6	SPT	5	50/5"	
			19					
			20					

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Log of Boring **ALB-11** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 897 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	20	S-7	CR	-	50/5"	
			21					
			22					
			23					
			24					
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	25	S-8	SPT	6	50/6"	
			26					
			27					
			28					
			29					
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	30	S-9	CR	-	50/3"	
			31					
			32					
			33					
			34					
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	35	S-10	SPT	5	50/5"	
			36					
			37					
			38					
			39					
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	40	S-11	CR	-	50/5"	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **ALB-11** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 897 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very dense, white-gray, some brown, fine to coarse SAND, some fine gravel, (SW), moist	45	S-12	SPT	3	50/3"	
			46					
			47					
			48					
			49					
			50	S-13	SPT	-	50/3"	No sample recovery.
	+845.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concrete. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

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Log of Boring **ALB-12** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 897 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/26/16 — Date Finished: 9/26/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 6-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 14 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Jeff Frazer
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+897.0	8 inch - Asphalt	0					
	+896.3	**FILL** Brown, silty fine to coarse SAND, some fine to coarse gravel, (SM), moist	1	B-1	HA			
	+893.0	**WEATHERED GRANITIC ROCK** Medium dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	5	S-1	CR	-	7 18 20	
		Loose, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	8	S-2	CR	-	4 2 1	
		Medium dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	10	S-3	CR	-	7 12 16	
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	13	S-4	CR	-	12 32 50/5"	
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	15	S-5	CR	-	45 50/2"	
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	18	S-6	CR	-	50/5"	

LANGAN

Log of Boring **ALB-12** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 897 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	20	S-7	CR	-	50/5"	
			21					
			22					
			23					
			24					
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	25	S-8	SPT	3	50/6"	
			26					
			27					
			28					
			29					
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	30	S-9	CR	-	50/2"	
			31					
			32					
			33					
			34					
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	35	S-10	SPT	4	50/6"	
			36					
			37					
			38					
			39					
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	40	S-11	CR	-	50/4"	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **ALB-12** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 897 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	45	S-12	SPT	4	50/4"	
			46					
			47					
			48					
			49					
		Very dense, white-pink, some brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	50	S-13	CR	-	50/3"	
	+845.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concrete. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **ELB-1** Sheet 1 of 2

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 911 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/23/16 — Date Finished: 9/23/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 31.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 6 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+911.0	**FILL**	0					
		Loose, tan-brown, silty fine SAND, (SM), moist	5	S-1	SPT	15	2, 3, 4	
	+903.0	**ALLUVIAL DEPOSITS**	8					
		Dense, white-tan, fine to coarse SAND, some gravel, trace cobble, (SW), dry	10	S-2	SPT	16	7, 20, 17	
		Dense, white-tan, fine to coarse, SAND, some gravel, trace cobble, (SW), dry	15	S-3	SPT	17	21, 30, 21	
	+893.0		18					
			20					

LANGAN

Log of Boring **ELB-1** Sheet 2 of 2

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 911 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, tan-brown, silty fine SAND, (SM), moist	20	S-4	SPT	17	5 7 12	
	+888.0		21					
			22					
			23					
		Dense, tan-brown, fine to coarse SAND, trace gravel, (SW), dry	24					
			25	S-5	SPT	16	8 7 23	
	+883.0		26					
			27					
			28					
		Dense, tan-brown, silty fine to medium SAND, (SM), moist	29					
			30	S-6	SPT	16	11 19 26	
	+879.5		31					
		End of borning at 31.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	32					
			33					
			34					
			35					
			36					
			37					
			38					
			39					
			40					
			41					
			42					
			43					
			44					
			45					

LANGAN

Log of Boring **LB-1** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 921 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/19/16 — Date Finished: 9/19/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+921.0	**FILL** Tan, fine to coarse SAND, some silt, trace gravel, (SM), dry	0	B-1	HA			
	+918.0	**ALLUVIAL DEPOSITS** Dense, tan, fine to coarse SAND, trace silt, trace gravel, (SW), dry	5	S-1	CR	-	3 6 14	No sample recovery.
	+913.0	Dense, tan, fine to coarse SAND, trace silt, trace gravel, (SW-SM), dry	10	S-2	SPT	15	16 21 26	
	+908.0	Dense, tan, fine to coarse SAND, trace silt, some gravel, (SW), dry	15	S-3	CR	18	41 32 38	Gravel layer at approximately 17 feet.
	+903.0		20					

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Log of Boring **LB-1** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 921 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, orange- brown, silty fine to coarse SAND, some clay, trace gravel, (SM), moist	20–21	S-4	SPT	18	11, 16, 15	
			21–25					
		Dense, orange-brown, silty fine to medium SAND, some clay, trace gravel, (SM), moist	25–26	S-5	CR	18	16, 24, 32	
			26–30					
		Medium dense, orange-brown, silty fine to coarse SAND, trace gravel, (SM), moist	30–31	S-6	SPT	18	10, 11, 11	
			31–35					
		Dense, orange-brown, silty fine to coarse SAND, trace gravel, (SM), moist	35–36	S-7	CR	18	11, 23, 45	
			36–40					
		Medium dense, orange-brown, silty fine to coarse SAND, some clay, (SM), moist	40–41	S-8	SPT	18	9, 10, 14	
			41–43					
	+878.0		43–45					

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Log of Boring **LB-1** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 921 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, light brown, fine to medium SAND, trace silt, (SP), moist	45	S-9	CR	18	11 24 36	
			46					
			47					
			48					
			49					
		Dense, light brown, fine to medium SAND, trace silt, (SP), moist	50	S-10	SPT	18	10 21 21	
	869.5		51					
		End of Borning at 51.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-2** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 918 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/19/16 — Date Finished: 9/19/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 10 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+918.0	**FILL** Brown, silty fine SAND, trace gravel, (SM), moist	0	B-1	HA			
	+914.0	**ALLUVIAL DEPOSITS** Medium dense, tan, silty fine to coarse SAND, trace gravel, (SM), dry	4	S-1	CR	18	9 10 11	
	+910.0	Medium dense, tan, fine to coarse SAND, trace silt, trace gravel, (SW-SM), dry	8	S-2	SPT	15	7 11 9	
	+905.0	Very dense, tan, silty fine to coarse SAND, trace gravel, trace cobble, (SM), dry	13	S-3	CR	18	32 50/5"	Gravel layer encountered at depth of appoximately 13 feet.
			20					

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Log of Boring **LB-2** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 918 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, light brown, fine to coarse SAND, some silt, trace gravel, (SM), dry	20	S-4	SPT	12	6 12 15	
			21					
			22					
			23					
			24					
		Medium dense, light brown, silty fine to coarse SAND, trace gravel, (SM), dry	25	S-5	CR	18	10 14 23	
			26					
			27					
			28					
			29					
		Medium dense, brown, fine to medium SAND, some silt, some gravel, (SM), moist	30	S-6	SPT	16	3 8 37	
	+887.0		31					Transition of soil type from SM to SW in split spoon sample.
		Medium dense, brown, fine to coarse SAND, trace silt, trace gravel, (SW), moist	32					
	+885.0		33					
			34					
		Dense, brown, silty fine SAND, trace clay, (SM), moist	35	S-7	CR	18	11 23 36	
			36					
			37					
			38					
			39					
		Medium dense, brown, silty fine to medium SAND, trace clay, (SM), moist	40	S-8	SPT	18	4 7 10	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **LB-2** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 918 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, brown, silty fine to medium SAND, trace clay, (SM), moist	45	S-9	CR	18	5 20 40	
			46					
			47					
			48					
			49					
		Medium dense, brown, silty fine to medium SAND, trace clay, (SM), moist	50	S-10	SPT	18	4 8 12	
	866.5		51					
		End of Borning at 51.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-3** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 917 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/20/16 — Date Finished: 9/20/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+917.0	**FILL** Brown, silty fine to medium SAND, trace gravel, (SM), moist	0	B-1	HA			
	+913.0	**ALLUVIAL DEPOSITS** Loose, brown, fine SAND, some silt, (SM), moist	5	S-1	SPT	15	1 1 2	
	+909.0	Dense, brown, fine sandy SILT, trace gravel, (ML), moist	10	S-2	CR	18	17 20 30	
	+904.0	Medium dense, orange-brown, silty fine to medium SAND, trace clay, (SM), moist	15	S-3	SPT	18	4 7 11	
			20					

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Log of Boring **LB-3** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 917 (NGVD 29)

Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	Dense, brown, silty fine SAND, (SM), moist	20	S-4	CR	18	7 20 28	
894.0		21					
		22					
		23					
	Medium dense, brown, fine to medium SAND, (SP), wet	24					
		25	S-5	SPT	16	10 9 11	
889.0		26					
		27					
	Medium dense, brown, silty fine SAND, (SM), moist	28					
		29					
		30	S-6	CR	18	6 10 17	
884.0		31					
		32					
		33					
	Stiff, brown, CLAY, trace silt, (CL), moist	34					
		35	S-7	SPT	16	3 5 7	
		36					
		37					
		38					
		39					
	Very stiff, brown, CLAY, trace silt, (CL), moist	40					
		41	S-8	CR	18	8 14 19	
		42					Pocket Penetrometer (PP) = 3.0 tsf
		43					
		44					
		45					

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Log of Boring **LB-3** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 917 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Stiff, brown, CLAY, trace silt, (CL), moist	45	S-9	SPT	18	2 4 6	
			46					
			47					
			48					
			49					
		Very Stiff, brown, CLAY, trace silt, (CL), moist	50	S-10	CR	18	5 12 18	
	+865.5		51					PP = 2.5 tsf
		End of boring at 51.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-4** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 938 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/19/16 — Date Finished: 9/21/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 56.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+938.0	**FILL** Light brown, fine to coarse SAND, some silt, trace gravel, (SM), dry	0	B-1	HA			
		Medium dense, light brown, silty fine SAND, trace fine gravel, (SM), dry	5	S-1	CR	18	10 15 21	
	+930.0	**ALLUVIAL DEPOSITS** Medium dense, light brown, silty fine to medium SAND, (SM), dry	8	S-2	SPT	15	5 7 9	
		Dense, tan, silty fine SAND, (SM), dry	15	S-3	CR	18	10 22 29	
			20					

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Log of Boring **LB-4** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 938 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, tan, silty fine SAND, (SM), dry	20					
			21	S-4	SPT	16	7 13 22	
			22					
			23					
			24					
		Dense, tan, silty fine SAND, (SM), dry	25					
			26	S-5	CR	18	11 20 30	
			27					
			28					
			29					
		Dense, tan, silty fine SAND, (SM), dry	30					
			31	S-6	SPT	12	11 19 24	
			32					
			33					
			34					
		Dense, tan, silty fine to coarse SAND, trace gravel, (SM), dry	35					
			36	S-7	CR	18	16 30 40	Gravel layer at 36 feet.
			37					
	+900.0		38					
			39					
		Dense, tan, fine to coarse SAND, trace gravel, (SW), dry	40					
			41	S-8	SPT	18	4 17 24	
			42					Stop drilling on 9/19/2016 at 41.5 feet for percolation test. Continue drilling on 9/21/2016.
			43					Gravel layer at 43.5 feet.
			44					
			45					

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Log of Boring **LB-4** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 938 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, tan, fine to coarse SAND, (SW), dry	45 46 47 48 49 50 51	S-9	SPT	12	9 20 26	
	+885.0		52 53					
		Medium dense, light brown, silty fine SAND, (SM), moist	54 55 56	S-10	SPT	10	11 14 12	
	+881.5	End of Boring at 56.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	57 58 59 60 61 62 63 64 65 66 67 68 69 70					

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Log of Boring **LB-5** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 941 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/20/16 — Date Finished: 9/20/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+941.0	**FILL** Light brown, silty fine to medium SAND, (SM), dry	0	B-1	HA			
		Loose, light brown, silty fine to medium SAND, (SM), dry	5	S-1	CR	18	4 7 12	
	+933.0	**ALLUVIAL DEPOSITS** Medium dense, light brown, silty fine SAND, (SM), dry	10	S-2	SPT	12	8 13 17	
	+928.0	Very stiff, light brown, CLAY, trace silt, (CL), moist	15	S-3	CR	18	9 15 26	Pocket Penetrometer (PP) = 3.75 tsf
			20					

LANGAN

Log of Boring **LB-5** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 941 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, light brown, silty fine SAND, (SM), moist	20	S-4	SPT	18	5 8 8	
			21					
			22					
			23					
			24					
		Medium dense, light brown, silty fine SAND, (SM), moist	25	S-5	CR	18	9 10 18	
			26					
			27					
			28					
			29					
		Medium dense, brown, silty fine to medium SAND, (SM), moist	30	S-6	SPT	17	5 8 8	
			31					
			32					
			33					
			34					
		Medium dense, brown, silty fine SAND, (SM), moist	35	S-7	CR	18	8 12 20	
			36					
			37					
			38					
			39					
		Medium dense, brown, silty fine SAND, (SM), moist	40	S-8	SPT	18	7 6 9	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **LB-5** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 941 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, brown, silty fine SAND, trace clay, (SM), moist	45	S-9	CR	18	9 19 28	
			46					
			47					
			48					
			49					
		Medium dense, brown, silty fine SAND, (SM), moist	50	S-10	SPT	15	6 13 17	
	889.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-6** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 939 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/20/16 — Date Finished: 9/20/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+939.0		0					
	+938.5	2.5 inch - Asphalt 4.0 inch - Aggregate Base						
		FILL Brown, silty fine to medium SAND, trace gravel, (SM), dry	1	B-1	HA			
			2					
			3					
			4					
		Loose, brown, silty fine to medium SAND, (SM), dry	5	S-1	SPT	15	2 3 3	
			6					
	+931.0		7					
		ALLUVIAL DEPOSITS	8					
			9					
		Medium dense, brown, silty fine SAND, (SM), dry	10	S-2	CR	18	6 8 13	
			11					
			12					
			13					
			14					
		Loose, light brown, silty fine SAND, (SM), dry	15	S-3	SPT	16	3 4 5	
			16					
			17					
			18					
			19					
			20					

LANGAN

Log of Boring **LB-6** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 939 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, light brown, silty fine SAND, (SM), dry	20	S-4	CR	18	7 12 18	
			21					
			22					
			23					
			24					
		Medium dense, light brown, silty fine SAND, (SM), dry	25	S-5	CR	18	6 11 18	
			26					
			27					
			28					
			29					
		Medium dense, light brown, silty fine SAND, (SM), dry	30	S-6	CR	18	8 12 18	
			31					
			32					
	+905.8		33					
		Hard, brown, silty CLAY, (CL), moist	34					
			35	S-7	CR	18	13 22 27	
			36					
			37					
	+900.8		38					
		Very stiff, light brown, SILT, some fine sand, (ML), moist	39					
			40	S-8	CR	18	7 12 24	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **LB-6** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 939 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very stiff, light brown, fine sandy SILT, (ML), moist	45	S-9	SPT	18	8 17 20	
	+890.8		46					
			47					
			48					
			49					
		Dense, tan, fine to medium SAND, (SP), moist	50	S-10	CR	18	9 32 31	
	+887.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concrete. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-7A** Sheet 1 of 2

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 907 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/22/16 — Date Finished: 9/22/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 31.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 6 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First ▽ - — Completion ▼ - — 24 HR. ▼ -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+907.0	**FILL** Brown, silty fine to medium SAND, trace clay, (SM), moist	0					
			1					
			2					
			3					
			4					
		Medium dense, brown, silty fine SAND, trace clay, (SM), moist	5	S-1	CR	18	4 8 14	
			6					
			7					
	+899.0	**ALLUVIAL DEPOSITS**	8					
			9					
		Dense, light brown, fine to coarse SAND, some gravel, (SW), dry	10	S-2	SPT	13	4 11 21	
			11					
			12					
			13					
			14					
		Dense, tan, fine to coarse SAND, some gravel, (SW), dry	15	S-3	CR	18	14 25 30	
			16					
			17					
	+889.0		18					
			19					
			20					

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Log of Boring **LB-7A** Sheet 2 of 2

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 907 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, tan, silty fine to coarse SAND, trace gravel, (SM), moist	20	S-4	SPT	15	12 15 13	
			21					
			22					
			23					
			24					
		Medium dense, orange-brown, silty fine SAND, (SM), moist	25	S-5	CR	18	14 15 21	
			26					
			27					
	+879.0		28					
			29					
		Dense, tan, fine to coarse SAND, trace silt, (SP-SM), moist	30	S-6	SPT	15	8 19 19	
	+875.5		31					
		End of boring at 31.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	32					
			33					
			34					
			35					
			36					
			37					
			38					
			39					
			40					
			41					
			42					
			43					
			44					
			45					

LANGAN

Log of Boring **LB-7B** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 911 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/22/16 — Date Finished: 9/22/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 61.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 13 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+911.0		0					
	+910.7	3 inch - Asphalt						
		FILL	1					
		Brown, silty fine to medium SAND, (SM), moist	2	B-1	HA			
			3					
			4					
		Loose, light brown, fine to coarse SAND, (SW), moist	5					
			6	S-1	CR	-	7 9 7	
			7					
	+903.0		8					
		ALLUVIAL DEPOSITS	9					
		Medium dense, light brown, fine to coarse SAND, trace gravel, (SW), moist	10					
			11	S-2	SPT	16	10 15 16	
			12					
			13					
			14					
		Very dense, light brown, fine to coarse SAND, trace gravel, trace cobble, (SW), moist	15					
			16	S-3	CR	-	20 41 50/4"	
			17					
			18					
			19					
			20					

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Log of Boring **LB-7B** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 911 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, light brown, fine to coarse, SAND, trace gravel, trace cobbles, (SW), moist	20	S-4	SPT	17	14 20 23	
	+888.0		23					
		Dense, brown, silty fine to coarse SAND, trace gravel, trace cobble, (SM), moist	25	S-5	CR	-	10 17 27	
	+883.0		28					
		Dense, brown, fine to coarse, clayey SAND, some silt, trace gravel, (SC), moist	30	S-6	SPT	15	9 14 21	
		Medium dense, brown, clayey fine to coarse SAND, some silt, (SC), moist	35	S-7	CR	-	5 10 21	
	+873.0		38					
		Stiff, orange -brown, CLAY, some fine to coarse sand, some silt, (CL), moist	40	S-8	SPT	18	4 7 9	
	+868.0		43					
			45					

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Log of Boring **LB-7B** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 911 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very dense, orange-brown, silty fine to medium SAND, trace clay, (SM), moist	45	S-9	CR	-	22 39 36	
			46					
			47					
			48					
			49					
		Very dense, orange-brown, silty fine to coarse SAND, trace fine gravel, (SM), moist	50	S-10	SPT	5	50/5"	
			51					
			52					
	+858.0		53					
		Very dense, tan-brown, fine to coarse SAND, some gravel, (SW), moist	54					
			55	S-11	SPT	5	50/5"	
			56					
			57					
			58					
			59					
		Very dense, tan-brown, fine to coarse SAND, some fine gravel, (SW), moist	60	S-12	SPT	11	34 50/5"	
	+849.5		61					
		End of boring at 61.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concrete. Groundwater was not encountered.	62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-8** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 904 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/22/16 — Date Finished: 9/22/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 61.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+904.0		0					
	+903.8	3 inch - Asphalt						
		FILL	1					
		Brown, silty fine to medium SAND, trace clay, (SM), moist	2					
			3	B-1	HA			
			4					
		Loose, brown, silty fine SAND, trace clay, (SM), moist	5					
			6	S-1	CR	18	2 2 3	
			7					
			8					
			9					
		Loose, brown, silty fine to medium SAND, trace clay, (SM), moist	10					
			11	S-2	SPT	18	1 2 3	
			12					
	+891.0		13					
		ALLUVIAL DEPOSITS	14					
		Very dense, tan-brown, fine to coarse SAND, trace gravel, trace cobbles, (SW), dry	15					
			16	S-3	CR	18	16 30 42	
			17					
			18					
			19					
			20					

LANGAN

Log of Boring **LB-8** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 904 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, tan- brown, fine to coarse SAND, trace gravel, (SW), dry	20	S-4	SPT	12	18 18 20	
	+881.0		23					
		Dense, tan-brown, silty fine to coarse SAND, trace gravel, (SM), dry	25	S-5	CR	18	10 21 23	
	+876.0		28					
		Stiff, brown, SILT, some fine sand, (ML), moist	30	S-6	SPT	18	4 5 10	
	+871.0		33					
		Very stiff, brown, CLAY, trace silt, (CL), moist	35	S-7	CR	18	8 13 15	Pocket Penetrometer (PP) = 3.75 tsf
		Stiff, brown, CLAY, trace silt, (CL), moist	40	S-8	SPT	18	3 5 8	
	+861.0		43					
			45					

LANGAN

Log of Boring **LB-8** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 904 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Dense, brown, clayey fine to coarse SAND, trace silt, (SC), moist	45	S-9	CR	18	6 16 26	
			46					
			47					
			48					
			49					
		Dense, brown, clayey fine to coarse, SAND, some silt, (SC), moist	50	S-10	SPT	18	8 17 21	
	852.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concrete. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-9** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 921 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/20/16 — Date Finished: 9/23/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 50.1 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+921.0	**FILL** Brown, silty fine SAND, trace clay, (SM), moist	0	B-1	HA			
		Medium dense, brown, silty fine SAND, trace clay, trace gravel, (SM), moist	5	S-1	SPT	15	10 13 6	
		Medium dense, brown, silty fine SAND, (SM), moist	10	S-2	SPT	17	9 12 11	
	+908.0	**ALLUVIAL DEPOSITS** Medium dense, brown, silty fine SAND, (SM), moist	13	S-3	CR	-	3 5 9	
			20					

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Log of Boring **LB-9** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 921 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, brown, silty fine SAND, (SM), moist	20					
			21	S-4	CR	-	9 6 8	
			22					
	898.0		23					
			24					
		Stiff, brown, CLAY, some silt, (CL), moist	25					
			26	S-5	SPT	18	2 5 9	
	893.0		27					Layer of gravel encountered at 26.5 feet.
			28					
			29					
		Dense, tan-brown, fine to coarse SAND, (SW), moist	30					
			31	S-6	CR	-	14 27 44	Stop drilling at 30 feet on 9/20/2016 for percolation test.
			32					Continue drilling on 9/23/2016.
			33					
			34					
		Dense, tan-brown, fine to coarse SAND, (SW), moist	35					
			36	S-7	SPT	12	6 16 17	
	883.0		37					
			38					
			39					
		Dense, tan-brown, silty fine SAND, (SM), moist	40					
			41	S-8	CR	-	12 18 30	
			42					
	878.0		43					
			44					
			45					

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Log of Boring **LB-9** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 921 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Stiff, tan-brown, SILT, trace fine to coarse sand, trace gravel, some clay (ML), moist	45	S-9	SPT	18	4 8 13	
	+873.0		46					
			47					
			48					
			49					
		Medium dense, tan-brown, silty fine SAND, trace clay, (SM), moist	50	S-10	CR	-	9 14 21	
	+869.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-10** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 941 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/21/16 — Date Finished: 9/21/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 12 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+941.0		0					
	+940.7	3 inch - Asphalt						
		FILL	1					
		Grey-brown, silty fine to medium SAND, some fine to coarse gravel, trace clay (SM), dry	2	B-1	HA			
			3					
			4					
		Very dense, brown, fine SAND, some silt, (SM), moist	5					
			6	S-1	SPT	15	23 36 20	
			7					
	+933.0		8					
		ALLUVIAL DEPOSITS	9					
		Medium dense, brown, fine silty SAND, (SM), moist	10					
			11	S-2	SPT	18	5 7 5	
			12					
	+928.0		13					
			14					
		Firm, brown, fine sandy SILT, (ML), moist	15					
			16	S-3	SPT	18	3 4 4	
			17					
			18					
			19					
			20					

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Log of Boring **LB-10** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 941 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very stiff, brown, fine sandy SILT, trace clay, (ML), moist	20	S-4	CR	18	8 11 13	
			21					
			22					
			23					
			24					
		Very stiff, brown, fine sandy SILT, trace clay, (ML), moist	25	S-5	SPT	16	4 8 9	
			26					
			27					
	+913.0		28					
		Medium dense, brown, silty fine SAND, trace clay, (SM), moist	29					
			30	S-6	CR	18	11 16 16	
			31					
			32					
	+908.0		33					
		Dense, light brown, fine to coarse SAND, some fine to coarse gravel, (SW), moist	34					
			35	S-7	SPT	18	8 15 19	
			36					
			37					
	+903.0		38					
		Very stiff, brown, fine sandy SILT, some clay, (ML), moist	39					
			40	S-8	CR	18	5 9 19	
			41					
			42					Pocket Penetrometer (PP) = 3.25 tsf
		Very stiff, brown, fine sandy SILT, (ML), moist	43	S-9	SPT	18	5 7 11	
			44					
			45					

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Log of Boring **LB-10** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 941 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very stiff, brown, fine sandy SILT, (ML), moist	45	S-10	SPT	18	7 11 10	
			46					
			47					
			48					
			49					
		Very stiff, fine sandy SILT, trace clay, (ML), moist	50	S-11	SPT	17	10 12 9	
	+889.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concrete. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

LANGAN

Log of Boring **LB-11** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 940 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/21/16 — Date Finished: 9/21/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+940.0	8 inch - Asphalt	0					
	+939.3	**FILL** Dark brown, silty fine to coarse SAND, trace clay, trace gravel, (SM), moist	1	B-1	HA			
			2					
			3					
			4					
		Very dense, brown, fine SAND, trace silt, (SP-SM), moist	5	S-1	SPT	12	36 30 25	
			6					
			7					
	+932.0	**ALLUVIAL DEPOSITS**	8					
			9					
		Medium dense, brown, fine SAND, (SP), moist	10	S-2	SPT	17	4 8 11	
			11					
			12					
			13					
			14					
		Dense, brown, fine SAND, (SP), moist	15	S-3	CR	18	8 22 29	
			16					
			17					
			18					
			19					
			20					

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Log of Boring **LB-11** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 940 (NGVD 29)

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, brown, fine SAND, (SP), moist	20					
			21	S-4	SPT	18	9 8 13	
			22					
	+917.0		23					
			24					
		Medium dense, brown, silty fine to medium SAND, (SM), moist	25					
			26	S-5	CR	18	5 16 23	
			27					
			28					
			29					
		Medium dense, brown, silty fine SAND, (SM), moist	30					
			31	S-6	SPT	18	10 7 14	
			32					
			33					
			34					
		Medium dense, light brown, silty fine to medium SAND, (SM), moist	35					
			36	S-7	CR	18	8 16 23	
			37					
	+902.0		38					
			39					
		Very stiff, brown, SILT, some clay, (ML), moist	40					
			41	S-8	SPT	18	6 8 15	
			42					
	+897.0		43					
			44					
			45					

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Log of Boring **LB-11** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 940 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Very stiff, brown, CLAY, some silt, (CL), moist	45	S-9	CR	18	5 10 23	Pocket Penetrometer (PP) = 3.25 tsf
	+892.0		46					
			47					
			48					
			49					
		Hard, brown, SILT, some clay, (ML), moist	50	S-10	SPT	14	10 22 20	
	+888.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout and surface patched with quick-dry concerte . Ground water was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

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Log of Boring **LB-12** Sheet 1 of 3

Project: Agua Mansa Commerce Park	Project No.: 700045403
Location: Jurupa Valley, California	Elevation and Datum: Approx. 950 (NGVD 29)
Drilling Company: Martini Drilling	Date Started: 9/21/16 — Date Finished: 9/21/16
Drilling Equipment: CME 75 Truck Mounted Drill Rig	Completion Depth: 51.5 ft — Rock Depth: -
Size and Type of Bit: 8-inch dia. Hollow Stem Auger	Number of Samples: Disturbed 11 — Undisturbed - — Core -
Casing Diameter (in): - — Casing Depth (ft): -	Water Level (ft.): First - — Completion - — 24 HR. -
Casing Hammer: - — Weight (lbs): - — Drop (in): -	Drilling Foreman: Gene Golar
Sampler: 2-inch O.D. Split Spoon/ 3 in O.D. Cal Mod	Field Engineer: Sing Song
Sampler Hammer: Automatic — Weight (lbs): 140 — Drop (in): 30	

Material Symbol	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+950.0	**FILL** Brown, silty fine SAND, trace gravel, (SM), moist	0	B-1	HA			
		Very dense, brown, trace pink, silty fine SAND, (SM), moist	5	S-1	SPT	16	8 19 40	
	+942.0	**ALLUVIAL DEPOSITS** Loose, brown, silty fine SAND, (SM), moist	10	S-2	SPT	17	2 2 4	
	+937.0	Stiff, brown, SILT, trace fine sand, (ML), moist	15	S-3	SPT	16	2 3 6	
	+932.0		20					

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Log of Boring **LB-12** Sheet 2 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 950 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, brown, silty fine SAND, (SM), moist	20	S-4	SPT	17	4 6 9	
			21					
			22					
			23					
			24					
		Medium dense, light brown, silty fine to medium SAND, (SM), moist	25	S-5	CR	18	8 15 25	
			26					
			27					
	+922.0		28					
			29					
		Medium dense, light brown, fine SAND, (SP), moist	30	S-6	SPT	18	5 11 13	
			31					
			32					
			33					
			34					
		Medium dense, light brown, fine SAND, (SP), moist	35	S-7	CR	18	6 14 23	
			36					
			37					
			38					
			39					
		Medium dense, light brown, fine SAND, (SP), moist	40	S-8	SPT	16	7 13 17	
			41					
			42					
			43					
			44					
			45					

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Log of Boring **LB-12** Sheet 3 of 3

Project	Project No.
Agua Mansa Commerce Park	700045403
Location	**Elevation and Datum**
Jurupa Valley, California	Approx. 950 (NGVD 29)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
		Medium dense, light brown, fine SAND, (SP), moist	45	S-9	CR	18	6 12 26	
			46					
			47					
			48					
			49					
		Medium dense, light brown, fine SAND, (SP), moist	50	S-10	SPT	18	8 13 14	
	898.5		51					
		End of boring at 51.5 feet. Boring backfilled with cement grout. Groundwater was not encountered.	52					
			53					
			54					
			55					
			56					
			57					
			58					
			59					
			60					
			61					
			62					
			63					
			64					
			65					
			66					
			67					
			68					
			69					
			70					

APPENDIX C
Percolation Test Results

PERCOLATION TEST DATA SHEET

LANGAN

Project:	Agua Mansa Commerce Park				Project No.:	700045403	Date of Test:	9/20/2016	
Test Hole No.:	LB-4				Tested By:	JAB			
Depth of Test Hole (ft):	40				USCS Soil Classification:		Dense, tan, fine to coarse SAND, trace gravel, (SW), dry		
Casing Depth (ft):	40' PVC Pipe; Perforated in Bottom 5'				Test Hole Diameter (in):		8		
Trial No.	Date	Time of Measurement	Initial Depth to Water (Feet)	Time of Measurement	Final Depth to Water (Feet)	Time Interval (min)	Change in Water Level (Feet)	Percolation Rate (in/min)	Infiltration Rate (in/hr)
Sandy soil criteria 1	9/20/2016	1:18 PM	34.80	1:33 PM	41.50	25	6.70	3.22	
Sandy soil criteria 2	9/20/2016	1:39 PM	36.20	2:04 PM	41.50	25	5.30	2.54	
1	9/20/2016	2:03 PM	31.60	2:13 PM	38.50	10	6.90	8.28	
2	9/20/2016	2:18 PM	37.50	2:28 PM	40.60	10	3.10	3.72	
3	9/20/2016	2:31 PM	36.00	2:41 PM	40.30	10	4.30	5.16	
4	9/20/2016	2:45 PM	36.80	2:55 PM	40.50	10	3.70	4.44	
5	9/20/2016	3:00 PM	35.90	3:10 PM	40.70	10	4.80	5.76	
6	9/20/2016	3:13 PM	35.00	3:23 PM	40.00	10	5.00	6.00	14.4

Comments:

1. Percolation test was performed in accordance with the Riverside County Flood Control and Water Conservation District ' "Design Handbook for Low Impact Development Best Management Practices" dated September 2011.
2. Per the procedures for deep percolation tests in sandy soils, measurements were taken in 10-minute intervals for an hour after sandy soil criteria was met.
3. Weather: Partly cloudy, 85° F
4. Measurements were collected from the Top of Pipe = 41.5 Feet

PERCOLATION TEST DATA SHEET

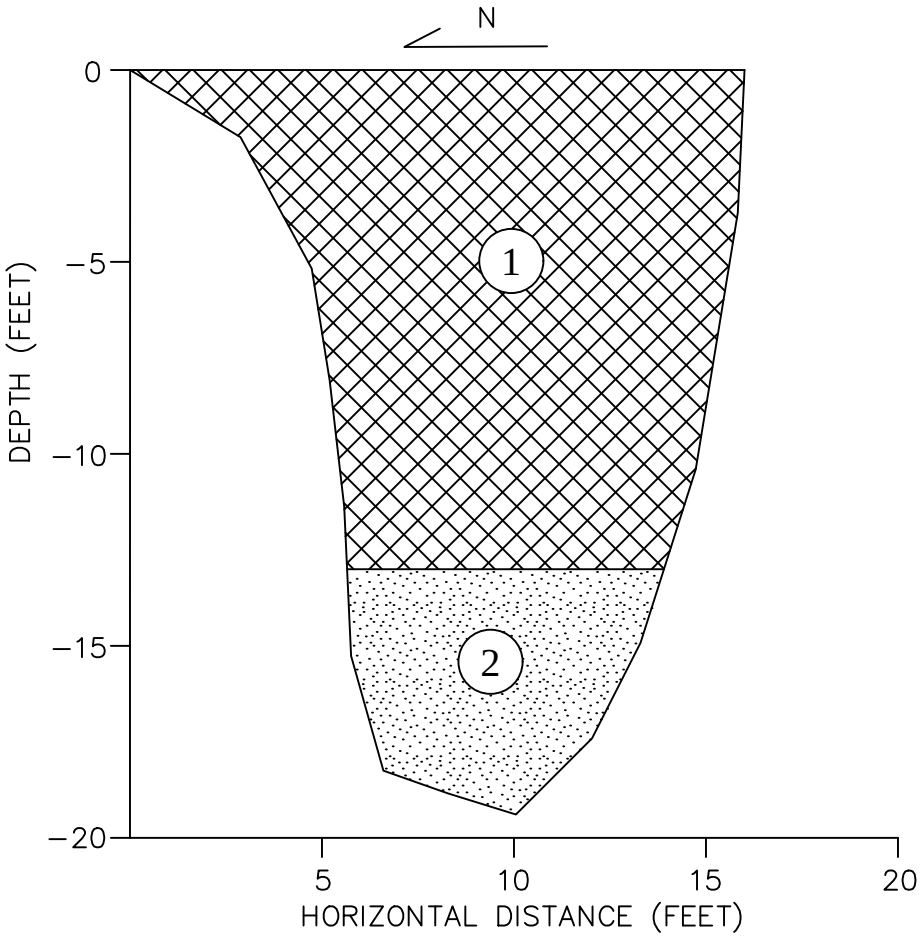
LANGAN

Project:	Agua Mansa Commerce Park				Project No.:	700045403	Date of Test:	9/22/2016	
Test Hole No.:	LB-9				Tested By:	JAB			
Depth of Test Hole (ft):	30				USCS Soil Classification:		Dense, tan-brown, fine to coarse SAND, (SW), moist		
Casing Depth (ft):	40' PVC Pipe; Perforated in Bottom 5'				Test Hole Diameter (in):		8		
Trial No.	Date	Time of Measurement	Initial Depth to Water (Feet)	Time of Measurement	Final Depth to Water (Feet)	Time Interval (min)	Change in Water Level (Feet)	Percolation Rate (in/min)	Infiltration Rate (in/hr)
Sandy soil criteria 1	9/22/2016	8:59 AM	23.15	9:24 AM	24.30	25	1.15	0.55	
Sandy soil criteria 2	9/22/2016	9:29 AM	22.80	9:54 AM	23.90	25	1.10	0.53	
1	9/22/2016	9:54 PM	23.90	10:04 AM	24.20	10	0.30	0.36	
2	9/22/2016	10:08 AM	23.50	10:18 AM	23.80	10	0.30	0.36	
3	9/22/2016	10:22 AM	22.50	10:32 AM	23.10	10	0.60	0.72	
4	9/22/2016	10:32 AM	23.10	10:42 AM	23.50	10	0.40	0.48	
5	9/22/2016	10:42 AM	23.50	10:52 AM	23.90	10	0.40	0.48	
6	9/22/2016	10:52 AM	23.90	11:02 AM	24.25	10	0.35	0.42	0.8

Comments:

1. Percolation test was performed in accordance with the Riverside County Flood Control and Water Conservation District ' "Design Handbook for Low Impact Development Best Management Practices" dated September 2011
2. Per the procedures for deep percolation tests in sandy soils, measurements were taken in 10-minute intervals for an hour after sandy soil criteria was met.
3. Weather: Partly cloudy, 85°C
4. Measurements were collected from the Top of Pipe = 28.9 Feet

APPENDIX D
Test Pit Logs



TEST PIT DESCRIPTION:

(1) Tan, fine to medium SAND, trace gravel, (SP). [FILL]

(2) Tan/light grey, fine to coarse SAND, trace gravel, trace cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 22 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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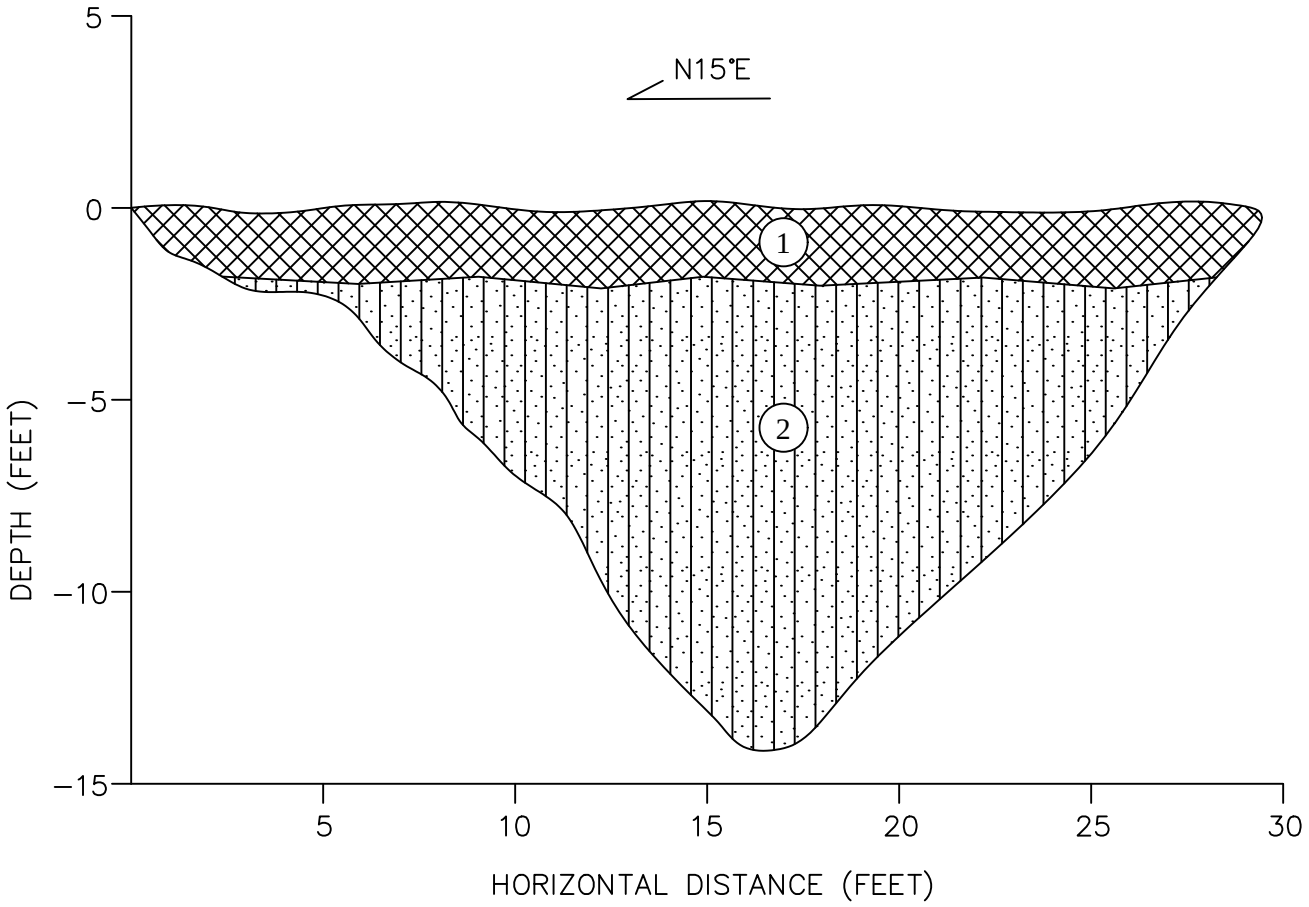
ABU DHABI ATHENS DOHA DUBAI ISTANBUL LONDON PANAMA
Langan Engineering & Environmental Services, Inc.

Project: AGUA MANSA COMMERCE PARK
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Figure Title: TEST PIT LOG LT-2

Project No.	Figure No.
700045403	D-1
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:52 User: jbaron Style Table: Langan.stb Layout: LT-2



TEST PIT DESCRIPTION:

(1) Tan, silty fine SAND, (SM), dry, [FILL]

(2) Tan, silty fine SAND, (SM), dry, pinholes in sidewall observed at approximately 5 feet. [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 21 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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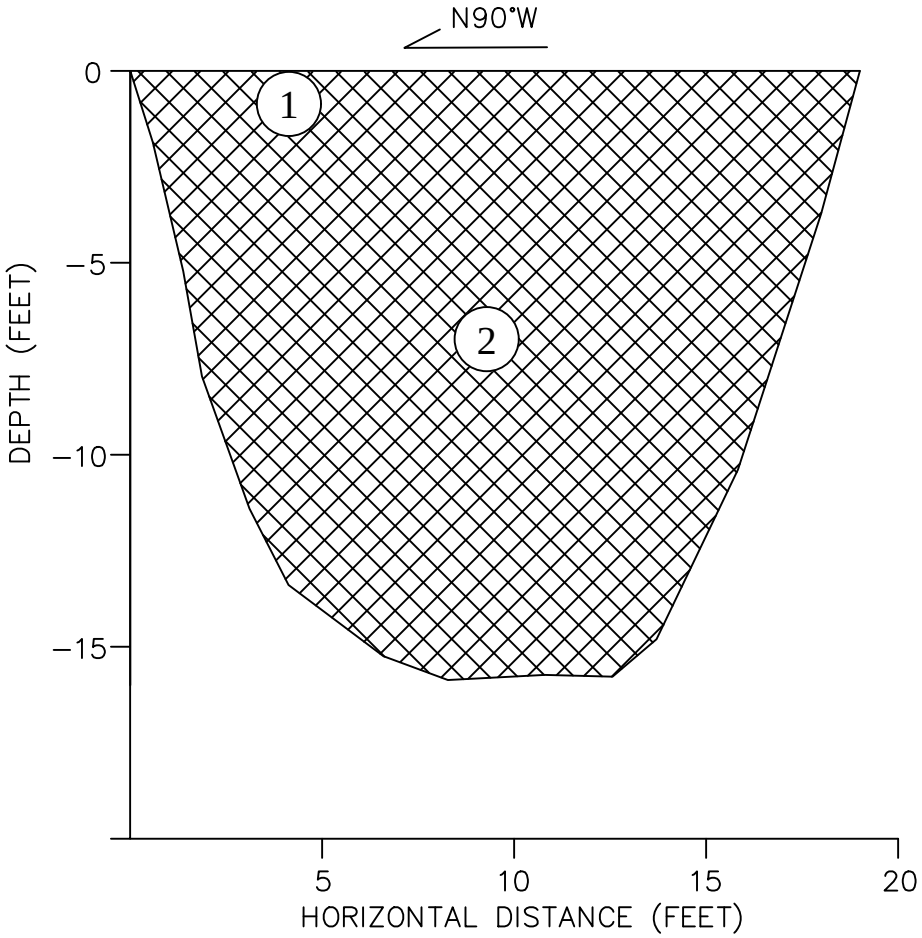
ABU DHABI ATHENS DOHA DUBAI ISTANBUL LONDON PANAMA
Langan Engineering & Environmental Services, Inc.

Project	AGUA MANSA COMMERCE PARK JURUPA VALLEY RIVERSIDE COUNTY CALIFORNIA
Figure Title	TEST PIT LOG LT-4
Project No.	700045403
Date	28 APRIL 2017
Scale	1" = 5'
Logged By / Drawn By	JAB / DJJ
Figure No.	D-2

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-4



TEST PIT DESCRIPTION:

(1) Light grey, SAND, (SP), partially cemented materials. [FILL]

(2) Light brown, fine to medium SAND, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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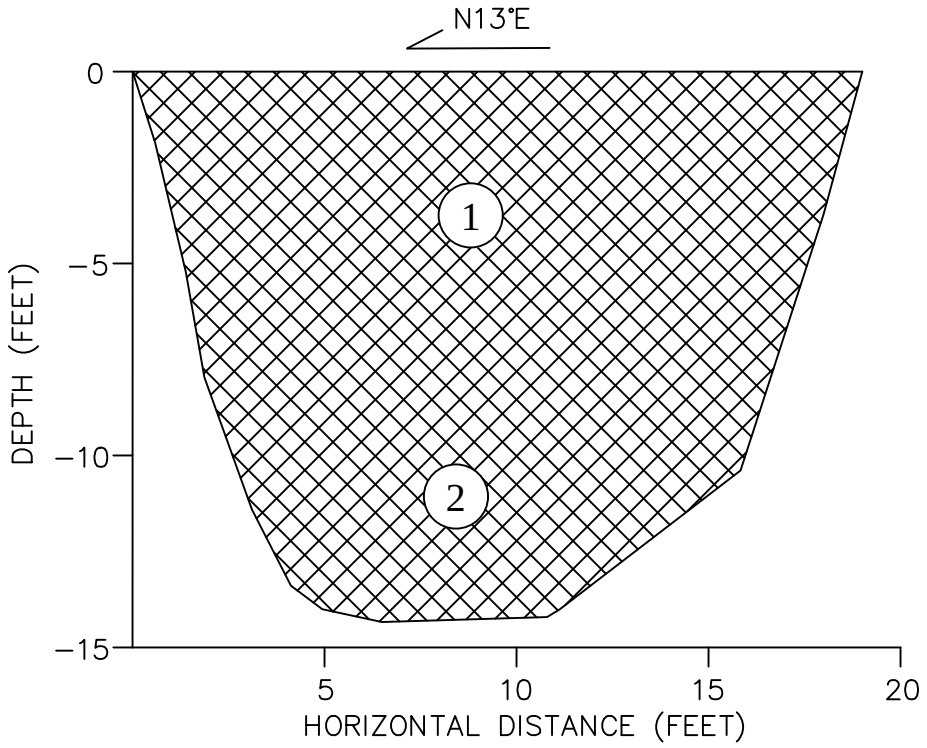
Langan Engineering & Environmental Services, Inc.

