Appendix E-1

Geotechnical Due-Diligence Evaluation

ALBUS-KEEFE & ASSOCIATES, INC
GEOTECHNICAL CONSULTANTS

August 15, 2019
J.N.: 2808.00

Nick Browne
BRE EL SEGUNDO HOLDCO LLC
525 Pacific Coast Highway
El Segundo, CA 90245

Subject: **Geotechnical Due-Diligence Evaluation, Proposed Retail & Residential Development, ALOFT Development, Sepulveda Blvd. and Mariposa Ave., City of El Segundo, California.**

Dear Mr. Browne,

Albus-Keefe & Associates, Inc. is pleased to present to you our geotechnical due-diligence report for the proposed mixed-purpose development at the subject site. This report presents the results of our review of historical photos, review of previous geotechnical studies for nearby sites contained in our library and at the city of El Segundo, and engineering analyses. Conclusions relevant to the feasibility of the proposed site development are also presented in this report based on the findings of our work.

We appreciate this opportunity to be of service to you. If you have any questions regarding the contents of this report, please do not hesitate to call.

Sincerely,

ALBUS-KEEFE & ASSOCIATES, INC.

David E. Albus
Principal Engineer

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of our work was to evaluate the feasibility of proposed site development in order to assist you in your land acquisition evaluation and due-diligence review. The scope of our work for this investigation was focused primarily on the geotechnical issues that we expect to have significant fiscal impacts on future site development. *While this report is comprehensive for the intended purpose, it is not intended for final design purposes. As such, additional geotechnical studies may be warranted based on our review of future rough grading plans and foundation plans.* The scope of our geotechnical due-diligence work included the following:

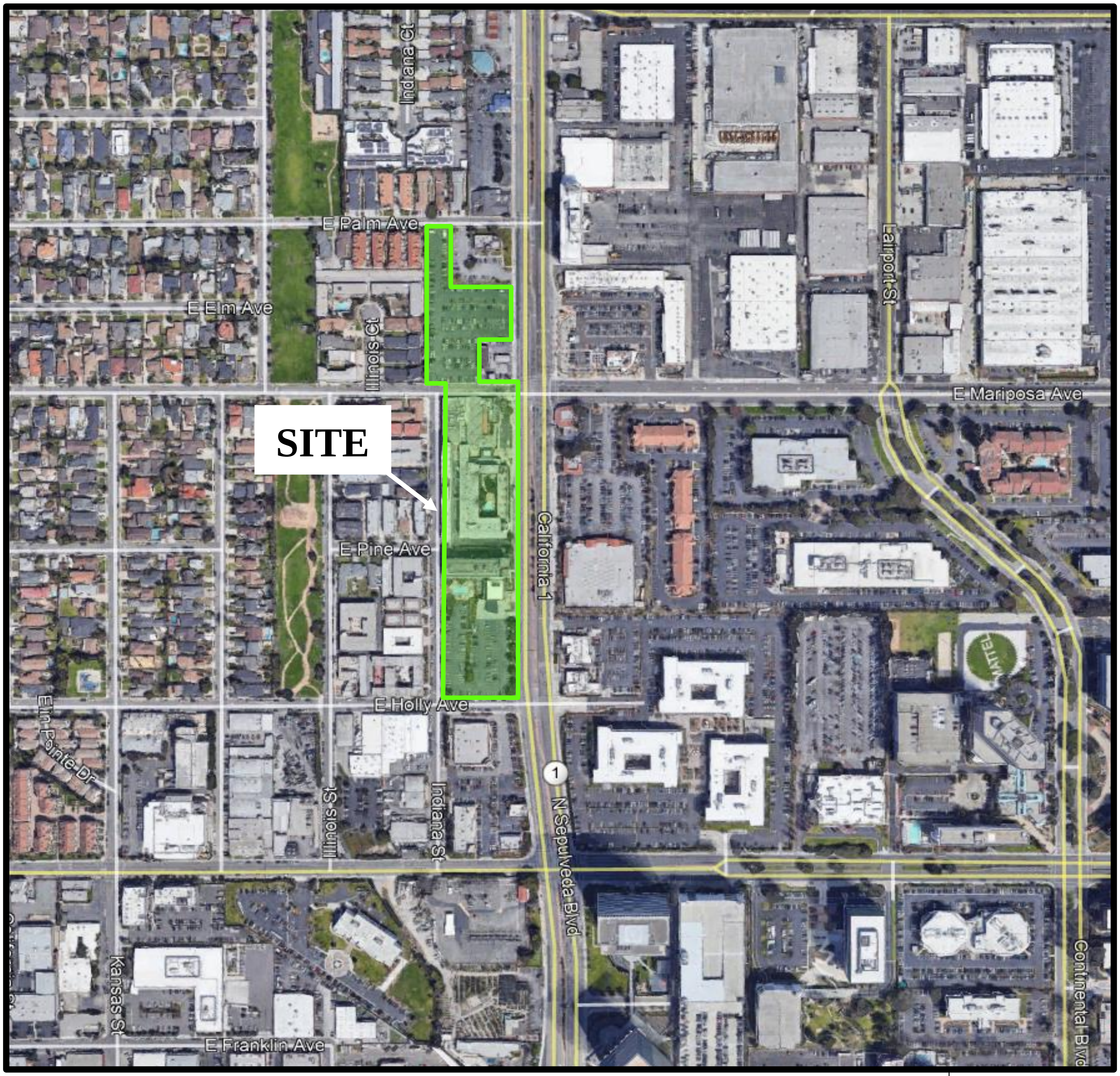
- Review of available geologic publications, aerial photographs, reports, and maps for the site and nearby vicinity that are contained in our in-house library.
- Engineering analyses of data obtained from previous exploration and laboratory testing
- Evaluation of site seismicity, liquefaction potential, and settlement potential of foundations.
- Preparation of this report

1.2 SITE LOCATION AND DESCRIPTION

The site is comprised of ten parcels of land in the city of El Segundo, California as summarized below.

APN	Site Address
4139-024-057	Not Available
4139-024-058	Not Available
4139-025-091	525 N Sepulveda Boulevard
4139-025-081	475 N Sepulveda Boulevard
4139-025-073	Not Available
4139-025-074	Not Available
4139-025-075	Not Available
4139-025-076	Not Available

Descriptions of the site location and its improvements have been prepared below. For the purposes of describing the subject site, the site was divided into the north and south portions in relations to East Mariposa Avenue. The location of the site and its relationship to the surrounding areas are shown on Figure 1, Site Location Map.



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SITE LOCATION MAP
BRE El Segundo HoldCo, LLC
Proposed Retail & Residential Development
Sepulveda Blvd. and Mariposa Ave.
El Segundo, California

NOT TO SCALE

FIGURE 1

APN: 4139-024-057 & 4139-024-058

This portion of the project site is located at the northwest corner of Pacific Coast Highway (PCH) and East Mariposa Avenue. This portion is bordered by East Palm to the north, PCH to the east, East Mariposa Avenue to the south, and a residential development to the west. This portion is rectangular in shape and encompasses approximately 2.0 acres of land. Currently, this site consist of an asphalt-paved parking lot. The asphalt is in good condition with a trace of asphalt cracking. A retaining wall approximately 3 to 10 feet in height is located along the west property line.

