Appendix B

Geotechnical Evaluation

GEOTECHNICAL EVALUATION
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PREPARED FOR:

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May 15, 2009
Project No. 105879004

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Mr. Scott Frier
Mojave Solar, LLC
13911 Park Avenue, Suite 206
Victorville, California 92392

Subject: Geotechnical Evaluation
Mojave Solar Project
Lockhart, California

Dear Mr. Frier:

In accordance with your authorization, we have performed a geotechnical evaluation for the proposed Mojave Solar Project in Lockhart, California. This report presents our geotechnical findings, conclusions, and recommendations regarding the proposed project. Our report was prepared in accordance with our proposal dated January 22, 2009. We appreciate the opportunity to be of service on this project.

Sincerely,
NINYO & MOORE

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1. INTRODUCTION

In accordance with your request and our proposal dated January 22, 2009, we have performed a geotechnical evaluation for the proposed Mojave Solar Project (MSP) located in Lockhart, California (Figure 1). We previously performed a preliminary geotechnical evaluation (Ninyo & Moore, 2007), and an updated preliminary geotechnical and fault hazard evaluation (Ninyo & Moore, 2008) for the Harper Lake Solar project, which occupied a smaller site than the current project. The results of our previous evaluations are incorporated into this report. This report presents our conclusions regarding the geotechnical conditions at the subject site and our recommendations for the design of this project.

2. SCOPE OF SERVICES

Ninyo & Moore's scope of services for this project included review of pertinent background data, performance of a geologic reconnaissance, subsurface evaluation, fault evaluation, and engineering analysis with regard to the proposed project. Specifically, we performed the following tasks:

- Reviewing background data listed in the Selected References section of this report. The data reviewed included geotechnical reports, topographic maps, geologic data, fault maps, and a site plan for the project.
- Performing a geologic reconnaissance of the proposed site, including the observation and mapping of geologic conditions and the evaluation of possible geologic hazards which may impact the proposed project.
- Marking of proposed exploratory excavation locations prior to contacting Underground Service Alert (USA) for utility clearance.
- Performing subsurface exploration consisting of excavation, logging, and sampling of 68 exploratory borings and eight exploratory test pits. Bulk samples were collected at selected intervals and transported to our laboratory for testing.
- Performing a fault evaluation consisting of the excavation, logging, sampling, and observation of one fault trench.
- Performing five electrical resistivity surveys.
- Performing six percolation tests.

- Performing geotechnical laboratory testing of selected samples.
- Preparing this report presenting our findings, conclusions, and recommendations for the design of the project.

3. SITE DESCRIPTION

The MSP project site is located east and west of Harper Lake Road and north and south of Lockhart Road near the town of Lockhart, in San Bernardino County, California. The property includes Section 33 and portions of Sections 28, 29, 30, and 32 within Township 11N - Range 4W, San Bernardino Base Meridian (SBBM). The site is relatively flat with a gentle downward slope toward Harper Lake to the northeast. Portions of the property have been used for agricultural purposes in the past but have now been fallow for several years. Structures on the site consist of an abandoned general store with basement, buildings and structures associated with an alfalfa processing plant, several farm houses, barns, and out buildings, several reservoirs and cisterns, irrigation equipment, and several wells. Elevations on the main solar project site range from approximately 2,020 feet above mean sea level (MSL) near the northeastern end of the site on Harper Lake, to approximately 2,105 feet MSL at the southwest corners of Sections 30 and 33. Vegetation generally consists of a sparse to moderate growth of weeds and brush, and moderately sized trees at farm house sites and used as windbreaks.

4. PROJECT DESCRIPTION

The site is proposed as a solar power project utilizing solar thermal technology. The project is divided into two main areas designated Alpha and Beta. Major solar equipment improvements at the Alpha and Beta areas are expected to consist of:

- Parabolic trough solar array installation, including:
  - Placement of foundations to support the solar arrays
  - Heat transfer fluid piping with support foundations
- Power Block, including:
  - Steam turbine generator(s)
  - Steam generator/thermal storage
  - Condenser and cooling tower

  - Switchyard and transmission poles
  - Control, equipment, and administration buildings
- Ancillary Equipment/Facilities, including:
  - Emergency power source
  - Water/wastewater treatment facilities

The parabolic trough solar array collector field is modular in nature and comprises many parallel rows of single-axis-tracking parabolic trough solar collectors. The solar collectors are aligned on a north-south direction and will be supported by foundations designed to withstand the anticipated loading for the installation. Each solar collector has a parabolic-shaped reflector that focuses the sun's direct beam radiation on a linear receiver pipe located at the focus of the parabola. The reflectors are mobile and track the sun from east to west during the diurnal cycle to ensure that the sun is continuously focused on the linear receiver.

The heat transfer fluid is heated up to approximately 750° F as it circulates through piping along the solar array collector field and returns to the power block. The heat transfer fluid piping is then routed to a steam generator where the fluid is used to produce high-pressure steam for turbine electricity generators.

Cooling for the plant will include a cooling tower designed to diffuse the low quality heat from the process. The cooling tower will be installed on the power block near the condenser. Water treatment for the process water will be housed in a water treatment building on the power block. Should the plant be water-cooled, blow-down water from the wet cooling tower will be routed to lined evaporation ponds to be located at a lower elevation than the cooling tower and likely near the northern end of the site; no evaporation ponds would be needed if dry cooling is used.

The project will include an emergency power source, either from a back feed of the on-site switchyard with a dedicated transformer, or from an emergency generator; which will be used to safely shut down the system in the event of a power failure. This system along with the rest of the power plant will be monitored and controlled from the control room building located near the power block.

5. FIELD EXPLORATION AND LABORATORY TESTING

Our field exploration of the subject site included a geologic reconnaissance and subsurface exploratory work conducted on June 7, and August 24 through August 30, 2006, and April 2 through 10, 2009. The boring, test pit, trench, percolation testing, and resistivity survey locations were selected based on the results of our background geotechnical review, field reconnaissance, and the proposed project elements presented in the Mojave Solar One site plan prepared by Merrell Johnson Engineering (2009). Prior to commencing the subsurface exploration, USA was notified for mark-out of the existing utilities. The purpose of the borings and test pits was to evaluate subsurface conditions and to collect soil samples for laboratory testing. The purpose of the fault trench was to evaluate for the presence of active faulting. The approximate locations of the borings, test pits, percolation testing, resistivity surveys, and the fault trench are shown on Figure 2.

5.1. Exploratory Borings

The subsurface evaluation consisted of drilling 68 borings with 8-inch diameter augers. The borings were drilled with a truck-mounted, continuous flight hollow-stem auger drill. Samples were collected at selected depths and were transported to our laboratory for testing. Boring depths ranged from approximately 11.5 to 51.5 feet. Detailed logs of the borings are presented in Appendix A.

5.2. Exploratory Test Pits

Eight exploratory test pits were excavated to depths of up to approximately 13 feet. The test pits were excavated using a JCB 215S rubber-tire backhoe with a 24-inch bucket. Bulk samples were collected at selected depths and were transported to our laboratory for testing. The test pits were backfilled with excavated soils. Detailed logs of the test pits are presented in Appendix A.

5.3. Laboratory Testing

Laboratory testing of representative soils samples included in-situ dry density and moisture content, grain size analysis, Atterberg limits, consolidation, shear strength, expansion index, soil corrosivity tests, and R-value. The results of the in-situ dry density and moisture testing are presented on the boring logs presented in Appendix A. The results of other laboratory tests performed are presented in Appendix B.

5.4. Fault Trench

An Alquist-Priolo earthquake fault zone has been mapped extending into the northeastern corner of the site. An exploratory fault trench was excavated across the mapped fault zone to evaluate the presence of an active fault within this area. The exploratory fault trench was excavated to a depth of approximately 6 feet and had a length of approximately 1,400 feet. The trench was excavated using a CAT 420 rubber-tired backhoe with a 24-inch bucket. The fault trench log was prepared by scraping the trench sidewalls to produce a fresh surface and mapping the northern face of the trench as shown in Appendix C. The fault trench was backfilled with spoils near the optimum moisture content and compacted to a relative compaction of 90 percent, as evaluated by American Society for Testing and Materials (ASTM) D 1557.

5.5. Percolation Testing

Six percolation tests were performed at the site on April 6 and 9, 2009 in proposed evaporation pond and land farm locations. These percolation test locations are shown on Figure 2 as PT-1 through PT-6. The results of our percolation testing and a description of the field procedure are presented in Appendix D.

5.6. Geophysical Survey

On April 10, 2009 five soil electrical resistivity surveys, shown on Figure 2 as R-1 through R-5, were performed at the power blocks and interconnect substation sites in the Alpha and Beta areas of the project. The data were collected in general accordance with the ASTM Test Method G57 using an Advanced Geosciences, Inc. Supersting R8 earth resistivity meter and four electrodes in a Wenner configuration. Soil resistivity measurements were collected at electrode spacings of 2, 5, 10, 15, 20, 30, 40, 50, 60, and 80 feet (except for R-1 with a maximum spacing of 60 feet), along two perpendicular traverses. The results of the resistivity survey and details regarding the data collection are presented in Appendix E. In general, the resistivity data collected are of good quality, with good agreement between orthogonal traverses indicating a fairly homogenous medium.

6. GEOLOGY AND SUBSURFACE CONDITIONS

Our findings regarding regional and site geology and groundwater conditions at the subject site are provided in the following sections.

6.1. Regional Geologic Setting

The project area is situated in the eastern portion of the Mojave Desert Geomorphic Province. This geomorphic province encompasses an area that extends approximately 250 miles from the intersection of the San Andreas and Garlock Faults on the west to the Nevada and Arizona borders on the east. The western end of the province is bounded by the San Andreas and Garlock Faults. The province is up to 100 miles wide and is generally bounded by the Garlock Fault, Tehachapi Mountains, and Basin and Range to the north and to the south by the Transverse Ranges (Norris and Webb, 1990). In general, the province consists of broad alluviated valleys underlain by sedimentary, metamorphic, and igneous rocks. The Mojave Desert Province within the project area generally consists of Tertiary- and Quaternary-age igneous and sedimentary rock, and older alluvium.

The Mojave Desert Province is traversed by a group of sub-parallel faults and fault zones trending roughly northwest. Several of these faults, shown on Figure 3, are considered active faults. The Lenwood-Lockhart, Helendale, San Andreas, and Garlock faults are active fault systems located northwest and southwest of the project area. The Harper Lake Fault Zone, and Blackwater and Calico faults are active fault systems located northeast and east of the project area. An unnamed active fault, which has been mapped as a State of California Special Studies Zone, extends through the northeastern portion of the project site (Figure 4). Major tectonic activity associated with these and other faults within this regional tectonic framework consists primarily of strike-slip (lateral) movement. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report.

6.2. Site Geology

Geologic units observed during our subsurface exploration included lake deposits and older alluvium. Generalized descriptions of the earth units are provided in the subsequent sections.

6.2.1. Lake Deposits

Lake deposits were encountered in test pit TP-3, located on the northeastern corner of the proposed solar project site where it extends onto Harper Lake. As observed, the lake deposits generally consisted of damp to saturated, loose to medium dense, silt and sand, and soft to firm clay. Salt deposition was common on the surface of the lake deposits.

6.2.2. Older Alluvium

Older alluvium underlies the project site, except in the vicinity of test pit TP-3 which was excavated in the Harper Lake area. As encountered, the alluvium generally consists of damp to saturated, loose to very dense, silty and clayey fine to coarse sand with occasional layers of gravel, silt and clay, and wet, hard, fine sandy and silty clay. Some layers of caliche consisting of strongly cemented layers of sand and silt were encountered in several of the test pits.

6.3. Groundwater

Groundwater was encountered in test pits TP-3 and TP-5 and boring B-10 in the vicinity of Harper Lake at depths of approximately 4, 9 and 10 feet, respectively. Groundwater was encountered in borings B-35 and B-44 in the Alpha power block at depths of approximately 32 and 33 feet, respectively, and in borings B-53 and B-62 in the Beta power block at depths of approximately 27 and 31 feet, respectively. Based on our review of groundwater depth records for nearby wells (California Department of Water Resources, 2009), we anticipate that the regional groundwater table at the subject site is at a depth of more than 100 feet. However, according to our observations, perched groundwater may be encountered at a depth of approximately 4 feet below the ground surface (bgs) in the vicinity of Harper Lake and at a depth of approximately 27 feet bgs in the Alpha and Beta power blocks. Fluctuations in the groundwater level may occur due to variations in water levels in Harper Lake, rainfall, irrigation, groundwater pumping, ground surface topography, subsurface geologic conditions and structure, and other factors.

6.4. Faulting and Seismicity

The project site is located in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered significant during the design life of the proposed structures. In addition, a portion of the subject site is located within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone). Figure 3 shows the approximate site location relative to the major faults in the region. The active Lenwood-Lockhart-Old Woman Springs fault is located approximately 2,300 feet southwest of the site.

Table 1 lists selected principal known active faults that may affect the subject site, the approximate fault-to-site distances, and the maximum moment magnitude (M_{max}) as published by the Cao, et al. (2003) for the California Geological Survey (CGS). The approximate fault-to-site distances were calculated using the computer program FRISKSP (Blake, 2001).

Table 1 – Principal Active Faults

Fault	Approximate Fault-to-Site Distance [1] miles (kilometers)	Maximum Moment Magnitude [2] (M_{max})
Lenwood-Lockhart-Old Woman Springs	2,300 ft (0.7)	7.5
Helendale - S. Lockhardt	6.6 (10.6)	7.3
Gravel Hills - Harper Lake	9.0 (14.5)	7.1
Blackwater	15.4 (24.7)	7.1
Calico - Hidalgo	24.2 (39.0)	7.3
Landers	32.3 (52.0)	7.3
Garlock (East)	34.3 (55.2)	7.5
Garlock (West)	41.6 (66.9)	7.3
San Andreas (Mojave)	47.7 (76.7)	7.4
San Andreas (San Bernardino)	50.6 (81.4)	7.5

Notes:
[1] Blake, 2001
[2] Cao, et al., 2003

The principal seismic hazards at the subject site are surface fault rupture, ground motion, liquefaction, dynamic settlement, dynamic compaction, ground subsidence, lateral spreading, and landslides. A brief description of these hazards and the potential for their occurrences on site are discussed below.

6.4.1. Surface Fault Rupture

Based on our review of the referenced literature and our site reconnaissance, the project site is located in close proximity to the Lenwood-Lockhart-Old Woman Springs fault. Therefore, the probability of damage from surface fault rupture is considered to be moderate at the site. Significant potential for lurching or cracking of the ground surface also exists.

6.4.2. Ground Motion

The 2007 California Building Code (CBC) recommends that the design of structures be based on the horizontal peak ground acceleration (PGA) having a 2 percent probability of exceedance in 50 years which is defined as the Maximum Considered Earthquake (MCE). The statistical return period for PGA_{MCE} is approximately 2,475 years. In addition, 2007 CBC recommends that a site-specific ground motion analysis should be performed for sites located within 10 km of an active fault. The site-specific ground motion analysis include s probabilistic and deterministic methods in conformance with American Society of Civil Engineers (ASCE) 7-05 guidelines.

The site-specific probabilistic seismic hazard analysis (PSHA) was performed using the computer program FRISKSP developed by Blake (2001). The probabilistic analysis incorporates uncertainties in time, recurrence intervals, size, and location (along faults) of hypothetical earthquakes. This method thus accounts for likelihood (rather than certainty) of occurrence and provides levels of ground acceleration that might be more reasonably hypothesized for a finite exposure period. FRISKSP calculates the probability of experiencing various ground accelerations at a site over a period of time and the probability of exceeding expected ground accelerations within the lifetime of the proposed structure from the significant earthquakes within a specific radius of search. For the present case, a search radius of 62 miles (i.e., 100 kilometers) was selected. The earthquake magnitudes used in this program are based on the current CGS fault model. In evaluating the seismic hazards associated with the site, we have used an attenuation relation proposed by Boore, et al. (1997) for Soil Class D (stiff soil). The probabilistic MCE acceleration response spectrum for the site is presented on Figure 5.

The deterministic seismic hazard analysis was performed by computing the median spectral response acceleration for characteristic earthquakes acting individually on known active faults within the region based on attenuation relationships published by Sadigh, et al. (1997) and Boore, et. al. (1997) and the fault data presented in Table 1. The MCE ground motion was modeled by scaling the largest median spectral response acceleration computed at each period by 150 percent. The deterministic MCE acceleration response spectrum from our analysis is presented on Figure 5.

In accordance with ASCE 7-05, the site-specific design acceleration response spectrum shall be considered as the lesser of the probabilistic and deterministic MCE acceleration response spectra computed at each period of interest multiplied by a 2/3 scaling factor. The recommended site-specific design acceleration response spectrum is presented on Figure 5. This spectrum should be used for structural design of the proposed buildings at the site. Response modification and importance factors should be applied to the recommended site-specific spectrum, as appropriate.

6.4.3. Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

The liquefaction potential of subsurface soils at the Alpha and Beta power blocks was evaluated using the soil sampler blow counts recorded at various depths in exploratory borings B-44 and B-62, respectively, and our laboratory test results. The liquefaction analysis was based on the National Center for Earthquake Engineering Research (NCEER) procedure (Youd, et al., 1997) developed from the methods originally recommended by Seed and Idriss (1982) using the computer program LiquefyPro (CivilTech Software, 2007). A perched groundwater table located at a depth of 27 feet below the existing ground surface was used in our liquefaction evaluation of the Alpha and Beta power blocks. Our liquefaction analysis indicates that minor zones within the medium dense granular soil layers occurring below the assumed groundwater level and up to a depth of approximately 37 feet below the ground surface are susceptible to liquefaction during the design seismic event.

6.4.4. Dynamic Settlement of Saturated Soils

As a result of liquefaction, the proposed structures may be subject to several hazards, including liquefaction-induced settlement. In order to estimate the amount of post-earthquake settlement, the method proposed by Tokimatsu and Seed (1987) was used in which the seismically induced cyclic stress ratios and corrected N-values are related to the volumetric strain of the soil. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils.

Under the current conditions, post-earthquake total settlements of up to approximately 1 and 1.5 inches were calculated for the Alpha and Beta power blocks, respectively. Based on the guidelines presented in CGS Special Publication 117 (2008) and assuming relatively discontinuous subsurface stratigraphy across the site, we estimate differential settlement on the order of 1/2 inch over a horizontal distance of 40 feet at the Alpha power block and 3/4 inch over a horizontal distance of 40 feet at the Beta power block.

6.4.5. Ground Subsidence

Based on the design curves developed by Ishihara (1995) and considering the thickness of the non-liquefiable surface layer (above the historic high groundwater table) overlying the liquefiable soil layer, ground subsidence or seismically induced bearing failure is not a design consideration for the project.

6.4.6. Lateral Spread

Lateral spread of the ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. Lateral spread has generally been observed to take place in the direction of a free-face (i.e., retaining wall, slope, channel, etc.) but has also been observed to a lesser extent on ground surfaces with gentle slopes. An empirical model developed by Youd, et al. (2002) is typically used to predict the amount of horizontal ground displacement within a site. For sites located in proximity to a free-face, the amount of lateral ground displacement is correlated with the distance of the site from the free-face. Other factors such as earthquake magnitude, distance from the causative fault, thickness of the liquefiable layers, and the fines content and particle sizes of the liquefiable layers also influence the amount of lateral ground displacement.

Based on the relatively level topography of the site, the thickness and depth of the potentially liquefiable soil layer, and the corrected sampler blow counts (i.e., $[N1]_{60\text{-}CS}$) within the liquefiable layers that are in excess of 15, seismically induced lateral spread is not a design consideration for the project.

6.4.7. State of California Earthquake Fault Zone

As noted, a designated State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone) has been mapped extending into the northern portion of the eastern side of the site as an unnamed fault indicated on Figure 4. To mitigate the hazard of surface faulting to structures for human occupancy, the Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972. This act designates an earthquake fault zone which extends to either side of the surface trace of an active fault (i.e., a fault that exhibits evidence of ground displacement in the last 11,000 years). Pursuant to the act, these faults and associated earthquake fault zones are plotted on topographic maps. Before a structure for human occupancy can be permitted within an earthquake fault zone, a fault evaluation and written report for the site must be prepared by a licensed geologist. If an active fault is found, a structure for human occupancy needs to be set back from the fault 50 feet or more.

Our literature review (California Department of Conservation Division of Mines and Geology [CDMG], 1987) indicates that the mapping of the unnamed fault associated with the earthquake fault zone is based on aligned tonal lineaments, a subtle scarp in Holocene alluvium, and the linear western shoreline of Harper Lake. The actual presence of this fault has not been established. The earthquake recurrence interval and maximum moment magnitude for earthquakes on this fault have also not been determined.

No evidence of faulting was observed during our geologic reconnaissance of the site. Trenching of this mapped fault was performed as part of our previous evaluation to check for its presence. The evaluation consisted of the excavation, logging, and sampling of an approximately 1,400-foot long fault trench extending across the Alquist-Priolo fault zone. The fault trench logs are presented in Appendix C. Evidence of active faulting was not encountered during our fault evaluation. The mappable units observed did not exhibit displacement, offset, or other evidence of faulting (fault gouge, slickensides, or mineralization).

6.5. Landsliding

Based on our review of referenced geologic maps, literature and topographic maps, landslides, or indications of deep-seated landsliding were not noted underlying the project site. The potential for significant large-scale slope instability at the site is not a design consideration.

6.6. Subsidence Due to Groundwater Withdrawal

Based on our review of well records for three wells on Lockhart Road, east of Harper Lake Road, the groundwater level at the site was at a depth of 18 feet in 1919, 95 feet in 1953, and 176 feet in 1996 shortly after most agricultural pumping ended in Lockhart. The groundwater level has since risen to a depth of approximately 140 feet. It is our understanding that groundwater withdrawal for the MSP is anticipated to be less than the recharge of the aquifer and therefore we expect the groundwater level to continue to rise. We do not anticipate significant additional subsidence at MSP unless future pumping lowers the groundwater level below the historic low of 176 feet.

7. CONCLUSIONS

Based on our review of the referenced background data and geologic field reconnaissance, it is our opinion that construction of the proposed project is feasible from a geotechnical standpoint. Preliminary geotechnical considerations include the following:

- The project site is generally underlain by older alluvium and minor areas of lake deposits.
- In general, excavation of the alluvial material and lake deposits should be achievable with earthmoving equipment in good operating condition. Variations of in-place moisture content will be encountered; therefore, aeration or moisture conditioning during compaction should be anticipated. If encountered, cemented caliche deposits will necessitate heavy ripping during grading.
- The near-surface soils are generally compressible and considered unsuitable in the current condition for structural support.
- Groundwater was measured during our subsurface exploration at an approximate depth of 27 feet bgs in the Alpha and Beta power blocks and at an approximate depth of 4 feet bgs in the vicinity of Harper Lake. Fluctuations in the groundwater level should be expected due to variations in seasonal precipitation and other factors.
- The Lenwood-Lockhart-Old Woman Springs fault is located approximately 2,300 feet southwest of the site and is capable of generating an earthquake with a moment magnitude of 7.5.
- A State of California Earthquake Fault Zone has been mapped in the northeastern corner of the site. Based on the results of our literature review, site reconnaissance, and our fault trench evaluation, there is no evidence of active faulting.

- Based on the guidelines presented in CGS Special Publication 117 (2008), we estimate liquefaction differential settlement on the order of 1/2 inch over a horizontal distance of 40 feet at the Alpha power block and of 1-1/4 inches over a horizontal distance of 40 feet at the Beta power block.
- Our laboratory testing indicates that the site lake deposits can be considered corrosive according to Caltrans (2003) corrosion guidelines.

8. RECOMMENDATIONS

In the following sections, we present our geotechnical recommendations for the design and construction of the proposed facilities and associated improvements. These recommendations are based on our evaluation of the site geotechnical conditions, and our assumptions regarding the planned developments. Further geotechnical evaluation and engineering analyses may be provided once specific details regarding the structure sizes and foundation loads are available.

8.1. Earthwork

Grading plans were not available at the time of our present evaluation. We anticipate that site grading will generally consist of the preparation of building and equipment foundation pads, preparation of flatwork subgrade, as well as utility trench backfill. In addition, Typical Earthwork Guidelines for the project are included as Appendix F. In the event of a conflict in recommendations, the recommendations presented below should supersede those in Appendix F.

8.1.1. Site Preparation

The project site should be cleared and grubbed prior to grading. Clearing and grubbing should consist of the substantial removal of building foundations and basements, septic tanks and leach fields, cisterns, vegetation and other deleterious materials from the areas to be graded. Wells to be destroyed should be destroyed in accordance with San Bernardino County and State of California Department of Water Resources guidelines. Clearing and grubbing should extend beyond the proposed excavation and fill areas. The debris generated during clearing and grubbing should be removed from areas to be graded and disposed at a legal dumpsite away from the site.

8.1.2. Excavation Characteristics

Based on our subsurface exploration and our experience with similar materials, it is our opinion that the on-site soils are generally excavatable with heavy-duty earthmoving equipment in good working condition. Excavations close to or below the groundwater will encounter wet and loose or soft ground conditions. Wet soils may be subject to pumping under heavy equipment loads. Heavy ripping will be needed for efficient grading of cemented caliche deposits.

8.1.3. Remedial Grading for Building Pad and Equipment Areas

Due to the compressible nature of the near-surface soils, we recommend that the existing site soils (topsoil and/or alluvium) be removed from the building pad and equipment foundation areas and replaced with granular soils with low to very low expansion potential (i.e., an Expansion Index [EI] of 50 or less as evaluated in accordance with ASTM D 4829). The removal operation should extend to a depth of 5 feet below the bottom of the structural footings or to groundwater, whichever is less. For the purpose of this report, a building pad or equipment foundation area is defined as the area underlying any settlement-sensitive structure and extending a horizontal distance of 5 feet beyond the limits of the structure and extending downward at a 1:1 (horizontal to vertical) inclination. Deeper removals may be needed if unsuitable materials are exposed at the excavation bottom during grading. The depth and extent of the removal should be further evaluated in the field by Ninyo & Moore.

The resultant excavation subgrade should be scarified to a depth of 8 inches, moisture conditioned to a moisture content of 3 to 5 percent above the laboratory optimum and recompacted to a relative compaction of 90 percent as evaluated by ASTM Test Method D 1557.

If wet soils are encountered in the remedial excavations the subsequent drying and additional handling of these soils may be needed. Loose, soft, or otherwise deleterious material encountered at the bottom of excavation should be overexcavated and recompacted in accordance with the recommendations provided herein. Additional stabilization efforts may be used in lieu of the additional removal at the bottom of the excavations, Ninyo & Moore should be consulted regarding the usage of an approximately 1-foot thick layer of crushed aggregate in the bottom of the excavation in conjunction with geosynthetic materials or placement of a lean concrete mud mat.

8.1.4. Remedial Grading for Exterior Flatwork

To reduce the potential for differential movement due to compressible soils, we recommend that granular soils with generally low to very low expansion potential (i.e., an EI of less than 50) be placed below the exterior flatwork areas to a depth of 3 feet below the bottom of the flatwork. The low expansive material should extend horizontally beyond the edge of the flatwork or pavement to a distance of 3 feet. The subgrade soils should be compacted to a relative compaction of 90 percent as evaluated by ASTM D1557.

8.1.5. Materials for Fill

Granular on-site soils with an organic content of less than 3 percent by volume (or 1 percent by weight) are suitable for use as fill. Fill soils should be free of trash, debris, roots, vegetation, organics, or other deleterious materials. Fill and utility trench backfill materials should not contain rocks or lumps over 3 inches in largest dimension, and not more than 30 percent larger than 3/4 inch. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or disposed of off site. Any imported fill material should be a low or very low expansion potential (i.e., an EI of 50 or less as evaluated by ASTM D 4829) granular soil. Imported materials should also be non-corrosive in accordance with the Caltrans (2003) corrosion guidelines. Materials for use as fill should be evaluated by the geotechnical consultant's representative prior to filling or importing. The contractor should be responsible for the uniformity of imported materials brought to the site.

8.1.6. Compacted Fill

Prior to placement of compacted fill, the contractor should request an evaluation of the exposed ground surface by Ninyo & Moore. Unless otherwise recommended, the exposed ground surface should then be scarified to a depth of approximately 8 inches and watered or dried, as needed, to achieve moisture contents generally above the optimum moisture content. The scarified materials should then be compacted to a relative compaction of 90 percent as evaluated in accordance with ASTM D 1557. The evaluation of compaction by the geotechnical consultant should not be considered to preclude any requirements for observation or approval by governing agencies. It is the contractor's responsibility to notify the geotechnical consultant and the appropriate governing agency when project areas are ready for observation, and to provide reasonable time for that review.

Fill materials should be moisture conditioned to generally above the laboratory optimum moisture content prior to placement. The optimum moisture content will vary with material type and other factors. Moisture conditioning of fill soils should be generally consistent within the soil mass.

Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill should be prepared to receive fill. Preparation may include scarification, moisture conditioning, and recompaction.

Compacted fill should be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift should be watered or dried as needed to achieve a moisture content generally above the laboratory optimum, mixed, and then compacted by mechanical methods to a relative compaction of 90 percent as evaluated by ASTM D 1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved.

8.1.7. Slopes

Unless otherwise recommended by Ninyo & Moore (or another qualified geotechnical consultant) and approved by the regulating agencies, cut and fill slopes should not be steeper than 2:1 (horizontal to vertical). Compaction of the face of fill slopes should be performed by backrolling at intervals of 4 feet or less in vertical slope height, or as dictated by the capability of the available equipment, whichever is less. Fill slopes should be backrolled utilizing a sheepsfoot-type roller. Care should be taken to maintain the desired moisture conditions and/or reestablish them, as needed, prior to backrolling. The placement, moisture conditioning, and compaction of fill slope materials should be done in accordance with the recommendations presented in the Compacted Fill section of this report.

Site runoff should not be permitted to flow over the tops of slopes. Positive drainage should be established away from the top of slopes. This may be accomplished by utilizing brow ditches placed at the top of slopes to divert surface runoff away from the slope face where drainage devices are not otherwise available.

The on-site soils will be susceptible to erosion; therefore, the project plans and specifications should contain design features and construction requirements to mitigate erosion of on-site soils during and after construction. Slopes and other exposed ground surfaces should be appropriately planted with protective ground cover or otherwise stabilized.

8.1.8. Temporary Excavation and Shoring

Trenches and excavations should be designed and constructed in accordance with Occupational Safety and Health Administration (OSHA) regulations. These regulations provide trench sloping and shoring design parameters for trenches up to 20 feet deep based on the soil types encountered. Trenches over 20 feet deep should be designed by the contractor's engineer based on site-specific geotechnical analyses. For planning purposes, we recommend that the following OSHA soil classifications be used:

Older Alluvium and Lake Deposits *Type C*

Upon making the excavations, the soil/rock classifications and excavation performance should be evaluated in the field by Ninyo & Moore or another qualified geotechnical consultant in accordance with OSHA regulations. Recommendations for temporary shoring can be provided, if requested.

Temporary excavations should be constructed in accordance with OSHA recommendations. For trench or other excavations, OSHA requirements regarding personnel safety should be met by using appropriate shoring (including trench boxes) or by laying back the slopes no steeper than 1.5:1 (horizontal to vertical) in Type C soil. Temporary excavations that encounter seepage or caving may need shoring or may be stabilized by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage or caving should be evaluated on a case-by-case basis. On-site safety of personnel is the responsibility of the construction contractor(s).

8.1.9. Drainage

Roof, pad, and slope drainage should be diverted away from slopes and structures to suitable discharge areas by nonerodible devices (e.g., gutters, downspouts, concrete swales, etc.). Positive drainage adjacent to structures should be established and maintained. Positive drainage may be accomplished by providing drainage away from the foundations of structures at a gradient of 2 percent or steeper for a distance of 5 feet or more outside the building perimeter, and further maintained by a graded swale leading to an appropriate outlet, in accordance with the recommendations of the project civil engineer and/or landscape architect.

Surface drainage on the site should be provided so that water is not permitted to pond. A gradient of 2 percent or steeper should be maintained over the pad area and drainage patterns should be established to divert and remove water from the site to appropriate outlets.

Care should be taken by the contractor during final grading to preserve any berms, drainage terraces, interceptor swales or other drainage devices on or adjacent to the property. Drainage patterns established at the time of final grading should be maintained for the life of the project. The property maintenance personnel should be made very clearly aware that altering drainage patterns might be detrimental to slope stability and foundation performance.

8.2. Seismic Design Considerations

Design of the proposed improvements should be in accordance with the requirements of governing jurisdictions and applicable building codes. Table 2 presents the seismic design parameters for the site in accordance with CBC (2007) guidelines and mapped spectral acceleration parameters (United States Geological Survey [USGS], 2008).

Table 2 – 2007 California Building Code Seismic Design Criteria

Seismic Design Factors	Value
Site Class	D
Site Coefficient, F_a	1.028
Site Coefficient, F_v	1.551
Mapped Spectral Acceleration at 0.2-second Period, S_s	1.179g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.449g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	1.212g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.697g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.808g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.465g

8.3. Foundations

The following foundation design parameters are provided based on our geotechnical analysis. The foundation design parameters are not intended to preclude differential movement of soils. Minor cracking (considered tolerable) of foundations may occur. It is anticipated that the majority of the proposed structures will be founded on shallow footings or mat foundations. Solar arrays and electricity distribution towers may be supported on deep foundations. The following sections present our foundation recommendations. More specific recommendations may be provided after review of proposed building plans.

8.3.1. Shallow Footings

Shallow spread or continuous footings, founded in compacted fill may be designed using an allowable bearing capacity of 2,000 pounds per square foot (psf). These allowable bearing capacities may be increased by one-third when considering loads of short duration such as wind or seismic forces. Spread footings should be founded 18 inches below the adjacent grade. Continuous footings should have a width of 15 inches and isolated footings should be 24 inches in width. The spread footings should be reinforced in accordance with the recommendations of the project structural engineer.

8.3.2. Lateral Resistance

For resistance of footings to lateral loads, we recommend an allowable passive pressure of 250 psf per foot of depth be used up to a value of 2,500 psf. This value assumes that the ground is horizontal for a distance of 10 feet, or three times the height generating the passive pressure, whichever is larger. We recommend that the upper one-foot of soil not protected by pavement or a concrete slab be neglected when calculating passive resistance.

For frictional resistance to lateral loads, we recommend a coefficient of friction of 0.35 be used between soil and concrete. The allowable lateral resistance can be taken as the sum of the frictional resistance and passive resistance provided the passive resistance does not exceed one-half of the total allowable resistance. The passive resistance values may be increased by one-third when considering loads of short duration such as wind or seismic forces.

8.3.3. Static Settlement

We estimate that the proposed facilities, designed and constructed as recommended herein, will undergo total settlement on the order of 1 inch. Differential settlement on the order of 1/2 inch over a horizontal span of 40 feet should be expected.

8.3.4. Mat Foundations

Due to the anticipated static and dynamic settlements, the structural engineer may consider a structurally rigid mat foundation for settlement sensitive buildings and equipment foundations. Mat foundations placed on compacted granular fill with generally very low to low expansion potential (i.e., an EI of 50 or less) may be designed using an allowable bearing capacity of 2,500 psf. This allowable bearing capacity may be increased by one-third when considering loads of short duration such as wind or seismic forces. Thickness and reinforcement of the mat foundation should be in accordance with the recommendations of the project structural engineer.

A mat foundation is a large concrete slab, designed by a structural engineer for specific use, to interface one or more columns or pieces of equipment with the foundation soil. It may encompass the entire foundation footprint or only a portion. The mat contact stresses are generally lower than other shallow foundation types due to distribution of stress over a larger area and stress compensation from excavated soils.

The appropriate allowable contact pressure(s) beneath the bases of mat foundations will vary with their size, shape, and other factors. The contact pressure beneath the mats should not exceed the allowable bearing pressure values of 2,500 psf. The mat foundation may be designed using a coefficient of subgrade reaction, K_v, of 250 kips per cubic foot (kcf). This value is based on a unit square foot area and should be adjusted for the planned mat size. The coefficient of subgrade reaction, K_b, for a mat of a specific width may be evaluated using the following equation:

$$\mathbf{K_b = K_v[(b+1)/2b]^2}$$

Where, **b** is the width of the foundation in feet.

8.4. Deep Foundations

Based on our discussions with the project engineer and the observed site conditions, we anticipate that cast-in-drilled-hole (CIDH) piles will be used for the project. We evaluated 18- and 24-inch diameter CIDH piles for the solar array supports and 60-inch diameter CIDH piles for the 85- to 90-foot high transmission poles.

8.4.1. Axial Pile Capacity

The allowable loads for the CIDH piles were analyzed using the computer program AllPile (CivilTech, 2007) based on assumed pile lengths. The calculated pile capacities are based on frictional capacity and end bearing. Tension capacities are based on the downward frictional capacity and include the pile weight. A pile spacing of three pile diameters on center or more should be maintained. The results of ultimate axial pile capacity and service load evaluation for a factor of safety of 2.0 are summarized in Table 3.

Table 3 – Axial Pile Capacity Evaluation

CIDH Pile Diameter (inches)	Pile Length (feet)	Ultimate Downward Capacity (kips)	Design (Service) Loads (kips)	
			Compression	Tension
18	15	48	24	9
18	20	66	33	15
18	25	92	46	23
24	15	75	37	14
24	20	100	50	23
24	25	134	67	34
60	15	364	182	79
60	20	428	214	92
60	25	512	256	128

8.4.2. Lateral Capacity

Our analyses did not account for dynamic loads due to inertial loads from the structure during the design earthquake. However, we assumed that the dynamic loads would not be higher than the lateral capacities for each pile. Maximum moments generated by the indicated deflections are based on geotechnical considerations. We recommend that the maximum moment capacities of the piles be evaluated by the structural engineer. Lateral capacities for pile lengths and embedment conditions that are different from those assumed in our analyses may be different than those presented below.

Lateral capacities based on fixed-head and free-head conditions for 18- and 24-inch diameter CIDH piles with 15 foot length and 60-inch diameter CIDH piles with 25 foot length as summarized in Tables 4, 5 and 6, respectively.

Table 4 – Lateral Load Capacity
18-inch-diameter CIDH Pile

Pile Design Parameters	Fixed-Head		Free-Head	
Lateral Deflection of Shaft Head (inch)	0.25	0.50	0.25	0.50
Design Shaft Length (feet)	15	15	15	15
Lateral Load (kips)	25	51	9	18
Maximum Positive Moment (kips-foot)	109.2	223.3	34.7	69.3
Depth to Maximum Positive Moment (feet)	0.0	0.0	5.8	5.8
Maximum Negative Moment (kips-foot)	-24.5	-49.9	-5.6	0.0
Depth to Maximum Negative Moment (feet)	8.6	8.5	10.0	15.0
Depth to Zero Deflection (feet)	11.7	11.8	9.8	10.2

Table 5 – Summary of Single Pile Lateral Load Capacity
24-inch-diameter CIDH Pile

Pile Design Parameters	Fixed-Head		Free-Head	
Lateral Deflection of Shaft Head (inch)	0.25	0.50	0.25	0.50
Design Shaft Length (feet)	15	15	15	15
Lateral Load (kips)	38	76	12.5	24.5
Maximum Positive Moment (kips-foot)	218.3	437.5	52.7	103.3
Depth to Maximum Positive Moment (feet)	0.0	0.0	6.2	6.1
Maximum Negative Moment (kips-foot)	-17.9	-35.8	0.0	0.0
Depth to Maximum Negative Moment (feet)	10.0	10.0	15.0	15.0
Depth to Zero Deflection (feet)	12.6	12.6	10.9	11.1

Table 6 – Summary of Single Pile Lateral Load Capacity
60-inch-diameter CIDH Pile

Pile Design Parameters	Fixed-Head		Free-Head	
Lateral Deflection of Shaft Head (inch)	0.25	0.50	0.25	0.50
Design Shaft Length (feet)	25	25	25	25
Lateral Load (kips)	190	370	53	102
Maximum Positive Moment (kips-foot)	2316.7	4516.7	383.3	737.5
Depth to Maximum Positive Moment (feet)	0.0	0.0	11.1	11.1
Maximum Negative Moment (kips-foot)	-51.0	-99.2	0.0	0.0
Depth to Maximum Negative Moment (feet)	19.7	19.7	25.0	25.0
Depth to Zero Deflection (feet)	22.2	22.5	19.4	19.7

For lateral loading, piles in a group may be considered to act individually when the center-to-center spacing is greater than 3D (where, D is the diameter of the pile) in the direction normal to loading and greater than 8D in the direction parallel to loading. The following table presents the lateral load reduction factors to be applied for various pile spacings for in-line loading.

Table 7 – Lateral Load Group Reduction Factors

Center-to-Center Pile Spacing for In-Line Loading	Group Efficiency (Ratio of Lateral Resistance of Pile in a Group to Single Pile)
8D	1.00
7D	0.94
6D	0.88
5D	0.82
4D	0.76
3D	0.70

8.4.3. Construction Considerations for Cast-In-Drilled-Hole (CIDH) Piles

Construction of CIDH piles should be observed by the geotechnical consultant during drilling to evaluate if the piles have been extended to the recommended depths. The drilled holes should be cleaned of loose soil and gravel. It is the contractor's responsibility to take the appropriate measures to provide for the integrity of the drilled holes and to see that the holes are cleaned and straight and that sloughed loose soil is removed from the bottom of the hole prior to the placement of concrete. Drilled CIDH piles should be checked for alignment and plumbness during installation. The amount of acceptable misalignment of a pile is approximately 3 inches from the plan location but may be reduced based on design criteria. The center-to-center spacing of piles should be no less than three times the nominal diameter of the pile.

Groundwater was encountered in our exploratory borings at depths of approximately 4 feet bgs in the vicinity of Harper Lake and 27 feet bgs in the older alluvium areas. As a result, we anticipate that groundwater may be encountered in the drilled holes for the CIDH piles. It is recommended that the contractor considers appropriate measures during construction to reduce the potential for caving of the drilled holes, including the use of steel casing and/or drilling mud. In addition, we recommend placement of concrete by tremie method to see that the aggregate and cement do not segregate during concrete placement.

Contractors with proven records in the installation of CIDH piles should be considered. We recommend that the drilling equipment have a rated torque of 20,000 foot-pounds or more. During construction, a certified deep foundation inspector should document the diameter, depth, vertical alignment, and the nature of the materials encountered at each pile location. Reinforcing steel and concrete placement should be continuously observed by Ninyo & Moore. A quality control report should be submitted for each pile stating, in writing, that the design details have been observed and meet the requirements.

We recommend that the use of pile integrity testing be considered to evaluate the installed condition of the piles. Pile integrity tests may be performed as low strain dynamic (sonic echo) testing. If performed, the pile integrity tests should be performed under the direction of the design engineer and be monitored in the field by Ninyo & Moore.

8.5. Slab-on-Grade

We recommend that conventional, slab-on-grade floors, underlain by compacted fill materials of generally very low to low expansion potential, be 5 inches in thickness and be reinforced with No. 3 reinforcing bars spaced 18 inches on center each way. The reinforcing bars should be placed near the mid-height of the slab. As a means to help reduce shrinkage cracks, we recommend that the slabs be provided with expansion joints at intervals of approximately 12 feet each way. The slab reinforcement and expansion joint spacing should be designed by the project structural engineer.

If moisture sensitive floor coverings are to be used, we recommend that slabs be underlain by a vapor retarder and capillary break system consisting of a 10-mil polyethylene (or equivalent) membrane placed over 4 inches of medium to coarse, clean sand or pea gravel and overlain by an additional 2 inches of sand to help protect the membrane from puncture during placement and to aid in concrete curing. The exposed subgrade should be moistened prior to the placement of concrete.

8.6. Concrete Flatwork

Exterior concrete flatwork should be 4 inches in thickness and should be reinforced with No. 3 reinforcing bars placed at 24 inches on-center both ways. No vapor retarder is needed for exterior flatwork. To reduce the potential manifestation of distress to exterior concrete flatwork due to movement of the underlying soil, we recommend that such flatwork be installed with crack-control joints at appropriate spacing as designed by the structural engineer. Exterior slabs should be underlain by 4 inches of clean sand. The subgrade soils should be treated as indicated in the Remedial Grading for Exterior Flatwork section of this report. Positive drainage should be established and maintained adjacent to flatwork.

8.7. Preliminary Pavement Design

We understand that asphalt concrete-paved access drives and parking areas will be constructed on the site. For planning purposes we are providing preliminary pavement designs. Laboratory testing was performed on a representative sample of the on-site soils to evaluate R-value. The test was in general accordance with California Test (CT) Method 301 and the result is presented in Appendix B. The test result indicates an R-value of 61 for the sample tested. We have used this value for the preliminary design of flexible pavements at the project site. Actual pavement recommendations should be based on R-value tests performed on bulk samples of the soils that are exposed at the finished subgrade elevations in the areas to be paved once grading operations have been performed. For design we have used a Traffic Index of 5.0 for parking areas and site driveways and 6.0 for truck traffic. The preliminary recommended pavement sections are as follows:

Table 8 – Recommended Pavement Sections

Area	R-Value	Traffic Index	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking and Driveways	61	5.0	3.0	4.0
Truck Traffic	61	6.0	4.0	4.0

If traffic loads are different from those assumed, the pavement design should be reevaluated. In addition, we recommend that the upper 12 inches of the subgrade and the Class 2 aggregate base be compacted to a relative compaction of 95 percent as evaluated by ASTM D 1557.

We suggest that consideration be given to using Portland cement concrete (PCC) pavement in areas where dumpsters will be stored and where refuse trucks will stop and load. Experience indicates that refuse truck traffic can significantly shorten the useful life of asphalt concrete sections. We recommend that in these areas, 6-inch thick PCC pavement with a flexural strength of 600 pounds per square inch (psi) reinforced with No. 3 bars, 18 inches on center, be placed over 12 inches of very low to low expansive soil compacted to a relative compaction of 95 percent as evaluated by ASTM D 1557.

8.8. Corrosion

Laboratory testing was performed on representative samples of the on-site soils to evaluate pH and electrical resistivity, as well as chloride and sulfate contents. The samples tested were representative of the older alluvium and of the lake deposits. The pH and electrical resistivity tests were performed in accordance with CT 643 and the sulfate and chloride tests were performed in accordance with CTs 417 and 422, respectively. These laboratory test results are presented in Appendix B.

The results of the corrosivity testing indicated electrical resistivity ranging from 3,015 to 10,720 ohm-cm for older alluvium and 154 ohm-cm for lake deposits; soil pH ranging from 7.1 to 7.7 for older alluvium and 7.7 for lake deposits; chloride content ranging from 25 to 380 parts per million (ppm) for older alluvium and 11,200 ppm for lake deposits; and, sulfate content ranging from 0.002 to 0.011 percent (i.e., 20 to 110 ppm) for older alluvium and 0.99 percent (i.e., 9,900 ppm) for lake deposits. Based on Caltrans criteria, older alluvium would be classified as non-corrosive. However, lake deposits would be classified as corrosive, which is defined as having soil with more than 500 ppm chlorides, more than 0.2 percent sulfates, or a pH less than 5.5. We recommend that a corrosion engineer be consulted for further evaluation of soil corrosivity at the site.

8.9. Concrete Placement

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. As stated above, the soil samples tested in this evaluation indicated a water-soluble sulfate contents ranging from 0.002 to 0.011 percent by weight in older alluvium areas and 0.99 percent (i.e., 9,900 ppm) for lake deposits. According to the American Concrete Institute (ACI) guideline 318-05, the potential for sulfate attack is negligible for water-soluble sulfate content of up to about

0.10 percent and severe for water-soluble sulfate content of 0.2 to 2.0 percent by weight in soils. Therefore, the older alluvium may be considered to have a negligible potential for sulfate attack and the lake deposits have severe potential for water-soluble sulfate attack. Based on ACI (2005) criteria, Type II cement may be used for concrete construction in older alluvium areas. Type V cement should be used for any structures constructed on the lake deposits. However, due to the potential variability of site soils, consideration should be given to using Type V cement and concrete with a water-cement ratio no higher than 0.45 by weight for normal weight aggregate concrete and a 28-day compressive strength of 4,500 psi or more for the project.