Project: AGUA MANSA COMMERCE PARK
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Figure Title: TEST PIT LOG LT-5

Project No.	Figure No.
700045403	D-3
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:52 User: jbaron Style Table: Langan.stb Layout: LT-5



TEST PIT DESCRIPTION:

(1) Light brown, fine to medium silty SAND, (SM). [FILL]

(2) Tan/light grey, fine to medium SAND, trace gravel, trace cobbles (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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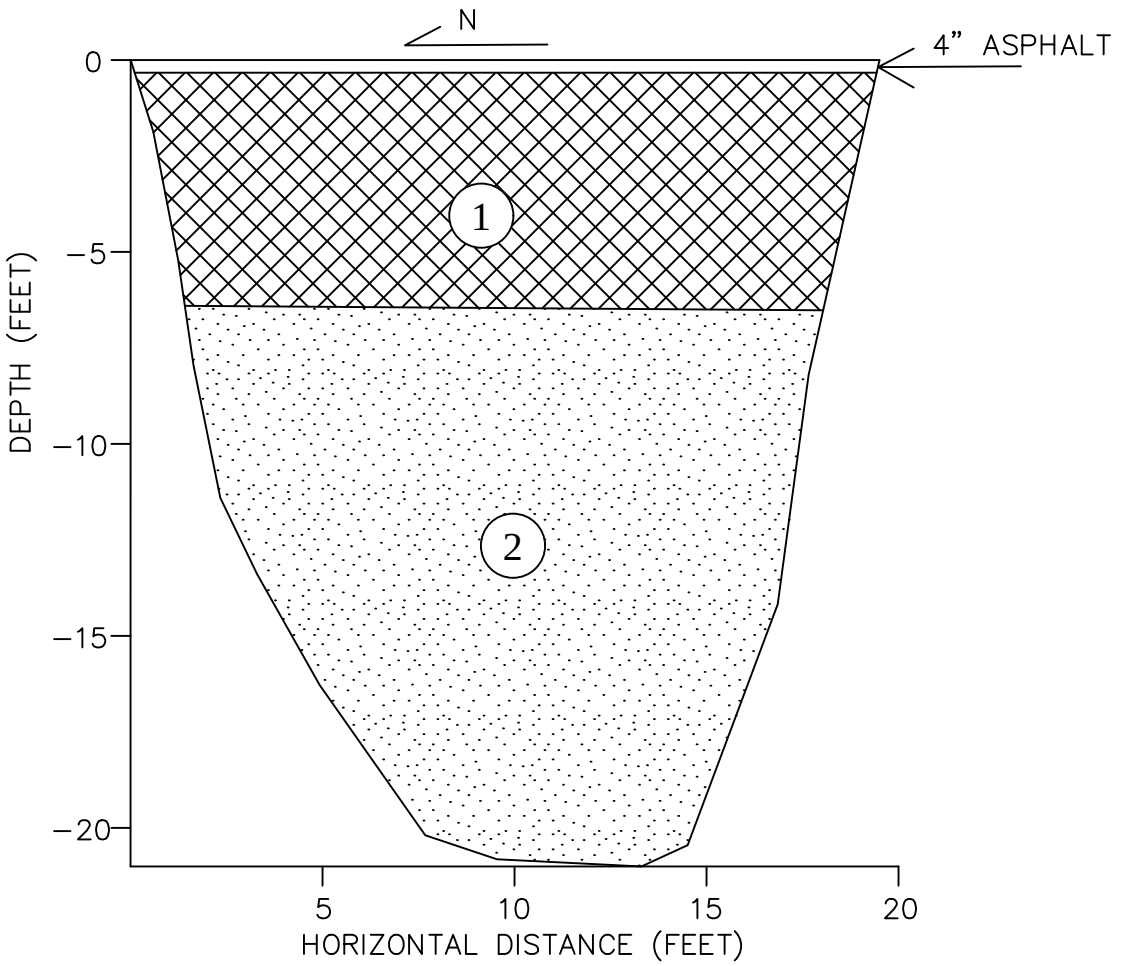
Figure Title: TEST PIT LOG LT-6

Project No.	Figure No.
700045403	D-4
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:52 User: jbaron Style Table: Langan.stb Layout: LT-6



TEST PIT DESCRIPTION:

(1) Tan/light brown, fine to medium silty SAND, (SM). [FILL]

(2) Tan/light brown, fine to coarse SAND, trace gravel and cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 22 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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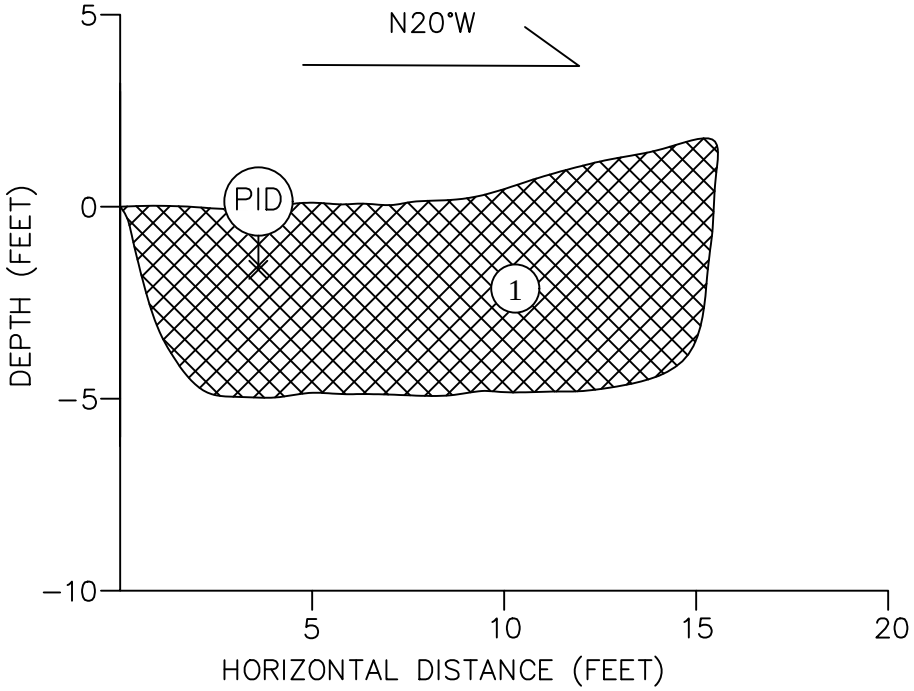
Figure Title: TEST PIT LOG LT-8

Project No.	Figure No.
700045403	D-5
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:52 User: jbaron Style Table: Langan.stb Layout: LT-8



TEST PIT DESCRIPTION:

(1) Brown–black, silty fine to coarse SAND, some fine to coarse gravel, (SM), dry, slight odor, vegetation within trench side walls, PID=10 parts per million, plastic debris. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 21 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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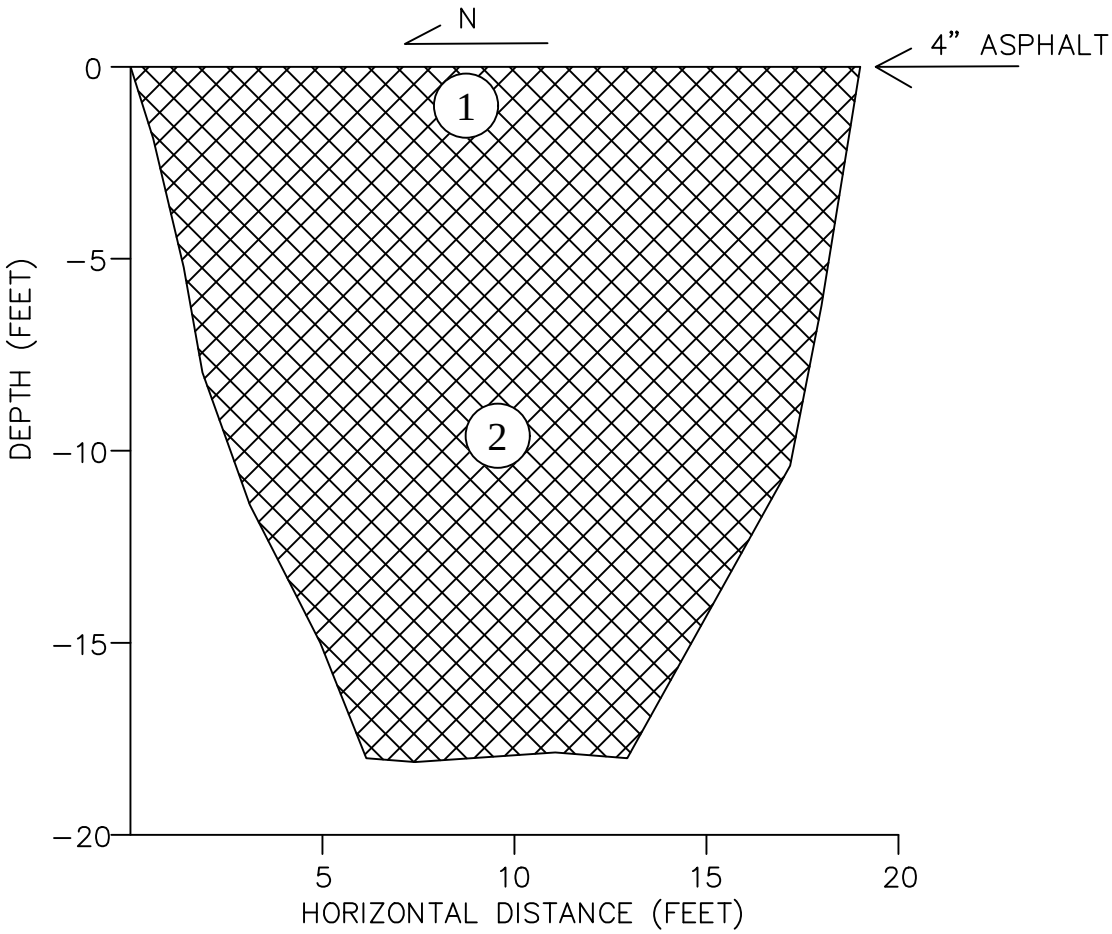
Figure Title: TEST PIT LOG LT-9

Project No.	Figure No.
700045403	D-6
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-9



TEST PIT DESCRIPTION:

(1) Light brown, fine to coarse SAND, (SP). [FILL]

(2) Light brown, fine to medium SAND, trace silt and clay, (SP−SM). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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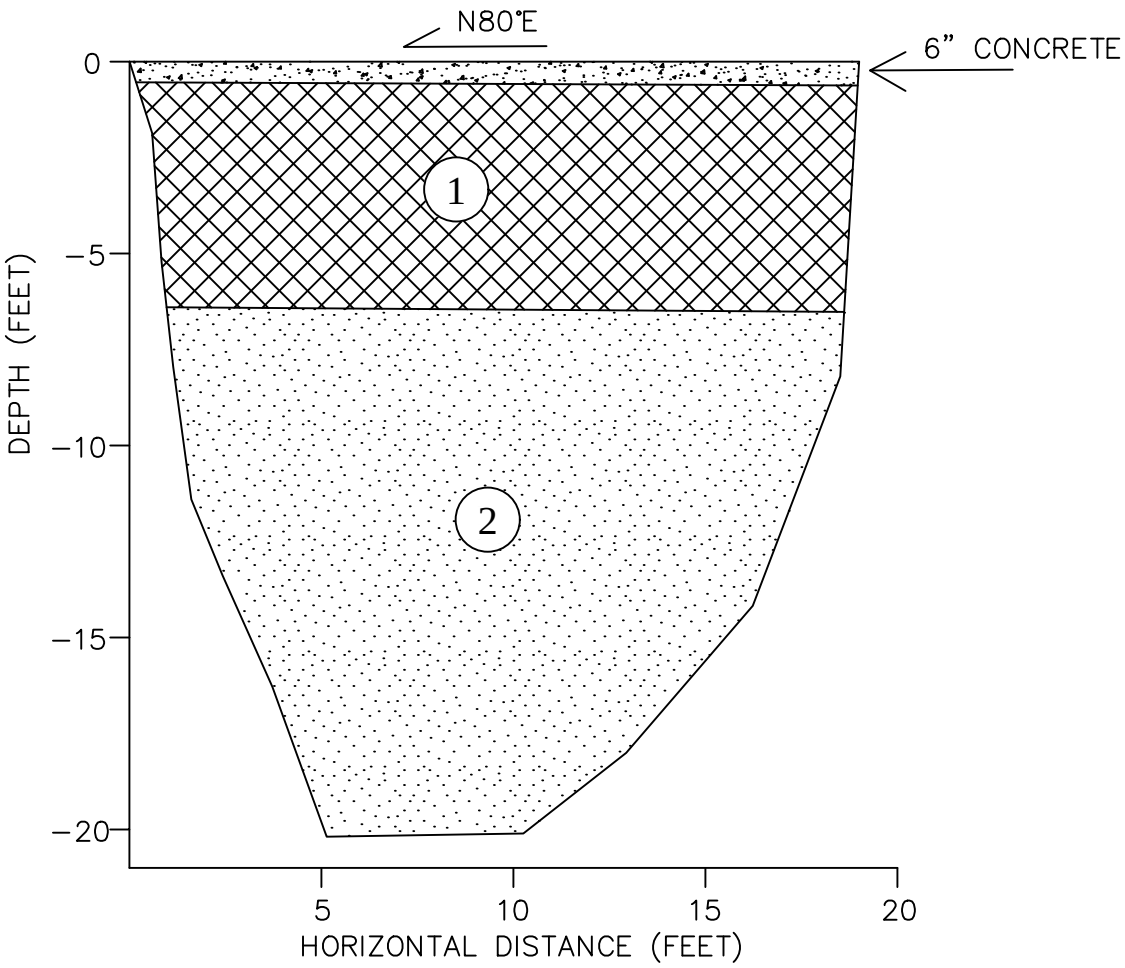
Project	AGUA MANSA COMMERCE PARK JURUPA VALLEY RIVERSIDE COUNTY CALIFORNIA
Figure Title	TEST PIT LOG LT-10
Project No.	700045403
Date	28 APRIL 2017
Scale	1" = 5'
Logged By / Drawn By	DL / DJJ
Figure No.	D-7

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:52 User: jbaron Style Table: Langan.stb Layout: LT-10



TEST PIT DESCRIPTION:

(1) Tan, fine to coarse silty SAND, trace gravel, (SM). [FILL]

(2) Tan−grey, medium to coarse SAND, trace gravel, trace cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 22 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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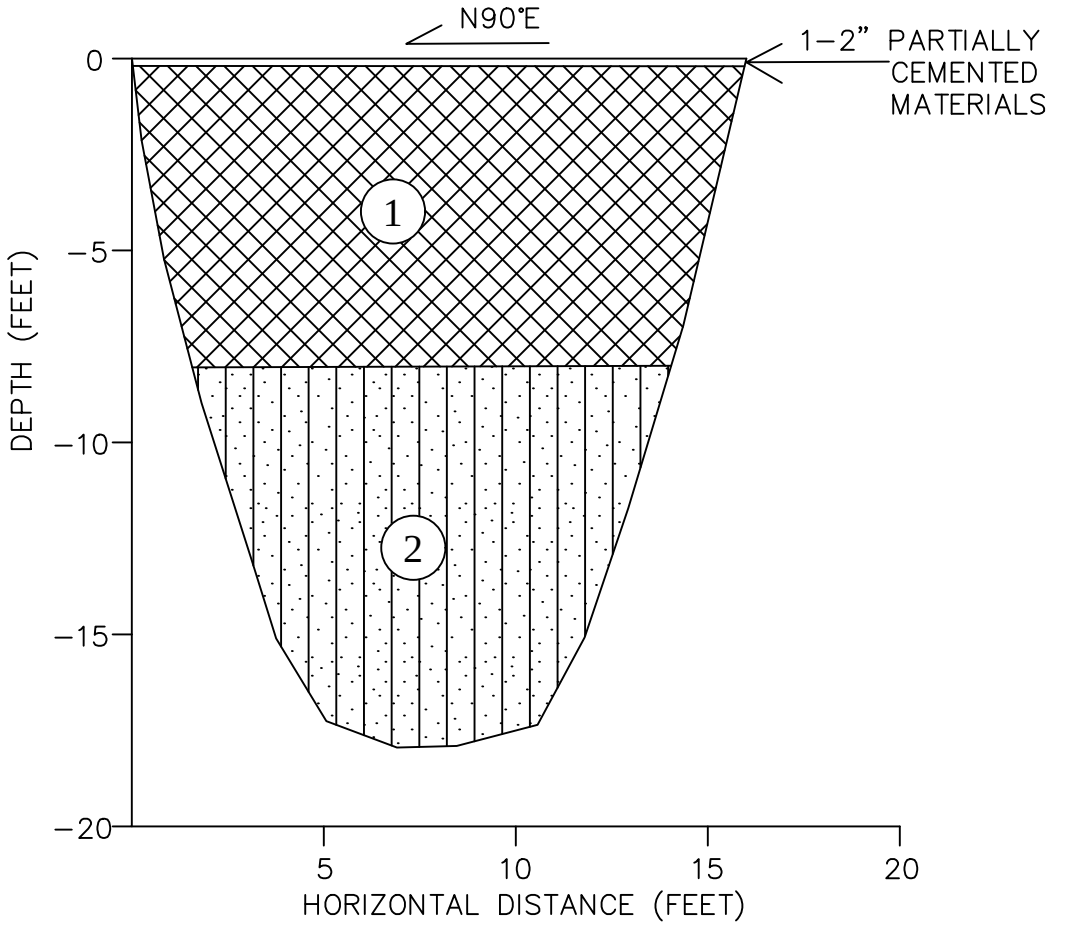
Figure Title: TEST PIT LOG LT-11

Project No.	Figure No.
700045403	D-8
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ



TEST PIT DESCRIPTION:

(1) Tan/light brown, fine to medium silty SAND, trace gravel, (SM). [FILL]

(2) Light brown, fine to coarse silty SAND, trace gravel and cobbles, (SM). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 22 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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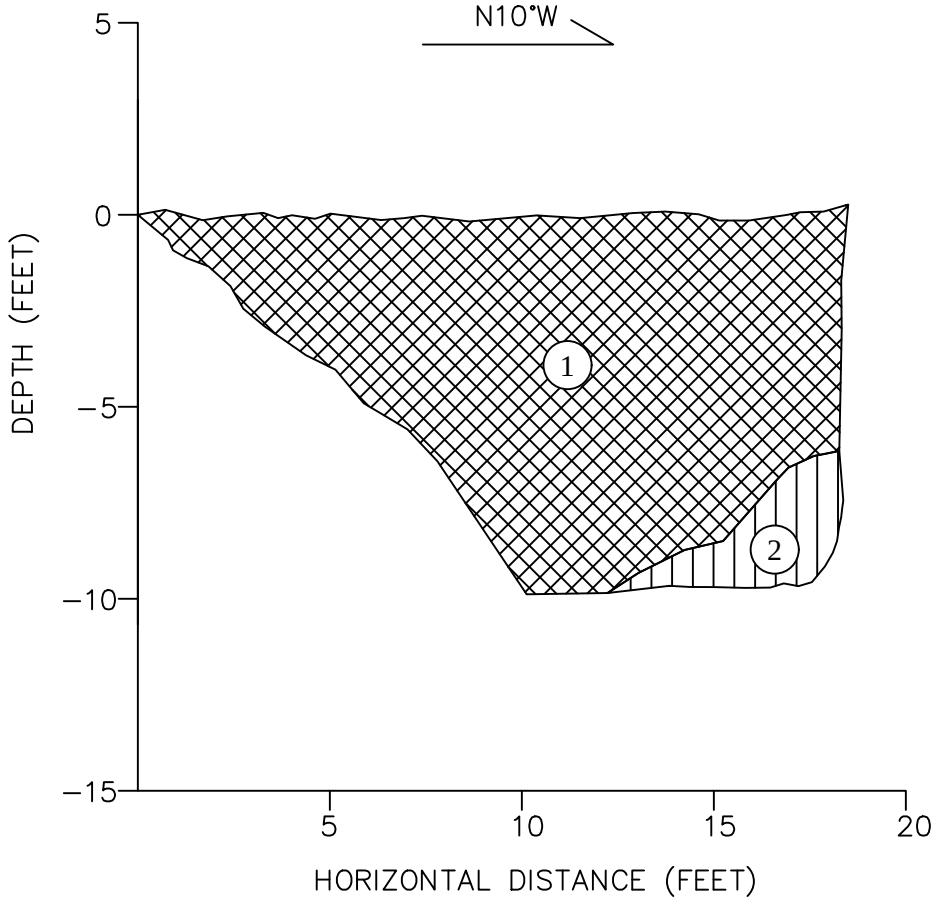
Project	AGUA MANSA COMMERCE PARK JURUPA VALLEY RIVERSIDE COUNTY CALIFORNIA
Figure Title	TEST PIT LOG LT-12
Project No.	700045403
Date	28 APRIL 2017
Scale	1" = 5'
Logged By / Drawn By	DL / DJJ
Figure No.	D-9

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:52 User: jbaron Style Table: Langan.stb Layout: LT-12



TEST PIT DESCRIPTION:

1. Brown–tan, silty fine to coarse SAND, some fine to coarse gravel, some cobbles, (SM), dry, vegetation debris. [FILL]
2. Brown–tan, sandy SILT, fine sand, trace cobbles, (ML), moist. [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 21 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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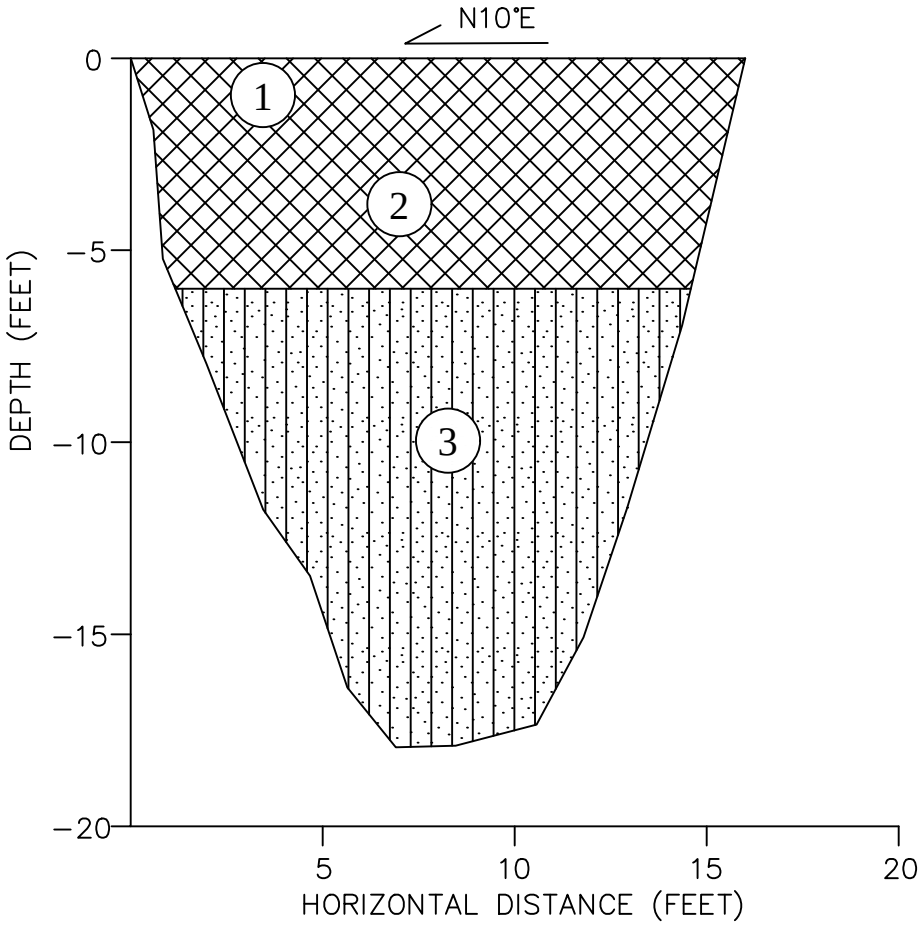
Figure Title: TEST PIT LOG LT-13

Project No.	Figure No.
700045403	D-10
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-13



TEST PIT DESCRIPTION:

1. Light grey, partially cemented material. [FILL]
2. Tan, fine to coarse SAND, trace gravel, (SP). [FILL]
3. Light brown, fine to medium silty SAND, (SM). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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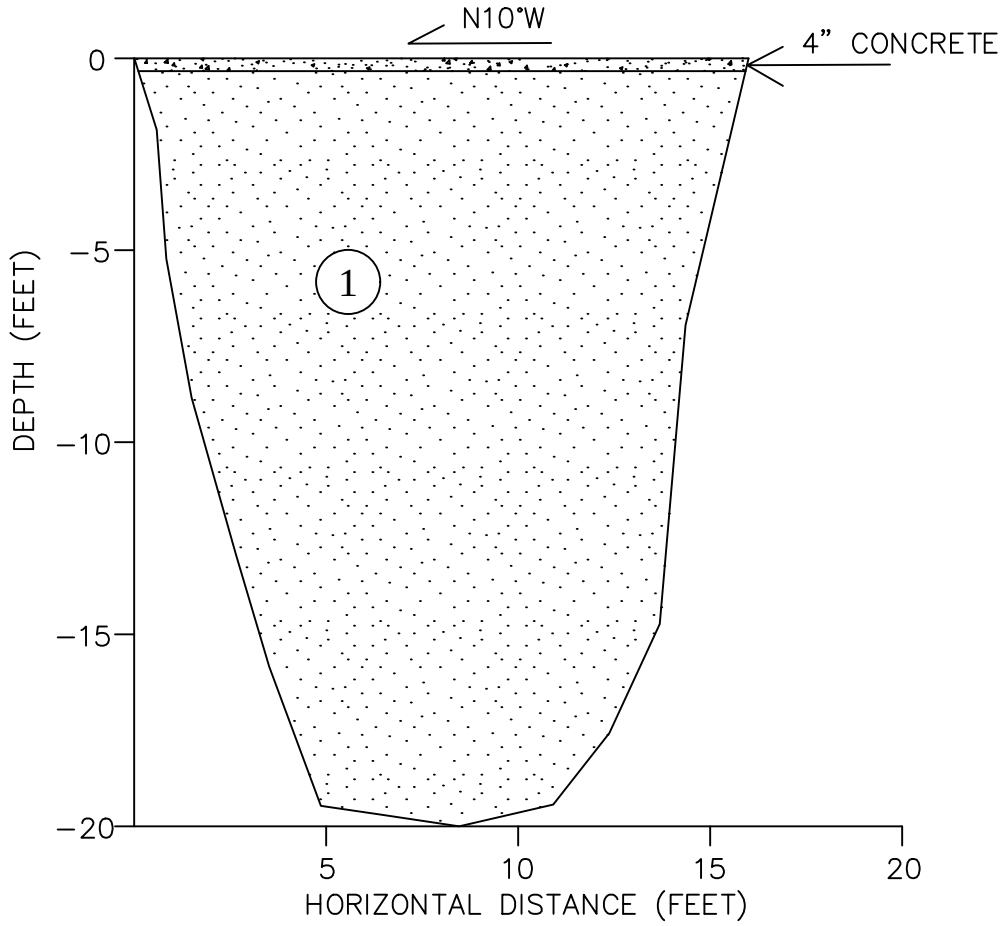
Figure Title: TEST PIT LOG LT-14

Project No.	Figure No.
700045403	D-11
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-14



TEST PIT DESCRIPTION:

(1) Tan/brown, fine to coarse SAND, trace gravel and cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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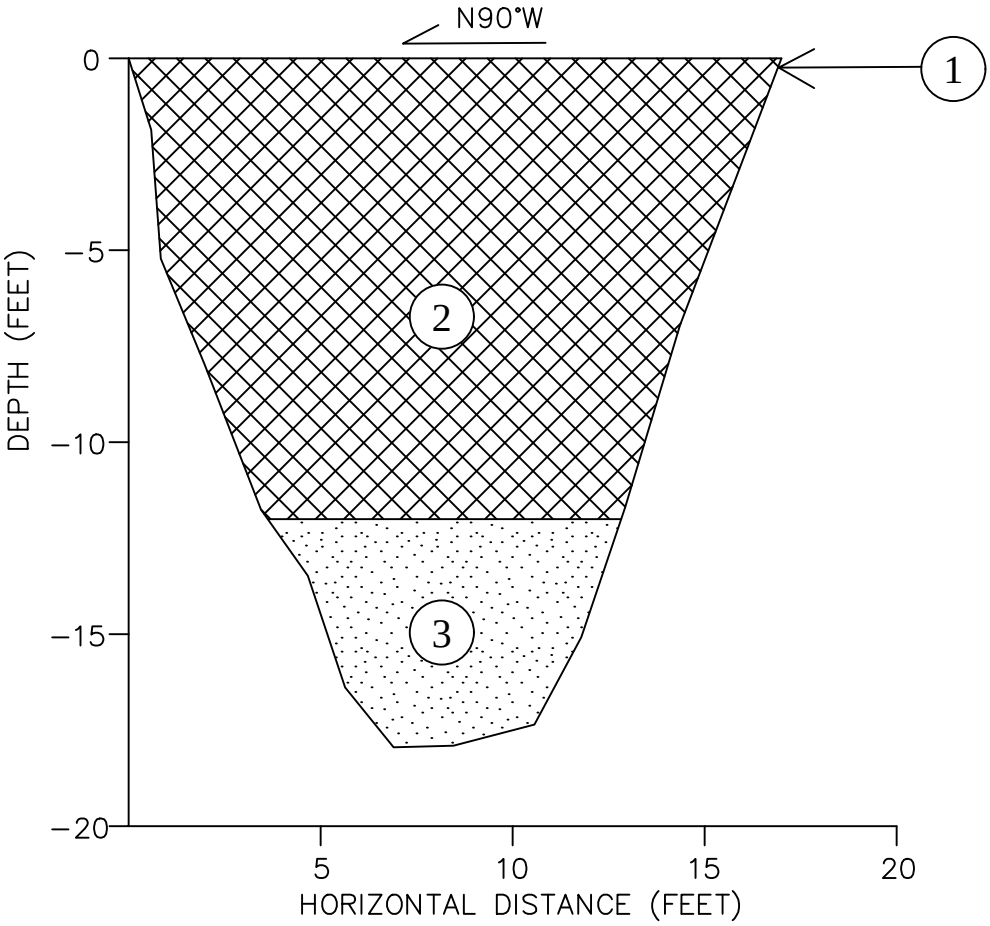
Figure Title: TEST PIT LOG LT-15

Project No.	Figure No.
700045403	D-12
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-15



TEST PIT DESCRIPTION:

1. Light grey, partially cemented material. [FILL]
2. Tan, fine to coarse SAND, (SP). [FILL]
3. Light brown, fine to medium SAND, trace cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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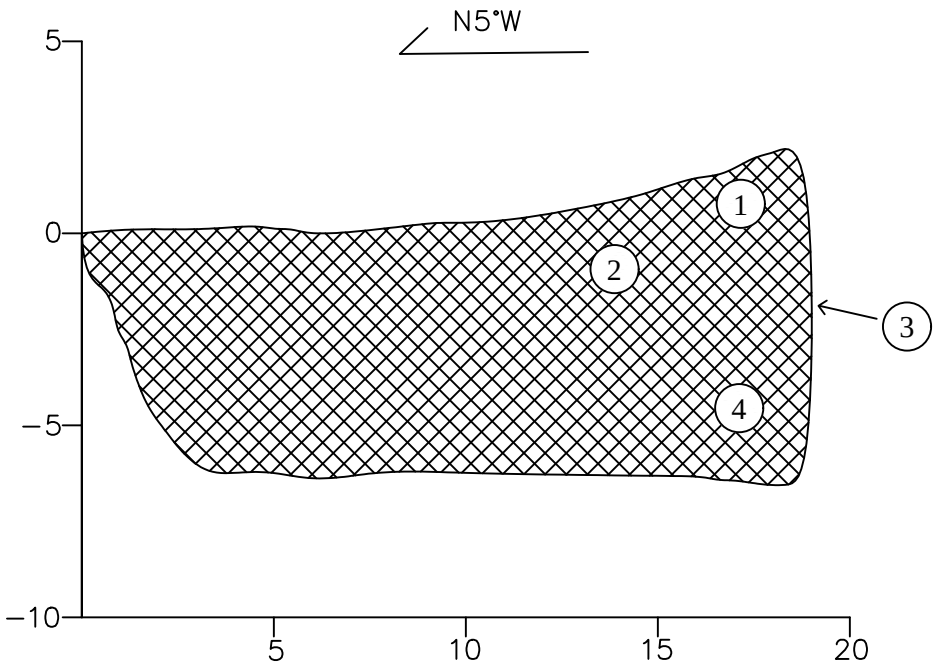
Figure Title: TEST PIT LOG LT-16

Project No.	Figure No.
700045403	D-13
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-16



TEST PIT DESCRIPTION:

1. Tan, fine to coarse SAND, some fine to coarse gravel, (SW), dry. [FILL]
2. 3" Asphalt. [FILL]
3. Gray, fine to coarse SAND, some fine gravel, (SW), dry. [FILL]
4. Brown, SILT, trace fine sand, (ML), moist. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 19 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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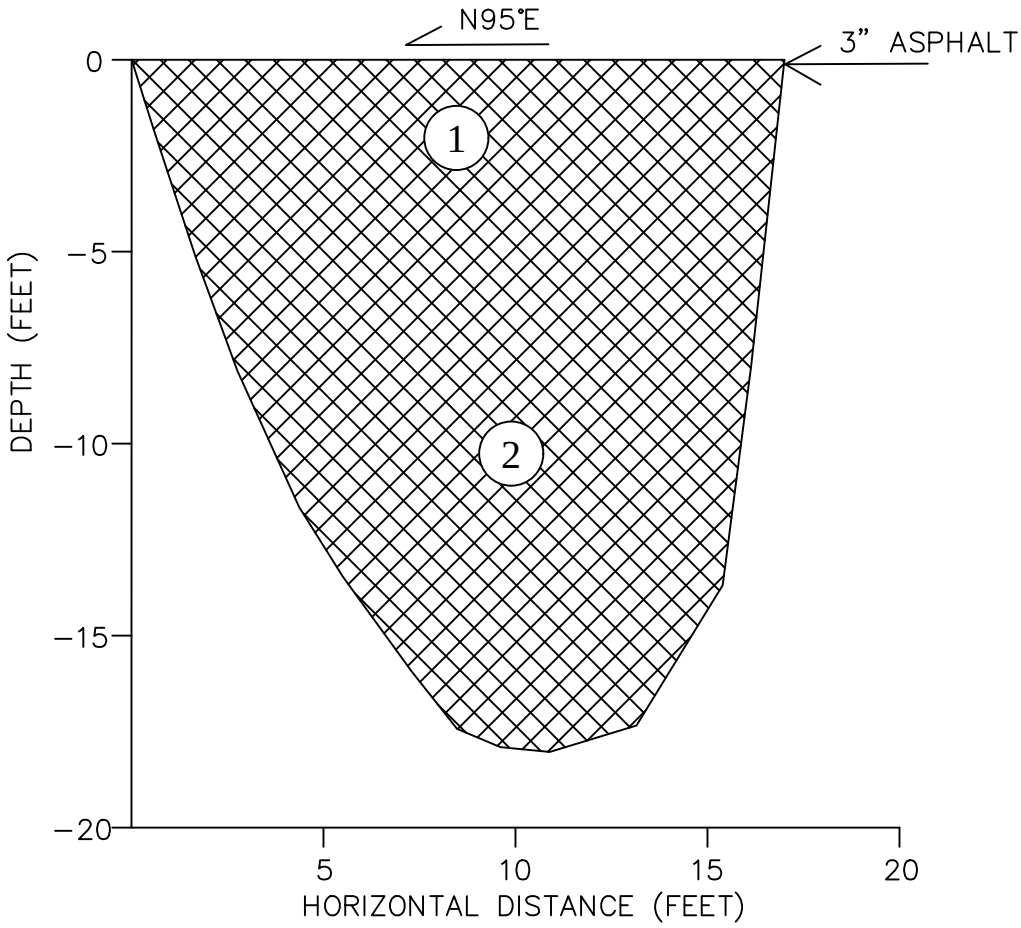
Figure Title: TEST PIT LOG LT-17

Project No.	Figure No.
700045403	D-14
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-17



TEST PIT DESCRIPTION:

1. Tan, fine to coarse SAND, (SP). [FILL]

2. Light brown, fine to medium SAND, trace cobbles, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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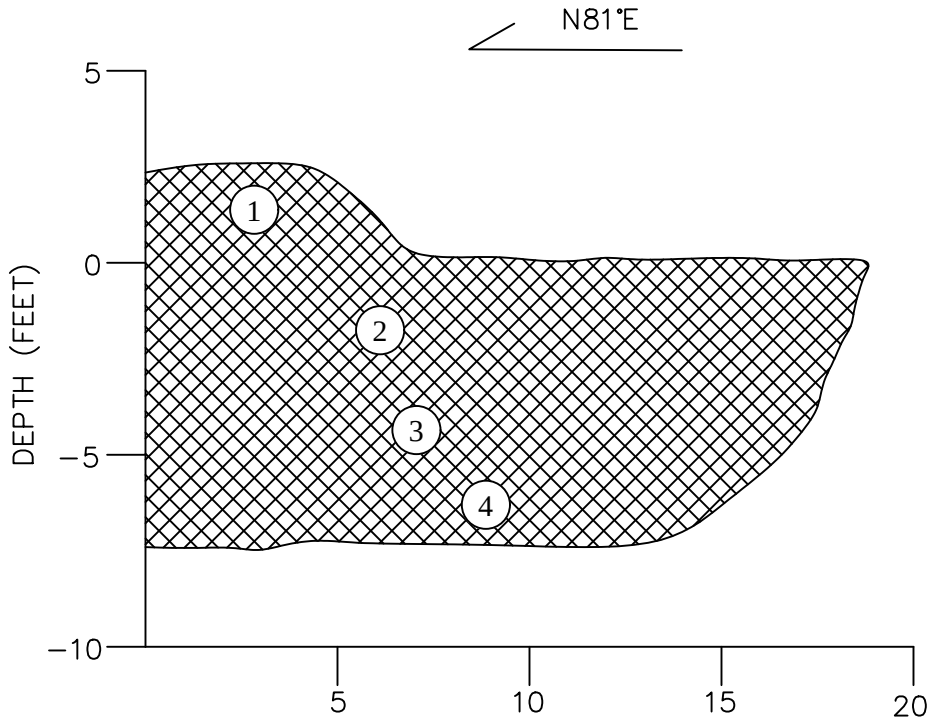
Figure Title: TEST PIT LOG LT-18

Project No.	Figure No.
700045403	D-15
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-18



TEST PIT DESCRIPTION:

1. Tan, silty, fine to medium SAND, some fine to coarse gravel, (SM), dry. [FILL]
2. Tan fine to coarse SAND, some fine to medium gravel, cemented, (SW), dry. [FILL]
3. Tan, fine to medium SAND, (SP), dry. [FILL]
4. Reddish–brown, silty fine to medium SAND, (SM), moist. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 19 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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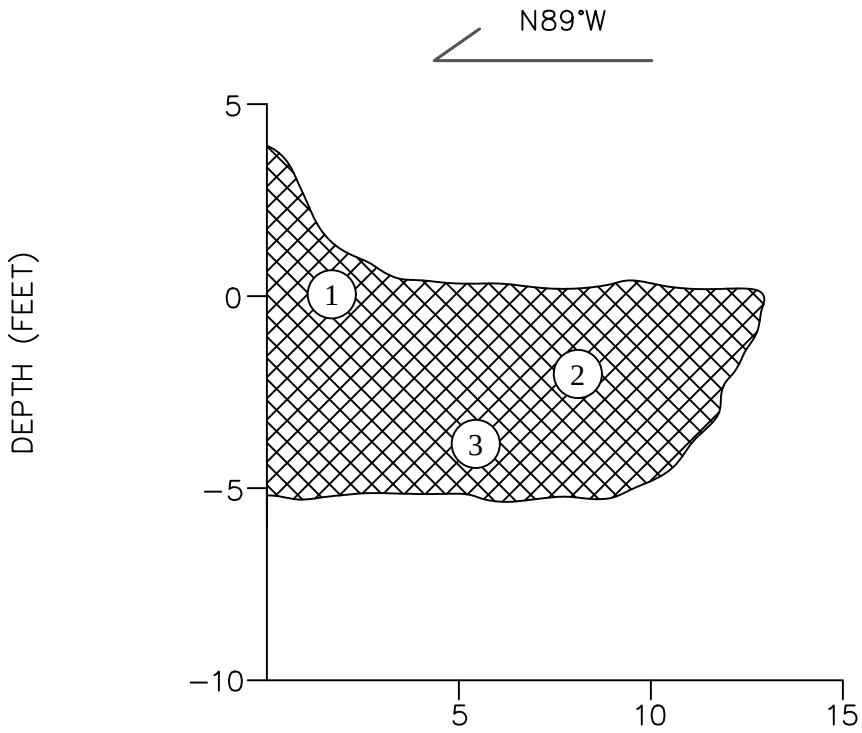
Figure Title: TEST PIT LOG LT-19

Project No.	Figure No.
700045403	D-16
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-19



TEST PIT DESCRIPTION:

1. Tan/grey, fine to coarse SAND, some gravel, (SW), dry, cemented material. [FILL]
2. Dark brown, silty fine to coarse SAND, some gravel, (SM), moist, cemented material. [FILL]
3. Reddish–brown, silty fine to medium SAND, (SM), moist. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 19 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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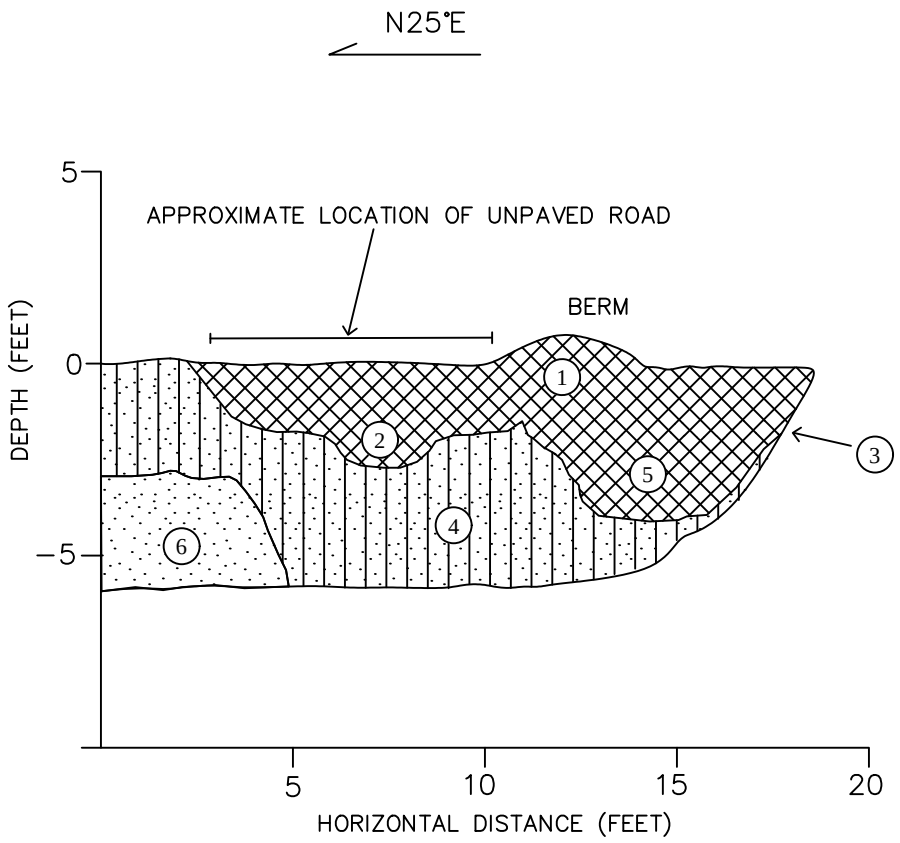
Figure Title: TEST PIT LOG LT-20

Project No.	Figure No.
700045403	D-17
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-20



TEST PIT DESCRIPTION:

1. Dark brown, silty fine to coarse SAND, some fine gravel, (SM), dry. [FILL]
2. Gray, fine to coarse GRAVEL, (GP), dry, cemented material. [FILL]
3. Pink, suspected CKD.
4. Brown, silty fine to coarse SAND, some fine to coarse gravel, (SM), moist. [Alluvial Deposits]
5. Brown with white mottling, fine GRAVEL, (GP), cemented material. [FILL]
6. Light gray, fine to medium SAND, (SP), dry.