Topography within this portion is relatively flat with elevations of approximately 116 to 127 feet above mean sea level (MSL), based on GoogleEarth. Drainage is generally directed toward the east toward PCH and south toward Mariposa Avenue. Vegetation at the site consists of grass and medium-sized trees within landscape areas of the restaurant.

APN: 4139-025-091, 4139-025-081, 4139-025-073, 4139-025-074, 4139-025-075, & 4139-025-076

This portion of the project site is located at the southwest corner of PCH and East Mariposa Avenue. This portion is bordered by East Mariposa to the north, PCH to the east, East Holly Avenue to the south, and Indiana Street to the west. This portion is rectangular in shape and encompasses approximately 4.7 acres of land. Currently, a commercial structure is located at the northeast corner of this site, two hotels are located at the northern and central portions, and the southern portion consist of an asphalt-paved parking lot in good condition.

The commercial structure at the north end of this parcel consists of a one- to two-story structure with an associated asphalt paved parking lot. This parcel is also developed with two hotels comprised of three 5- to 9-story buildings. The buildings contain a partial subterranean level where they are located along PCH. A couple of retaining walls approximately 10 feet high are located along the central portion of the site. Additionally, a couple of slopes that are up to 18 feet in height and gradients of 2:1 (H:V) are also located within the central portion of the site.

Topography within this portion grades down to the southwest. Elevations range from approximately 97 to 116 feet above mean sea level (MSL), based on GoogleEarth. Drainage is generally directed to the southwest towards Indiana Street and East Holly Avenue. Indiana Avenue is situated at a lower elevation than PCH. East Holly Avenue is situated at a lower elevation than East Mariposa Avenue. Vegetation is present within the southern parking lot and consist of grass and medium-sized trees.

1.3 PROPOSED DEVELOPMENT

We understand that the proposed site development will consist of structures up to five stories high with one subterranean level. The structures will provide retail, residential, and parking garages. Other associated improvements will include drive alleys, landscaping, and underground utilities.

No grading or structural plans were available in preparing of this report. However, we anticipate that some rough grading of the site will be required to achieve future surface configurations. We understand that the retaining walls and the associated grades along the west and east property lines may be modified. Proposed site development is anticipated to be comprised of steel and wood framing and masonry block construction with concrete slabs on grade supported by conventional foundations. Future foundation loads are expected to range from relatively light to moderate.

2.0 INVESTIGATION

2.1 RESEARCH

We have reviewed the referenced geologic publications, maps, and historical aerial photos of the vicinity. Data from these sources were utilized to the development of some of our findings and conclusions presented in this report.

Review of the referenced predevelopment aerial photos from 1953 indicate the southern portion of the site was predominantly undeveloped and several structures are present at the northwest and southwest corner of present day PCH and East Mariposa Avenue. A rectangular excavation is present across the site that spans from Indiana St. to PCH, and from the projection of E. Pine Ave. and for a distance of about 140 feet southerly of E. Pine. The excavation is estimated to be about 18 feet deep with the bottom near the elevation of Indiana St. Sometime in 1979, the southern excavation is occupied by a structure. Between 1953 and 1963, a storage yard is present at the southwest corner. The existing hotel and commercial area to the north are also constructed. Between 1963 and 1972, the structures at the northwest corner of PCH and East Mariposa Avenue are demolished and the existing parking lot and gas station is constructed. By 1980, the central hotel and southern parking lot have been constructed. Between 1994 and 2003, the restaurant the at the northwest portion of the site is constructed. The site does not appear to have been significantly altered since 2003.

Several sites within the vicinity of the subject site was previously investigated by this firm at 1222 East Mariposa Avenue, 888 North PCH and 1700 Grand Avenue (Albus-Keefe January 2013, Albus-Keefe July 2013, & Albus-Keefe June 2013, respectively). Subsurface investigation consisted of numerous soil borings to depths of 11 to 51 feet. Pertinent exploration and associated laboratory testing of soil samples from these prior investigations were utilized in our work and included in Appendix A.

3.0 SUBSURFACE CONDITIONS

3.1 SOIL CONDITIONS

Review of Geologic Map of California, Long Beach Sheet (CDMG 1962), indicates the site is underlain by quaternary Dune Sand deposits. Based on the referenced site explorations by our firm, the site is likely to be underlain by similar subsurface materials with a thin cap of artificial fill. The underlying soils are likely to be comprised of sand with varying amount of silt and clay materials that should be slightly moist to moist and loose to very dense. Density is anticipated to increase with depth. Artificial fill will most likely be present within the site due to the previous and recent developments.

3.2 GROUNDWATER

A review of the CDMG Seismic Hazard Zone Report 036 indicates that historical high groundwater levels for the general area have been interpreted at 160 feet below the ground surface in the vicinity of the site. Groundwater was not observed to the maximum depth of 51.0 feet below the existing surface in our exploratory borings in the vicinity of the site.

3.3 FAULTING

Evidence of active faulting within and adjacent the site was not readily observed during the site visit. The site does not lie within an "Earthquake Fault Zone" as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act. A summary of known active faults within 10 miles of the project are summarized in Table 3.1.

TABLE 3.1
Summary of Nearby Faults

Name	Distance (miles)	Slip Rate (mm/yr.)	Preferred Dip (degrees)	Slip Sense	Rupture Top (km)	Fault Length (km)
Newport-Inglewood, alt 1	3.64	1	88	strike slip	0	65
Newport Inglewood Connected alt 1	3.64	1.3	89	strike slip	0	208
Newport Inglewood Connected alt 2	4.37	1.3	90	strike slip	0	208
Palos Verdes Connected	4.73	3	90	strike slip	0	285
Palos Verdes	4.73	3	90	strike slip	0	99
Puente Hills (LA)	8.24	0.7	27	thrust	2.1	22
Santa Monica Connected alt 2	8.39	2.4	44	strike slip	0.8	93
Santa Monica Connected alt 1	8.91	2.6	51	strike slip	0	79
Santa Monica, alt 1	8.91	1	75	strike slip	0	14

4.0 ANALYSES

4.1 SEISMICITY

We have performed probabilistic seismic analyses utilizing the U.S. Seismic Design Maps web application by OSHPD, conforming with ASCE7-10. From our analyses, we obtain a PGA of 0.598 in accordance with Figure 22-7 of ASCE 7-10. The site amplification factor, F_{PGA}, for Site Class D at this range of PGA is 1.0. Therefore, site modified peak ground acceleration, $PGA_M = 1.0 \times 0.598 =$

0.60g. The mean event associated with a probability of exceedance equal to 2% over 50 years has a moment magnitude of 6.80 and the mean distance to the seismic source is 7.4 miles.