9. LIMITATIONS

The preliminary field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for preliminary design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no controls.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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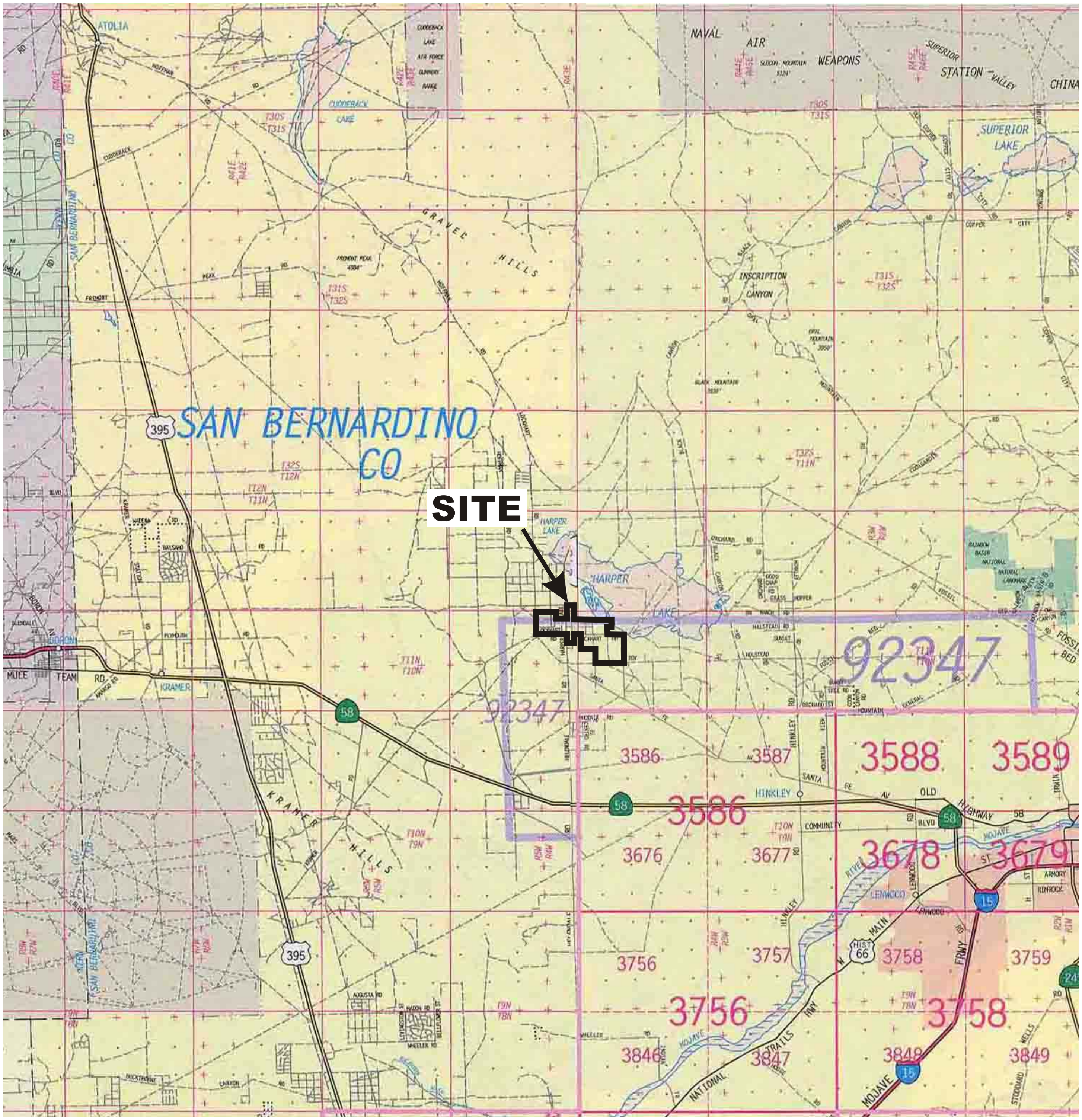

REFERENCE: 2005 THOMAS GUIDE FOR SAN BERNARDINO AND RIVERSIDE COUNTIES, STREET GUIDE AND DIRECTORY.

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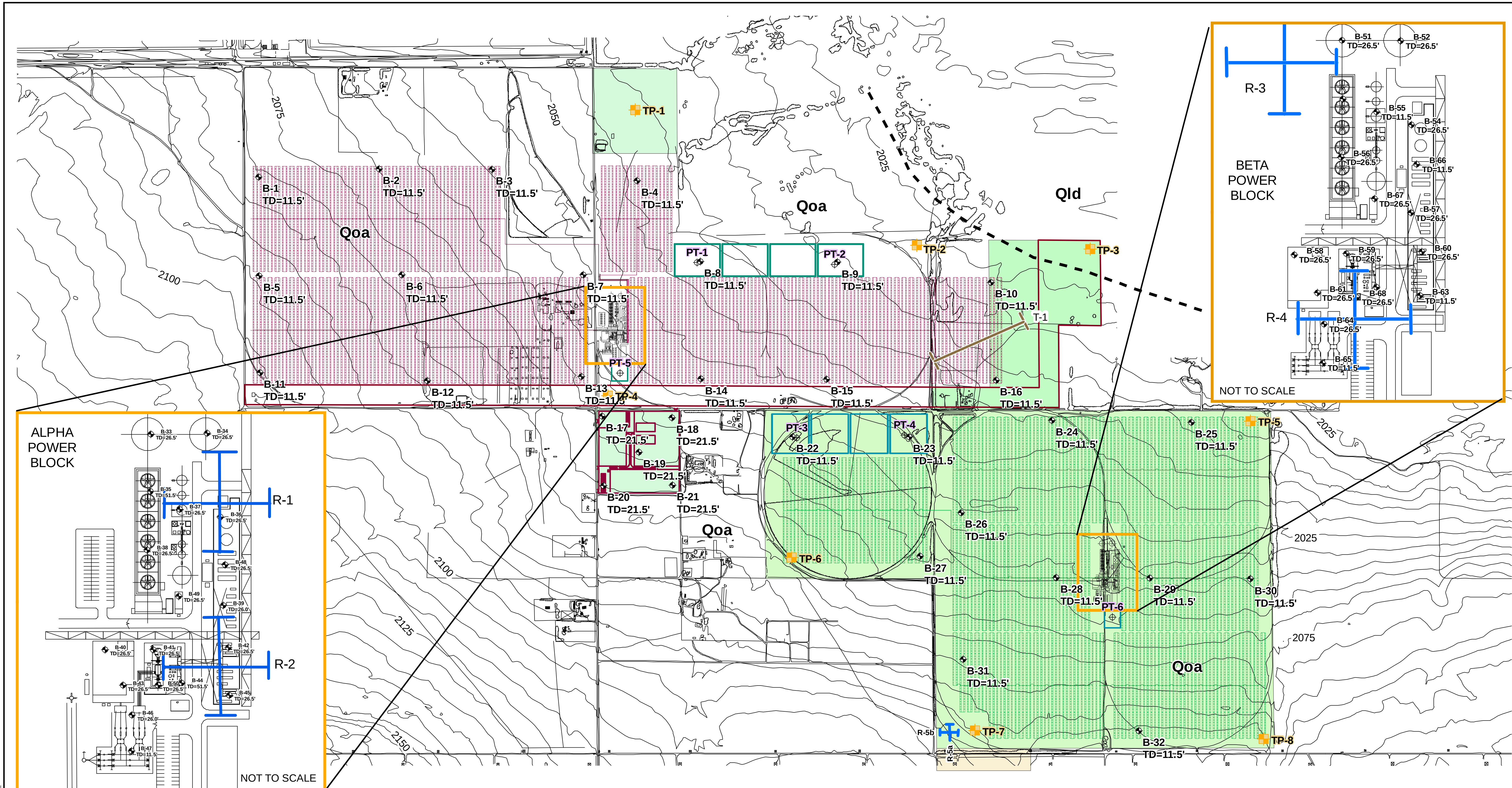
APPROXIMATE SCALE IN MILES

N

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

fig 1 105879004 slm

Ninyo & Moore		SITE LOCATION MAP	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	1
105879004	5/09		



LEGEND

- APPROXIMATE BORING LOCATION
- APPROXIMATE PERCOLATION TEST LOCATION
- APPROXIMATE TEST PIT LOCATION
- APPROXIMATE RESISTIVITY SURVEY LOCATION
- APPROXIMATE FAULT TRENCH LOCATION
- ALPHA DRAINAGE CHANNELS
- ALPHA MIRROR
- ALPHA PONDS LANDFARM
- ALPHA POWER BLOCK
- BETA MIRROR
- BETA PONDS LANDFARM
- BETA POWER BLOCK
- CONSTRUCTION LAYDOWN
- CONTOURS
- APPROXIMATE LOCATION OF GEOLOGIC CONTACT
- BETA BOUNDARY
- BETA DISTURBANCE AREA
- BETA DRAINAGE CHANNEL
- COMMON BOUNDARY
- CONSTRUCTION LAYDOWN BOUNDARY
- TRANS INTERCONNECT BOUNDARY

NOTES: TD=APPROXIMATION DEPTH IN FEET
Qld LAKE DEPOSITS
Qoa OLDER ALLUVIUM

N

APPROXIMATE SCALE

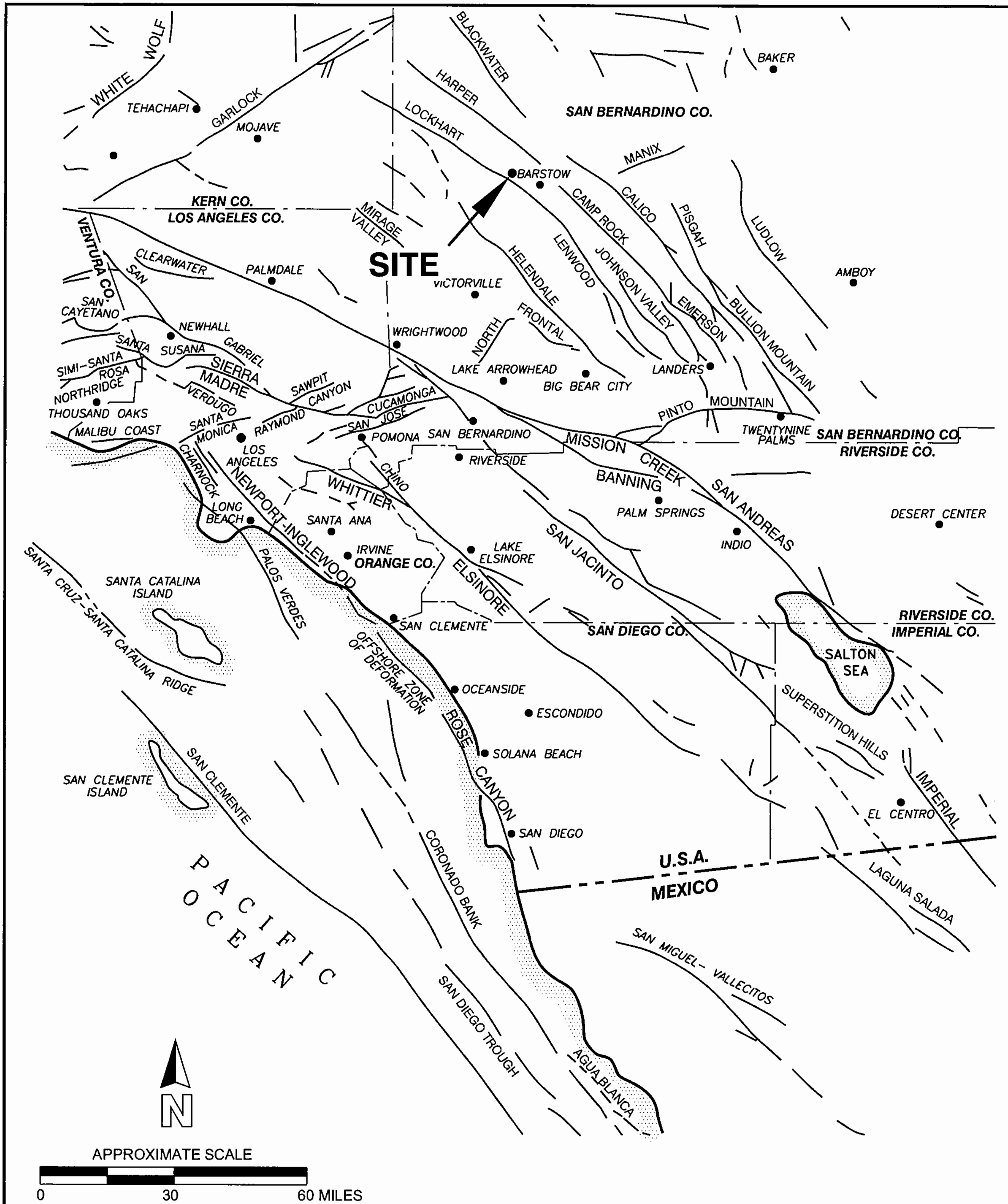
0 1000 2000 FEET

NOTE: ALL DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

REFERENCE: MERRELL JOHNSON ENGINEERING, 2009
MOJAVE SOLAR ONE SITE PLAN

Ninyo & Moore		GEOTECHNICAL MAP	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	2
105879004	5/09		

5-5-09 105879004_Harper_Lake\105879004_Fig2_bor_loc.mxd

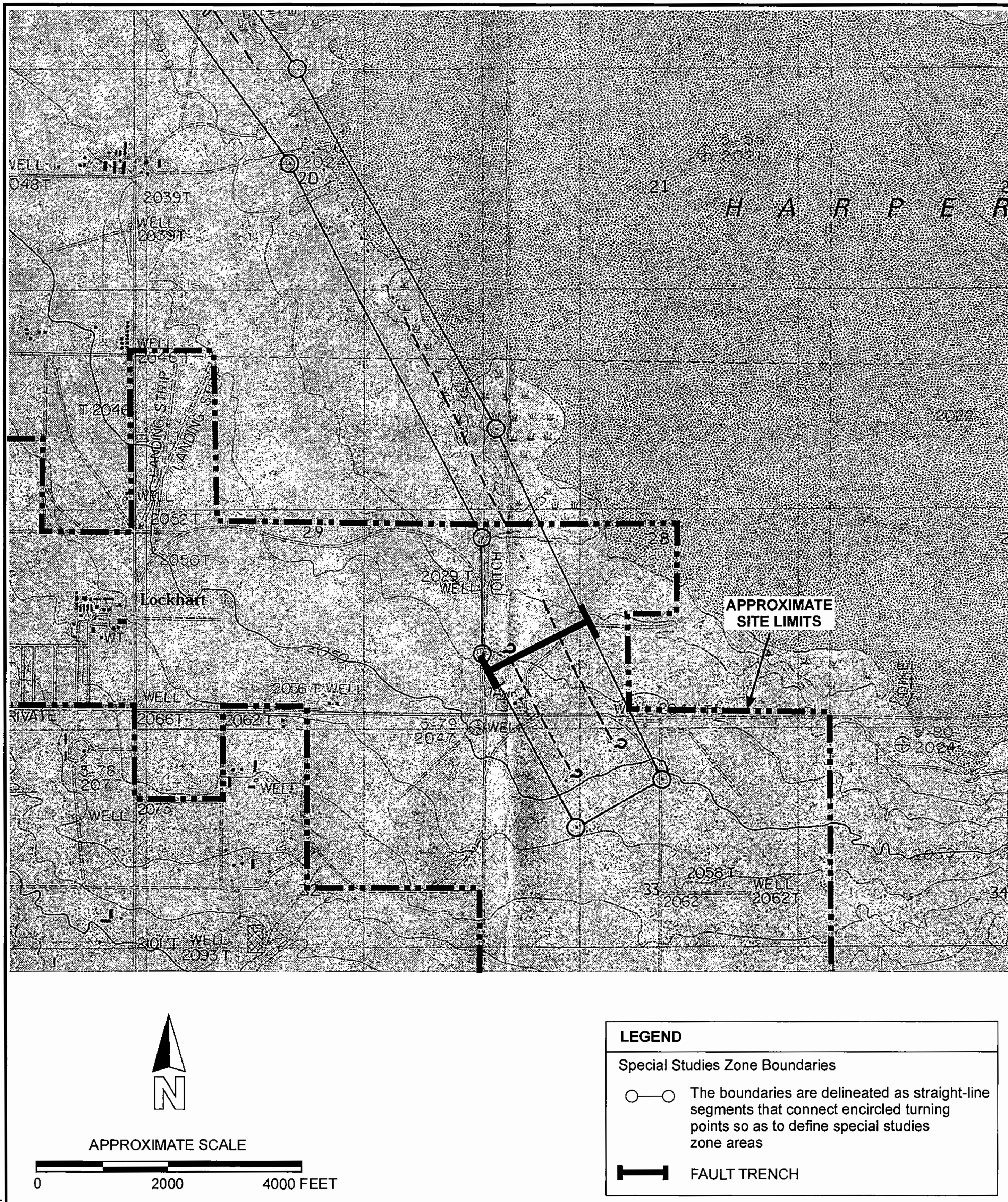


NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE

AFTER NORRIS AND WEBB, 1990

fig 3 105879004 fault

Ninyo & Moore		FAULT LOCATION MAP	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	3
105879004	5/09		



NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

REFERENCE: STATE OF CALIFORNIA SPECIAL STUDIES ZONES, LOCKHART QUADRANGLE, DATED MARCH 1, 1988.

Ninyo & Moore		SPECIAL STUDIES ZONE MAP	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	4
105879004	5/09		

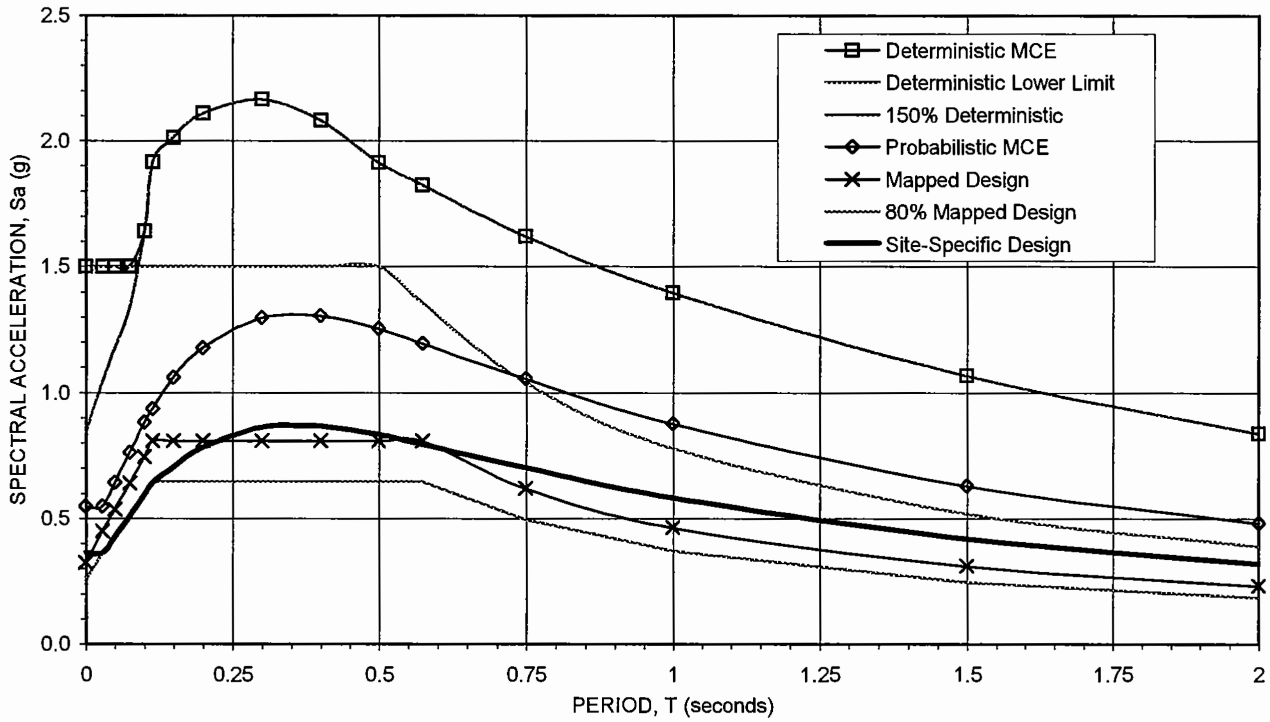
fig 4 105879004 special studies

PERIOD (seconds)	SITE-SPECIFIC DESIGN RESPONSE SPECTRUM Sa, (g)
0.000	0.365
0.030	0.365
0.050	0.428
0.075	0.511
0.100	0.596
0.115	0.646
0.150	0.707
0.200	0.785

PERIOD (seconds)	SITE-SPECIFIC DESIGN RESPONSE SPECTRUM Sa, (g)
0.300	0.865
0.400	0.869
0.500	0.836
0.575	0.796
0.750	0.703
1.000	0.584
1.500	0.420
2.000	0.321

S_{DS} = 0.785 > 0.9x0.869 S_{D1} = 0.642

S_{MS} = 1.178 S_{M1} = 0.963



NOTES:

1. Probabilistic Acceleration Response Spectra (ARS) is for Maximum Considered Earthquake (MCE) with ground motion having 2% probability of exceedance in 50 years using Boore et al. (1997) attenuation relationship for Site Class D (stiff soil profile).
2. Deterministic ARS is 150% of the largest median values from attenuation relationships by Sadigh et al. (1997) and Abrahamson and Silva (1997) considering a magnitude 7.5 event on the Lenwood-Lockhart-Old Woman Springs fault located approximately 0.7 km from the site. Deterministic ARS conforms with lower bound limit per ASCE 7-05 Section 21.2.2.
3. Site-Specific Design ARS is the lesser of spectral ordinates of deterministic and probabilistic ARS at each period per ASCE 7-05 Section 21.2.3. Site-Specific Design ARS conforms with lower bound limit per ASCE 7-05 Section 21.3.
4. Mapped Design ARS computed from ASCE 7 mapped spectral ordinates modified for Site Class D with 2/3 scaling factor per ASCE 7-05 Section 11.4. Presented for comparison.
5. ARS curves for horizontal ground motion assume 5% damping and do not include response modification factor or importance factor.
6. Seismic Design Category D per 2007 CBC Section 1613A.5.6.

Ninyo & Moore	ACCELERATION RESPONSE SPECTRA	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	5
105879004 / 5/09		

Copy of 105879004 seismic hazard .xls

APPENDIX A

BORING AND TEST PIT LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings and test pits. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following methods.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	BORING LOG EXPLANATION SHEET
0								Bulk sample.
								Modified split-barrel drive sampler.
								No recovery with modified split-barrel drive sampler.
								Sample retained by others.
								Standard Penetration Test (SPT).
5								No recovery with a SPT.
			XX/XX					Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
								No recovery with Shelby tube sampler.
								Continuous Push Sample.
								Seepage.
10								Groundwater encountered during drilling.
								Groundwater measured after drilling.
							SM	ALLUVIUM: Solid line denotes unit change.
								Dashed line denotes material change.
								Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Sheared Bedding Surface
15								
								The total depth line is a solid line that is drawn at the bottom of the boring.
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BORING LOG

EXPLANATION OF BORING LOG SYMBOLS

PROJECT NO.	DATE	FIGURE
	Rev. 01/03	

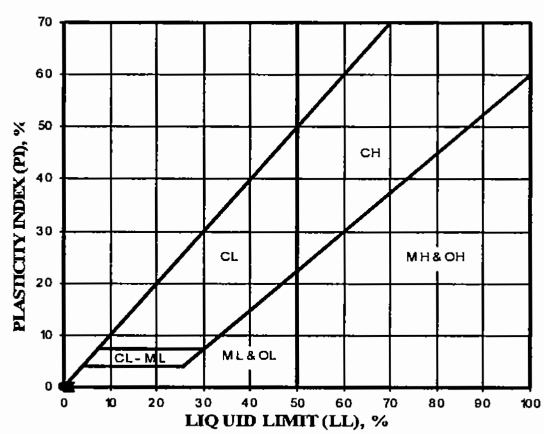
U.S.C.S. METHOD OF SOIL CLASSIFICATION

MAJOR DIVISIONS		SYMBOL	TYPICAL NAMES
COARSE-GRAINED SOILS (More than 1/2 of soil >No. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction <No. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than 1/2 of soil <No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

GRAIN SIZE CHART

CLASSIFICATION	RANGE OF GRAIN SIZE	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL Coarse Fine	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.76 76.2 to 19.1 19.1 to 4.76
SAND Coarse Medium Fine	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.76 to 0.075 4.76 to 2.00 2.00 to 0.420 0.420 to 0.075
SILT & CLAY	Below No. 200	Below 0.075

PLASTICITY CHART



Ninyo & Moore | U.S.C.S. METHOD OF SOIL CLASSIFICATION

DATE DRILLED 4/07/09 BORING NO. B-1

GROUND ELEVATION 2,080' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5			19	1.8	108.7			Medium dense.
10			18					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-1

DATE DRILLED	4/07/09
BORING NO.	B-2
GROUND ELEVATION	2,070' ± (MSL)
SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		X	20					Medium dense to dense.
10		X	64	2.3	119.9			Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-2

DATE DRILLED 4/07/09 BORING NO. B-3

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5			19	2.9	111.5			
10			26					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-3

DATE DRILLED	4/07/09	BORING NO.	B-4
GROUND ELEVATION	2,045' ± (MSL)	SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense to dense, silty fine to coarse SAND.
5		X	75	4.9	116.9			Very dense.
10		X	44					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-4

DATE DRILLED	4/07/09	BORING NO.	B-5
GROUND ELEVATION	2,095' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	X						SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		X	15	2.9	111.2			
10		X	57					Very dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-5

DATE DRILLED	4/07/09	BORING NO.	B-6
GROUND ELEVATION	2,075' ± (MSL)	SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		■	9					
10		■	43	4.5	113.1			Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-6

DATE DRILLED	4/09/09	BORING NO.	B-7
GROUND ELEVATION	2,055' ± (MSL)	SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5			20	2.4	110.3			Medium dense.
10			16					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-7

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/06/09 BORING NO. B-8 GROUND ELEVATION 2,040' ± (MSL) SHEET 1 OF 1 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY MAH LOGGED BY MAH REVIEWED BY RI **DESCRIPTION/INTERPRETATION**
0							SM	<u>OLDER ALLUVIUM:</u> Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
								Damp; dense.
5			64	5.3	108.2			
10			22					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. <u>Note:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA		
PROJECT NO.	DATE	FIGURE
105879004	5/09	A-8

DATE DRILLED	4/06/09	BORING NO.	B-9
GROUND ELEVATION	2,035' ± (MSL)	SHEET 1	OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		X	33					Damp; dense to very dense.
10		X	26	3.4	110.4			Medium dense; fine to medium sand.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09.
15								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-9

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	Bulk						SM	OLDER ALLUVIUM: Brown, damp to moist, loose to medium dense, silty fine to coarse SAND.
5		Driven	13					
				▽				Saturated.
10		Driven	24					
								Total Depth = 11.5 feet. Groundwater encountered at a depth of approximately 8 feet during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
15								
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DATE DRILLED 4/07/09 BORING NO. B-10

GROUND ELEVATION 2,025' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-10

DATE DRILLED	4/07/09	BORING NO.	B-11
GROUND ELEVATION	2,100' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY BTM	LOGGED BY BTM	REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		X	26					Dense.
10		X	58	3.2	111.4			
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-11

DATE DRILLED 4/07/09 BORING NO. B-12

GROUND ELEVATION 2,085' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			48	6.2	109.5			Damp; dense.
10			39					Very dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-12

DATE DRILLED	4/09/09	BORING NO.	B-13
GROUND ELEVATION	2,065' ± (MSL)	SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		■	31	2.3	112.5			
10		◤	41					Very dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-13

DATE DRILLED 4/09/09	BORING NO. B-14	
GROUND ELEVATION 2,055' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer)	DROP 30"	
SAMPLED BY BTM	LOGGED BY BTM	REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			48	4.7	114.4			Dense.
10			31					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-14

DATE DRILLED	4/09/09	BORING NO.	B-15
GROUND ELEVATION	2,050' ± (MSL)	SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		■	28	3.1	113.4			Medium dense.
10		▼	29					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09.
								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-15

DATE DRILLED	4/07/09	BORING NO.	B-16
GROUND ELEVATION	2,035' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY BTM	LOGGED BY BTM	REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, damp to moist, loose to medium dense, silty fine to coarse SAND.
5		■	33	4.5	115.2			
10		■	26					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-16

DATE DRILLED	4/09/09
BORING NO.	B-17
GROUND ELEVATION	2,065' ± (MSL)
SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		X	40	1.9	116.0			Medium dense.
10		X	26					Dense.
15		X	80/11"					Very dense.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-17

DATE DRILLED 4/09/09 BORING NO. B-17

GROUND ELEVATION 2,065' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		▼	27				SM	OLDER ALLUVIUM: (Continued) Brown, dry to damp, dense, silty fine to medium SAND.
								Total Depth = 21.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-18

DATE DRILLED 4/09/09 BORING NO. B-18

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		■	45	1.8	116.9			Dense.
10		◣	44					Very dense.
15		■	38					Medium dense.
							CH	Brown, damp, very stiff, sandy CLAY.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-19

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/09/09 BORING NO. B-18 GROUND ELEVATION 2,060' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG DESCRIPTION/INTERPRETATION
20		▼	18				CH	OLDER ALLUVIUM: (Continued) Brown, damp, very stiff, sandy CLAY.
								Total Depth = 21.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-20

DATE DRILLED 4/09/09 BORING NO. B-19

GROUND ELEVATION 2,065' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SW-SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, well-graded SAND with silt.
5		■	56	2.3	114.2			Dense.
10		◣	47					Very dense.
15		■	66					Dense; fine sand.
							CL	Brown, damp, very stiff, sandy CLAY.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-21

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/09/09 BORING NO. B-19 GROUND ELEVATION 2,065' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG **DESCRIPTION/INTERPRETATION**
20		■	17				CL	OLDER ALLUVIUM: (Continued) Brown, damp, very stiff, sandy CLAY.
								Total Depth = 21.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-22

DATE DRILLED 4/09/09 BORING NO. B-20

GROUND ELEVATION 2,070' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	<u>OLDER ALLUVIUM:</u> Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			61	4.1	116.8			Dense.
10			65					Very dense.
15			52					Damp; dense.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-23

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		▼	27				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to medium SAND.
								Total Depth = 21.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/09/09 BORING NO. B-20

GROUND ELEVATION 2,070' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-24

DATE DRILLED	4/09/09
BORING NO.	B-21
GROUND ELEVATION	2,070' ± (MSL)
SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		X	37	4.2	118.7			Medium dense.
10		X	31					Dense.
15		X	72					Very dense.
							CL	Brown, damp, very stiff, sandy CLAY.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-25

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	19				CL	OLDER ALLUVIUM: (Continued) Brown, damp, very stiff, sandy CLAY.
								Total Depth = 21.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/09/09 BORING NO. B-21

GROUND ELEVATION 2,070' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-26

DATE DRILLED	4/06/09	BORING NO.	B-22
GROUND ELEVATION	2,060' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	X						SM	OLDER ALLUVIUM: Brown, damp, medium dense, silty fine to coarse SAND.
5		X	19					
10		X	60	2.2	109.5			Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09.
								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-27

DATE DRILLED	4/06/09	BORING NO.	B-23
GROUND ELEVATION	2,050' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	Bulk (0–5)						SM	OLDER ALLUVIUM: Brown, damp, loose, silty fine to coarse SAND.
5		Driven	12	2.1	108.5			
10		Driven	26					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-28

DATE DRILLED 4/07/09 BORING NO. B-24

GROUND ELEVATION 2,040' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, damp, loose to medium dense, silty fine to coarse SAND.
5		■	17					Medium dense.
10		■	27	10.5	110.6			Moist.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09.
15								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-29

DATE DRILLED	4/07/09
BORING NO.	B-25
GROUND ELEVATION	2,035' ± (MSL)
SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		■	22	3.5	110.8			Medium dense.
10		▼	21					Damp to moist; dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-30

DATE DRILLED 4/09/09 BORING NO. B-26

GROUND ELEVATION 2,050' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	X						SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		X	62	4.7	121.7			Dense.
10		X	17					Damp to moist; medium dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/09/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-31

DATE DRILLED 4/07/09 BORING NO. B-27

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5			18					Medium dense.
10			31	24.3	97.9			Moist to wet; micaceous.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-32

DATE DRILLED	4/08/09
BORING NO.	B-28
GROUND ELEVATION	2,060' ± (MSL)
SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		■	17	2.3	112.6			Medium dense.
10		▼	33					Dense to very dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-33

DATE DRILLED	4/08/09
BORING NO.	B-29
GROUND ELEVATION	2,055' ± (MSL)
SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		■	38	6.5	120.4			Damp; medium dense.
10		◣	21					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-34

DATE DRILLED	4/07/09	BORING NO.	B-30
GROUND ELEVATION	2,060' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY BTM	LOGGED BY BTM	REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		■	42	6.8	116.5			Damp; medium dense to dense.
10		■	23					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-35

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			49	8.9	113.9			Damp; dense.
10			22					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/07/09 BORING NO. B-31

GROUND ELEVATION 2,080' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-36

DATE DRILLED	4/07/09	BORING NO.	B-32	
GROUND ELEVATION	2,090' ± (MSL)	SHEET 1 OF 1		
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)			
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"	
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		X	29	3.3	117.5			Dense.
10		X						Damp; fine to medium sand.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/07/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry, medium dense, silty fine SAND.
5			18					
10			67	4.8	125.4			Damp; dense; fine to medium sand.
15			23					Fine sand.
20								

DATE DRILLED 4/03/09 BORING NO. B-33

GROUND ELEVATION 2,050' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-38

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	85/11"	3.7	122.8		SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine SAND.
25		◣	27					Moist; dense; fine to medium sand.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/03/09 BORING NO. B-33

GROUND ELEVATION 2,050' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DATE DRILLED 4/02/09 BORING NO. B-34

GROUND ELEVATION 2,050' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry, dense, silty fine to coarse SAND.
5			58					
10			41					Very dense.
15			32	3.9	114.2			Medium dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-40

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/02/09 BORING NO. B-34; GROUND ELEVATION 2,050' ± (MSL) SHEET 2 OF 2; METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling); DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"; SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI; DESCRIPTION/INTERPRETATION
20			42				SM	OLDER ALLUVIUM: (Continued) Brown, dry to damp, very dense, silty fine to coarse SAND.
25			53	8.5	114.9			Reddish brown; damp; dense; fine sand.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/02/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-41

DATE DRILLED 4/08/09 BORING NO. B-35

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			27					Dense.
10			45	5.3	118.6			
15			20					Damp; medium dense to dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-42

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	36				SM	OLDER ALLUVIUM: (Continued) Brown, damp to moist, medium dense, silty fine to medium SAND.
25		◣	39					Very dense; silty fine sand.
30		■	79					Wet; silty fine to coarse sand.
				▽				
							SC	Brown, saturated, medium dense, clayey fine to medium SAND.
35		◣	12					
40								

DATE DRILLED 4/08/09 BORING NO. B-35

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-43

DATE DRILLED	4/08/09	BORING NO.	B-35	
GROUND ELEVATION	2,055' ± (MSL)	SHEET 3 OF 3		
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)			
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"	
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		■	38				SC	OLDER ALLUVIUM: (Continued) Brown, saturated, medium dense, clayey fine to medium SAND.
							CH	Brown, wet, hard, fine sandy silty CLAY.
45		■	17					Very stiff.
50		■	43					Hard.
								Total Depth = 51.5 feet. Groundwater encountered at a depth of approximately 32 feet during drilling. Backfilled shortly after drilling on 4/08/09.
								Note: Groundwater may rise to a level higher than that measured in borehole due to relatively slow rate of seepage in clay and several other factors as discussed in the report. Please refer to the report for groundwater monitoring recommendations.
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MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-44

DATE DRILLED 4/02/09 BORING NO. B-36

GROUND ELEVATION 2,050' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SP-SM	OLDER ALLUVIUM: Brown, dry, medium dense, poorly graded SAND with silt.
5			18					
10			61	4.0	117.0			Damp; dense.
15			25					
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-45

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	90/11"	5.0	116.2		SP-SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, poorly graded SAND with silt.
25		◢	20					Medium dense to dense.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/02/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/02/09 BORING NO. B-36

GROUND ELEVATION 2,050' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-46

DATE DRILLED	4/03/09	BORING NO.	B-37
GROUND ELEVATION	2,055' ± (MSL)	SHEET 1 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, very dense, silty fine to medium SAND.
5		Driven	41					
10		Driven	84	4.1	124.7			
15		Driven	30					Damp; dense.
20								

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MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-47

DATE DRILLED 4/03/09 BORING NO. B-37

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	44	3.2	114.1		SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to coarse SAND.
25		◣	30					Fine sand.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-48

DATE DRILLED 4/03/09 BORING NO. B-38

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, damp, medium dense, silty fine to medium SAND.
5			35	6.1	111.2			
10			38					Very dense.
15			65/11"	6.	119.1			
20								

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-49

DATE DRILLED 4/03/09 BORING NO. B-38

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20			19				SM	OLDER ALLUVIUM: (Continued) Brown, damp, medium dense, silty fine to medium SAND.
25			73	8.1	125.2			Very dense.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/02/09 BORING NO. B-39

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, dense, silty fine to coarse SAND.
5			46	9.4	105.3			Damp.
10			37					Very dense.
15			44	5.6	120.7			Dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-51

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	
								DATE DRILLED 4/02/09 BORING NO. B-39 GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI
								DESCRIPTION/INTERPRETATION
20			55				SM	<u>OLDER ALLUVIUM:</u> (Continued) Brown, damp, very dense, silty fine to coarse SAND.
25			69	6.8	113.2			Dense.
								Total Depth = 26 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/02/09. <u>Note:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-52

DATE DRILLED	4/03/09	BORING NO.	B-40
GROUND ELEVATION	2,055' ± (MSL)	SHEET 1 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		■	28					
10		◪	27					Dense; fine to medium sand.
15		■	43					
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-53

DEPTH (feet)	SAMPLES Bulk / Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/03/09 BORING NO. B-40 GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI **DESCRIPTION/INTERPRETATION**
20		30				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to medium SAND.
25		85					Very dense.
							Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-54

DATE DRILLED 4/03/09	BORING NO. B-41
GROUND ELEVATION 2,055' ± (MSL)	SHEET 1 OF 2
METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)	
DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer)	DROP 30"
SAMPLED BY BTM LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SW-SM	OLDER ALLUVIUM: Brown, damp, medium dense, well-graded SAND with silt.
5		■	19					
10		■	49	7.5	116.0			Dense.
15		■	14					Medium dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-55

DATE DRILLED	4/03/09	BORING NO.	B-41
GROUND ELEVATION	2,055' ± (MSL)	SHEET 2 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	43	2.3	120.9		SW-SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, well-graded SAND with silt.
							CL	Brown, damp, very stiff, fine sandy CLAY.
25		■	18					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-56

DATE DRILLED	4/02/09	BORING NO.	B-42
GROUND ELEVATION	2,055' ± (MSL)	SHEET 1 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SW-SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, well-graded SAND with silt.
5		■	8					
10		■	46	2.2	118.6			Dense.
15		■	23					
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-57

DATE DRILLED	4/02/09	BORING NO.	B-42
GROUND ELEVATION	2,055' ± (MSL)	SHEET 2 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY BTM	LOGGED BY BTM	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	87/11"	5.0	122.7		SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine SAND.
25		■	31					Dense.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/02/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-58

DATE DRILLED 4/03/09	BORING NO. B-43
GROUND ELEVATION 2,055' ± (MSL)	SHEET 1 OF 2
METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)	
DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer)	DROP 30"
SAMPLED BY BTM LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, very dense, silty fine to coarse SAND.
5		◣	38					
10		■	41					Medium dense; fine to medium sand.
15		◣	38					Damp; very dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-59

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/03/09 BORING NO. B-43
								GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2
								METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)
								DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"
								SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI
								DESCRIPTION/INTERPRETATION
20			68				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to medium SAND.
25			28					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-60

DATE DRILLED	4/02/09	BORING NO.	B-44
GROUND ELEVATION	2,055' ± (MSL)	SHEET	1 OF 3
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, dense, silty fine to coarse SAND.
5			28					
10			47	1.4	115.4			Fine sand.
15			27					
20								

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-61

DATE DRILLED 4/02/09 BORING NO. B-44

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	73	6.8	118.1		SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine to medium SAND.
25		◣	20					Medium dense to dense; fine sand.
30		■	21	4.9	116.6			Micaceous.
								Wet.
				▽				Saturated.
							SC	Brown, moist, medium dense, clayey SAND.
35		◣	17					
								Dense; micaceous.
40								

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-62

DATE DRILLED	4/02/09	BORING NO.	B-44
GROUND ELEVATION	2,055' ± (MSL)	SHEET 3 OF 3	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		■	23				SC	ALLUVIUM: (Continued) Brown, moist, dense, silty clayey SAND; micaceous.
							CL	Grayish brown, moist, hard, silty fine sandy CLAY.
45		■	22					
50		■	32	24.6	97.1			
								Total Depth = 51.5 feet. Groundwater encountered at a depth of approximately 33 feet during drilling. (Perched) Backfilled shortly after drilling on 4/02/09. Note: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-63

DATE DRILLED 4/02/09 BORING NO. B-45

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			31					
10			23					Dense; fine to medium sand.
15			37	4.6	119.3			Medium dense; fine to coarse sand.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-64

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20			48				SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine to medium SAND.
25			48	5.3	117.7			Dense; fine to coarse sand.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/02/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/02/09 BORING NO. B-45

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-65

DATE DRILLED 4/03/09 BORING NO. B-46

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, dense, silty fine to coarse SAND.
5			54	7.9	110.8			
10			22					Fine to medium sand.
15			59	10.8	114.2			
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-66

DATE DRILLED 4/03/09 BORING NO. B-46

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20			58				SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine to medium SAND.
25			68	5.7	109.6			
								Total Depth = 26 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-67

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/03/09 BORING NO. B-47 GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 1 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI **DESCRIPTION/INTERPRETATION**
0							SM	OLDER ALLUVIUM: Brown, dry to damp, dense, silty fine to medium SAND.
5			54	3.5	115.0			
10			26					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-68

DATE DRILLED	4/02/09	BORING NO.	B-48
GROUND ELEVATION	2,055' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, dense, silty fine to coarse SAND.
5		X	23					
10		X	76	3.9	120.6			Very dense; fine sand.
15		X	33					Dense to very dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-69

DATE DRILLED	4/02/09	BORING NO.	B-48
GROUND ELEVATION	2,055' ± (MSL)	SHEET 2 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY BTM	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	88	5.3	118.0		SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine to coarse SAND.
25		◣	30					Dense; fine sand.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/02/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-70

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, damp, dense, silty fine to coarse SAND.
5		■	26					
10		■	88					Very dense.
15		■	36					Fine to medium sand.
20								

DATE DRILLED 4/03/09 BORING NO. B-49

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-71

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.