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 19 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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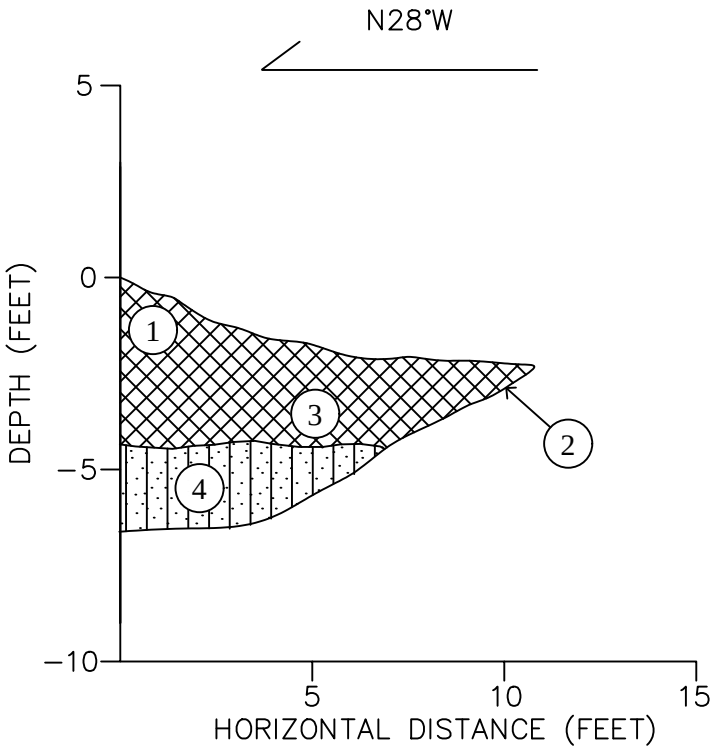
Figure Title: TEST PIT LOG LT-21

Project No.	Figure No.
700045403	D-18
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-21



TEST PIT DESCRIPTION:

1. Tan, fine to coarse SAND, some fine to coarse gravel, (SW), dry. [FILL]
2. 3" thick asphalt and 4' aggregate base. [FILL]
3. Dark brown, silty fine to coarse SAND, some fine to coarse gravel, (SM), moist. [FILL]
4. Reddish–brown, SILT, some fine sand, (SM), moist. [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 19 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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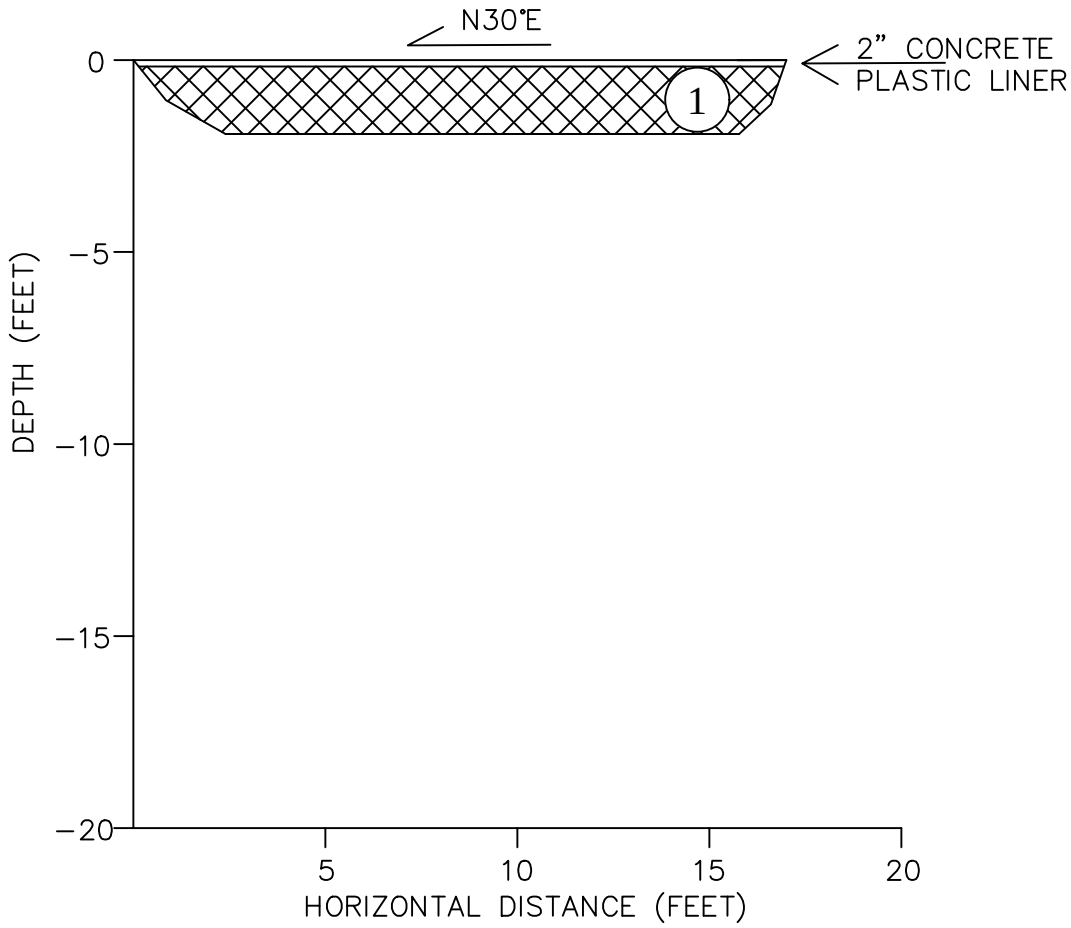
Figure Title: TEST PIT LOG LT-22

Project No.	Figure No.
700045403	D-19
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-22



TEST PIT DESCRIPTION:

(1) Tan, fine to coarse SAND, (SP). [FILL]

Encountered concrete at 2 feet

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 20 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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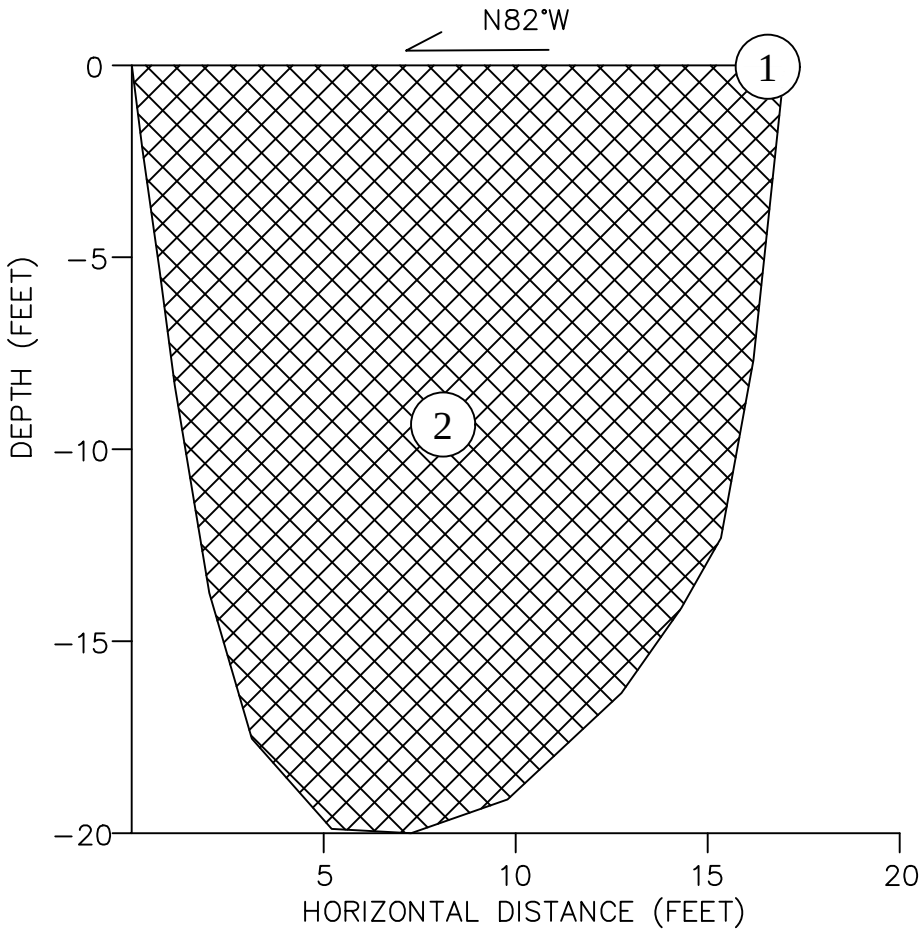
Figure Title: TEST PIT LOG LT-23

Project No.	Figure No.
700045403	D-20
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ



TEST PIT DESCRIPTION:

1. Cemented materials.

2. Brown, fine to coarse SAND, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 23 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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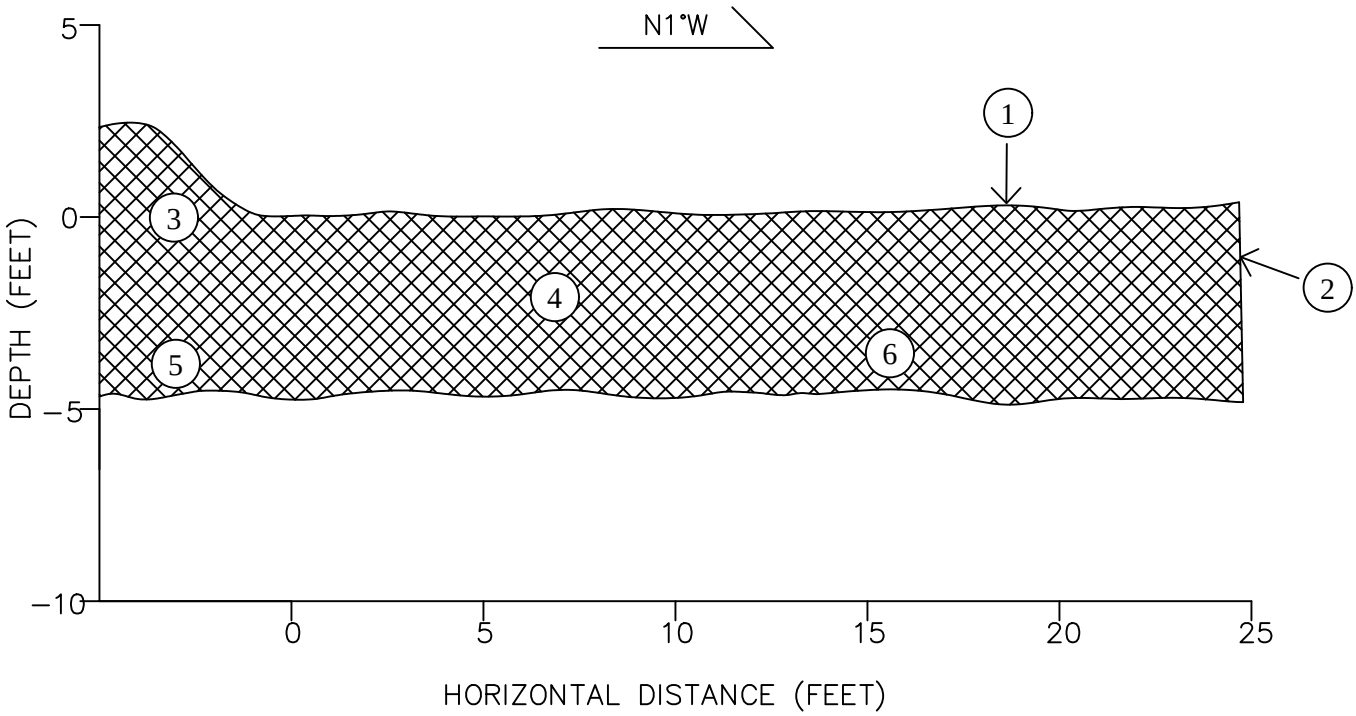
Figure Title: TEST PIT LOG LT-24

Project No.	Figure No.
700045403	D-21
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-24



TEST PIT DESCRIPTION:

1. Brown, silty fine to coarse SAND, some fine to coarse gravel, (SM), moist. [FILL]
2. Pink, cemented and hardened material, trace fine sand, suspected CKD, dry. [FILL]
3. White, fine to coarse SAND, some silt, some fine to coarse gravel, (SM), dry. [FILL]
4. Red, clayey fine to coarse SAND, some fine to coarse gravel, (SC), moist. [FILL]
5. White, SILT, trace fine sand, cemented, (ML), dry. [FILL]
6. Brown, silty fine to coarse SAND, some fine to coarse gravel, some cobbles, (SM), moist. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 20 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING

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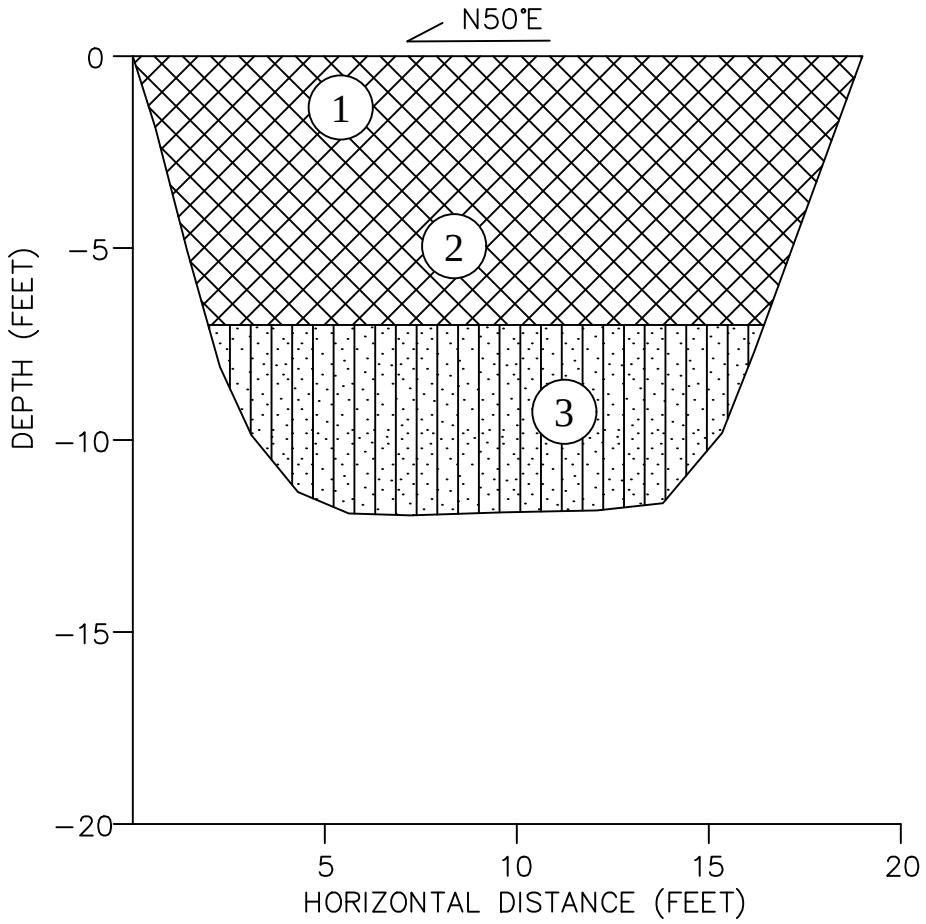
Figure Title: TEST PIT LOG LT-26

Project No.	Figure No.
700045403	D-22
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-26



TEST PIT DESCRIPTION:

1. Tan, fine to medium SAND, (SP), partially cemented materials. [FILL]
2. Light brown, fine to medium SAND, trace clay, (SC), partially cemented materials. [FILL]
3. Brown, fine to coarse silty SAND, trace gravel, (SM). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 20 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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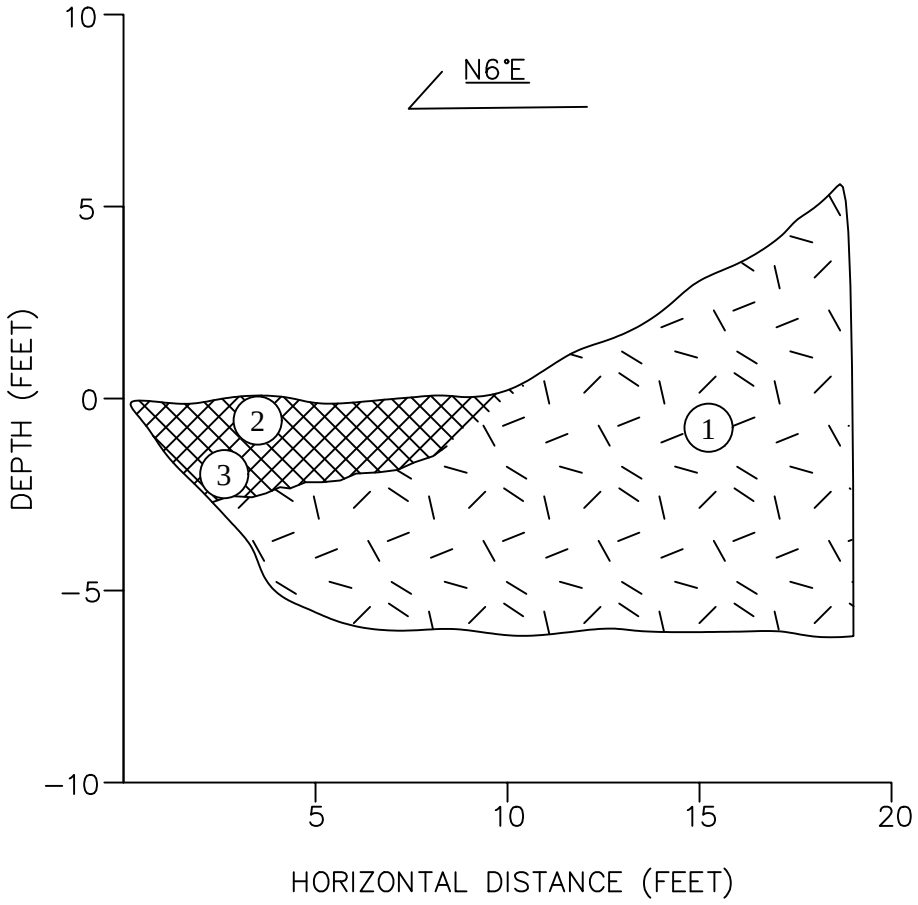
Figure Title: TEST PIT LOG LT-27

Project No.	Figure No.
700045403	D-23
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-27



TEST PIT DESCRIPTION:

1. Brownish−white, decomposed granitic rock. [WEATHERED ROCK]
2. 12" thick cement and concrete. [FILL]
3. Tan, fine SAND, (SP), dry (mixed with harden cement pink material suspected CKD). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 19 SEPTMENBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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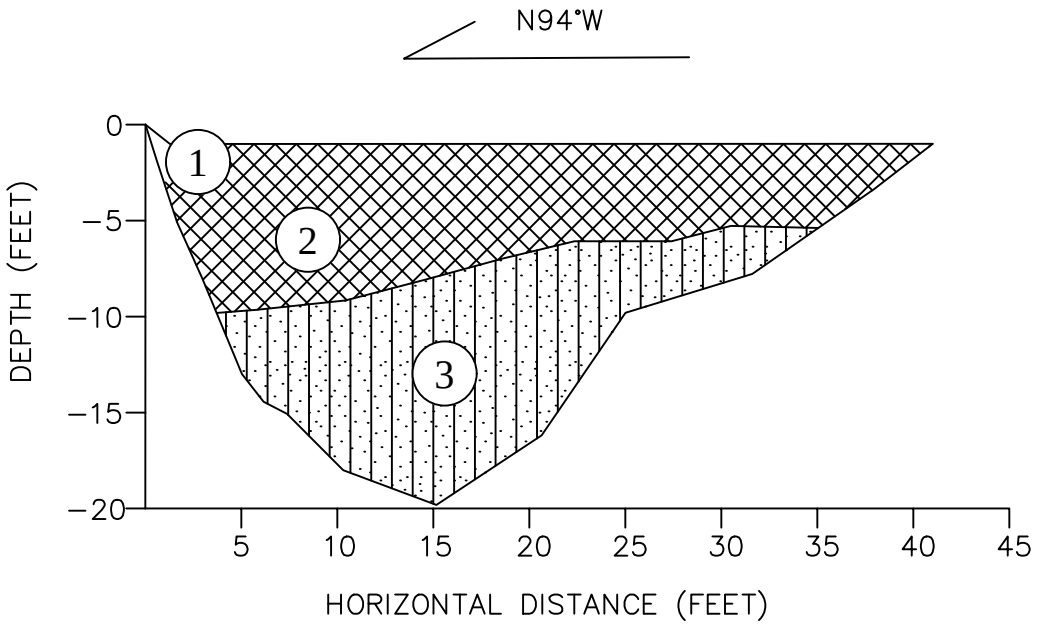
Figure Title: TEST PIT LOG LT-28

Project No.	Figure No.
700045403	D-24
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-28



TEST PIT DESCRIPTION:

1. Light brown, fine to coarse SAND, trace gravel, (SP). [FILL]
2. Tan, fine to medium SAND, (SP), and cement kiln dust (CKD). [FILL]
3. Light brown, fine to coarse SAND, trace gravel, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 23 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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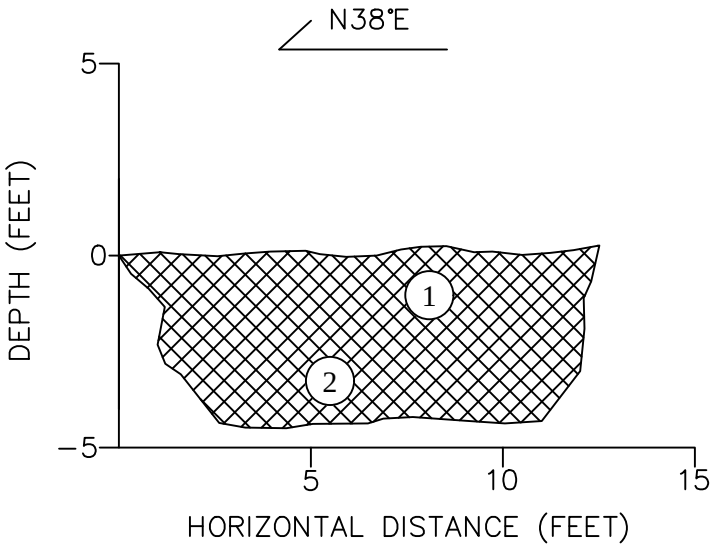
Figure Title: TEST PIT LOG LT-29

Project No.	Figure No.
700045403	D-25
Date: 28 APRIL 2017	
Scale: 1" = 10'	
Logged By: DL / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-29



TEST PIT DESCRIPTION:

1. Pink, silty fine to coarse SAND, some fine to coarse gravel, cemented, (SM), dry. [FILL]
2. Grey–brown cement, metal, wood and fabric. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 21 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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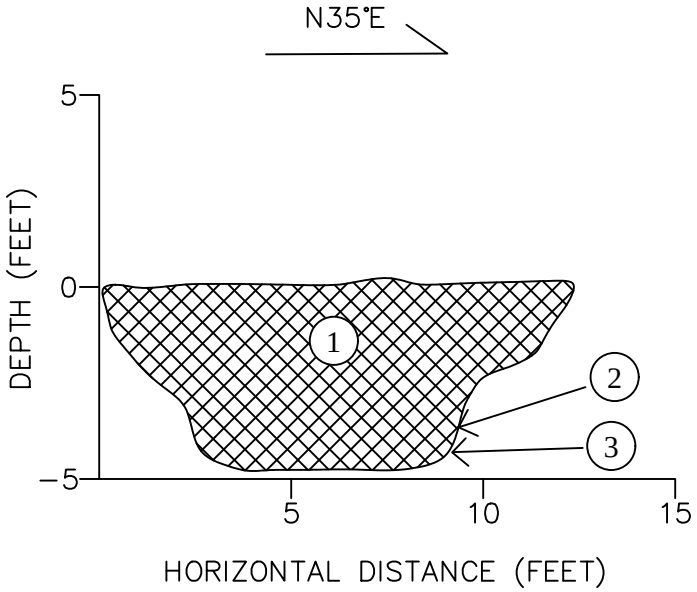
Figure Title: TEST PIT LOG LT-30

Project No.	Figure No.
700045403	D-26
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-30



TEST PIT DESCRIPTION:

1. Pink–tan, silty fine to coarse SAND, some fine to coarse gravel, (SM), dry, plastic debris. [FILL]
2. Pink, cement, brittle, crushed turns to very fine powder, suspected CKD, dry. [FILL]
3. Black–brown, silty fine to coarse SAND, (SM), dry. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 21 SEPTEMEBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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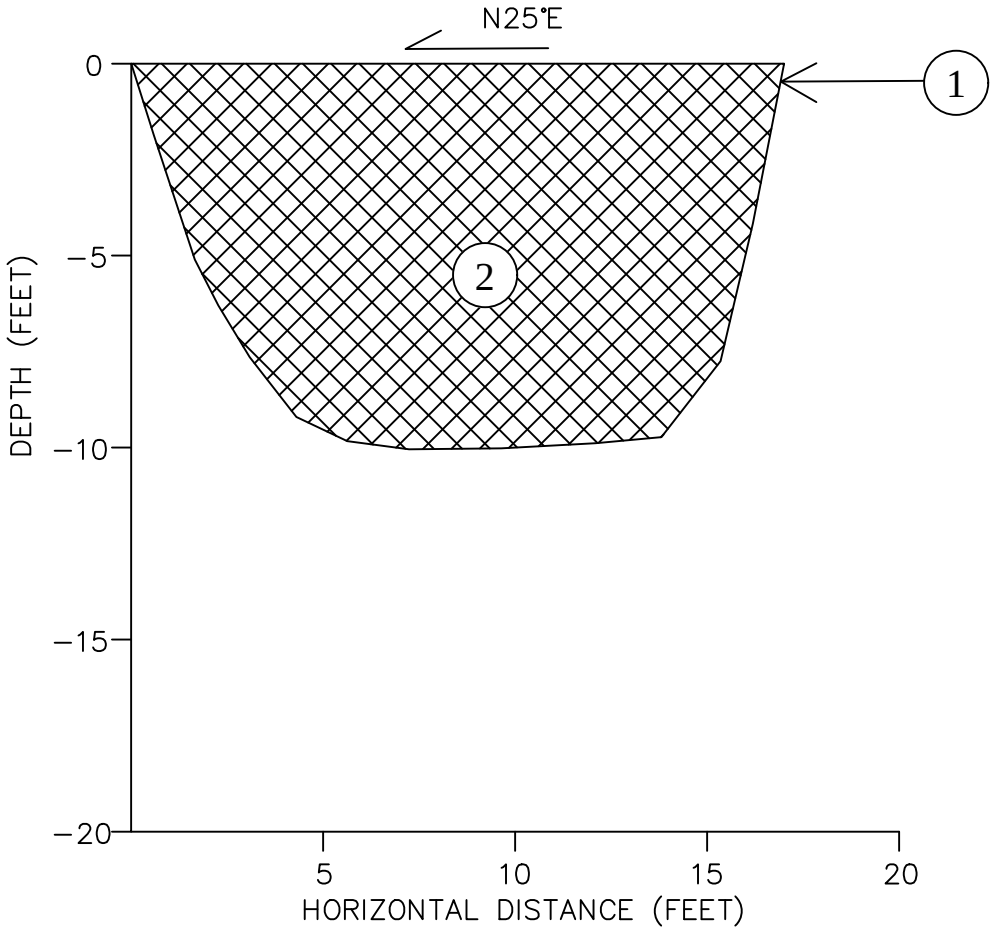
Project	AGUA MANSA COMMERCE PARK JURUPA VALLEY RIVERSIDE COUNTY CALIFORNIA
Figure Title	TEST PIT LOG LT-31
Project No.	700045403
Date	28 APRIL 2017
Scale	1" = 5'
Logged By / Drawn By	JAB / DJJ
Figure No.	D-27

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs.dwg Date: 4/26/2017 Time: 14:38 User: jbaron Style Table: Langan.stb Layout: LT-31



TEST PIT DESCRIPTION:

(1) Light brown, fine to medium SAND, trace gravel, (SP). [FILL]

(2) Grey, fine to coarse SAND, trace gravel, (SP), partially cemented materials. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 20 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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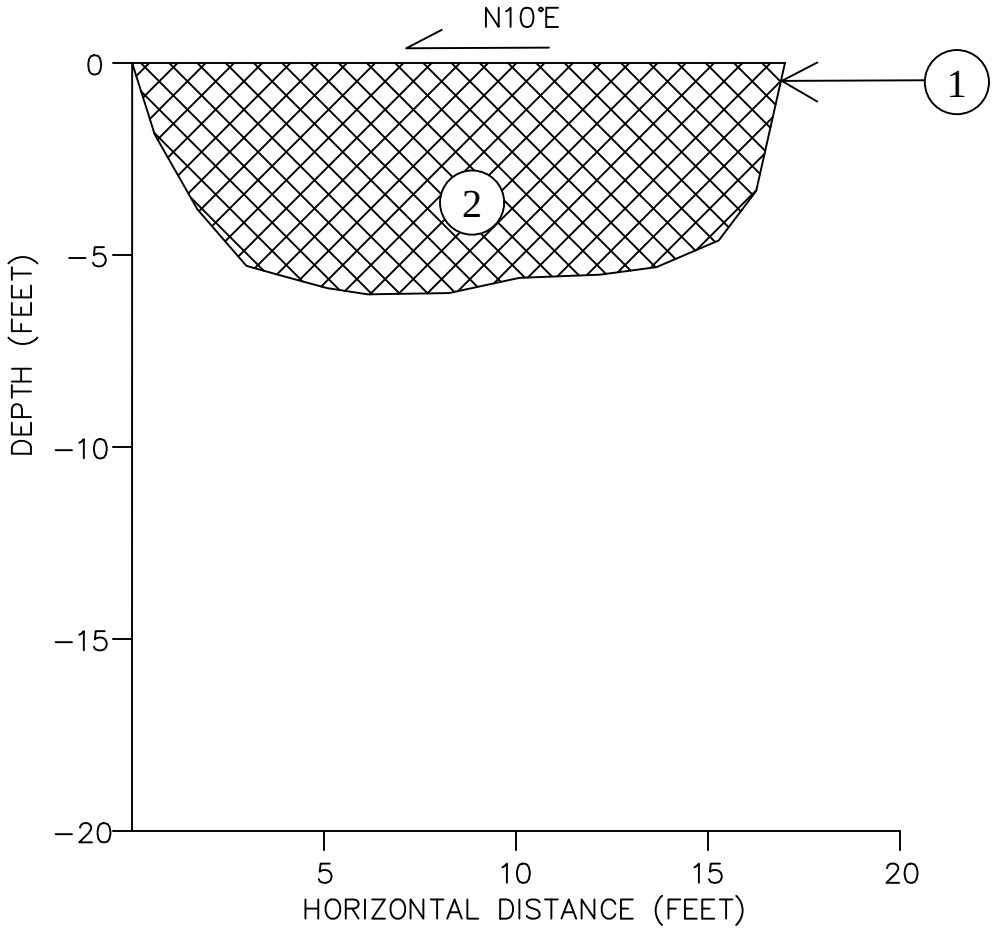
Figure Title: TEST PIT LOG LT-32

Project No.	Figure No.
700045403	D-28
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-32



TEST PIT DESCRIPTION:

(1) Tan, fine to medium SAND, (SP). [FILL]

(2) Tan, fine to medium SAND, trace gravel, (SP), partially cemented materials. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 20 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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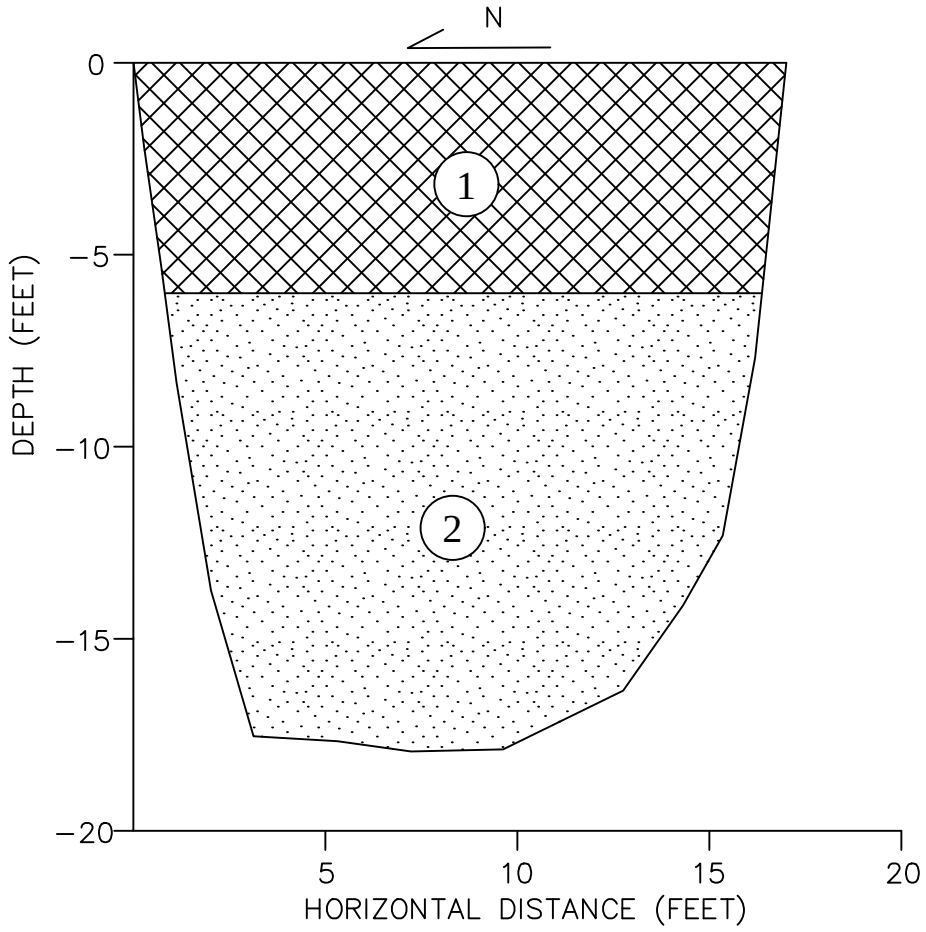
Figure Title: TEST PIT LOG LT-33

Project No.	Figure No.
700045403	D-29
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-33



TEST PIT DESCRIPTION:

(1) Tan, fine to medium SAND, tracel gravel, (SP). [FILL]

(2) Gravelly SAND, trace cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 22 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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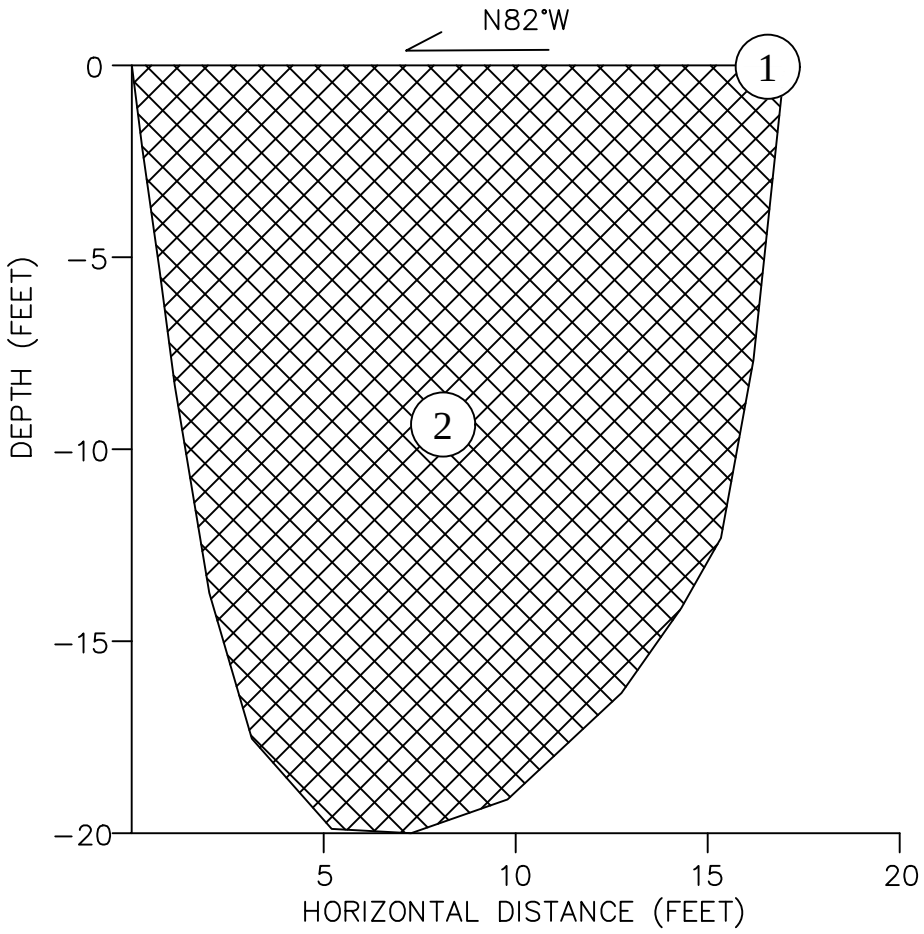
Figure Title: TEST PIT LOG LT-35

Project No.	Figure No.
700045403	D-30
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-35



TEST PIT DESCRIPTION:

1. Cemented materials.

2. Brown, fine to coarse SAND, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 23 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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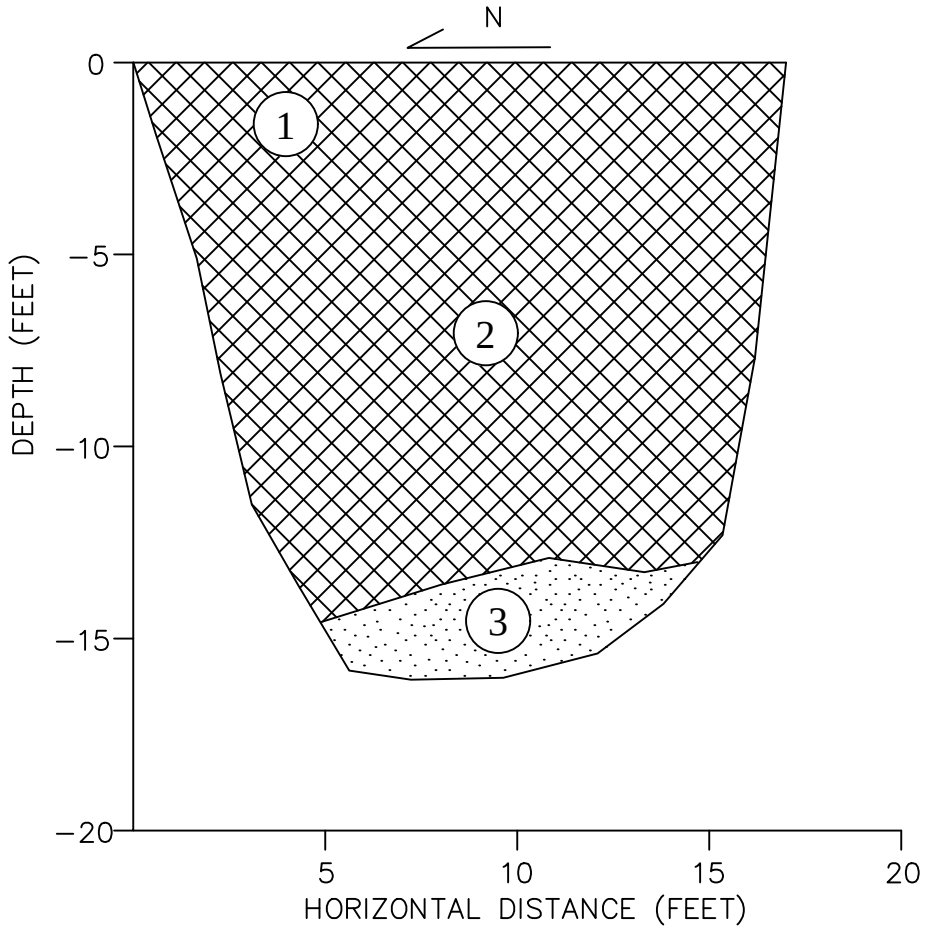
Figure Title: TEST PIT LOG LT-36

Project No.	Figure No.
700045403	D-31
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:53 User: jbaron Style Table: Langan.stb Layout: LT-36



TEST PIT DESCRIPTION:

(1) Tan/light grey, fine to coarse SAND, trace gravel, (SP). [FILL]

(2) Light brown, fine to coarse SAND, (SP). [FILL]

(3) Light brown, fine to coarse SAND, trace gravel, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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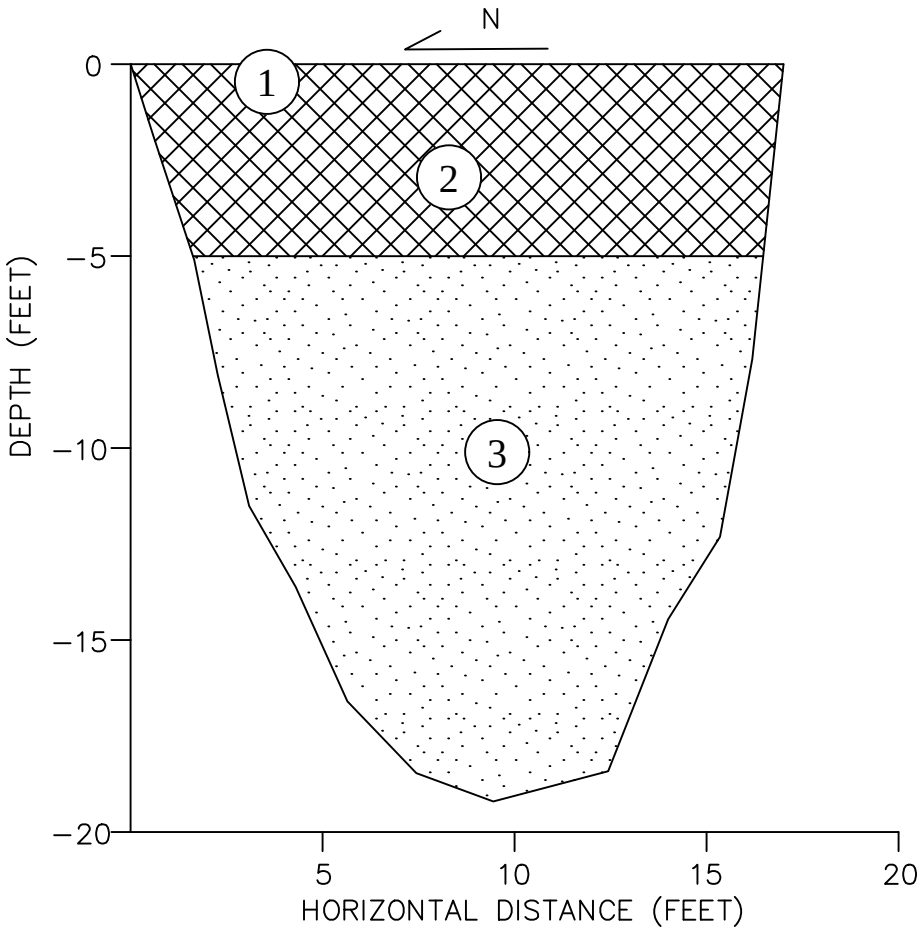
Figure Title: TEST PIT LOG LT-39

Project No.	Figure No.
700045403	D-32
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-39



TEST PIT DESCRIPTION:

(1) Light grey, partially cemented material.