4.2 SETTLEMENT

Analyses were performed to evaluate potential for static settlement using subsurface information from one of our earlier projects less than 200 feet west of the project site (Job Number 2088.00; referenced report of January 16, 2013). Our analyses used sampler penetration resistance (blow count) from hollow stem boring logs to estimate the elastic modulus of soil strata. For this feasibility-level evaluation, no loads or foundation configurations are available. Therefore, assumptions were made about the likely loading and configurations. Results of our analyses are summarized in Table 3.2 below.

TABLE 3.2
Summary of Settlement Analyses

Condition	Load	Bearing Pressure (psf)	Total Settlement (in.)
Pad at PCH grade	650 kip Column	4500	1.0
Pad at 8 feet below PCH Grade	720 kip Column	5000	0.9
Pad at PCH grade	10 kip/ft Wall	5000	0.5
Pad at 8 feet below PCH Grade	10 kip/ft Wall	5000	0.3

4.3 LIQUEFACTION

Engineering research of soil liquefaction potential (Youd, et al., 2001) indicates that generally three basic factors must exist concurrently in order for liquefaction to occur. These factors include:

- A source of ground shaking, such as an earthquake, capable of generating soil mass distortions.
- A relatively loose silty and/or sandy soil.
- A relative shallow groundwater table (within approximately 50 feet below ground surface) or completely saturated soil conditions that will allow positive pore pressure generation.

The liquefaction susceptibility of the onsite soils was evaluated by analyzing the potential concurrent occurrence of the above-mentioned three basic factors. The liquefaction evaluation for the site was completed under the guidance of Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California (CDMG, 2008).

Historical high groundwater is anticipated at a depth of at least 50 feet below the site. Therefore, the potential for liquefaction to occur beneath the site is considered to be very low. Furthermore, the site is not located within a mapped California Geologic Survey liquefaction hazard zone.

5.0 CONCLUSIONS

5.1 FEASIBILITY OF PROPOSED DEVELOPMENT

From a geotechnical point of view, the proposed site development is considered feasible provided appropriate geotechnical recommendations are incorporated into the design and construction of the project. Key issues that could have significant fiscal impacts on the geotechnical aspects of the proposed site development are discussed in the following sections of this report.

5.2 GEOLOGIC HAZARD

5.2.1 Ground Rupture

No active faults are known to project through the site nor does the site lie within the bounds of an "Earthquake Fault Zone" as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act. As such, the potential for ground rupture due to fault displacement beneath the site is considered very low.

5.2.2 Ground Shaking

The site is situated in a seismically active area that has historically been affected by generally moderate to occasionally high levels of ground motion. The site lies in relative close proximity to several seismically active faults; therefore, during the life of the proposed structures, the property will probably experience similar moderate to occasionally high ground shaking from these fault zones, as well as some background shaking from other seismically active areas of the Southern California region. Potential ground accelerations have been estimated for the site and are presented in Section 4.1 of this report. Design and construction in accordance with the current California Building Code (C.B.C.) requirements is anticipated to adequately address potential ground shaking.

5.2.3 Liquefaction

The depth to historic high groundwater reported by the CGS in the site vicinity is greater than 50 feet below the ground surface (Seismic Hazard Zone Report 036). As such the potential for liquefaction at the site is considered very low. Furthermore, the site is not located within a mapped California Geologic Survey liquefaction hazard zone.

5.2.4 Landsliding

The site is not located within an area identified by the California Geologic Survey (CGS) as having potential for seismic slope instability. Geologic hazards associated with landsliding are not anticipated at the site.

5.3 STATIC SETTLEMENT

Previous data suggests that some soils at the site may exhibit collapsible potential upon wetting. If such materials are left unmitigated, this condition could result in excessive settlement of structures and site improvements due to the weight of new foundations and the introduction of water from rain or irrigation. Excessive settlement from such materials can be mitigated if they are removed and recompacted. Materials anticipated to exhibit this condition consist of the artificial fill soils and upper 2 to 3 feet of the Dune Deposits.

Soils below the collapsible soil zone are anticipated to exhibit low compressibility characteristics in their current state. We have performed analyses to estimate the potential settlement of foundation supported by these materials as further discussed in Section 4.2. From our analyses, we conclude that total settlement of foundations will be less than about 1 inch provided column and wall loads do not exceed about 700 kips and 10 kips/ft., respectively, and bearing pressure is limited to about 4,500 to 5,000 psf. Associated differential settlement should be less than ½ inch over 30 feet. Such settlement is anticipated to be tolerable for proposed site development.

5.4 EXCAVATION AND MATERIAL CHARACTERISTICS

Existing artificial fill and the upper 2 to 3 feet of the Dune Sands are anticipated to be unsuitable to support proposed site development in their current condition. This condition can be mitigated by removing and recompacting these materials. We anticipate these materials will generally extend to depths of about 3 to 6 feet. Once these materials are removed, they are anticipated to be suitable for reuse as compacted fill.

Within materials located within the upper 10 feet from the grade at PCH, temporary construction slopes and trench excavations can likely be cut vertically up to a height of 4 feet within the onsite materials provided that no surcharging of the excavations is present. Temporary excavations greater than 4 feet in height will likely require side laybacks to 1:1 (H:V) or flatter to mitigate the potential for sloughing. Portions of the site below a depth of 10 feet from PCH grade may encounter friable sands that will tend to slough or run. Cuts in these materials will likely require a layback of 1.5:1 (H:V) at any height.

Demolition of the existing site improvements will generate a considerable amount of concrete and asphaltic concrete debris. Significant portions of concrete and asphaltic concrete debris can likely be reduced in size to less than 4 inches and incorporated within fill soils during earthwork operations.

Onsite disposal systems, clarifiers, and other underground improvements may be present on site. If encountered during future rough grading, these improvements will require proper abandonment or removal.

Off-site improvements, streets, and right-of-ways exist near and along the property lines. The presence of the existing offsite improvements will limit removals of unsuitable materials adjacent the property lines. Special grading techniques, such as slot cutting, will be required adjacent to the property lines were offsite structures are nearby. Construction of perimeter site walls will likely require deepened footings or caissons and grade beams where removals are restricted by property boundaries. Shoring may be required for excavation for the subterranean level.

Subsurface soils are anticipated to be relatively easy to excavate with conventional heavy earthmoving equipment. Removal and recompaction of the site materials will result in some moderate shrinkage and subsidence. Design of site grading will require consideration of this loss when evaluating earthwork balance issues.

The existing near surface soils are typically below optimum moisture content. As such, moisturizing of site materials will likely be required prior to placement as compacted fill

5.5 SHRINKAGE AND SUBSIDENCE

Volumetric changes in earth quantities will occur when excavated onsite soil materials are replaced as properly compacted fill. We estimate the existing artificial fills and upper collapsible Dune Sand deposits will shrink approximately 10 to 20 percent. Reprocessing of removal bottoms are anticipated to result in negligible subsidence. The estimates of shrinkage and subsidence are intended as an aid for project engineers in determining earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that occurs during the grading process.