DATE DRILLED 4/03/09 BORING NO. B-49

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

DESCRIPTION/INTERPRETATION

Depth (feet)	Blows/Foot	Classification U.S.C.S.	Description/Interpretation
20	90/11"	SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine to coarse SAND.
25	28		Dense.
30			Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-72

DATE DRILLED	4/03/09	BORING NO.	B-50
GROUND ELEVATION	2,055' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	<u>OLDER ALLUVIUM:</u> Brown, dry to damp, dense, silty fine to coarse SAND.
5		X	26					
10		X	29					Medium dense.
15		X	29					Dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-73

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/03/09 BORING NO. B-50 GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (AT B-52) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI **DESCRIPTION/INTERPRETATION**
20		■	67				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to medium SAND.
25		◣	32					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/03/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED	4/06/09	BORING NO.	B-51
GROUND ELEVATION	2,055' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	MAH	LOGGED BY	MAH
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			74	4.6	127.2			Very dense.
10			26					Damp; dense.
15			38					Medium dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-75

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	21				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to coarse SAND.
							SC	Brown, damp, very dense, clayey SAND.
25		■	71					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/06/09 BORING NO. B-51

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY MAH LOGGED BY MAH REVIEWED BY RI

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-76

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to medium SAND.
5			29					Dense.
10			25	5.6	124.0			Medium dense; fine to coarse sand.
15			21					Dense.
20								

DATE DRILLED 4/08/09 BORING NO. B-52

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	47				SM	OLDER ALLUVIUM: (Continued) Brown, dry to damp, dense, silty fine to coarse SAND.
							CL	Brown, damp, hard, sandy CLAY.
25		■	26					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/08/09 BORING NO. B-52

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DATE DRILLED 4/08/09 BORING NO. B-53

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to medium SAND.
5			36					Very dense.
10			26	10.5	110.4			Damp; medium dense; fine to coarse sand.
15			22					Dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-79

DATE DRILLED	4/08/09	BORING NO.	B-53
GROUND ELEVATION	2,055' ± (MSL)	SHEET	2 OF 3
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	55				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to coarse SAND.
							CH	Brown, damp, very stiff to hard, sandy silty CLAY; micaceous.
25		■	20	▽				
30		■	41					Wet; hard.
							SM	Brown, wet, dense, silty fine to coarse SAND; scattered gravel; micaceous.
35		■	31					
40								

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-80

DATE DRILLED 4/08/09 BORING NO. B-53

GROUND ELEVATION 2,055' ± (MSL) SHEET 3 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		▼	18				SM	OLDER ALLUVIUM: (Continued) Brown, wet, medium dense, silty fine to coarse SAND.
45		▼	25					Dense; silty fine sand; micaceous.
							CL	Grayish brown, wet, very stiff, fine sandy silty CLAY; micaceous.
50		▼	14					
								Total Depth = 51.5 feet. Groundwater encountered at a depth of approximately 27 feet during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater may rise to a level higher than that measured in borehole due to relatively slow rate of seepage in clay and several other factors as discussed in the report. Please refer to the report for groundwater monitoring recommendations.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-81

DATE DRILLED 4/08/09 BORING NO. B-54

GROUND ELEVATION 2,055' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		X	21					Dense.
10		X	40	6.3	111.3			Medium dense.
15		X	18					
							SC	Brown, damp, dense, silty clayey SAND.
20								

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-82

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/08/09 BORING NO. B-54 GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG **DESCRIPTION/INTERPRETATION**
20		■	47				SC	<u>OLDER ALLUVIUM:</u> (Continued) Brown, damp to moist, dense, silty clayey SAND.
							CL	Brown, damp, hard, silty sandy CLAY.
25		■	21					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. <u>Note:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-83

DATE DRILLED 4/08/09	BORING NO. B-55
GROUND ELEVATION 2,055' ± (MSL)	SHEET 1 OF 1
METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)	
DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer)	DROP 30"
SAMPLED BY BTM LOGGED BY BTM	REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to medium SAND.
5		X	18					Medium dense.
							CL	Brown, damp, very stiff, silty CLAY.
10		X	35	6.4	108.1		SM	Brown, damp, medium dense, silty fine to coarse SAND.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-84

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	■						SM	OLDER ALLUVIUM: Brown, damp, medium dense, silty fine to coarse SAND.
5		■	34					Very dense.
10		■	32	8.1	108.9			Medium dense.
15		■	27					Dense.
20								

DATE DRILLED 4/06/09 BORING NO. B-56

GROUND ELEVATION 2,058' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY MAH LOGGED BY MAH REVIEWED BY RI

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-85

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/06/09 BORING NO. B-56 GROUND ELEVATION 2,058' ± (MSL) SHEET 2 OF 2 METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling) DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30" SAMPLED BY MAH LOGGED BY MAH REVIEWED BY RI **DESCRIPTION/INTERPRETATION**
20			84				SM	<u>OLDER ALLUVIUM:</u> (Continued) Brown, damp, very dense, silty fine to coarse SAND; scattered fine gravel.
							CL	Brown, damp, hard, CLAY.
25			22					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. <u>Note:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-86

DATE DRILLED	4/08/09	BORING NO.	B-57
GROUND ELEVATION	2,055' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	BTM	LOGGED BY	BTM
REVIEWED BY	JG		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to medium SAND.
5			16					Medium dense.
10			37	2.9	110.0			
15			22					Dense; silty fine to medium sand.
							CH	Brown, damp, hard, sandy CLAY.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-87

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	42				CH	OLDER ALLUVIUM: (Continued) Brown, damp to moist, hard, sandy CLAY.
25		■	25					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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DATE DRILLED 4/08/09 BORING NO. B-57

GROUND ELEVATION 2,055' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-88

DATE DRILLED 4/06/09 BORING NO. B-58

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY MAH LOGGED BY MAH REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5			45	7.1	116.5			Damp; dense.
10			13					Medium dense.
15			26					
20								

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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-89

DATE DRILLED	4/06/09	BORING NO.	B-58
GROUND ELEVATION	2,060' ± (MSL)	SHEET	2 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	MAH	LOGGED BY	MAH
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	17				SC	OLDER ALLUVIUM: (Continued) Brown, damp, medium dense, clayey SAND.
							CL	Brown, damp, hard, CLAY.
25		■	39					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-90

DATE DRILLED	4/06/09	BORING NO.	B-59			
GROUND ELEVATION	2,060' ± (MSL)	SHEET	1	OF	2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)					
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"			
SAMPLED BY	MAH	LOGGED BY	MAH	REVIEWED BY	RI	

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		■	37					Very dense.
10		■	38	12.3	115.1			Medium dense.
15		■	17					
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-91

DATE DRILLED	4/06/09	BORING NO.	B-59
GROUND ELEVATION	2,060' ± (MSL)	SHEET 2 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	MAH	LOGGED BY MAH	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	63				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to coarse SAND.
							CL	Brown, damp, hard, sandy CLAY.
25		■	22					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-92

DATE DRILLED	4/06/09	BORING NO.	B-60
GROUND ELEVATION	2,060' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	MAH	LOGGED BY	MAH
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, fine to coarse SAND.
5	Driven	24	8.1	114.0			Damp; medium dense.
10	Driven	14					Moist.
15	Driven	28					
20							

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MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-93

DATE DRILLED 4/06/09	BORING NO. B-60	
GROUND ELEVATION 2,060' ± (MSL)	SHEET 2 OF 2	
METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer)	DROP 30"	
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	38				SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, silty fine to coarse SAND.
25		■	25					Medium dense.
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-94

DATE DRILLED 4/06/09 BORING NO. B-61

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY MAH LOGGED BY MAH REVIEWED BY RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		■	46	6.2	115.8			Damp; dense.
10		◣	23					Trace clay.
15		■	40					Medium dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-95

DATE DRILLED	4/06/09	BORING NO.	B-61
GROUND ELEVATION	2,060' ± (MSL)	SHEET 2 OF 2	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	28				SM	OLDER ALLUVIUM: (Continued) Brown, damp to moist, dense, silty fine to coarse SAND.
							CL	Brown, damp, hard, CLAY.
25		■	35					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-96

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	<u>OLDER ALLUVIUM:</u> Brown, dry to damp, medium dense, silty fine to medium SAND.
5			22					Dense.
10			32	5.4	113.5			Medium dense.
15			16					Damp; silty fine sand.
20								

DATE DRILLED 4/08/09 BORING NO. B-62

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-97

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	38				SM	OLDER ALLUVIUM: (Continued) Brown, damp, medium dense, silty fine to medium SAND.
							CL	Brown, damp, very stiff, sandy CLAY.
25		■	18					
							SM	Brown, wet, medium dense, silty fine SAND; micaceous.
30		■	16	▽				Saturated.
35		■	15					Silty fine to medium sand.
							ML	Brown, wet, medium dense, fine sandy SILT.
40								

DATE DRILLED 4/08/09 BORING NO. B-62

GROUND ELEVATION 2,060' ± (MSL) SHEET 2 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-98

DATE DRILLED 4/08/09 BORING NO. B-62

GROUND ELEVATION 2,060' ± (MSL) SHEET 3 OF 3

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40		▼	20				ML	OLDER ALLUVIUM: (Continued) Brown, wet, medium dense to dense, fine sandy SILT; micaceous.
							SM	Brown, wet, medium dense, silty fine SAND; micaceous.
45		▼	19					
50		▼	46					Very dense; silty fine to coarse sand.
								Total Depth = 51.5 feet. Groundwater encountered at a depth of approximately 31 feet during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
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60								

DATE DRILLED	4/06/09	BORING NO.	B-63
GROUND ELEVATION	2,060' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, loose to medium dense, silty fine to coarse SAND.
5		X	14					Trace clay.
10		X	29	3.4	111.7			
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG
MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-100

DATE DRILLED	4/06/09	BORING NO.	B-64
GROUND ELEVATION	2,060' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	MAH	LOGGED BY	MAH
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	<u>OLDER ALLUVIUM:</u> Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			21					Damp; dense; caliche in shoe.
10			37	7.6	114.4			Medium dense.
15			22					Damp to moist; dense.
20								

DATE DRILLED	4/06/09	BORING NO.	B-64
GROUND ELEVATION	2,060' ± (MSL)	SHEET	2 OF 2
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY	MAH	LOGGED BY	MAH
REVIEWED BY	RI		

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	44				SM	OLDER ALLUVIUM: (Continued) Brown, damp to moist, dense, silty fine to coarse SAND.
							CL	Brown, moist, very stiff, sandy CLAY.
25		■	19					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-102

DATE DRILLED	4/06/09	BORING NO.	B-65
GROUND ELEVATION	2,060' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)		
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)	DROP	30"
SAMPLED BY MAH	LOGGED BY MAH	REVIEWED BY	RI

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0	X						SM	OLDER ALLUVIUM: Brown, dry, medium dense, silty fine to coarse SAND.
5		X	36	11.1	112.1			Damp to moist.
10		X	16					
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-103

DATE DRILLED	4/08/09
BORING NO.	B-66
GROUND ELEVATION	2,055' ± (MSL)
SHEET	1 OF 1
METHOD OF DRILLING	8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)
DRIVE WEIGHT	140 lbs. (Auto-Trip Hammer)
DROP	30"
SAMPLED BY	BTM
LOGGED BY	BTM
REVIEWED BY	JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry to damp, medium dense, silty fine to coarse SAND.
5		■	21	3.1	117.6			Medium dense.
10		■	27					Dense.
								Total Depth = 11.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09.
								Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-104

DATE DRILLED 4/08/09 BORING NO. B-67

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	<u>OLDER ALLUVIUM:</u> Brown, dry to damp, medium dense, silty fine to coarse SAND.
5			25					Dense.
10			42	4.3	113.7			Damp; medium dense to dense.
15			23					Dense.
20								

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BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-105

DEPTH (feet)	SAMPLES Bulk / Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.

DATE DRILLED 4/08/09 BORING NO. B-67

GROUND ELEVATION 2,060' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY JG

DESCRIPTION/INTERPRETATION

DEPTH (feet)	Bulk	Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	85				SM	OLDER ALLUVIUM: (Continued) Brown, damp, very dense, clayey silty fine to coarse SAND.
25		■	34					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/08/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
30								
35								
40								

Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-106

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							SM	OLDER ALLUVIUM: Brown, dry, loose to medium dense, silty, fine to coarse SAND.
5			7					
10			31	3.1	112.3			Medium dense.
15			16					
20								

DATE DRILLED 4/06/09 BORING NO. B-68

GROUND ELEVATION 2,060' ± (MSL) SHEET 1 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-107

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20		■	48				SM	OLDER ALLUVIUM: (Continued) Brown, damp, dense, silty fine to coarse SAND.
							CL	Brown, damp, very stiff, fine sandy CLAY.
25		◣	19					
								Total Depth = 26.5 feet. Groundwater not encountered during drilling. Backfilled shortly after drilling on 4/06/09. Note: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
30								
35								
40								

DATE DRILLED 4/06/09 BORING NO. B-68

GROUND ELEVATION 2,060' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Diameter Hollow-Stem Auger (Mobile B-61) (Cal Pac Drilling)

DRIVE WEIGHT 140 lbs. (Auto-Trip Hammer) DROP 30"

SAMPLED BY BTM LOGGED BY BTM REVIEWED BY RI

Ninyo & Moore

BORING LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105879004	5/09	A-108

Ninyo & Moore

Explanation of Test Pit, Core, Trench and Hand Auger Log Symbols

PROJECT NO.	DATE

EXCAVATION LOG EXPLANATION SHEET

DEPTH (FEET)	SAMPLES (Bulk / Driven / Sand Cone)	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	
0				SM	FILL:
	Bulk				Bulk sample.
				ML	Dashed line denotes material change.
	Driven				Drive sample.
1	Sand Cone				Sand cone performed.
		(seepage symbol)			Seepage
		(groundwater symbol)			Groundwater encountered during excavation.
					No recovery with drive sampler.
2		(groundwater symbol)			Groundwater encountered after excavation.
					Sample retained by others.
		xx/xx			Shelby tube sample. Distance pushed in inches/length of sample recovered in inches
3					No recovery with Shelby tube sampler.
				SM	ALLUVIUM:
					Solid line denotes unit change.
					Attitude: Strike/Dip
4					b: Bedding
					c: Contact
					j: Joint
					f: Fracture
					F: Fault
					cs: Clay Seam
5					s: Shear
					bss: Basal Slide Surface
					sf: Shear Fracture
					sz: Shear Zone
					sbs: Sheared Bedding Surface
					The total depth line is a solid line that is drawn at the bottom of the excavation log.

SCALE: 1 inch = 1 foot

Testpit explanation.xls

FIGURE

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TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

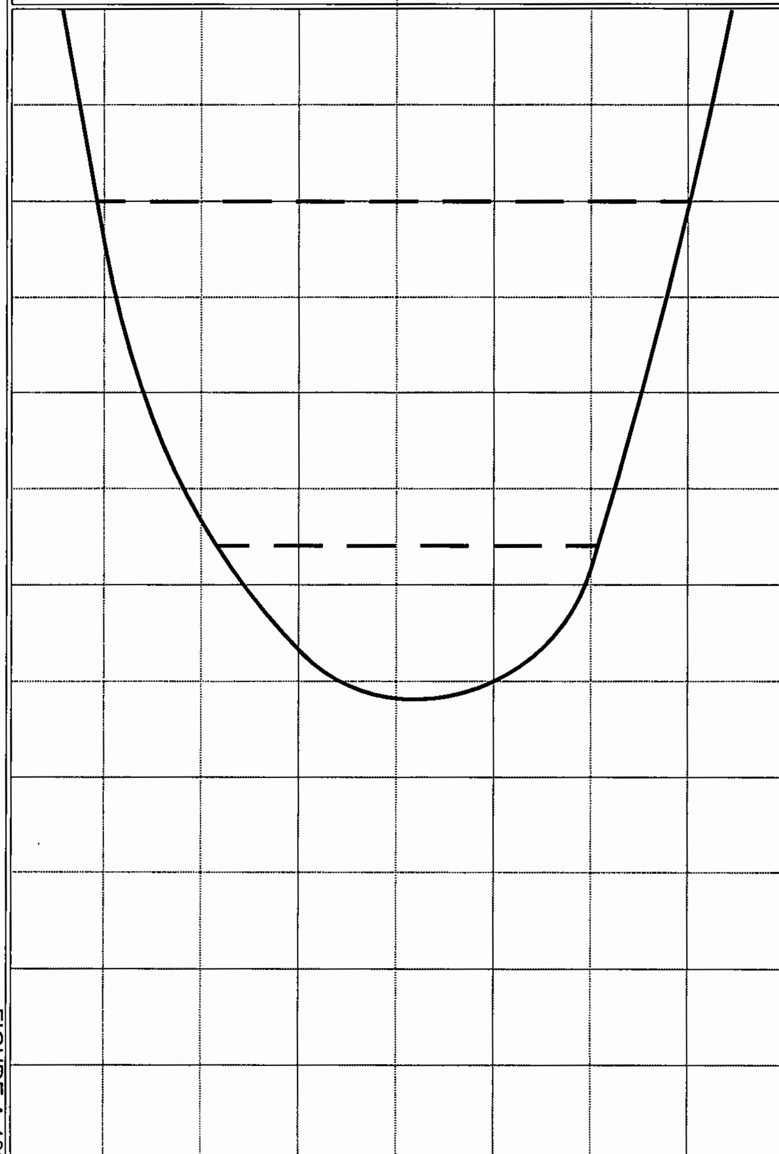
PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 08/30/06 TEST PIT NO. TP-1

GROUND ELEVATION 2042' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						ML	ALLUVIUM: Brown, damp, medium dense, fine to medium sandy SILT; micaceous; scattered roots and roothairs.
2.5	■						Scattered caliche deposits.
						SM	Reddish brown, damp to moist, medium dense, silty fine to medium SAND; micaceous.
5							Scattered caliche deposits.
7.5	■					SC	Grayish brown, damp to moist, medium dense, clayey fine to medium SAND.
							Scattered caliche deposits,
10							Total Depth = 9 feet. Groundwater not encountered. Backfilled on 08/30/06.
12.5							
15							

SCALE = 1 in./2.5 ft.

FIGURE A-109

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

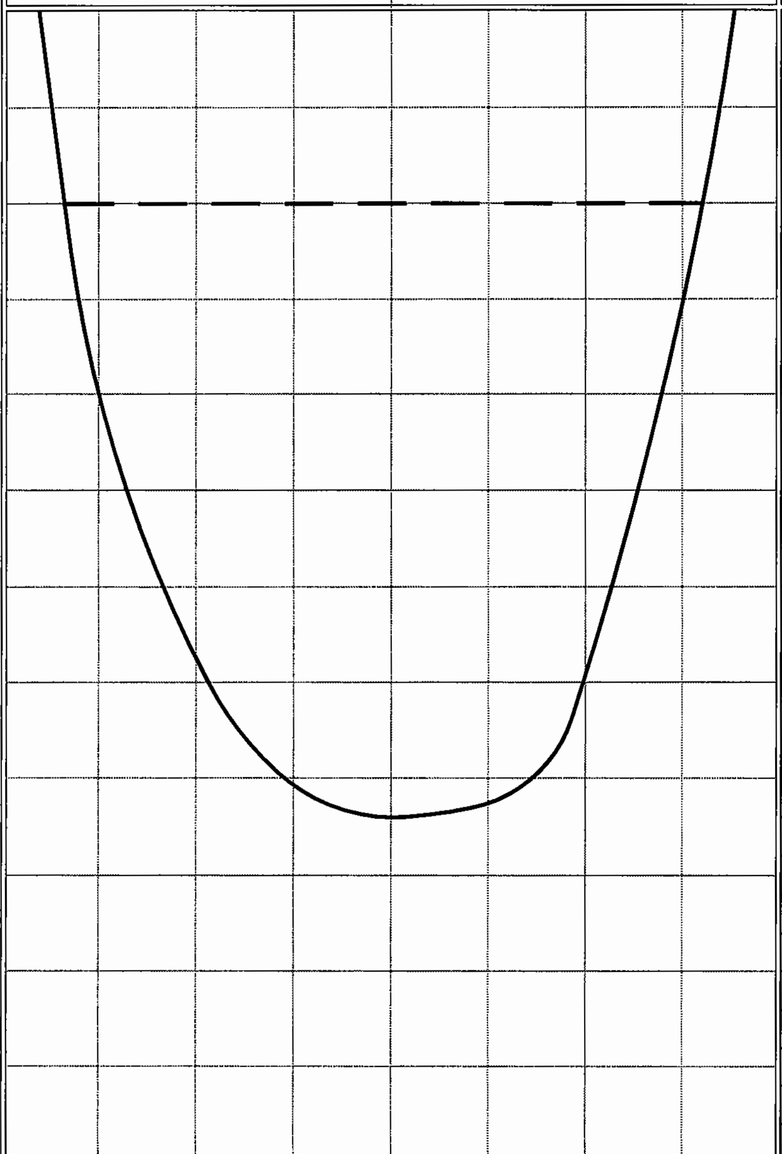
PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 08/30/06 TEST PIT NO. TP-2

GROUND ELEVATION 2029' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map



DEPTH (FEET)	SAMPLES (Bulk / Driven / Sand Cone)	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	Bulk			SM	ALLUVIUM: Brown, damp, medium dense, fine to medium silty SAND.
2.5				SC	Reddish brown, damp to moist, medium dense, clayey fine to coarse SAND.
7.5					Moist to wet.
10	Bulk				Strongly caliche-cemented layer.
10.5					Total Depth = 10.5 feet. Groundwater not encountered. Backfilled on 08/30/06.
12.5					
15					

SCALE = 1 in./2.5 ft.

FIGURE A-110

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

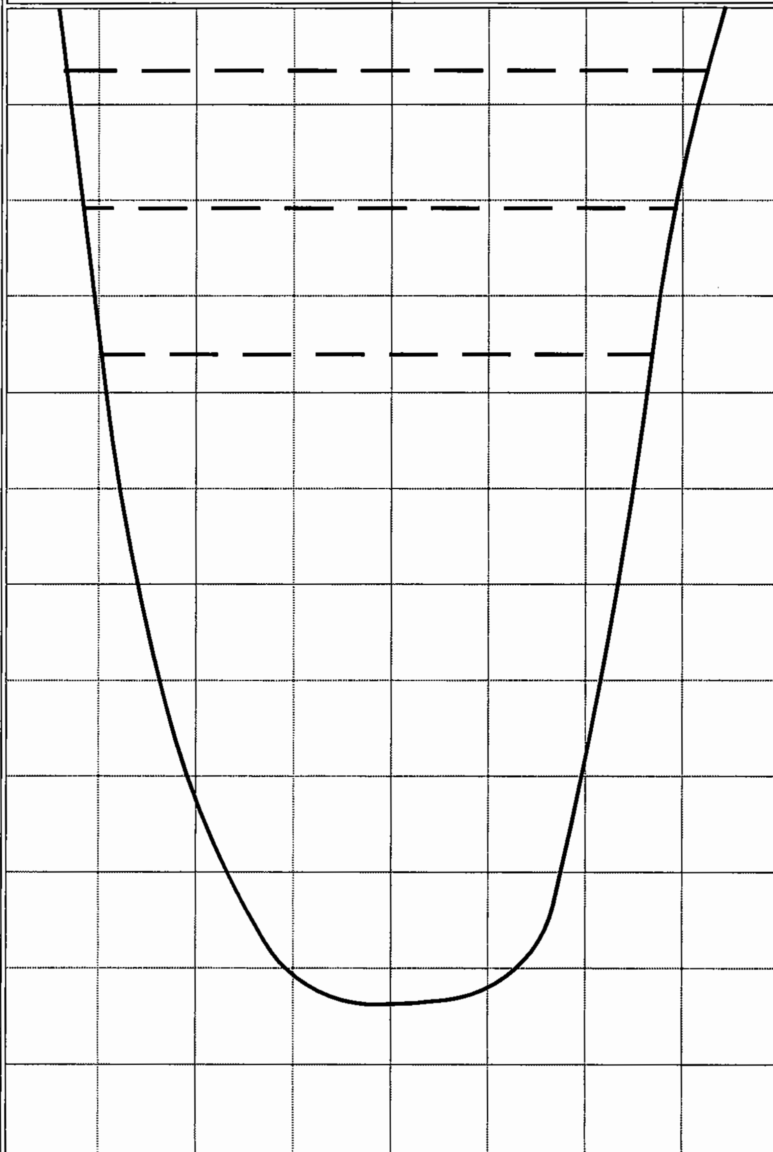
PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 08/30/06 TEST PIT NO. TP-3

GROUND ELEVATION 2022' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map



DEPTH (FEET)	SAMPLES (Bulk / Driven / Sand Cone)	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0				ML	LAKE DEPOSITS: Light brown, damp, medium dense SILT.
	Bulk			CL	Brown, damp to moist, soft CLAY.
2.5		▽ (groundwater)		SP	Brown, wet, loose, fine to coarse SAND. (Caving in upper 4')
5				CL+SP	Brown, saturated, soft CLAY, interbedded with brown, loose, fine to coarse SAND.
10					Soft to firm CLAY interbedded with medium dense SAND.
12.5					Total Depth = 13 feet. Groundwater encountered at approximately 4 feet. Backfilled on 08/30/06.
15					

SCALE = 1 in./2.5 ft.

FIGURE A-111

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE
105879004	5/09

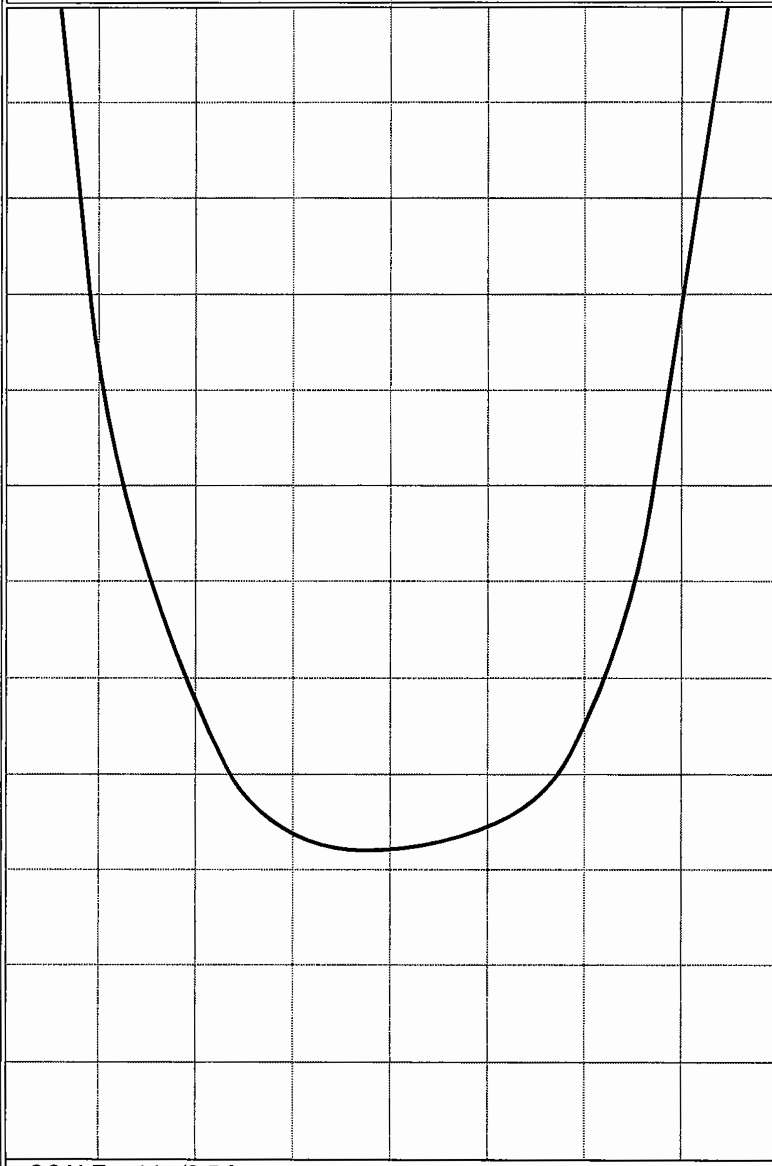
DATE EXCAVATED 06/07/06 TEST PIT NO. TP-4

GROUND ELEVATION 2062' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map

DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SM	ALLUVIUM: Reddish brown, damp, medium dense, silty fine to coarse SAND; few scattered strongly cemented (concreted) zones.
2.5	■ (approx. 2–4 ft)						
5							
7.5	■ (approx. 8–10 ft)						Light grayish brown, medium dense to dense; scattered caliche deposits; scattered strongly concreted zones with some grayish brown clay.
10							
12.5							Total Depth = 11 feet. Groundwater not encountered. Backfilled on 06/07/06.
15							



SCALE = 1 in./2.5 ft.

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

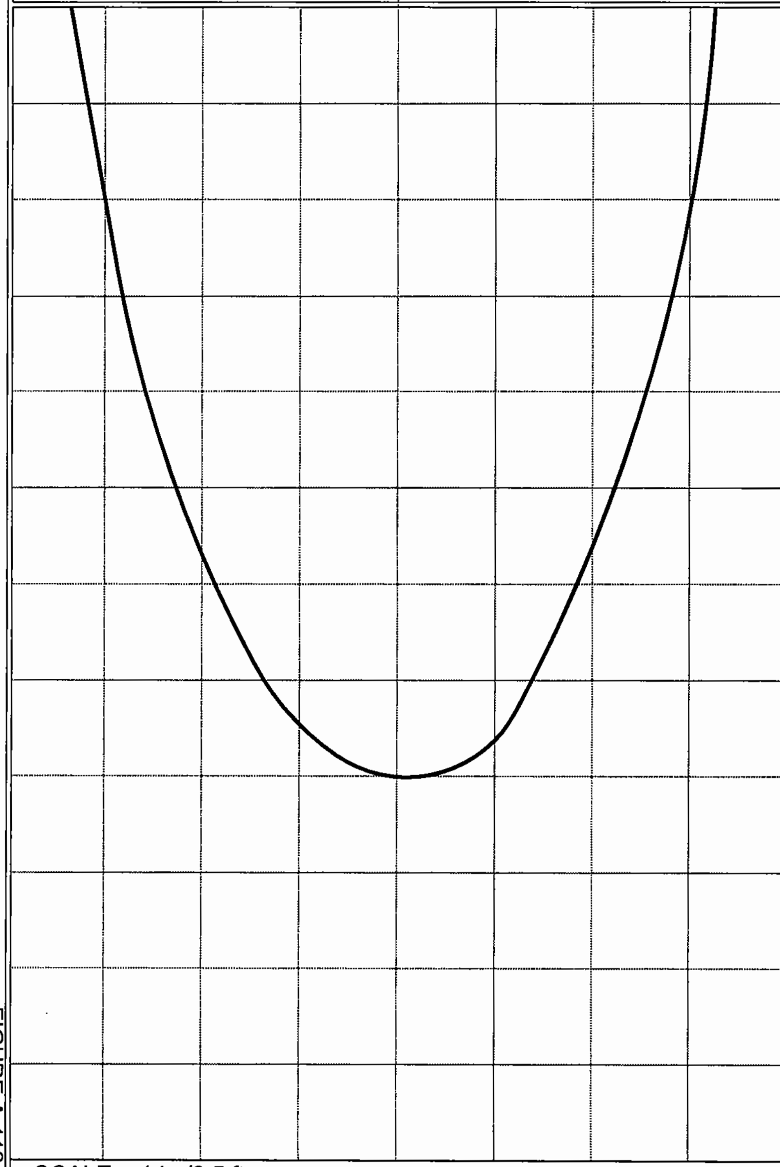
PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 06/07/06 TEST PIT NO. TP-5

GROUND ELEVATION 2028' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SM	ALLUVIUM: Reddish brown, damp, medium dense, silty fine to medium SAND.
2.5							Damp to moist; fine to coarse sand; trace of clay; few strongly cemented (concreted) zones.
5							Moist to wet.
7.5	■ (8–10)			▽ (9)			
10							Saturated.
							Total Depth = 10 feet. Groundwater encountered at approximately 9 feet. Backfilled on 06/07/06.
12.5							
15							

SCALE = 1 in./2.5 ft.

FIGURE A-113

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 06/07/06 TEST PIT NO. TP-6

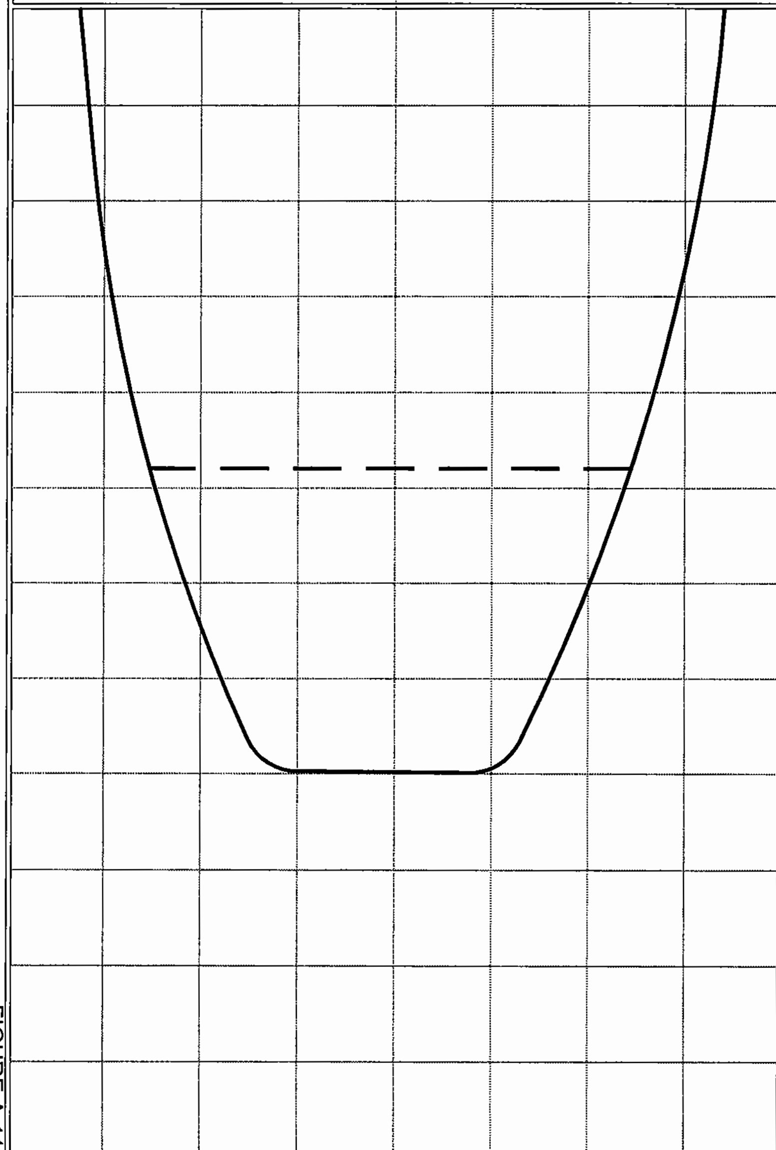
GROUND ELEVATION 2074' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map

DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0–6	Bulk sample (approx. 1–3 ft)					SW-SM	ALLUVIUM: Reddish brown, loose to medium dense, silty, gravelly, well graded SAND; with silt; trace gravel; few strongly cemented (concreted) zones.
6–10	Bulk sample (approx. 8–10 ft)					SM	Reddish brown, damp, medium dense to dense, silty fine to coarse SAND; abundant strongly concreted zones, very difficult to excavate.
10							Total Depth = 10 feet. Groundwater not encountered. Backfilled on 06/07/06.

Depth scale: 0, 2.5, 5, 7.5, 10, 12.5, 15



SCALE = 1 in./2.5 ft.

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 06/07/06 TEST PIT NO. TP-7

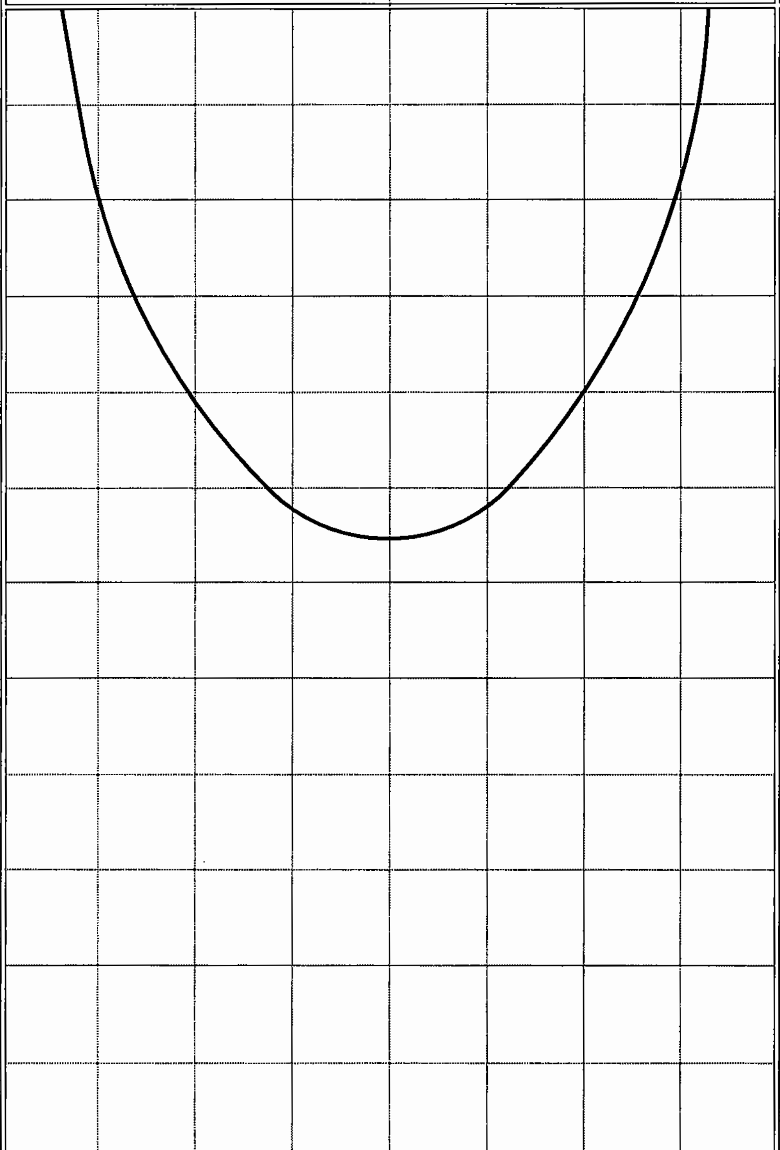
GROUND ELEVATION 2090' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map

DEPTH (FEET)	SAMPLES Bulk	SAMPLES Driven	SAMPLES Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SM	ALLUVIUM: Reddish brown, damp, medium dense, silty, gravelly, fine to coarse SAND; few strongly cemented (concreted) zones.
							Dark brown; trace of clay; scattered caliche deposits; scattered strongly cemented zones.
							Total Depth = 7 feet. Groundwater not encountered. Backfilled on 06/07/06.

Depth scale: 0, 2.5, 5, 7.5, 10, 12.5, 15



SCALE = 1 in./2.5 ft.

FIGURE A-115

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE
105879004	5/09

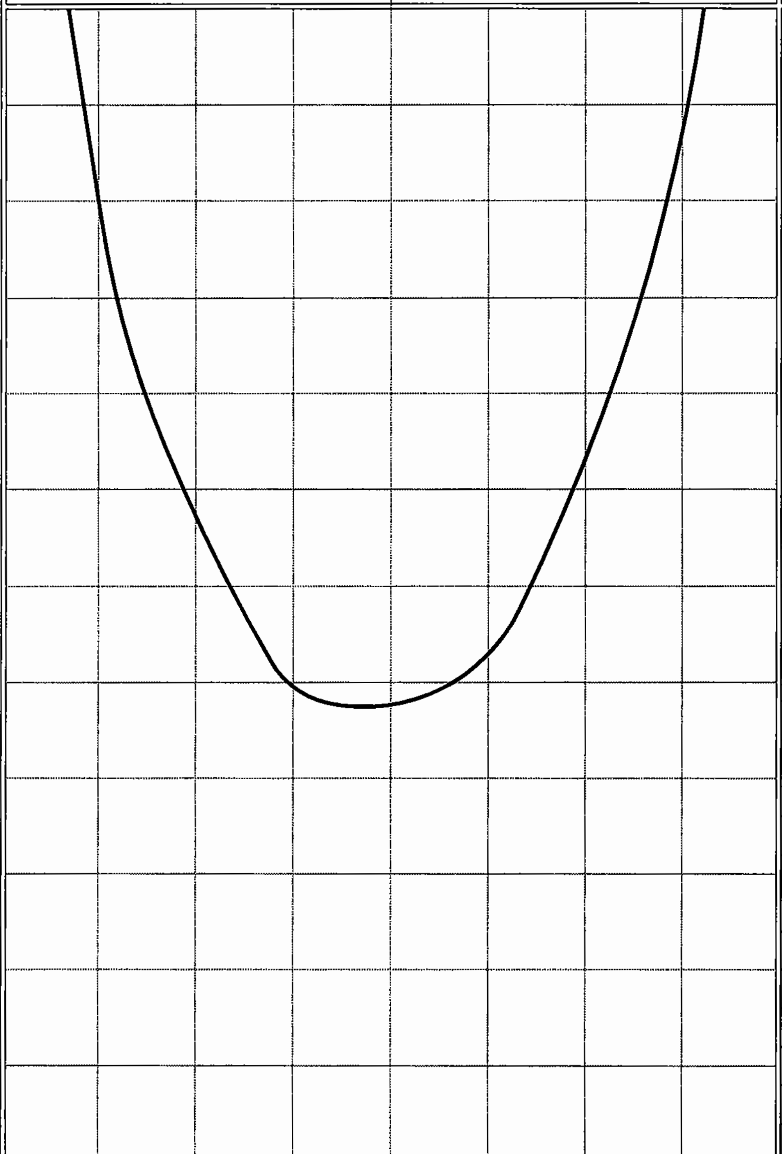
DATE EXCAVATED 06/07/06 TEST PIT NO. TP-8

GROUND ELEVATION 2100' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map

DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SM	ALLUVIUM: Brown, damp, medium dense, silty fine to coarse SAND.
2.5							Reddish brown; scattered caliche deposits; scattered strongly cemented zones (from 2' to 4').
							Damp to moist; cohesionless (caving in).
5	■ (5 to 6.5)						
7.5							
10							Total Depth = 9 feet, caving at 4 feet. Groundwater not encountered. Backfilled on 06/07/06.
12.5							
15							



SCALE = 1 in./2.5 ft.

FIGURE A-116

Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE
105879004	5/09

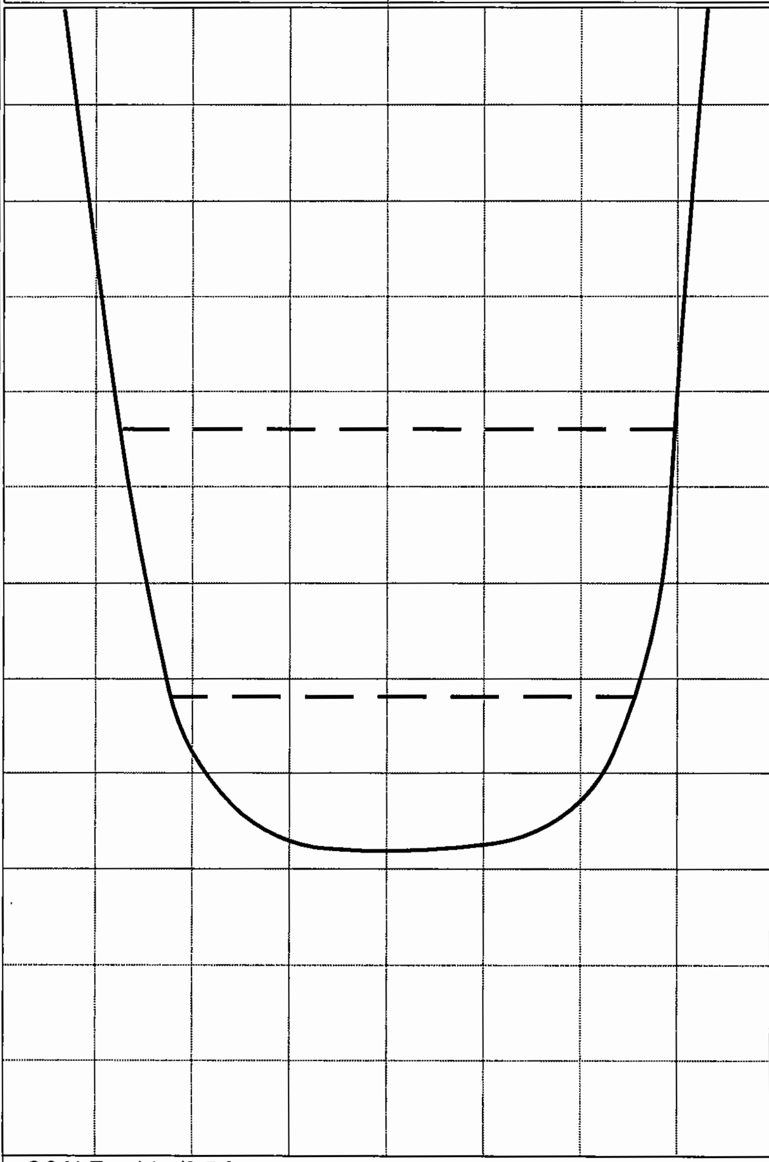
DATE EXCAVATED 06/07/06 TEST PIT NO. TP-9

GROUND ELEVATION 2150' ± (MSL) LOGGED BY CAT

METHOD OF EXCAVATION Rubber Tire Backhoe

LOCATION See Geotechnical Map

DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0	■ (0–2)					SM	<u>ALLUVIUM</u>: Brown, damp, medium dense to dense, silty fine to coarse SAND; scattered caliche deposits; scattered strongly cemented (concreted) zones.
5							Yellowish brown; some fine gravel.
						ML	Brown, damp, medium dense to dense, fine to medium sandy SILT; scattered strongly cemented zones.
10	■ (9–11)					SM	Light grayish brown, damp, medium dense to dense, silty, gravelly, fine to coarse SAND; scattered strongly concreted zones.
							Total Depth = 11 feet. Groundwater not encountered. Backfilled on 06/07/06.



SCALE = 1 in./2.5 ft.

FIGURE A-117

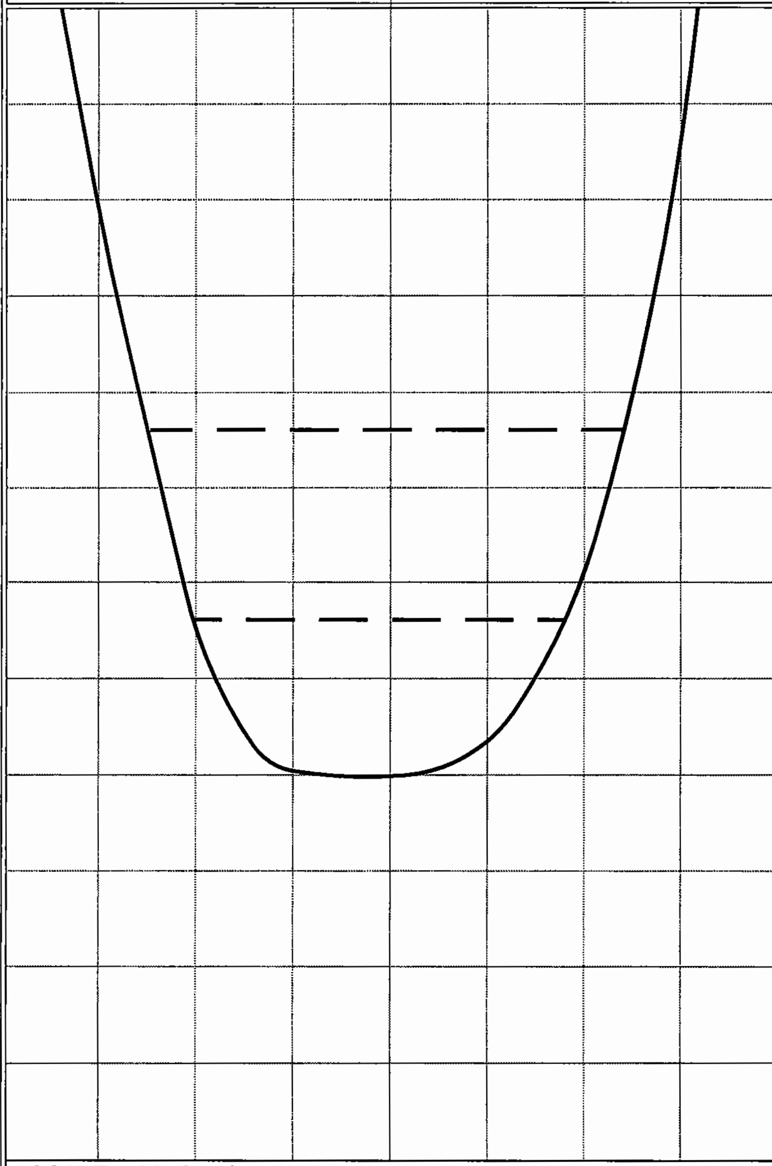
Ninyo & Moore

TEST PIT LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

PROJECT NO.	DATE
105879004	5/09

DATE EXCAVATED 06/07/06 TEST PIT NO. TP-10
GROUND ELEVATION 2150' ± (MSL) LOGGED BY CAT
METHOD OF EXCAVATION Rubber Tire Backhoe
LOCATION See Geotechnical Map



DEPTH (FEET)	SAMPLES: Bulk	SAMPLES: Driven	SAMPLES: Sand Cone	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION
0						SM	ALLUVIUM: Brown, damp, medium dense to dense, silty fine to coarse SAND; scattered caliche deposits; scattered strongly cemented (concreted) zones.
2.5							Fine sand.
							Fine to coarse sand.
5						ML	Brown, damp, medium dense to dense, fine sandy SILT; scattered strongly concreted zones.
7.5	■					SM	Light grayish brown, damp, medium dense to dense, silty, gravelly fine to coarse SAND; scattered strongly concreted zones.
10							Total Depth = 10 feet. Groundwater not encountered. Backfilled on 06/07/06.
12.5							
15							

SCALE = 1 in./2.5 ft.

FIGURE A-118

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory excavations in Appendix A.

Gradation Analysis

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-19. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

200 Wash

An evaluation of the percentage of particles passing the No. 200 sieve in a selected soil sample was performed in general accordance with ASTM D 1140. The test results are presented on Figure B-20.

Atterberg Limits

A test was performed on a selected representative fine-grained soil sample to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. The test results were utilized to evaluate the soil classification in accordance with the USCS. The test results and classification is shown on Figure B-21.

Consolidation Tests

Consolidation tests were performed on selected relatively undisturbed soil samples in general accordance with ASTM D 2435. The samples were inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the tests are summarized on Figures B-22 through B-24.

Direct Shear Tests

Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figures B-25 through B-36.

Proctor Density Tests

The maximum dry density and optimum moisture content of a selected representative soil sample was evaluated using the modified Proctor method in general accordance with ASTM D 1557. The test results are summarized on Figure B-37.

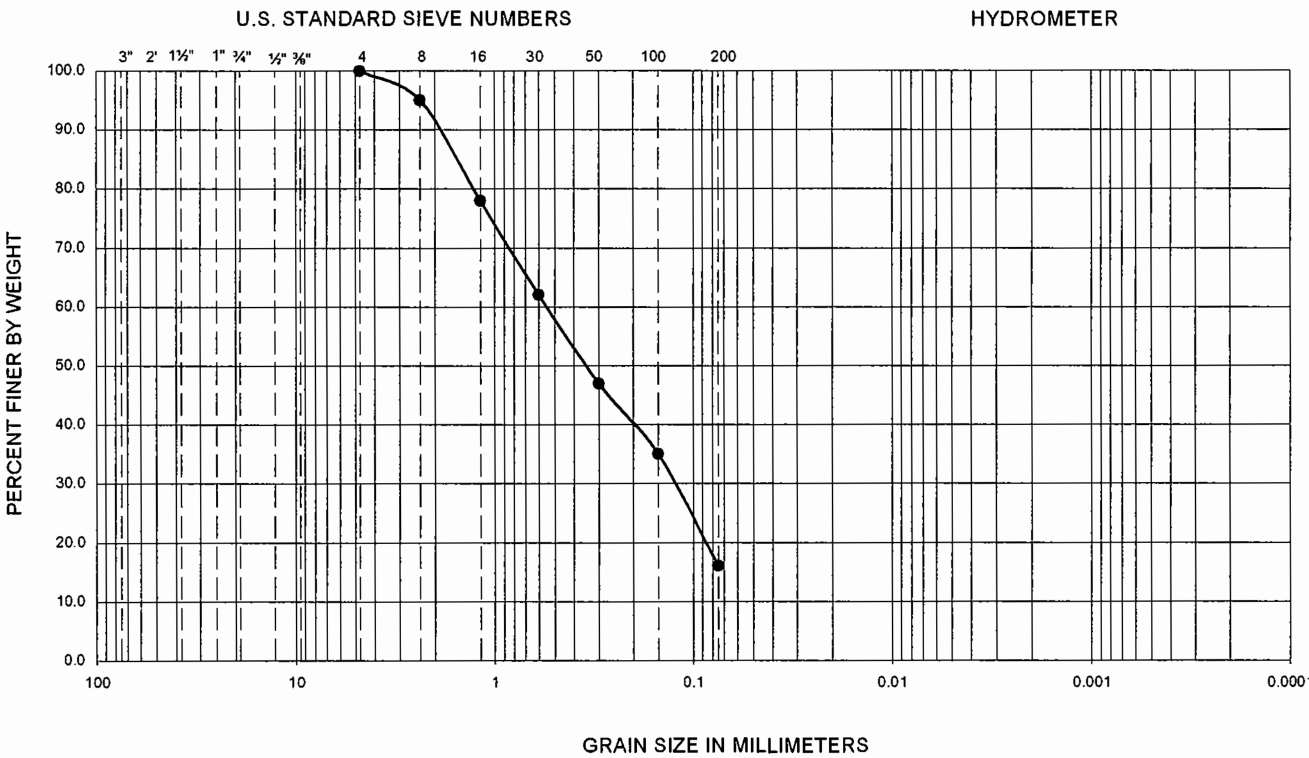
Soil Corrosivity Tests

Soil pH, and resistivity tests were performed on representative samples in general accordance with CT Method 643. The soluble sulfate and chloride content of selected samples were evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-38.