(2) Tan/grey, fine to coarse SAND, trace gravel and cemented materials, (SP). [FILL]

(3) Tan/grey, medium to coarse SAND, trace gravel and cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 26 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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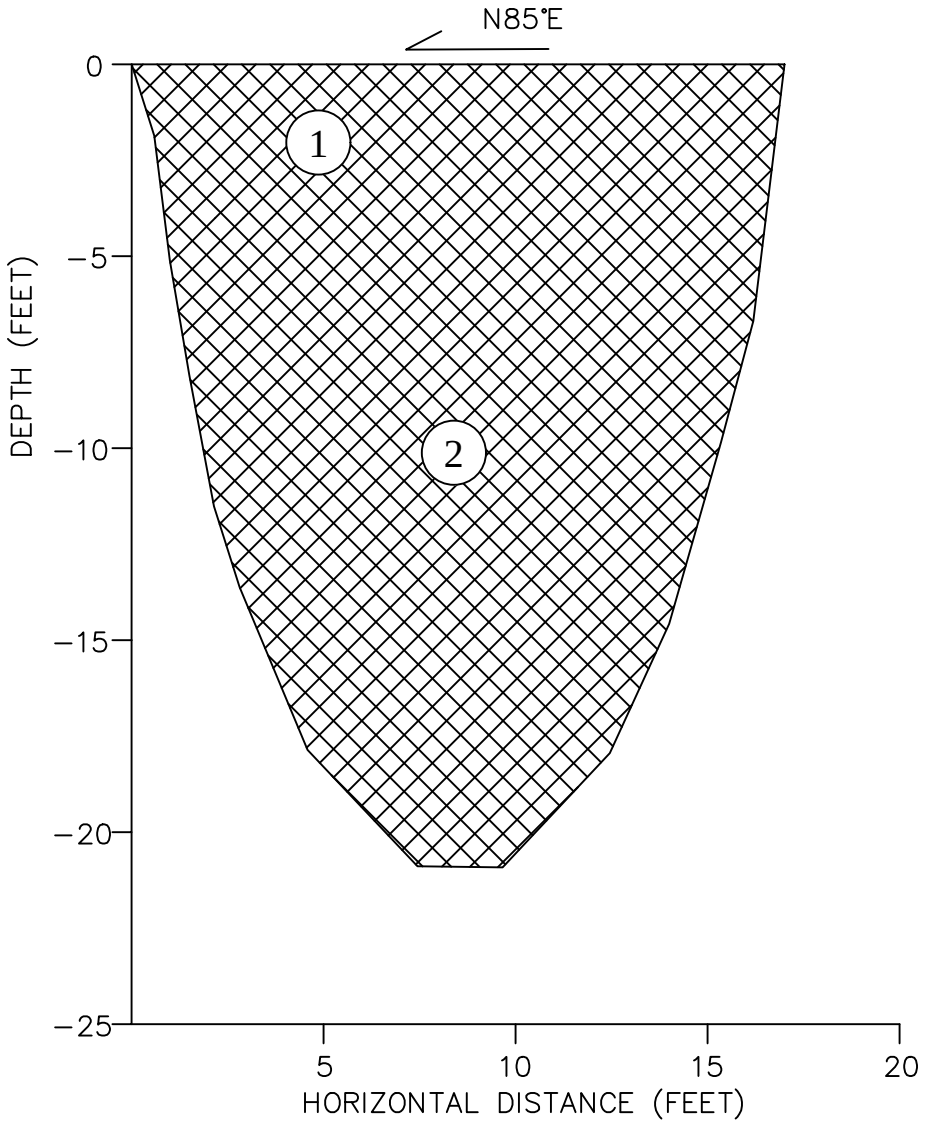
Figure Title: TEST PIT LOG LT-40

Project No.	Figure No.
700045403	D-33
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-40



TEST PIT DESCRIPTION:

(1) Light grey, partially cemented materials and cement kiln dust (CKD) layers. [FILL]

(2) Tan/brown, fine to coarse SAND, trace gravel and cobbles, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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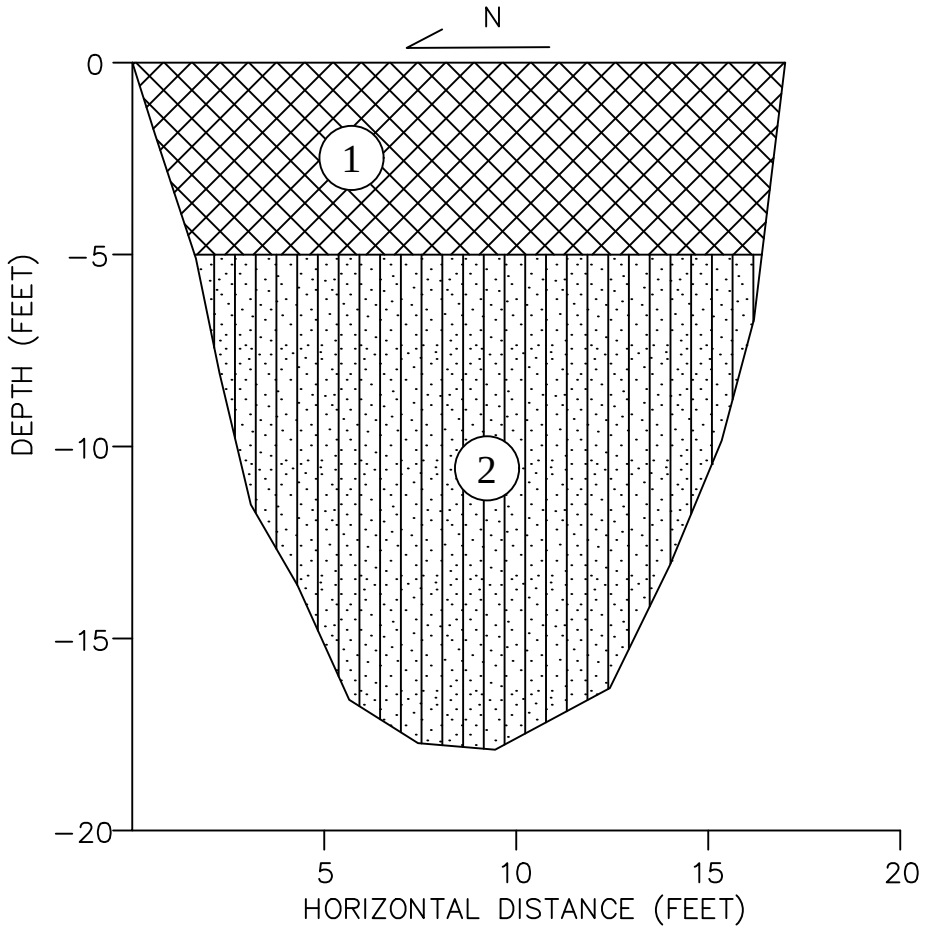
Figure Title: TEST PIT LOG LT-41

Project No.	Figure No.
700045403	D-34
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-41



TEST PIT DESCRIPTION:

(1) Tan, fine to coarse silty SAND, (SM). [FILL]

(2) Tan, fine to coarse silty SAND, trace gravel, (SM). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 26 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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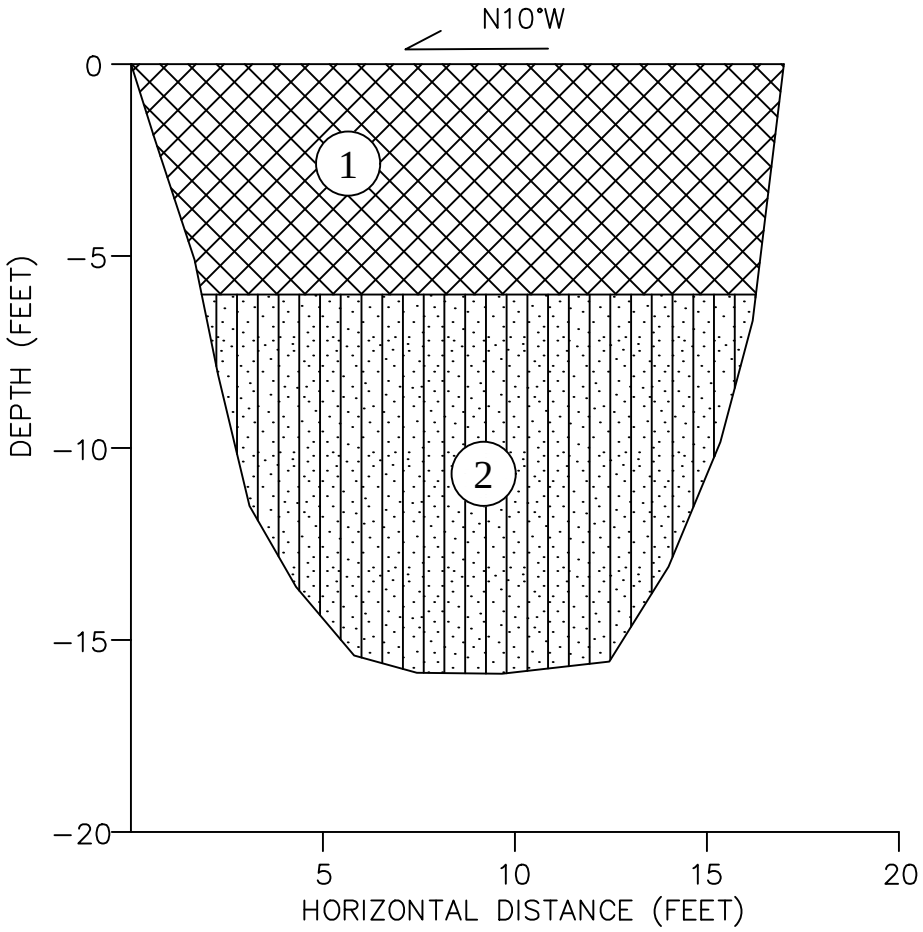
Figure Title: TEST PIT LOG LT-42

Project No.	Figure No.
700045403	D-35
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-42



TEST PIT DESCRIPTION:

(1) Tan, fine to medium silty SAND, (SM). [FILL]

(2) Tan, fine to coarse silty SAND, (SM), trace gravel and cobbles. [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 26 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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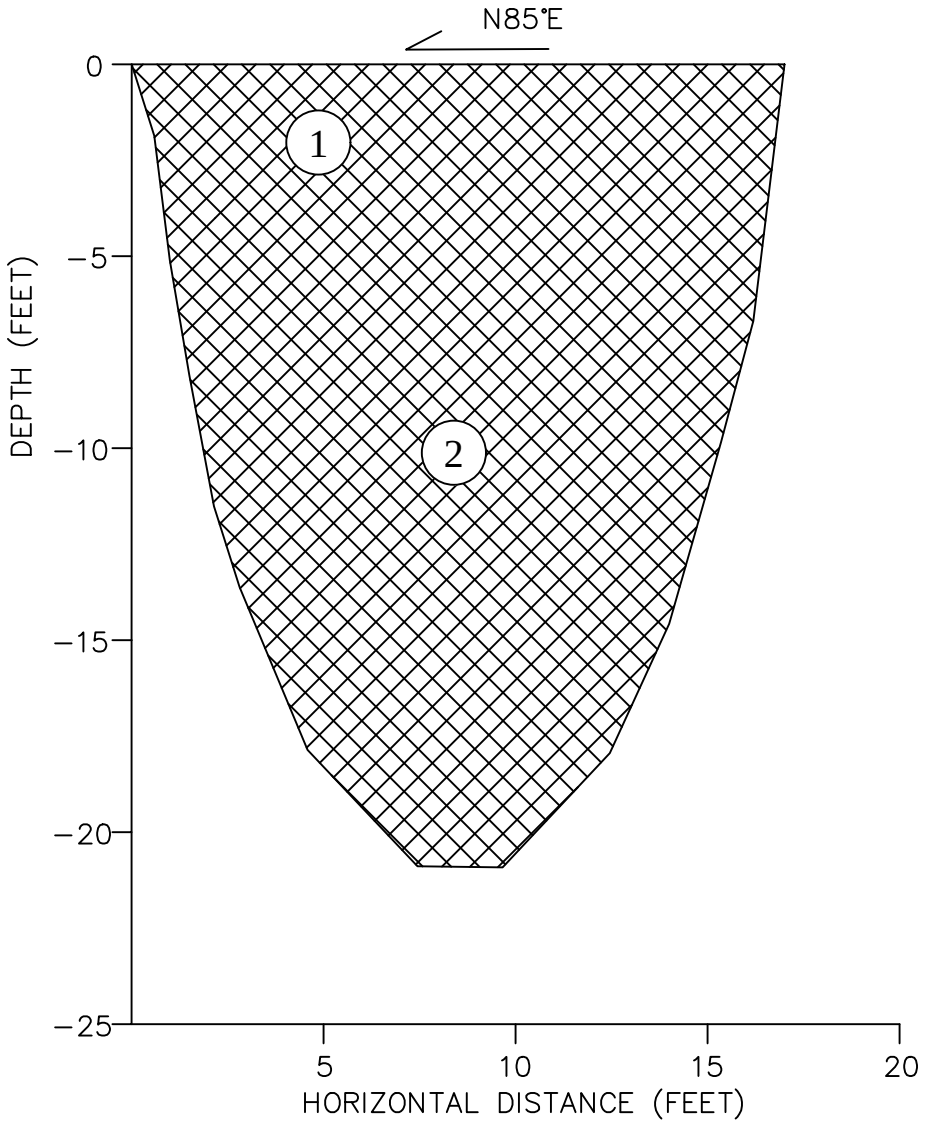
Figure Title: TEST PIT LOG LT-43

Project No.	Figure No.
700045403	D-36
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-43



TEST PIT DESCRIPTION:

(1) Light grey, partially cemented materials and cement kiln dust (CKD) layers. [FILL]

(2) Tan/brown, fine to coarse SAND, trace gravel and cobbles, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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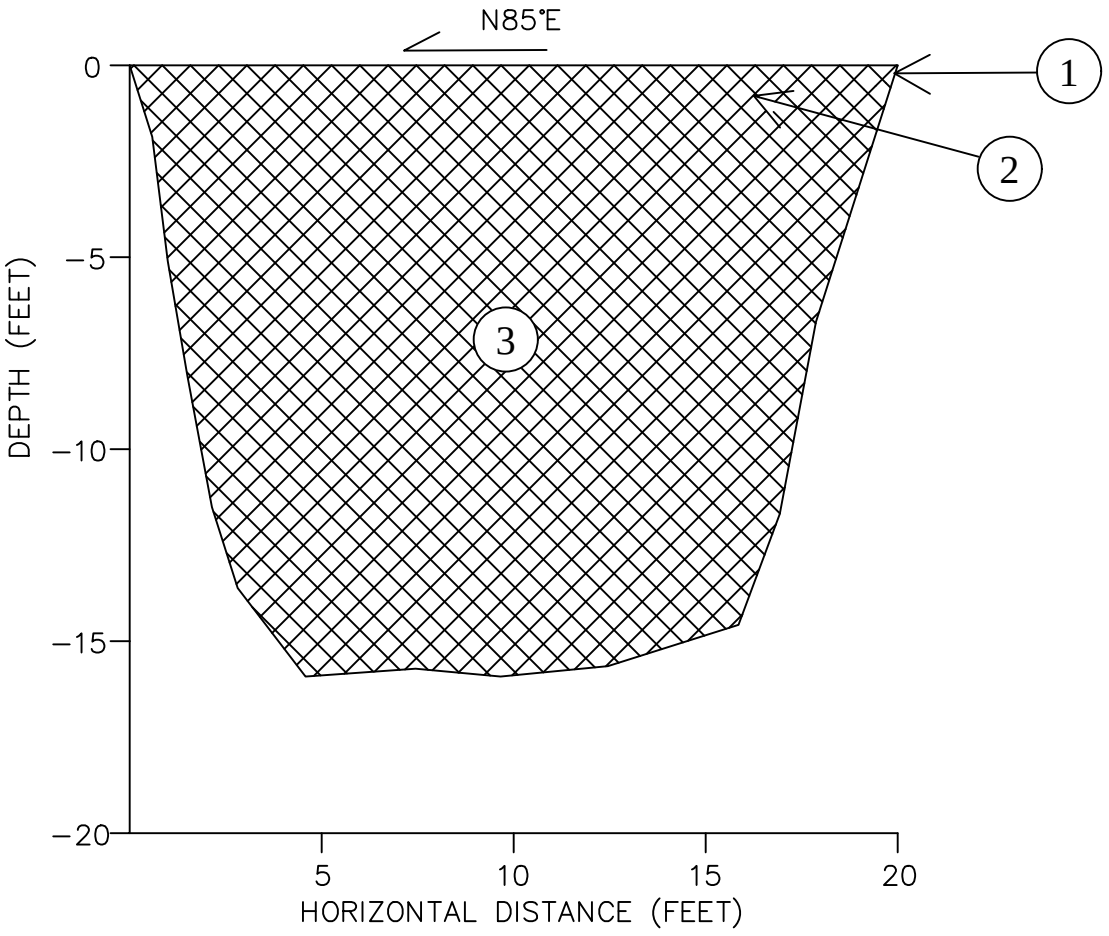
Figure Title: TEST PIT LOG LT-44

Project No.	Figure No.
700045403	D-37
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-44



TEST PIT DESCRIPTION:

1. Cemented materials / asphalt
2. Brown, fine to medium SAND, (SP). [FILL]
3. Light brown, fine to medium SAND, trace clay and silt, (SM). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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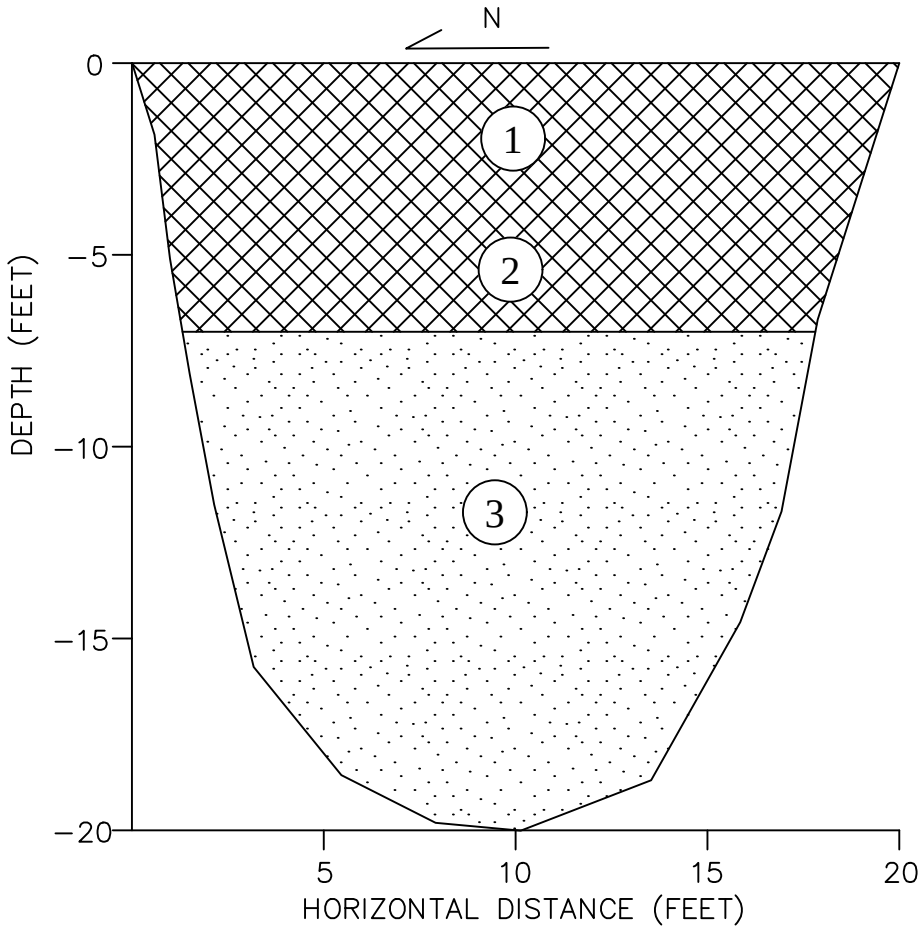
Figure Title: TEST PIT LOG LT-45

Project No.	Figure No.
700045403	D-38
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-45



TEST PIT DESCRIPTION:

(1) Tan/light brown, fine to medium SAND, (SP). [FILL]

(2) Tan/light brown, fine to coarse SAND, trace gravel and cobbles, (SP). [FILL]

(3) Tan/light brown, fine to medium SAND, trace gravel and cobbles, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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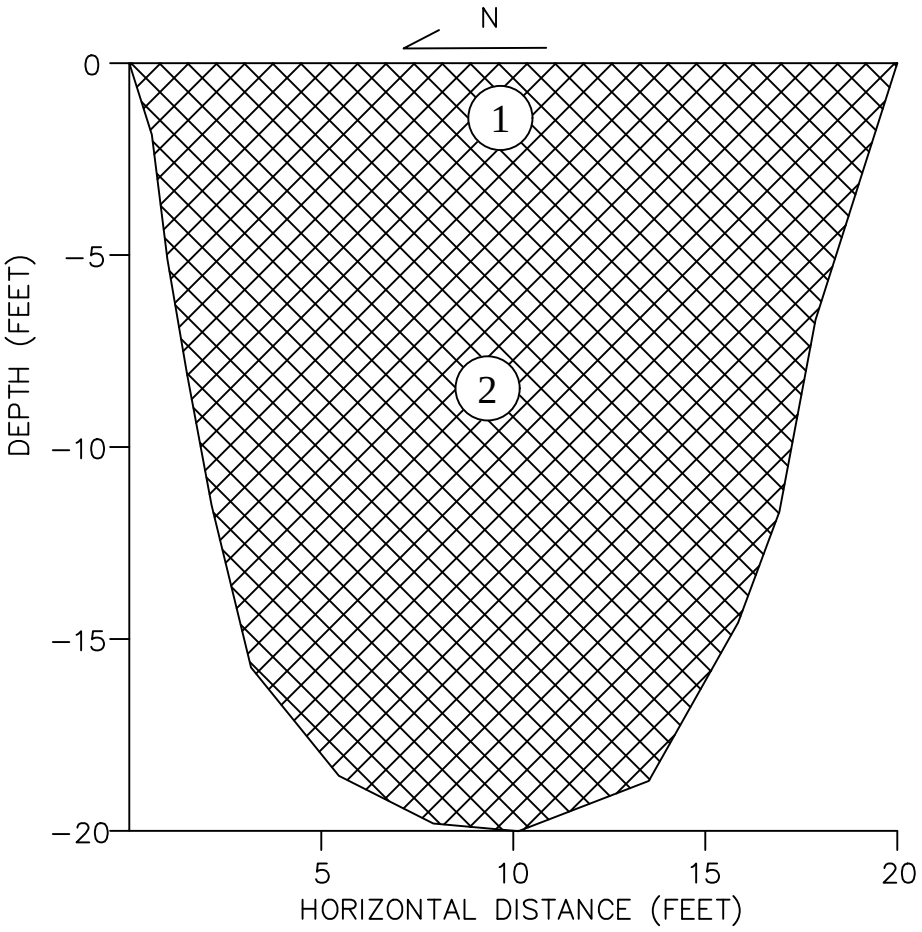
Figure Title: TEST PIT LOG LT-46

Project No.	Figure No.
700045403	D-39
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-46



TEST PIT DESCRIPTION:

1. White/light grey, heavily cemented materials. [FILL]

2. Tan/brown, fine to medium SAND, trace silt and clay, (SM). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 29 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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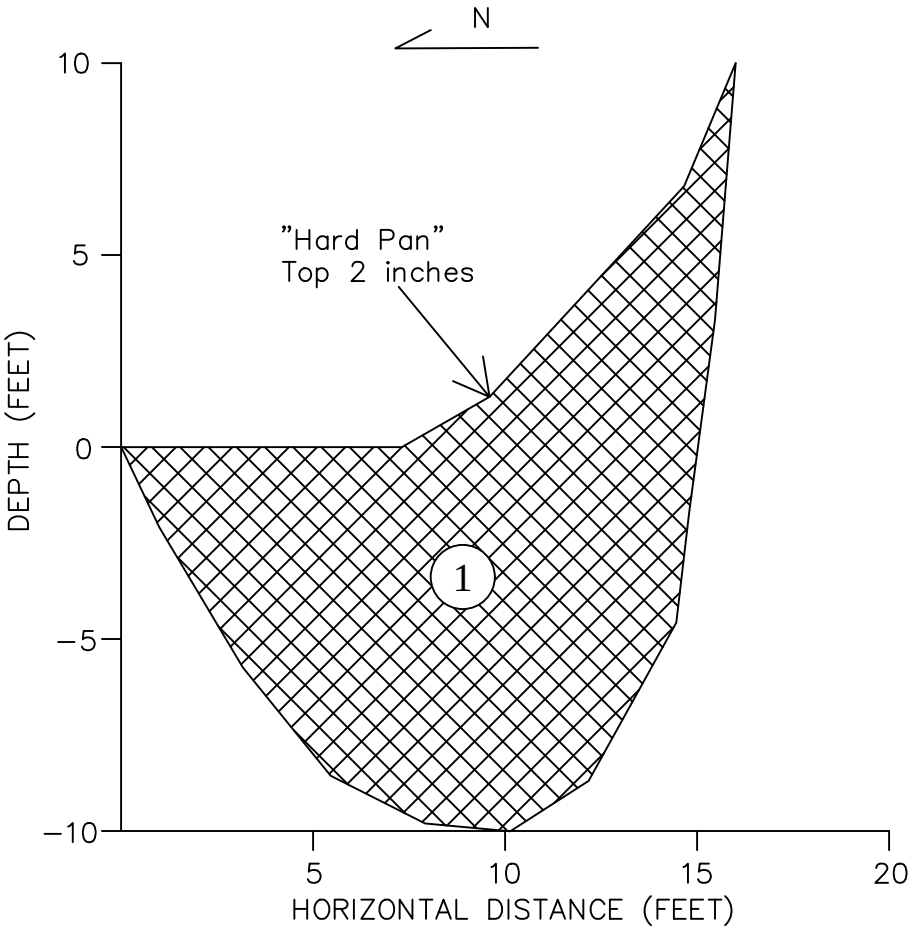
Figure Title: TEST PIT LOG LT-47

Project No.	Figure No.
700045403	D-40
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-47



TEST PIT DESCRIPTION:

(1) Tan, fine to coarse SAND, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 29 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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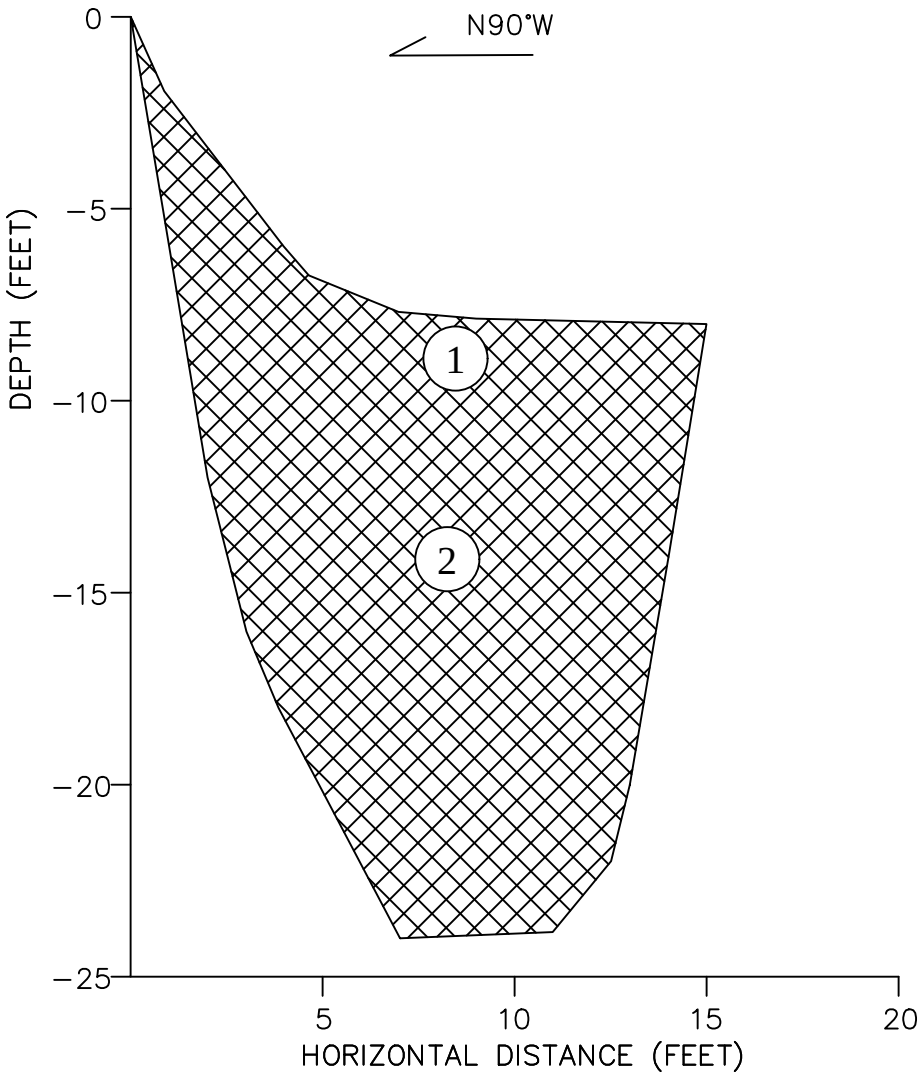
Figure Title: TEST PIT LOG LT-CBermA

Project No.	Figure No.
700045403	D-41
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-CBermA



TEST PIT DESCRIPTION:

(1) Light tan, fine silty SAND, (SM). [FILL]

(2) Light tan, fine silty SAND, (SM), contains cement kiln dust pockets. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 27 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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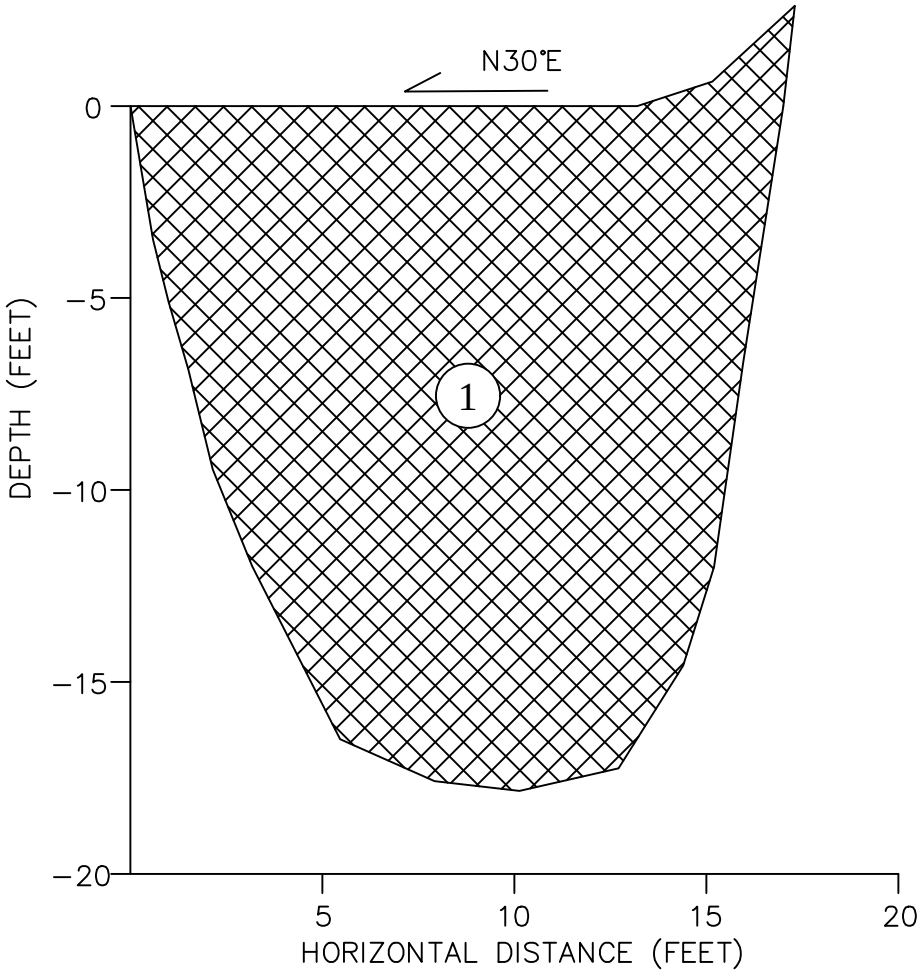
Figure Title: TEST PIT LOG LT-MW1A

Project No.	Figure No.
700045403	D-42
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-MW1A



TEST PIT DESCRIPTION:

(1) Light tan, fine silty SAND, (SM), contains cement kiln dust (CKD) pockets. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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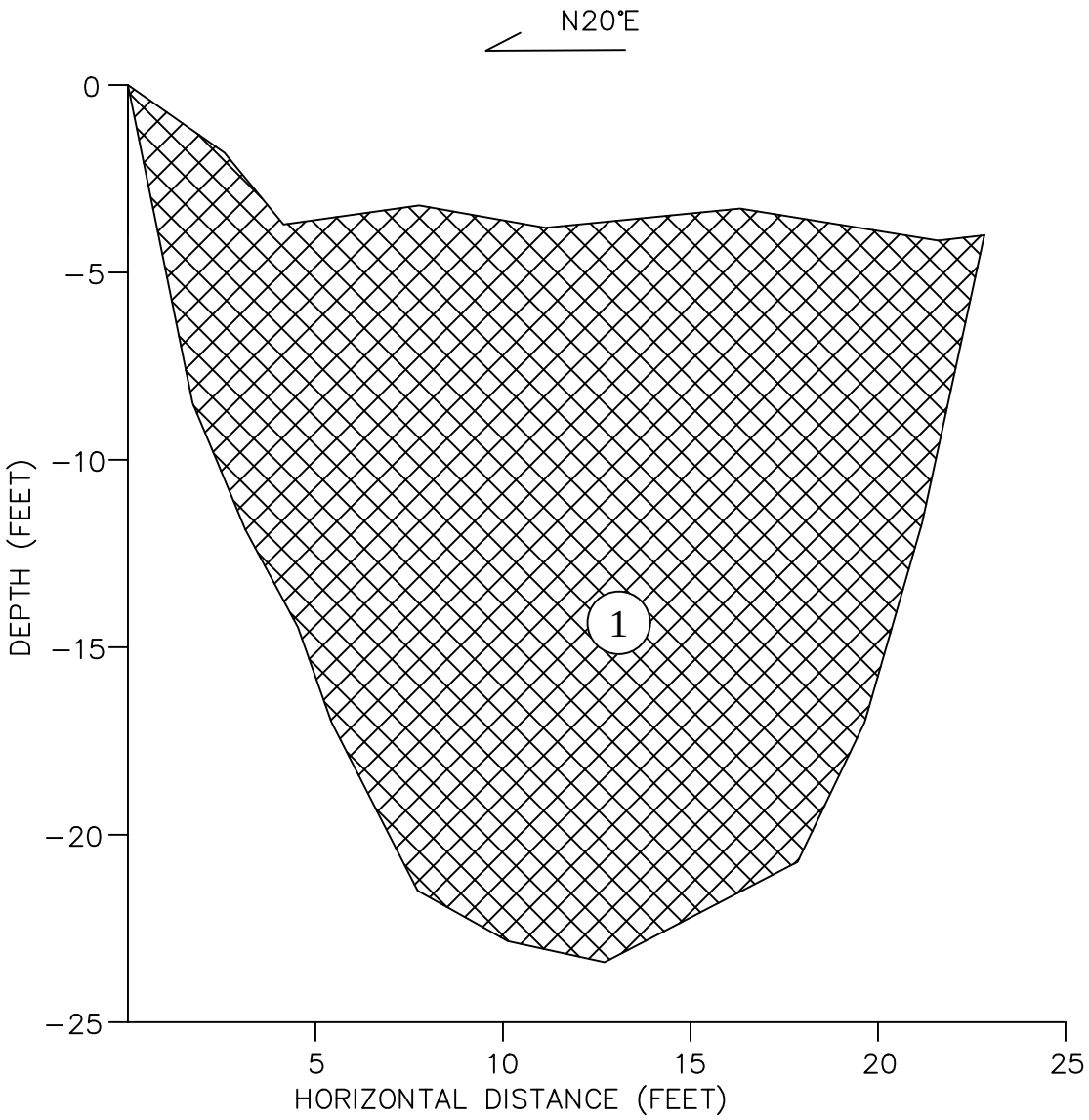
Figure Title: TEST PIT LOG LT-MW1B

Project No.	Figure No.
700045403	D-43
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:54 User: jbaron Style Table: Langan.stb Layout: LT-MW1B



TEST PIT DESCRIPTION:

(1) Tan, fine to medium silty SAND, (SM), some cement kiln dust pockets. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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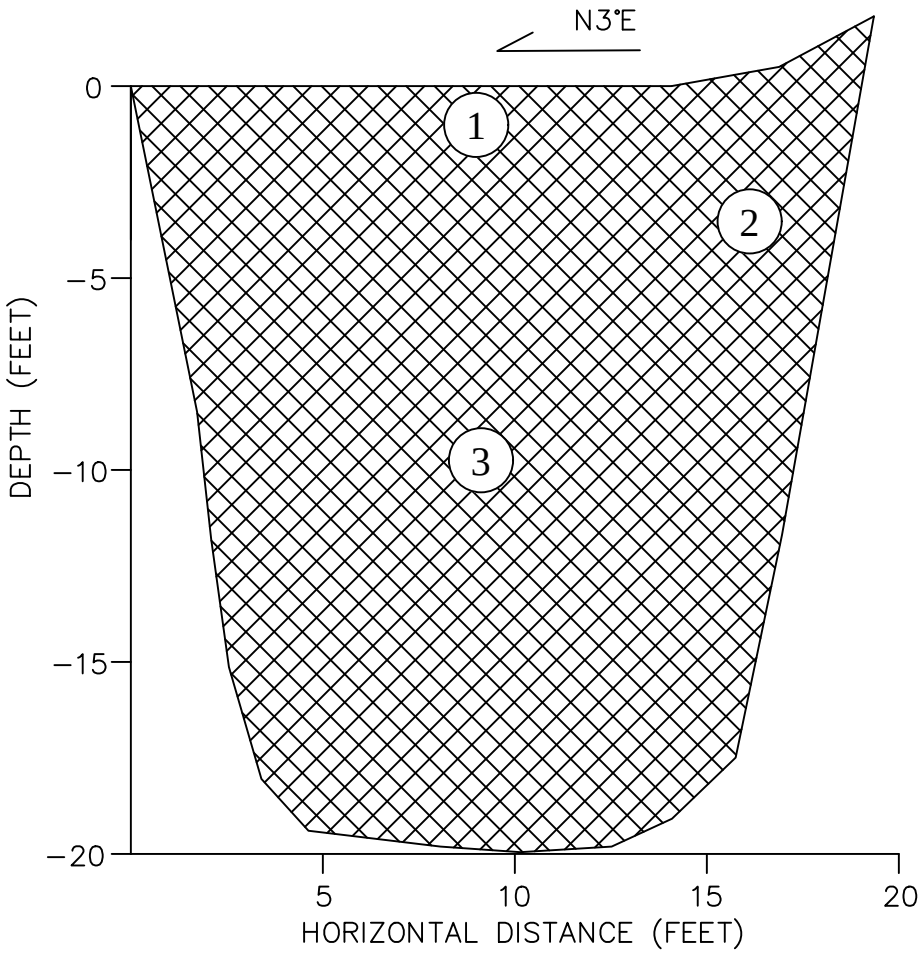
Figure Title: TEST PIT LOG LT-MW1C

Project No.	Figure No.
700045403	D-44
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-MW1C



TEST PIT DESCRIPTION:

1. White/light grey, partially cemented material. [FILL]
2. Dark grey, fine to medium SAND, trace gravel and coal, (SP). [FILL]
3. Tan, fine to medium SAND, trace gravel, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AN LOGGING.

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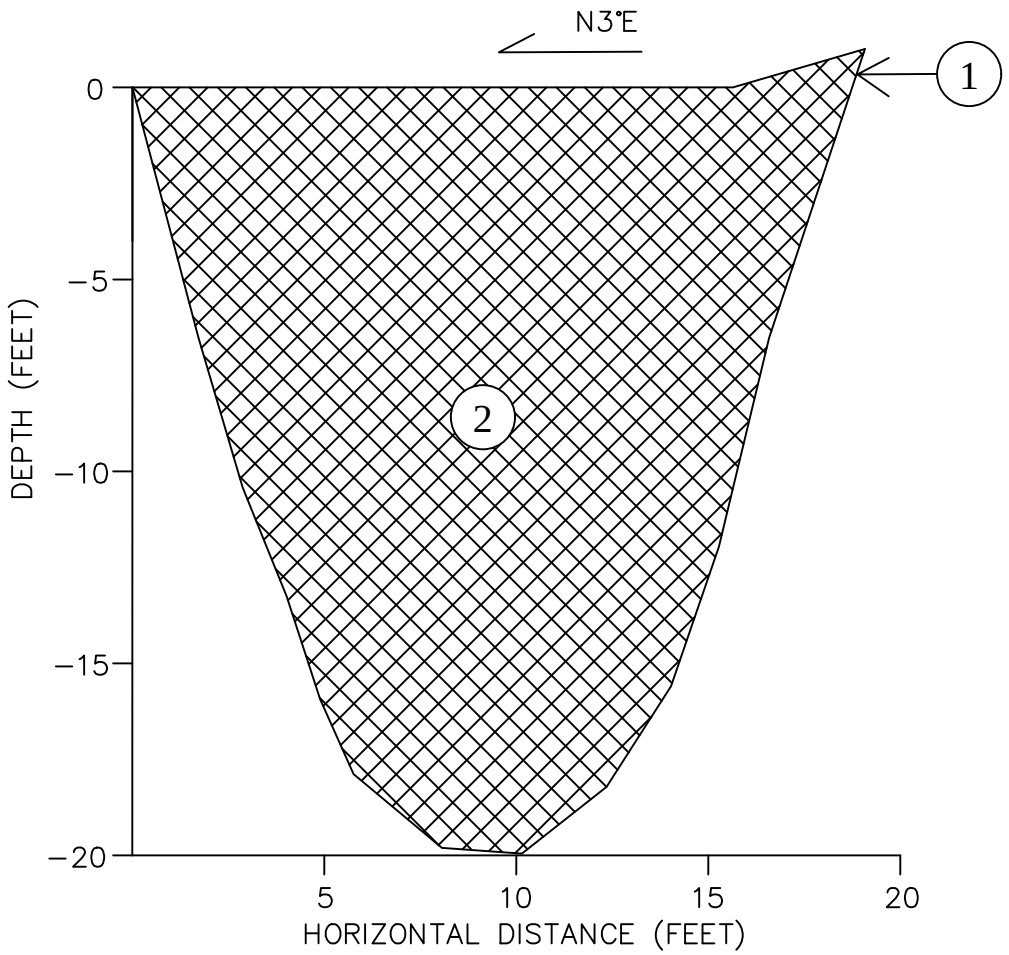
Figure Title: TEST PIT LOG LT-SBermA

Project No.	Figure No.
700045403	D-45
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-SBermA



TEST PIT DESCRIPTION:

(1) White/light grey, partially cemented material. [FILL]

(2) Tan/light brown, fine to coarse SAND, trace gravel, (SP). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AN LOGGING.

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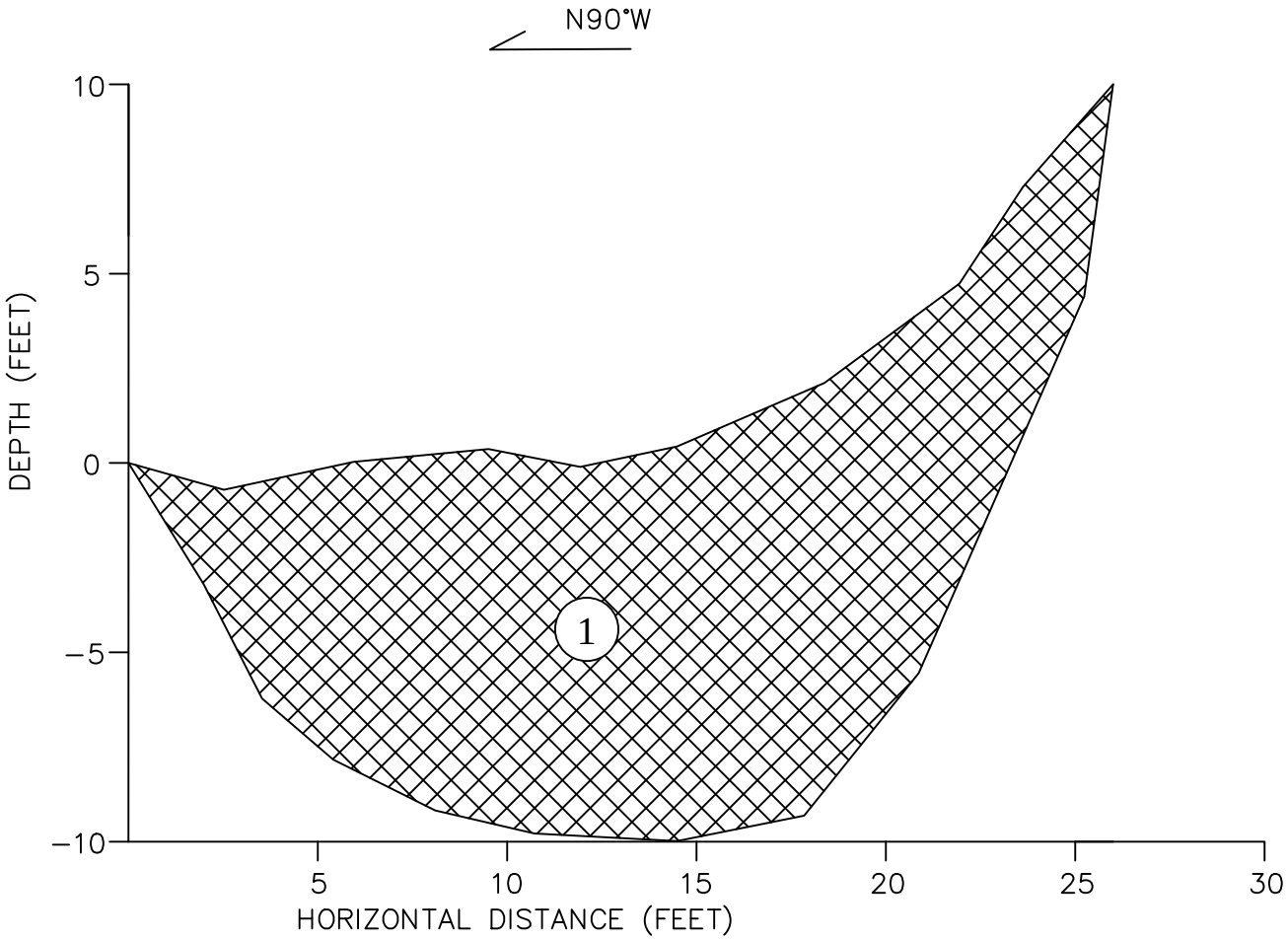
Figure Title: TEST PIT LOG LT-SBermB

Project No.	Figure No.
700045403	D-46
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-SBermB



TEST PIT DESCRIPTION:

(1) Tan, fine silty SAND, (SM), trace cement kiln dust (CKD). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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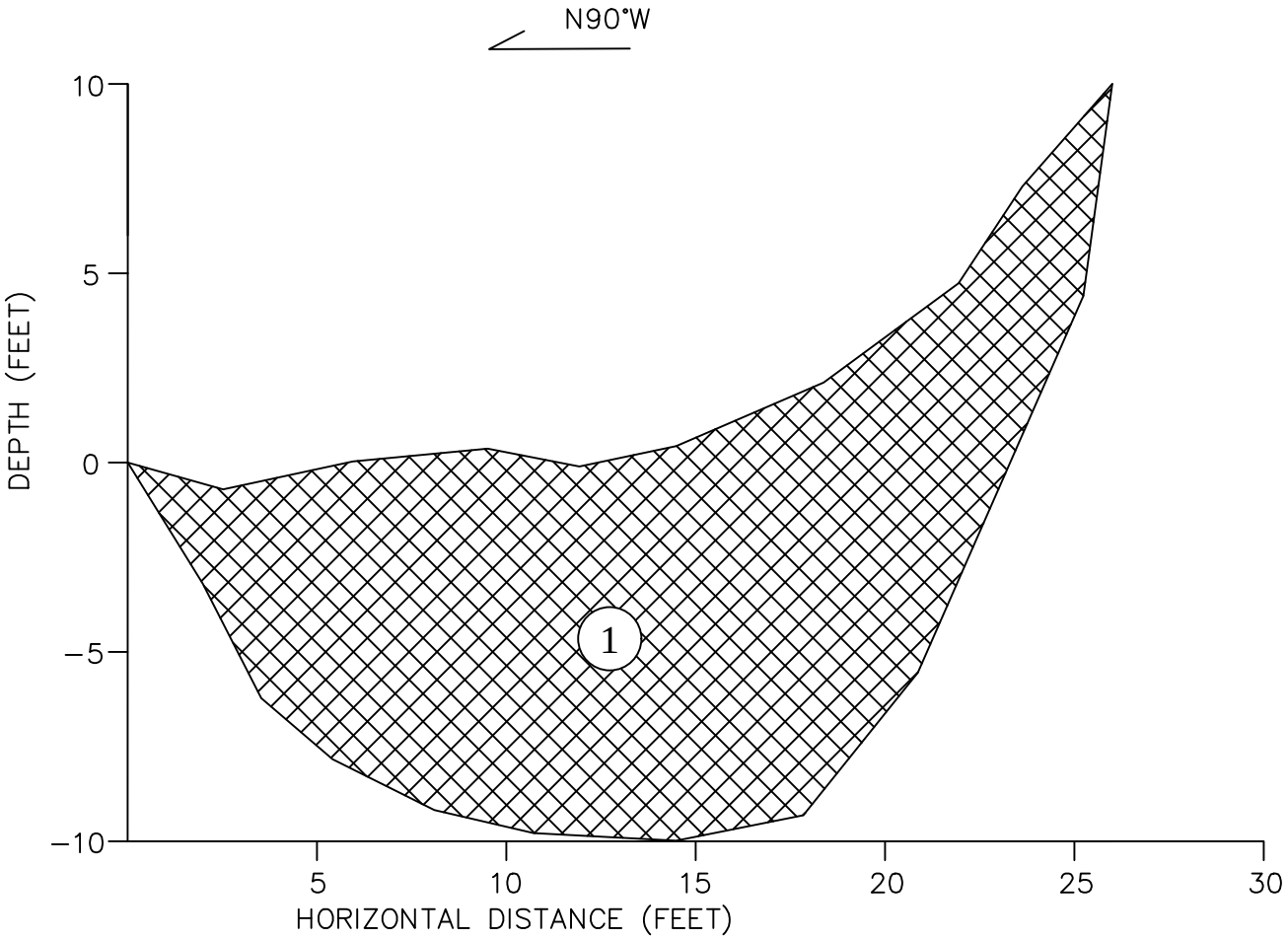
Project: AGUA MANSA COMMERCE PARK
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Figure Title: TEST PIT LOG LT-EBermC

Project No.	Figure No.
700045403	D-47
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-EBermC



TEST PIT DESCRIPTION:

(1) Tan, fine to medium silty SAND, (SM), trace cement kiln dust (CKD) pockets. [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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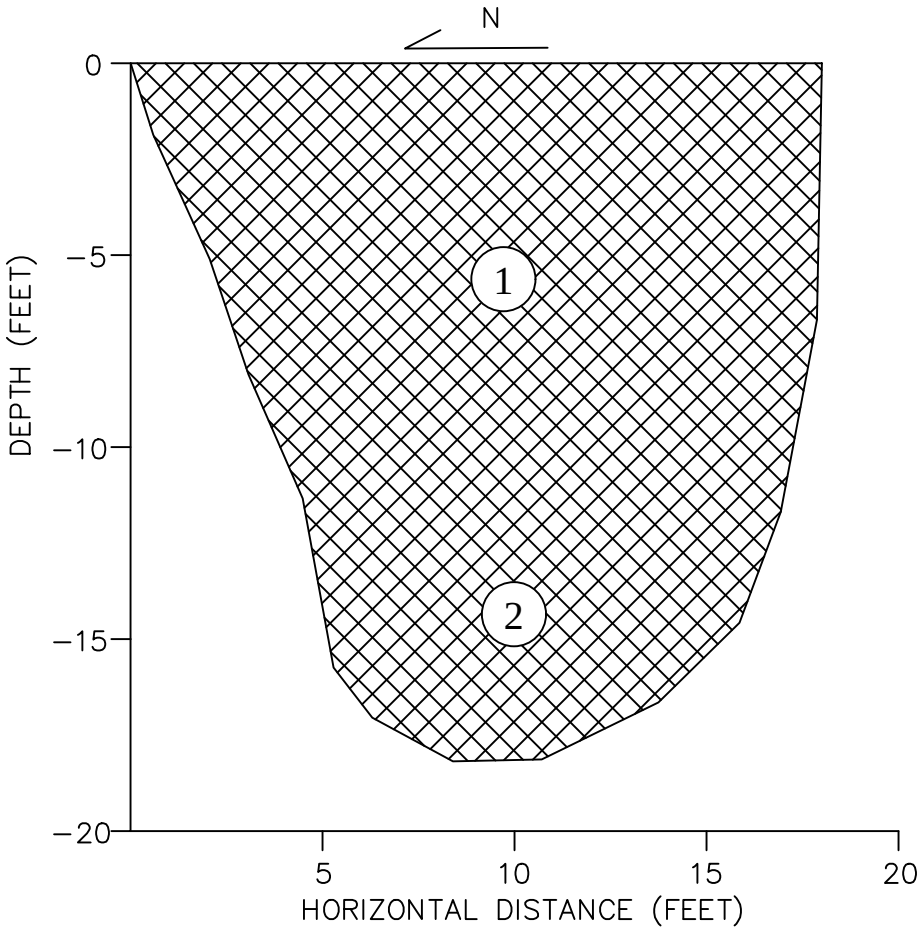
Figure Title: TEST PIT LOG LT-EBermD