5.6 SOIL EXPANSION

Based on our previous laboratory test results within the adjacent sites, the near-surface soils are generally anticipated to possess a **Very Low** to **Low** expansion potential. Testing for soil expansion will be required subsequent to rough grading and prior to construction of foundations and other concrete work to confirm these conditions. Expansive soils can undergo volume changes when they become wetted or dried. These changes can affect the overlying structures and other surface improvements. Given the expansion potential anticipated at the site, only nominal steps will be needed to mitigate adverse effects such as minor steel reinforcing of foundations and slabs, and moisture preparation and jointing details for flatwork.

5.7 SEISMIC DESIGN PARAMETERS

For design of the project in accordance with Chapter 16 of the 2016 California Building Code (CBC), the following table presents the seismic design factors:

5.8 FOUNDATIONS

The following design parameters are provided as feasibility-level parameters. These design parameters are based on typical site materials encountered during subsurface exploration at nearby sites and are provided for preliminary design and estimating purposes. Theses parameters should be verified by site-specific geotechnical investigation. Furthermore, the project geotechnical consultant should provide final design parameters following observation and testing of site materials during grading. Depending on actual materials encountered during site grading and actual foundation loads, the design parameters presented herein may require modification.

TABLE 5.1
2016 CBC Seismic Design Parameters

Parameter	Value
Site Class	D
Mapped MCE Spectral Response Acceleration, short periods, S_S	1.632
Mapped MCE Spectral Response Acceleration, at 1-sec. period, S_1	0.603
Site Coefficient, Fa	1.0
Site Coefficient, Fv	1.5
Adjusted MCE Spectral Response Acceleration, short periods, S_{MS}	1.632
Adjusted MCE Spectral Response Acceleration, at 1-sec. period, S_{M1}	0.904
Design Spectral Response Acceleration, short periods, S_{DS}	1.088
Design Spectral Response Acceleration, at 1-sec. period, S_{D1}	0.603

MCE = Maximum Considered Earthquake

5.8.1 Allowable Bearing Value

A bearing value of 1,800 pounds per square foot (psf) may be used for continuous footings and pad footings supported by compacted fill or competent Dune Sand deposits and having a minimum width of 12 inches and founded at minimum of 12 inches below the lowest adjacent grade. This value may be increased by 400 psf and 900 psf for each additional foot in width and depth, respectively, up to a maximum value of 5,000 psf. Recommended allowable bearing values include both dead and live loads, and may be increased by one-third for wind and seismic forces.

5.8.2 Lateral Resistance

A passive earth pressure of 200 pounds per square foot per foot of depth (pcf) up to a maximum value of 1000 pounds per square foot (psf) may be used to determine lateral bearing for footings. A coefficient of friction of 0.37 times the dead load forces may also be used between concrete and the supporting soils to determine lateral sliding resistance. The passive pressure may be increased by 1/3 for wind and seismic loading. However, no increase should be applied to the friction factor. The passive pressure should be reduced by 50% for footings facing ascending slope.

The above values are based on footings placed directly against compacted fill or competent native soil. In the case where footing edges are formed, all backfill against the footings should be compacted to at least 90 percent of the laboratory standard.

5.8.3 Footings and Slabs on Grade

Exterior and interior building footings may be founded at the minimum depths indicated in the California Building Code. All continuous footings should be reinforced with a minimum of two No. 4 bars, one top and one bottom. The structural engineer may require different reinforcement and should dictate if greater than the recommendations provided herein.

Interior isolated pad footings should be a minimum of 24 inches square and founded at minimum depths of 12 inches below the lowest adjacent final grade. Exterior isolated pad footings intended for support of patio covers and similar construction should be a minimum of 24 inches square and founded at a minimum depth of 12 inches below the lowest adjacent final grade.

Interior concrete slabs constructed on grade should be a minimum 4 inches thick. If such slabs will be used for garage parking, they should have a minimum thickness of 5 inches. Slabs should be reinforced with 6-inch by 6-inch, W2.9 X W2.9 (No. 6 by No. 6) reinforcing wire mesh or No. 3 bars spaced 30 inches each way. Care should be taken to ensure the placement of reinforcement at mid-slab height. The structural engineer may recommend a greater slab thickness and reinforcement based on proposed use and loading conditions and such recommendations should govern if greater than the recommendations presented herein.

Concrete floor slabs in areas to receive carpet, tile, or other moisture sensitive coverings should be underlain with a moisture vapor retarder 10-mil Visqueen, or equal. The membrane should be properly lapped, sealed, and protected with at least 2 inches of sand having a sand equivalent (SE) of 30 or greater. One inch of this sand can be placed above the membrane. This vapor retarder system is anticipated to be suitable for most flooring finishes that can accommodate some vapor emissions. However, this system may emit more than 4 pounds of water per 1000 sq. ft. and therefore, may not be suitable for all flooring finishes. Additional steps should be taken if such vapor emission levels are too high for anticipated flooring finishes.

Special consideration should be given to slabs in areas to receive ceramic tile or other rigid, crack-sensitive floor coverings. Design and construction of such areas should mitigate hairline cracking as recommended by the structural engineer.

Block-outs should be provided around interior columns to permit relative movement and mitigate distress to the floor slabs due to differential settlement that will occur between column footings and adjacent floor subgrade soils as loads are applied.

Prior to placing concrete, subgrade soils below slab-on-grade areas should be thoroughly moistened to provide a moisture content that is equal to or greater than 100% of the optimum moisture content to a depth of 12 inches.

5.9 RETAINING WALLS

5.9.1 Allowable Bearing Value and Lateral Resistance

Design of retaining and screen walls may utilize the bearing and lateral resistance values provided in Section 5.8.1 and 5.8.2.

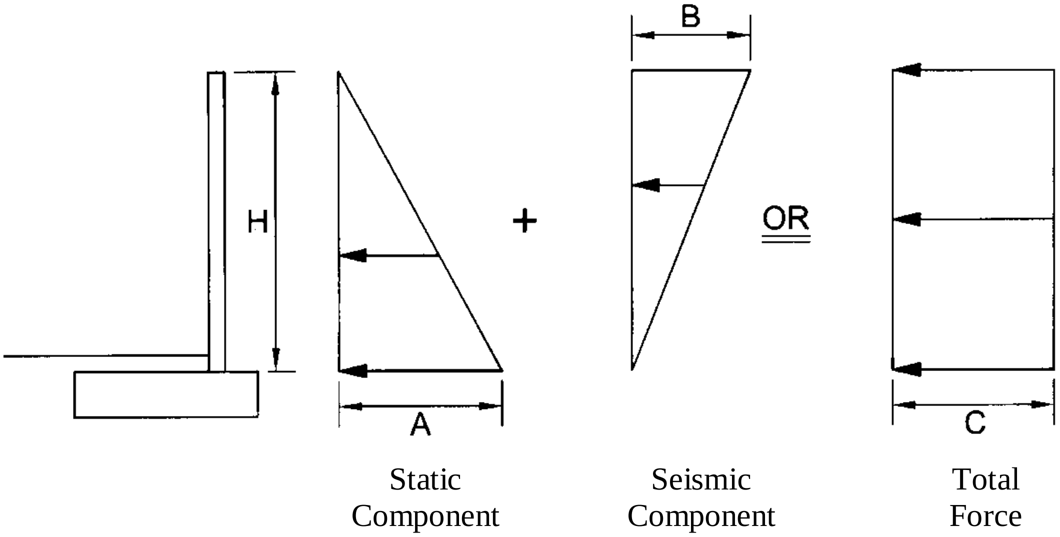
5.9.2 Earth Pressures

Conventional retaining walls should be designed for the static earth pressures as indicated in Table 5.2 below. These values are active (unrestrained) and at-rest (restrained) conditions based on backfill material parameters from projects in the vicinity of this project site. All values are for drained backfill conditions and do not consider hydrostatic pressures. All walls should be designed to support any adjacent structural surcharge loads imposed by other nearby walls, footings or traffic loads, and hydraulic pressures in addition to the earth pressures provided below.