R-Value

The resistance value, or R-value, for site soils was evaluated in general accordance with CT 301. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results. The test results are shown on Figure B-39.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

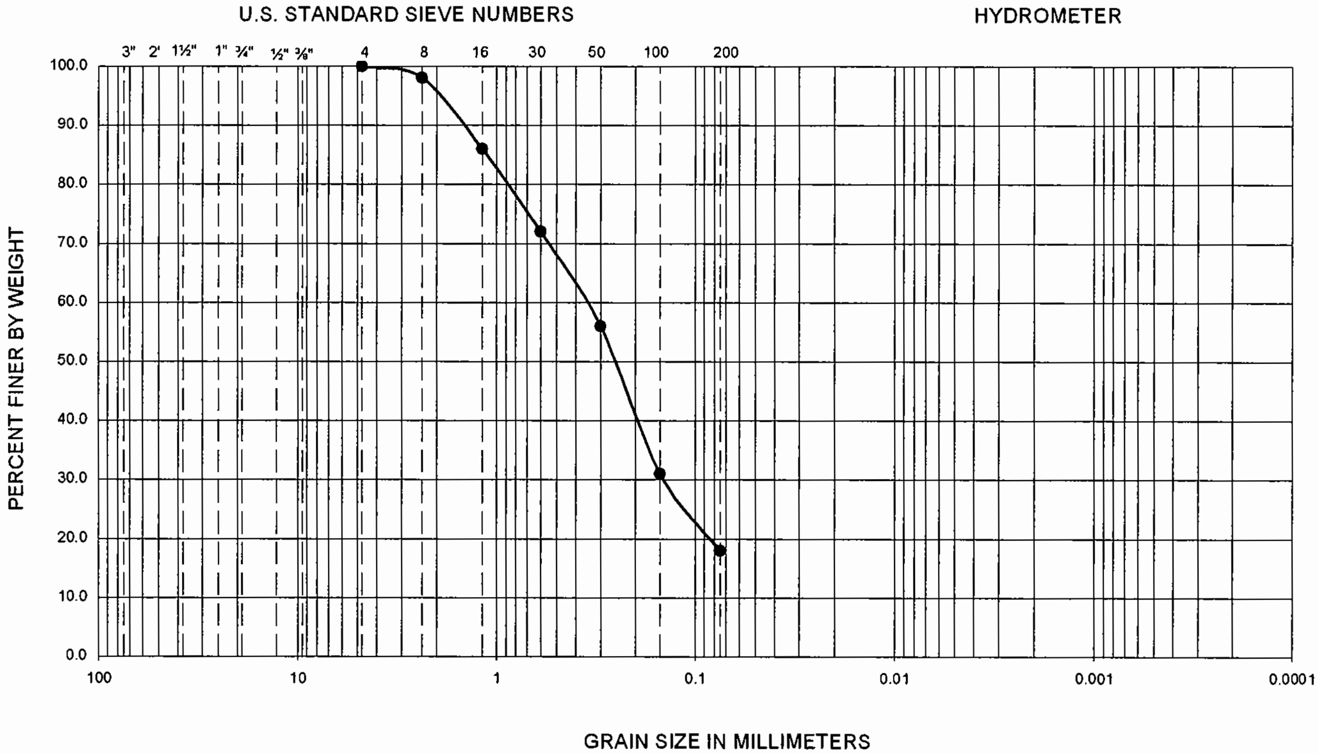


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-8	5.0-6.5	--	--	--	--	--	--	--	--	16	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-1
105879004	5/09		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-8	10.0-11.5	--	--	--	--	--	--	--	--	18	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore

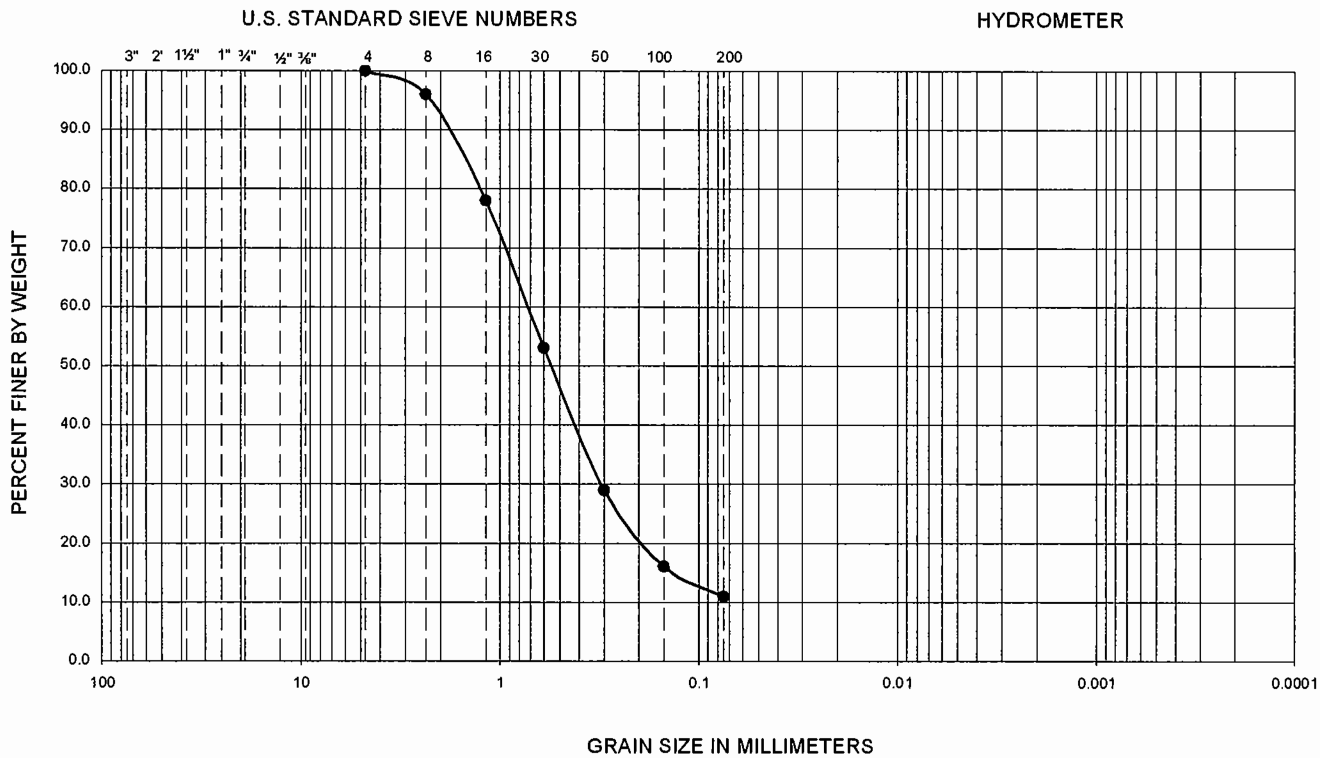
GRADATION TEST RESULTS

FIGURE **B-2**

PROJECT NO.	DATE
105879004	5/09

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



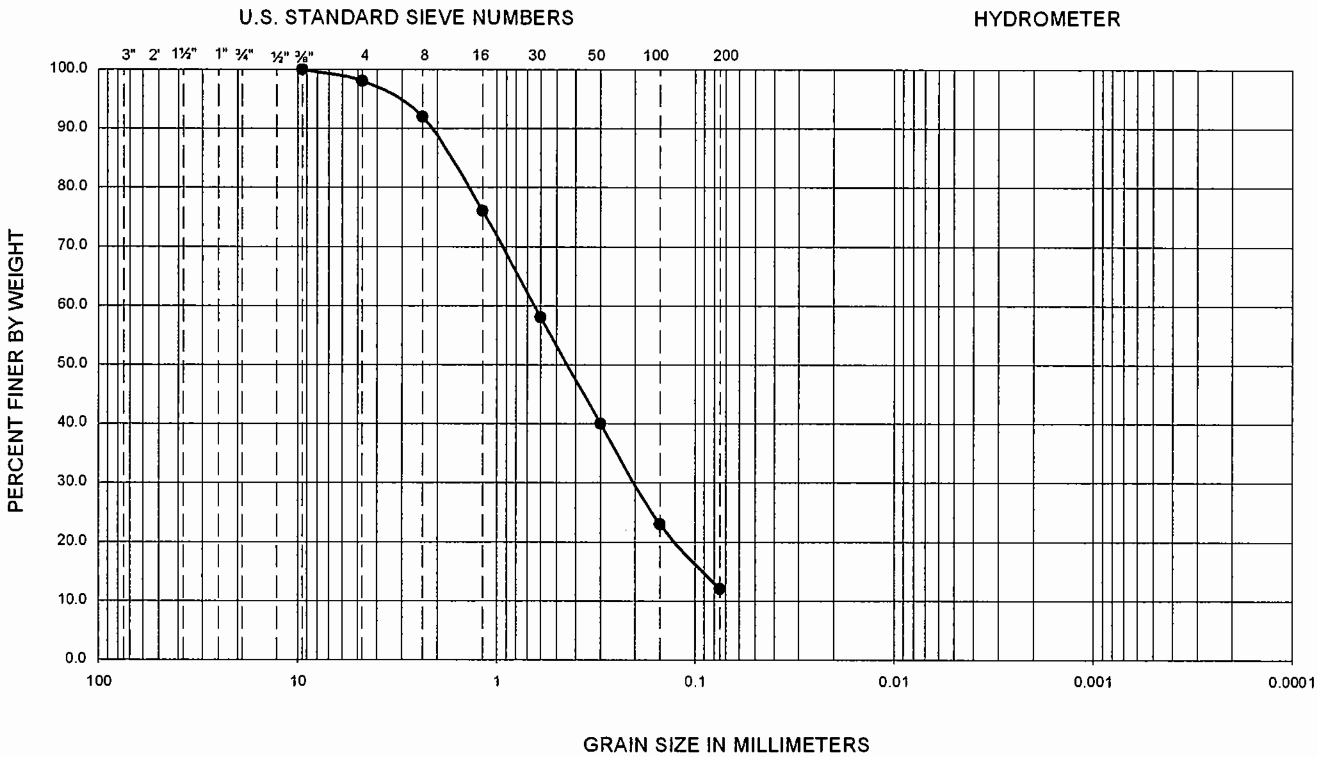
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-19	5.0-6.5	--	--	--	0.06	0.32	0.72	12.0	2.4	11	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-3
105879004 / 5/09		

105879004 SIEVE B-19 @ 5.0-6.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

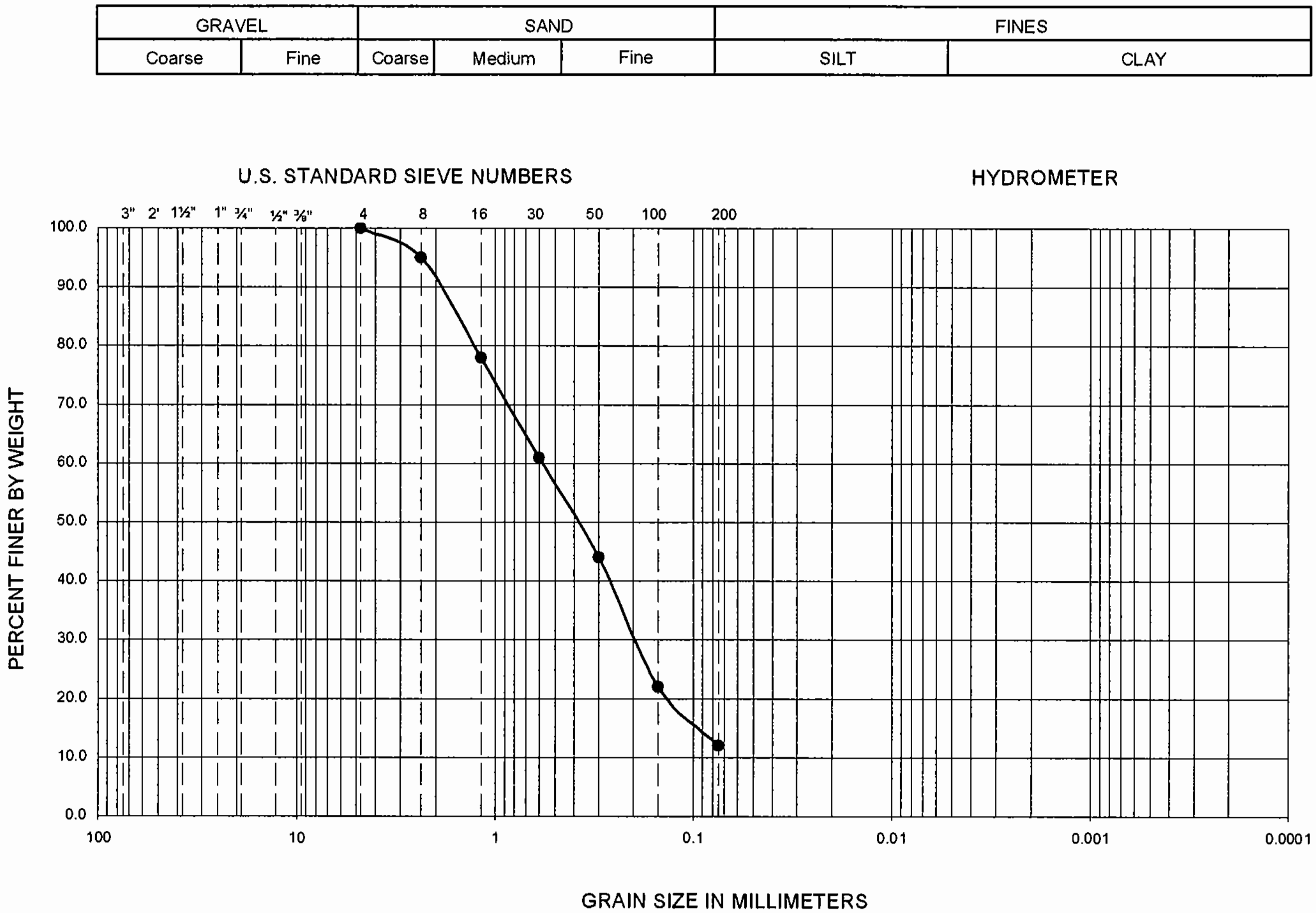


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-22	5.0-6.5	--	--	--	--	--	--	--	--	12.4	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-4
105879004	5/09		

105879004 SIEVE B-22 @ 5.0-6.5.xls



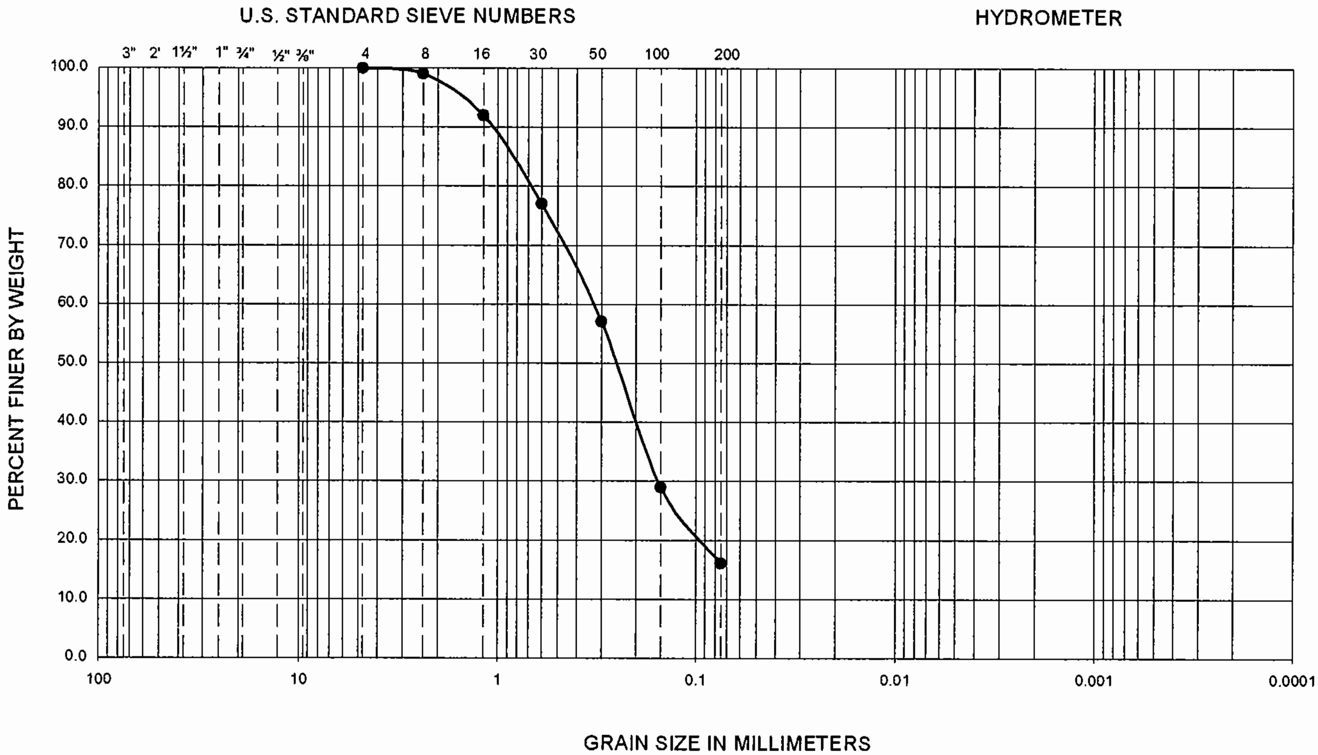
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-22	10.0-11.5	--	--	--	--	--	--	--	--	12.4	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT	B-5
105879004 / 5/09	LOCKHART, CALIFORNIA	

105879004 SIEVE B-22 @ 10.0-11.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

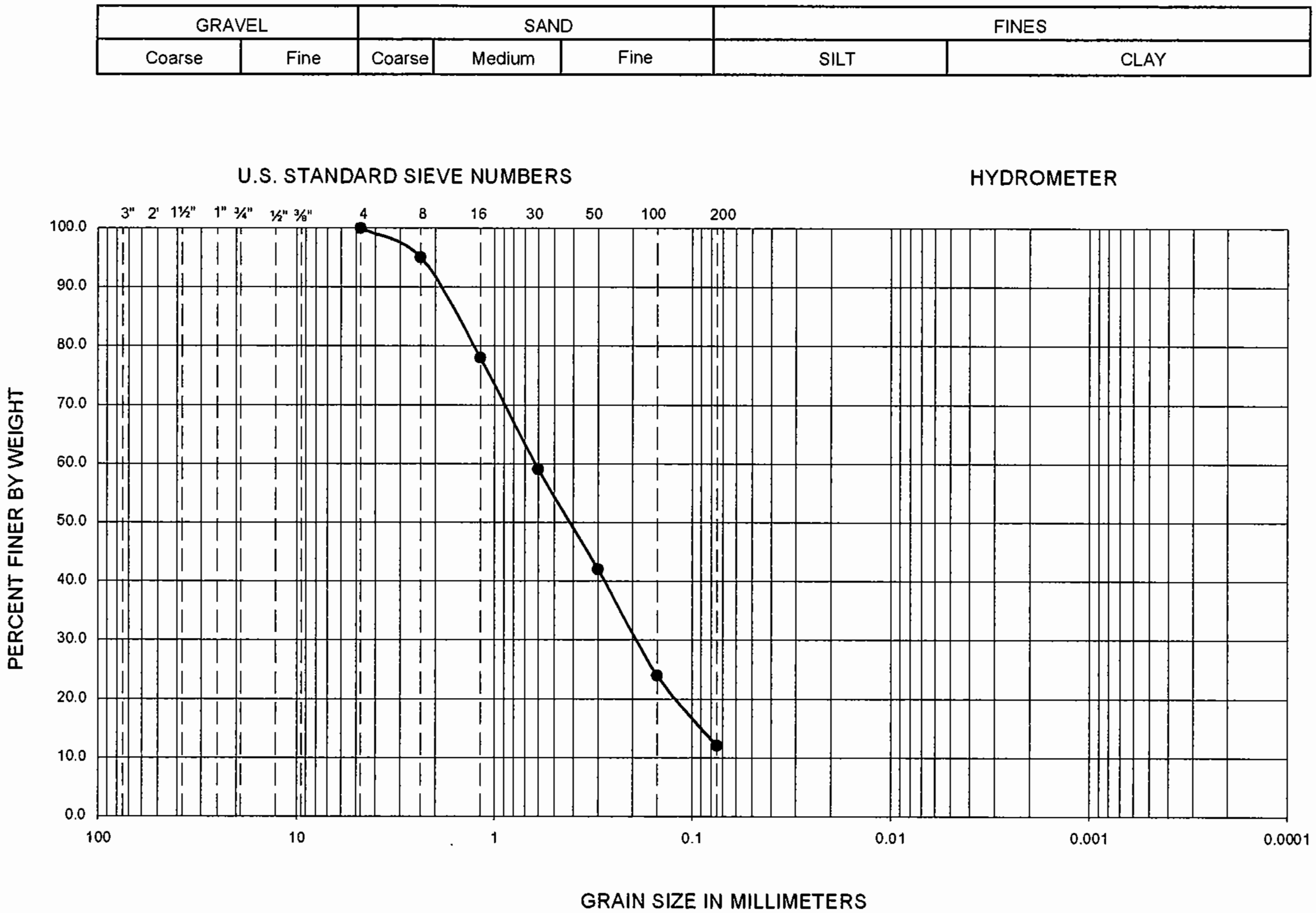


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-33	15.0-16.5	--	--	--	--	--	--	--	--	16	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-6
105879004	5/09		

105879004 SIEVE B-33 @ 15.0-16.5.xls



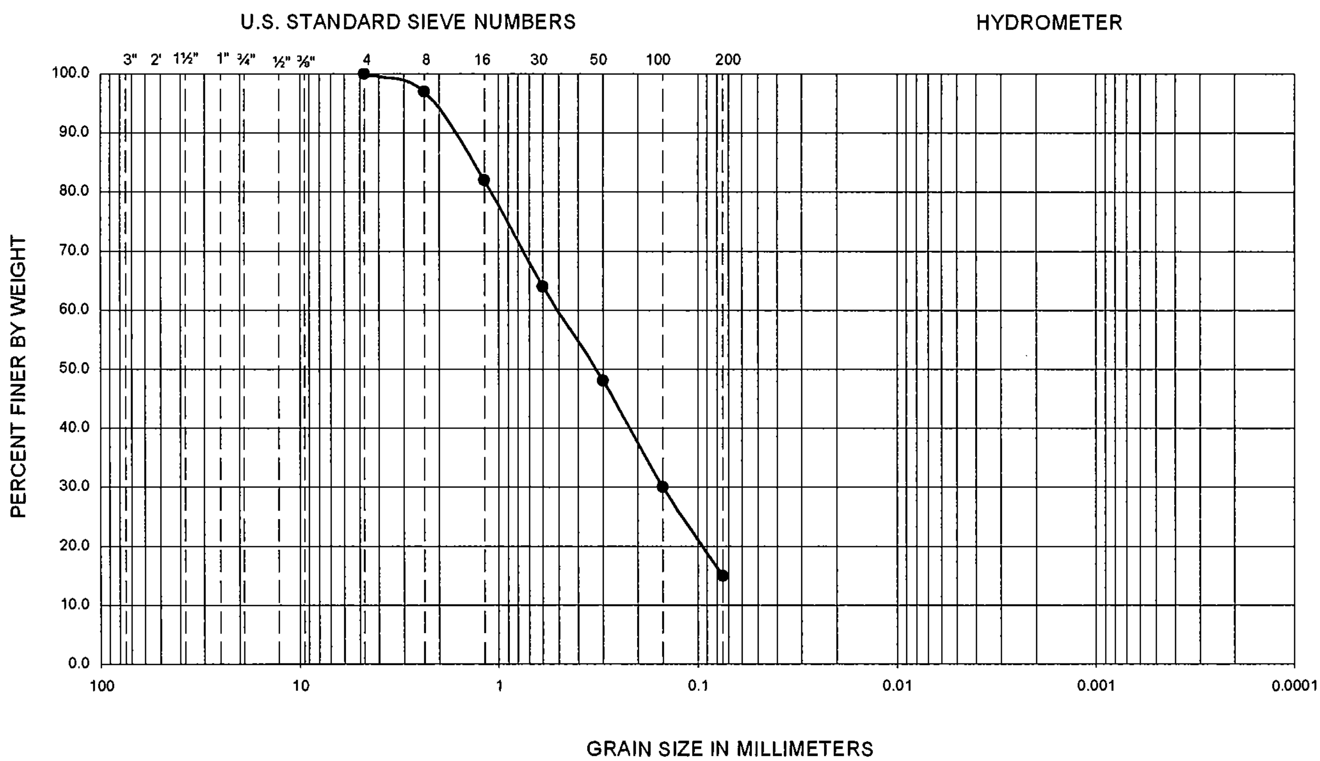
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-36	5.0-6.5	--	--	--	0.07	0.20	0.63	9.0	0.9	11.8	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-7
105879004	5/09		

105879004 SIEVE B-36 @ 5.0-6.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



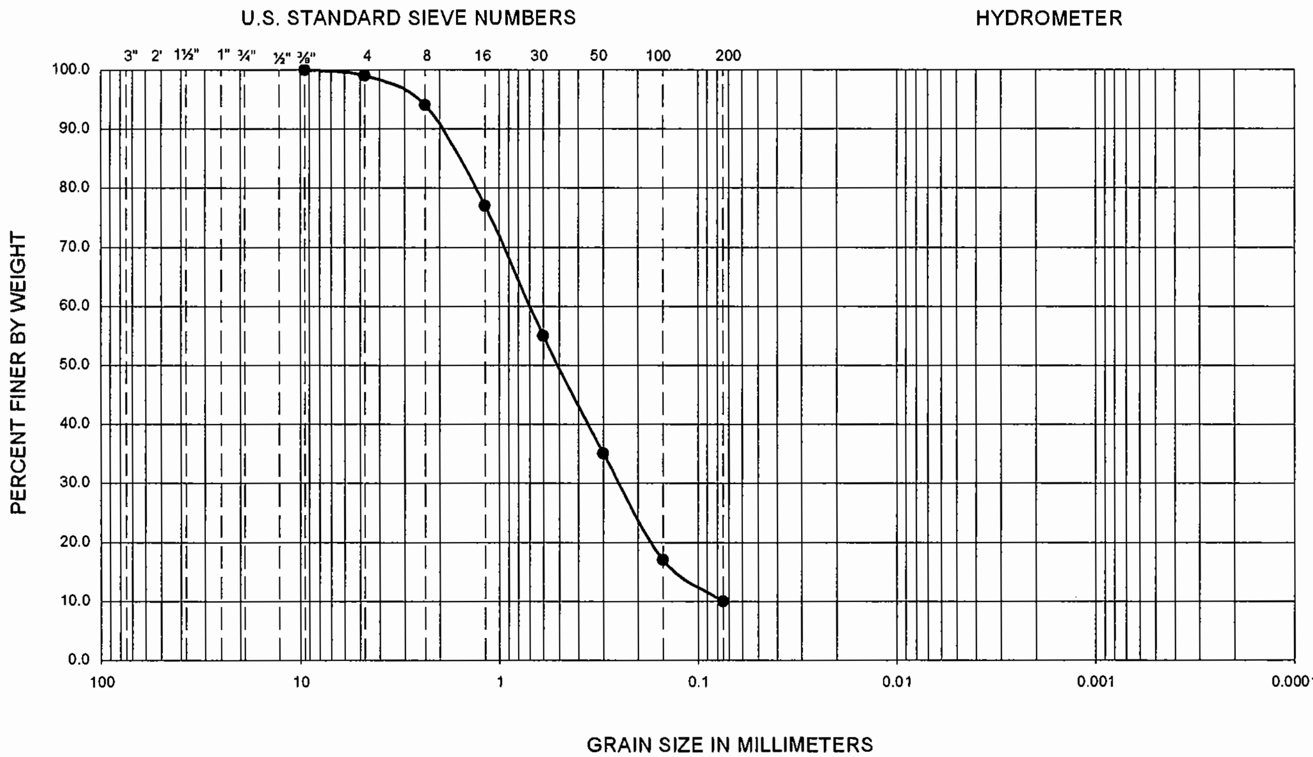
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-40	10.0-11.5	--	--	--	--	--	--	--	--	15	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-8
105879004	5/09		

105879004 SIEVE B-40 @ 10.0-11.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

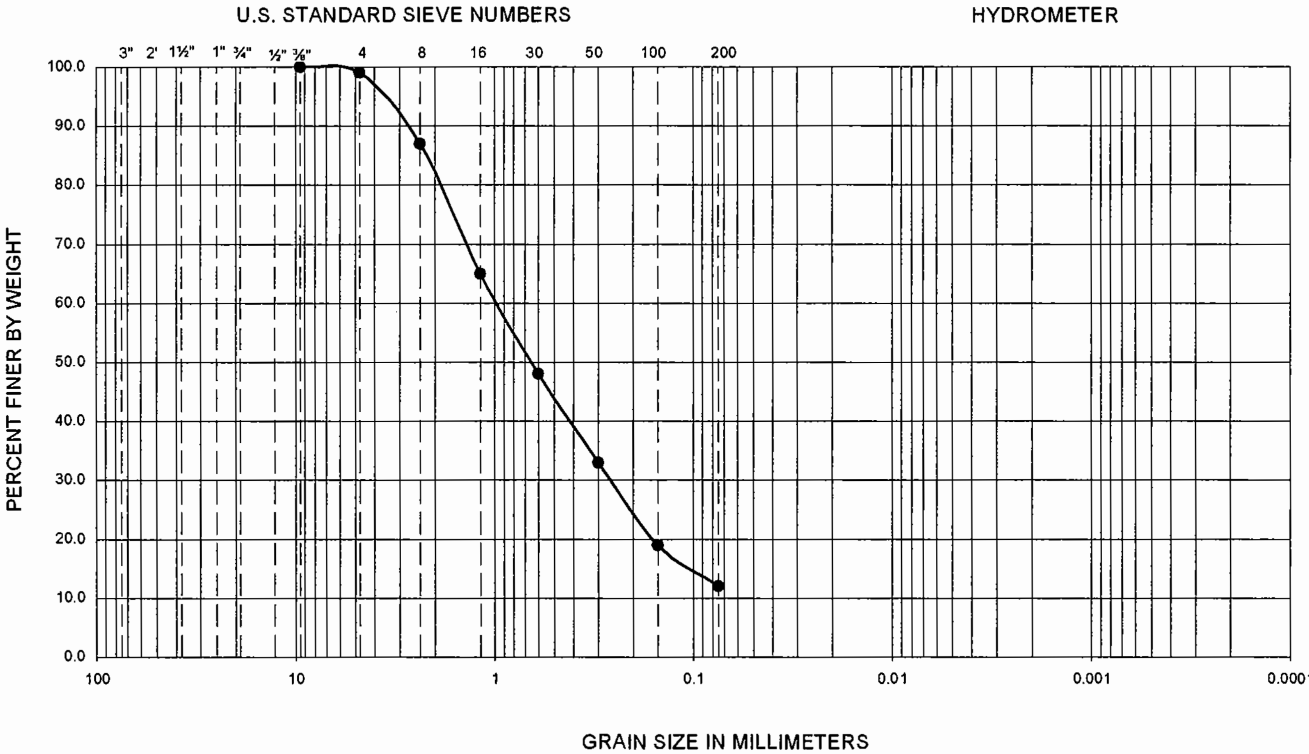


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-41	5.0-6.5	--	--	--	0.07	0.27	0.70	9.5	1.4	10	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-9
105879004	5/09		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

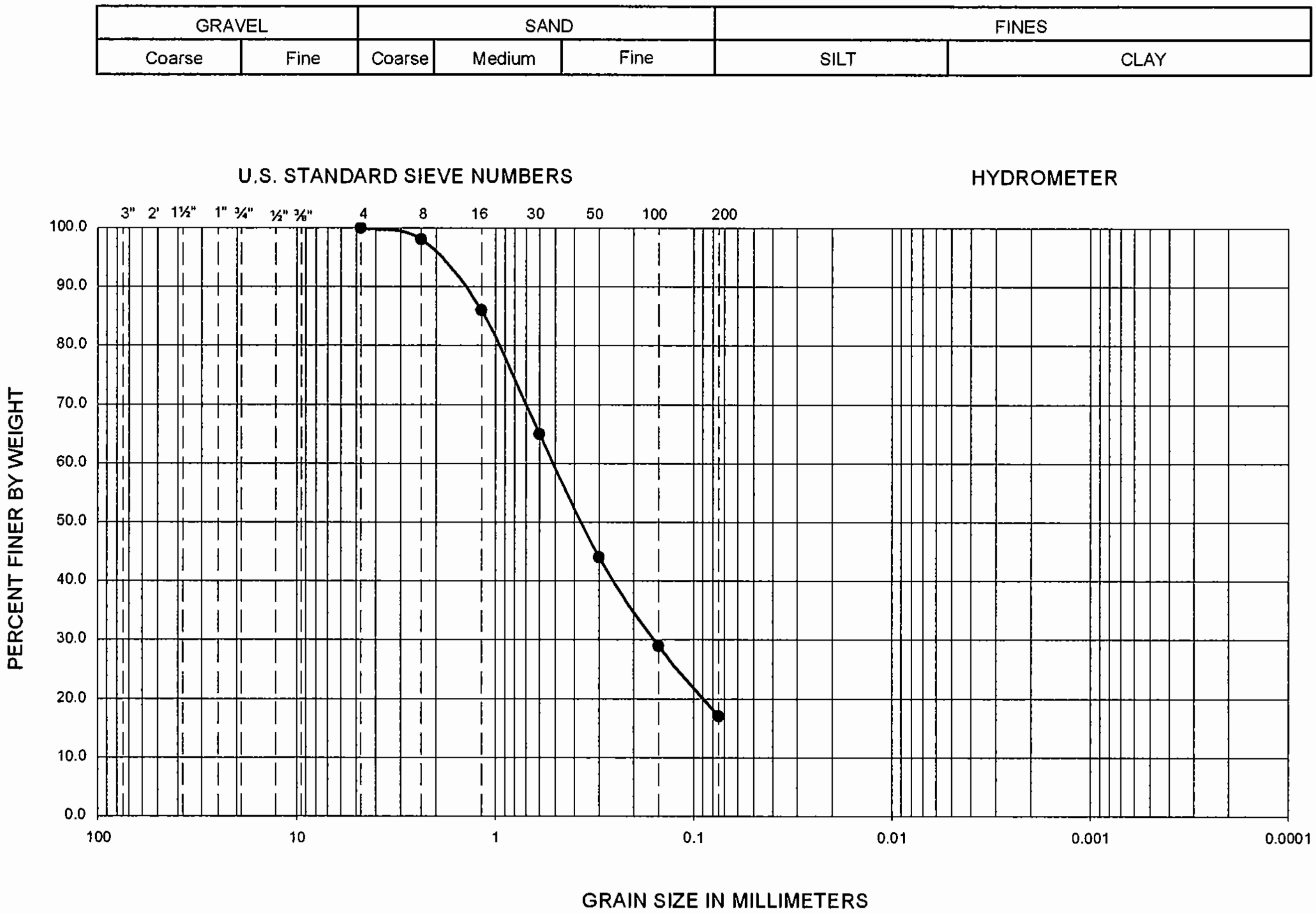


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-42	15.0-16.5	--	--	--	0.06	0.28	1.00	18.2	1.4	11.6	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT	B-10
105879004 / 5/09	LOCKHART, CALIFORNIA	

105879004 SIEVE B-42 @ 15.0-16.5.xls



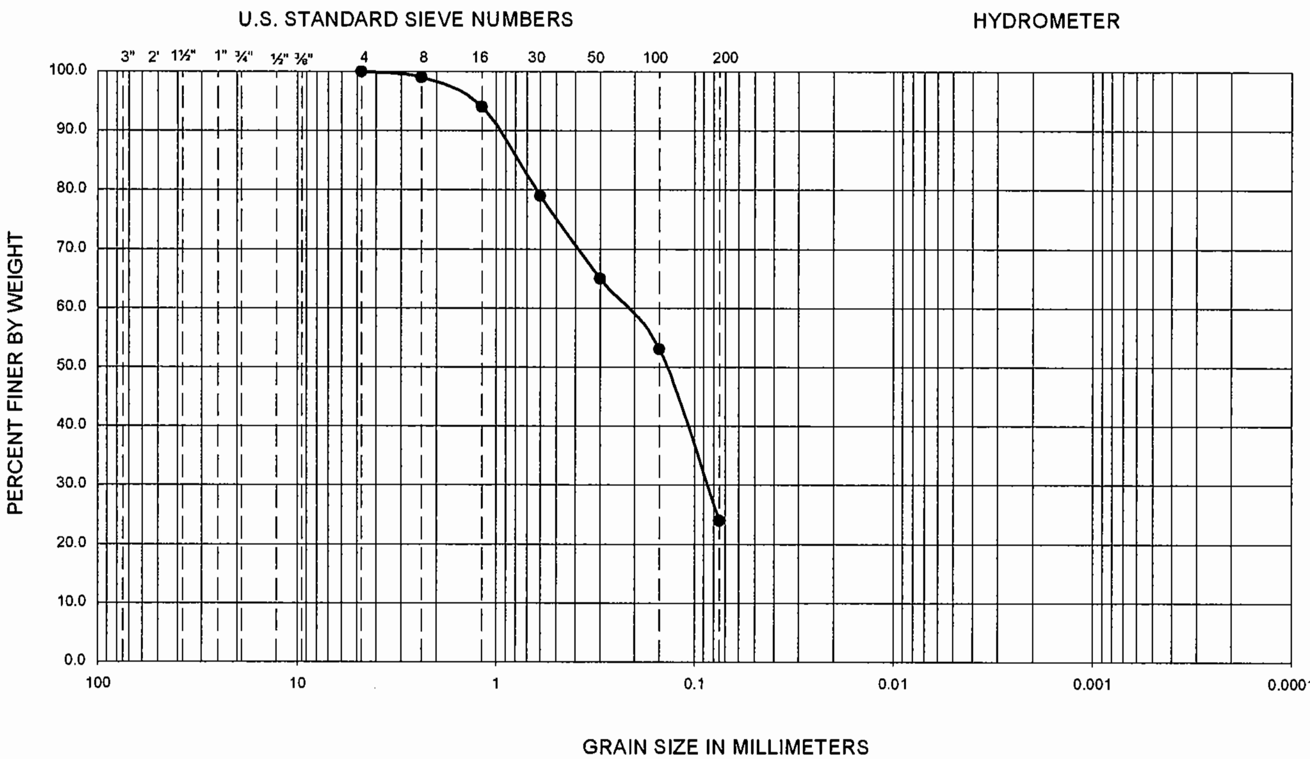
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-44	15.0-16.5	--	--	--	--	--	--	--	--	17	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT	B-11
105879004 / 5/09	LOCKHART, CALIFORNIA	

105879004 SIEVE B-44 @ 15.0-16.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



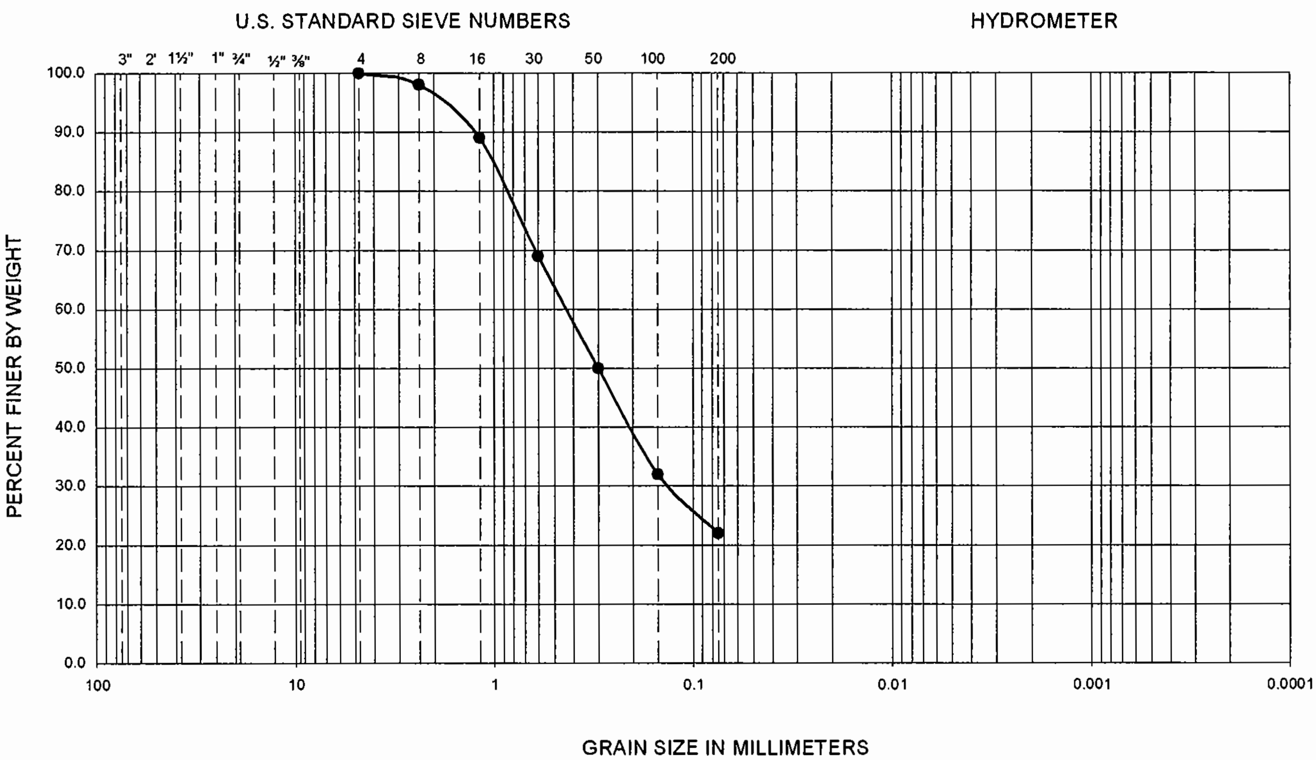
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-46	10.0-11.5	--	--	--	--	--	--	--	--	24	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-12
105879004	5/09		

105879004 SIEVE B-46 @ 10.0-11.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

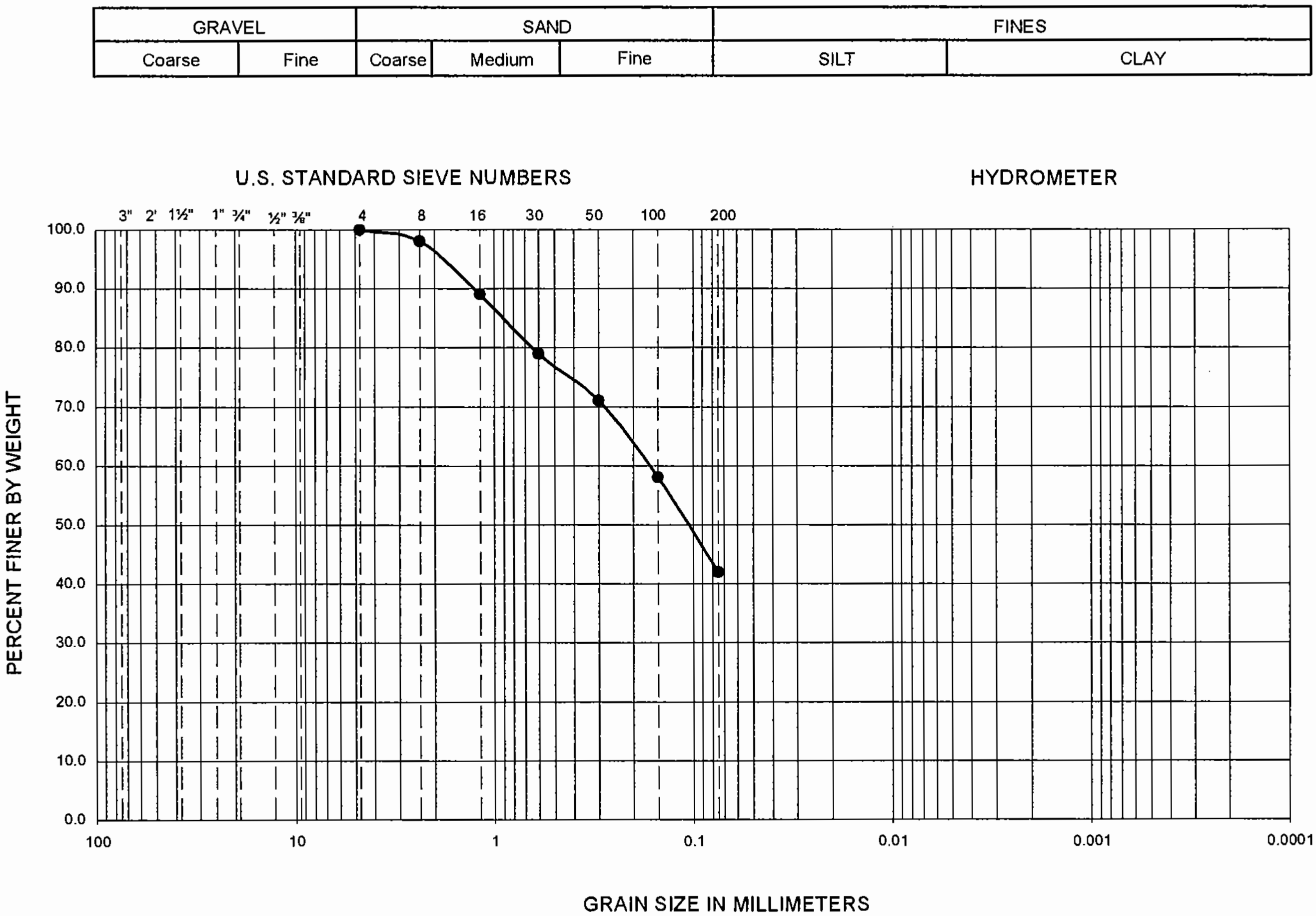


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-49	15.0-16.5	--	--	--	--	--	--	--	--	22	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-13
105879004	5/09		