Project No.	Figure No.
700045403	D-48
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-EBermD



TEST PIT DESCRIPTION:

(1) Tan, fine silty SAND, (SM). [FILL]

(2) Tan, fine silty SAND, (SM), trace cement kiln dust (CKD). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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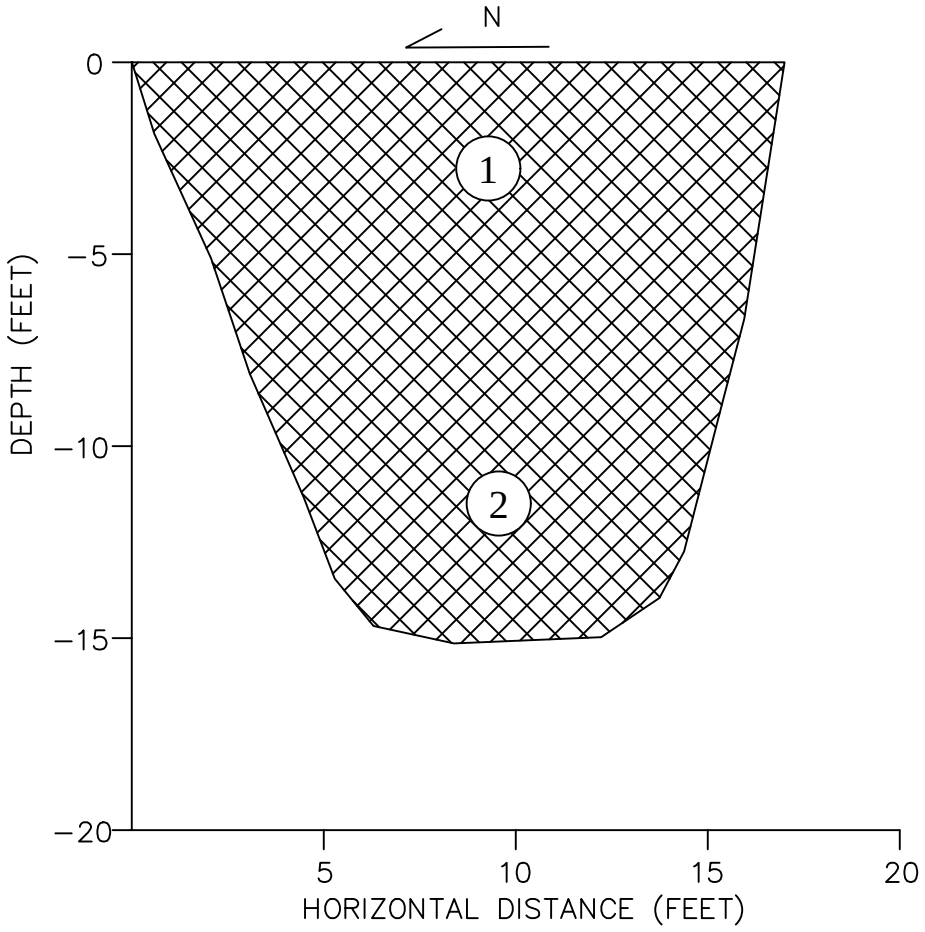
Figure Title: TEST PIT LOG LT-NBermA

Project No.	Figure No.
700045403	D-49
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-NBermA



TEST PIT DESCRIPTION:

(1) Light grey, fine to medium silty SAND, trace gravel, (SM). [FILL]

(2) Tan, fine to medium silty SAND, (SM), trace cement kiln dust (CKD). [FILL]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 28 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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Project: AGUA MANSA COMMERCE PARK
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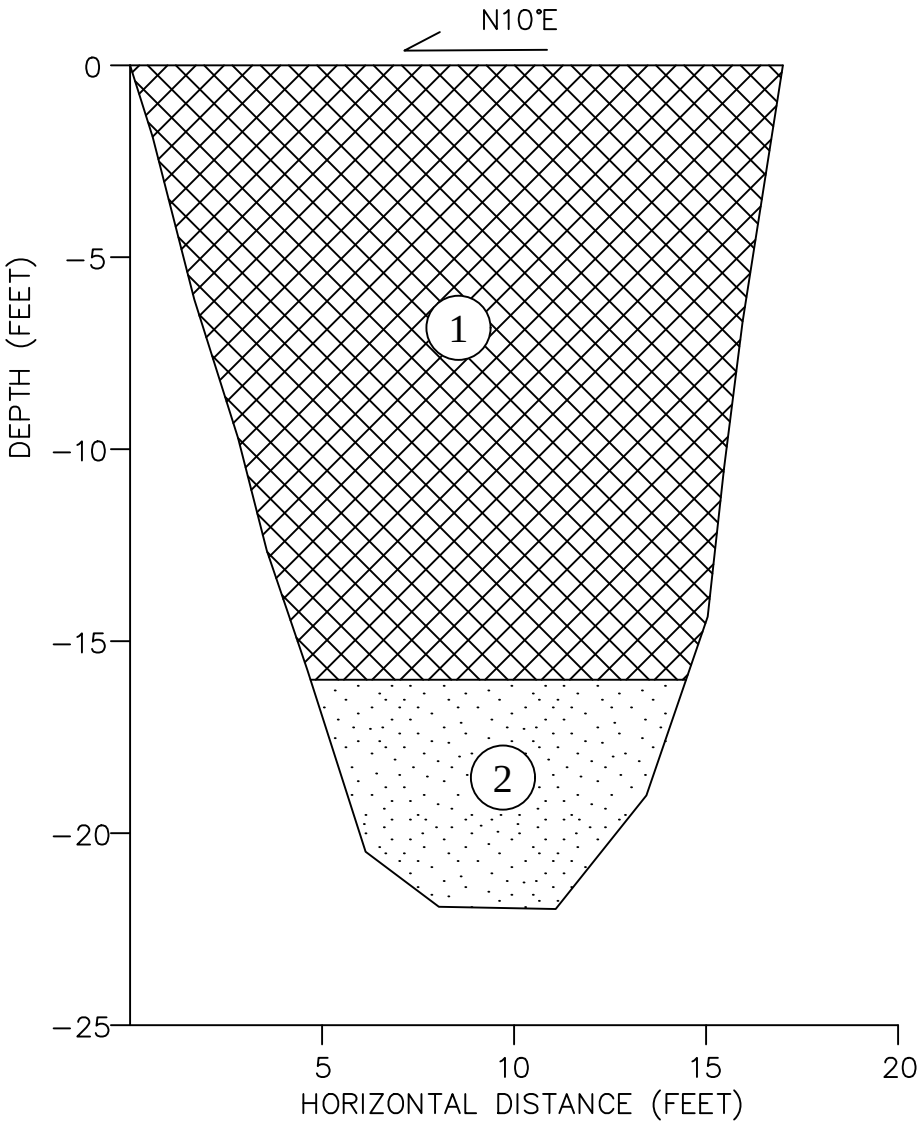
Figure Title: TEST PIT LOG LT-NBermB

Project No.	Figure No.
700045403	D-50
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-NBermB



TEST PIT DESCRIPTION:

(1) Light brown, fine to coarse SAND, trace gravel, (SP). [FILL]

(2) Light brown, medium to coarse SAND, trace gravel, (SP). [Alluvial Deposits]

NOTES:

1. REFER TO FIGURE 2 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 29 SEPTEMBER 2016 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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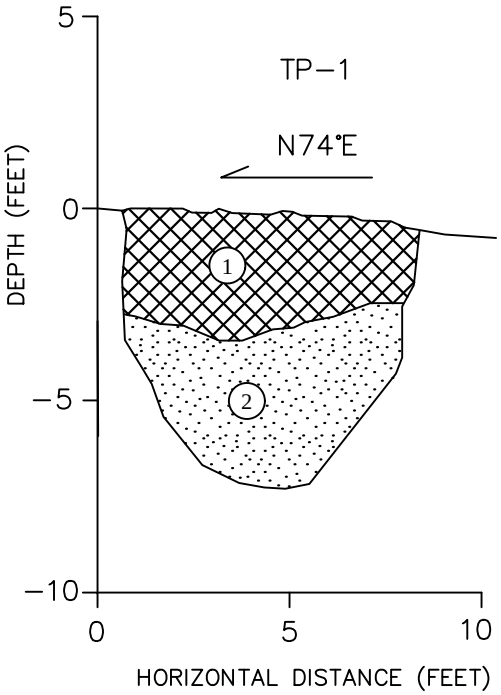
Figure Title: TEST PIT LOG LT-Sewer

Project No.	Figure No.
700045403	D-51
Date: JANUARY 2017	
Scale: 1" = 5'	
Logged By: DL	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045403\Cadd Data - 700045403\2D-DesignFiles\700045403 Test Pit Logs and Cross Sections.dwg Date: 4/26/2017 Time: 14:55 User: jbaron Style Table: Langan.stb Layout: LT-Sewer



TEST PIT DESCRIPTION:

(1) 7.5YR 5/4, silty fine to medium SAND, (SM), dry to slightly moist [FILL]

(2) 7.5YR 4/4, fine SAND, (SP), moist [Alluvial Deposit]

NOTES:

1. REFER TO FIGURE 1 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 10 APRIL 2017 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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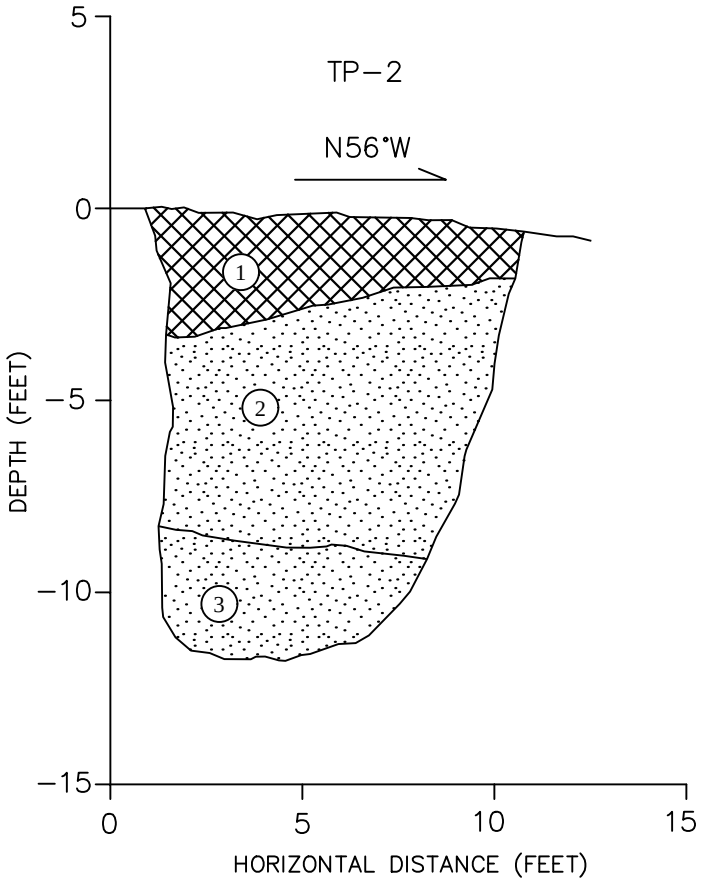
Figure Title: TEST PIT LOG TP-1

Project No.	Figure No.
700045407	D-52
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045407\Cadd Data - 700045407\2D-DesignFiles\Test Pits.dwg Date: 4/28/2017 Time: 19:03 User: jbaron Style Table: Langan.stb Layout: TP-1



TEST PIT DESCRIPTION:

(1) 7.5YR 5/4, silty fine to medium SAND, (SM), dry to slightly moist, scattered roots and rootlets [FILL]

(2) 7.5YR 4/4, fine SAND, (SP), moist [Alluvial Deposit]

(3) 7.5YR 4/4, medium SAND, trace coarse sand, (SP), moist

NOTES:

1. REFER TO FIGURE 1 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 10 APRIL 2017 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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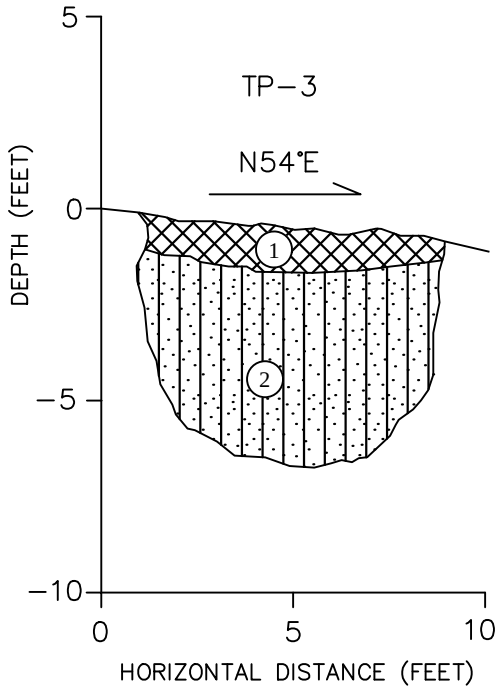
Figure Title: TEST PIT LOG TP-2

Project No.	Figure No.
700045407	D-53
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB	Drawn By: DJJ

Filename: \\langan.com\data\IRV\data4\700045407\Cadd Data - 700045407\2D-DesignFiles\Test Pits.dwg Date: 4/28/2017 Time: 19:03 User: jbaron Style Table: Langan.stb Layout: TP-2



TEST PIT DESCRIPTION:

(1) 7.5YR 5/4, silty fine to medium SAND, (SM), dry to slightly moist [FILL]

(2) 7.5YR 4/4, fine to medium SAND, some silt, (SM), moist [Alluvial Deposit]

NOTES:

1. REFER TO FIGURE 1 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 10 APRIL 2017 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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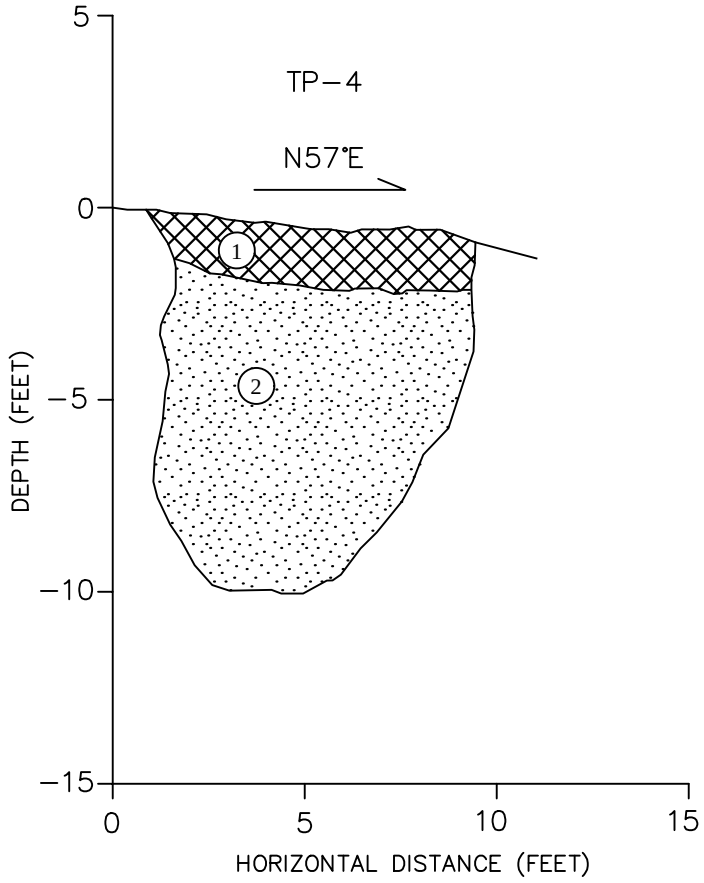
RIVERSIDE COUNTY CALIFORNIA

Figure Title: TEST PIT LOG TP-3

Project No.	Figure No.
700045407	D-54
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045407\Cadd Data - 700045407\2D-DesignFiles\Test Pits.dwg Date: 4/28/2017 Time: 19:03 User: jbaron Style Table: Langan.stb Layout: TP-3



TEST PIT DESCRIPTION:

(1) 7.5YR 5/4, silty fine to medium SAND, (SM), dry to slightly moist [FILL]

(2) 7.5YR 4/4, fine SAND, (SP), moist [Alluvial Deposit]

NOTES:

1. REFER TO FIGURE 1 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 10 APRIL 2017 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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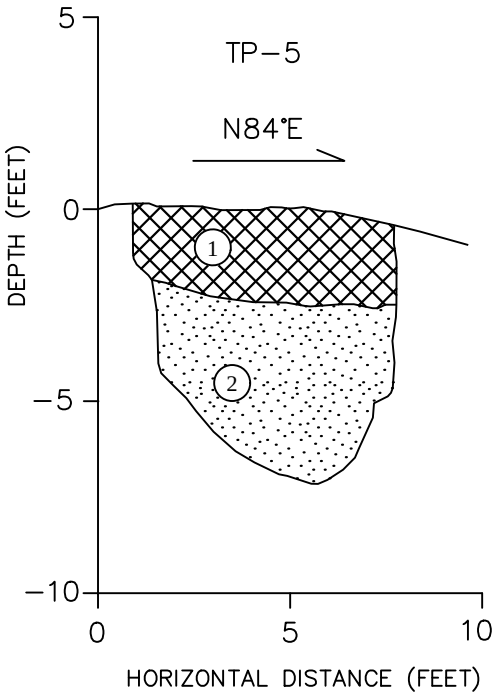
Figure Title: TEST PIT LOG TP-4

Project No.	Figure No.
700045407	D-55
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045407\Cadd Data - 700045407\2D-DesignFiles\Test Pits.dwg Date: 4/28/2017 Time: 19:03 User: jbaron Style Table: Langan.stb Layout: TP-4



TEST PIT DESCRIPTION:

(1) 7.5YR 5/4, silty medium SAND, (SM), dry to slightly moist [FILL]

(2) 7.5YR 5/6, medium SAND, trace coarse sand (SP), moist [Alluvial Deposit]

NOTES:

1. REFER TO FIGURE 1 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 10 APRIL 2017 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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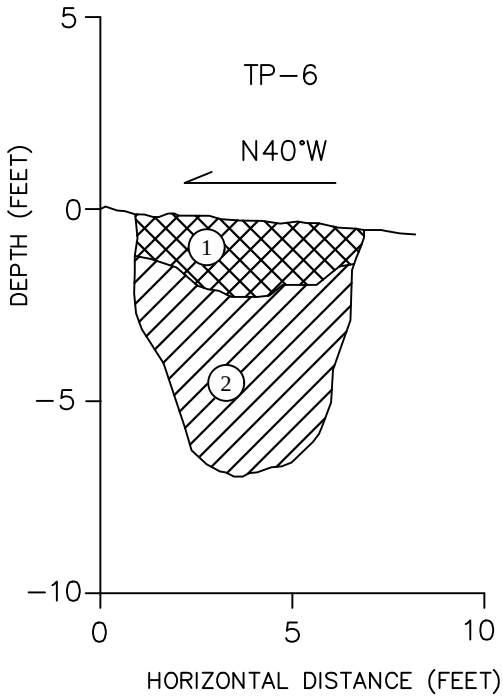
Figure Title: TEST PIT LOG TP-5

Project No.	Figure No.
700045407	D-56
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045407\Cadd Data - 700045407\2D-DesignFiles\Test Pits.dwg Date: 4/28/2017 Time: 19:03 User: jbaron Style Table: Langan.stb Layout: TP-5



TEST PIT DESCRIPTION:

(1) 10YR 6/3, SILT, (ML), dry [FILL]

(2) 10YR 4/3, CLAY and fine SAND, (CL), slightly moist [Alluvial Deposit]

NOTES:

1. REFER TO FIGURE 1 FOR APPROXIMATE LOCATION OF TEST PITS.
2. TEST PIT WAS EXCAVATED ON 10 APRIL 2017 AND BACKFILLED AFTER OBSERVATION AND LOGGING.

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RIVERSIDE COUNTY CALIFORNIA

Figure Title: TEST PIT LOG TP-6

Project No.	Figure No.
700045407	D-57
Date: 28 APRIL 2017	
Scale: 1" = 5'	
Logged By: JAB / Drawn By: DJJ	

Filename: \\langan.com\data\IRV\data4\700045407\Cadd Data - 700045407\2D-DesignFiles\Test Pits.dwg Date: 4/28/2017 Time: 19:03 User: jbaron Style Table: Langan.stb Layout: TP-6

APPENDIX E
Geophysical Investigation Report

Report of Geophysical Investigation

Former Crestmore Mine
Project #1609161J

Langan
Irvine, California

3505 Cadillac Ave O-209A
Costa Mesa, CA 92626
(714) 435-1073

SPECTRUM GEOPHYSICS, 3505 CADILLAC AVE O-209A, COSTA MESA, CA 92626

EXECUTIVE SUMMARY

Spectrum Geophysics was hired to conduct a geophysical investigation during September and October of 2016 at the Former Crestmore Mine in Jurupa Valley, California. The purpose of this investigation was twofold: The first task (Task #1) was to investigate for the presence of tunnels and shafts/adits associated with the former mine operation to a depth of 300 feet (where possible) to assess safety and proposed development concerns at the Site. The second task (Task#2) was to identify the depth to bedrock in the Wet Weather Quarry Area.

To accomplish Task # 1 Spectrum collected electrical resistivity and induced polarization data along three transects: Line 1RS was 220 ground meters (722 ground feet) and ran southwest to northeast in the Wet Weather Quarry Area; this line was established to explore for the presence of tunnels that could extend north of the Wet Weather Quarry area. Line 2RS was 108 ground meters (354 ground feet) and ran WSW-ENE across the known tunnel shaft in the southern portion of the Site; this line was established in an attempt to image and delineate the tunnel connected to the known tunnel shaft. Line 3RS was 220 ground meters (722 ground feet) and ran northeast-southwest, beginning just northwest of the north edge of the Former Crestmore Mine and extending to the southwest along the road south of the former White Cement Manufacturing Plant, where it was terminated at the fence just east of the railroad tracks; this line was established to explore for the presence of tunnels running south of the White Cement Manufacturing Plant and west of the Former Crestmore Mine. The locations of these transects are indicated in Figure 1.

To accomplish Task # 2 Spectrum collected p-wave seismic refraction data along two transects in the Wet Weather Quarry area: Line 1RF was 775 ground feet and ran southwest to northeast in the Wet Weather Quarry area. Line 2RF was 775 ground feet and ran SSW-NNE in the Wet Weather Quarry area. The locations of these transects are indicated in Figure 1.

Results of Surveys in the Wet Weather Quarry Area

Both the resistivity/IP and the seismic refraction data were useful in the Wet Weather Quarry Area. Based on a very high electrical resistivity response juxtaposed next to a low resistivity background material (assumed to be limestone) the electrical resistivity/IP data indicate the presence of a tunnel and possibly a shaft on Line 1RS in the Wet Weather Quarry Area. The p-wave seismic refraction data were able to detect the bottom of the quarry on Line 1 RF. The sections below contain a brief summary of the findings.

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Line 1RS

Electrical resistivity (upper image) and IP (lower image) profiles for Line 1RS are presented in Figure 2. The data indicate a high resistivity (7,000 Ohm-meters -dark red) feature with a response consistent with that of a vertical shaft between Stations 263 and 330 beginning at a depth of about 30 feet below ground surface (bgs) and extending to at least 160 feet bgs. It should be mentioned that there is a possibility that this high resistivity feature is associated with a vertical concrete column or a granitic intrusion instead of a vertical shaft ; this could be confirmed by drilling. In addition to this, the data indicate the presence of a horizontal tunnel, as evidenced by an extremely high resistivity feature-dark red- between Stations 582 and 687 beginning at a depth of 30 feet bgs on Line 1 (Figure 2).

Line 1RF

The seismic refraction profile for Line 1RF is presented in Figure 3. The data indicate a three-layer case, where Layer 1 is interpreted as the loose, weathered fill material at the Site and Layer 2 is slightly more consolidated and may contain cement kiln dust per conversations with Langan personnel. Layer 3 is interpreted as bedrock below the quarry, and has a velocity of 4,150 feet/s; the top of Layer 3 is encountered at about 140 feet bgs in the vicinity of Stations 350 to 550.

Line 2RF

The data collected along Line 2RF are still being processed at the time of this summary.

Results of Surveys in the Southern Portion of the Site

The resistivity/IP data were useful in the southern portion of the Site adjacent to the Former Crestmore Mine. Based on a very high electrical resistivity response juxtaposed next to a low resistivity background material the electrical resistivity/IP data confirm the presence of the known tunnel shaft and have identified several other tunnel or shaft-like features. The sections below contain a brief summary of the findings.

Line 2RS

Electrical resistivity (upper image) and IP (lower image) profiles for Line 2RS are presented in Figure 4. The data indicate a steeply northeast dipping high resistivity (3,000 to 4,000 Ohm-meters -dark red) feature between Stations 160 and 200 on Line 2RS that begins about 15 feet below ground surface. This feature exhibits a response consistent with that of a

vertical shaft, and extends to at least 80 feet bgs; it is therefore interpreted to be associated with the known vertical shaft located just north of the center of Line 2RS. In addition to this, the data indicate the presence of a horizontal tunnel that connects to the shaft at about 40 feet bgs between Stations 200 and 300; this tunnel then appears to continue to the east (Figure 4). Another possible vertical shaft is indicated between Stations 40 and 70 as evidenced by the elevated resistivity (100 to 200 Ohm-meters) response over background.

Line 3RS

Electrical resistivity (upper image) and IP (lower image) profiles for Line 3RS are presented in Figure 5. The data indicate several extremely high resistivity (over 10,000 Ohm-meters – dark brown) anomalies; these are all believed to be associated with shafts or tunnels, and they extend to depths of 50 to 100 feet bgs. The locations of these anomalies are identified in Figure 5 and are as follows:

- Between Stations 65 and 157 beginning about 5 feet bgs and dipping to the northeast
- Between Stations 234 and 334 beginning about 66 feet bgs at Station 234 and dipping to the northeast
- Between Stations 372 and 390 at about 30 feet bgs (may be a tunnel running perpendicular to Line 3)
- Between Stations 401 and 460 beginning about 20 feet bgs

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LIST OF FIGURES

SPECTRUM GEOPHYSICS, 3505 CADILLAC AVE O-209A, COSTA MESA, CA 92626

The Fisher M-Scope was used to investigate for the presence of near-surface buried metallic material and utilities at the Property. The M-Scope has a transmitter and a receiver at the ends of a short boom. The transmitter emits a radio-frequency source signal that induces a secondary magnetic field in metallic material in its immediate vicinity. The receiver measures the signal strength of this secondary magnetic field and emits an audible response, the volume and pitch of which increase in the presence of metallic material. The sensitivity of the M-Scope allows the precise identification of the lateral boundaries of a metallic object.

1.1 **Utility Locators**

A Radiodetection RD-400 Utility Locator and a Dynatel 500A Cable Locator were used at the Property to check for the presence of utilities associated with the existing oil wells, and to follow up on identified EM-31 anomalies. Utility locators are specifically designed to accurately locate and delineate metallic underground pipes and utilities. These locators are designed to detect the magnetic field resulting from an electric current flow on a line.

During the use of a locator, a transmitter emits a radio-frequency source signal that induces a secondary electromagnetic field in nearby utilities. A receiver unit measures the signal strength of this secondary magnetic field and emits an audible response to allow the precise location and tracing of the pipe, cable, or other conductor in which the signal is induced. If the utility is accessible, the source signal can be directly connected to it, which makes the secondary field much larger and more readily measurable. The line tracer is effective for the location of long, linear metallic objects.

2.0 **ELECTRICAL METHODS**

Electrical resistivity and IP methods have historically been used in mineral exploration to identify buried ore bodies and disseminated sulfide deposits; however, more recently they have been used in environmental and groundwater studies.

2.1 **Resistivity**

The electrical resistivity of a material is a measure of the ease with which an electrical current can flow through that material. In the electrical resistivity method a DC circuit is established in the ground via cables and electrodes, and the ground acts as the resistor to complete the circuit. The resistivity method calculates the electrical resistance of the ground by sending a known amount of current through a known section of ground via electrodes and measuring the potential difference between two other electrodes some distance from the current electrodes.

A useful property of electrical resistivity for *dry* sedimentary soils and rocks is that an increase in grain size generally causes an increase in resistivity (e.g. coarse-grained materials such as gravel or cobbles have higher resistivity values than finer grained materials such as fine sands and silts).

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Because the electrical resistivity of a material correlates well with grain size, this method can be used not only to identify lateral and vertical boundaries between different materials but also to identify the lithology of the material (e.g. sand vs. silt vs. clay). In sedimentary rocks, the bulk resistivity is approximately equal to the resistivity of the pore fluid divided by the fractional porosity, where electrical current flow through these materials is primarily electrolytic. As a result, permeable materials (such as coarse sands or sandstones) are typically less resistive (or more conductive) when *fully saturated* than when dry – making the electrical resistivity method useful for many groundwater applications. In addition, because ionic conduction is enhanced by the presence of dissolved salts in the pore fluid, soils and rocks saturated with saline or high-TDS groundwater will have significantly lower levels of resistivity than soils and rocks bearing fresh water.

In the case of attempting to transmit electrical current through a void space, such as a mine shaft or tunnel, essentially there is no path for the current to take across that void space. Therefore, the electrical resistivity of that void space is *very high (essentially infinite)* unless the void space is completely filled with water.

It is important to note that clay will also give rise to low resistivity measurements. While clay is not permeable, the presence of clay minerals in soil or rock will decrease the resistivity for two reasons: 1) because clay minerals can combine with water and 2) because clay minerals tend to ionize and contribute to the supply of free ions in a material, thereby providing another path for current to travel along. Because clays, in addition to high chloride/high TDS water, will give rise to low resistivity measurements, the polarization property of clays was used to discriminate clays from brackish or saline groundwater during this project. Clays generally polarize in the presence of an injected current because of the property of *membrane polarization.*

2.2 **Induced Polarization**

The induced polarization method measures the ability of a material to polarize, or hold charge. IP is also known as "complex resistivity," or resistivity as a function of time (time domain IP) or frequency (spectral IP). In the time domain IP method used by the SuperSting, a known amount of current is injected into a section of ground via electrodes, the current is then turned off, and the voltage between two other electrodes some distance away is measured at specific time intervals (or gates) after current turn off during a specified integration time (in this case 2 seconds). For each measurement location, the measured residual voltage at each time gate is then normalized by the primary voltage, and the result is called chargeability, with units of mV/V or milliseconds (ms) and can be plotted on a decay curve. Electrical resistivity and IP data are typically displayed in 2D sections or profiles, where they supply lateral and vertical electrical resistivity/chargeability information about materials directly below a given transect (much like a road cut).

The chargeability of a material is based on its ability to polarize, or hold charge. IP is a surface phenomenon which takes place at the interface between an electrolyte and a mineral grain. The chargeability of a material depends on the salinity of the electrolyte, grain size distribution, ion exchange properties of the interface, thickness of the electrical double layer, current pulse duration and excitation frequency. Clays and disseminated mineral deposits tend to have higher

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chargeability than sands or granites because they tend to have more free ions available. In time domain IP, certain layered earth situations where there is a sharp drop in resistivity with depth (such as in the case of resistive alluvium over materials bearing high salinity fluids) can cause the discharge current to flow in the opposite direction, resulting in negative chargeability values (Nabighian and Elliot 1976).

Res/IP Data Processing

The data file saved for each transect was entered into the software program EarthImager® (Advanced Geosciences, Inc., 2010). This program reads the data file, which contains information such as electrode spacing, length of transect, number of repeat measurements per electrode, and type of resistivity/IP array. Once the data are read into EarthImager® each raw data set is reviewed for indication of erroneous or noisy data using interactive displays of several different measurement parameters, depending on the type of data. The resistivity data were reviewed for measured voltage, apparent resistivity, injected current, repeatability and geometric factor. The IP data were reviewed for measured voltage, apparent chargeability, voltage decay curve, and correlation coefficient. During this process care was taken to review cultural features such as utilities and vaults, so that noisy or suspect data points could be removed from the final measured resistivity and chargeability pseudosections. This final edited data file was then saved and used for the inversion procedure.

To carry out the inversion the final edited data file containing both the measured apparent resistivity pseudosection and the measured apparent chargeability pseudosection is read into EarthImager®, topography information is read into the program and the data are then sorted into finite element blocks, where each block is assigned an initial resistivity/chargeability value. A forward modeling algorithm that uses a non-linear least squares optimization technique is used to first calculate synthetic apparent resistivity/apparent chargeability values that would be measured with the given array type for the starting model. The data are then jointly inverted using a non-linear inversion routine for resistivity and a linear inversion routine for the IP chargeability data, where the *synthetic calculated* apparent resistivity/apparent chargeability values are then compared with the *actual measured* apparent resistivity/apparent chargeability values, and the difference between the two used to improve the model to produce a resistivity/chargeability model that has a lower root-mean-square (RMS) error fit to the measured sections. The program advances through a series of iterations to improve the model until an acceptable error level is reached (usually 10% or less) or the inversion converges.

For each transect, the final product of the processing is two color-contoured model sections – one of resistivity and one of chargeability. The final fitting error between the *synthetic calculated* apparent resistivity/apparent chargeability pseudosection and the *actual measured* apparent resistivity/apparent chargeability pseudosection is represented as the RMS (root mean square) in percent.

It should be noted that the resolution of the resistivity/IP method decreases with increasing depth. Therefore, the finite element mesh becomes coarser with depth, providing lower resolution and a more generalized model. This tends to produce broadening and flattening along the lower

boundary. The highest resolution and most accurate depth conversion data are provided in the upper 30% of the model section, where the overall resolution is approximately one-half the unit electrode separation. In generation of the final model sections for Lines 1 and 2 and 3, one standard color scheme was used for resistivity and one standard color scheme was used for chargeability. This was done to facilitate interpretation and provide a means to compare the results from line to line.

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DRAFT

N
W E
S
NORTH

Scale in feet
0 100 200

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Geophysical Investigation Map

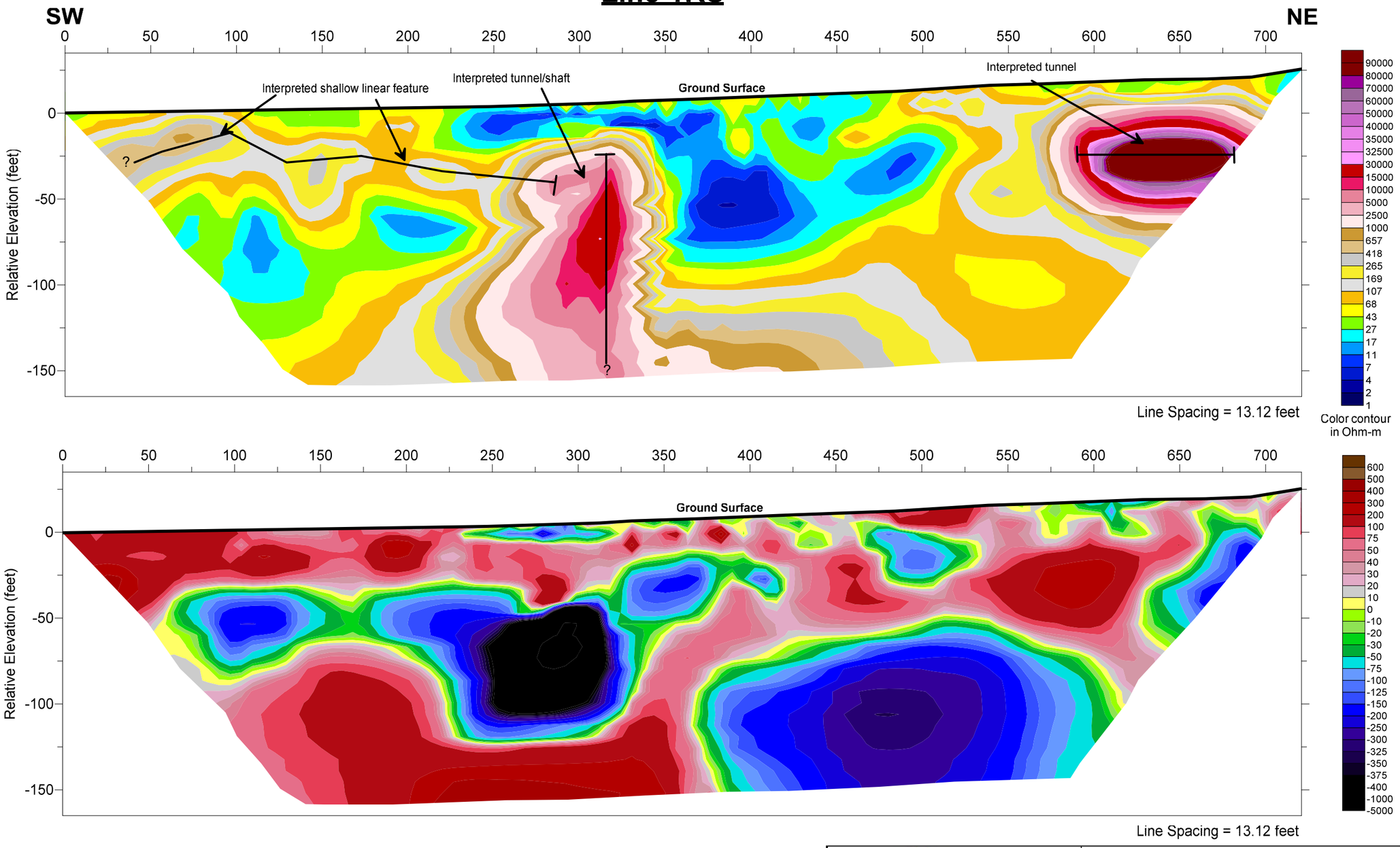
PROJECT: Geophysical Investigation
Former Crestmore Mine
Jurupa Valley, California

PREPARED FOR: Langan
Irvine, CA

SCALE: 1 inch = approx 200 feet
FIGURE BY: BAU
REVIEWED BY: LCD

FIGURE NUMBER: 1A
PROJECT NUMBER: 1609161J
DATE: 11/15/16

Line 1RS



Scale in feet

0 30 60

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Resistivity and Induced Polarization Profiles - Line 1RS

PROJECT: Geophysical Investigation, Former Crestmore Mine, Jurupa Valley, California

PREPARED FOR: Langan, Irvine, CA

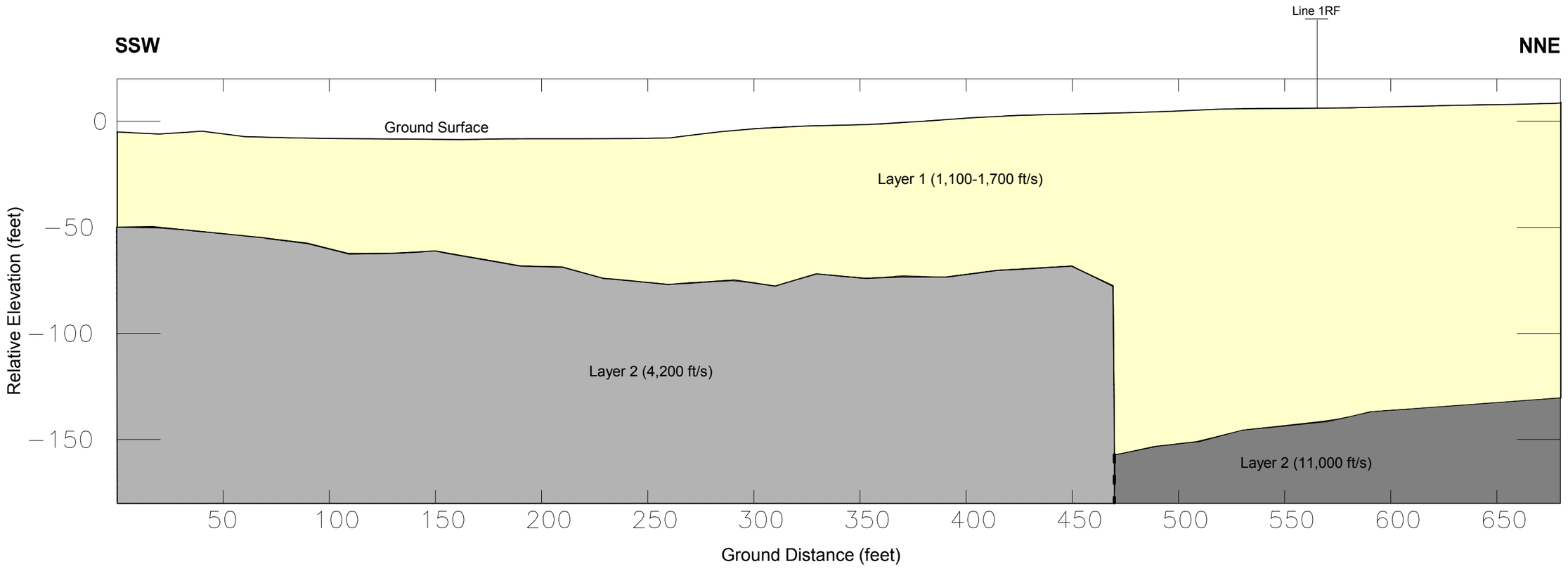
SCALE	FIGURE BY	REVIEWED BY
1 inch = 60 feet	BAU	LCD

FIGURE NUMBER: 2

PROJECT NUMBER: 1609161J

DATE: 12/09/16

Line 2RF



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Seismic Refraction Profile - Line 2RF

PROJECT: Geophysical Investigation
Former Crestmore Mine
Jurupa Valley, California

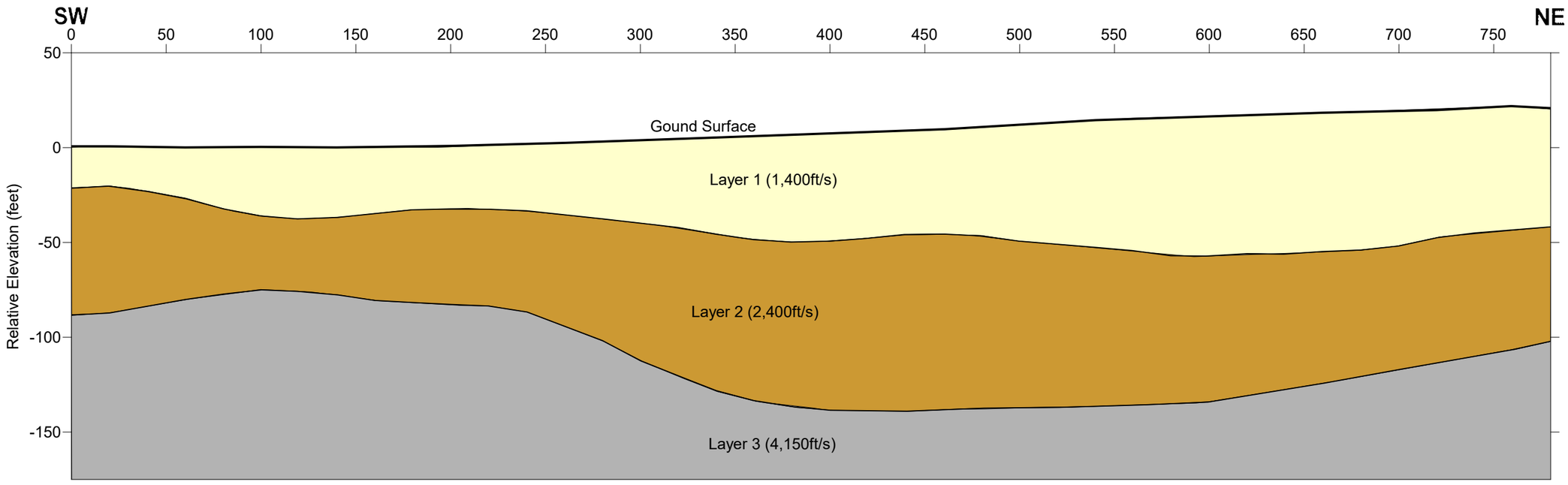
PREPARED FOR: Langan
Irvine, CA

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = 50 feet	BAU	LCD	12/29/16

FIGURE NUMBER: 3A

PROJECT NUMBER: 1609161J

Line 1RF



Geophone spacing = 20 feet

DRAFT

Scale in feet

0 30 60

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Seismic Refraction Profile - Line 1RF

PROJECT: Geophysical Investigation
Former Crestmore Mine
Jurupa Valley, California