In Table 5.2, H is the vertical height of the retained portion of the wall in feet and the resulting pressure is in pounds per square foot (psf). 2016 CBC requires inclusion of seismic pressure for retaining heights greater than 6 feet. Seismic earth pressures provided herein use a peak ground acceleration (PGA) of 0.39g, corresponding to probability of exceedance of 10 percent in 50 years. Seismic earth pressures are based on the method provided by Seed and Whitman (1970) for active condition, and Wood (1973) for at-rest condition.

As indicated in the diagram below, in Table 5.2, static earth pressure has an upright triangular distribution, with its value at base shown by "A". Seismic earth pressure has an inverted triangular distribution whose base value is represented by "B". Value "C" represents a combination of these two values, in the form of a uniform pressure distribution.

TABLE 5.2
EARTH PRESSURE DIAGRAMS



Pressure Values
Walls Supporting Engineered Backfill

Value	Un-restrained (Active) Condition		Restrained (At-rest) Condition
	Active Level Backfill	Active 2:1 Backfill	At-rest Level Backfill
A	39H	68H	65H
B	13H	13H	22H
C	26H	41H	44H

Note:
H is in feet and resulting pressure is in psf. Design may utilize either the sum of the static component and the seismic component force diagrams or the total force diagram above. SEAOSC has suggested using a load factor of 1.7 for the static component and 1.0 for the seismic component. The actual load factors should be determined by the structural engineer.

5.10 CONCRETE MIX DESIGN

Laboratory testing of soils from nearby sites indicates **Negligible** soluble sulfate content. Concrete designed to follow the procedures provided in ACI 318, Section 4.3, Table 4.3.1 for negligible sulfate exposure are anticipated to be adequate for mitigation of sulfate attack on concrete. Upon completion of rough grading, an evaluation of as-graded conditions and further laboratory testing will be required for the site to confirm or modify the conclusions provided in this section.

5.11 PAVEMENT SECTIONS

Based on the anticipated soil conditions present at the site and a range of assumed traffic indices, preliminary pavement sections are provided in the table below. A preliminary "R-value" of 25 was used for the near-surface soil in this preliminary pavement design. The sections provided below are feasibility-level section and should be re-evaluated subsequent to site investigation, detailed estimates of traffic index, and should be finalized upon site grading. Final pavement sections should be based on actual R-value testing of in-place soils and analysis of anticipated traffic.

TABLE 5.3
PRELIMINARY PAVEMENT DESIGN

Location	Traffic Index	AC (inches)	Concrete Paver	PCC (inches)	AB (inches)
All Entries And Interior Driveways	5.0	3.0	--	--	7.0
		4.0			4.0
		--	8 cm		8.0
		--	--	6.0	--
	5.5	3.0	--	--	9.0
		4.0			6.0
		--	8 cm		10.0
		--	--	6.5	--
	6.0	4.0			8.0
		5.0			6.0
		--	8 cm		11.0
		--	--	7.0	--
Parking Stalls	--	3.0	--	--	4.0

AC - Asphaltic Concrete, AB - Aggregate Base, PCC – Portland Cement Concrete

Portland Cement Concrete (PCC) paving should be provided with cold joints or score lines spaced no more than 10 feet in each direction. Cold joints should be provided with dowels consisting of No. 4 bars spaced at 18 inches center to center. Edges of concrete paving for which traffic loads will traverse directly across should be thickened by at least 1.5 inches over a taper distance of 5 feet.

5.12 EXTERIOR FLATWORK

Exterior flatwork should be a minimum 4 inches thick. Cold joints or saw cuts should be provided at least every 7 feet in each direction. Cold joints should be keyed or provided with dowels spaced 18 inches on center. Special jointing detail should be provided in areas of block-outs, notches, or other irregularities to avoid cracking at points of high stress. Where flatwork is more than 7 feet wide in minimum dimension, the slab should be reinforced with No. 3 bars spaced 18 inches center to center each way.

Subgrade soils below flatwork should be thoroughly moistened to a moisture content to slightly above the optimum to a depth of 12 inches. Moistening should be accomplished by lightly spraying the area over a period of a few days just prior to pouring concrete.

Drainage from flatwork areas should be directed to local area drains and/or other appropriate collection devices designed to carry runoff water to the street or other approved drainage structures. The concrete flatwork should also be sloped at a minimum gradient of 0.5% away from building foundations and masonry walls.

The geotechnical consultant should observe and verify the density and moisture content of subgrade soils prior to pouring concrete to ensure that the required compaction and pre-moistening recommendations have been met.

5.13 UTILITY TRENCHES

Trench excavations should conform to the recommendations provided in Section 5.4. The project geologist or soil engineer should observe all trench excavations to provide specific recommendations. All trench excavations should conform to the requirements of CAL OSHA.

All utility trench backfill within the property should be compacted to at least 90 percent of the laboratory standard. Soils placed within the pipe zone (6 inches below and 12 inches above the pipe) should consist of particles no greater than ¾ inches and have an Sand Equivalent (SE) of at least 30. The materials within the pipe zone should be consolidated by compaction. Above the pipe zone (>1 foot above pipe), the backfill may consist of general fill materials. Trench backfill should be brought to uniform moisture, slightly over optimum, placed in lifts no greater than 12 inches in thickness, and then mechanically compacted with appropriate equipment to at least 90 percent of the laboratory standard. For trenches with sloped walls, backfill material should be placed in lifts no greater than 8 inches in loose thickness, and then compacted by rolling with a sheepsfoot tamper or similar equipment. The project geotechnical consultant should perform density testing along with probing to verify that adequate compaction has been achieved.

Within shallow trenches (less than 18 inches deep) where pipes may be damaged by heavy compaction equipment, imported clean sand having a SE of 30 or greater may be utilized. The sand should be placed in the trench then compacted with hand equipment if possible.

Where utility trenches are proposed parallel to any building footing (interior and/or exterior trenches), the bottom of the trench should not be located below a 1:1 (H:V) plane projecting downward from the outside edge of the adjacent footing base. For utility trenches located below a 1:1 (H:V) plane projecting downward from the outside edge of the adjacent footing base or crossing footing trenches, concrete or slurry should be used as trench backfill.