105879004 SIEVE B-49 @ 15.0-16.5.xls

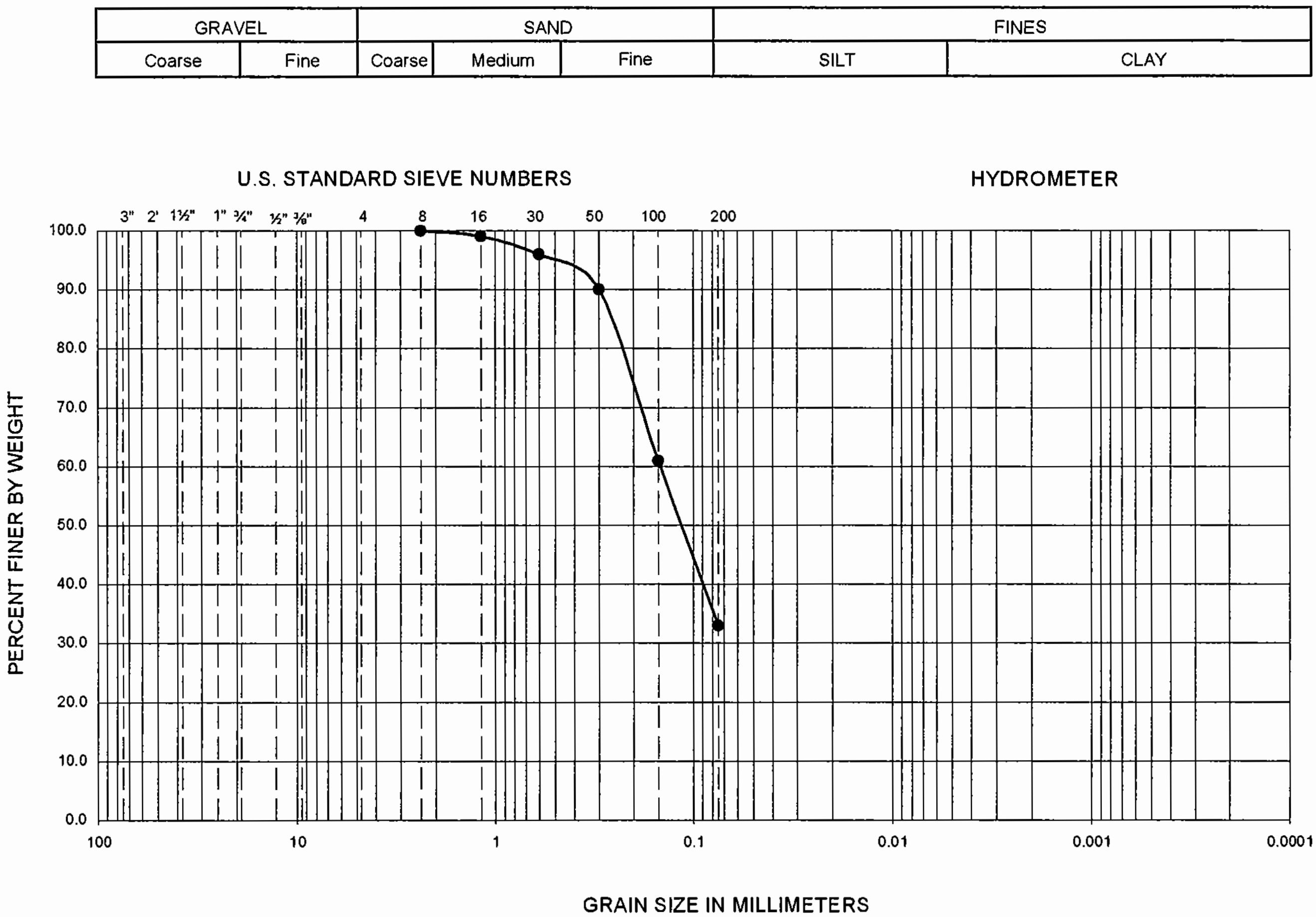


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-62	15.0-16.5	--	--	--	--	--	--	--	--	42	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-14
105879004 / 5/09		

105879004 SIEVE B-62 @ 15.0-16.5.xls



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-62	30.0-31.5	--	--	--	--	--	--	--	--	33	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore

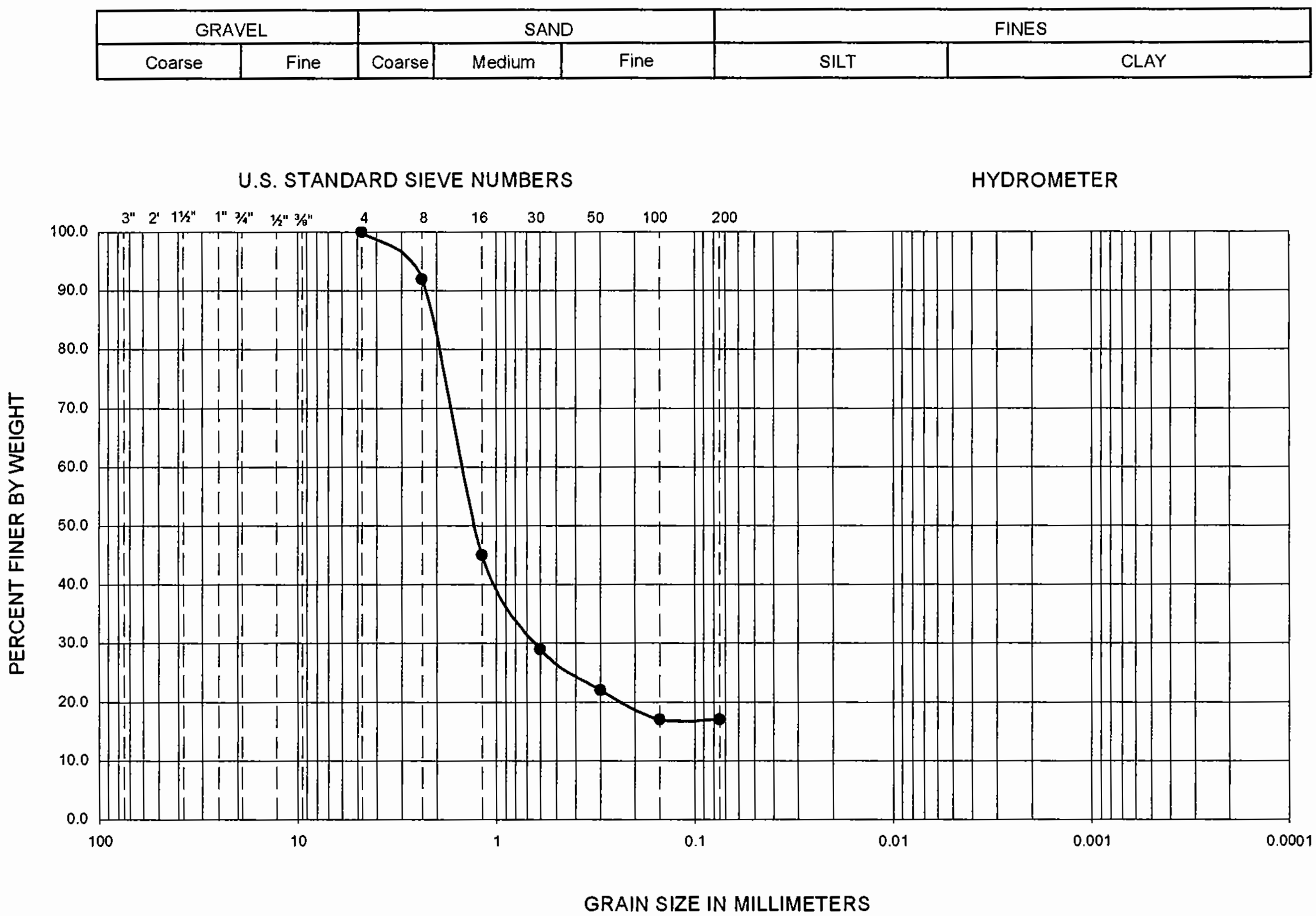
GRADATION TEST RESULTS

FIGURE **B-15**

PROJECT NO.	DATE
105879004	5/09

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

105879004 SIEVE B-62 @ 30.0-31.5.xls

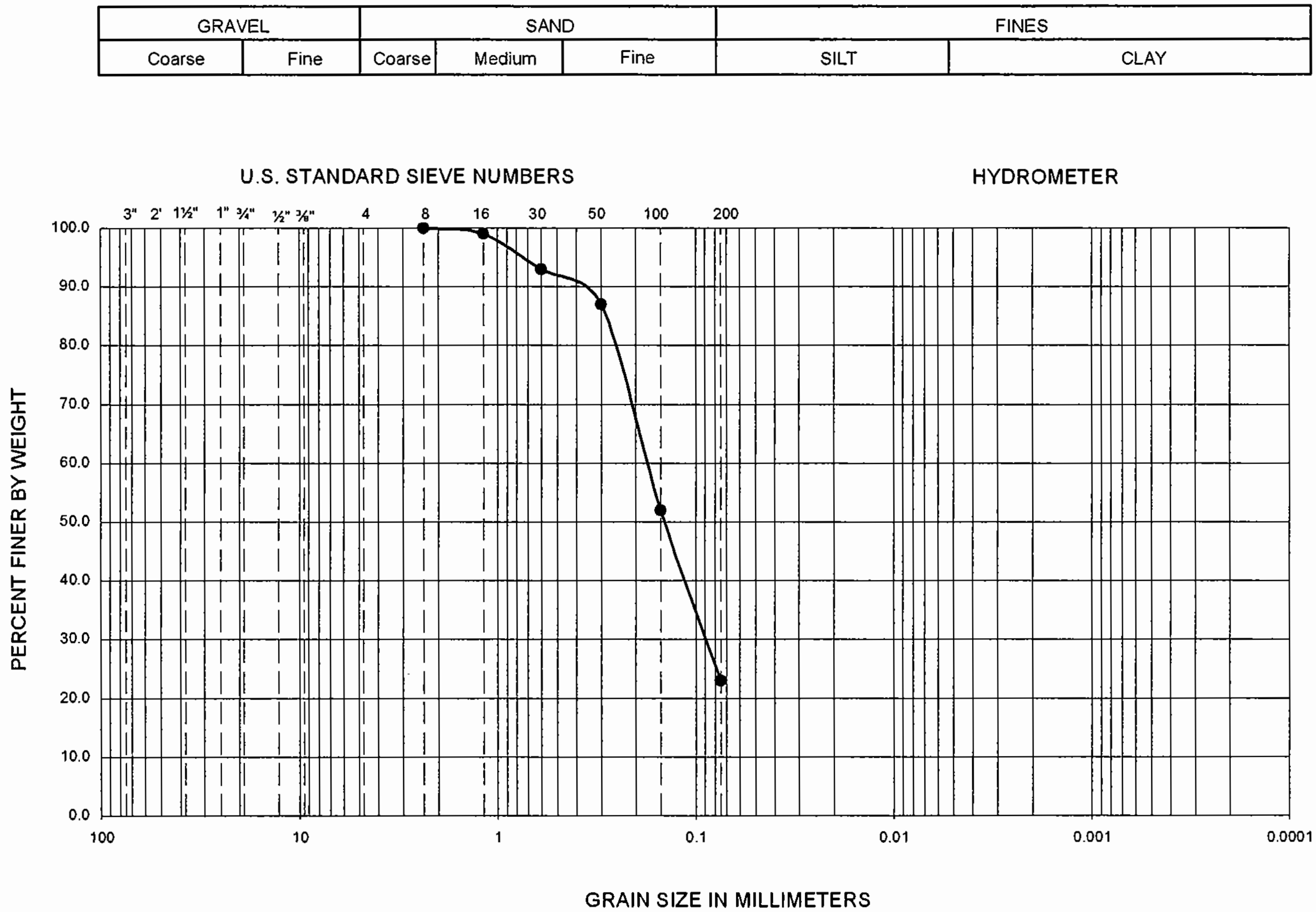


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-62	35.0-36.5	--	--	--	--	--	--	--	--	17	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-16
105879004	5/09		

105879004 SIEVE B-62 @ 35.0-36.5.xls

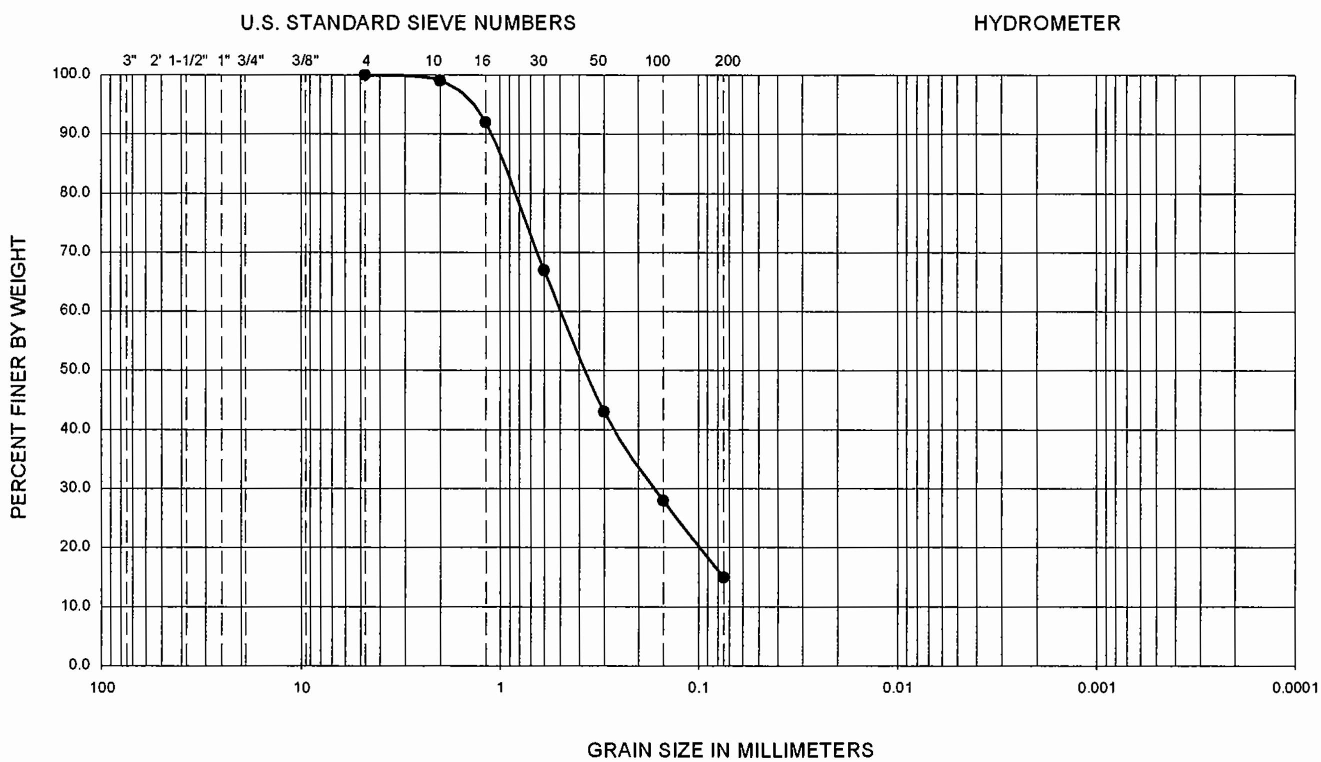


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-62	45.0-46.5	--	--	--	--	--	--	--	--	23	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. / DATE		
105879004 / 5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-17

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

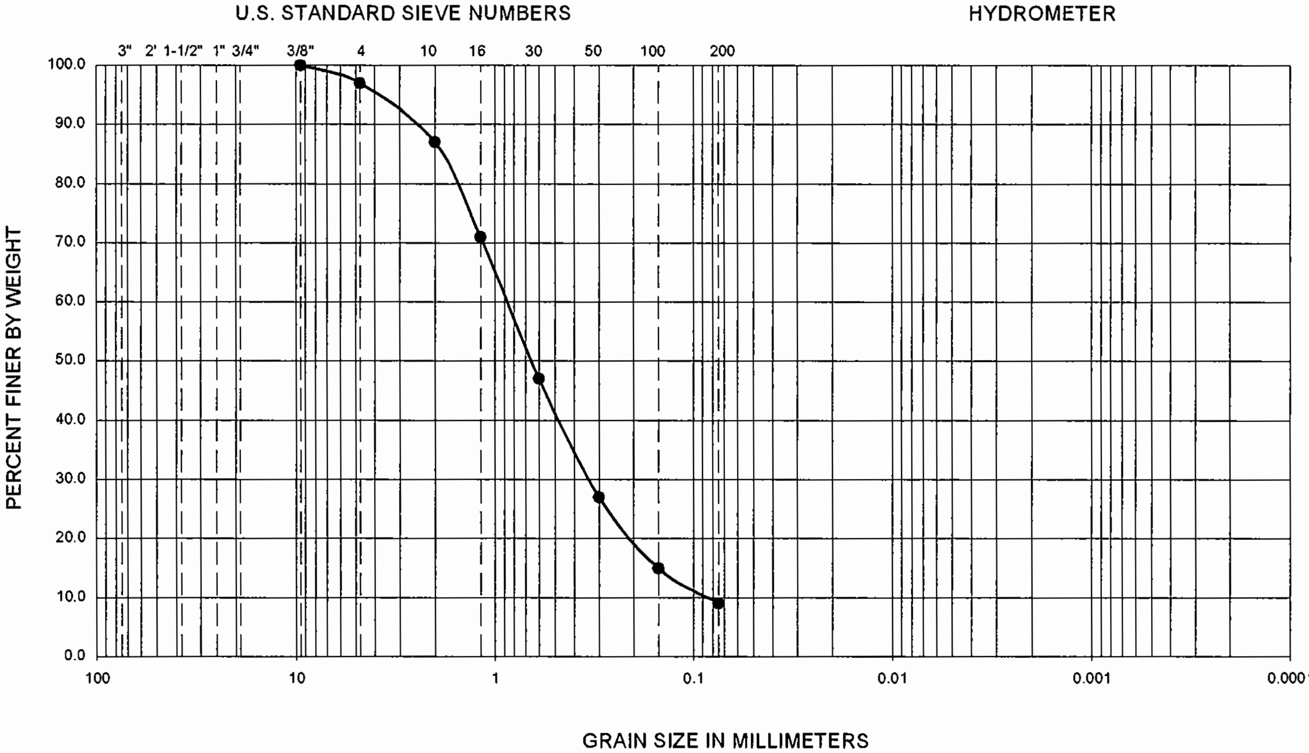


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	U.S.C.S
●	TP-4	8.0-10.0	--	--	--	--	--	--	--	--	15	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. 105879004 / DATE 5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-18

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	U.S.C.S
●	TP-6	1.0-3.0	--	--	--	0.09	0.34	0.88	10.4	1.5	9	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-19
105879004	5/09		

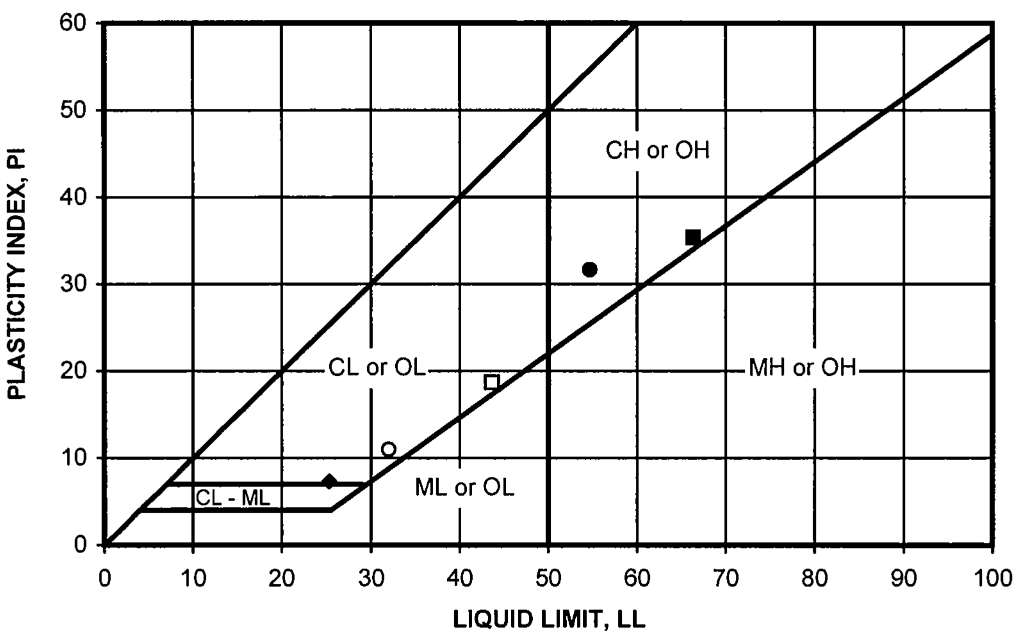
SAMPLE LOCATION	SAMPLE DEPTH (FT)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-44	25-26.5	Silty SAND	94	23	SM
B-44	35-36.5	Clayey SAND	100	46	SC
B-44	45-46.5	Sandy CLAY	100	55	CL
TP-2	0.0-2.0	Silty SAND	100	22	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140-00

Ninyo & Moore		NO. 200 SIEVE ANALYSIS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-20
105879004	5/09		

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-18	20.0-21.5	55	23	32	CH	CH
■	B-35	45.0-46.5	66	31	35	CH	CH
◆	B-41	25.0-26.5	25	18	7	CL	CL
○	B-44	35.0-36.5	32	21	11	CL	SC
□	TP-3	1.0-2.0	44	25	19	CL	CL

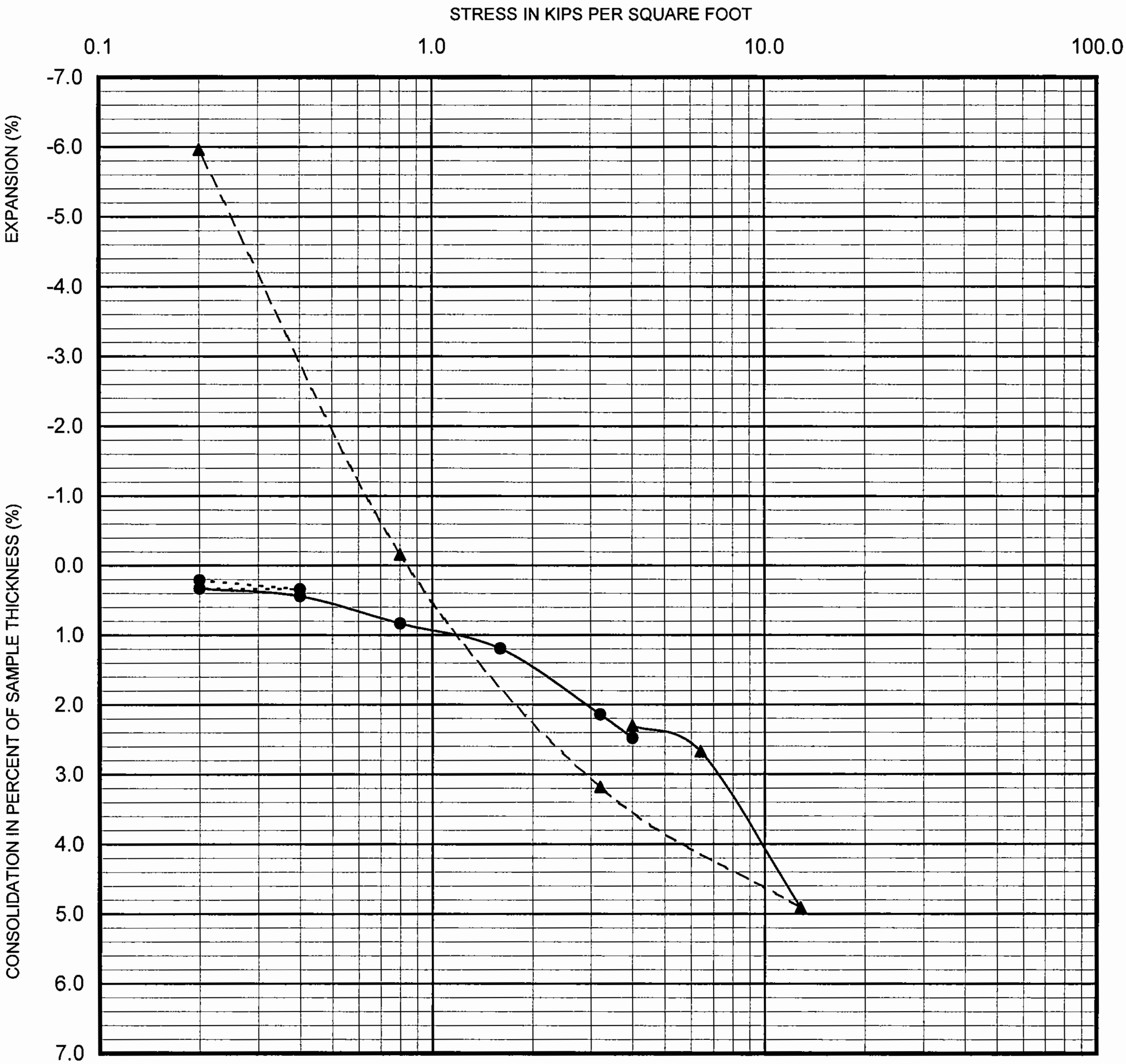
NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318-05

Ninyo & Moore		ATTERBERG LIMITS TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-21
105879004	5/09		

105879004 ATTERBERG Page 1.xls



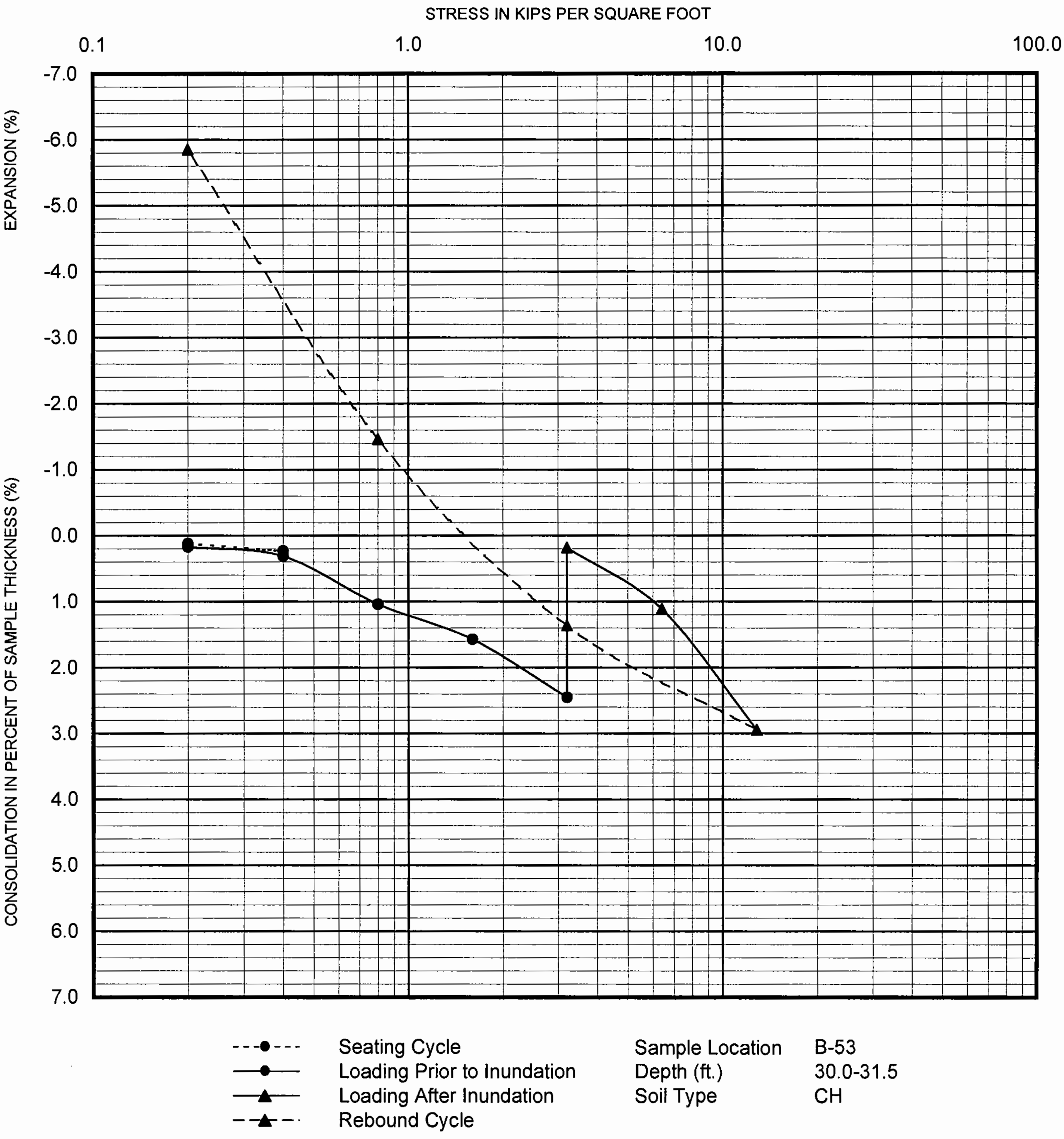
- - -●- - -	Seating Cycle	Sample Location	B-35
——●——	Loading Prior to Inundation	Depth (ft.)	50.0-51.5
——▲——	Loading After Inundation	Soil Type	CH
– –▲– –	Rebound Cycle		

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435-04

Ninyo & Moore

CONSOLIDATION TEST RESULTS

PROJECT NO.	DATE		FIGURE
105879004	5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-22



Sample Location	B-53
Depth (ft.)	30.0-31.5
Soil Type	CH

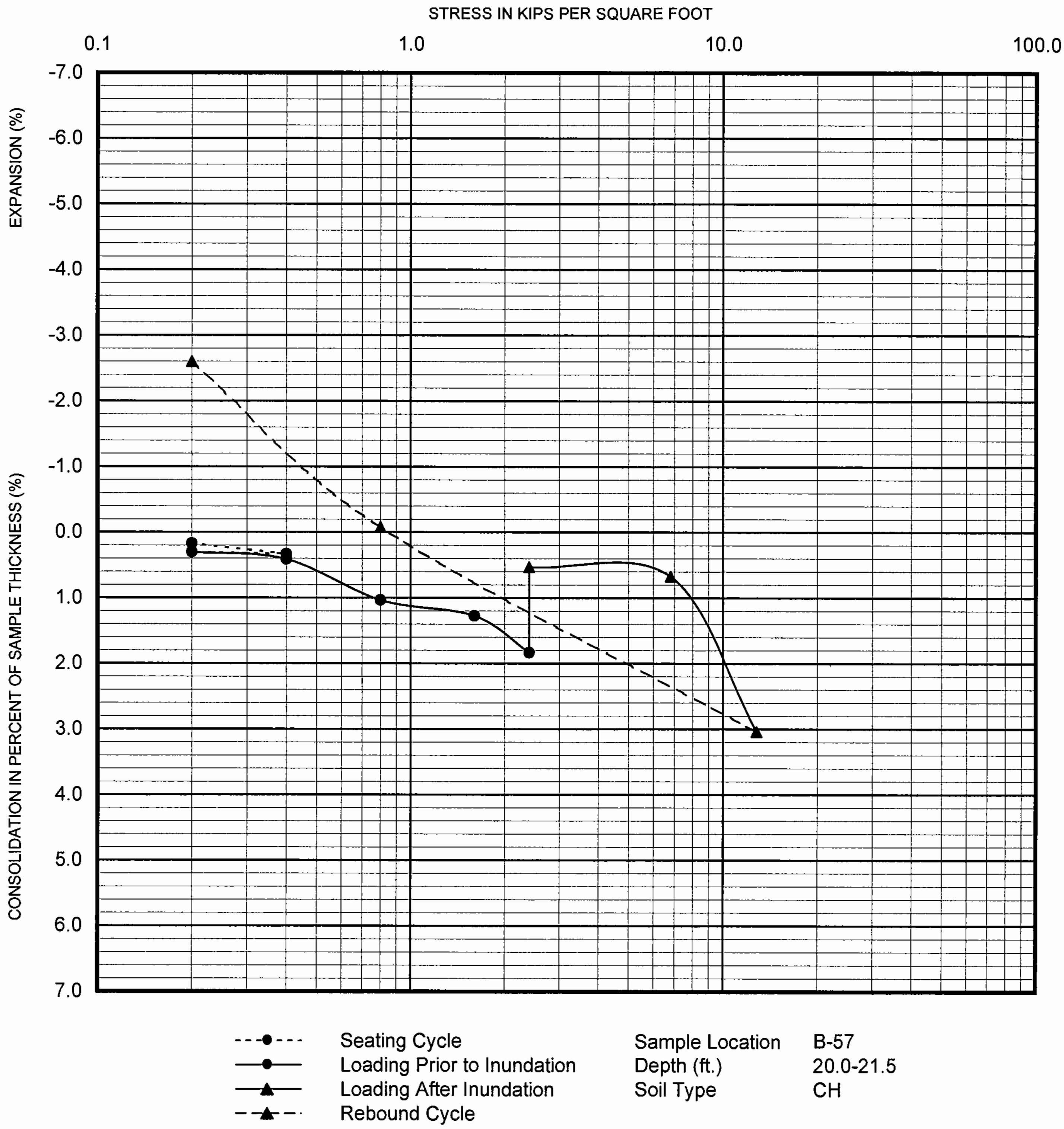
PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435-04

Ninyo & Moore

CONSOLIDATION TEST RESULTS

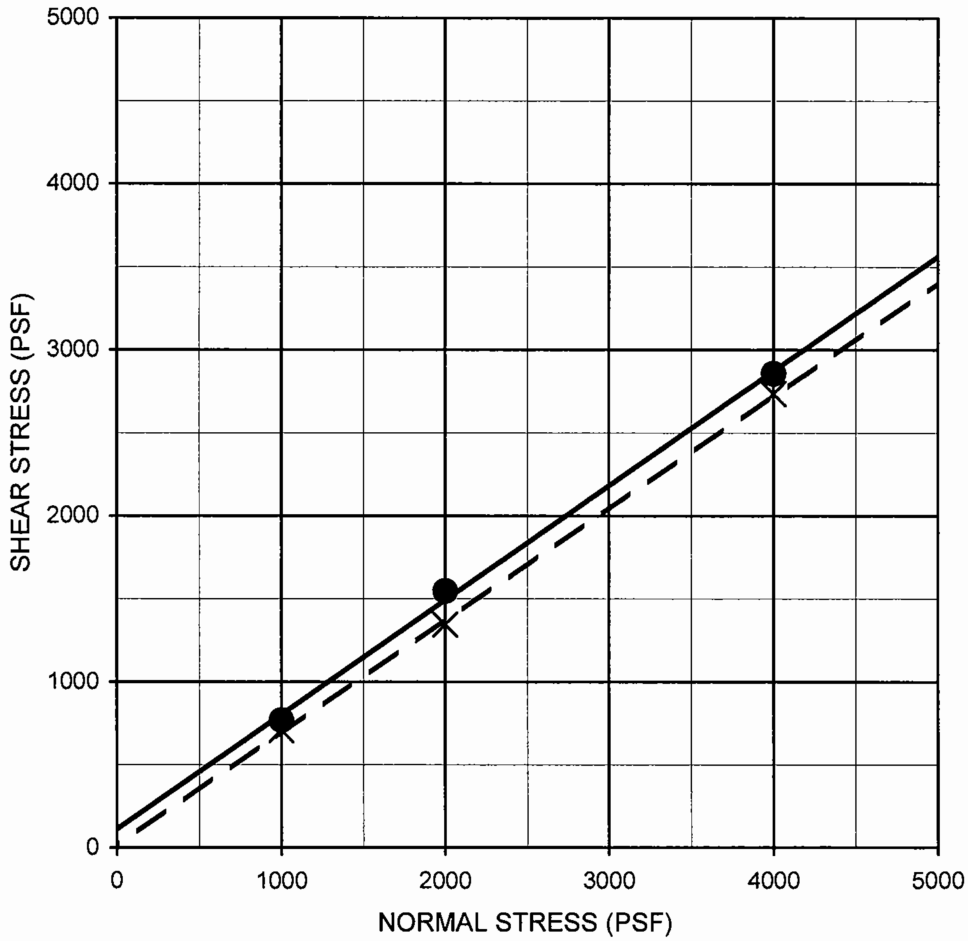
PROJECT NO.	DATE		FIGURE
105879004	5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-23

105879004 CONSOLIDATION B-53 @ 30.0-31.5.xls



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435-04

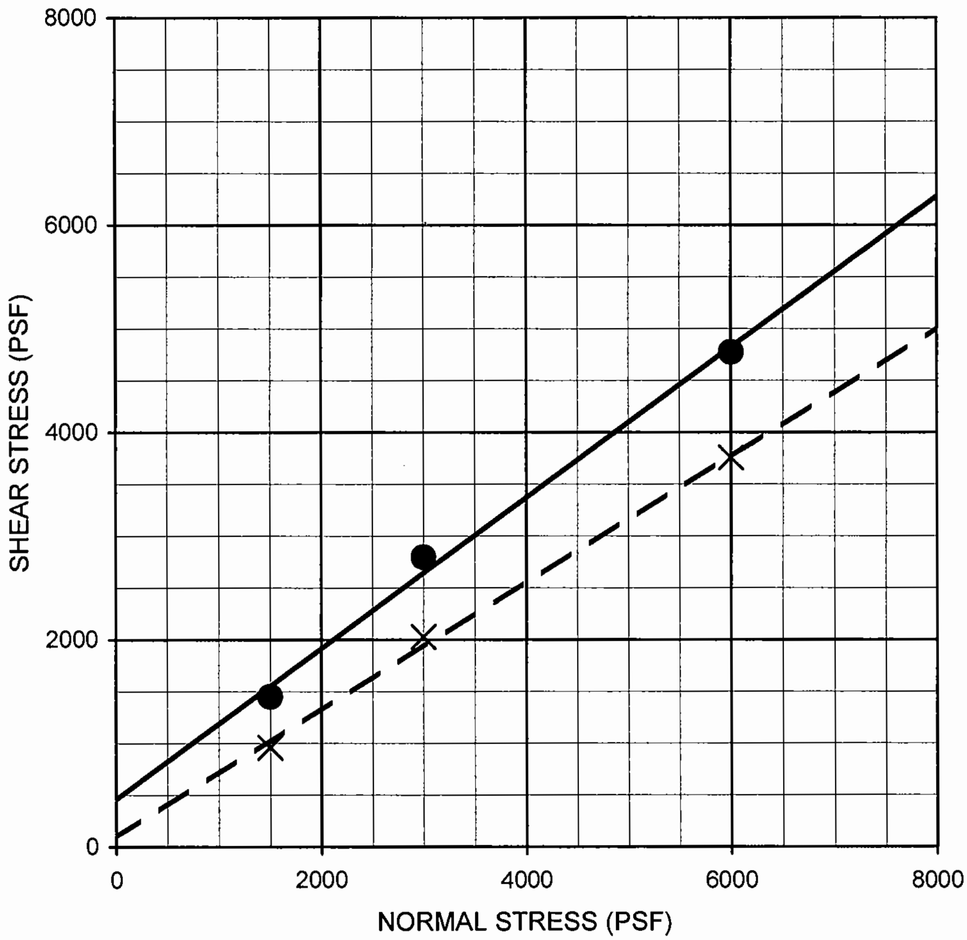
Ninyo & Moore	CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO. / DATE		
105879004 / 5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-24



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	——●——	B-5	5.0-6.5	Peak	110	35	SM
Silty SAND	- - X - -	B-5	5.0-6.5	Ultimate	10	34	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

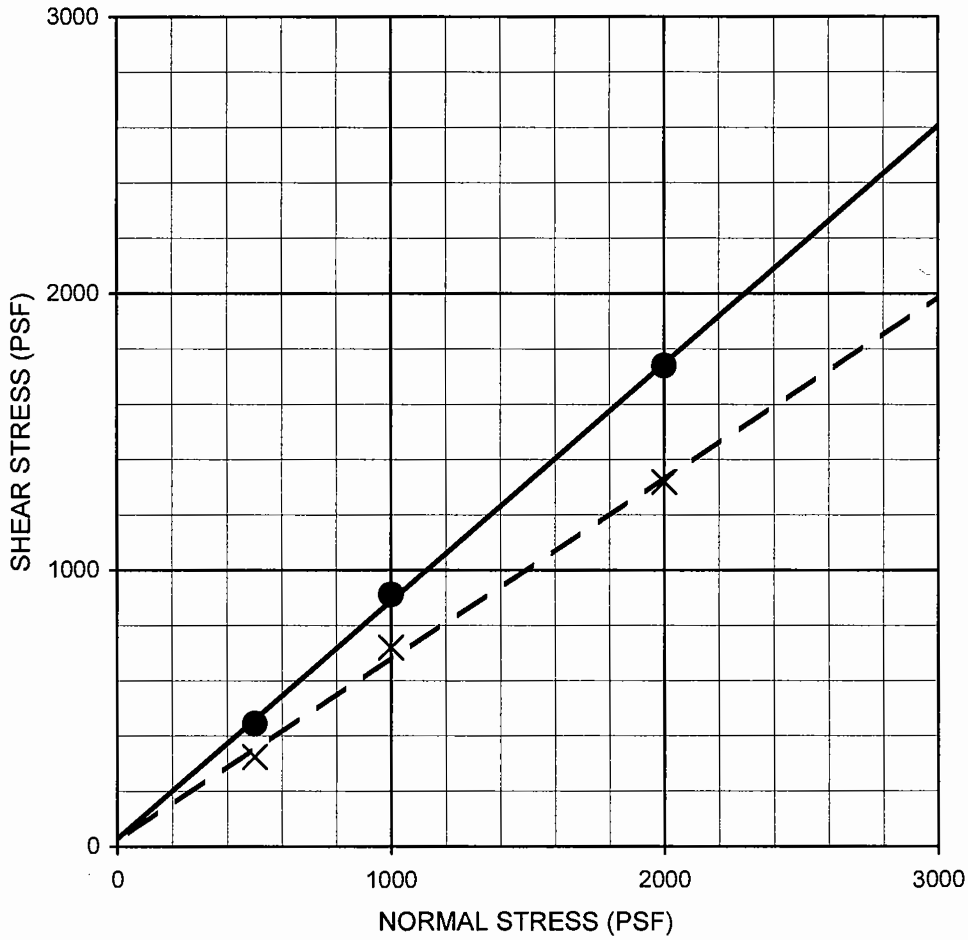
Ninyo & Moore		DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-25
105879004	5/09		



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	—●—	B-21	5.0-6.5	Peak	460	36	SM
Silty SAND	- - X - -	B-21	5.0-6.5	Ultimate	100	32	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

Ninyo & Moore		DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-26
105879004	5/09		

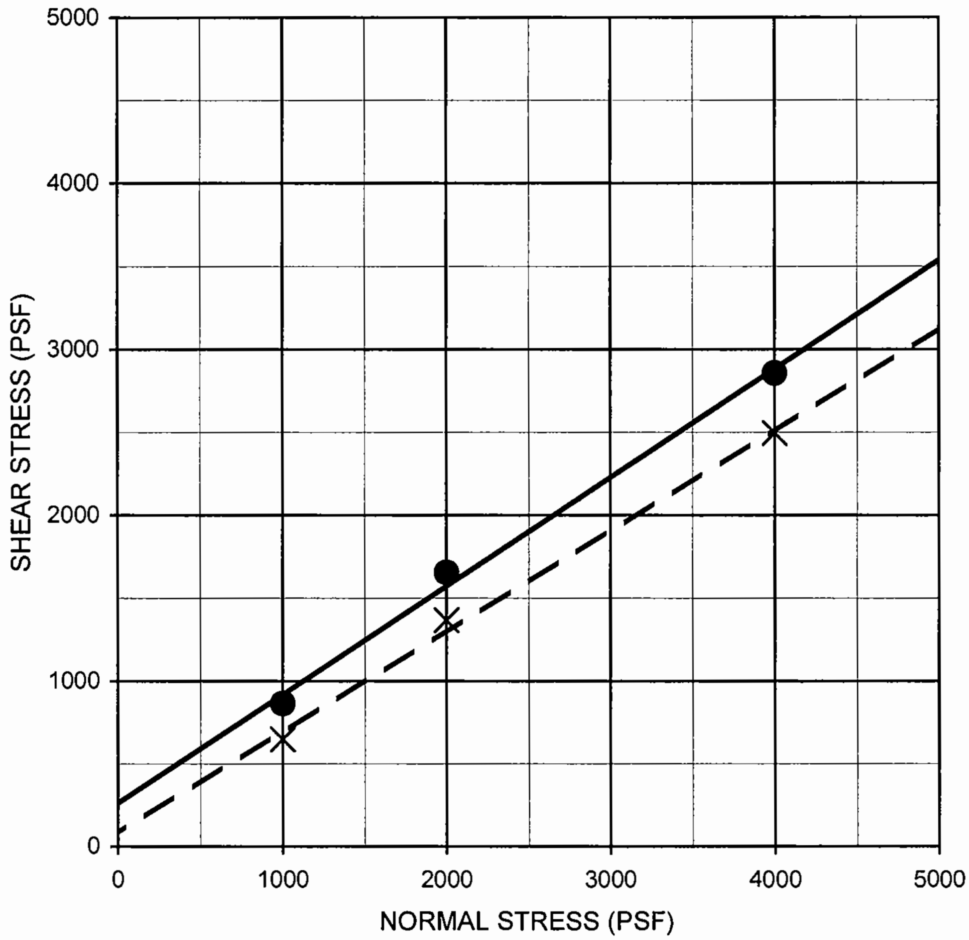


Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	—●—	B-23	5.0-6.5	Peak	30	41	SM
Silty SAND	- - x - -	B-23	5.0-6.5	Ultimate	20	33	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

Ninyo & Moore		DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-27
105879004	5/09		

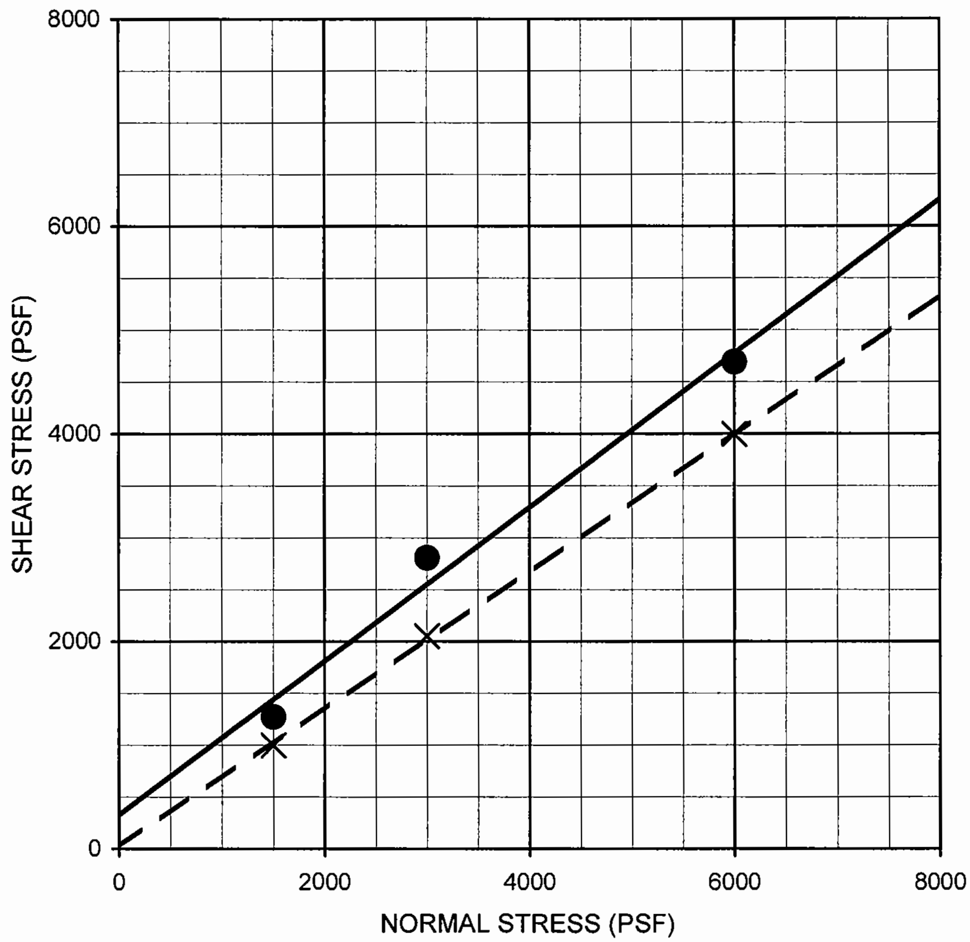
105879004 SHEAR B-23 @ 5.0-6.5.xls



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	——●——	B-28	5.0-6.5	Peak	260	33	SM
Silty SAND	– – x – –	B-28	5.0-6.5	Ultimate	80	31	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