PREPARED FOR: Langan
Irvine, CA

SCALE: 1 inch = 60 feet

DRAWN BY: BAU

REVIEWED BY: LCD

FIGURE NUMBER: 3

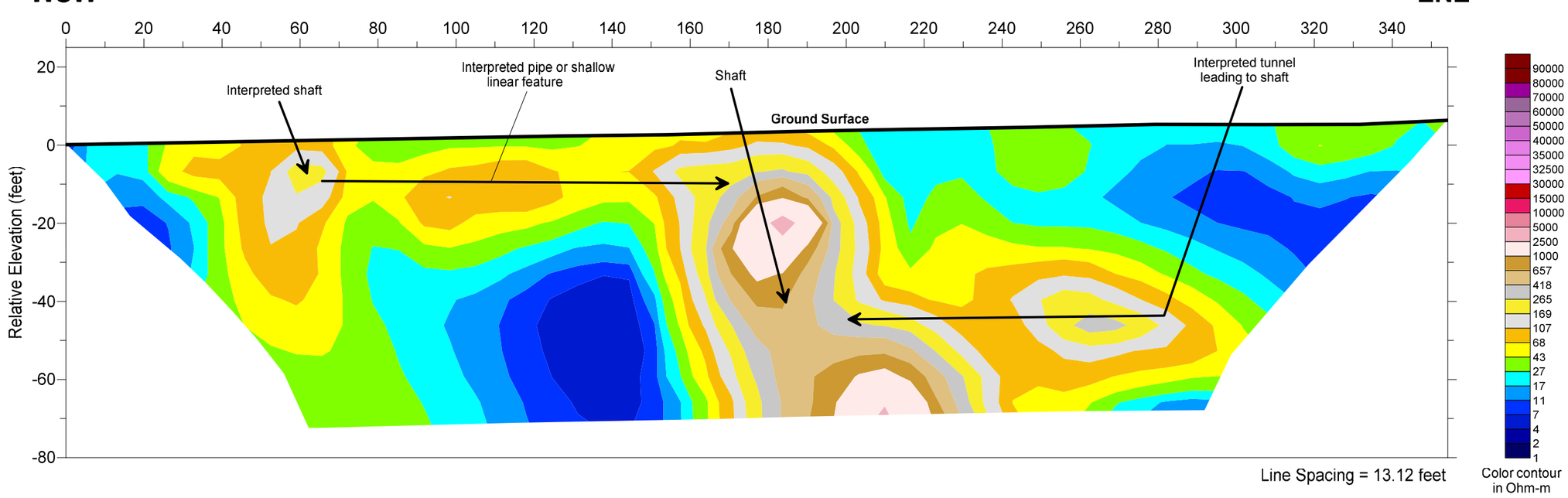
PROJECT NUMBER: 1609161J

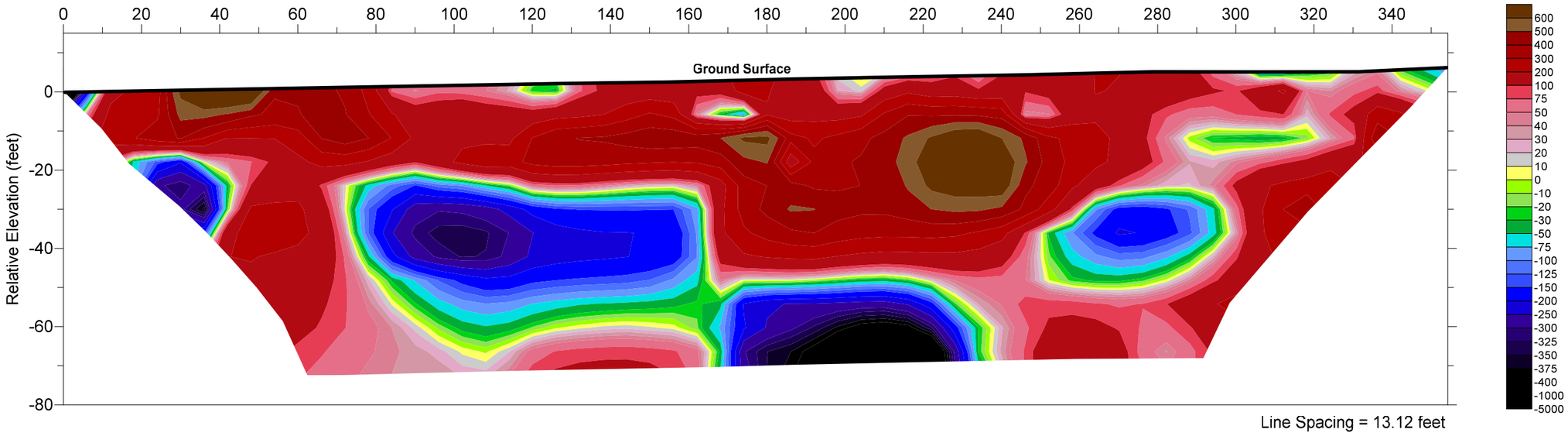
DATE: 11/15/16

Line 2RS

WSW

ENE





Scale in feet

0 15 30

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Resistivity and Induced Polarization Profiles - Line 2RS

FIGURE NUMBER 4

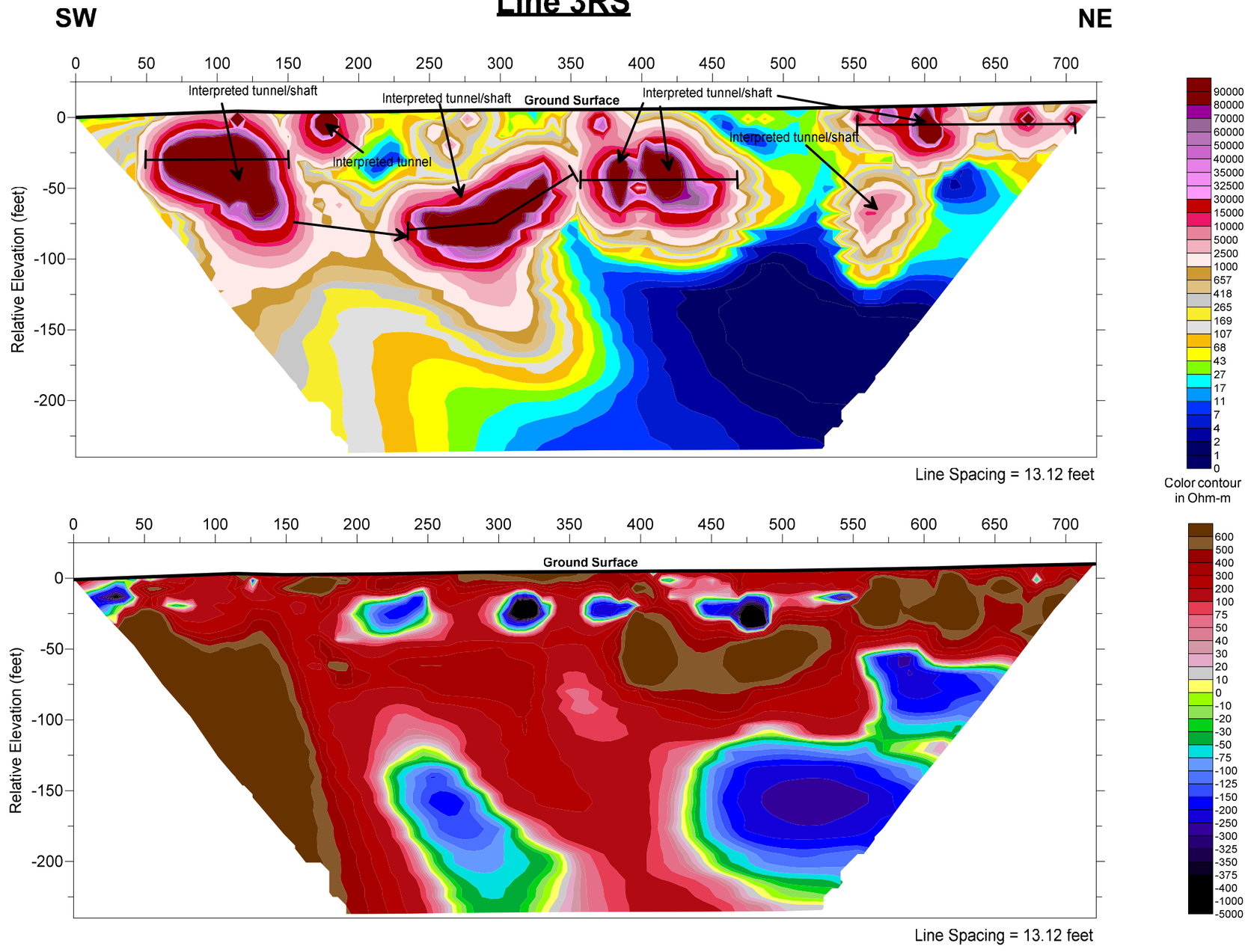
PROJECT
Geophysical Investigation
Former Crestmore Mine
Jurupa Valley, California

PREPARED FOR
Langan
Irvine, CA

PROJECT NUMBER 1609161J

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = 30 feet	BAU	LCD	12/09/16

Line 3RS



Scale in feet

0 40 80

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Resistivity and Induced Polarization Profiles - Line 3RS

PROJECT: Geophysical Investigation
Former Crestmore Mine
Jurupa Valley, California

PREPARED FOR: Langan
Irvine, CA

SCALE	FIGURE BY	REVIEWED BY
1 inch = 80 feet	BAU	LCD

FIGURE NUMBER: 5

PROJECT NUMBER: 1609161J

DATE: 12/09/16

APPENDIX F
Laboratory Results

DENSITY TESTS

PROJECT Langan # 700045403 **JOB NO.** 2012-0057 **BY** LD **DATE** 10/05/16

Sample No.	LB-1/S-3	LB-1/S-5	LB-1/S-7	LB-2/S-1	LB-2/S-3	LB-2/S-5	LB-3/S-2	LB-3/S-4
Depth (ft)	15 - 16.5	25 - 26.5	35 - 36.5	5 - 6.5	15 - 16.5	25 - 26.5	10 - 11.5	20 - 21.5
Soil Type	Brown, F.C. Sand w. Gravel	Brown, F.M. Silty Sand	Brown, F.C. Silty Sand	Brown, F.C. Silty Sand w. Gravel	Brown, F.C. Silty Sand w. Gravel	Brown, F.C. Silty Sand w. Gravel	Brown, F. Sandy Silt	Brown, F. Silty Sand
Wet+Tare	578.3	1239.4	1240.0	Disturbed	943.5	928.7	636.4	997.8
No. Ring	3	6	6		5	5	4	5
% Water	1.5	6.5	6.8	3.8	1.3	1.8	8.3	17.1
Dry Density(pcf)	121.6	126.8	126.5		118.5	115.5	88.0	110.3
Pocket Pen.								
Sample No.	LB-3/S-8	LB-4/S-1	LB-4/S-3	LB-4/S-5	LB-4/S-7			
Depth (ft)	30 - 31.5	5 - 6.5	15 - 16.5	25 - 26.5	35 - 36.5			
Soil Type	Brown, Clay	Brown, F. Silty Sand	Brown, F. Silty Sand	Brown, F. Silty Sand	Brown, F.C. Silty Sand			
Wet+Tare	580.0	714.2	871.2	1077.1	988.4			
No. Ring	3	4	5	6	6			
% Water	26.4	2.5	2.9	3.6	0.6			
Dry Density(pcf)	98.4	109.3	105.3	108.9	99.9			
Pocket Pen.								

Geo-Logic ASSOCIATES

DENSITY TESTS

PROJECT Langan # 700045403 **JOB NO.** 2012-0057 **BY** LD **DATE** 10/05/16

Sample No.	LB-5/S-1	LB-5/S-3	LB-5/S-5	LB-5/S-7	LB-6/S-2	LB-6/S-4	LB-6/S-7	
Depth (ft)	5 - 6.5	15 - 16.5	25 - 26.5	35 - 36.5	10 - 11.5	20 - 21.5	35 - 36.5	
Soil Type	Brown, F.M. Silty Sand	Brown, Clay	Brown, F. Silty Sand	Brown, Silty F. Sand	Brown, F. Silty Sand	Brown, F. Silty Sand	Brown, Silty Clay	
Wet+Tare	910.9	1137.4	855.2	1132.3	939.8	547.6	758.5	
No. Ring	5	6	5	6	5	3	4	
% Water	3.3	28.3	3.6	7.5	2.3	3.0	15.4	
Dry Density(pcf)	111.4	94.4	102.0	112.0	117.1	111.9	105.0	
Pocket Pen.								
Sample No.	LB-7A/S-1	LB-7A/S-3	LB-7A/S-5	LB-8/S-1	LB-8/S-3	LB-8/S-5		
Depth (ft)	5 - 6.5	15 - 16.5	25 - 26.5	5 - 6.5	15 - 16.5	25 - 26.5		
Soil Type	Brown, F. Silty Sand	Brown, F.M. Sand w. Gravel	Brown, F. Silty Sand	Brown, Silty F. Sand	Brown, F.C. Sand w. Gravel	Brown, F.C. Silty Sand w. Gravel		
Wet+Tare	764.8	948.8	733.6	1110.0	910.6	720.4		
No. Ring	4	5	4	6	5	4		
% Water	4.3	1.1	4.7	16.4	2.0	1.9		
Dry Density(pcf)	117.5	120.0	110.8	100.8	112.6	111.1		
Pocket Pen.								

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DENSITY TESTS

PROJECT Langan # 700045403 **JOB NO.** 2012-0057 **BY** LD **DATE** 10/05/16

Sample No.	LB-9/S-3	LB-9/S-4	LB-10/S-4	LB-10/S-8	LB-11/S-5	LB-11/S-7	LB-12/S-5	
Depth (ft)	**15 - 16.5**	**20 - 21.5**	**20 - 21.5**	**40 - 41.5**	**25 - 26.5**	**35 - 36.5**	**25 - 26.5**	
Soil Type	Brown, F. Silty Sand	Brown, F. Silty Sand	Brown, F. Sandy Silt	Brown, F. Sandy Silt	Brown, F.M. Silty Sand	Brown, F.M. Silty Sand	Brown, F.M. Silty Sand	
Wet+Tare	1031.2	876.4	1131.9	593.7	1014.1	1019.8	1038.3	
No. Ring	6	5	6	3	6	6	6	
% Water	**2.8**	**3.6**	**8.9**	**18.3**	**2.4**	**5.4**	**2.8**	
Dry Density(pcf)	**103.5**	**105.4**	**110.5**	**108.3**	**101.5**	**99.4**	**104.4**	
Pocket Pen.								
Sample No.	**ALB-10/S-3**	**ALB-10/S-5**	**ALB-10/S-7**					
Depth (ft)	**15 - 16.5**	**25 - 26.5**	**35 - 36.5**					
Soil Type	Brown,F.M. Silty Sand w. rock frmgts	No Sample Recovered	Brown, F.M. Silty Sand					
Wet+Tare	990.0		1024.7					
No. Ring	6		6					
% Water	**6.3**		**4.6**					
Dry Density(pcf)	**94.7**		**100.8**					
Pocket Pen.								

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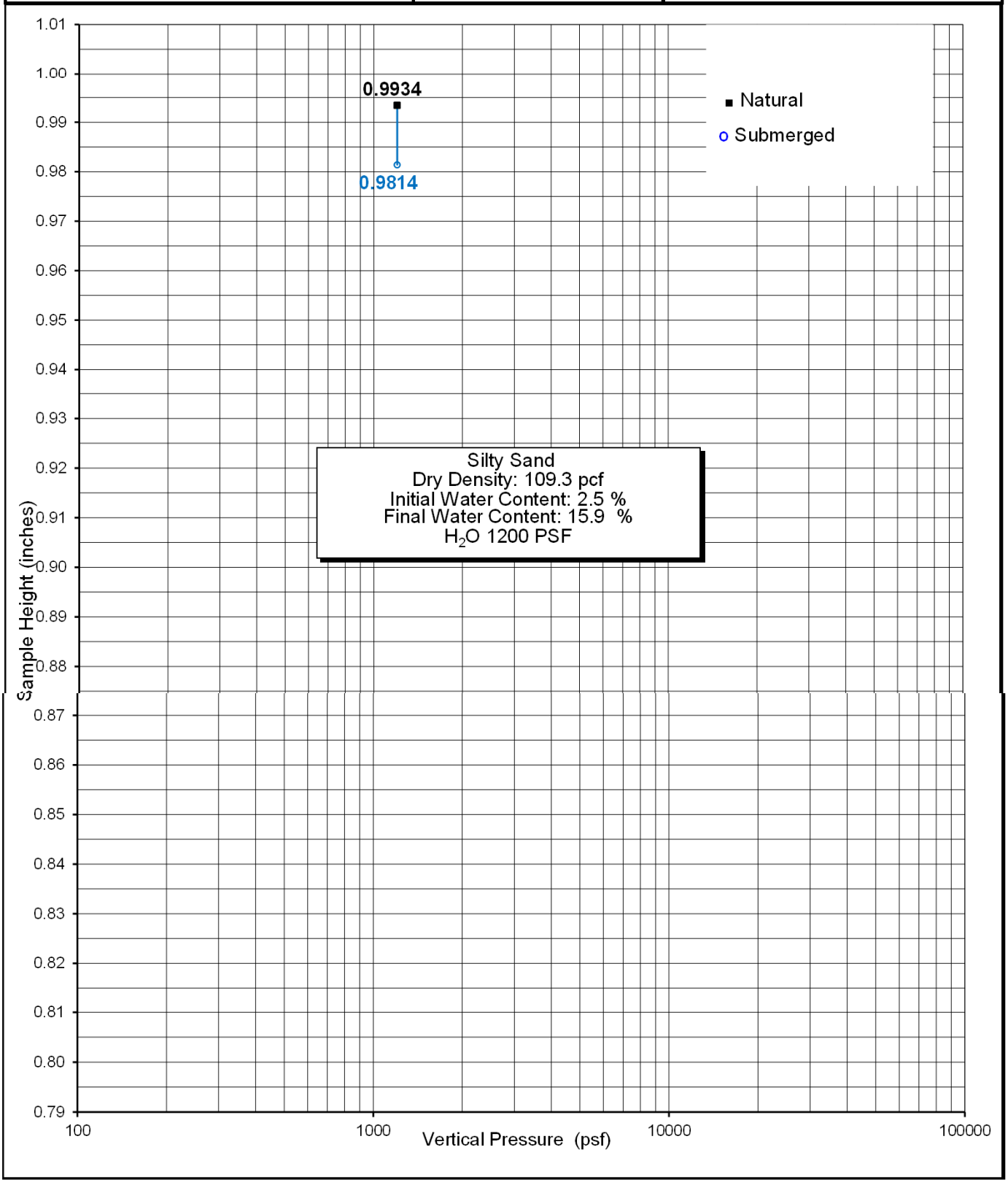
Langan Engineering #700045403

CONSOLIDATION TEST - ASTM D2435

Job No. 2012-0057

Boring / Sample No.	LB-4 / S-1	Depth:	5' - 6.5'	Date	10-01-16



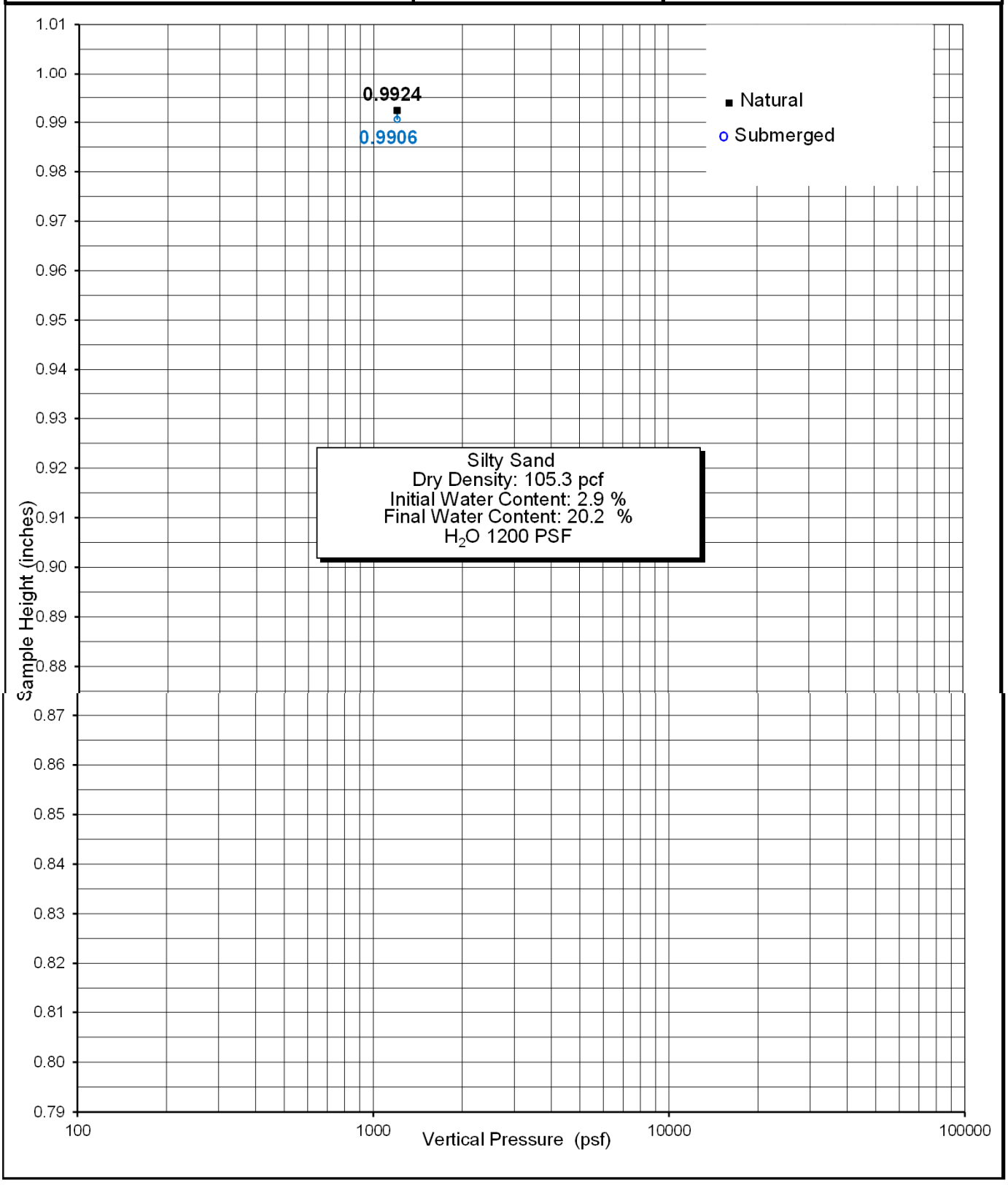
Geo-Logic Associates

Langan Engineering #700045403

CONSOLIDATION TEST - ASTM D2435

Job No. 2012-0057

Boring / Sample No.	LB-4 / S-3	Depth:	15' - 16.5'	Date	10-01-16



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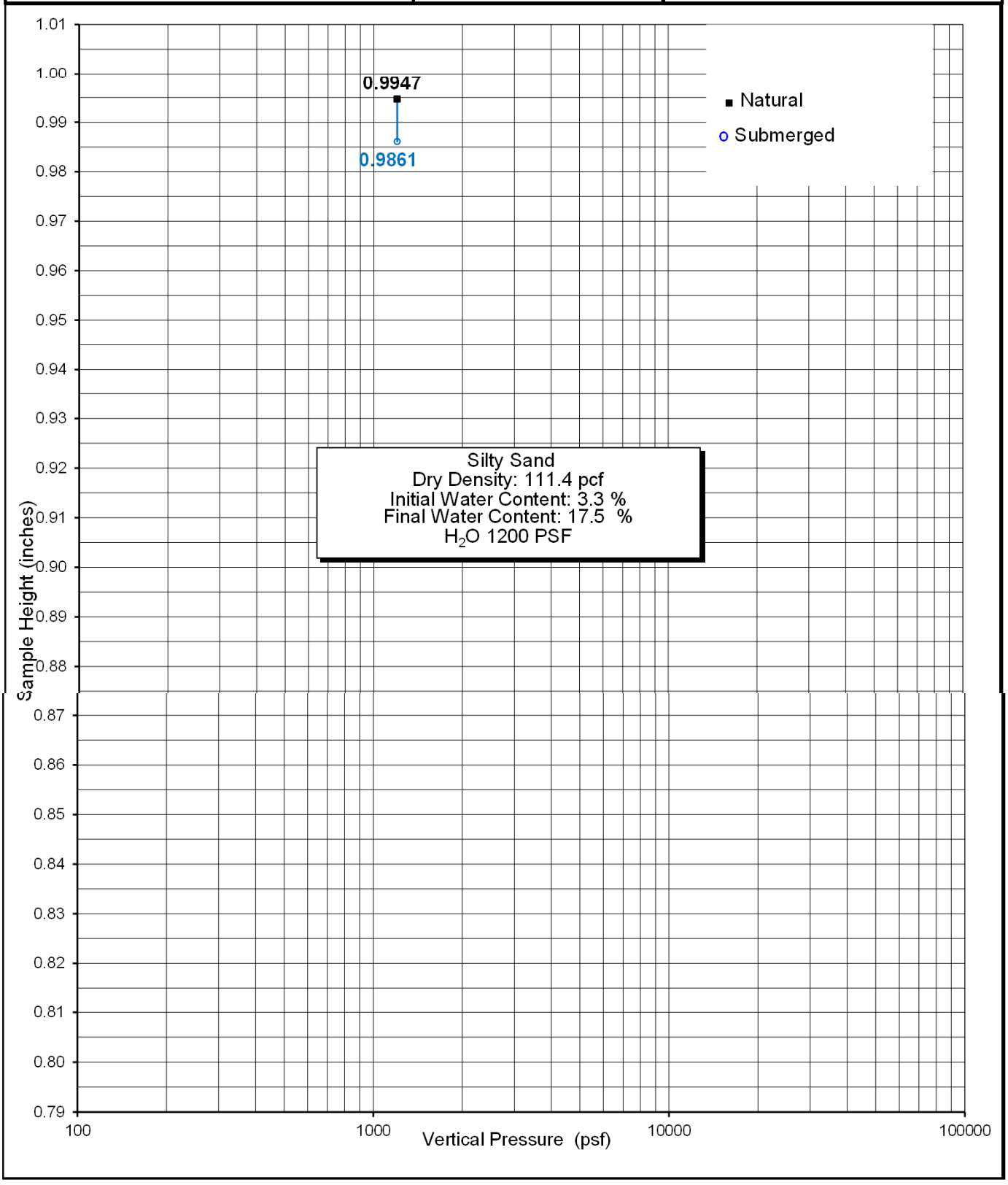
Langan Engineering #700045403

CONSOLIDATION TEST - ASTM D2435

Job No. 2012-0057

Boring / Sample No.	LB-5 / S-1	Depth:	5' - 6.5'	Date	10-01-16



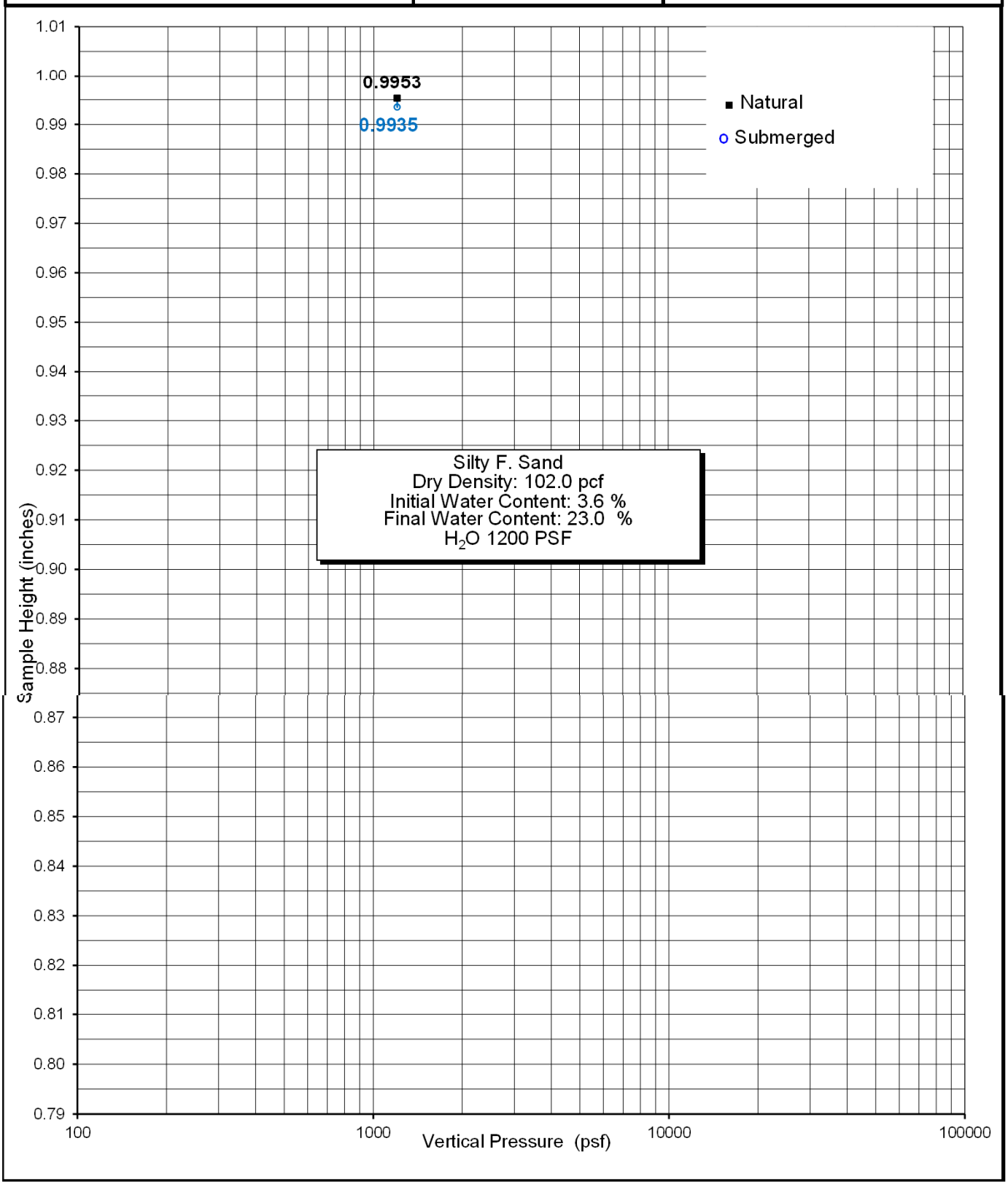
Geo-Logic Associates

Langan Engineering #700045403

CONSOLIDATION TEST - ASTM D2435

Job No. 2012-0057

Boring / Sample No.	LB-5 / S-5	Depth:	25' - 26.5'	Date	10-01-16



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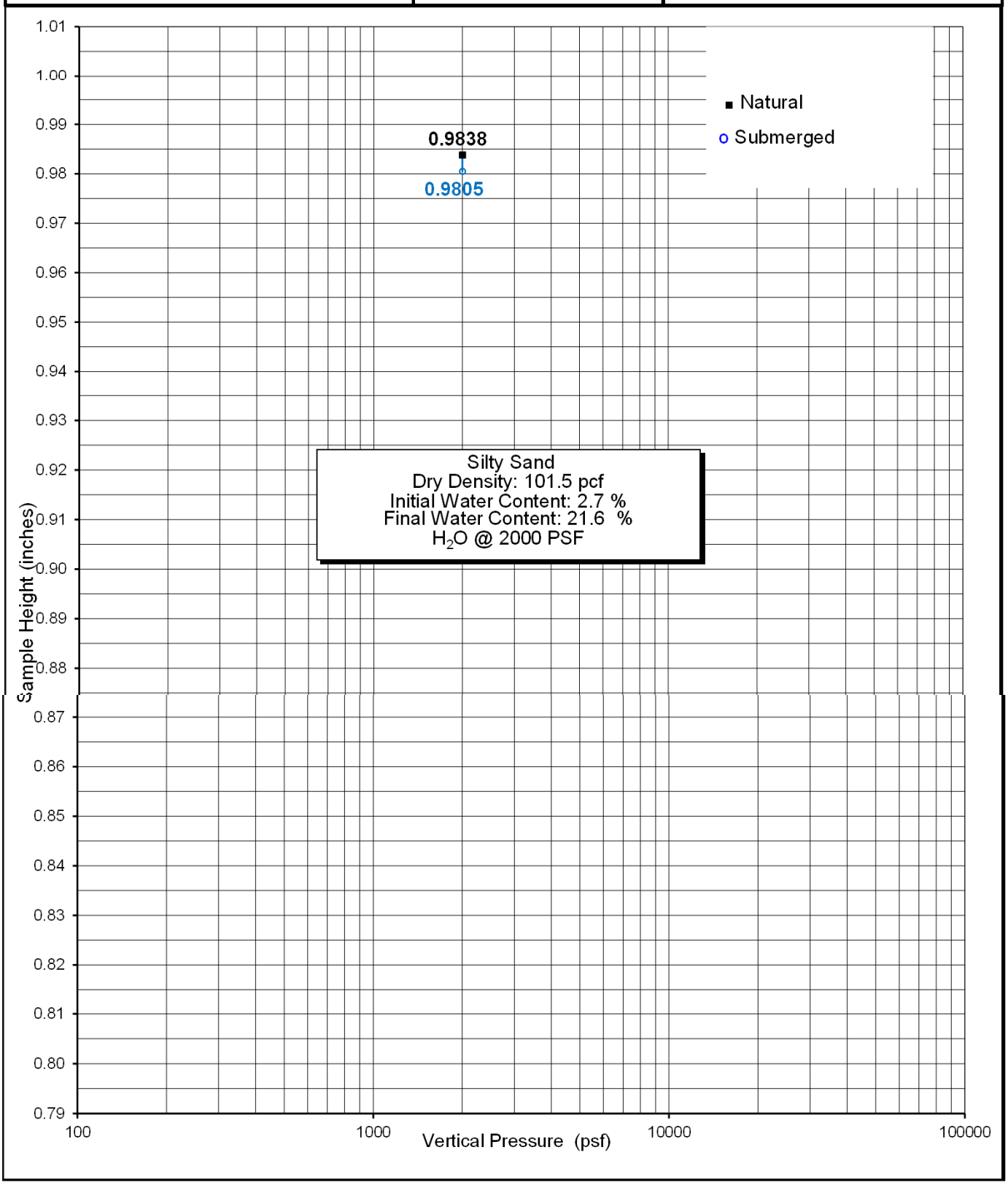
Langan Engineering #700045403

CONSOLIDATION TEST - ASTM D2435

Job No. 2012-0057

Boring / Sample No.	LB-6 / S-5	Depth:	25' - 26.5'	Date	10-01-16



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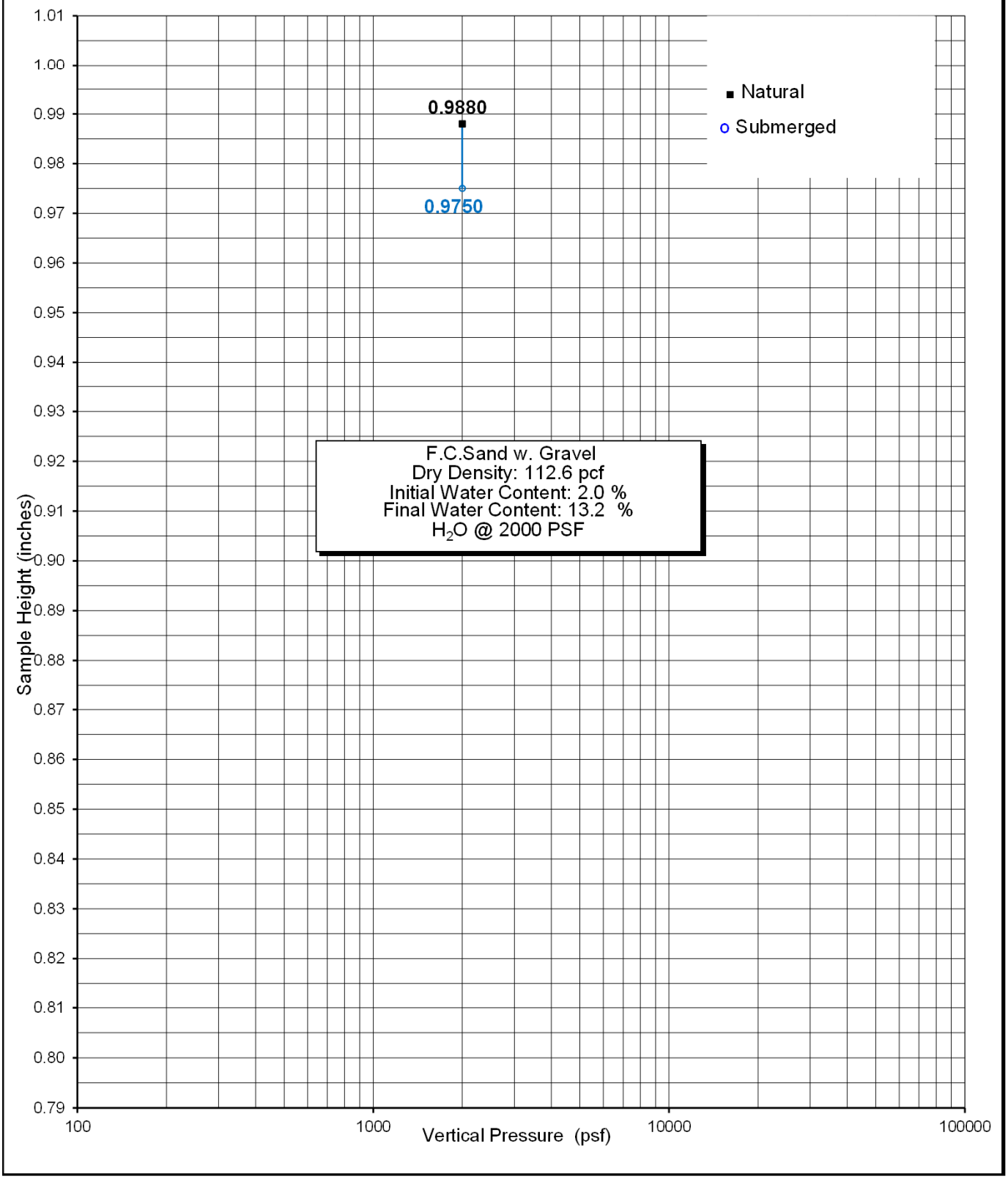
Langan Engineering #700045403

CONSOLIDATION TEST - ASTM D2435

Job No. 2012-0057

Boring / Sample No.	LB-8 / S-3	Depth:	15' - 16.5'	Date	10-01-16



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EXPANSION INDEX - UBC 18-2 & ASTM D 4829-88

PROJECT Langan #700045403 JOB NO. 2012-0057

Sample	LB-5 / S-3		By	LD	Sample			By	
Sta. No.					Sta. No.				
Soil Type	Brown, Clay				Soil Type				
Date	Time	Dial Reading	Wet+Tare	556.2	Date		Dial Reading	Wet+Tare	
10/1/2016	13:35	0.1732	Tare	219.5				Tare	
		H2O	Net Weight	336.7				Net Weight	
10/2/2016	10:00	0.0945	% Water	17.0				% Water	
			Dry Dens.	87.2				Dry Dens.	
			% Max					% Max	
			Wet+Tare	620				Wet+Tare	
			Tare	219.5				Tare	
			Net Weight	400.5				Net Weight	
INDEX	79	7.9%	% Water	39.2	**INDEX**			% Water	

Sample			By		Sample			By	
Sta. No.					Sta. No.				
Soil Type					Soil Type				
Date		Dial Reading	Wet+Tare		Date		Dial Reading	Wet+Tare	
			Tare					Tare	
			Net Weight					Net Weight	
			% Water					% Water	
			Dry Dens.					Dry Dens.	
			% Max					% Max	
			Wet+Tare					Wet+Tare	
			Tare					Tare	
			Net Weight					Net Weight	
INDEX			% Water		**INDEX**			% Water	

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WASH #200 SIEVE - ASTM D 1140-92

Job Name	Langan # 700045403	Date	10-8-16
Job No.	2012-0057	By	LD

Sample	LB-1 / S-2	**Sample**	LB-2 / S-2	**Sample**	LB-2 / S-4
Soil Type		Soil Type		Soil Type	
% water	0	% water	0	% water	0
Wet weight	261.6	Wet weight	286.9	Wet weight	266.6
Dry weight	261.6	Dry weight	286.9	Dry weight	266.6
+ 200 sieve	235.1	+ 200 sieve	263.2	+ 200 sieve	224.9
% Retained	89.9	% Retained	91.7	% Retained	84.4
%Pass. #200	**10**	**%Pass. #200**	**8**	**%Pass. #200**	**16**

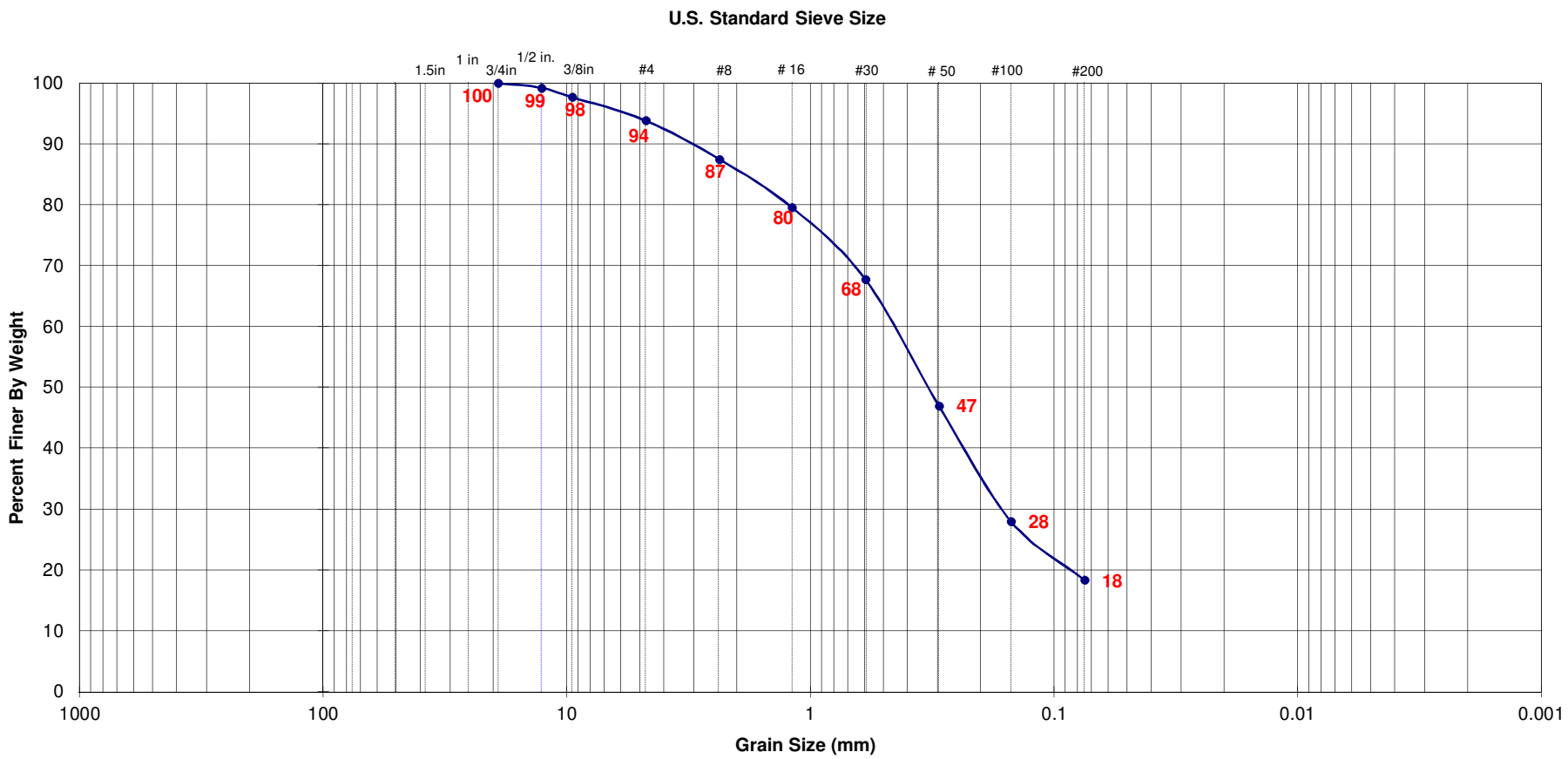
Sample	LB-3 / S-1	**Sample**	LB-3 / S-3	**Sample**	LB-3 / S-9
Soil Type		Soil Type		Soil Type	
% water	11.1	% water	14.3	% water	0
Wet weight	224.9	Wet weight	232.5	Wet weight	195.9
Dry weight	202.5	Dry weight	203.5	Dry weight	195.9
+ 200 sieve	166	+ 200 sieve	104	+ 200 sieve	67.2
% Retained	82.0	% Retained	51.1	% Retained	34.3
%Pass. #200	**18**	**%Pass. #200**	**49**	**%Pass. #200**	**66**

Sample	LB-5 / S-3	**Sample**	LB-6 / S-1	**Sample**	LB-6 / S-5
Soil Type		Soil Type		Soil Type	
% water	17.9	% water	5.2	% water	2.7
Wet weight	154.9	Wet weight	240.4	Wet weight	221.6
Dry weight	131.4	Dry weight	228.5	Dry weight	215.8
+ 200 sieve	9	+ 200 sieve	118.9	+ 200 sieve	154
% Retained	6.9	% Retained	52.0	% Retained	71.4
%Pass. #200	**93**	**%Pass. #200**	**48**	**%Pass. #200**	**29**

Sample	LB-6 / S-8	**Sample**	LB-10 / S-8	**Sample**	ALB-10 / S-3
Soil Type		Soil Type		Soil Type	
% water	4.2	% water	18.3	% water	6.3
Wet weight	235.2	Wet weight	180	Wet weight	225.4
Dry weight	225.7	Dry weight	152.2	Dry weight	212.0
+ 200 sieve	66.8	+ 200 sieve	19.2	+ 200 sieve	177.3
% Retained	29.6	% Retained	12.6	% Retained	83.6
%Pass. #200	**70**	**%Pass. #200**	**87**	**%Pass. #200**	**16**

Geo-Logic ASSOCIATES

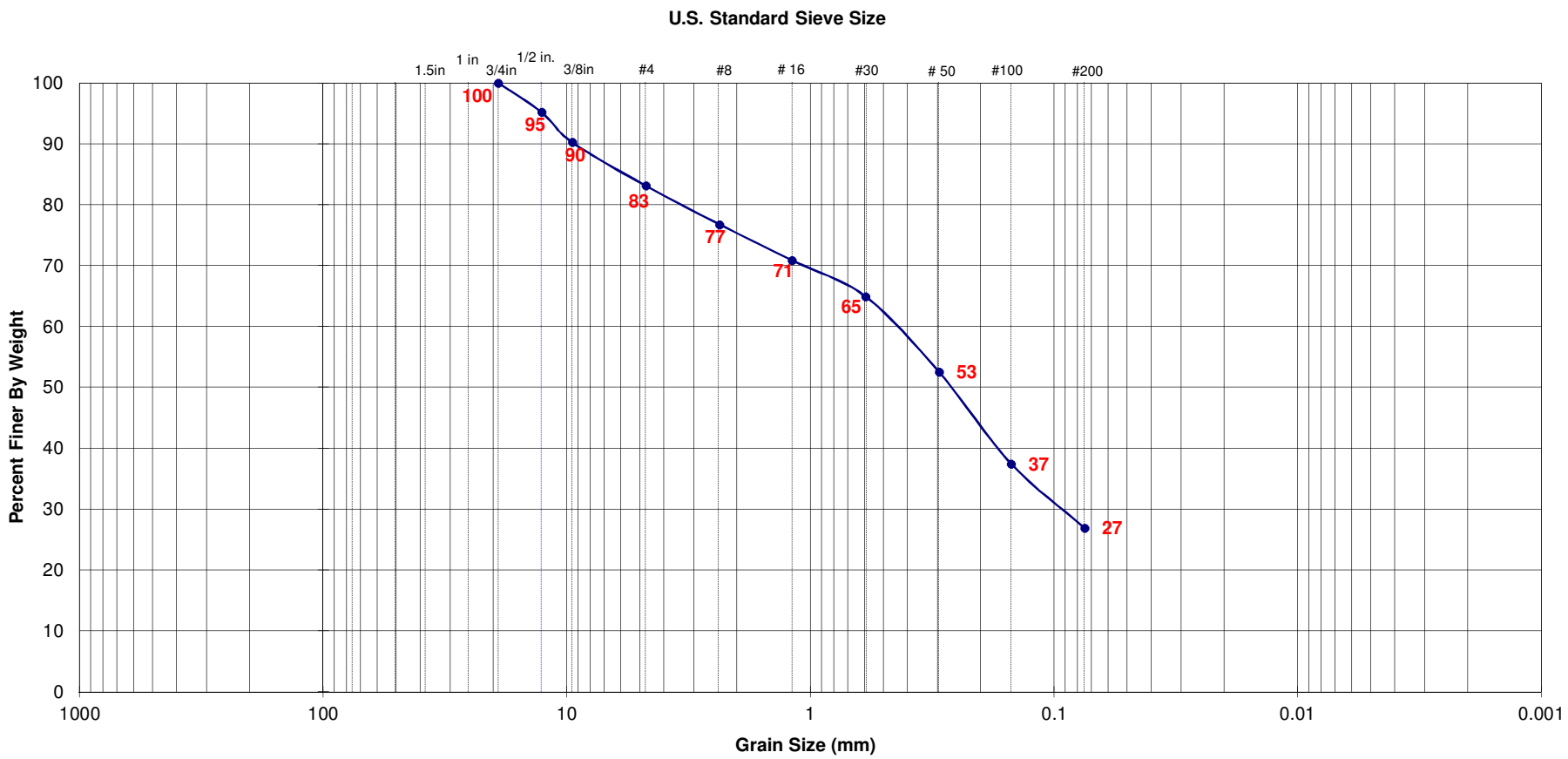
Date: 10/12/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-1 / B-1									**SM**	