5.14 STORMWATER INFILTRATION CHARACTERISTICS

Based on our review of previous data, we anticipate the site will be feasible for infiltration of storm water for WQMP purposes. Due to the limited space anticipated to be available for infiltration and the likelihood of subterranean structures, we recommend the use of dry wells for infiltration. For preliminary design purposes, the following parameters may be assumed for design of dry wells at the site. Specific design parameters will require onsite testing and analyses.

TABLE 5.4
Preliminary Dry Well Design Parameters

Design Factor	Value
Total Depth	30’
Chamber Depth	18’
Shaft Diameter	0’-20’: 6’OD, 20’-30’: 4’ OD
Assumed Invert Depth	7’
Peak Flow Rate	0.28 cfs
Draw Down Time	45 min.
Setbacks from Structures	10’ for on-grade, 20’ for 1 subterranean level

6.0 LIMITATIONS

This report is based on the proposed development and geotechnical data as described herein. The materials described herein and in other literature are believed representative of the total project area, and the conclusions contained in this report are presented on that basis. However, soil materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions and recommendations contained herein. As such, observation and testing by a geotechnical consultant prior to and during the grading and construction phases of the project are essential to confirming the basis of this report.

This report summarizes several geotechnical topics that should be beneficial for project planning and budgetary evaluations. *The information presented herein is intended only for a preliminary feasibility evaluation and* ***is not*** *intended to satisfy the requirements of a site specific and detailed geotechnical investigation required for further planning and permitting.*

This report has been prepared consistent with that level of care being provided by other professionals providing similar services at the same locale and time period. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty.

This report should be reviewed and updated after a period of one year or if the site ownership or project concept changes from that described herein.

This report has been prepared for the exclusive use of **BRE El Segundo HoldCo, LLC** to assist the project consultants in determining the feasibility of the proposed development. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

Respectfully submitted,

ALBUS-KEEFE & ASSOCIATES, INC

Mark Principe
Staff Engineer

David E. Albus
Principal Engineer
GE 2455

REGISTERED PROFESSIONAL ENGINEER
DAVID E. ALBUS
No. 2455
Exp. 12/31/20
GEOTECHNICAL
STATE OF CALIFORNIA

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Albus-Keefe & Associates, Inc., *Geotechnical Investigation Report, Proposal Building Addition and Renovation Project, 1222 Grand Avenue, El Segundo, California*, dated July 17, 2013. J.N. 2189.00.

Albus-Keefe & Associates, Inc., *Geotechnical Geotechnical Feasibility Investigation, Proposed 5-Story Hotel Building, 888 North Sepulveda Boulevard, El Segundo, California,* dated June 18, 2013. J.N. 2173.00.

Albus-Keefe & Associates, Inc., *Geotechnical Grading Plan Review, Proposed Residential Townhome Development, 1700 and 1710 East Mariposa Avenue, City of El Segundo, California*, dated January 16, 2013. J.N. 2088.00.

APPENDIX A

LOGS AND LAB TEST RESULTS OF NEARBY PROJECTS

EXPLORATION LOG

Project: **Residential Development**		Boring No.: **Legend**
Location: **1700 & 1710 Mariposa Ave., El Segundo, CA**		Elevation:
Job No.: **2088.00**	Client: **The Olson Company**	Date:
Drill Method:	Driving Weight:	Logged By:

Depth (Feet)	Lith-ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
5									
10									
15									
20									

EXPLANATION.

Solid lines separate geologic units and/or material types.

Dashed lines indicate unknown depth geologic unit change or material type change.

■ **Solid black rectangle** in Core column represents California Split-Spoon sampler (2.5in. ID, 3in. OD).

⧗ **Double triangle** in core column represents SPT sampler.

○ **Open circle** in Core coumn represents sample not recovered.

▒ **Light gray rectangle** in Bulk column represents large bag sample.

Other Laboratory Tests:

MAX = Maximum Dry Density/Optimum Moisture Content
SO4 = Soluble Sulfate Content
EI = Expansion Index
COR = Corrosion Series
DSR = Direct Shear, Remolded
DS = Direct Shear, Undisturbed
SA = Sieve Analysis (1" through #200 sieve)
PSA = Particle Size Analysis (SA with Hydrometer)
-200 = Percent Passing #200 Sieve
HYD = Hydrometer Only
CON = Consolidation
SE = Sand Equivalent
RVAL = R-Value
ATT = Atterberg Limits
PER = Permeability.

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Plate A-1

EXPLORATION LOG

Project: **Residential Development**		Boring No.: **B-1**	
Location: **1700 & 1710 Mariposa Ave., El Segundo, CA**		Elevation:	
Job No.: **2088.00**	Client: **The Olson Company**	Date:	**5/23/12**
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By:	**DDA**

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per Foot	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		ARTIFICIAL FILL (Qaf) Silty Sand (SM): Light brown to brown; dry to damp; loose; fine-grained sand; scattered roots, trace debris.							
				12	■		3.1	105.1	CON
		OLDER DUNE SAND (Qso) Silty Sand (SM): Brown to reddish-brown; damp; medium dense; fine-grained sand; pinhole pores, weathered.		21	■		3.9	104.1	CON DS
5									
10		@ 10', becomes damp to moist, dense, fine- to medium-grained Silty Sand with less silt content (sandier).		25	■		5.3	110.9	
15				33	■		8.1	103.0	
20				40	■		6.6	104.0	
		Sand (SP): Light reddish-brown; moist; dense to very dense; fine- to medium-grained sand; poorly graded.							

EXPLORATION LOG

Project:	**Residential Development**	Boring No.:	**B-1**
Location:	**1700 & 1710 Mariposa Ave., El Segundo, CA**	Elevation:	
Job No.: **2088.00**	Client: **The Olson Company**	Date:	**5/23/12**
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By:	**DDA**

Depth (Feet)	Lith-ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
				51	■		8.0	110.8	
		Silty Sand to Sandy Silt (ML/SM): Brown to reddish-brown; moist; dense/very stiff; fine-grained sand.							
		Bottom of boring at 26.5' No groundwater Boring backfilled with soil cuttings.							
30									
35									
40									
45									

EXPLORATION LOG - V2 - AKA.GDT - 6/6/12 10:12 - T:\GINTPROJECTS\2088.00.GPJ

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Plate A-3

EXPLORATION LOG

Project: **Residential Development**

Boring No.: **B-2**

Location: **1700 & 1710 Mariposa Ave., El Segundo, CA**

Elevation:

Job No.: **2088.00**

Client: **The Olson Company**

Date: **5/23/12**

Drill Method: **Hollow-Stem Auger**

Driving Weight: **140 lbs / 30 in**

Logged By: **DDA**

Depth (Feet)	Lith-ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
		OLDER DUNE SAND (Qso) Silty Sand (SM): Reddish-brown; damp to moist; dense; fine- to medium-grained sand.							
				44	■		3.1	115.3	SO4 PSA
5				39	■		3.4	112.9	
10		@ 10', becomes light reddish brown, moist Silty Sand with less silt content (sandier).		30	■		9.3	105.6	PSA
15				52	■		6.0	100.5	
20				40	■		4.3	98.2	