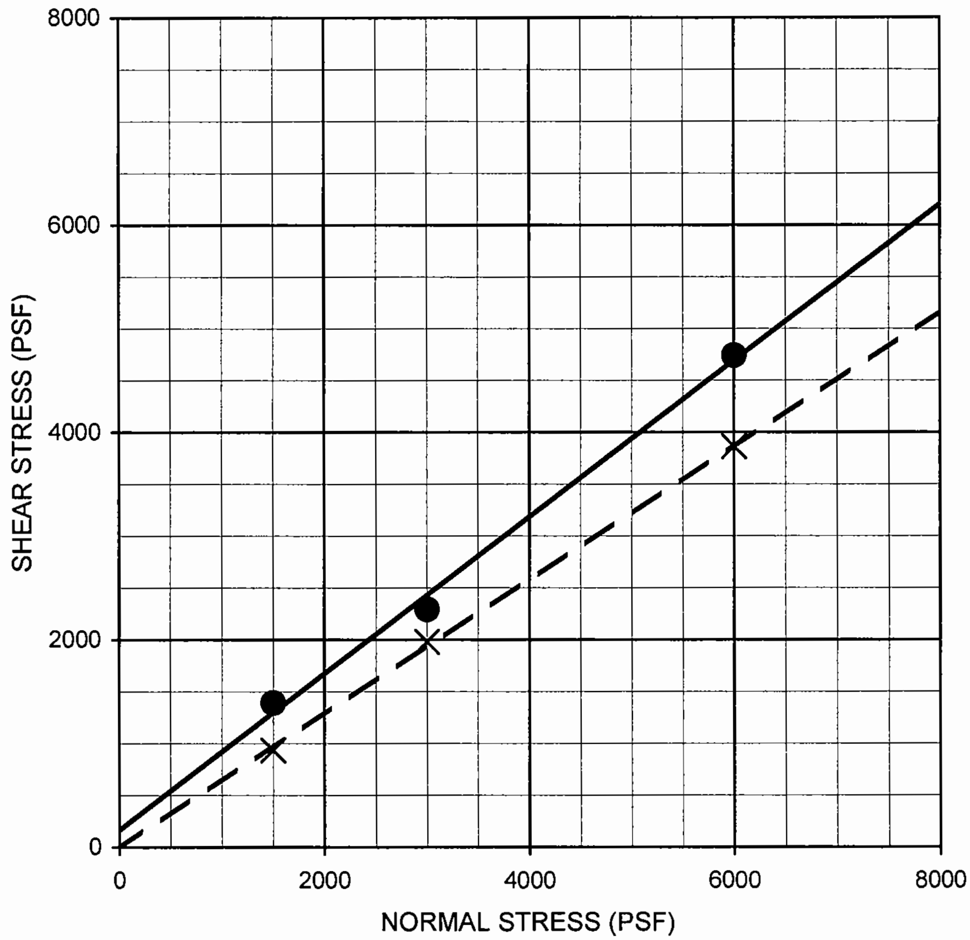
Ninyo & Moore	DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO. 105879004 / DATE 5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-28



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	——●——	B-34	5.0-6.5	Peak	330	37	SM
Silty SAND	- - X - -	B-34	5.0-6.5	Ultimate	20	34	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

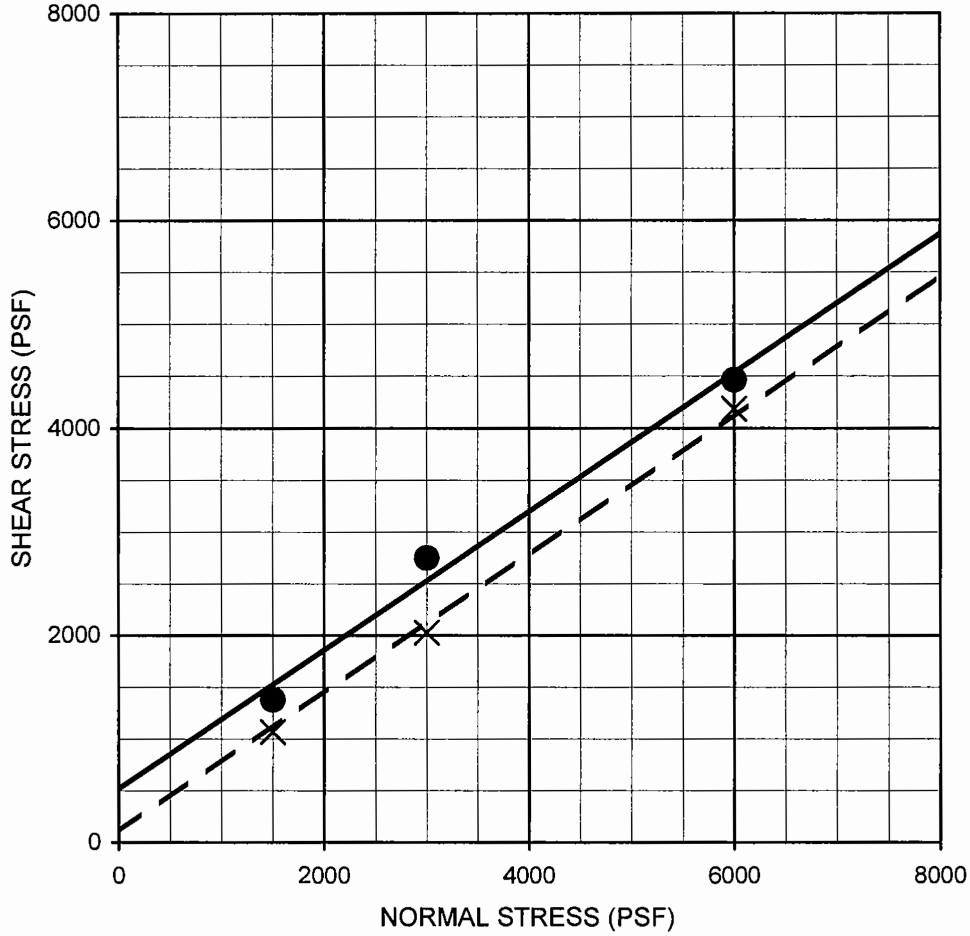
Ninyo & Moore	DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO. 105879004	MOJAVE SOLAR PROJECT	B-29
DATE 5/09	LOCKHART, CALIFORNIA	



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	——●——	B-38	5.0-6.5	Peak	170	37	SM
Silty SAND	- - X - -	B-38	5.0-6.5	Ultimate	0	33	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

Ninyo & Moore	DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-30
105879004 / 5/09		



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	—●—	B-45	5.0-6.5	Peak	520	34	SM
Silty SAND	- - x - -	B-45	5.0-6.5	Ultimate	110	34	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

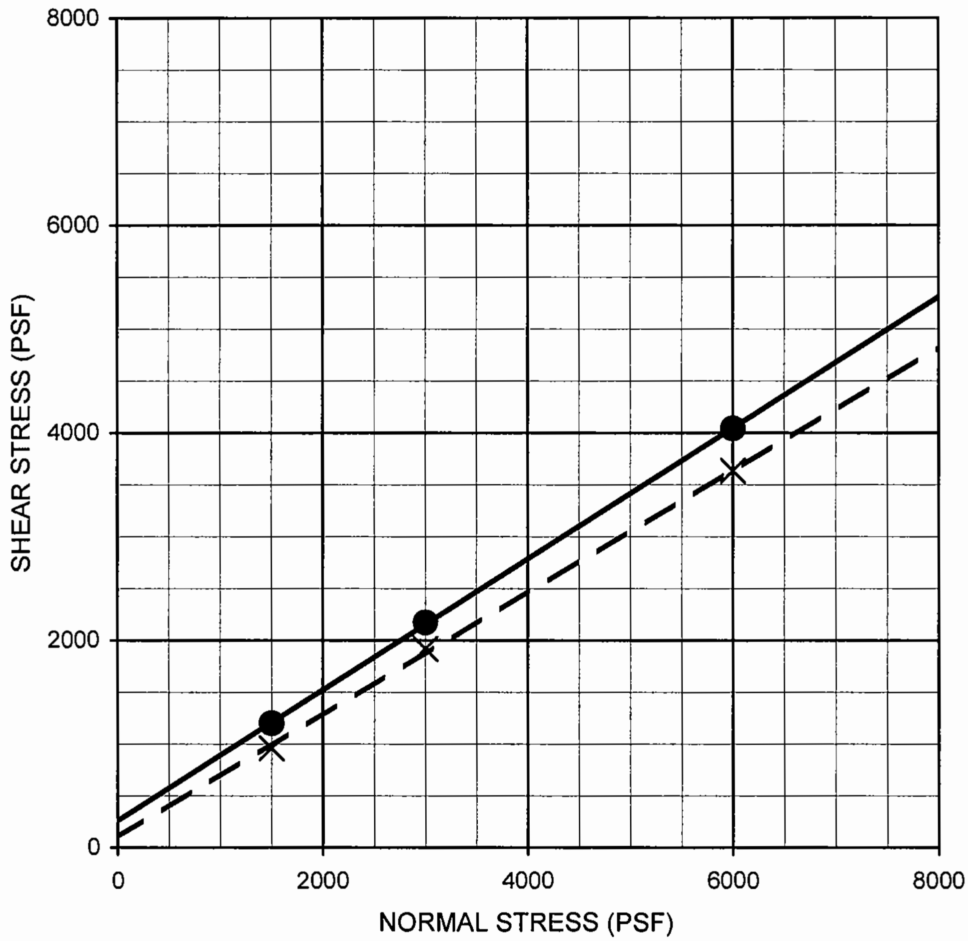
Ninyo & Moore

DIRECT SHEAR TEST RESULTS

FIGURE **B-31**

PROJECT NO.	DATE
105879004	5/09

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

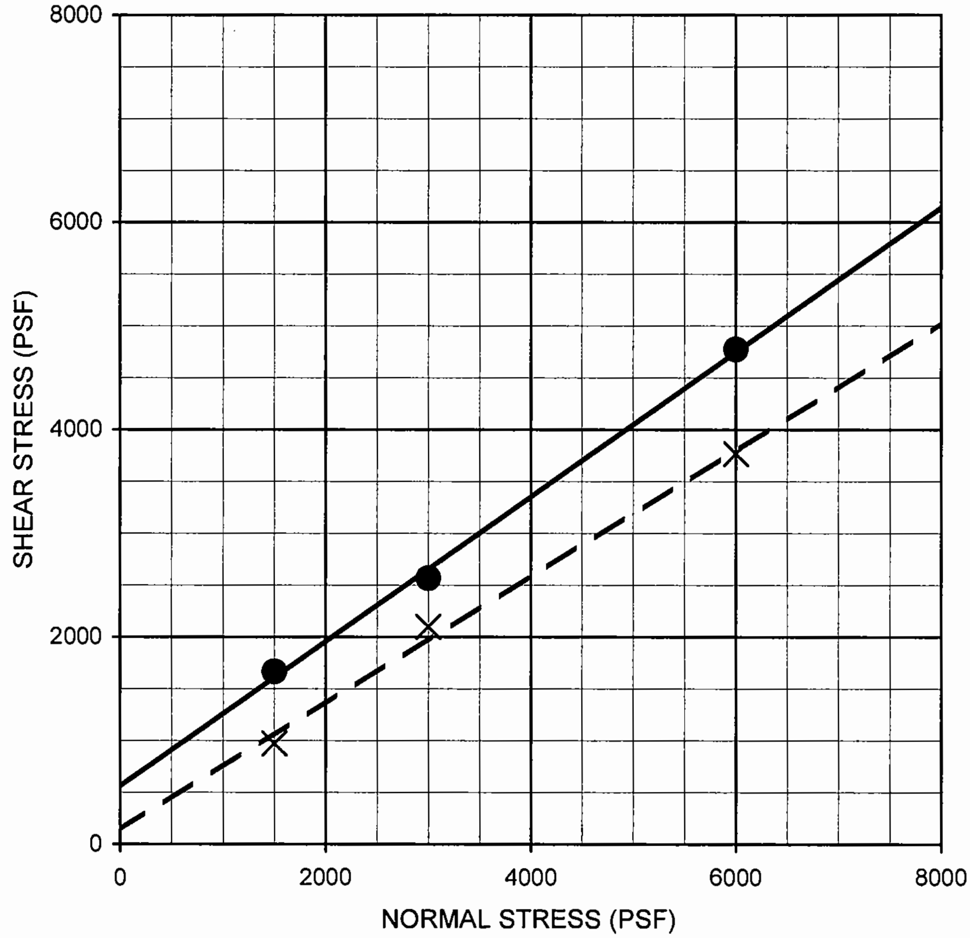


Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	——●——	B-50	10.0-11.5	Peak	260	32	SM
Silty SAND	- - x - -	B-50	10.0-11.5	Ultimate	100	31	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

Ninyo & Moore	DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO. 105879004	DATE 5/09	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-32

105879004 SHEAR B-50 @ 10.0-11.5.xls



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, φ (degrees)	Soil Type
Silty SAND	—●—	B-51	5.0-6.5	Peak	560	35	SM
Silty SAND	- - X - -	B-51	5.0-6.5	Ultimate	140	31	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

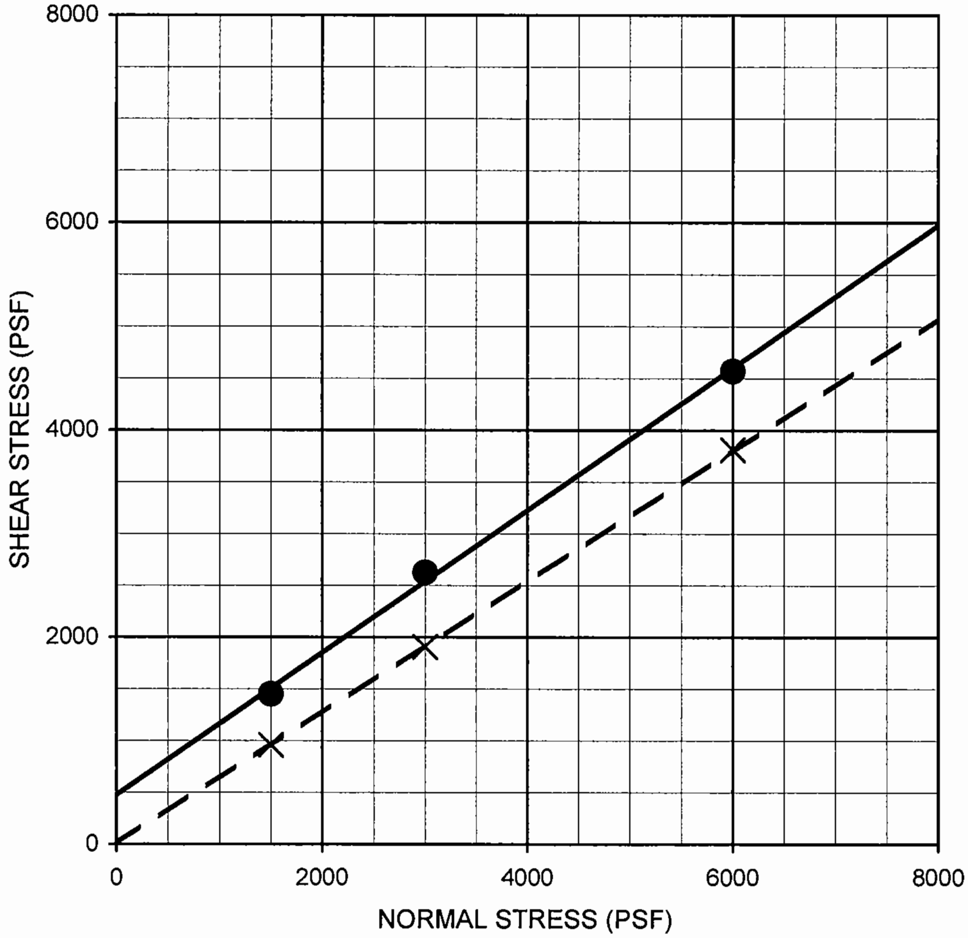
Ninyo & Moore

PROJECT NO.	DATE
105879004	5/09

DIRECT SHEAR TEST RESULTS

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

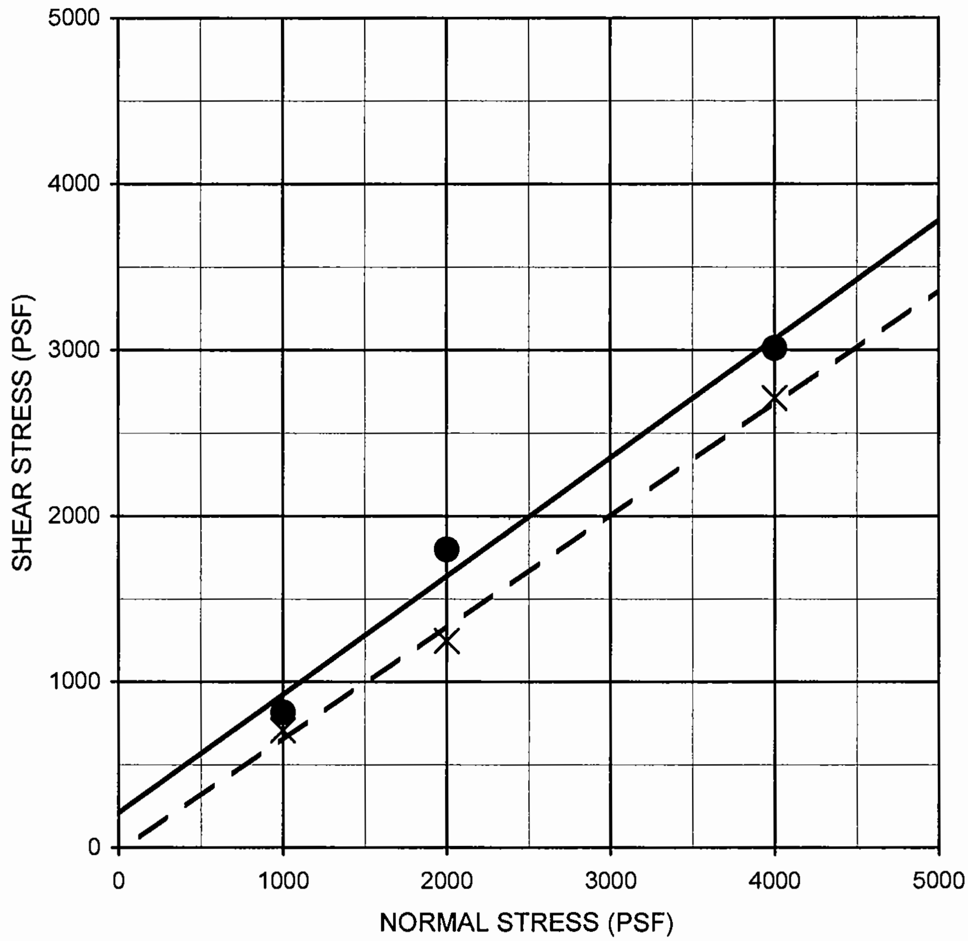
FIGURE
B-33



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	—●—	B-61	5.0-6.5	Peak	480	34	SM
Silty SAND	- - X - -	B-61	5.0-6.5	Ultimate	10	32	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

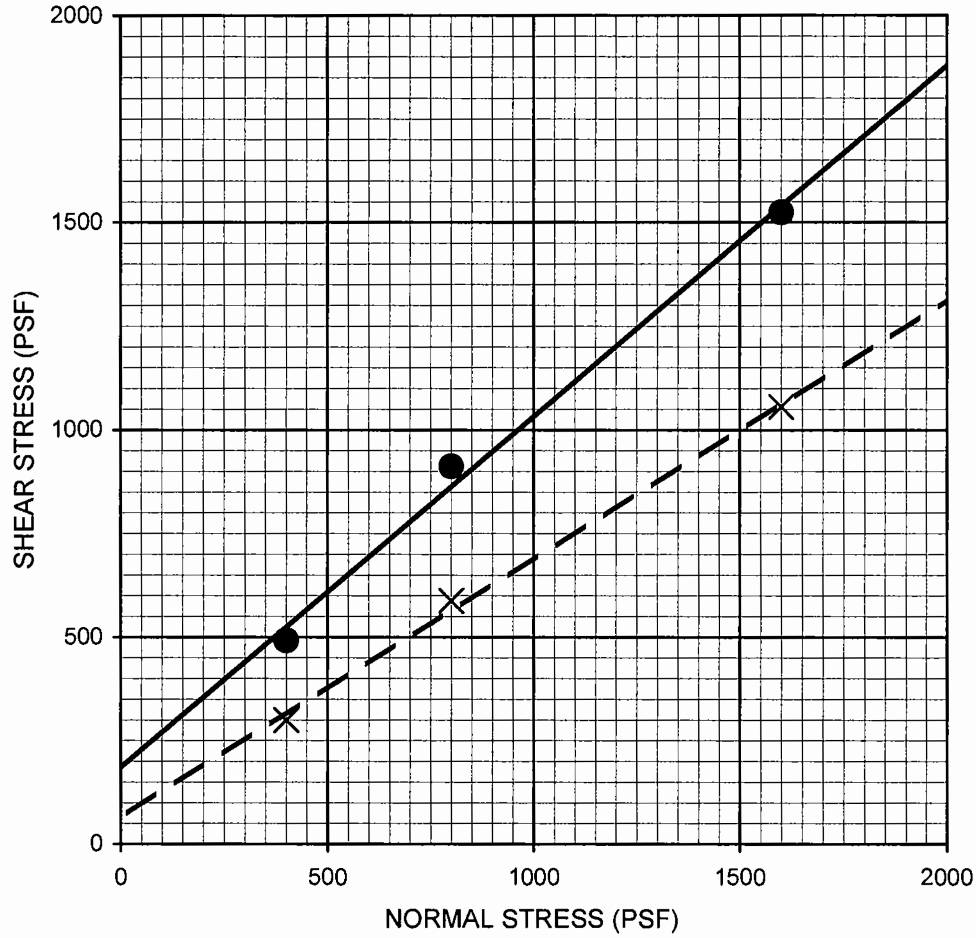
Ninyo & Moore		DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-34
105879004	5/09		



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	—●—	B-66	5.0-6.5	Peak	210	36	SM
Silty SAND	- - X - -	B-66	5.0-6.5	Ultimate	0	34	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04

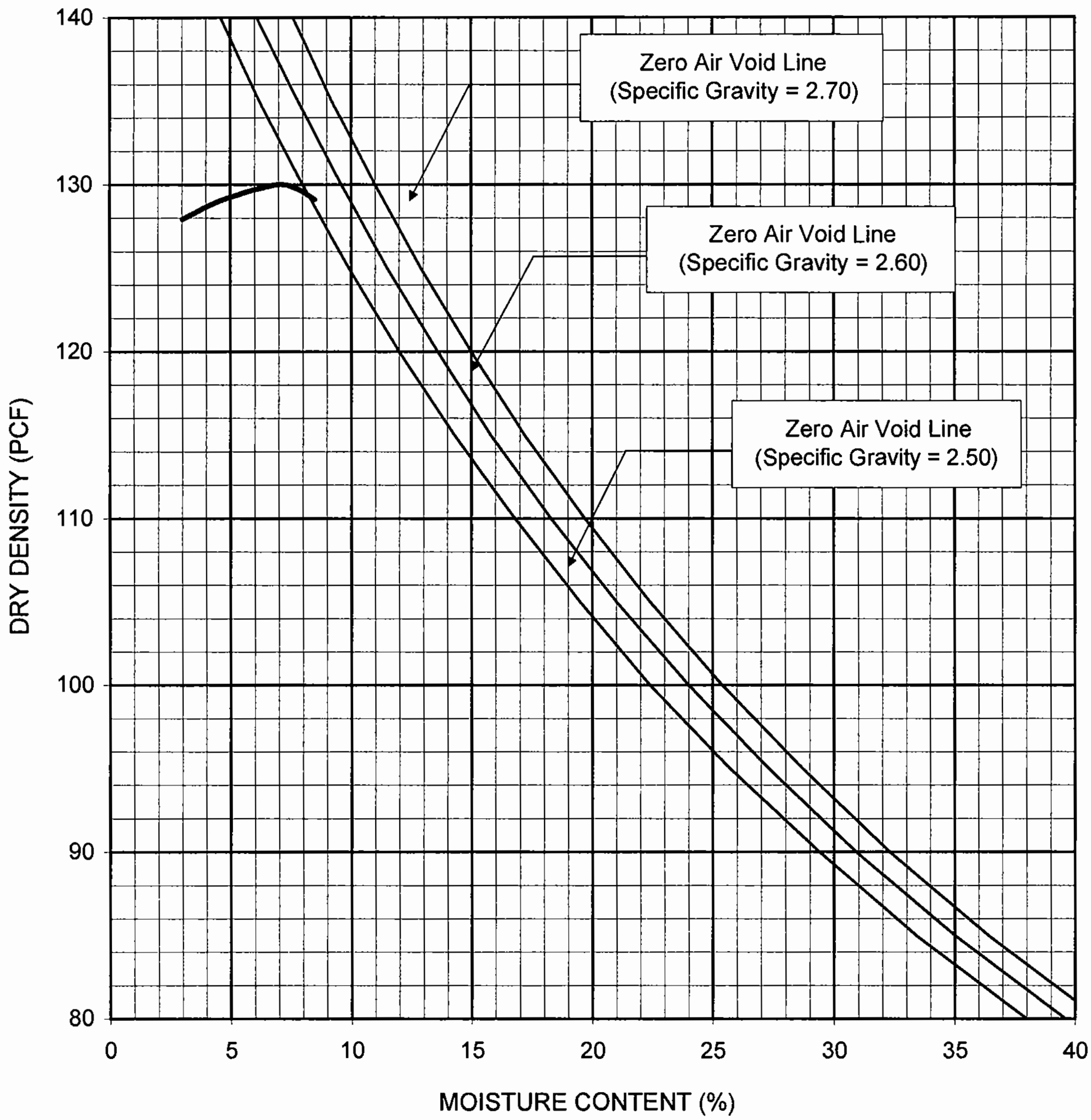
Ninyo & Moore	DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT NO. / DATE	MOJAVE SOLAR PROJECT	B-35
105879004 / 5/09	LOCKHART, CALIFORNIA	



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Well Graded SAND with Silt	—●—	TP-6	1.0-3.0	Peak	190	40	SW-SM
Well Graded SAND with Silt	- - X - -	TP-6	1.0-3.0	Ultimate	70	32	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080-04 ON A SAMPLE REMOLDED TO 90% RELATIVE COMPACTION

Ninyo & Moore		DIRECT SHEAR TEST RESULTS	FIGURE
PROJECT	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-36
105879004	5/09		



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
TP-6	1.0-3.0	Reddish Brown Well Graded SAND with Silt	130.0	7.0
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718-87)			N/A	N/A

PERFORMED IN GENERAL ACCORDANCE WITH ☑ ASTM D 1557-02 ☐ ASTM D 698-00a METHOD ☑ A ☐ B ☐ C

Ninyo & Moore		PROCTOR DENSITY TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-37
105879004	5/09		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH [1]	RESISTIVITY [1] (Ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-3	0-5.0	7.1	6,298	20	0.002	295
B-8	0-5.0	7.7	10,050	30	0.003	90
B-31	0-5.0	7.0	10,720	30	0.003	145
B-47	0-5.0	7.1	10,050	30	0.003	150
B-62	10.0-11.5	6.4	10,050	110	0.011	380
TP-3	1.0-2.0	7.7	154	9900	0.990	11200
TP-4	2.0-4.0	7.1	3,015	100	0.010	25

[1] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

Ninyo & Moore

CORROSIVITY TEST RESULTS

FIGURE

PROJECT NO.	DATE
105879004	5/09

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

B-38

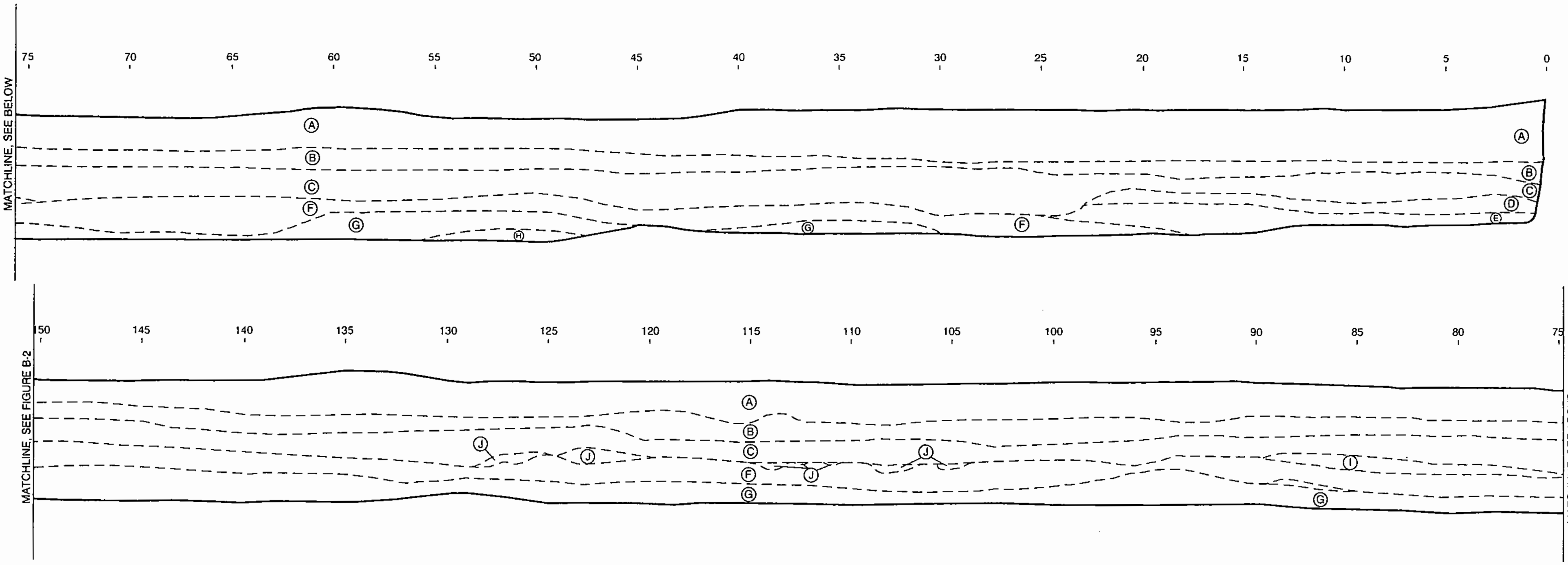
SAMPLE LOCATION	SAMPLE DEPTH (FT)	SOIL TYPE	R-VALUE
B-38	0.0-5.0	SM	61

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844-01/CT 301

Ninyo & Moore		R-VALUE TEST RESULTS	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	B-39
105879004	5/09		

APPENDIX C

FAULT TRENCH LOG



LEGEND

- (A) OLDER ALLUVIUM: BROWN, DAMP, MEDIUM DENSE TO DENSE, SILTY FINE TO MEDIUM SAND, SOME COARSE SAND, SOME FAINT CROSS BEDDING; GENERALLY MASSIVE; SCATTERED ROOTS.
- (B) BROWN, DAMP, MEDIUM DENSE SILTY FINE TO MEDIUM SAND; CALICHE CONCENTRATION.
- (C) GRADED BED SEQUENCE: BROWN, DAMP, DENSE, CLAYEY, FINE SANDY SILT GRADING DOWN TO FINE TO MEDIUM SANDY SILT; MICACEOUS; SCATTERED PINHOLE VOIDS.
- (D) BROWN, DAMP, DENSE, CLAYEY FINE, SANDY SILT GRADING DOWN TO FINE TO MEDIUM SANDY SILT; MICACEOUS; SCATTERED PINHOLE VOIDS.
- (E) BROWN, DAMP TO MOIST, MEDIUM DENSE TO DENSE, FINE SANDY SILT GRADING UP TO SILTY FINE TO MEDIUM SAND; MECACEOUS; SCATTERED PINHOLE VOIDS.
- (F)(G)(H)(I)(K) BROWN, DAMP TO MOIST, MEDIUM DENSE TO DENSE, FINE TO COARSE SANDY SILT GRADING UP TO FINE TO MEDIUM SANDY SILT; MICACEOUS.
- (J) LIGHT GRAYISH BROWN, DAMP, MEDIUM DENSE, FINE TO COARSE SANDY SILT; MICACEOUS.
- (L) BROWN, DAMP, MEDIUM DENSE TO DENSE, FINE, SANDY SILT GRADING DOWN TO FINE TO MEDIUM SANDY SILT.
- (M) YELLOWISH BROWN, DAMP TO MOIST, DENSE, FINE SANDY SILT; MICACEOUS.
- (N) YELLOWISH BROWN, DAMP TO MOIST, MEDIUM DENSE TO DENSE, SILTY FINE TO COARSE SAND; MICACEOUS.
- (O) GRAYISH BROWN, DAMP TO MOIST, DENSE TO MEDIUM DENSE, SILTY FINE TO COARSE SAND; MICACEOUS; SOME FINE GRAVEL.
- (P) GRAYISH BROWN, DAMP, MEDIUM DENSE, SILTY FINE TO COARSE SAND; SOME FINE GRAVEL.
- (Q) YELLOWISH BROWN, DAMP, DENSE, FINE SANDY SILT GRADING DOWN TO SILTY FINE TO MEDIUM SAND; MICACEOUS.
- (R) BROWN, DAMP, MEDIUM DENSE TO DENSE, FINE SANDY SILT GRADING DOWN TO FINE TO COARSE SANDY SILT; MICACEOUS; TRACE CLAY IN UPPER PORTION
- (S) GRAY, DAMP, DENSE, FINE TO COARSE SANDY FINE GRAVEL; MICACEOUS. (IN SOME AREAS TO GRAVELLY FINE TO COARSE SAND)
- (T) BROWN, DAMP, DENSE, FINE SANDY SILT GRADING DOWN TO SILTY FINE TO MEDIUM SAND, MICACEOUS.
- (U) GRAYISH BROWN, DAMP, DENSE, SILTY FINE TO COARSE SAND; MICACEOUS.
- (V) REDDISH BROWN, DAMP, MODERATELY CEMENTED SITY FINE-GRAINED SANDSTONE; MICACEOUS.
- (W) BROWN, DAMP, DENSE, FINE SANDY SILT GRADING DOWN TO SILTY FINE TO COARSE SAND; MICACEOUS.
- (X) BROWN, DAMP, DENSE, FINE SANDY SILT GRADING DOWN TO SILTY FINE TO COARSE SAND; MICACEOUS.
- (Y) GRAYISH BROWN, DAMP, DENSE, SILTY FINE GRAVELLY, FINE TO COARSE SAND; MICACEOUS.
- (Z) GRAYISH TO REDDISH BROWN, DAMP, DENSE, FINE SANDY SILT, TRACE CLAY; MICACEOUS.
- (AA) REDDISH BROWN, DAMP TO MOIST, DENSE, SILTY FINE TO MEDIUM SAND; MICACEOUS; TRACE COARSE SAND.
- (A) @ 1100 GRADES TO BROWN, DAMP, MEDIUM DENSE TO DENSE, SILTY, FINE, GRAVELLY FINE TO COARSE SAND; MASSIVE MICACEOUS (CHANNEL DEPOSITS).
- (G) @ 1200 GRADES TO LIGHT GRAY, DAMP, DENSE, SANDY SILT.

APPROXIMATE SCALE

0 5 10 FEET

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE

fig2 C-1-7 105879004 trench

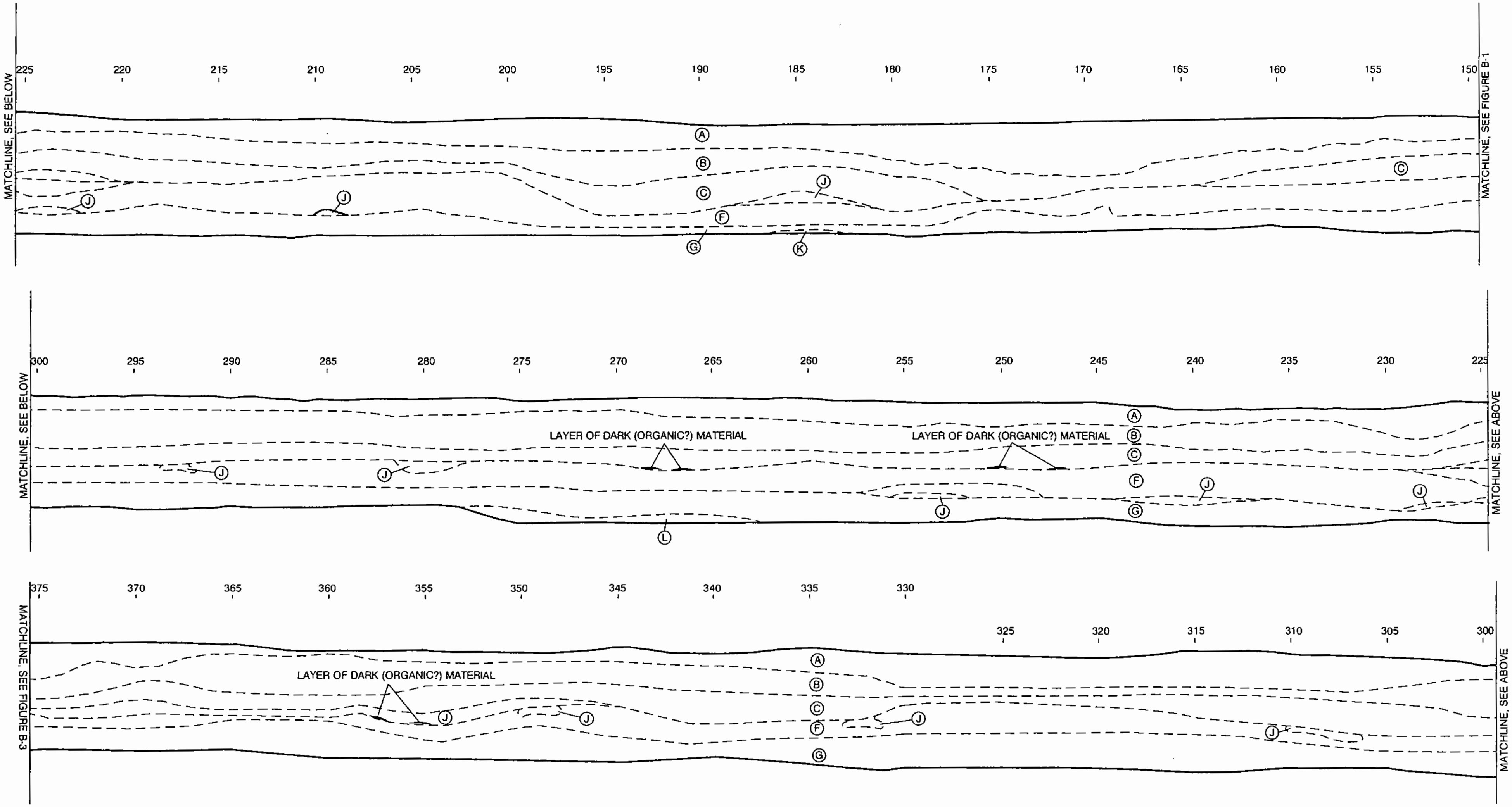
Ninyo & Moore

PROJECT NO.	DATE
105879004	5/09

TRENCH LOG

MOJAVE SOLAR PROJECT
LOCKHART, CALIFORNIA

FIGURE **C-1**



FOR LEGEND, SEE FIGURE B-1

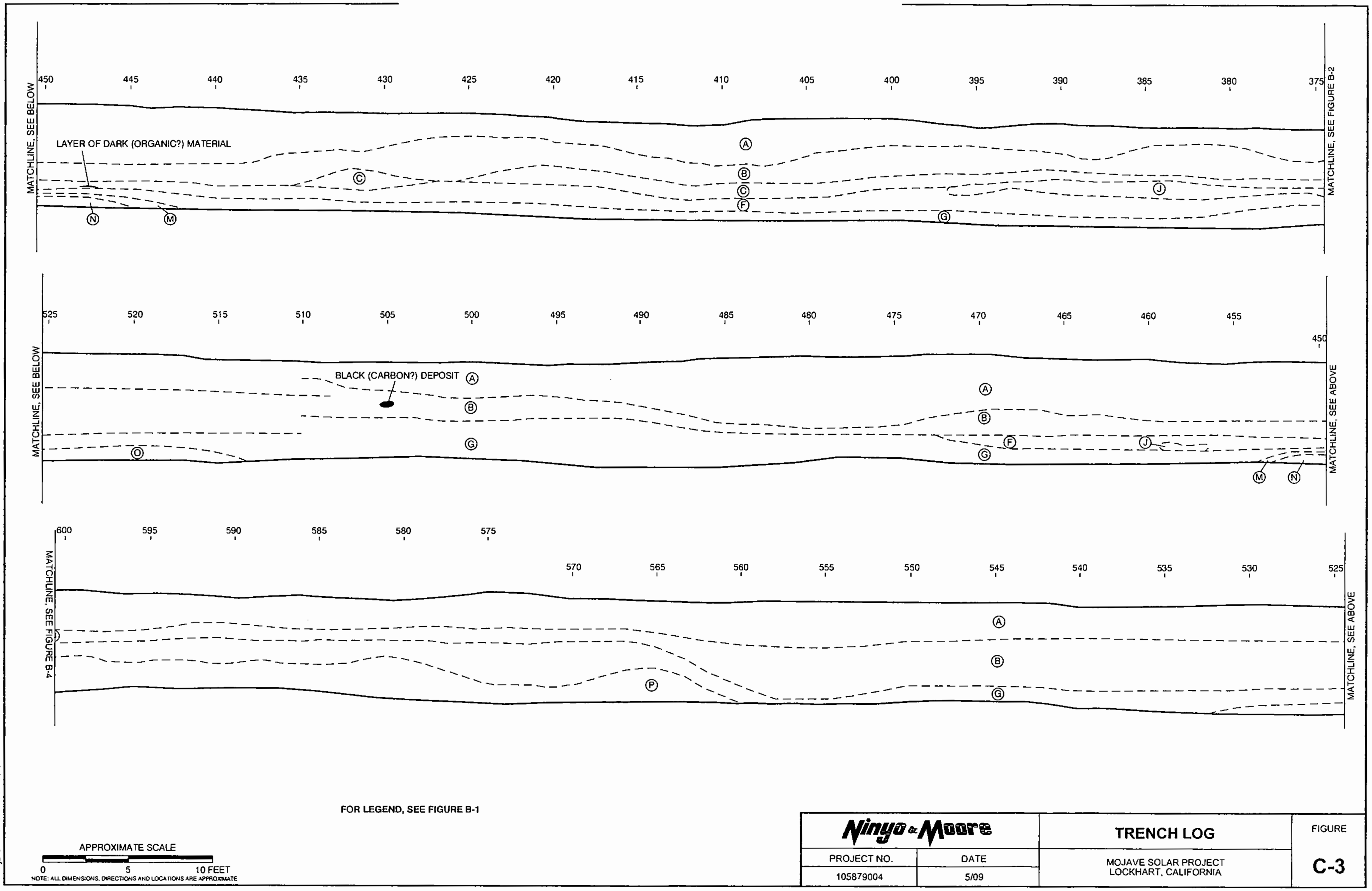
APPROXIMATE SCALE

0 5 10 FEET

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore		TRENCH LOG	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	C-2
105879004	5/09		

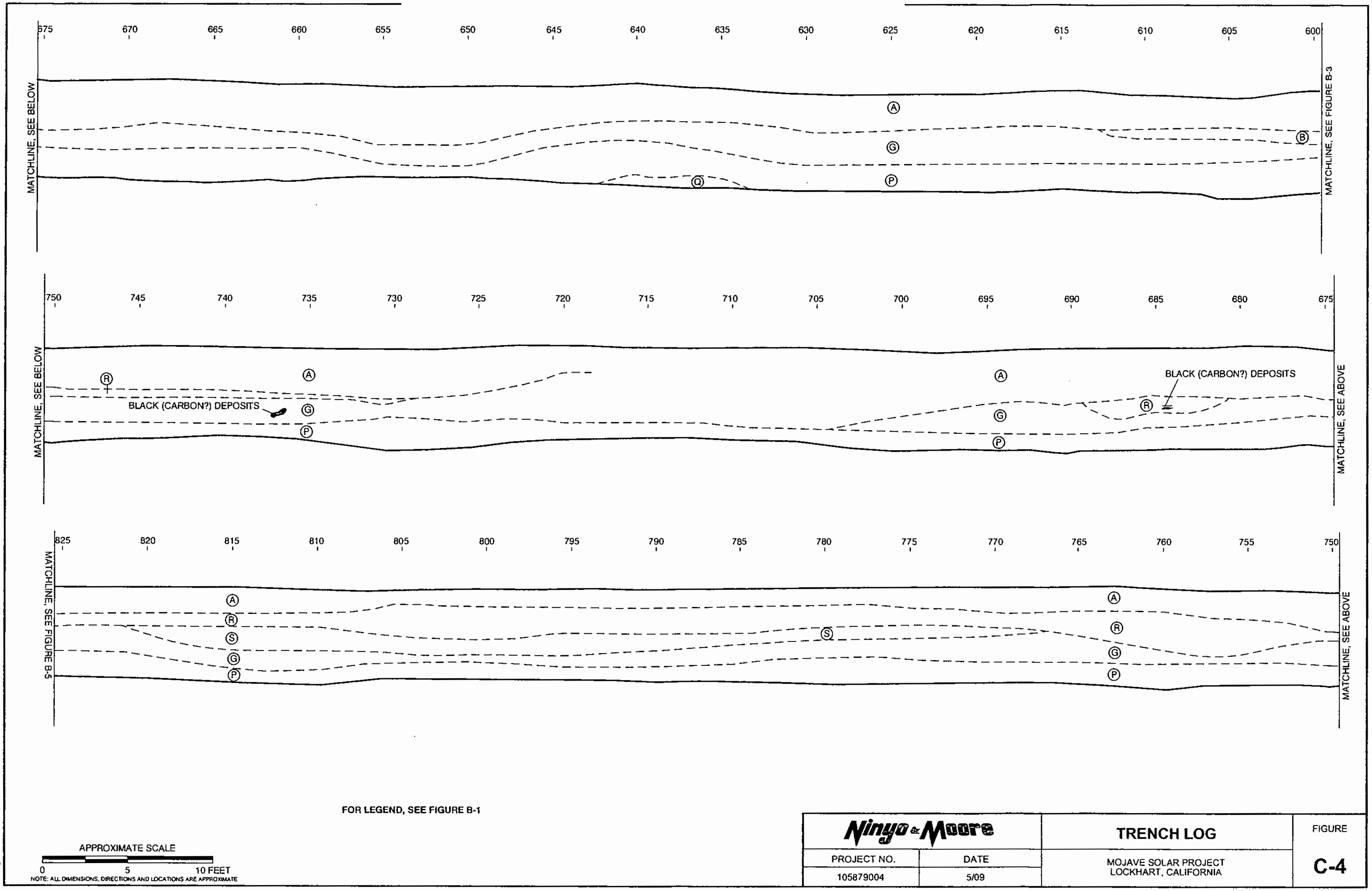
fig2 C-1-7 105879004 trench



FOR LEGEND, SEE FIGURE B-1

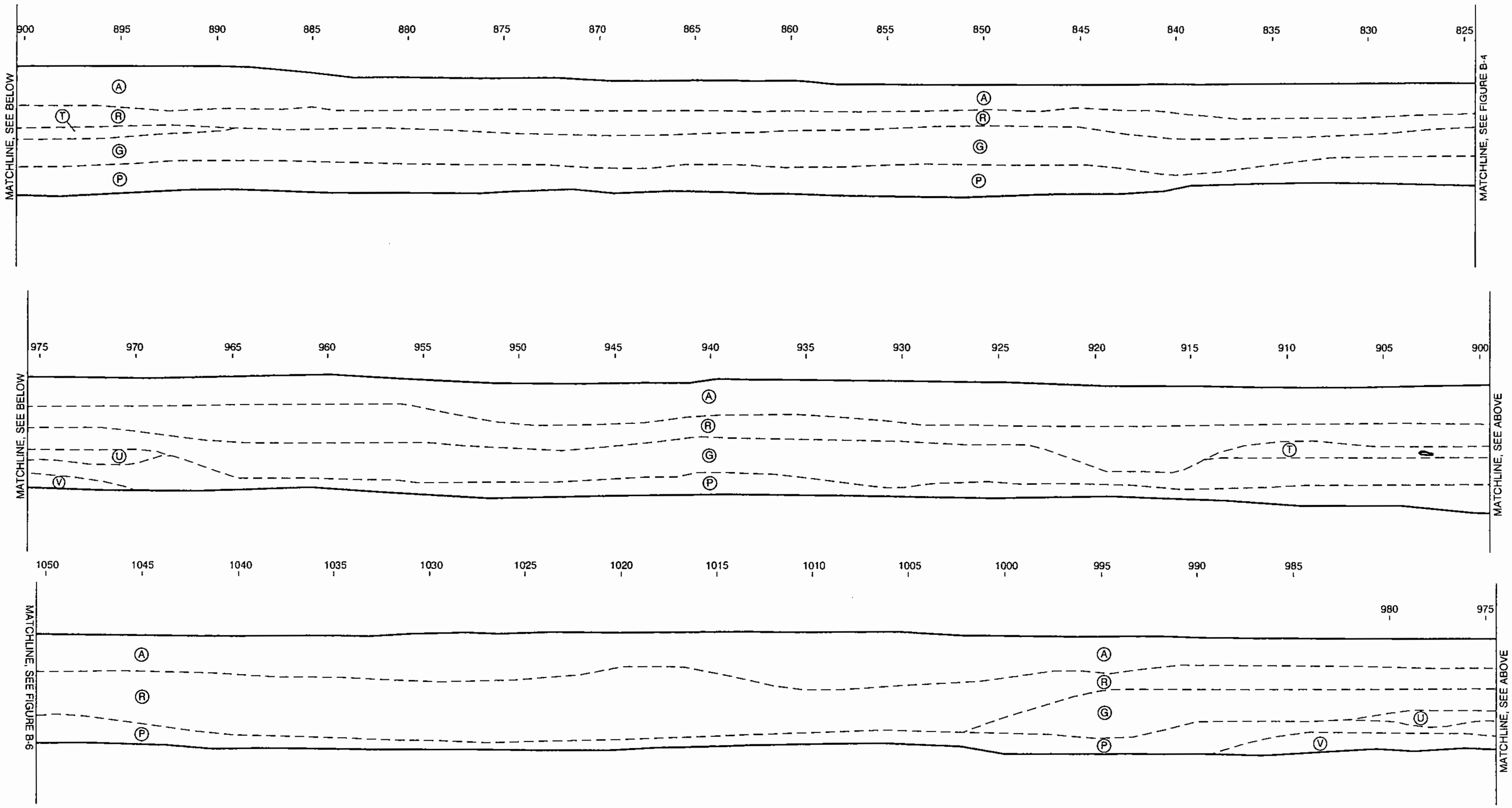
Ninyo & Moore		TRENCH LOG	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	C-3
105879004	5/09		

fig2 C-1-7 105879004 trench



FOR LEGEND, SEE FIGURE B-1

Ninyo & Moore		TRENCH LOG	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	C-4
105879004	5/09		