Geo-Logic Associates

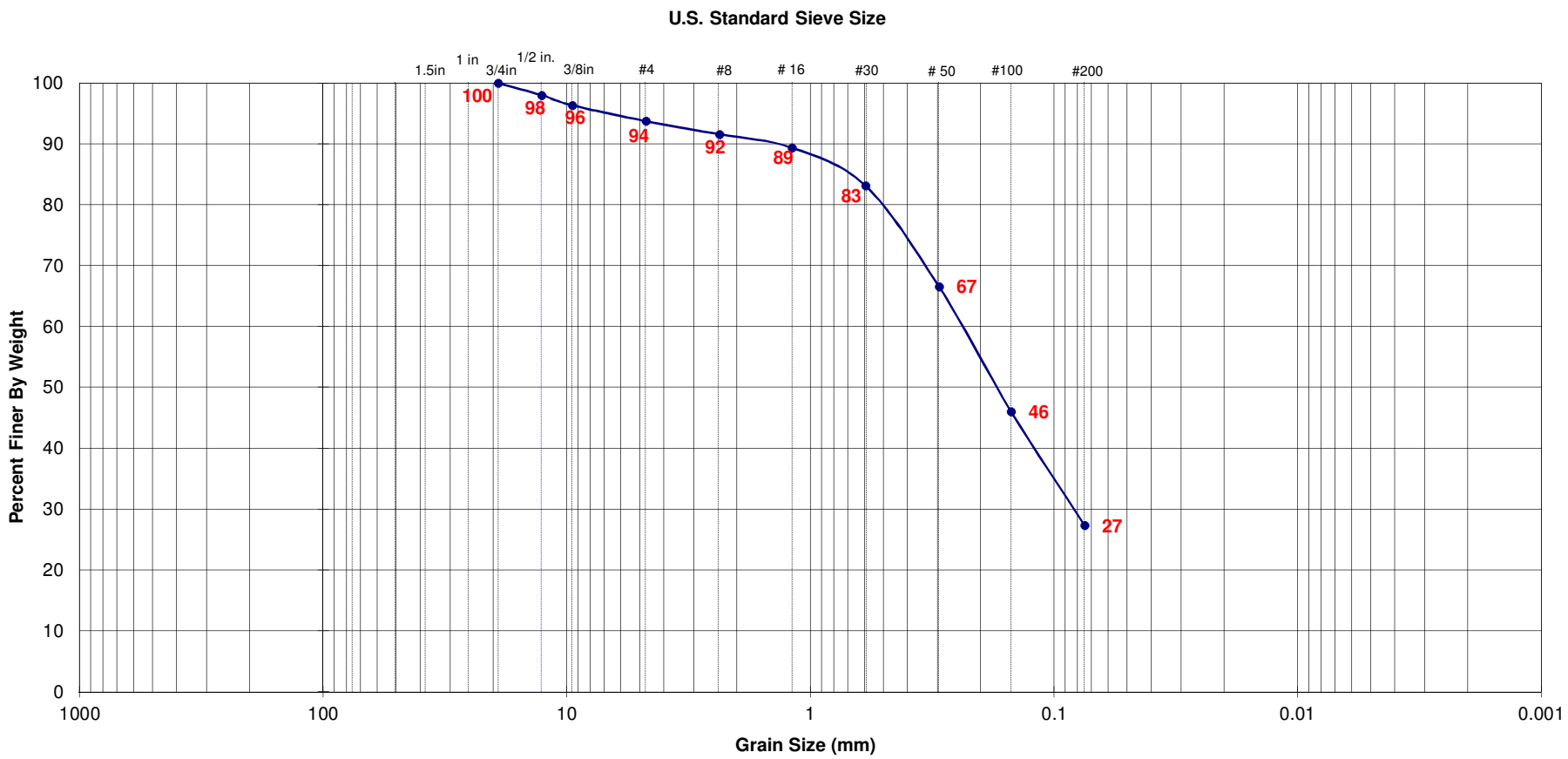
Date: 10/4/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-2 / S-6									**SM**	

Geo-Logic Associates

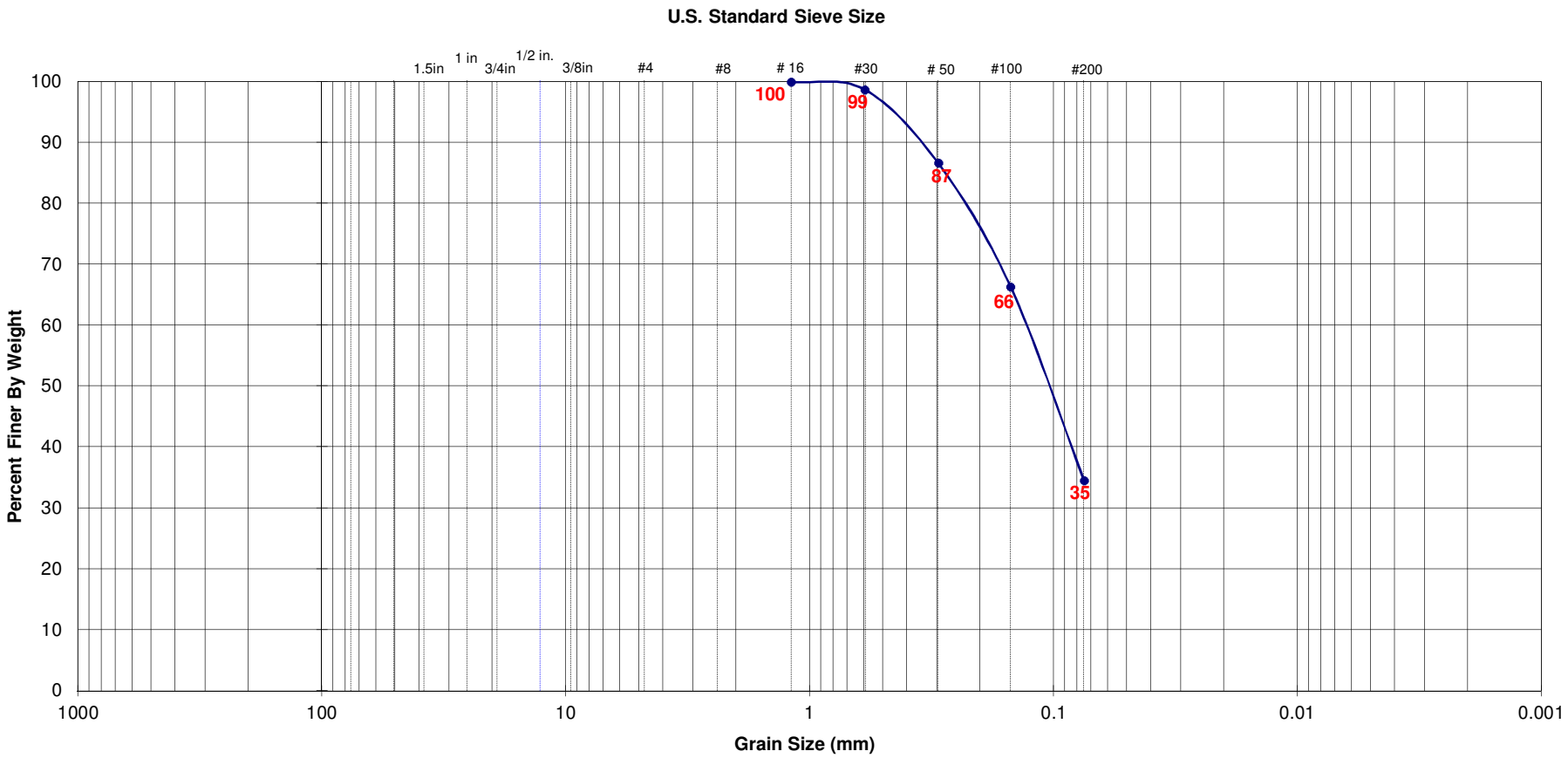
Date: 10/8/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-4 / B-1									**SM**	

Geo-Logic Associates

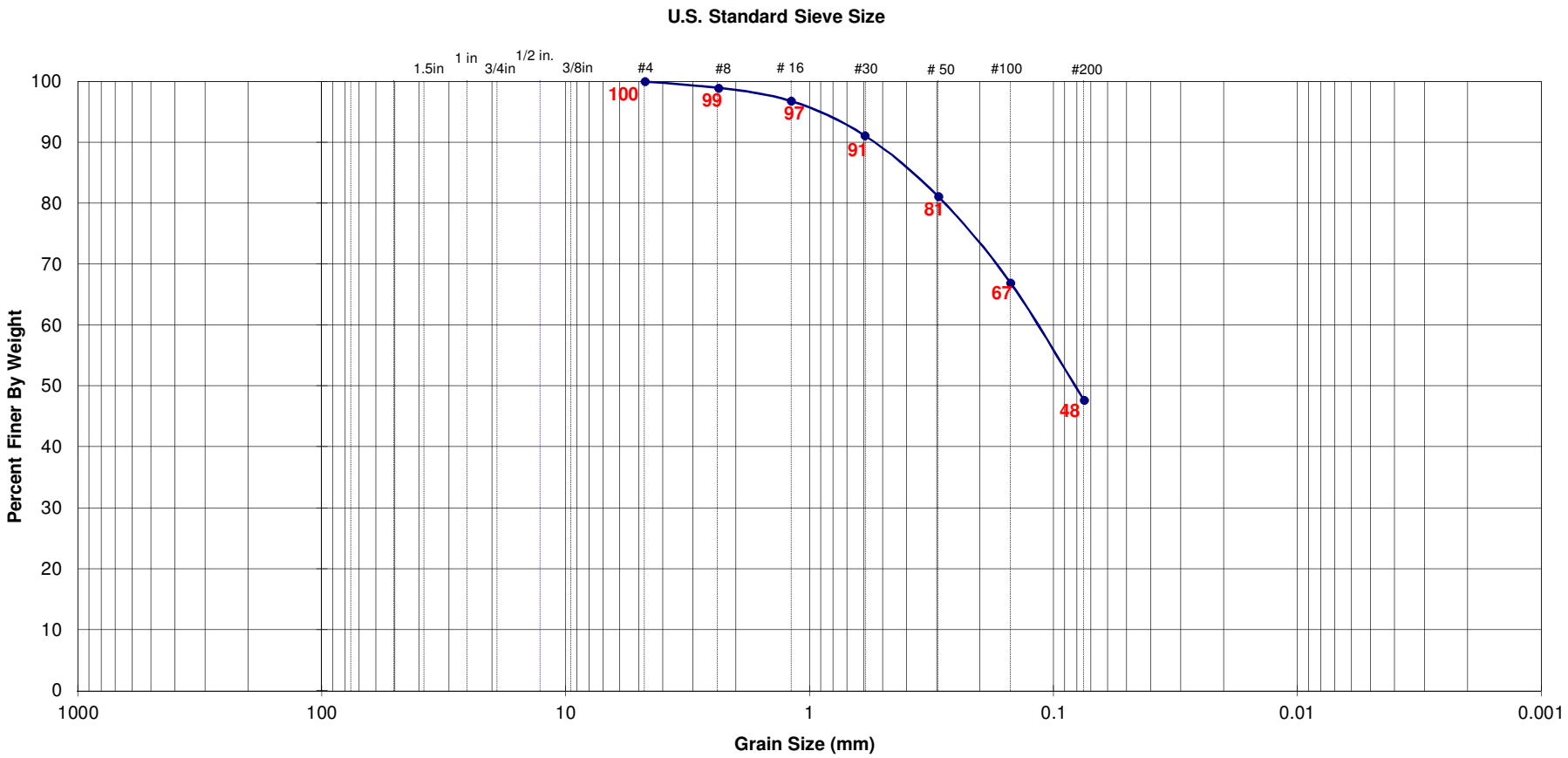
Date: 10/8/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-4 / S-2									**SM**	

Geo-Logic Associates

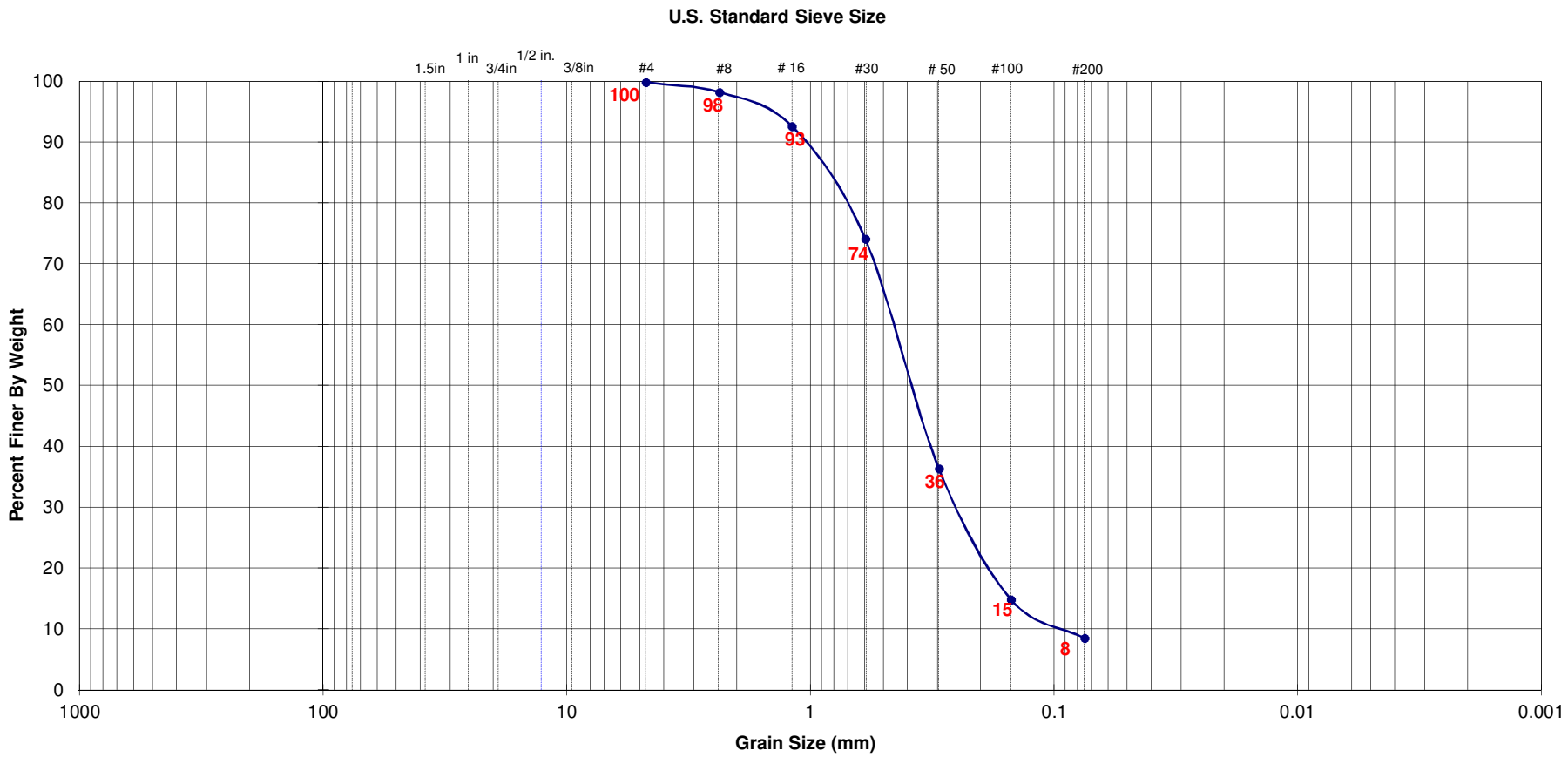
Date: 10/12/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-5 / B-1									**SM**	

Geo-Logic Associates

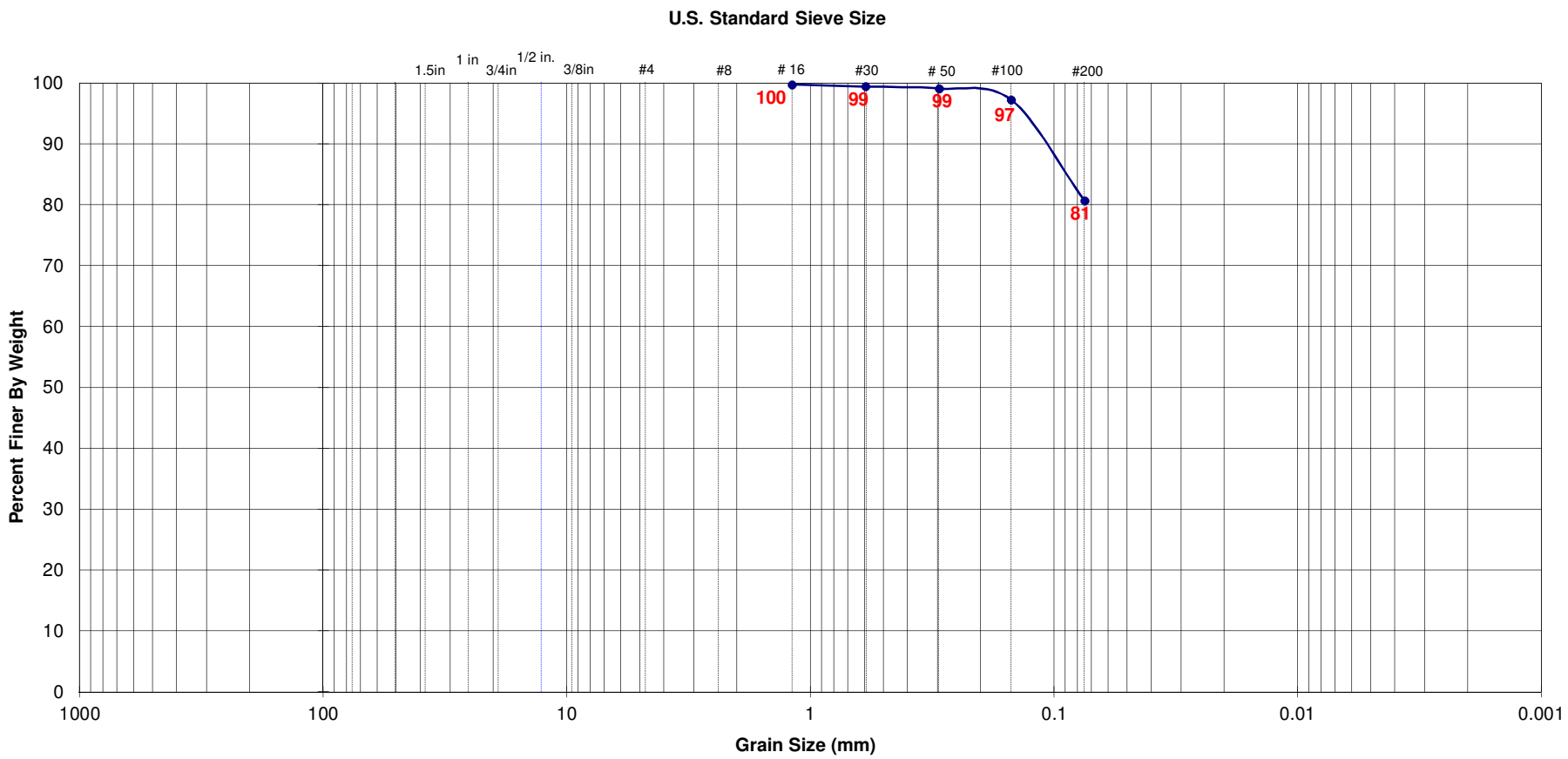
Date: 10/10/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-7A / S-6									**SP-SM**	

Geo-Logic Associates

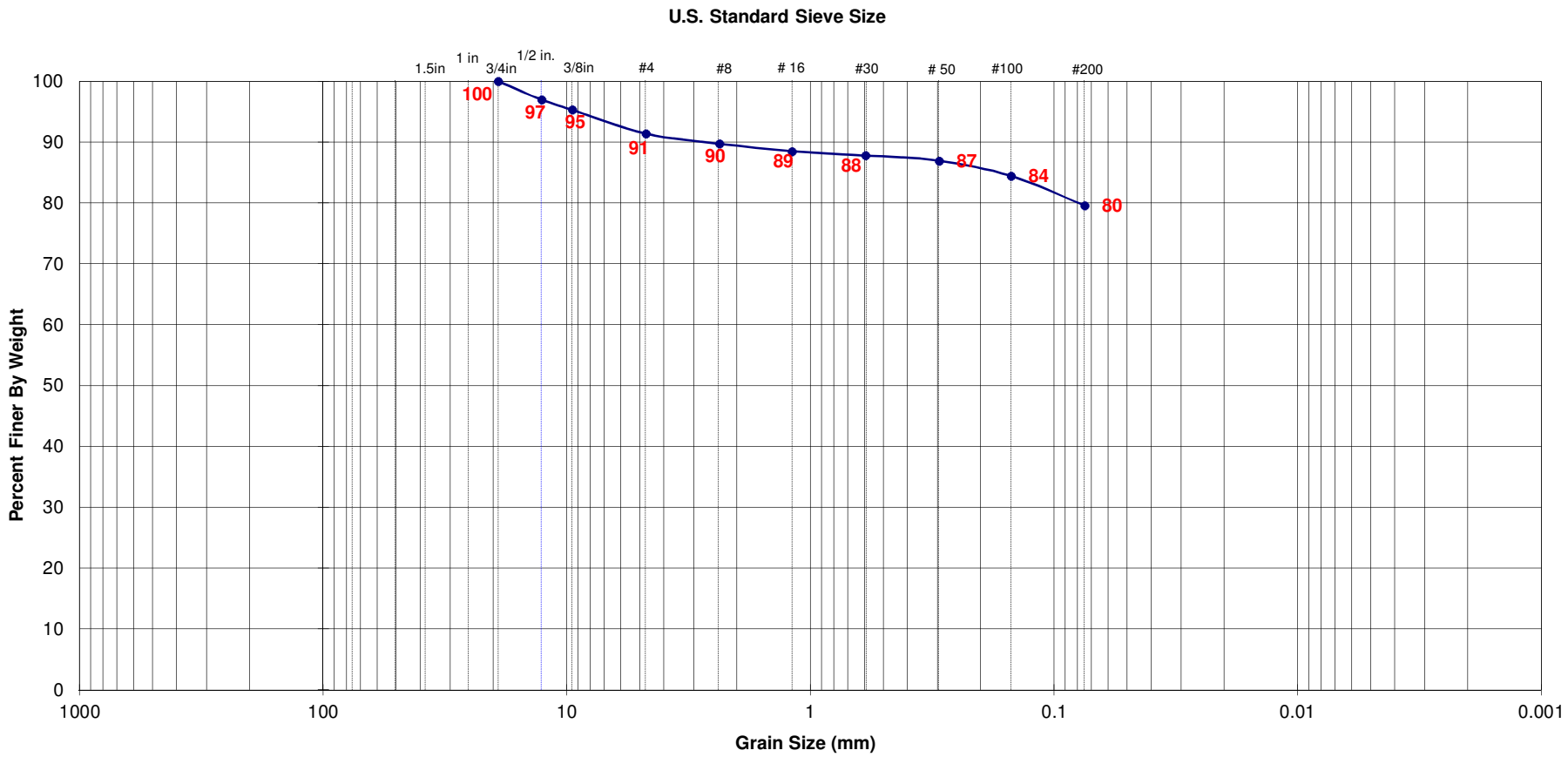
Date: 10/10/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-8 / S-6									**ML**	

Geo-Logic Associates

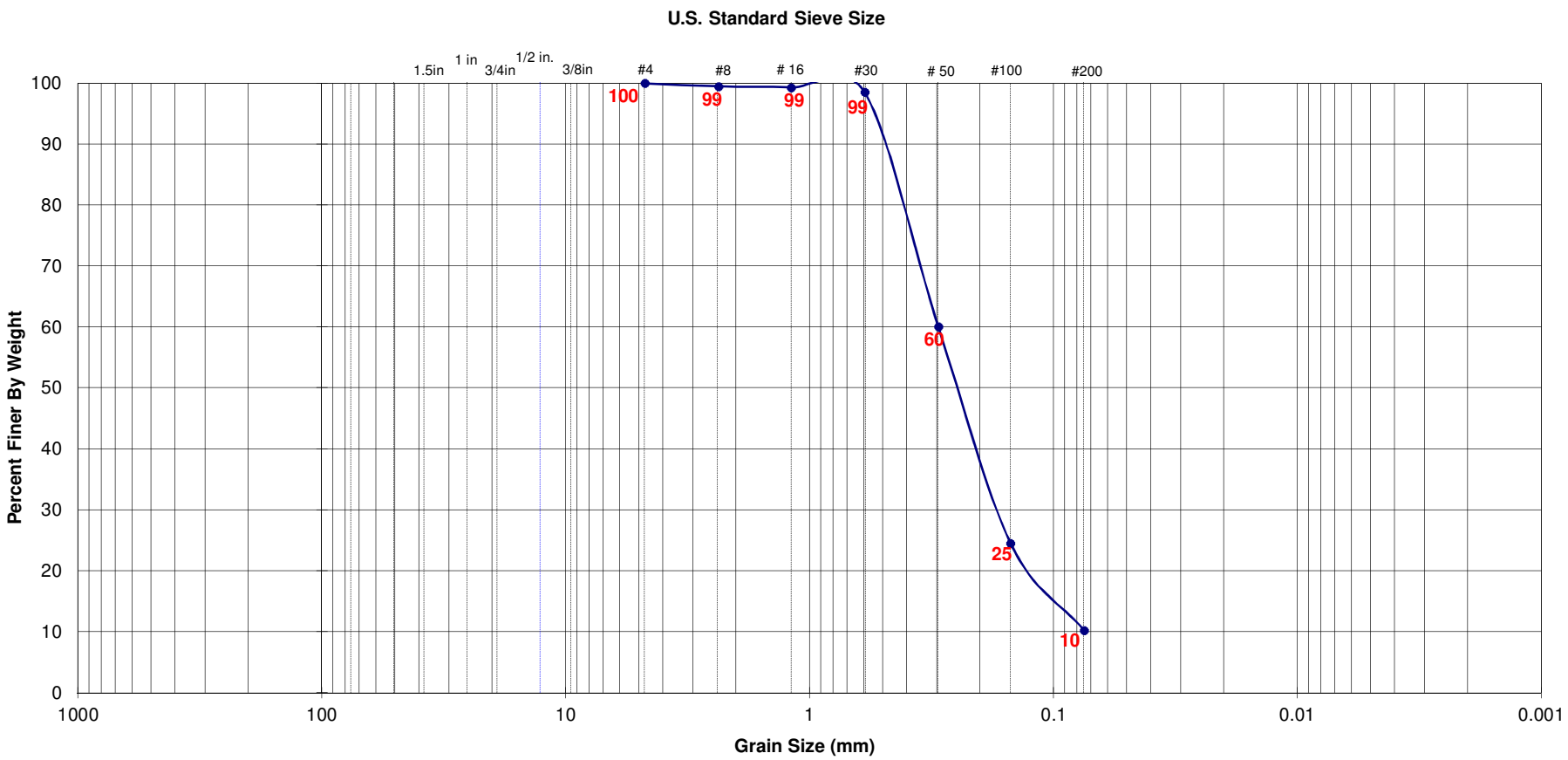
Date: 10/10/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-9 / S-9									**ML**	

Geo-Logic Associates

Date: 10/10/16



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
LB-11 / S-1									**SP-SM**	

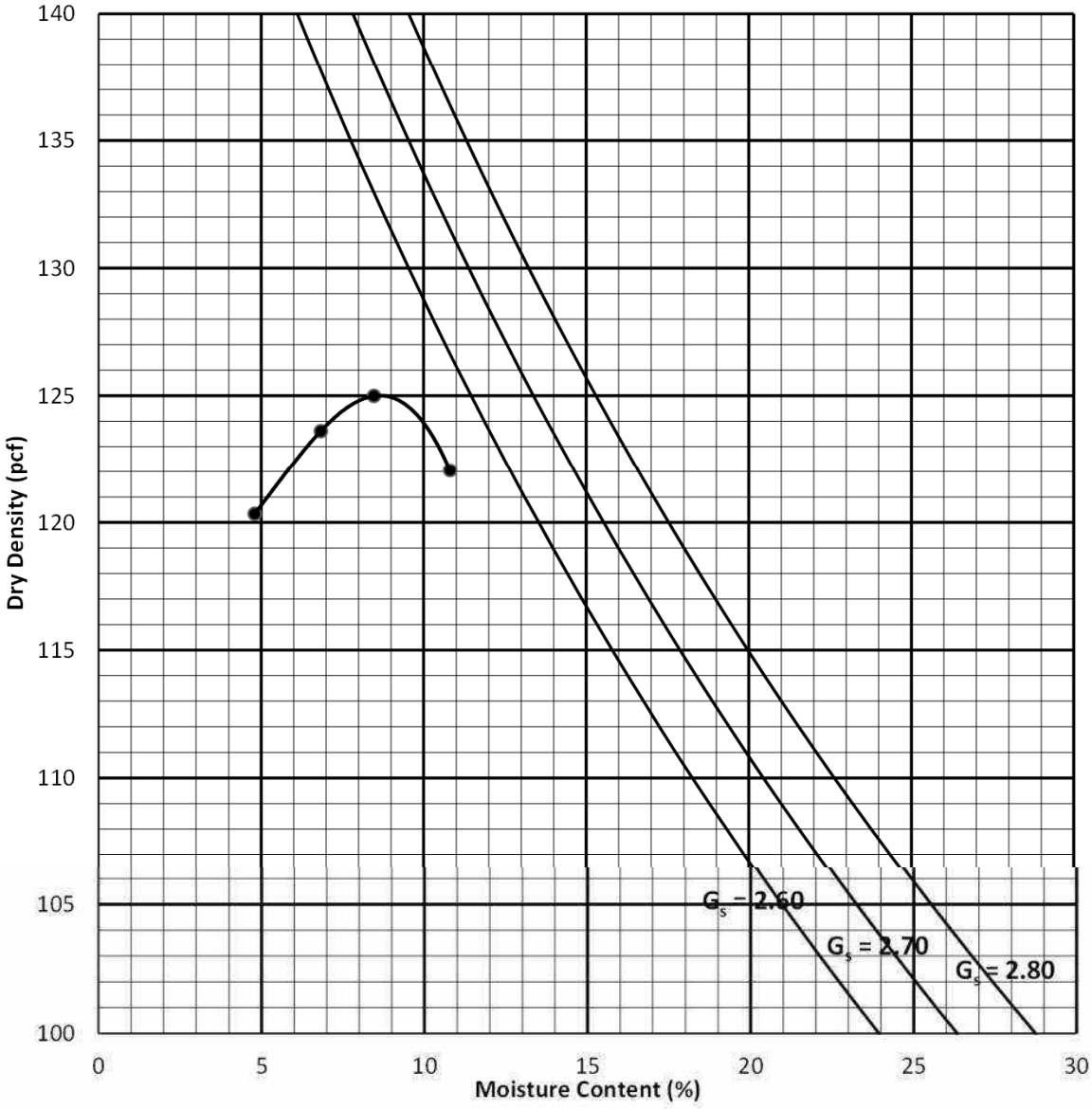
Geo-Logic Associates

COMPACTION TEST REPORT

Project: Langan # 700045403 **GLA No.** 2012-0057
Sample: LB-1 / B-1 **Date:** 10/10/2016
Description: Brown, F.C. SAND w. silty w. F. Gravel **By:** LD

ASTM D1557	Method B	Volume (cf): 0.03333		# Blows: 25	# Layers: 5
Specimen		A	B	C	D
Wet Weight (grs)		2045	2050	1997	1907
Wet Density (pcf)		135.3	135.6	132.1	126.1
Moisture Content (%)		10.8	8.5	6.8	4.8
Dry Density (pcf)		122.1	125.0	123.6	120.3

Max. Dry Density : 125.0 pcf
Opt. Water Content: 8.5 %



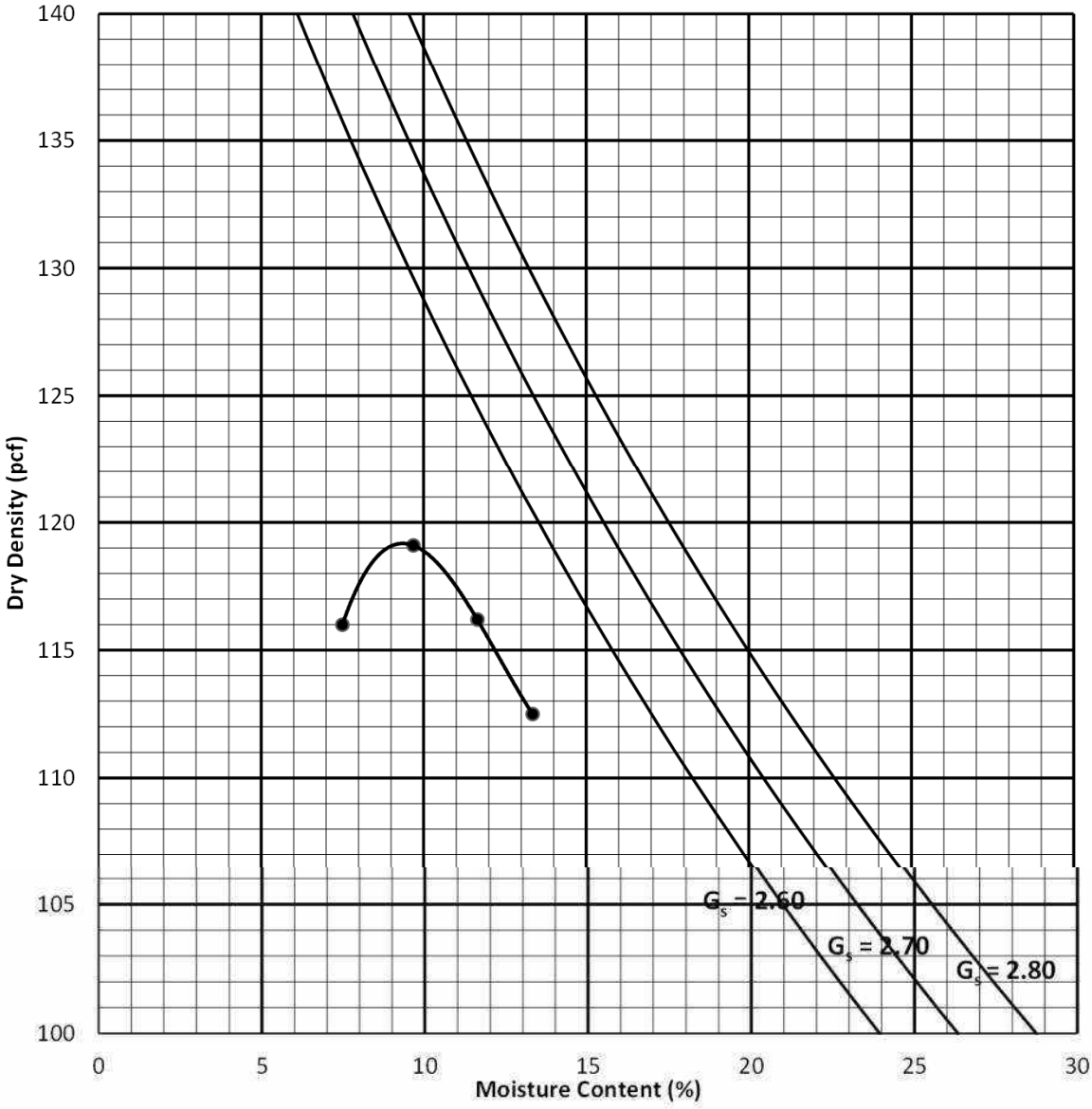
Geo-Logic ASSOCIATES

COMPACTION TEST REPORT

Project: Langan # 700045403 **GLA No.** 2012-0057
Sample: LB-3 / B-1 **Date:** 10/10/16
Description: Brown, F.M. Silty Sand w. Gravel **By:** LD

ASTM D1557	Method C	Volume (cf): 0.075		# Blows: 56	# Layers: 5
Specimen		A	B	C	D
Wet Weight (lbs)		9.73	9.56	9.80	9.35
Wet Density (pcf)		129.7	127.5	130.6	124.7
Moisture Content (%)		11.6	13.4	9.7	7.5
Dry Density (pcf)		116.2	112.5	119.1	116.0

Max. Dry Density : 119.0 pcf
Opt. Water Content: 9.5 %



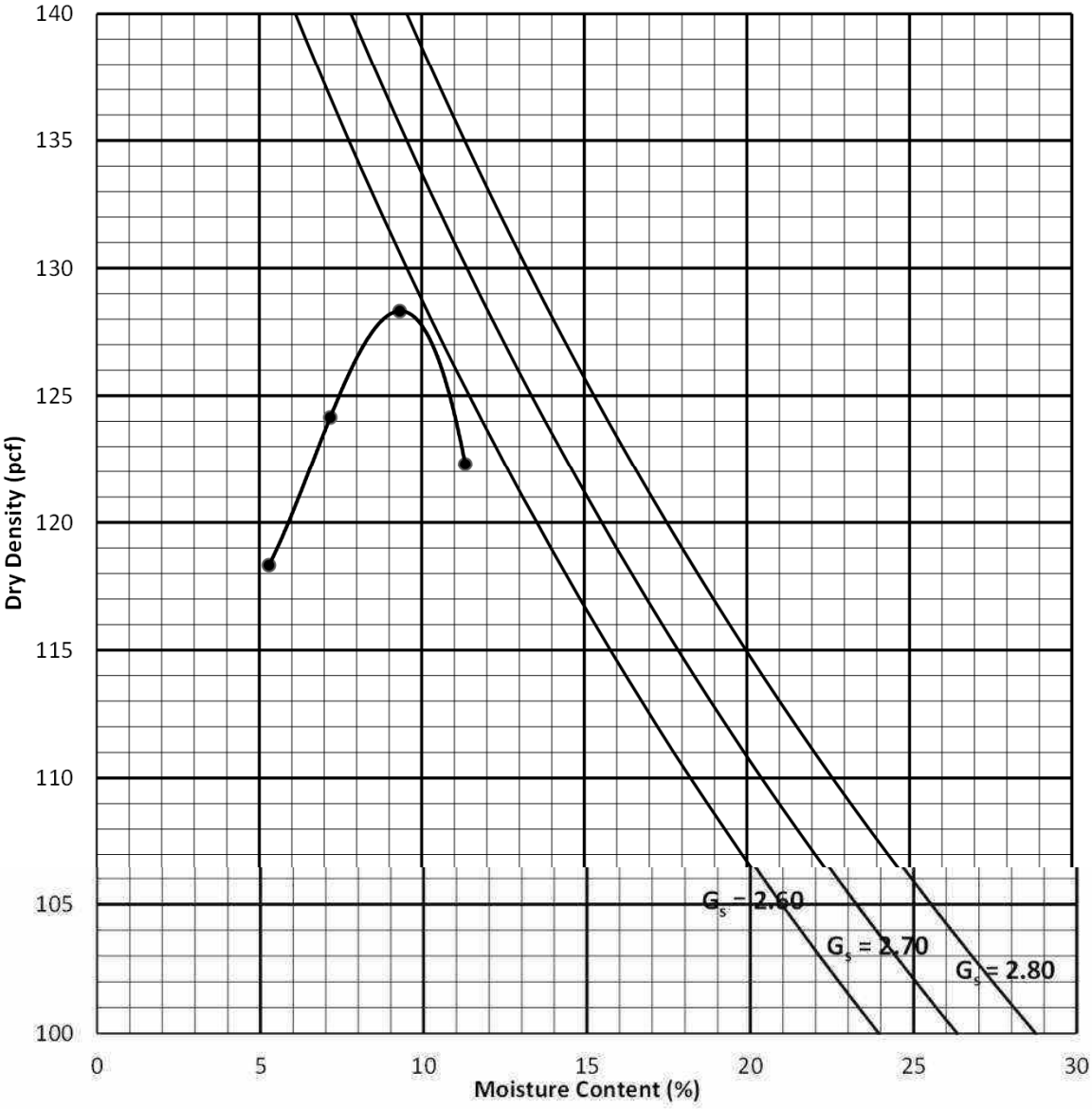
Geo-Logic ASSOCIATES

COMPACTION TEST REPORT

Project: Langan # 700045403 **GLA No.** 2012-0057
Sample: LB-5 / B-1 **Date:** 10/12/2016
Description: Brown, F.M. Silty Sand **By:** LD

ASTM D1557	Method A	Volume (cf): 0.03333		# Blows: 25	# Layers: 5
Specimen		A	B	C	D
Wet Weight (grs)		2059	2121	2012	1884
Wet Density (pcf)		136.2	140.3	133.1	124.6
Moisture Content (%)		11.3	9.3	7.2	5.3
Dry Density (pcf)		122.3	128.3	124.2	118.3

Max. Dry Density : 128.5 pcf
Opt. Water Content: 9.5 %



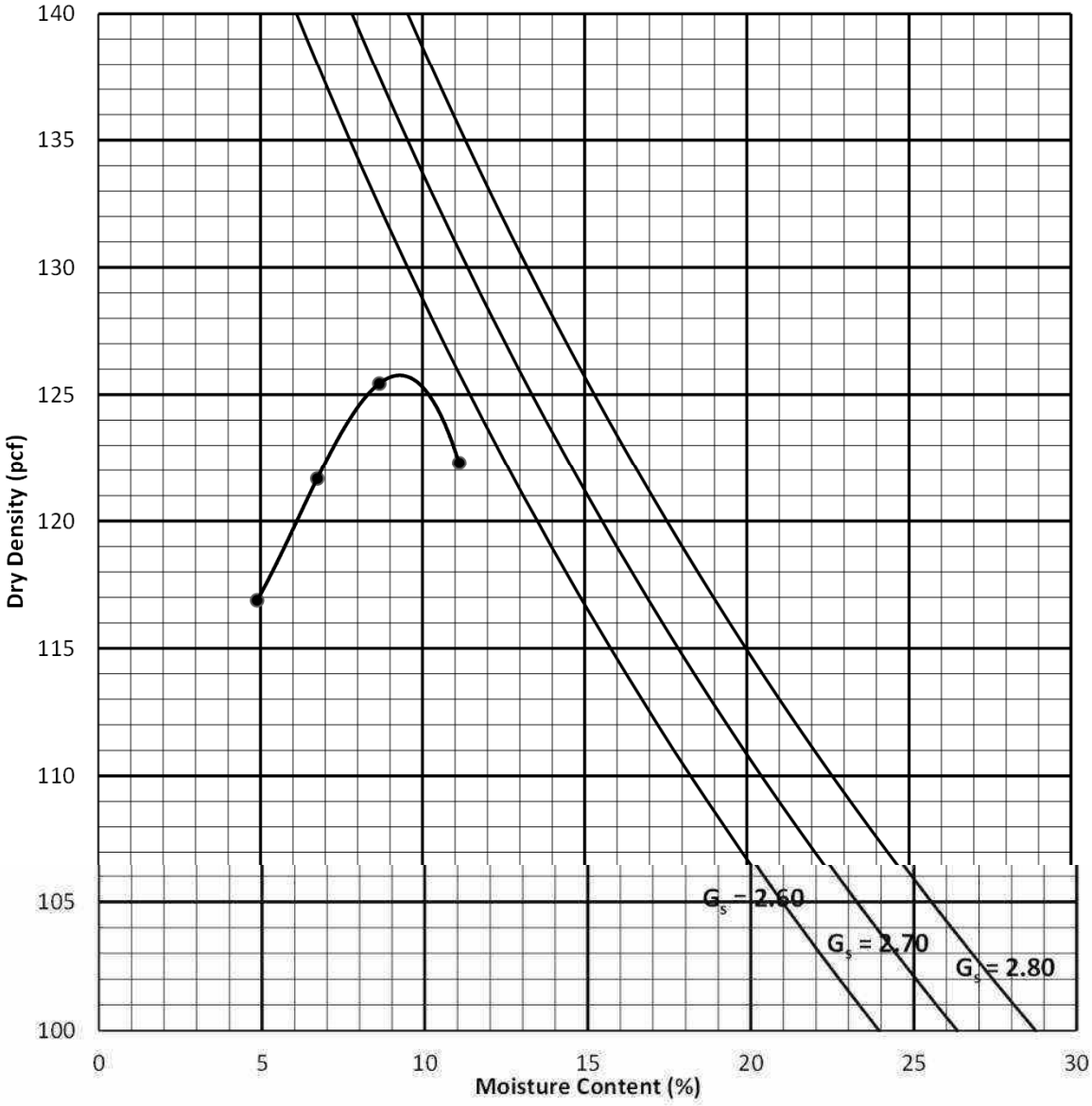
Geo-Logic ASSOCIATES

COMPACTION TEST REPORT

Project: Langan # 700045403 **GLA No.** 2012-0057
Sample: LB-6 / B-1 **Date:** 10/12/2016
Description: Brown, F.M. Silty Sand w. F. Gravel **By:** LD

ASTM D1557	Method B	Volume (cf): 0.03333		# Blows: 25	# Layers: 5
Specimen		A	B	C	D
Wet Weight (grs)		2055	2061	1964	1854
Wet Density (pcf)		135.9	136.3	129.9	122.6
Moisture Content (%)		11.1	8.7	6.7	4.9
Dry Density (pcf)		122.3	125.4	121.7	116.9