EXPLORATION LOG - V2 - AKA.GDT - 6/6/12 10:12 - T:\GINT\PROJECTS\2088.00.GPJ

EXPLORATION LOG

Project: **Residential Development**		Boring No.: **B-2**
Location: **1700 & 1710 Mariposa Ave., El Segundo, CA**		Elevation:
Job No.: **2088.00**	Client: **The Olson Company**	Date: **5/23/12**
Drill Method: **Hollow-Stem Auger**	Driving Weight:**140 lbs / 30 in**	Logged By: **DDA**

Depth (Feet)	Lith-ology	Material Description	Water	Samples Blows Per Foot	Samples Core	Samples Bulk	Laboratory Tests Moisture Content (%)	Laboratory Tests Dry Density (pcf)	Laboratory Tests Other Lab Tests
	⁘			79	■		4.3	106.2	
		Bottom of boring at 26.5' No groundwater Boring backfilled with soil cuttings.							
30									
35									
40									
45									

LABORATORY TESTING PROGRAM

Soil Classification

Soils encountered within the exploratory borings were initially classified in the field in general accordance with the visual-manual procedures of the Unified Soil Classification System (ASTM D 2488-93). The samples were re-examined in the laboratory and classifications reviewed and then revised where appropriate. The assigned group symbols are presented in the Exploration Logs provided in Appendix A.

In-Situ Moisture Content and Dry Density

Moisture content and dry density of in-place soil materials were determined in representative strata. Test data are summarized in the Exploration Logs, Appendix A.

Grain Size/Hydrometer Analysis

Grain size and hydrometer analyses were performed on selected samples to verify visual classifications performed in the field. The tests were performed in accordance with ASTM D 422-63. Test results are graphically presented on Plates B-1 and B-2.

Direct Shear

The Coulomb shear strength parameters, angle of internal friction and cohesion, were determined for a soil sample obtained from one of our borings. The test was performed in general conformance with ASTM D 3080-04. Three specimens were prepared for the test and each specimen was sheared under varied loads at an appropriate constant rate of strain. Results are graphically presented on Plate B-3.

Consolidation

Consolidation tests were performed for selected soil samples in general conformance with ASTM D 2435-04. Axial loads were applied in several increments to a laterally restrained 1-inch-high sample. Loads were applied in geometric progression by doubling the previous load, and the resulting deformations were recorded at selected time intervals. The test samples were inundated at a selected load to evaluate the effect of a sudden increase in moisture content (hydro-consolidation potential). Results of the tests are graphically presented on Plates B-4 and B-5.

Soluble Sulfate Content

A chemical analysis was performed on a selected sample to determine soluble sulfate content. This test was performed in our soil laboratory in accordance with California Test Method No 417. The test result is included on Table B.

TABLE B
SUMMARY OF LABORATORY TEST RESULTS

Boring No.	Sample Depth (ft.)	Soil Description	Test Results	
B-2	2	Silty Sand (SM)	Percent Passing #200 Sieve: Soluble Sulfate Content: Sulfate Exposure:	24.5% 0.000% Negligible
B-2	10	Silty Sand (SM)	Percent Passing #200 Sieve:	13.5%

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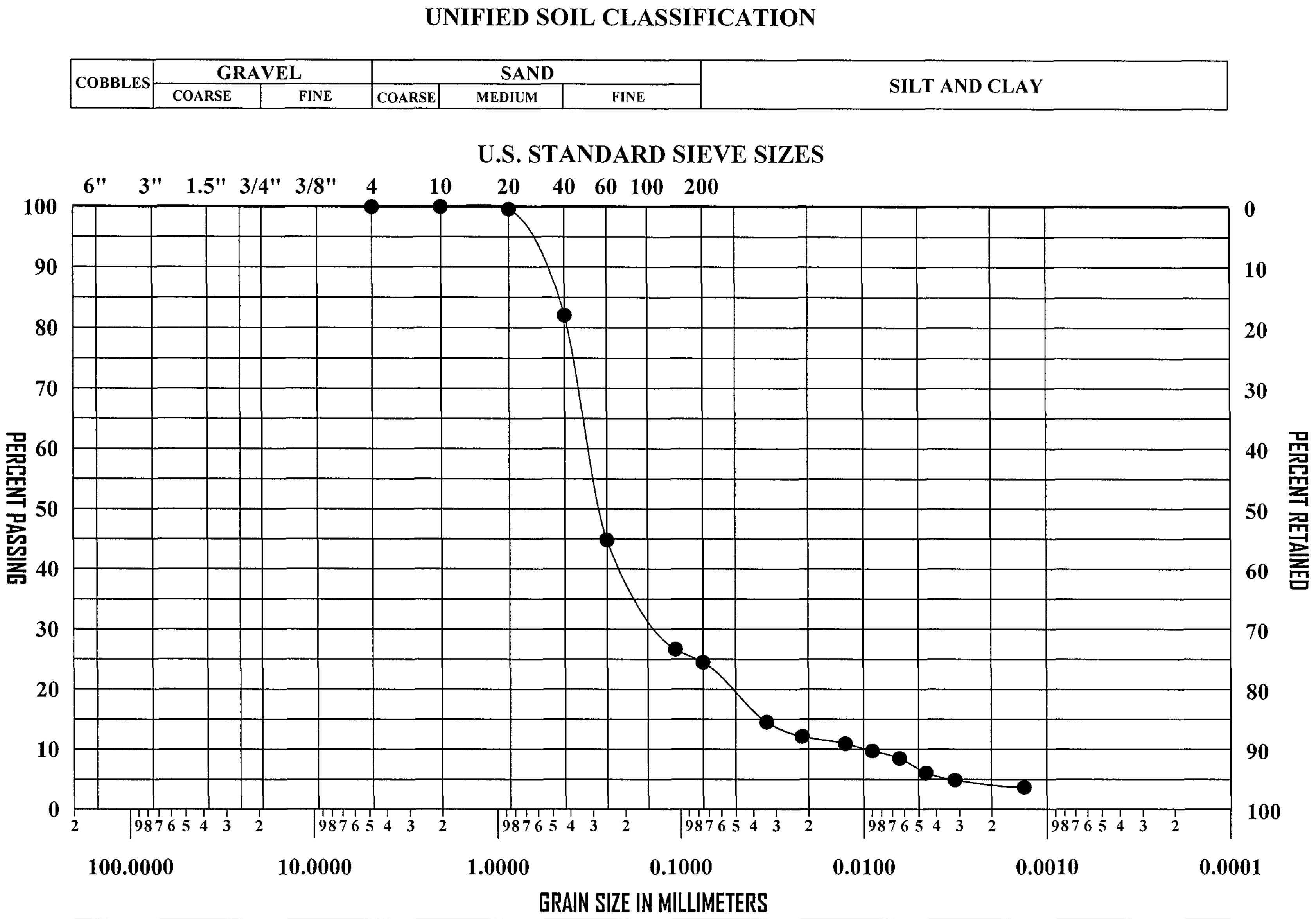
GRAIN SIZE DISTRIBUTION