FOR LEGEND, SEE FIGURE B-1

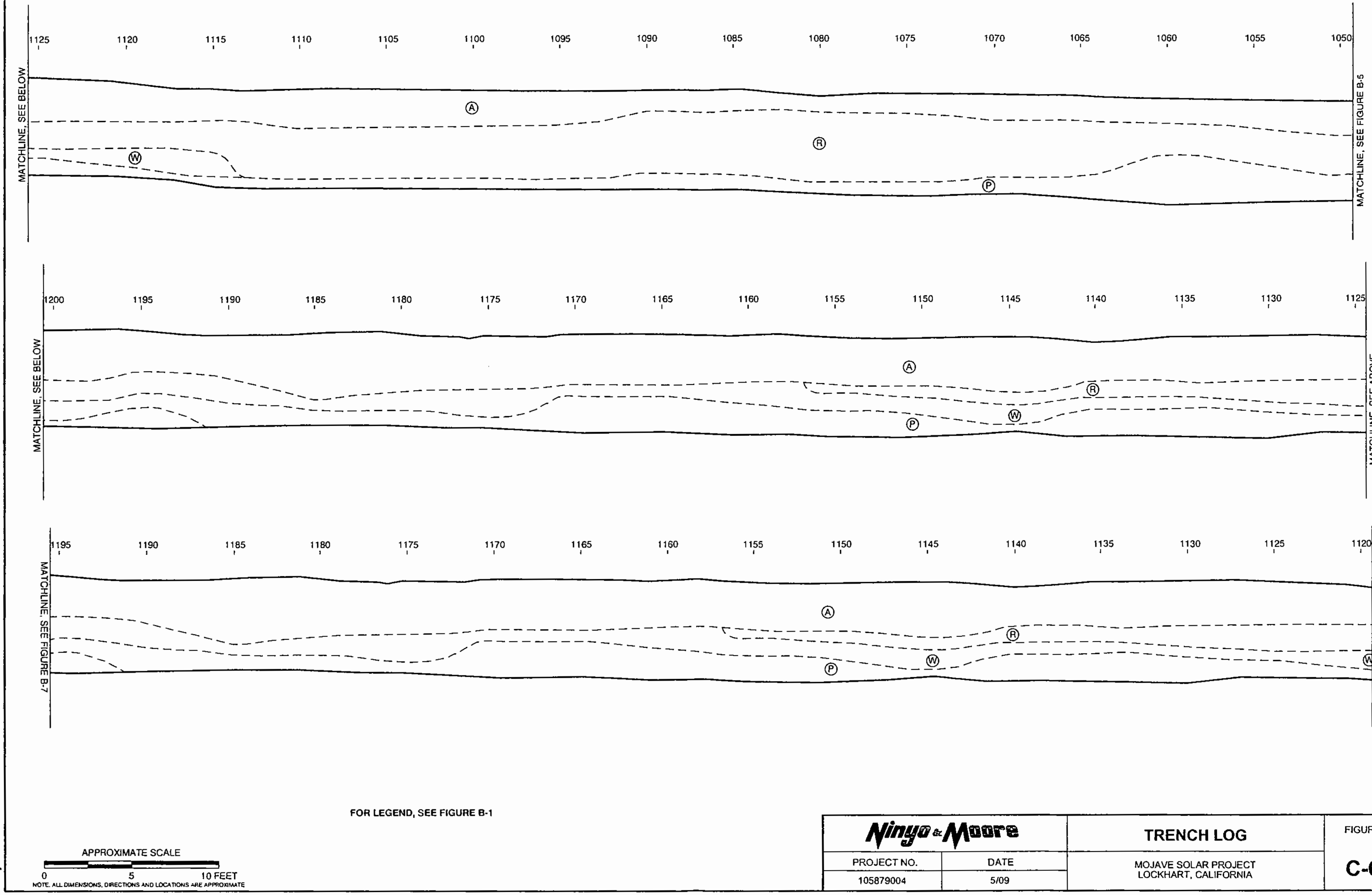
APPROXIMATE SCALE

0 5 10 FEET

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore		TRENCH LOG	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	C-5
105879004	5/09		

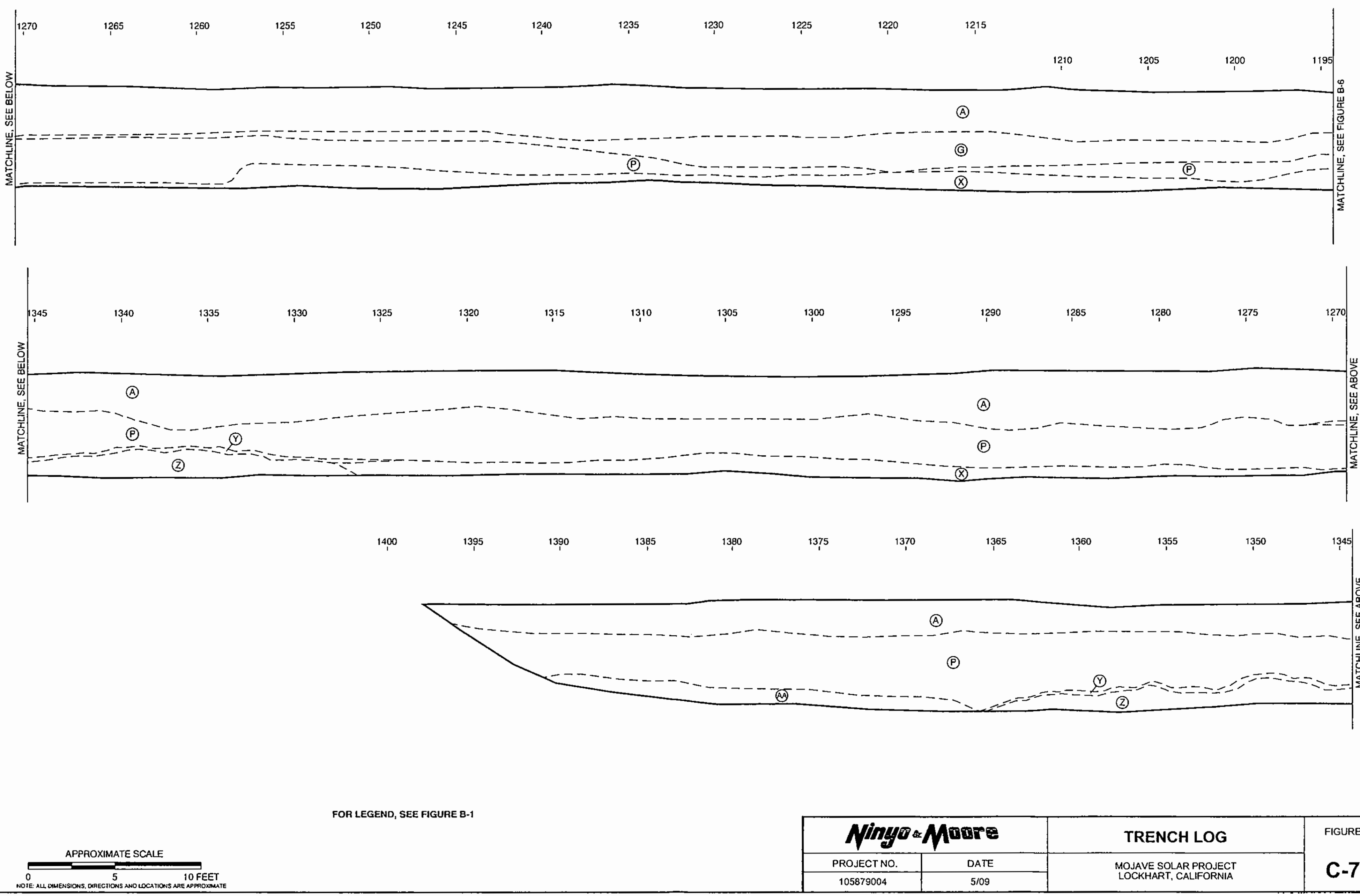
fig2 C-1-7 1058/9004 trench



FOR LEGEND, SEE FIGURE B-1

Ninyo & Moore		TRENCH LOG	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	C-6
105879004	5/09		

fig2 C-1-7 105879004 trench



FOR LEGEND, SEE FIGURE B-1

Ninyo & Moore		TRENCH LOG	FIGURE
PROJECT NO.	DATE	MOJAVE SOLAR PROJECT LOCKHART, CALIFORNIA	C-7
105879004	5/09		

fig2 C-1-7 105879004 trench

APPENDIX D

PERCOLATION TESTING RESULTS

Ninyo & Moore performed six percolation tests within the proposed evaporation pond and land farm areas at the subject site. The percolation tests are numbered PT-1 through PT-6 and their locations are shown on Figure 2. The percolation test borings were advanced on April 3, 2009 with a truck mounted, 8-inch diameter, continuous flight auger drill. The materials encountered in the borings consisted of old alluvium. As encountered, the alluvial materials generally consisted of light brown to brown, dry to damp, loose to medium dense, silty fine to coarse sand. The depth to the regional groundwater table at the site is anticipated to be on the order of 150 feet. Perched groundwater, however, was encountered in several of our borings at a depth of approximately 28 to 32 feet. Groundwater levels at the site may fluctuate due to seasonal variations, groundwater withdrawal or injection, or other factors.

Percolation testing was performed on April 6 and 9, 2009 at the approximate locations shown on Figure 2. The percolation tests were performed in general accordance with County of San Bernardino Department of Public Health guidelines presented in On-Site Waste Water Disposal System (OWWDS, 1992). Test holes were drilled approximately 3 feet deep and 6 inches in diameter. Approximately 2 inches of gravel was placed on the bottom of the hole. Varying lengths of 2-inch, perforated pipe were installed in an upright position on top of the gravel layer and then backfilled with approximately 1/2 cubic foot of gravel.

Each test hole was presoaked for 4 hours. To begin the percolation testing procedure, the test holes were filled with 12 inches of water. The test holes were given 30 minutes to percolate more than 5 inches of water. If 5 inches of water or more percolate within 30 minutes, then the fast test can be performed. Five of our tests were eligible for the fast test which consists of taking readings every ten minutes for the next hour. Test holes were refilled after each reading. Percolation test PT-6 did not percolate 5 inches of water in 30 minutes. The standard percolation test was performed consisting of taking readings every 30 minutes for the next four hours, refilling the test hole after each reading. The percolation rate was so slow in PT-6 that the test was terminated after one hour. Percolation test results were adjusted in accordance with the San Bernardino County Department of Public Health correction calculation for gravel-packed test holes. Adjusted percolation test results were 7, 9, 7, 4, 3, and more than 535 minutes per inch for tests PT-1 through PT-6, respectively. The percolation test borings were backfilled on April 6 and 9, 2009 at the conclusion of testing. Percolation test results are presented on the following tables.

Test Date - 4/06/09							PT - 1
Approximate Test Hole Diameter - 6.0 in					Approximate Test Hole Depth - 3.0 ft.		
Test performed and recorded by: BTM							
t_1	d_1	t_2	d_2	Δt	Δd	Rate (R, mpi)	Adjusted Rate (R, mpi)
0	2.50	10	2.77	10	0.27	3.1	6.8
11	2.50	21	2.76	10	0.26	3.2	7.0
21	2.50	31	2.75	10	0.25	3.3	7.3
32	2.50	42	2.75	10	0.25	3.3	7.3
44	2.50	54	2.75	10	0.25	3.3	7.3
55	2.50	65	2.75	10	0.25	3.3	7.3

Test Date - 4/06/09							PT - 2
Approximate Test Hole Diameter - 6.0 in					Approximate Test Hole Depth - 3.3 ft.		
Test performed and recorded by: BTM							
t_1	d_1	t_2	d_2	Δt	Δd	Rate (R, mpi)	Adjusted Rate (R, mpi)
0	2.80	10	3.02	10	0.22	3.8	8.3
11	2.80	21	3.01	10	0.21	4.0	8.7
21	2.80	31	3.00	10	0.20	4.2	9.2
32	2.80	42	3.01	10	0.21	4.0	8.7
44	2.80	54	3.01	10	0.21	4.0	8.7
55	2.80	65	3.01	10	0.21	4.0	8.7

Notes:

t_1 = initial time when filling or refilling is completed in minutes

d_1 = initial depth to water in hole at t_1 in feet

t_2 = final time when incremental water level reading is taken in minutes

d_2 = final depth to water in hole at t_2 in feet

Δt = change in time between initial and final water level readings in minutes (t_2 - t_1)

Δd = change in depth to water in feet (d_2 - d_1)

MPI = minutes per inch

Test Date - 4/06/09							PT - 3
Approximate Test Hole Diameter - 6.0 in					Approximate Test Hole Depth - 2.7 ft.		
Test performed and recorded by: BTM							
t_1	d_1	t_2	d_2	Δt	Δd	Rate (R, mpi)	Adjusted Rate (R, mpi)
0	2.20	10	2.49	10	0.29	2.9	6.3
12	2.20	22	2.47	10	0.27	3.1	6.8
23	2.20	33	2.48	10	0.28	3.0	6.5
33	2.20	43	2.47	10	0.27	3.1	6.8
44	2.20	54	2.47	10	0.27	3.1	6.8
55	2.20	65	2.47	10	0.27	3.1	6.8

Test Date - 4/06/09							PT - 4
Approximate Test Hole Diameter - 6.0 in					Approximate Test Hole Depth - 3.3 ft.		
Test performed and recorded by: BTM							
t_1	d_1	t_2	d_2	Δt	Δd	Rate (R, mpi)	Adjusted Rate (R, mpi)
0	2.80	9	3.30	9	0.50	1.5	3.3
11	2.80	20	3.30	9	0.50	1.5	3.3

Notes:

t_1 = initial time when filling or refilling is completed in minutes

d_1 = initial depth to water in hole at t_1 in feet

t_2 = final time when incremental water level reading is taken in minutes

d_2 = final depth to water in hole at t_2 in feet

Δt = change in time between initial and final water level readings in minutes (t_2 - t_1)

Δd = change in depth to water in feet (d_2 - d_1)

MPI = minutes per inch

Test Date - 4/06/09							PT - 5
Approximate Test Hole Diameter - 6.0 in Test performed and recorded by: BTM					Approximate Test Hole Depth - 2.8 ft.		
t_1	**d_1**	**t_2**	**d_2**	**Δt**	**Δd**	**Rate (R, mpi)**	**Adjusted Rate (R, mpi)**
0	2.25	8	2.75	8	0.50	1.3	2.9
10	2.25	18	2.75	8	0.50	1.3	2.9

Test Date - 4/09/09							PT - 6
Approximate Test Hole Diameter - 6.0 in Test performed and recorded by: BTM					Approximate Test Hole Depth - 3.3 ft.		
t_1	**d_1**	**t_2**	**d_2**	**Δt**	**Δd**	**Rate (R, mpi)**	**Adjusted Rate (R, mpi)**
0.0	2.72	30.0	2.72	30	0.00	NA	NA
30.0	2.72	60.0	2.73	30	0.01	250.0	549.6
60.0	2.73	90.0	2.73	30	0.00	NA	NA
90.0	2.73	120.0	2.74	30	0.01	250.0	549.6
120.0	2.74	150.0	2.74	30	0.00	NA	NA
150.0	2.74	180.0	2.75	30	0.01	250.0	549.6

Notes:

t_1 = initial time when filling or refilling is completed in minutes

d_1 = initial depth to water in hole at t_1 in feet

t_2 = final time when incremental water level reading is taken in minutes

d_2 = final depth to water in hole at t_2 in feet

Δt = change in time between initial and final water level readings in minutes ($t_2 - t_1$)

Δd = change in depth to water in feet ($d_2 - d_1$)

MPI = minutes per inch

NA = did not percolate

APPENDIX E

RESISTIVITY SURVEY

SOUTHWEST GEOPHYSICS, INC.
YOUR SUBSURFACE SOLUTION

April 27, 2009
Project No. 109087

Mr. Frank Moreland
Ninyo & Moore
5710 Ruffin Road
San Diego, California 92123

Subject: Geophysical Evaluation
Harper Lake Power Facility
San Bernardino County, California

Dear Mr. Moreland:

In accordance with your authorization, we have performed geophysical survey services for the proposed Harper Lake Power Facility to be located in the Lockhart area of San Bernardino County, California (Figure 1). The purpose of our services was to collect in-situ electrical resistivity measurements for use in the design and construction of the subject project. Our services were conducted on April 10, 2009. This report presents the survey methodology, equipment used, analysis, and results.

Our scope of services for the project included collection of electrical resistivity data at five locations on the property, compilation of the data collected, and preparation of this data report. Specifically we conducted two orthogonal resistivity soundings in north-south and east-west directions. The soundings are labeled "a" and "b" for the north-south and east-west directions, respectively. Figures 2a and 2b illustrate the approximate location of the lines, and Figures 3a through 3c depict the general site conditions in the area of the lines. The data were collected in general accordance with ASTM G 57 using an Advanced Geosciences, Inc. (AGI) SuperSting R8 earth resistivity meter and four stainless steel electrodes in a Wenner configuration. The SuperSting can generate up to 800 volts and 2 amps and allows for the direct measurement of resistance.

Soil resistance measurements were collected at electrode spacings of approximately 2, 5, 10, 15, 20, 30, 40, 60, and 80 feet, except for R-1 which had a maximum spacing of 60 feet. The general locations of the soundings were pre-selected by a representative of your office. The electrode locations were cleared of vegetation, and the soil around the electrode was moistened with salt water prior to conducting the measurements. Special care was exercised to ensure firm contact with the soil.

The results of the electrical resistivity surveys are presented in Figures 4a and 4b. In general, the measurements collected along orthogonal soundings are fairly consistent, indicating subsurface homogeneous conditions at the test locations. In addition, the standard deviation between multiple readings was generally less than 0.3 percent.

The field services and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions presented in this report. Please also note that our evaluation was limited to measuring in-situ apparent soil resistivity at locations generally selected by your office. Southwest Geophysics, Inc. should be contacted if the reader has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of this report by parties other than the client is undertaken at said parties' sole risk.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Sincerely,
SOUTHWEST GEOPHYSICS, INC.

Patrick Lehrmann, P.G., R.Gp.
Principal Geologist/Geophysicist

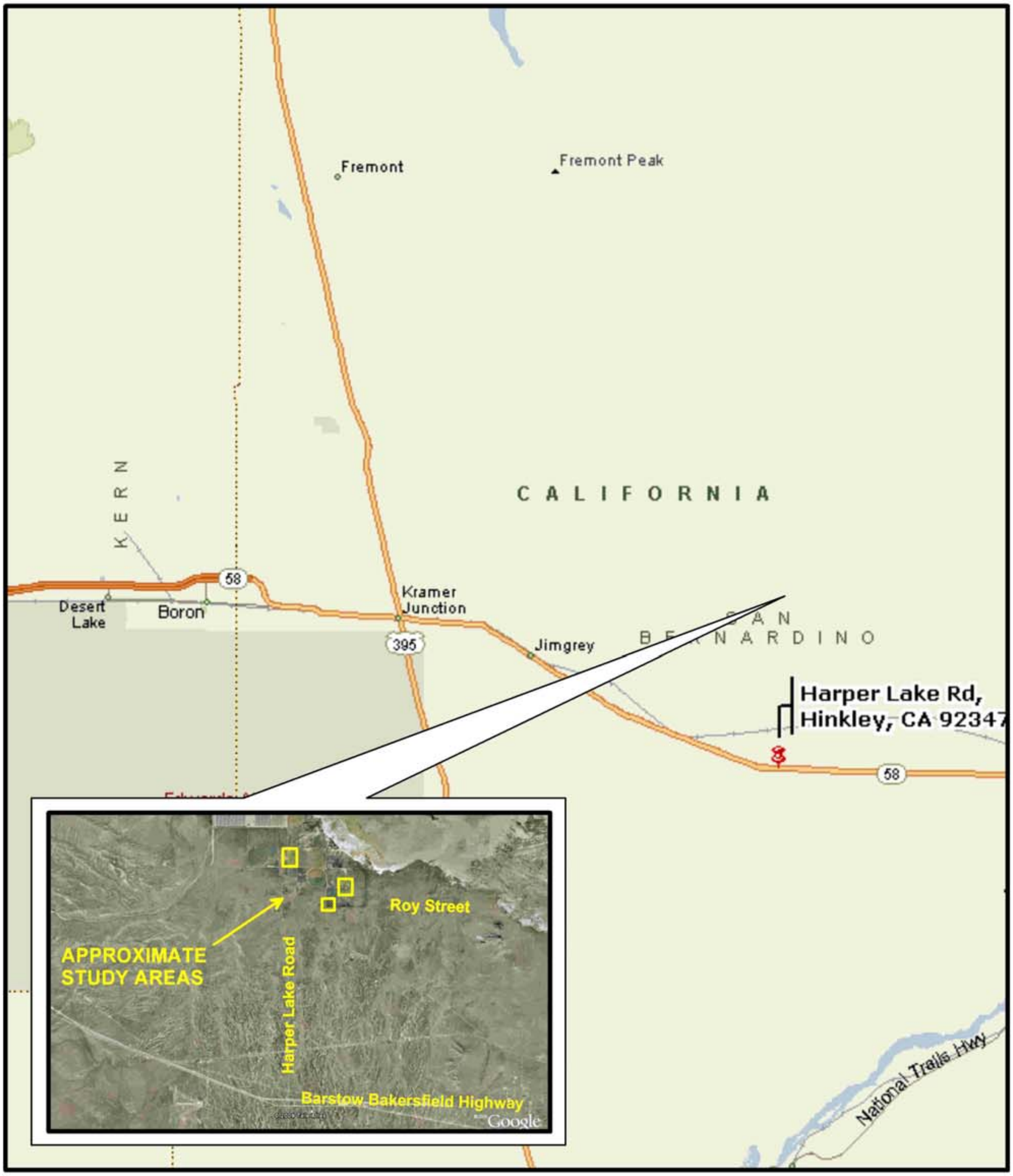
Hans van de Vrugt, C.E.G., R.Gp.
Principal Geologist/Geophysicist

HV/PFL/hv

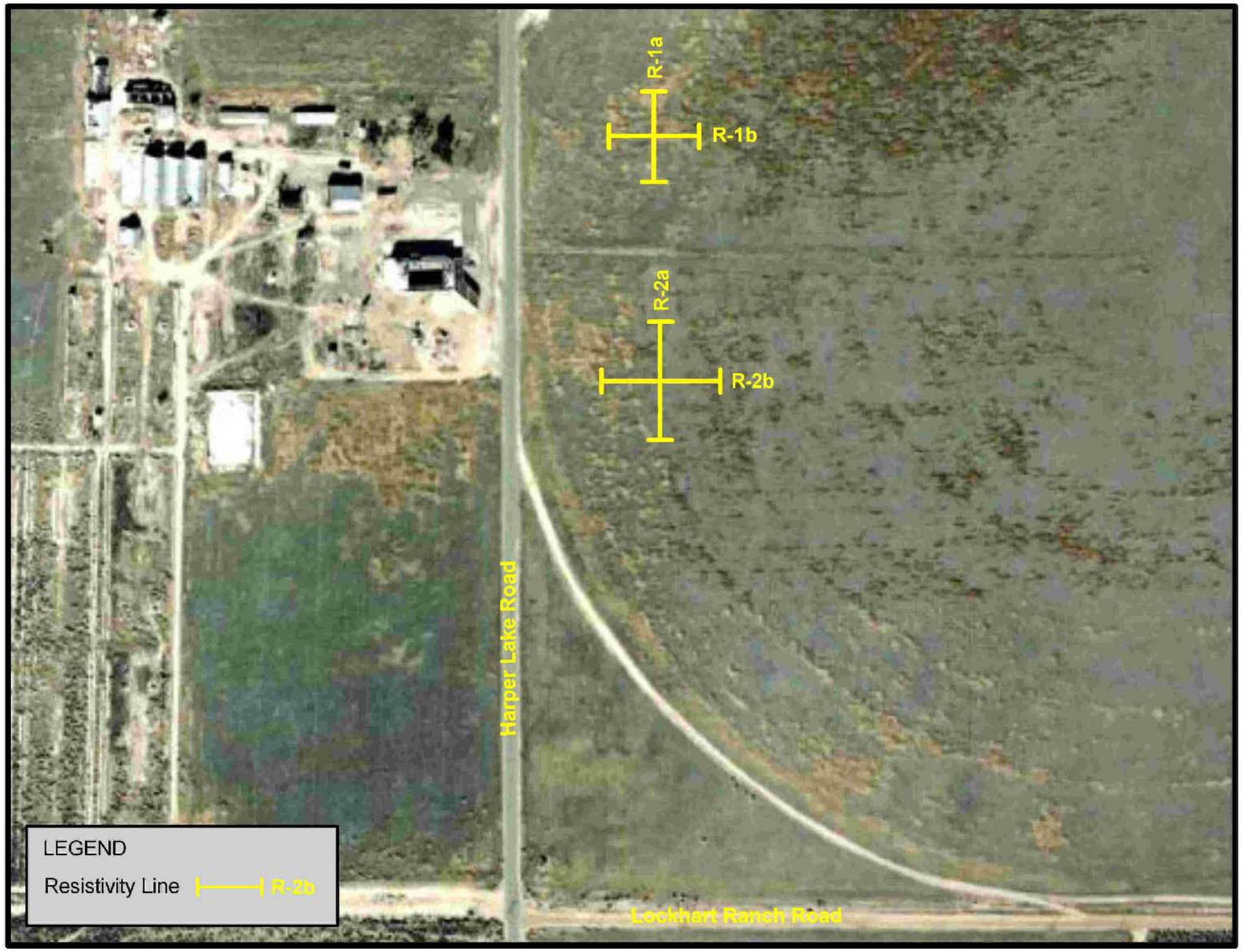
Attachments: Figure 1 – Site Location Map
Figures 2a and 2b – Resistivity Sounding Location Maps
Figures 3a and 3b – Site Photographs
Figures 4a and 4b – Electrical Resistivity Results

REGISTERED GEOPHYSICIST
Hans van de Vrugt
No 1012
Exp. 2/28/10
STATE OF CALIFORNIA

Distribution: Addressee (electronic)

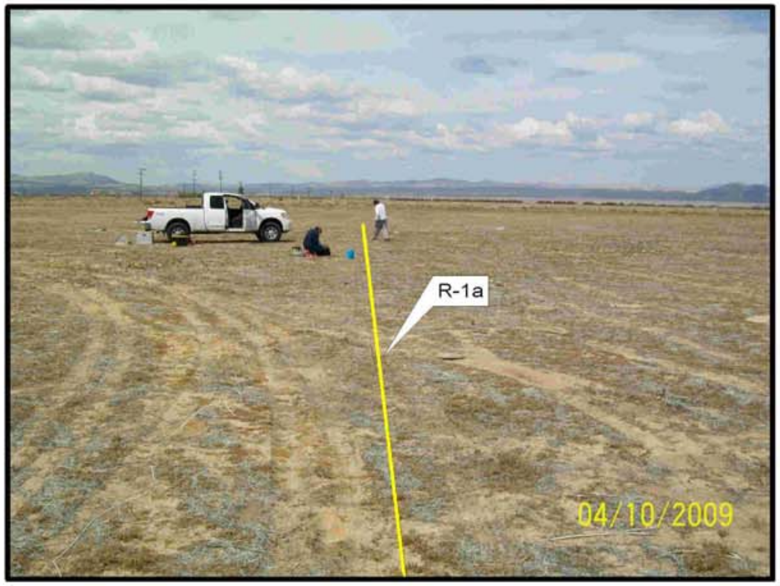


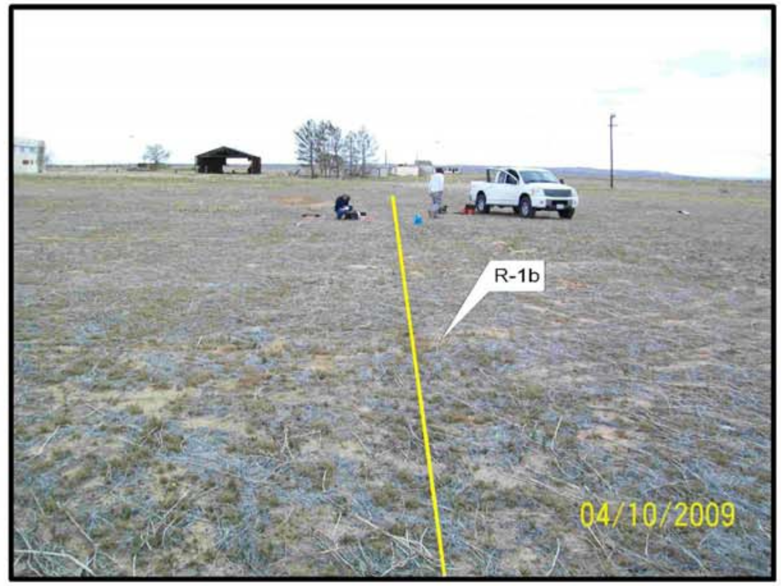
SITE LOCATION MAP	N	Harper Lake Power Facility San Bernardino County, California		SOUTHWEST GEOPHYSICS INC.
		Project No.: 109087	Date: 04/09	Figure 1

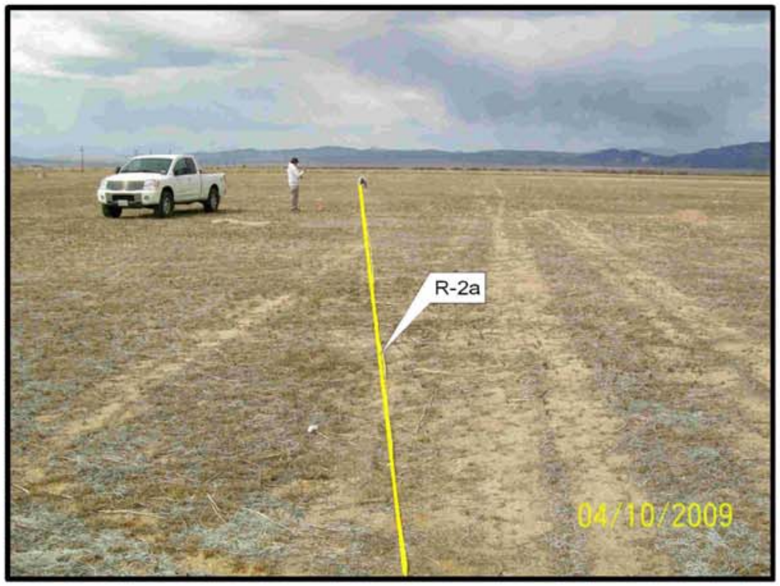


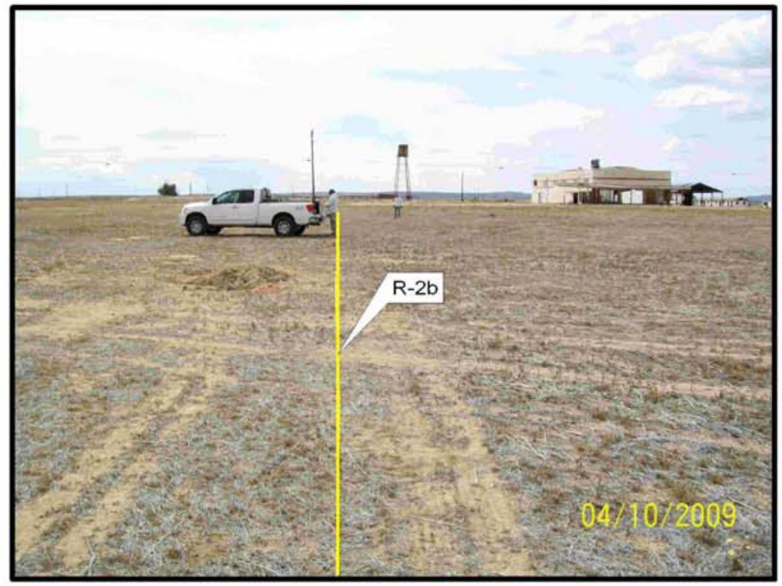
RESISTIVITY SOUNDING LOCATION MAP	N	Harper Lake Power Facility San Bernardino County, California Project No.: 109087 / Date: 04/09	SOUTHWEST GEOPHYSICS INC. Figure 2a	0 300 600 approximate scale in feet

RESISTIVITY SOUNDING LOCATION MAP	Harper Lake Power Facility San Bernardino County, California	SOUTHWEST GEOPHYSICS INC. Figure 2b
	Project No.: 109087 — Date: 04/09	

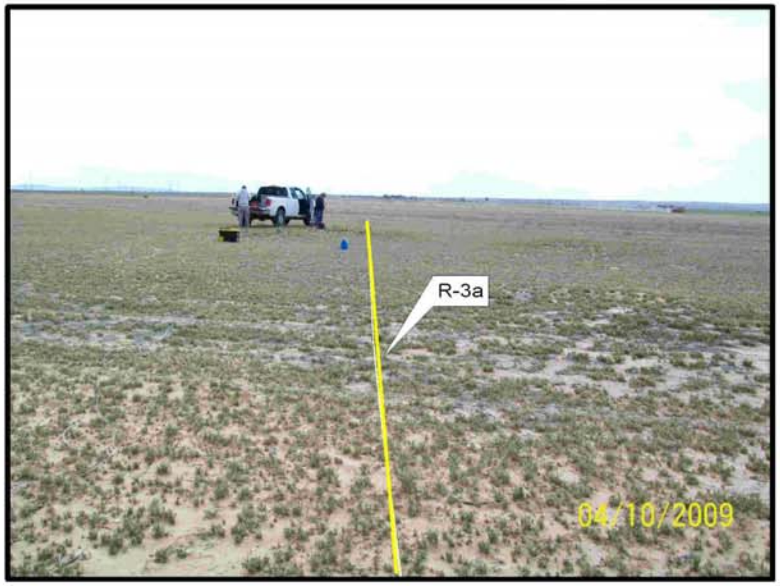


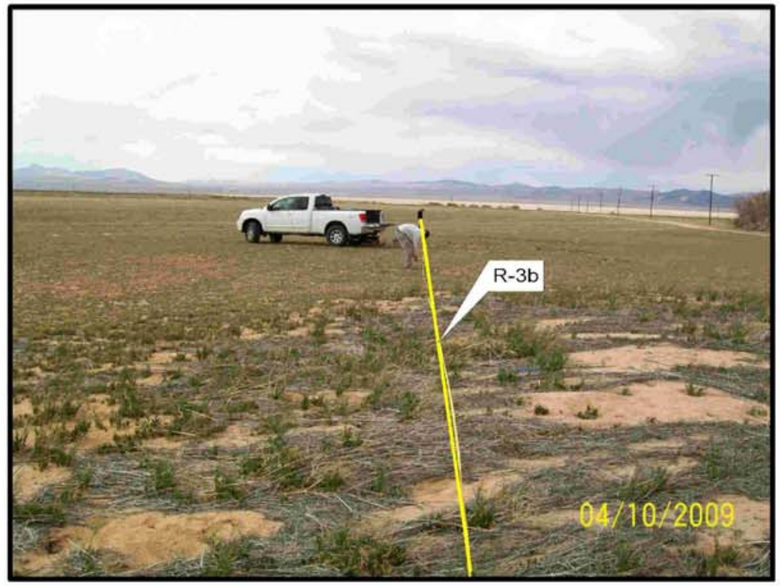


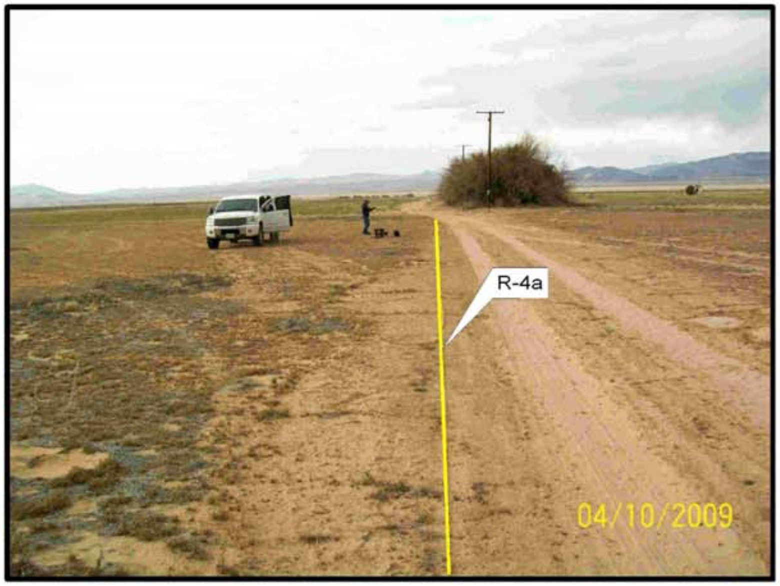


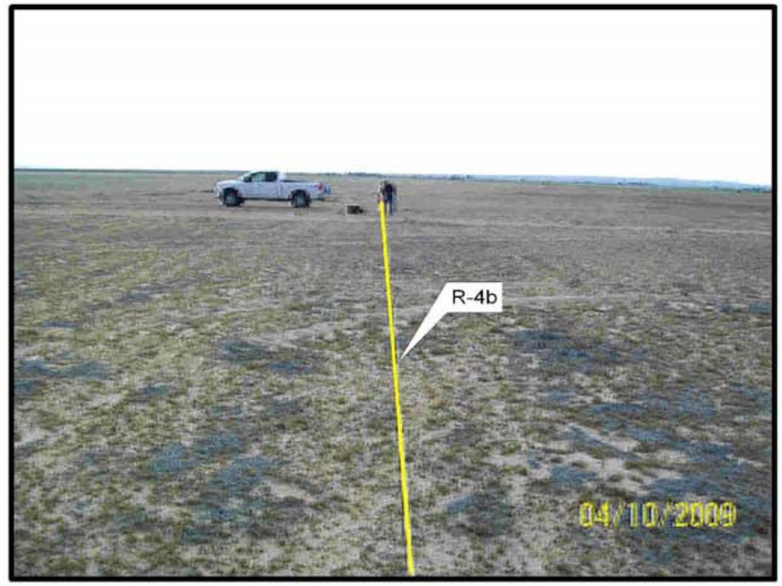


SITE PHOTOGRAPHS	Harper Lake Power Facility San Bernardino County, California Project No.: 109087 Date: 04/09	SOUTHWEST GEOPHYSICS INC. Figure 3a

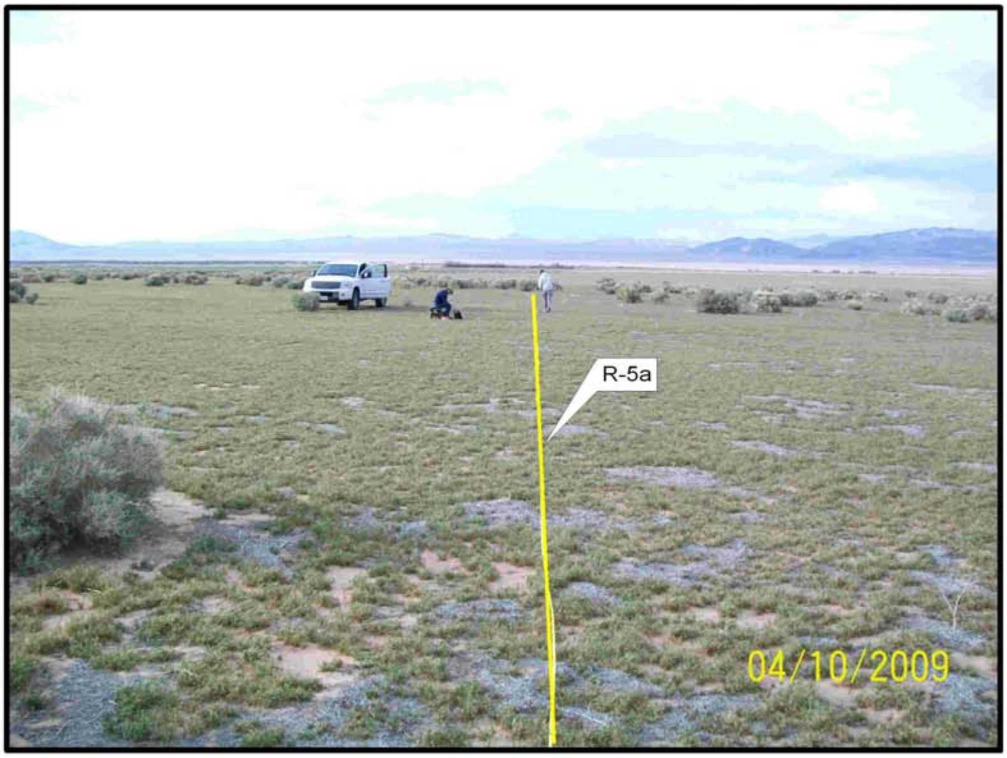


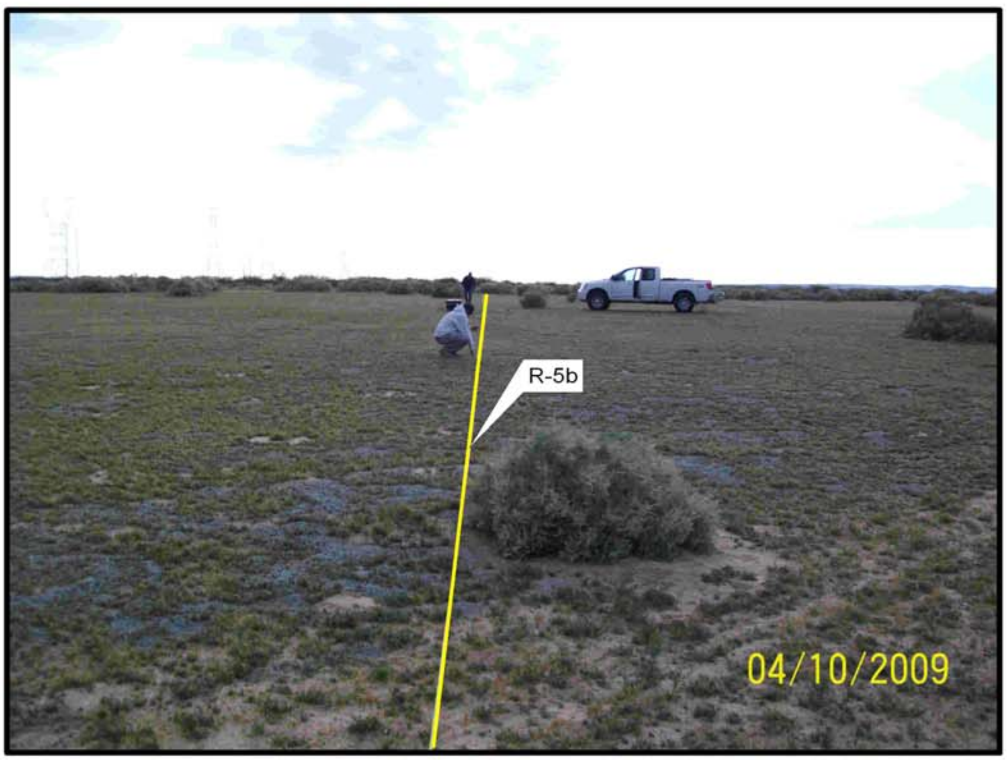






SITE PHOTOGRAPHS	Harper Lake Power Facility San Bernardino County, California Project No.: 109087 Date: 04/09	SOUTHWEST GEOPHYSICS INC. Figure 3b





SITE PHOTOGRAPHS

Harper Lake Power Facility
San Bernardino County, California

Project No.: 109087

Date: 04/09

SOUTHWEST GEOPHYSICS INC.

Figure 3c

Line No. (Orientation)	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity (ohm-cm)	Apparent Resistivity (ohm-ft)
R-1a	2	2.379	40.030	0.1	15332.40	503.03
(N-S)	5	2.914	10.160	0.1	9728.78	319.19
	10	3.346	2.530	0.1	4845.24	158.96
	15	2.478	1.284	0.0	3688.51	121.01
	20	4.469	0.835	0.2	3197.09	104.89
	30	6.615	0.443	0.0	2544.61	83.48
	40	3.18	0.507	1.2	3886.15	127.50
	60	7.238	0.487	0.0	5600.56	183.75
R-1b	2	4.296	39.740	0.0	15221.32	499.39
(E-W)	5	6.485	10.100	0.1	9671.32	317.30
	10	2.555	3.434	0.2	6576.50	215.76
	15	16.52	1.361	0.0	3909.70	128.27
	20	3.601	1.491	0.1	5710.87	187.36
	30	7.96	0.551	0.3	3162.81	103.77
	40	7.518	0.320	0.0	2449.81	80.37
	60	3.146	0.240	0.2	2754.32	90.36
R-2a	2	25.26	28.620	0.0	10962.11	359.65
(N-S)	5	36.68	10.830	0.1	10370.34	340.23
	10	17.01	2.930	0.0	5611.28	184.10
	15	13.81	1.451	0.0	4168.24	136.75
	20	16.1	0.952	0.0	3647.91	119.68
	30	22.82	0.460	0.0	2640.56	86.63
	40	17.23	0.280	0.1	2144.16	70.35
	60	14.54	0.096	0.0	1097.59	36.01
	80	8.113	0.057	0.2	878.04	28.81
R-2b	2	12.41	31.260	0.0	11973.29	392.82
(E-W)	5	34.18	9.812	0.0	9395.55	308.25
	10	12.58	3.574	0.0	6844.61	224.56
	15	9.211	1.814	0.1	5211.02	170.97
	20	11.58	1.048	0.1	4014.08	131.70
	30	57.12	0.475	0.1	2731.33	89.61
	40	79.82	0.246	0.0	1885.24	61.85
	60	18.9	0.102	0.2	1175.50	38.57
	80	26.12	0.050	0.2	763.61	25.05
R-3a	2	29.46	33.550	0.0	12850.41	421.60
(N-S)	5	38.14	5.773	0.0	5527.97	181.36
	10	20.78	1.441	0.0	2759.68	90.54
	15	24.98	0.766	0.0	2200.18	72.18
	20	12.05	0.561	0.0	2149.52	70.52
	30	7.634	0.309	0.1	1774.74	58.23
	40	20.4	0.189	0.1	1450.12	47.58
	60	30.51	0.087	0.2	1001.76	32.87
	80	11.36	0.040	0.1	618.20	20.28

Electrical Resistivity Results

Harper Lake Power Facility
San Bernardino County, California

Project No.: 109087 | Date: 04/09

SOUTHWEST GEOPHYSICS INC.