Max. Dry Density : 125.5 pcf
Opt. Water Content: 9.5 %



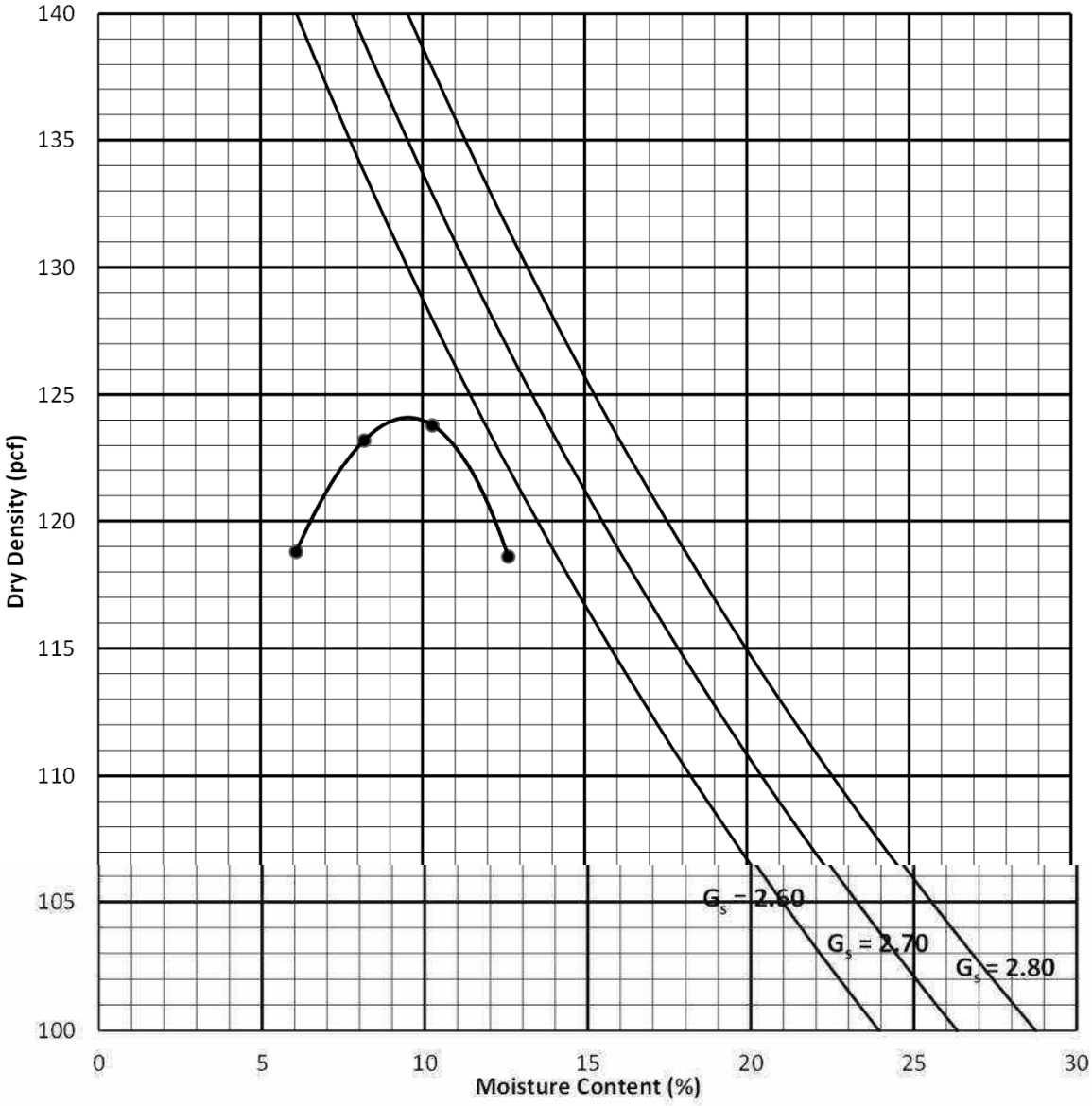
Geo-Logic ASSOCIATES

COMPACTION TEST REPORT

Project: Langan # 700045403 **GLA No.** 2012-0057
Sample: LB-10 / B-1 **Date:** 10/12/16
Description: Brown, F.M. Silty Sand w. Gravel & trace Clay **By:** LD

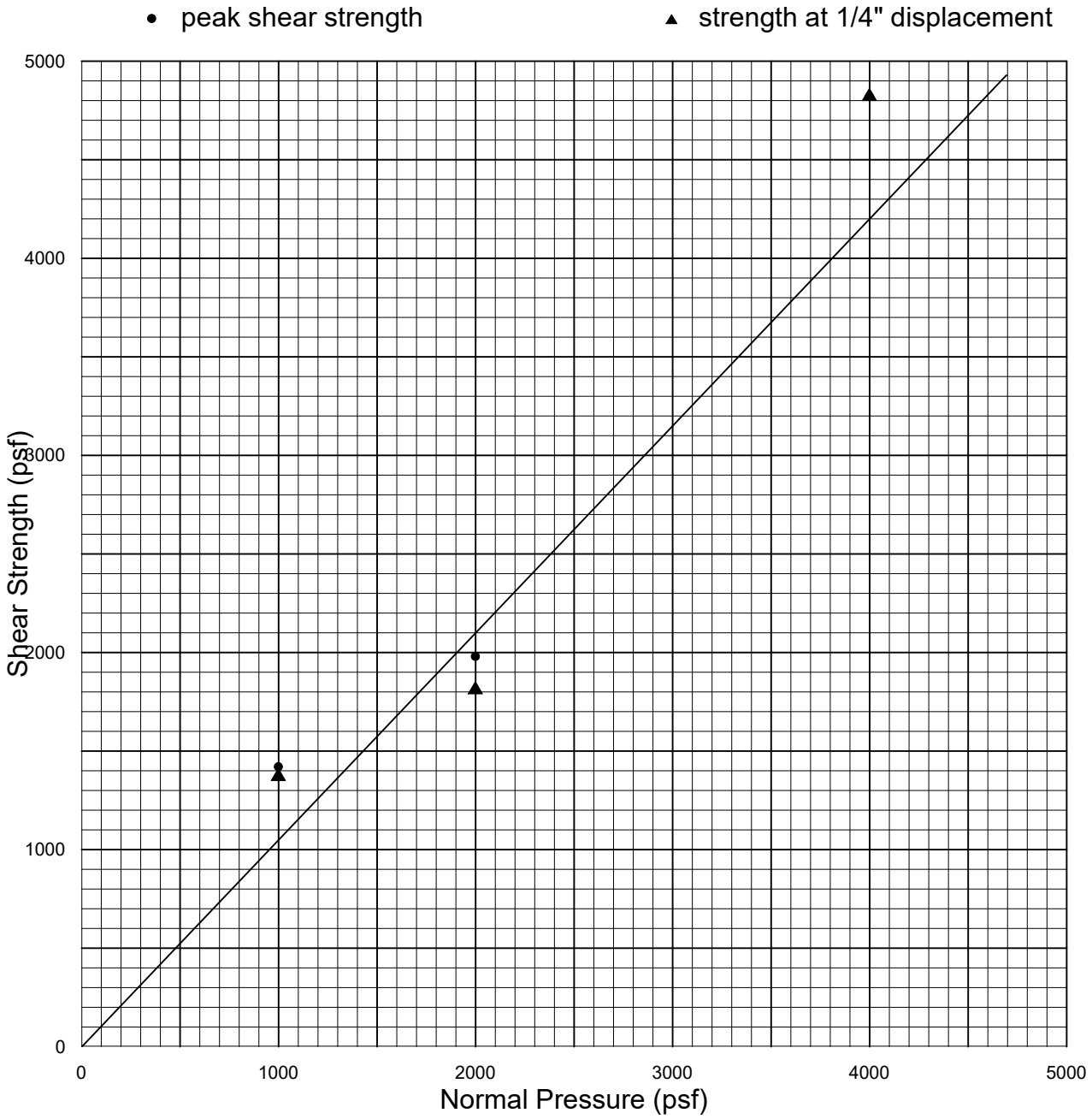
ASTM D1557	Method C	Volume (cf): 0.075		# Blows: 56	# Layers: 5
Specimen		A	B	C	D
Wet Weight (lbs)		10.02	10.24	10.00	9.45
Wet Density (pcf)		133.6	136.6	133.3	126.0
Moisture Content (%)		12.6	10.3	8.2	6.1
Dry Density (pcf)		118.6	123.8	123.2	118.8

Max. Dry Density : 124.0 pcf
Opt. Water Content: 9.5 %



Geo-Logic ASSOCIATES

DIRECT SHEAR TEST - ASTM D-3080



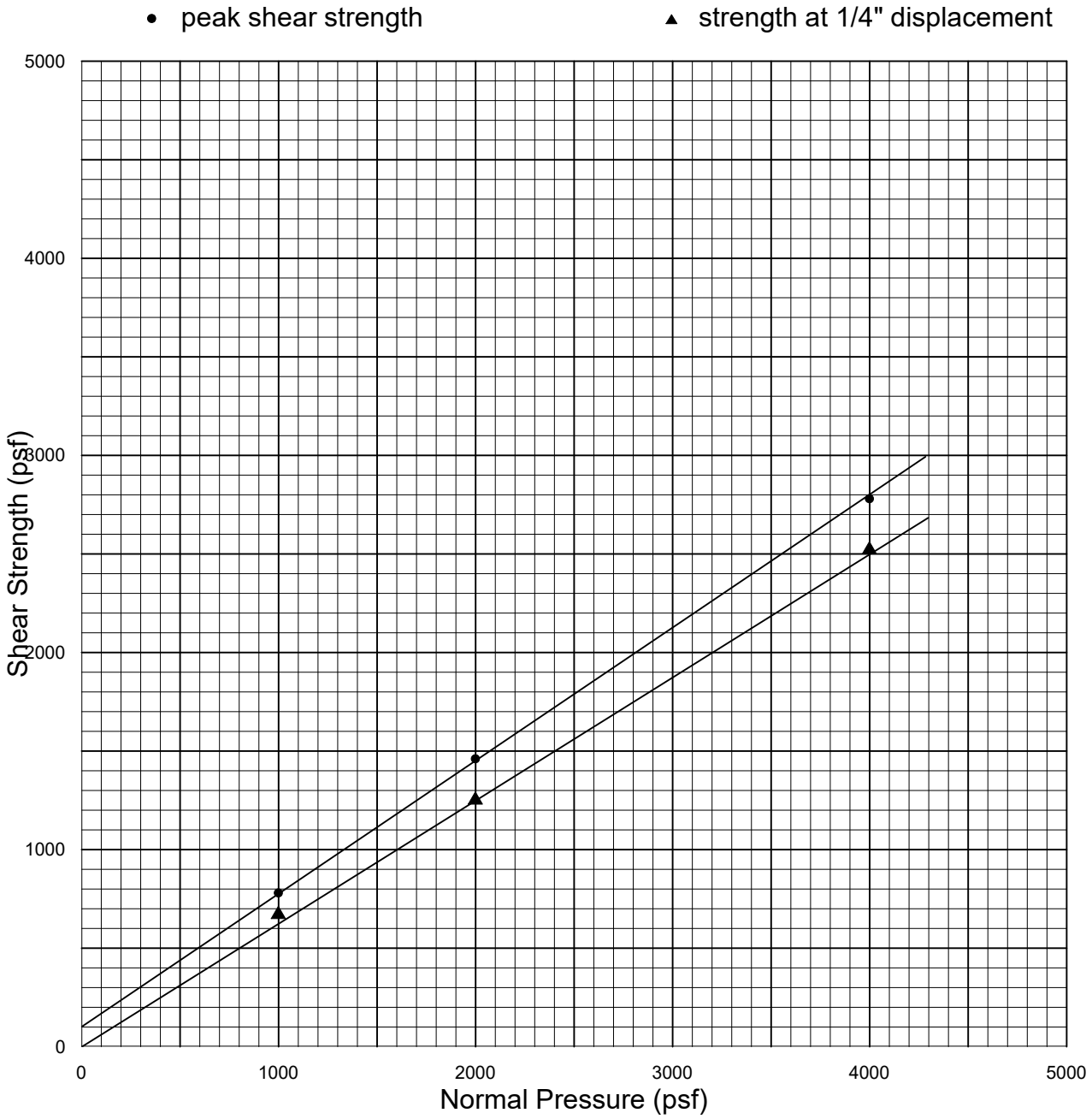
Strain Rate: 0.0084 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-1/S-3	Undisturbed & Saturated	F.C. Sand w. Gravel	121.6	1.5	12.2

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	1420 @ 0.1610"	1370
2000	1980 @ 0.1670"	1810
4000	4820 @ 0.2460"	4820
	C = 0 psf	C = 0 psf
	ϕ = 46 deg.	ϕ = 46 deg.

Date: 10-8-16

DIRECT SHEAR TEST - ASTM D-3080

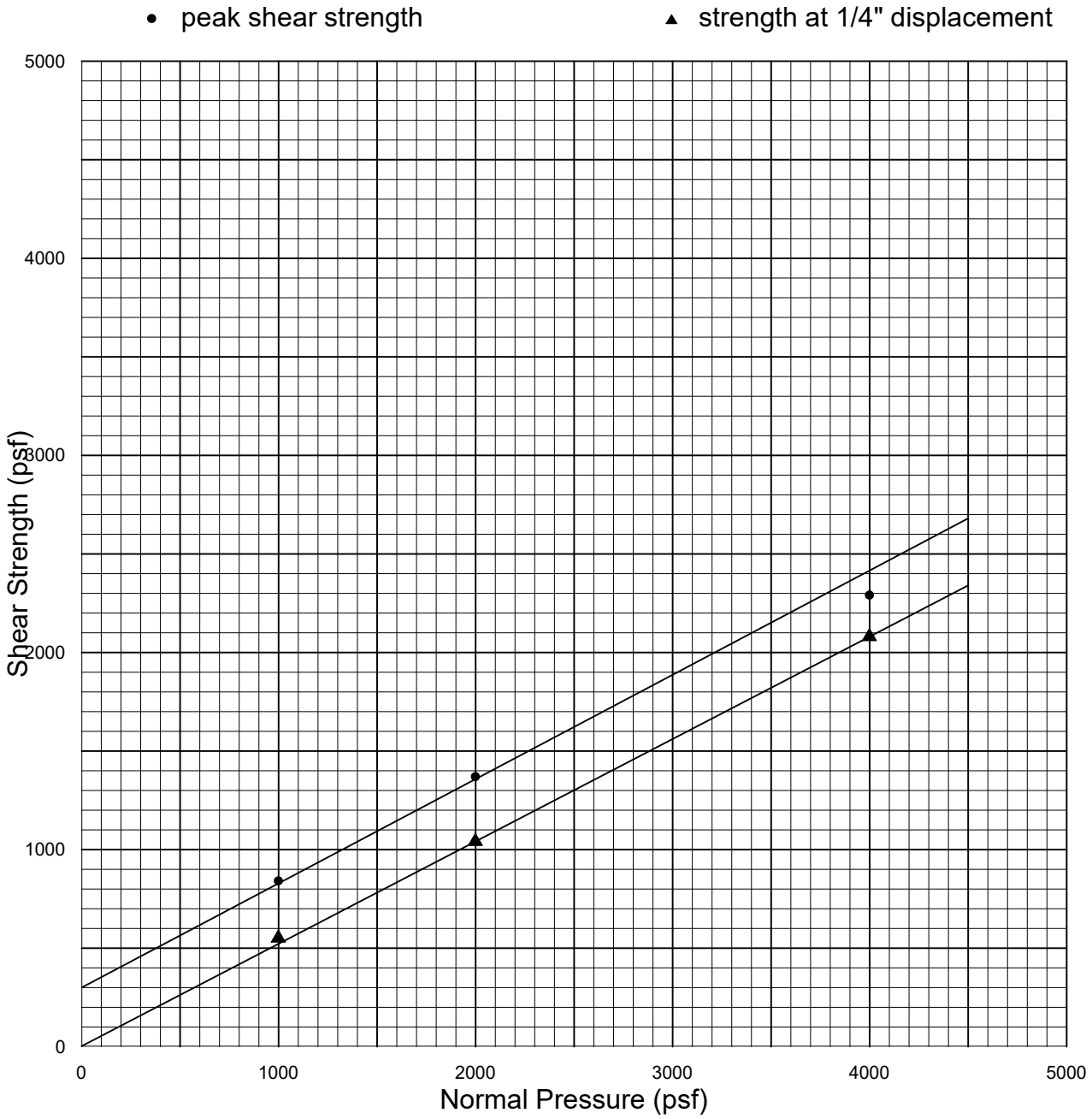


Strain Rate: 0.0084 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-4/S-3	Undisturbed & Saturated	F. Silty Sand	105.3	2.9	24.3

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	780 @ 0.0700"	670
2000	1460 @ 0.0705"	1250
4000	2780 @ 0.1010"	2520
	C = 100 psf	C = 0 psf
	ϕ = 34 deg.	ϕ = 32 deg.

DIRECT SHEAR TEST - ASTM D-3080



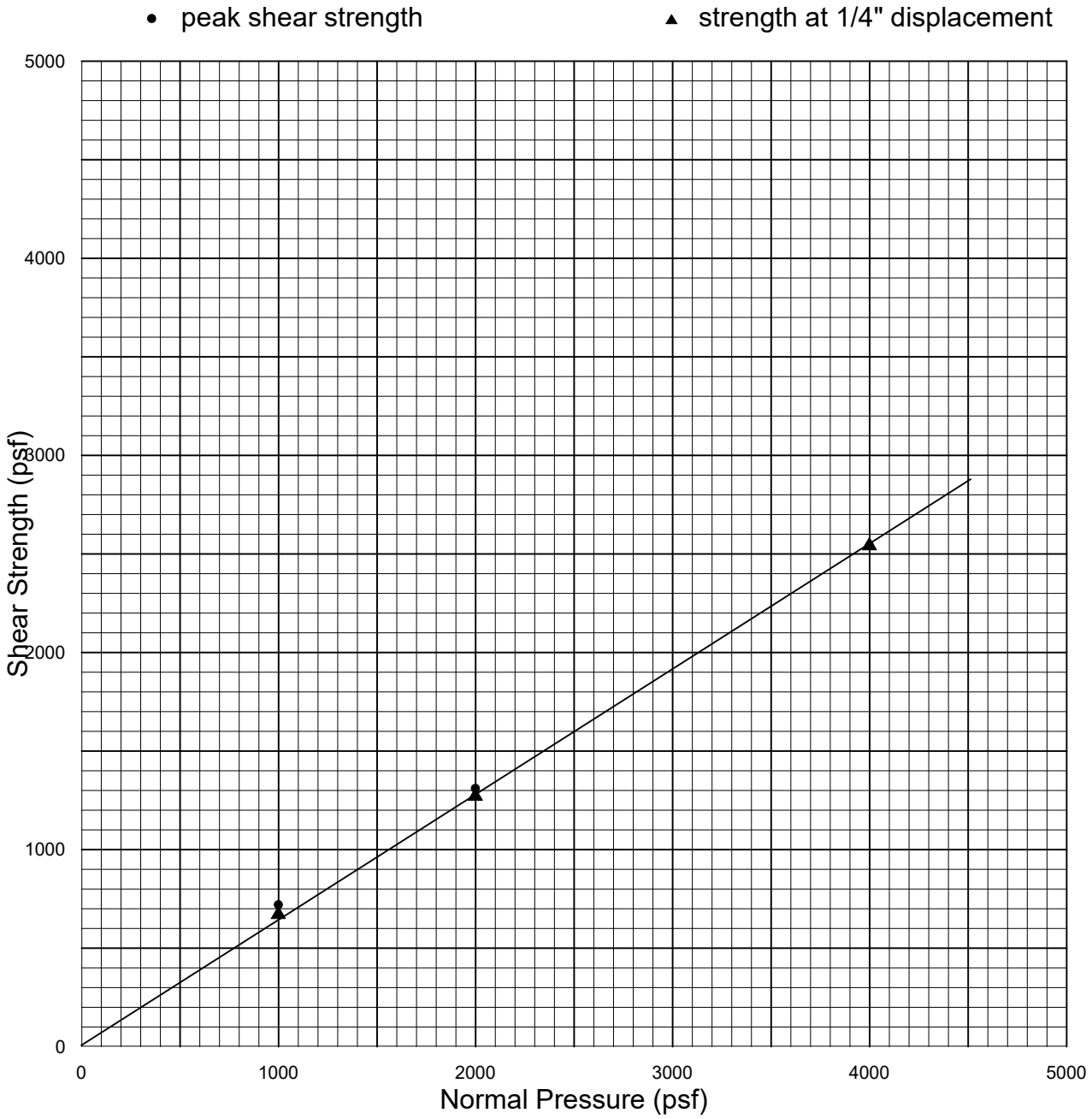
Strain Rate: 0.0042 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-5/S-3	Undisturbed & Saturated	Clay	94.4	28.3	35.4

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	840 @ 0.0600"	550
2000	1370 @ 0.0750"	1040
4000	2290 @ 0.1300"	2080
	C = 300 psf	C = 0 psf
	ϕ = 28 deg.	ϕ = 27 deg.

Date: 10-8-16

DIRECT SHEAR TEST - ASTM D-3080



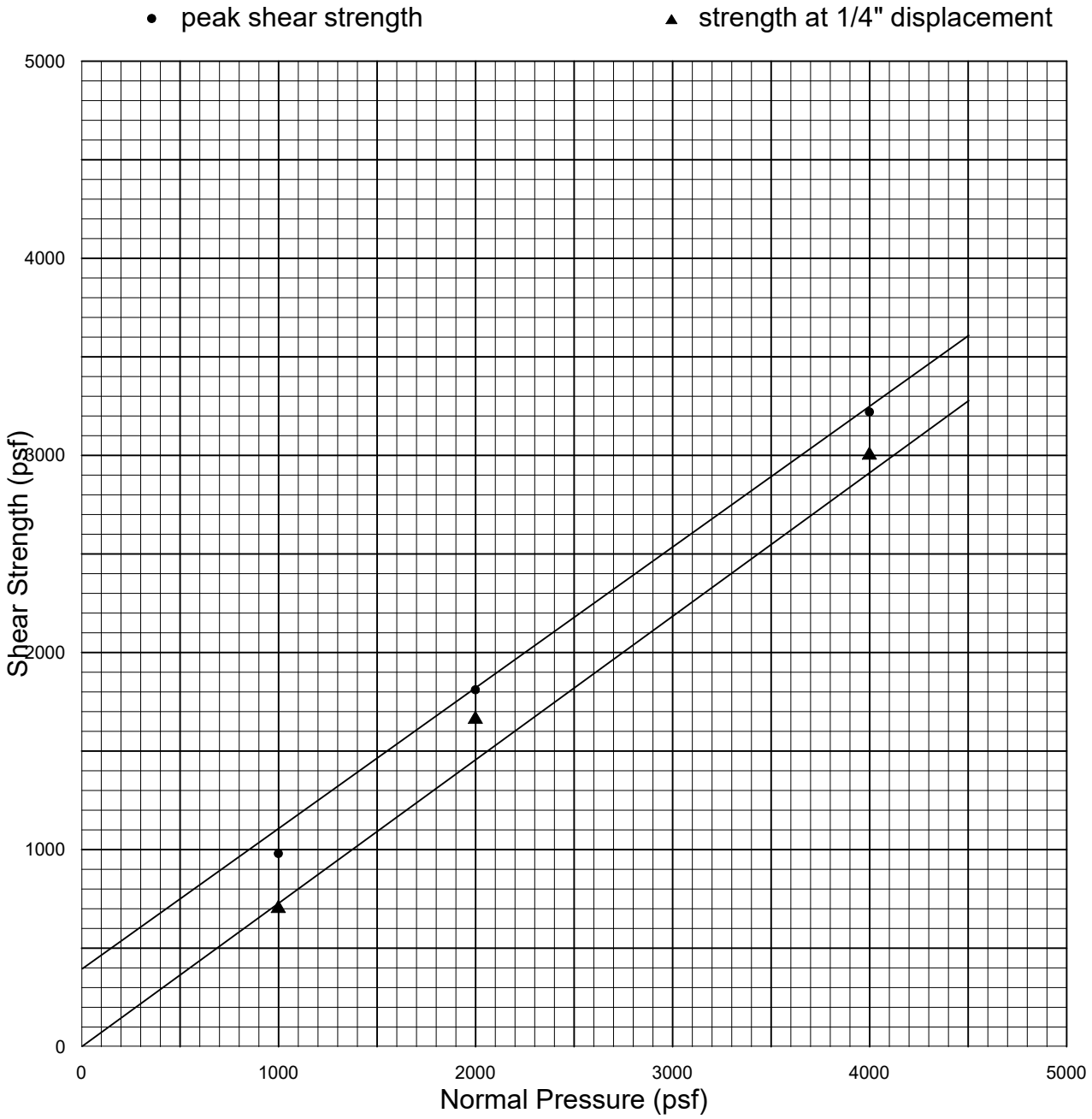
Strain Rate: 0.0084 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-6/S-4	Undisturbed & Saturated	F. Silty Sand	111.9	3.0	28.2

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	720 @ 0.0905"	670
2000	1310 @ 0.1305"	1270
4000	2540 @ 0.2460"	2540
	C = 0 psf	C = 0 psf
	ϕ = 33 deg.	ϕ = 33 deg.

Date: 10-8-16

DIRECT SHEAR TEST - ASTM D-3080

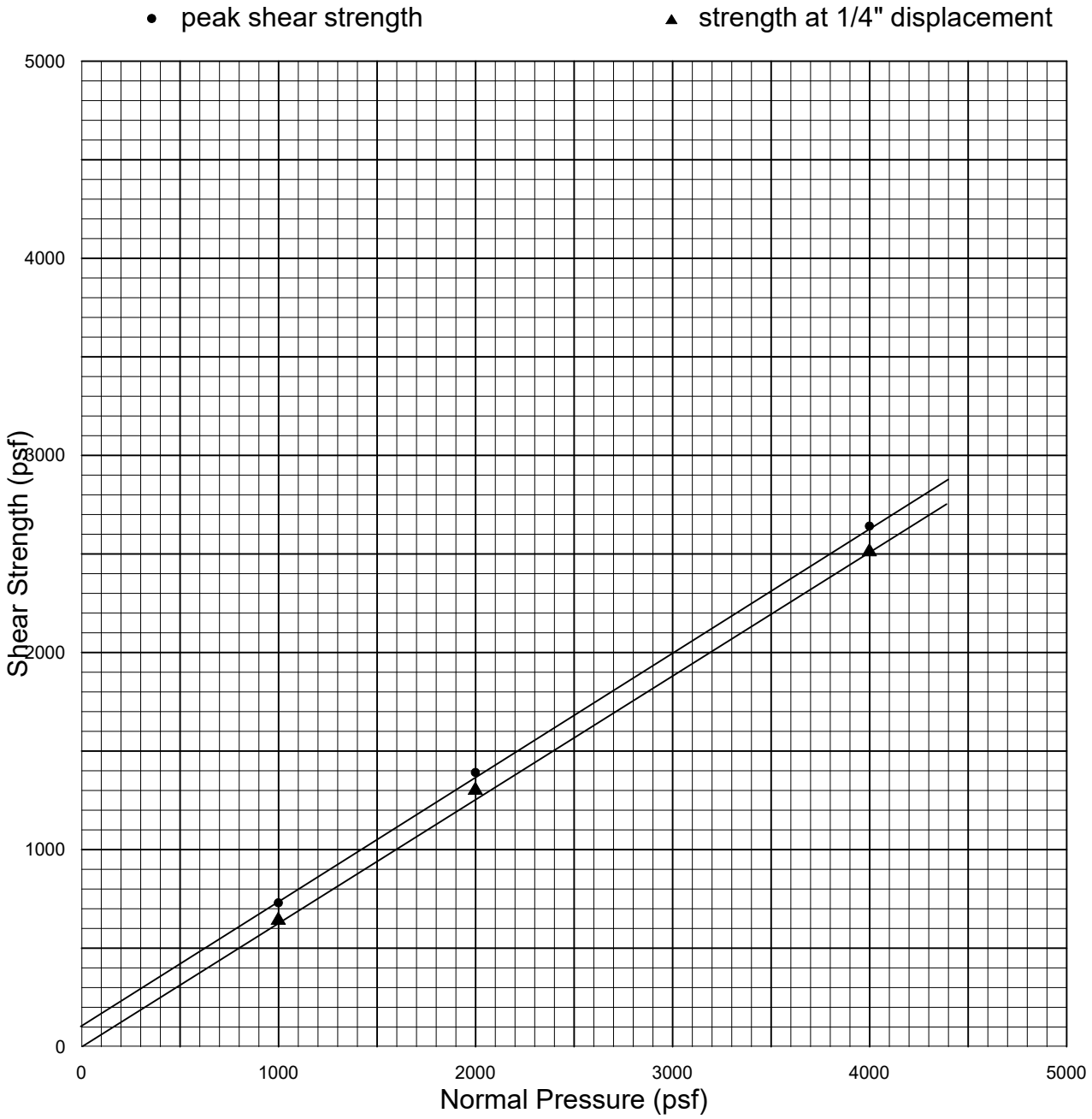


Strain Rate: 0.0084 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-8/S-3	Undisturbed & Saturated	F.C. Sand w. Gravel	112.6	2.0	14.3

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	980 @ 0.1065"	700
2000	1810 @ 0.1865"	1660
4000	3220 @ 0.1615"	3000
	C = 400 psf	C = 0 psf
	ϕ = 36 deg.	ϕ = 36 deg.

DIRECT SHEAR TEST - ASTM D-3080



Strain Rate: 0.0084 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-9/S-4	Undisturbed & Saturated	F. Silty Sand	105.4	3.6	19.5

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	730 @ 0.0755"	640
2000	1390 @ 0.0960"	1300
4000	2640 @ 0.1155"	2510
	C = 100 psf	C = 0 psf
	ϕ = 32 deg.	ϕ = 32 deg.

Date: 10-8-16

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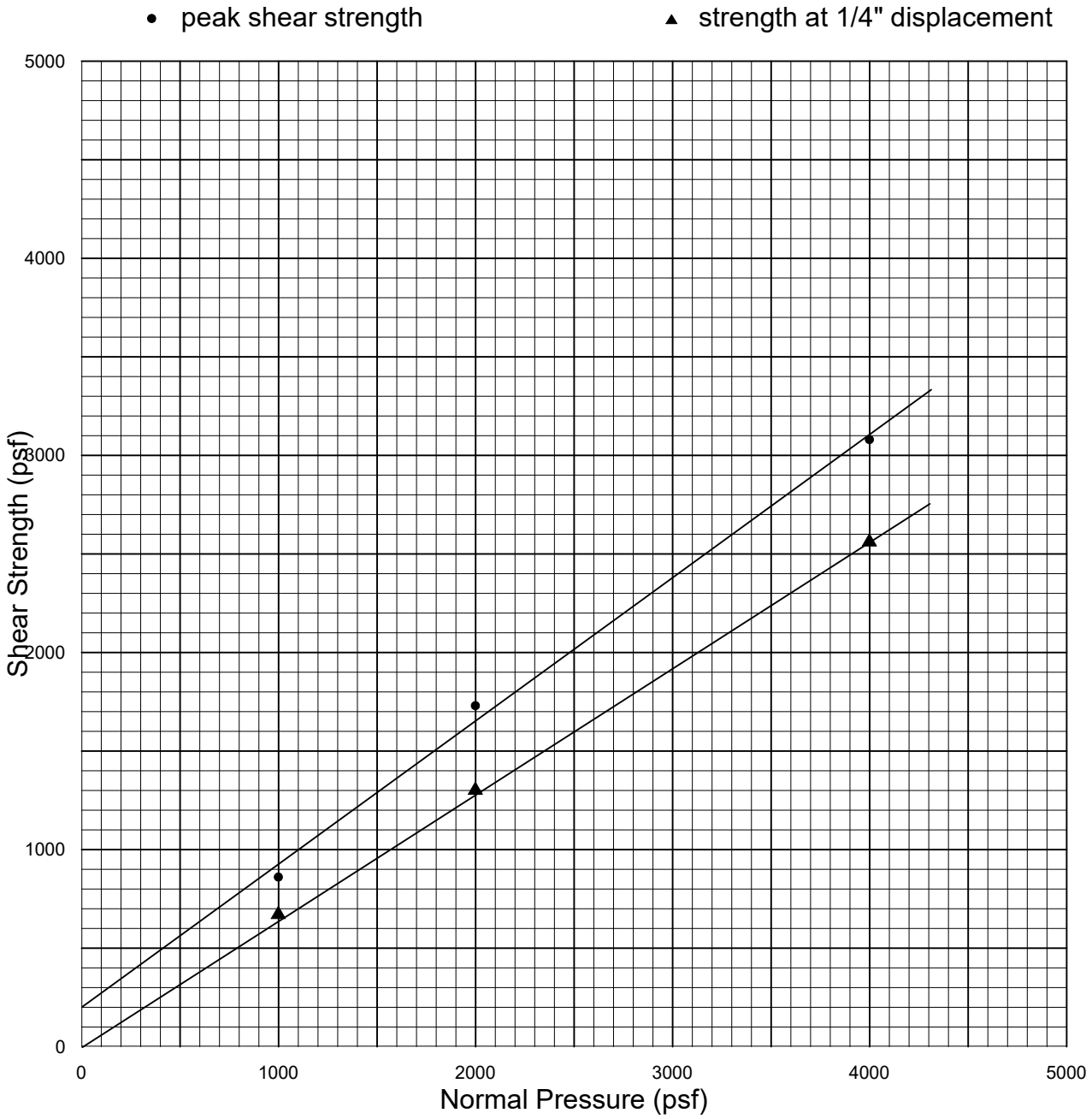
DIRECT SHEAR TEST - ASTM D-3080



Strain Rate: 0.0084 in. / min.

Sample	Type	Description	Dry Density (pcf)	Initial W.C. (%)	Final W.C. (%)
LB-12/S-5	Undisturbed & Saturated	F.M. Silty Sand	104.4	2.8	21.2

Normal Pressure (psf)	Peak Shear Strength (psf)	Ultimate Shear Strength (psf)
1000	860 @ 0.0410"	670
2000	1730 @ 0.0660"	1300
4000	3080 @ 0.1160"	2560
	C = 200 psf	C = 0 psf
	ϕ = 36 deg.	ϕ = 33 deg.

Date: 10-8-16

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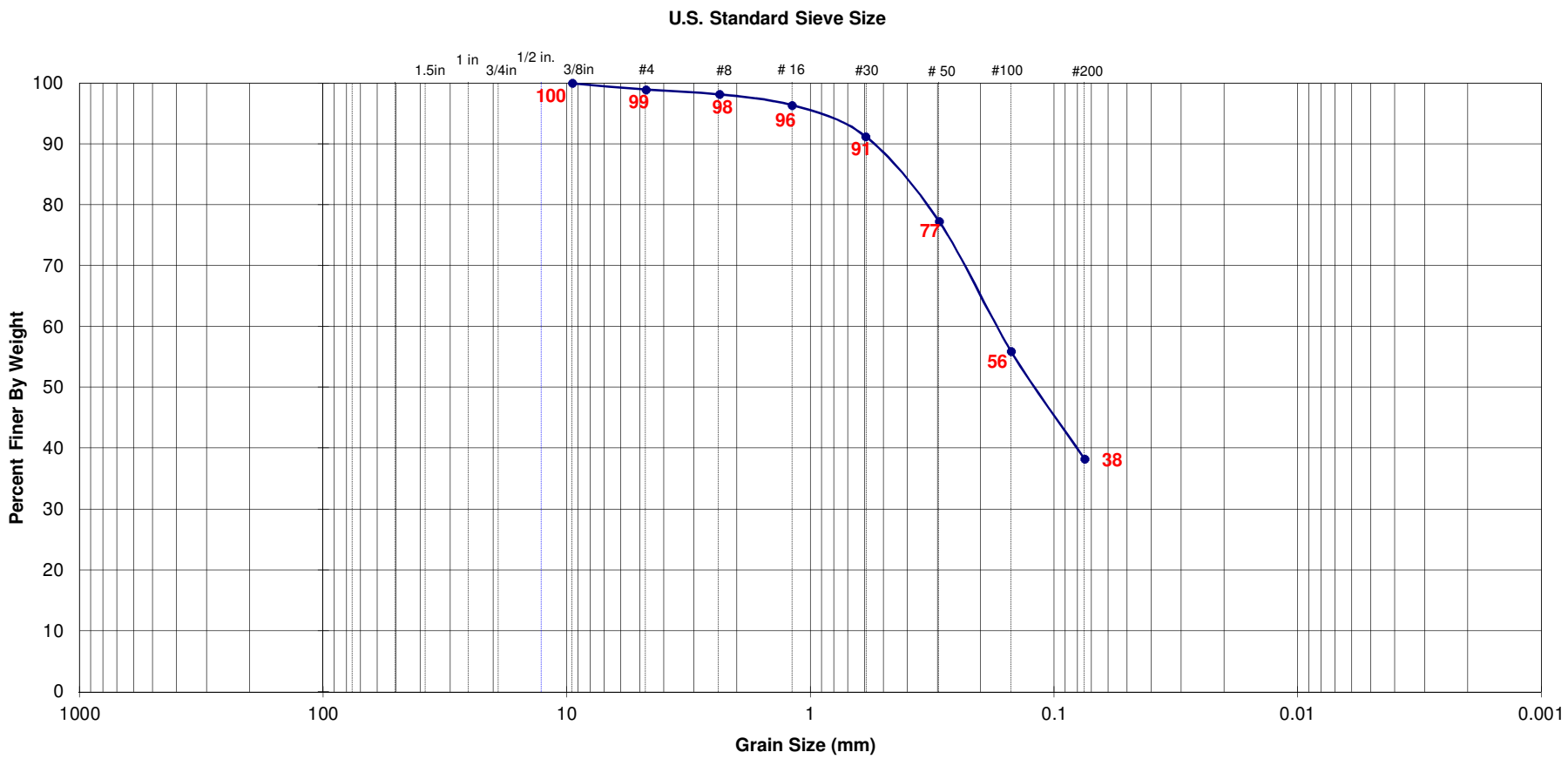
SAMPLE NO.:	LB-1 / B-1	LB-2 / B-1	LB-6 / B-1	LB-8 / B-1	ALB-10 / B-1
DESCRIPTION	F.C. Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand
DIRECT SHEAR TEST (type)					
Initial Moisture Content %					
Dry Density (pcf)					
Normal Stress (psf)					
Peak Shear Stress (psf)					
Ultimate Shear Stress (psf)					
Cohesion (psf)					
Internal Friction Angle (degrees)					
EXPANSION TEST UBC STD 18-2					
Initial Dry Density (pcf)					
Initial Moisture Content %					
Final Moisture Content %					
Pressure (psf)					
Expansion Index / Swell %					
CORROSIVITY TEST					
Resistivity (CTM643) (ohm-cm)	11000	6000	1500	4000	2000
pH (CTM643)	7.9	6.9	7.9	7.3	9.8
CHEMICAL TESTS					
Soluble Sulfate (CTM 417) (ppm)	165	103	239	91	128
Chloride Content (CTM 422) (ppm)	54	148	116	104	1534
Wash #200 Sieve (ASTM-1140) %					
Sand Equivalent (ASTM D2419)					

Geo-Logic Associates

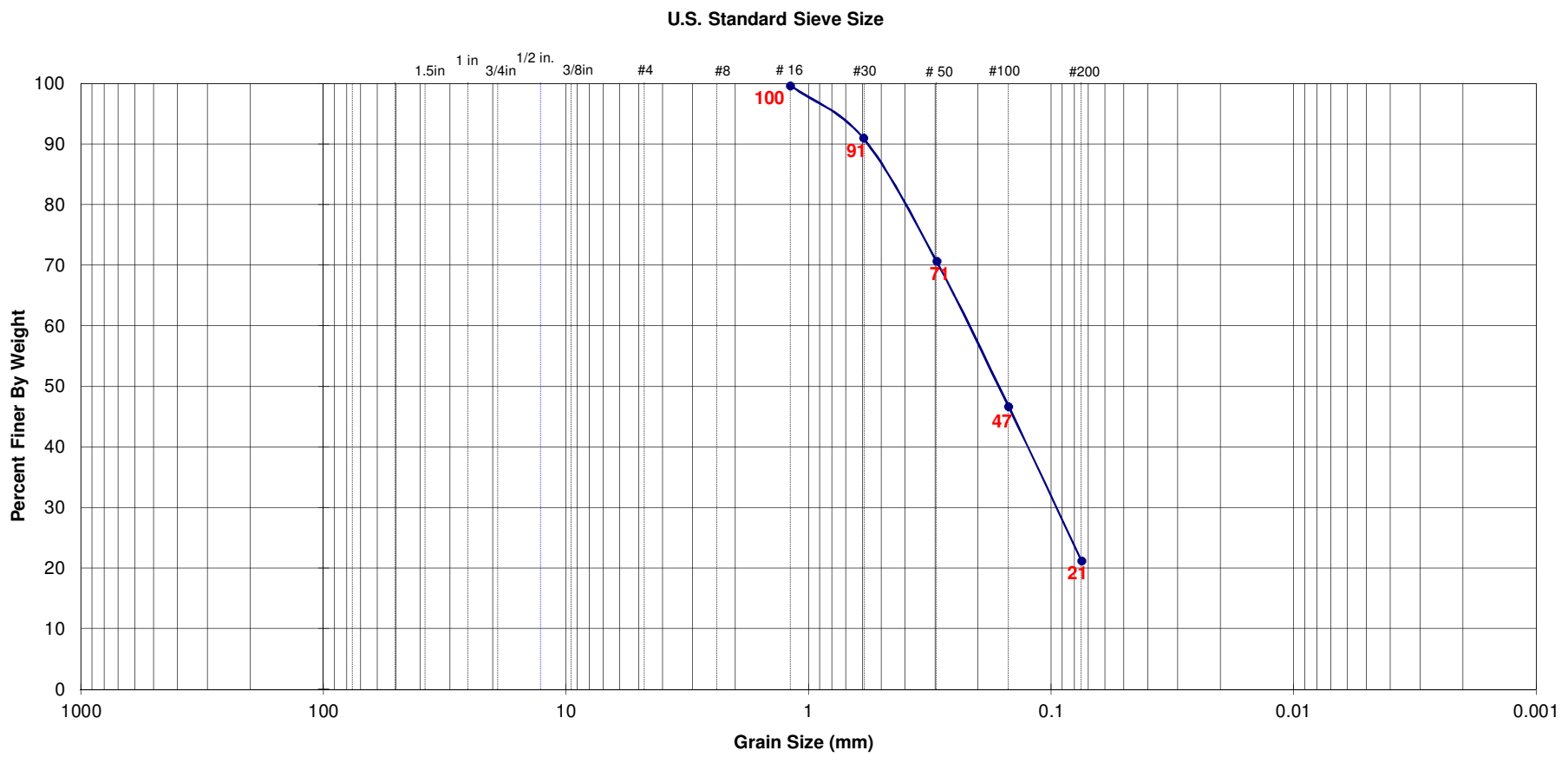
Date: 4/16/17



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
TP-1 / Sample B									**SM**	

Geo-Logic Associates

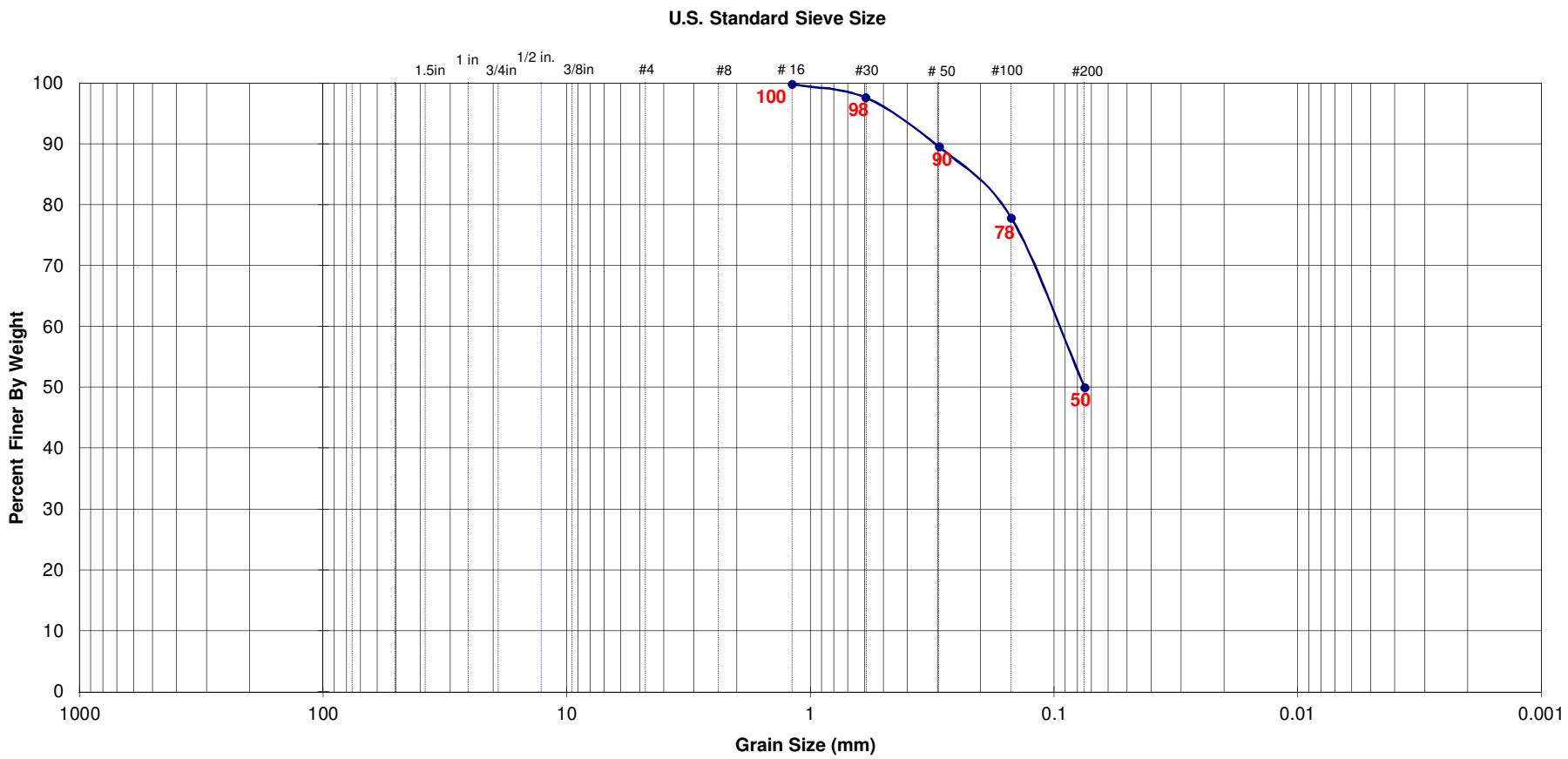
Date: 4/16/17



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
TP-3 / Sample A									**SM**	

Geo-Logic Associates

Date: 4/16/17



Boring / Sample No.	Initial Dry Density (pcf)	Initial Moist. (%)	Test Dry Density (pcf)	% Passing No. 200 Sieve	Sand Equivalent (ASTM D2419)	LL	PL	PI	Unified Soil Class.	Description
TP-6 / Sample A									**CL**	

Geo-Logic Associates