Figure 4a

Line No. (Orientation)	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity	
					(ohm-cm)	(ohm-ft)
R-3b	2	4.814	44.950	0.2	17216.87	564.86
(E-W)	5	15.99	5.607	0.0	5369.02	176.15
	10	20.5	1.274	0.0	2439.85	80.05
	15	5.651	0.763	0.1	2191.85	71.91
	20	12.11	0.506	0.1	1938.86	63.61
	30	16.86	0.305	0.1	1749.46	57.40
	40	15.09	0.207	0.1	1581.88	51.90
	60	10.75	0.084	0.2	970.16	31.83
	80	21.73	0.051	0.0	777.54	25.51
R-4a	2	23.87	41.380	0.0	15849.48	520.00
(N-S)	5	15.06	6.492	0.0	6216.46	203.95
	10	26.57	1.522	0.0	2914.80	95.63
	15	18.23	1.127	0.0	3237.50	106.22
	20	22.96	0.962	0.0	3685.83	120.93
	30	37.47	0.660	0.0	3791.35	124.39
	40	66.99	0.460	0.0	3523.04	115.59
	60	44.22	0.221	0.1	2535.99	83.20
	80	20.57	0.112	0.1	1714.41	56.25
R-4b	2	14.09	43.530	0.1	16672.98	547.01
(E-W)	5	23.78	6.061	0.1	5803.75	190.41
	10	20.62	1.471	0.0	2817.13	92.43
	15	18.24	1.149	0.0	3300.70	108.29
	20	28	1.021	0.1	3910.66	128.30
	30	13.5	0.658	0.2	3779.28	123.99
	40	11.73	0.432	0.3	3307.78	108.52
	60	4.493	0.254	0.3	2916.33	95.68
	80	5.908	0.140	0.0	2137.27	70.12
R-5a	2	14.8	32.500	0.0	12448.24	408.41
(N-S)	5	6.577	5.424	0.0	5193.79	170.40
	10	2.643	2.725	0.1	5218.68	171.22
	15	7.87	1.155	0.0	3317.93	108.86
	20	7.668	0.890	0.1	3409.67	111.87
	30	5.393	0.753	0.1	4328.54	142.01
	40	6.53	0.473	0.1	3626.46	118.98
	60	6.072	0.303	0.2	3479.38	114.15
	80	10	0.200	0.1	3056.52	100.28
R-5b	2	7.478	33.090	0.0	12674.22	415.82
(E-W)	5	7.415	5.413	0.0	5183.25	170.05
	10	6.479	2.489	0.2	4766.72	156.39
	15	5.087	1.492	0.0	4286.02	140.62
	20	7.748	0.868	0.0	3323.87	109.05
	30	6.464	0.638	0.0	3666.68	120.30
	40	5.679	0.461	0.2	3531.47	115.86
	60	8.539	0.317	0.1	3644.84	119.58
	80	7.098	0.212	0.1	3246.50	106.51

Electrical Resistivity Results

Harper Lake Power Facility
San Bernardino County, California

Project No.: 109087

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SOUTHWEST GEOPHYSICS INC.

Figure 4b

APPENDIX F

TYPICAL EARTHWORK GUIDELINES

TABLE OF CONTENTS

TYPICAL EARTHWORK GUIDELINES

1. GENERAL

These guidelines and the standard details attached hereto are presented as general procedures for earthwork construction for sites having slopes less than 10 feet high. They are to be utilized in conjunction with the project grading plans. These guidelines are considered a part of the geotechnical report, but are superseded by recommendations in the geotechnical report in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations which could supersede these specifications and/or the recommendations of the geotechnical report. It is the responsibility of the contractor to read and understand these guidelines as well as the geotechnical report and project grading plans.

1.1. The contractor shall not vary from these guidelines without prior recommendations by the geotechnical consultant and the approval of the client or the client's authorized representative. Recommendations by the geotechnical consultant and/or client shall not be considered to preclude requirements for approval by the jurisdictional agency prior to the execution of any changes.

1.2. The contractor shall perform the grading operations in accordance with these specifications, and shall be responsible for the quality of the finished product notwithstanding the fact that grading work will be observed and tested by the geotechnical consultant.

1.3. It is the responsibility of the grading contractor to notify the geotechnical consultant and the jurisdictional agencies, as needed, prior to the start of work at the site and at any time that grading resumes after interruption. Each step of the grading operations shall be observed and documented by the geotechnical consultant and, where needed, reviewed by the appropriate jurisdictional agency prior to proceeding with subsequent work.

1.4. If, during the grading operations, geotechnical conditions are encountered which were not anticipated or described in the geotechnical report, the geotechnical consultant shall be notified immediately and additional recommendations, if applicable, may be provided.

1.5. An as-graded report shall be prepared by the geotechnical consultant and signed by a registered engineer and registered engineering geologist. The report documents the geotechnical consultants' observations, and field and laboratory test results, and provides conclusions regarding whether or not earthwork construction was performed in accordance with the geotechnical recommendations and the grading plans. Recommendations for foundation design, pavement design, subgrade treatment, etc., may also be included in the as-graded report.

1.6. For the purpose of evaluating quantities of materials excavated during grading and/or locating the limits of excavations, a licensed land surveyor or civil engineer shall be retained.

1.7. Definitions of terms utilized in the remainder of these specifications have been provided in Section 11.

2. OBLIGATIONS OF PARTIES

The parties involved in the projects earthwork activities shall be responsible as outlined in the following sections.

2.1. The client is ultimately responsible for each of the aspects of the project. The client or the client's authorized representative has a responsibility to review the findings and recommendations of the geotechnical consultant. The client shall authorize the contractor and/or other consultants to perform work and/or provide services. During grading the client or the client's authorized representative shall remain on site or remain reasonably accessible to the concerned parties to make the decisions that may be needed to maintain the flow of the project.

2.2. The contractor is responsible for the safety of the project and satisfactory completion of grading and other associated operations, including, but not limited to, earthwork in accordance with the project plans, specifications, and jurisdictional agency requirements. During grading, the contractor or the contractor's authorized representative shall remain on site. The contractor shall further remain accessible during non-working hours, including at night and during days off.

2.3. The geotechnical consultant shall provide observation and testing services and shall make evaluations to advise the client on geotechnical matters. The geotechnical consultant shall report findings and recommendations to the client or the client's authorized representative.

2.4. Prior to proceeding with any grading operations, the geotechnical consultant shall be notified two working days in advance to schedule the needed observation and testing services.

2.4.1. Prior to any significant expansion or reduction in the grading operation, the geotechnical consultant shall be provided with two working days notice to make appropriate adjustments in scheduling of on-site personnel.

2.4.2. Between phases of grading operations, the geotechnical consultant shall be provided with two working days notice in advance of commencement of additional grading operations.

3. SITE PREPARATION

Site preparation shall be performed in accordance with the recommendations presented in the following sections.

3.1. The client, prior to any site preparation or grading, shall arrange and attend a pre-grading meeting between the grading contractor, the design engineer, the geotechnical consultant, and representatives of appropriate governing authorities, as well as any other involved parties. The parties shall be given two working days notice.

3.2. Clearing and grubbing shall consist of the substantial removal of vegetation, brush, grass, wood, stumps, trees, tree roots greater than 1/2-inch in diameter, and other deleterious materials from the areas to be graded. Clearing and grubbing shall extend to the outside of the proposed excavation and fill areas.

3.3. Demolition in the areas to be graded shall include removal of building structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, etc.), and other manmade surface and subsurface improvements, and the backfilling of mining shafts, tunnels and surface depressions. Demolition of utilities shall include capping or rerouting of pipelines at the project perimeter, and abandonment of wells in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition.

3.4. The debris generated during clearing, grubbing and/or demolition operations shall be removed from areas to be graded and disposed of off site at a legal dump site. Clearing, grubbing, and demolition operations shall be performed under the observation of the geotechnical consultant.

3.5. The ground surface beneath proposed fill areas shall be stripped of loose or unsuitable soil. These soils may be used as compacted fill provided they are generally free of organic or other deleterious materials and evaluated for use by the geotechnical consultant. The resulting surface shall be evaluated by the geotechnical consultant prior to proceeding. The cleared, natural ground surface shall be scarified to a depth of approximately 8 inches, moisture conditioned, and compacted in accordance with the specifications presented in Section 5 of these guidelines.

4. REMOVALS AND EXCAVATIONS

Removals and excavations shall be performed as recommended in the following sections.

4.1. Removals

4.1.1. Materials which are considered unsuitable shall be excavated under the observation of the geotechnical consultant in accordance with the recommendations contained herein. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic, compressible natural soils, fractured, weathered, soft bedrock, and undocumented or otherwise deleterious fill materials.

4.1.2. Materials deemed by the geotechnical consultant to be unsatisfactory due to moisture conditions shall be excavated in accordance with the recommendations of the geotechnical consultant, watered or dried as needed, and mixed to a generally uniform moisture content in accordance with the specifications presented in Section 5 of this document.

4.2. Excavations

4.2.1. Temporary excavations no deeper than 5 feet in firm fill or natural materials may be made with vertical side slopes. To satisfy California Occupational Safety and Health Administration (CAL OSHA) requirements, any excavation deeper than 5 feet shall be shored or laid back at a 1:1 inclination or flatter, depending on material type, if construction workers are to enter the excavation.

5. COMPACTED FILL

Fill shall be constructed as specified below or by other methods recommended by the geotechnical consultant. Unless otherwise specified, fill soils shall be compacted to 90 percent relative compaction, as evaluated in accordance with ASTM Test Method D 1557.

5.1. Prior to placement of compacted fill, the contractor shall request an evaluation of the exposed ground surface by the geotechnical consultant. Unless otherwise recommended, the exposed ground surface shall then be scarified to a depth of approximately 8 inches and watered or dried, as needed, to achieve a generally uniform moisture content at or near the optimum moisture content. The scarified materials shall then be compacted to 90 percent relative compaction. The evaluation of compaction by the geotechnical consultant shall not be considered to preclude any requirements for observation or approval by governing agencies. It is the contractor's responsibility to notify the geotechnical consultant and the appropriate governing agency when project areas are ready for observation, and to provide reasonable time for that review.

5.2. Excavated on-site materials which are in general compliance with the recommendations of the geotechnical consultant may be utilized as compacted fill provided they are generally free of organic or other deleterious materials and do not contain rock fragments greater than 6 inches in dimension. During grading, the contractor may encounter soil types other than those analyzed during the preliminary geotechnical study. The geotechnical consultant shall be consulted to evaluate the suitability of any such soils for use as compacted fill.

5.3. Where imported materials are to be used on site, the geotechnical consultant shall be notified three working days in advance of importation in order that it may sample and test the materials from the proposed borrow sites. No imported materials shall be delivered for use on site without prior sampling, testing, and evaluation by the geotechnical consultant.

5.4. Soils imported for on-site use shall preferably have very low to low expansion potential (based on UBC Standard 18-2 test procedures). Lots on which expansive soils may be exposed at grade shall be undercut 3 feet or more and capped with very low to low expansion potential fill. Details of the undercutting are provided in the Transition and Undercut Lot Details, Figure B of these guidelines. In the event expansive soils are present near the ground surface, special design and construction considerations shall be utilized in general accordance with the recommendations of the geotechnical consultant.

5.5. Fill materials shall be moisture conditioned to near optimum moisture content prior to placement. The optimum moisture content will vary with material type and other factors. Moisture conditioning of fill soils shall be generally uniform in the soil mass.

5.6. Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill shall be prepared to receive fill. Preparation may include scarification, moisture conditioning, and recompaction.

5.7. Compacted fill shall be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift shall be watered or dried as needed to achieve near optimum moisture condition, mixed, and then compacted by mechanical methods, using sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other appropriate compacting rollers, to the specified relative compaction. Successive lifts shall be treated in a like manner until the desired finished grades are achieved.

5.8. Fill shall be tested in the field by the geotechnical consultant for evaluation of general compliance with the recommended relative compaction and moisture conditions. Field density testing shall conform to ASTM D 1556-00 (Sand Cone method), D 2937-00 (Drive-Cylinder method), and/or D 2922-96 and D 3017-96 (Nuclear Gauge method). Generally, one test shall be provided for approximately every 2 vertical feet of fill placed, or for approximately every 1000 cubic yards of fill placed. In addition, on slope faces one or more tests shall be taken for approximately every 10,000 square feet of slope face and/or approximately every 10 vertical feet of slope height. Actual test intervals may vary as field conditions dictate. Fill found to be out of conformance with the grading recommendations shall be removed, moisture conditioned, and compacted or otherwise handled to accomplish general compliance with the grading recommendations.

5.9. The contractor shall assist the geotechnical consultant by excavating suitable test pits for removal evaluation and/or for testing of compacted fill.

5.10. At the request of the geotechnical consultant, the contractor shall "shut down" or restrict grading equipment from operating in the area being tested to provide adequate testing time and safety for the field technician.

5.11. The geotechnical consultant shall maintain a map with the approximate locations of field density tests. Unless the client provides for surveying of the test locations, the locations shown by the geotechnical consultant will be estimated. The geotechnical consultant shall not be held responsible for the accuracy of the horizontal or vertical locations or elevations.

5.12. Grading operations shall be performed under the observation of the geotechnical consultant. Testing and evaluation by the geotechnical consultant does not preclude the need for approval by or other requirements of the jurisdictional agencies.

5.13. Fill materials shall not be placed, spread or compacted during unfavorable weather conditions. When work is interrupted by heavy rains, the filling operation shall not be resumed until tests indicate that moisture content and density of the fill meet the project specifications. Regrading of the near-surface soil may be needed to achieve the specified moisture content and density.

5.14. Upon completion of grading and termination of observation by the geotechnical consultant, no further filling or excavating, including that planned for footings, foundations, retaining walls or other features, shall be performed without the involvement of the geotechnical consultant.

5.15. Fill placed in areas not previously viewed and evaluated by the geotechnical consultant may have to be removed and recompacted at the contractor's expense. The depth and extent of removal of the unobserved and undocumented fill will be decided based upon review of the field conditions by the geotechnical consultant.

5.16. Off-site fill shall be treated in the same manner as recommended in these specifications for on-site fills. Off-site fill subdrains temporarily terminated (up gradient) shall be surveyed for future locating and connection.

6. OVERSIZED MATERIAL

Oversized material shall be placed in accordance with the following recommendations.

6.1. During the course of grading operations, rocks or similar irreducible materials greater than 6 inches in dimension (oversized material) may be generated. These materials shall not be placed within the compacted fill unless placed in general accordance with the recommendations of the geotechnical consultant.

6.2. Where oversized rock (greater than 6 inches in dimension) or similar irreducible material is generated during grading, it is recommended, where practical, to waste such material off site, or on site in areas designated as "nonstructural rock disposal areas." Rock designated for disposal areas shall be placed with sufficient sandy soil to generally fill voids. The disposal area shall be capped with a 5-foot thickness of fill which is generally free of oversized material.

6.3. Rocks 6 inches in dimension and smaller may be utilized within the compacted fill, provided they are placed in such a manner that nesting of rock is not permitted. Fill shall be placed and compacted over and around the rock. The amount of rock greater than 3/4-inch in dimension shall generally not exceed 40 percent of the total dry weight of the fill mass, unless the fill is specially designed and constructed as a "rock fill."

6.4. Rocks or similar irreducible materials greater than 6 inches but less than 4 feet in dimension generated during grading may be placed in windrows and capped with finer materials in accordance with the recommendations of the geotechnical consultant, the approval of the governing agencies, and the Oversized Rock Placement Detail, Figure D, of these guidelines. Selected native or imported granular soil (Sand Equivalent of 30 or higher) shall be placed and flooded over and around the windrowed rock such that voids are filled. Windrows of oversized materials shall be staggered so that successive windrows of oversized materials are not in the same vertical plane. Rocks greater than 4 feet in dimension shall be broken down to 4 feet or smaller before placement, or they shall be disposed of off site.

7. SLOPES

The following sections provide recommendations for cut and fill slopes.

7.1. Cut Slopes

7.1.1. The geotechnical consultant shall observe cut slopes during excavation. The geotechnical consultant shall be notified by the contractor prior to beginning slope excavations.

7.1.2. If, during the course of grading, adverse or potentially adverse geotechnical conditions are encountered in the slope which were not anticipated in the preliminary evaluation report, the geotechnical consultant shall evaluate the conditions and provide appropriate recommendations.

7.2. Fill Slopes

7.2.1. When placing fill on slopes steeper than 5:1 (horizontal:vertical), topsoil, slope wash, colluvium, and other materials deemed unsuitable shall be removed. Near-horizontal keys and near-vertical benches shall be excavated into sound bedrock or firm fill material, in accordance with the recommendation of the geotechnical consultant. Keying and benching shall be accomplished. Compacted fill shall not be placed in an area subsequent to keying and benching until the area has been observed by the geotechnical consultant. Where the natural gradient of a slope is less than 5:1, benching is generally not recommended. However, fill shall not be placed on compressible or otherwise unsuitable materials left on the slope face.

7.2.2. Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a temporary slope, benching shall be conducted in the manner described in Section 7.2.1. A 3-foot or higher near-vertical bench shall be excavated into the documented fill prior to placement of additional fill.

7.2.3. Unless otherwise recommended by the geotechnical consultant and accepted by the Building Official, permanent fill slopes shall not be steeper than 2:1 (horizontal:vertical). The height of a fill slope shall be evaluated by the geotechnical consultant.

7.2.4. Unless specifically recommended otherwise, compacted fill slopes shall be overbuilt and cut back to grade, exposing firm compacted fill. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes shall be overexcavated and reconstructed in accordance with the recommendations of the geotechnical consultant. The degree of overbuilding may be increased until the desired compacted slope face condition is achieved. Care shall be taken by the contractor to provide mechanical compaction as close to the outer edge of the overbuilt slope surface as practical.

7.2.5. If access restrictions, property line location, or other constraints limit overbuilding and cutting back of the slope face, an alternative method for compaction of the slope face may be attempted by conventional construction procedures including backrolling at intervals of 4 feet or less in vertical slope height, or as dictated by the capability of the available equipment, whichever is less. Fill slopes shall be backrolled utilizing a conventional sheeps foot-type roller. Care shall be taken to maintain the specified moisture conditions and/or reestablish the same, as needed, prior to backrolling.

7.2.6. The placement, moisture conditioning and compaction of fill slope materials shall be done in accordance with the recommendations presented in Section 5 of these guidelines.

7.2.7. The contractor shall be ultimately responsible for placing and compacting the soil out to the slope face to obtain a relative compaction of 90 percent as evaluated by ASTM D 1557 and a moisture content in accordance with Section 5. The geotechnical consultant shall perform field moisture and density tests at intervals of one test for approximately every 10,000 square feet of slope.

7.2.8. Backdrains shall be provided in fill as recommended by the geotechnical consultant.

7.3. Top-of-Slope Drainage

7.3.1. For pad areas above slopes, positive drainage shall be established away from the top of slope. This may be accomplished utilizing a berm and pad gradient of 2 percent or steeper at the top-of-slope areas. Site runoff shall not be permitted to flow over the tops of slopes.

7.3.2. Gunite-lined brow ditches shall be placed at the top of cut slopes to redirect surface runoff away from the slope face where drainage devices are not otherwise provided.

7.4. Slope Maintenance

7.4.1. In order to enhance surficial slope stability, slope planting shall be accomplished at the completion of grading. Slope plants shall consist of deep-rooting, variable root depth, drought-tolerant vegetation. Native vegetation is generally desirable. Plants native to semiarid and arid areas may also be appropriate. Large-leafed ice plant should not be used on slopes. A landscape architect shall be consulted regarding the actual types of plants and planting configuration to be used.

7.4.2. Irrigation pipes shall be anchored to slope faces and not placed in trenches excavated into slope faces. Slope irrigation shall be maintained at a level just sufficient to support plant growth. Property owners shall be made aware that over watering of slopes is detrimental to slope stability. Slopes shall be monitored regularly and broken sprinkler heads and/or pipes shall be repaired immediately.

7.4.3. Periodic observation of landscaped slope areas shall be planned and appropriate measures taken to enhance growth of landscape plants.

7.4.4. Graded swales at the top of slopes and terrace drains shall be installed and the property owners notified that the drains shall be periodically checked so that they may be kept clear. Damage to drainage improvements shall be repaired immediately. To reduce siltation, terrace drains shall be constructed at a gradient of 3 percent or steeper, in accordance with the recommendations of the project civil engineer.

7.4.5. If slope failures occur, the geotechnical consultant shall be contacted immediately for field review of site conditions and development of recommendations for evaluation and repair.

8. TRENCH BACKFILL

The following sections provide recommendations for backfilling of trenches.

8.1. Trench backfill shall consist of granular soils (bedding) extending from the trench bottom to 1 foot or more above the pipe. On-site or imported fill which has been evaluated by the geotechnical consultant may be used above the granular backfill. The cover soils directly in contact with the pipe shall be classified as having a very low expansion potential, in accordance with UBC Standard 18-2, and shall contain no rocks or chunks of hard soil larger than 3/4-inch in diameter.

8.2. Trench backfill shall, unless otherwise recommended, be compacted by mechanical means to 90 percent relative compaction as evaluated by ASTM D 1557. Backfill soils shall be placed in loose lifts 8-inches thick or thinner, moisture conditioned, and compacted in accordance with the recommendations of Section 5. of these guidelines. The backfill shall be tested by the geotechnical consultant at vertical intervals of approximately 2 feet of backfill placed and at spacings along the trench of approximately 100 feet in the same lift.

8.3. Jetting of trench backfill materials is generally not a recommended method of densification, unless the on-site soils are sufficiently free-draining and provisions have been made for adequate dissipation of the water utilized in the jetting process.

8.4. If it is decided that jetting may be utilized, granular material with a sand equivalent greater than 30 shall be used for backfilling in the areas to be jetted. Jetting shall generally be considered for trenches 2 feet or narrower in width and 4 feet or shallower in depth. Following jetting operations, trench backfill shall be mechanically compacted to the specified compaction to finish grade.

8.5. Trench backfill which underlies the zone of influence of foundations shall be mechanically compacted to 90 percent or greater relative compaction, as evaluated by ASTM D 1557-02. The zone of influence of the foundations is generally defined as the roughly triangular area within the limits of a 1:1 (horizontal:vertical) projection from the inner and outer edges of the foundation, projected down and out from both edges.

8.6. Trench backfill within slab areas shall be compacted by mechanical means to a relative compaction of 90 percent, as evaluated by ASTM D 1557. For minor interior trenches, density testing may be omitted or spot testing may be performed, as deemed appropriate by the geotechnical consultant.

8.7. When compacting soil in close proximity to utilities, care shall be taken by the grading contractor so that mechanical methods used to compact the soils do not damage the utilities. If the utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, then the grading contractor may elect to use light mechanical compaction equipment or, with the approval of the geotechnical consultant, cover the conduit with clean granular material. These granular materials shall be jetted in place to the top of the conduit in accordance with the recommendations of Section 8.4 prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review by the geotechnical consultant and the utility contractor, at the time of construction.

8.8. Clean granular backfill and/or bedding materials are not recommended for use in slope areas unless provisions are made for a drainage system to mitigate the potential for buildup of seepage forces or piping of backfill materials.

8.9. The contractor shall exercise the specified safety precautions, in accordance with OSHA Trench Safety Regulations, while conducting trenching operations. Such precautions include shoring or laying back trench excavations at 1:1 or flatter, depending on material type, for trenches in excess of 5 feet in depth. The geotechnical consultant is not responsible for the safety of trench operations or stability of the trenches.

9. DRAINAGE

The following sections provide recommendations pertaining to site drainage.

9.1. Roof, pad, and slope drainage shall be such that it is away from slopes and structures to suitable discharge areas by nonerodible devices (e.g., gutters, downspouts, concrete swales, etc.).

9.2. Positive drainage adjacent to structures shall be established and maintained. Positive drainage may be accomplished by providing drainage away from the foundations of the structure at a gradient of 2 percent or steeper for a distance of 5 feet or more outside the building perimeter, further maintained by a graded swale leading to an appropriate outlet, in accordance with the recommendations of the project civil engineer and/or landscape architect.

9.3. Surface drainage on the site shall be provided so that water is not permitted to pond. A gradient of 2 percent or steeper shall be maintained over the pad area and drainage patterns shall be established to remove water from the site to an appropriate outlet.

9.4. Care shall be taken by the contractor during grading to preserve any berms, drainage terraces, interceptor swales or other drainage devices of a permanent nature on or adjacent to the property. Drainage patterns established at the time of finish grading shall be maintained for the life of the project. Property owners shall be made very clearly aware that altering drainage patterns may be detrimental to slope stability and foundation performance.

10. SITE PROTECTION

The site shall be protected as outlined in the following sections.

10.1. Protection of the site during the period of grading shall be the responsibility of the contractor unless other provisions are made in writing and agreed upon among the concerned parties. Completion of a portion of the project shall not be considered to preclude that portion or adjacent areas from the need for site protection, until such time as the project is finished as agreed upon by the geotechnical consultant, the client, and the regulatory agency.

10.2. The contractor is responsible for the stability of temporary excavations. Recommendations by the geotechnical consultant pertaining to temporary excavations are made in consideration of stability of the finished project and, therefore, shall not be considered to preclude the responsibilities of the contractor. Recommendations by the geotechnical consultant shall also not be considered to preclude more restrictive requirements by the applicable regulatory agencies.

10.3. Precautions shall be taken during the performance of site clearing, excavation, and grading to protect the site from flooding, ponding, or inundation by surface runoff. Temporary provisions shall be made during the rainy season so that surface runoff is away from and off the working site. Where low areas cannot be avoided, pumps shall be provided to remove water as needed during periods of rainfall.

10.4. During periods of rainfall, plastic sheeting shall be used as needed to reduce the potential for unprotected slopes to become saturated. Where needed, the contractor shall install check dams, desilting basins, riprap, sandbags or other appropriate devices or methods to reduce erosion and provide recommended conditions during inclement weather.

10.5. During periods of rainfall, the geotechnical consultant shall be kept informed by the contractor of the nature of remedial or precautionary work being performed on site (e.g., pumping, placement of sandbags or plastic sheeting, other labor, dozing, etc.).

10.6. Following periods of rainfall, the contractor shall contact the geotechnical consultant and arrange a walk-over of the site in order to visually assess rain-related damage. The geotechnical consultant may also recommend excavation and testing in order to aid in the evaluation. At the request of the geotechnical consultant, the contractor shall make excavations in order to aid in evaluation of the extent of rain-related damage.

10.7. Rain- or irrigation-related damage shall be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress, and other adverse conditions noted by the geotechnical consultant. Soil adversely affected shall be classified as “Unsuitable Material” and shall be subject to overexcavation and replacement with compacted fill or to other remedial grading as recommended by the geotechnical consultant.

10.8. Relatively level areas where saturated soils and/or erosion gullies exist to depths greater than 1 foot shall be overexcavated to competent materials as evaluated by the geotechnical consultant. Where adverse conditions extend to less than 1 foot in depth, saturated and/or eroded materials may be processed in-place. Overexcavated or in-place processed materials shall be moisture conditioned and compacted in accordance with the recommendations provided in Section 5. If the desired results are not achieved, the affected materials shall be overexcavated, moisture conditioned, and compacted until the specifications are met.

10.9. Slope areas where saturated soil and/or erosion gullies exist to depths greater than 1 foot shall be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where adversely affected materials exist to depths of 1 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place and compaction in accordance with the appropriate specifications may be attempted. If the desired results are not achieved, the affected materials shall be overexcavated, moisture conditioned, and compacted until the specifications are met. As conditions dictate, other slope repair procedures may also be recommended by the geotechnical consultant.

10.10. During construction, the contractor shall grade the site to provide positive drainage away from structures and to keep water from ponding adjacent to structures. Water shall not be allowed to damage adjacent properties. Positive drainage shall be maintained by the contractor until permanent drainage and erosion reducing devices are installed in accordance with project plans.

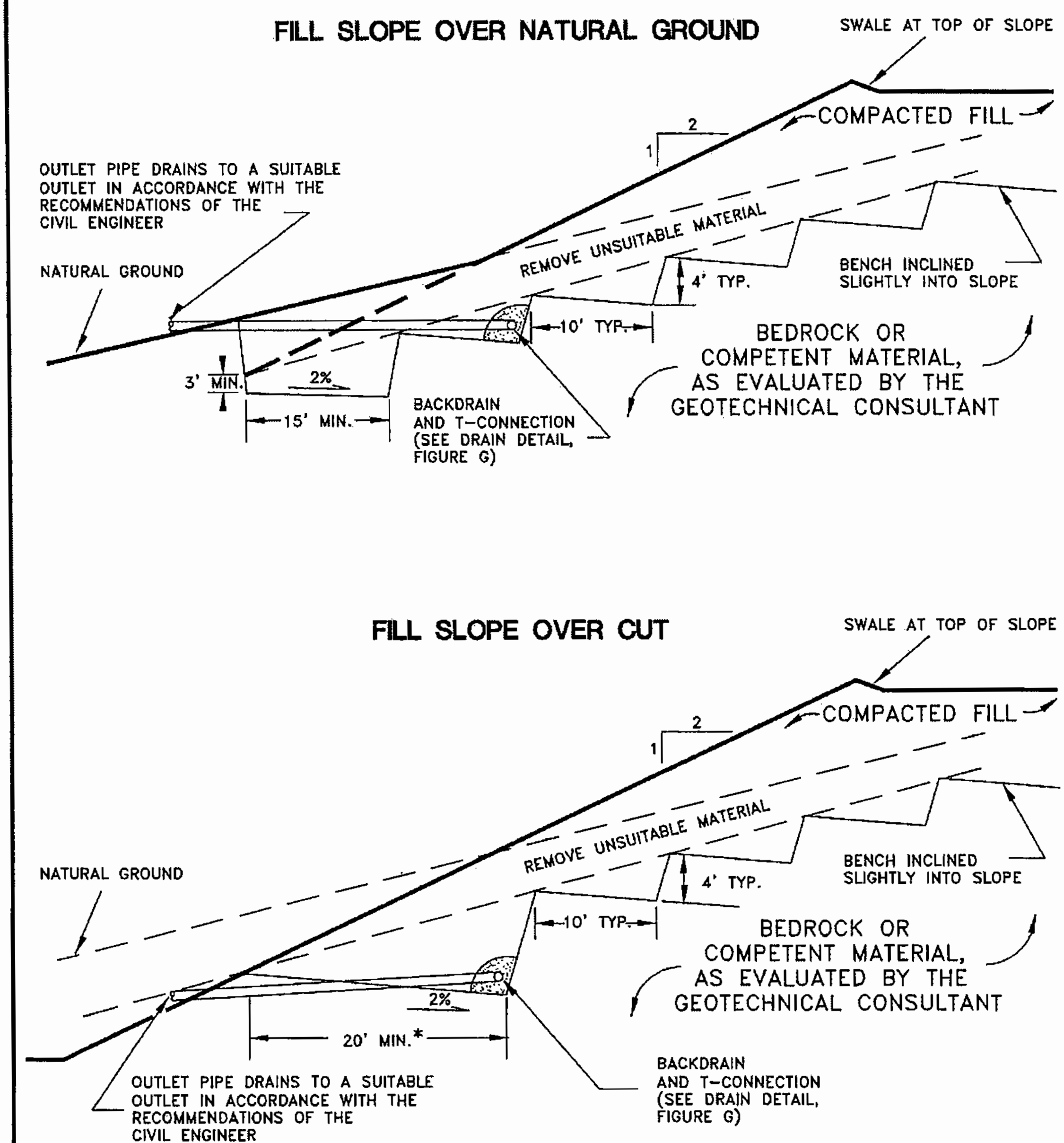
11. DEFINITIONS OF TERMS

ALLUVIUM:	Unconsolidated detrital deposits deposited by flowing water; includes sediments deposited in river beds, canyons, flood plains, lakes, fans at the foot of slopes, and in estuaries.
AS-GRADED (AS-BUILT):	The site conditions upon completion of grading.
BACKCUT:	A temporary construction slope at the rear of earth-retaining structures such as buttresses, shear keys, stabilization fills, or retaining walls.
BACKDRAIN:	Generally a pipe-and-gravel or similar drainage system placed behind earth-retaining structures such as buttresses, stabilization fills, and retaining walls.
BEDROCK:	Relatively undisturbed in-place rock, either at the surface or beneath surficial deposits of soil.
BENCH:	A relatively level step and near-vertical riser excavated into sloping ground on which fill is to be placed.
BORROW (IMPORT):	Any fill material hauled to the project site from off-site areas.
BUTTRESS FILL:	A fill mass, the configuration of which is designed by engineering calculations, to retain slopes containing adverse geologic features. A buttress is generally specified by a key width and depth and by a backcut angle. A buttress normally contains a back drainage system.
CIVIL ENGINEER:	The Registered Civil Engineer or consulting firm responsible for preparation of the grading plans and surveying, and evaluating as-graded topographic conditions.
CLIENT:	The developer or a project-responsible authorized representative. The client has the responsibility of reviewing the findings and recommendations made by the geotechnical consultant and authorizing the contractor and/or other consultants to perform work and/or provide services.
COLLUVIUM:	Generally loose deposits, usually found on the face or near the base of slopes and brought there chiefly by gravity through slow continuous downhill creep (see also Slope Wash).
COMPACTION:	The densification of a fill by mechanical means.

CONTRACTOR:	A person or company under contract or otherwise retained by the client to perform demolition, grading, and other site improvements.
DEBRIS:	The products of clearing, grubbing, and/or demolition, or contaminated soil material unsuitable for reuse as compacted fill, and/or any other material so designated by the geotechnical consultant.
ENGINEERED FILL:	A fill which the geotechnical consultant or the consultant's representative has observed and/or tested during placement, enabling the consultant to conclude that the fill has been placed in substantial compliance with the recommendations of the geotechnical consultant and the governing agency requirements.
ENGINEERING GEOLOGIST:	A geologist registered by the state licensing agency who applies geologic knowledge and principles to the exploration and evaluation of naturally occurring rock and soil, as related to the design of civil works.
EROSION:	The wearing away of the ground surface as a result of the movement of wind, water, and/or ice.
EXCAVATION:	The mechanical removal of earth materials.
EXISTING GRADE:	The ground surface configuration prior to grading; original grade.
FILL:	Any deposit of soil, rock, soil-rock blends, or other similar materials placed by man.
FINISH GRADE:	The as-graded ground surface elevation that conforms to the grading plan.
GEOFABRIC:	An engineering textile utilized in geotechnical applications such as subgrade stabilization and filtering.
GEOTECHNICAL CONSULTANT:	The geotechnical engineering and engineering geology consulting firm retained to provide technical services for the project. For the purpose of these specifications, observations by the geotechnical consultant include observations by the geotechnical engineer, engineering geologist and other persons employed by and responsible to the geotechnical consultant.

GEOTECHNICAL ENGINEER:	A licensed civil engineer and geotechnical engineer, registered by the state licensing agency, who applies scientific methods, engineering principles, and professional experience to the acquisition, interpretation, and use of knowledge of materials of the earth's crust to the resolution of engineering problems. Geotechnical engineering encompasses many of the engineering aspects of soil mechanics, rock mechanics, geology, geophysics, hydrology, and related sciences.
GRADING:	Any operation consisting of excavation, filling, or combinations thereof and associated operations.
LANDSLIDE DEPOSITS:	Material, often porous and of low density, produced from instability of natural or manmade slopes.
OPTIMUM MOISTURE:	The moisture content that is considered optimum relative to correction operations obtained from ASTM test method D 1557.
RELATIVE COMPACTION:	The degree of compaction (expressed as a percentage) of a material as compared to the dry density obtained from ASTM test method D 1557.
ROUGH GRADE:	The ground surface configuration at which time the surface elevations approximately conform to the project plan.
SHEAR KEY:	Similar to a subsurface buttress; however, it is generally constructed by excavating a slot within a natural slope in order to stabilize the upper portion of the slope without encroaching into the lower portion of the slope.
SITE:	The particular parcel of land where grading is being performed.
SLOPE:	An inclined ground surface, the steepness of which is generally specified as a ratio of horizontal units to vertical units.
SLOPE WASH:	Soil and/or rock material that has been transported down a slope by gravity assisted by the action of water not confined to channels (see also Colluvium).
SLOUGH:	Loose, uncompacted fill material generated during grading operations.

SOIL:	Naturally occurring deposits of sand, silt, clay, etc., or combinations thereof.
STABILIZATION FILL:	A fill mass, the configuration of which is typically related to slope height and is specified by the standards of practice for enhancing the stability of locally adverse conditions. A stabilization fill is normally specified by a key width and depth and by a backcut angle. A stabilization fill may or may not have a back drainage system specified.
SUBDRAIN:	Generally a pipe-and-gravel or similar drainage system placed beneath a fill along the alignment of buried canyons or former drainage channels.
TAILINGS:	Non-engineered fill which accumulates on or adjacent to equipment haul roads.
TERRACE:	A relatively level bench constructed on the face of a graded slope surface for drainage and maintenance purposes.
TOPSOIL:	The upper zone of soil or bedrock materials, which is usually dark in color, loose, and contains organic materials.
WINDROW:	A row of large rocks buried within engineered fill in accordance with guidelines set forth by the geotechnical consultant.



*MINIMUM KEY WIDTH DIMENSION. ACTUAL WIDTH SHOULD BE PROVIDED BY GEOTECHNICAL CONSULTANT BASED ON EVALUATION OF SITE-SPECIFIC GEOTECHNICAL CONDITIONS.

NOTES: CUT SLOPE SHALL BE CONSTRUCTED PRIOR TO PLACEMENT OF FILL.
SLOPE DRAINAGE SHOULD BE PROVIDED IN ACCORDANCE WITH RECOMMENDATIONS PRESENTED ON FIGURE E

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NOT TO SCALE

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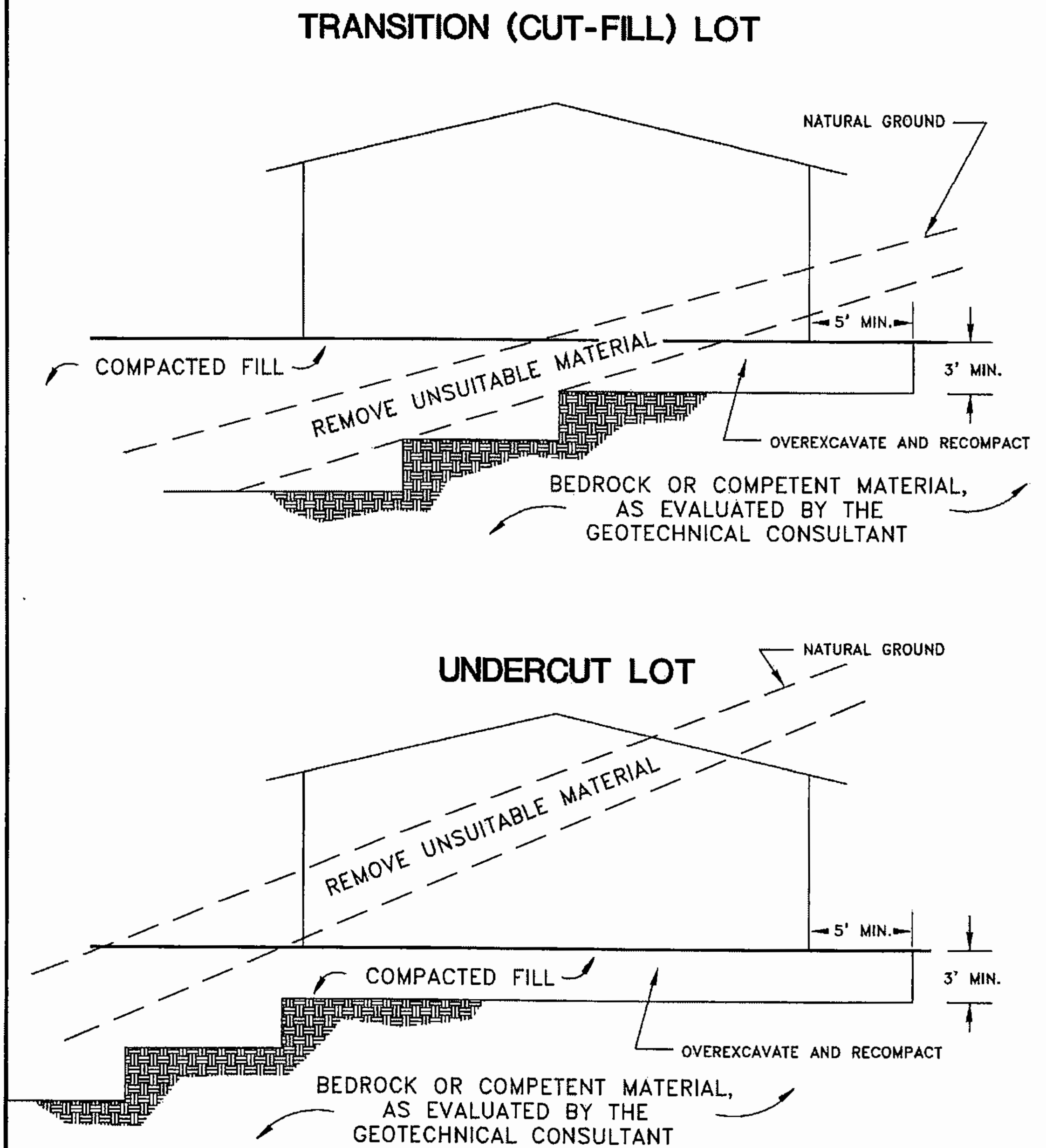
FILL SLOPE OVER NATURAL GROUND OR CUT

FIGURE A



NOTE: DIMENSIONS PROVIDED IN THE DETAILS ABOVE ARE APPROXIMATE AND MAY BE MODIFIED IN THE FIELD BY THE GEOTECHNICAL CONSULTANT AS CONDITIONS DICTATE.

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NOT TO SCALE

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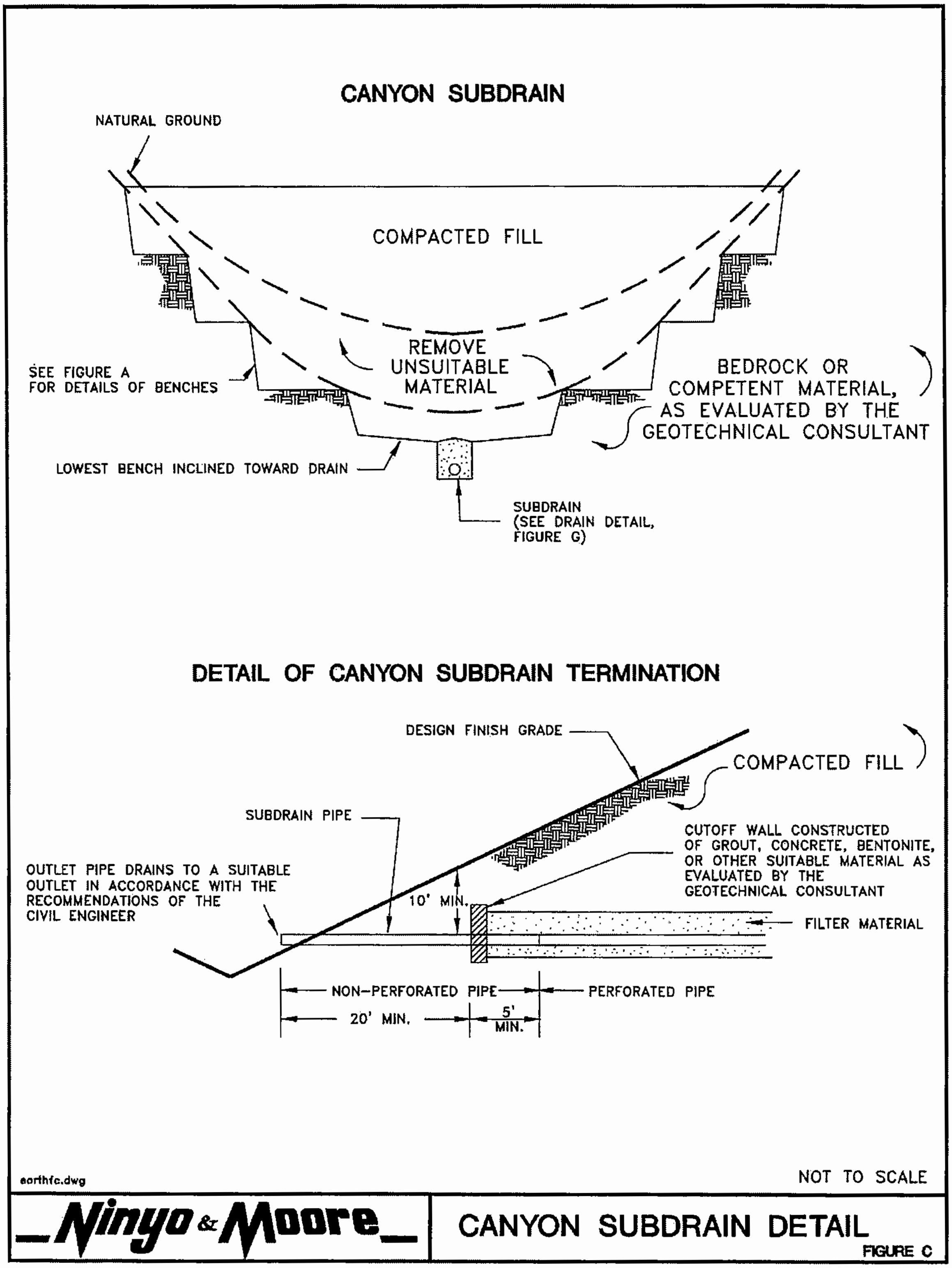
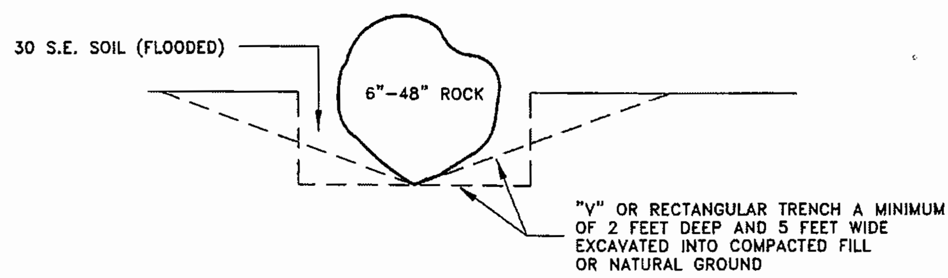
TRANSITION AND UNDERCUT LOT DETAILS FIGURE B



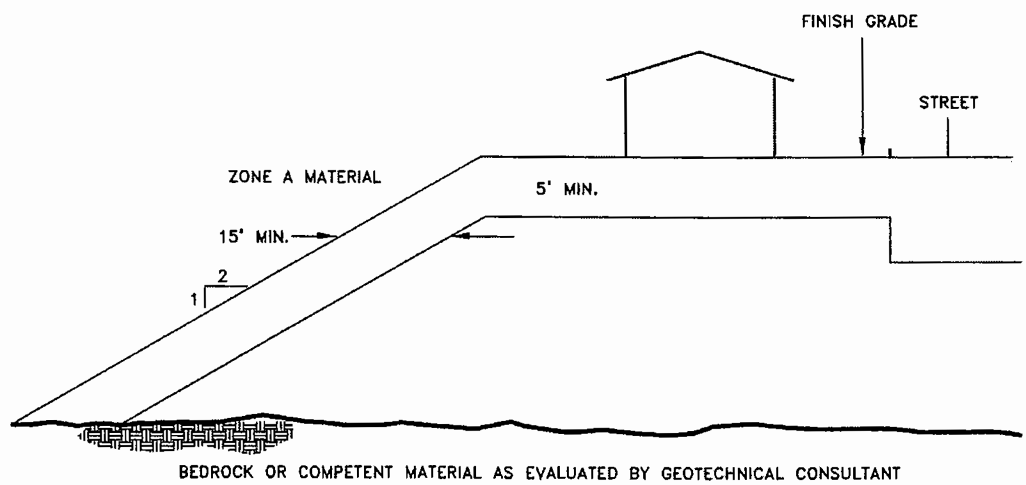
CANYON SUBDRAIN DETAIL

FIGURE C

WINDROW SECTION



PAD SECTION



ZONE A: COMPACTED FILL WITH ROCK FRAGMENTS NO GREATER THAN 6 INCHES IN DIAMETER.

ZONE B: COMPACTED FILL WITH ROCK FRAGMENTS BETWEEN 6 AND 48 INCHES IN DIAMETER MAY BE PLACED IN STAGGERED WINDROWS UP TO 100' LONG IN THIS ZONE AND SURROUNDED BY GRANULAR SOIL (30 SAND EQUIVALENT) DENSIFIED BY FLOODING. ROCK FRAGMENTS LESS THAN 6 INCHES IN DIAMETER MAY BE PLACED IN COMPACTED FILL SOIL.

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NOT TO SCALE

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OVERSIZED ROCK PLACEMENT DETAIL

FIGURE D