Job No: 2088.00
Plate No: B-1



LOCATION	DEPTH	SYMBOL	LL	PI	CLASSIFICATION
B-2	2'	●——●			Silty Sand (SM)
		■- - - -■			
		▲— - - ▲			
		◆— · — ◆			

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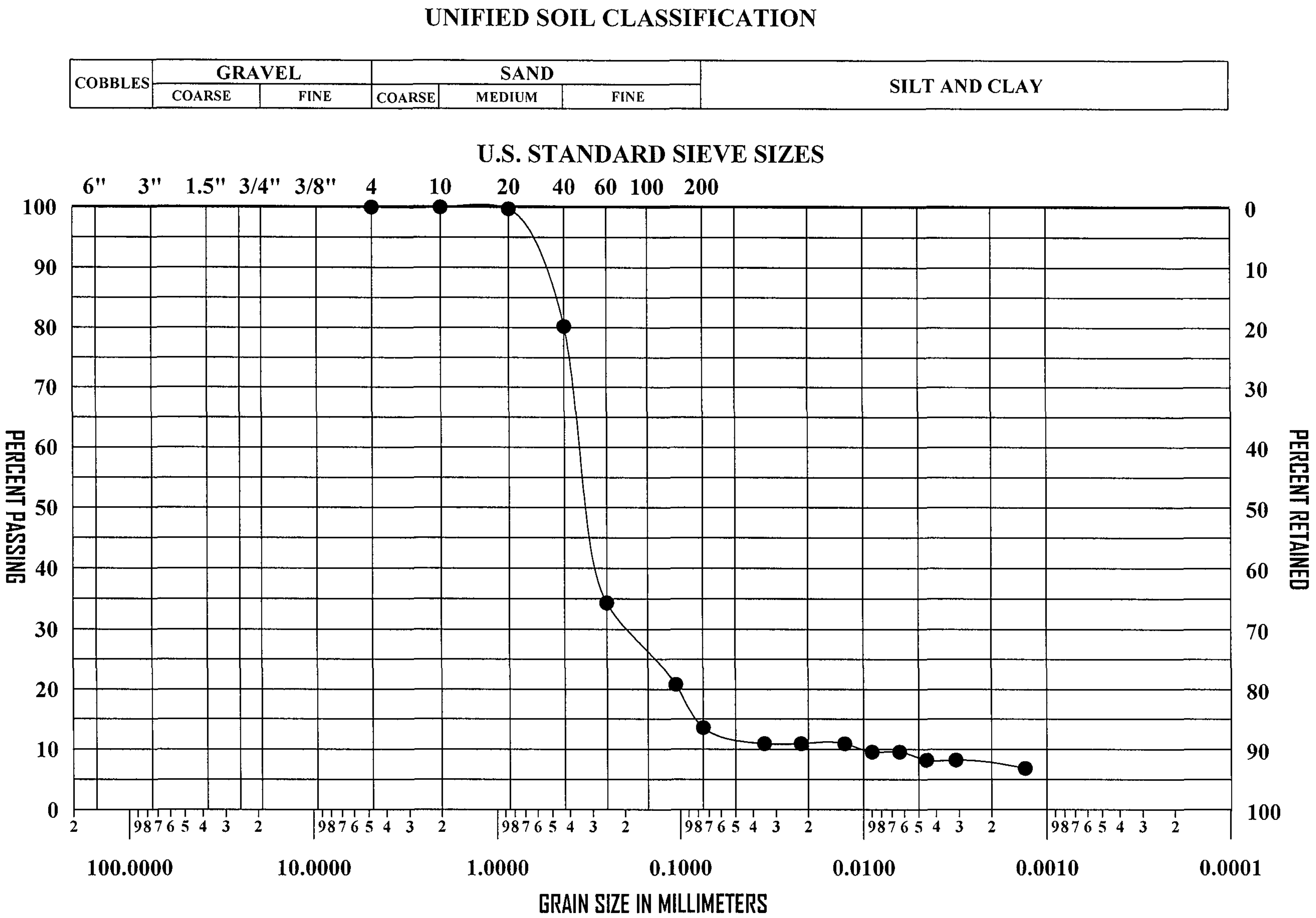
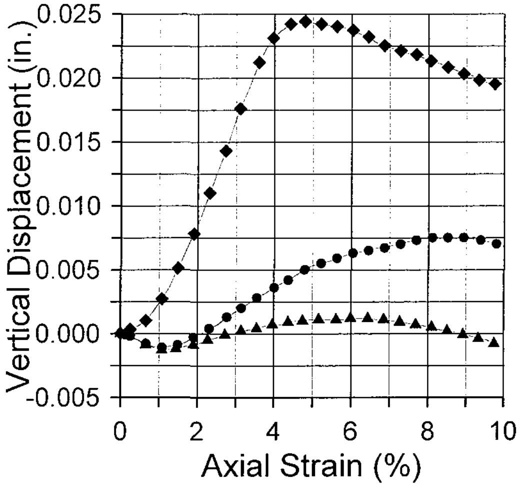
GRAIN SIZE DISTRIBUTION

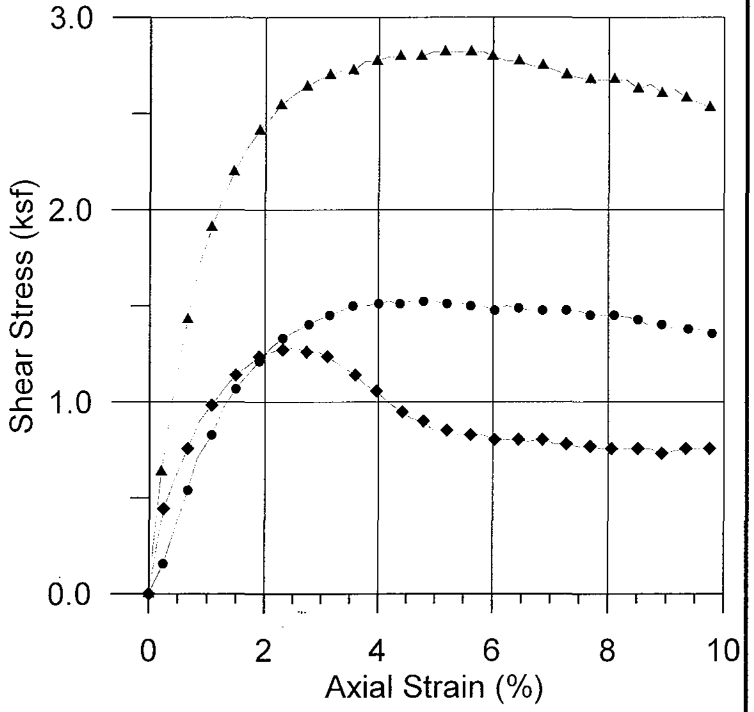


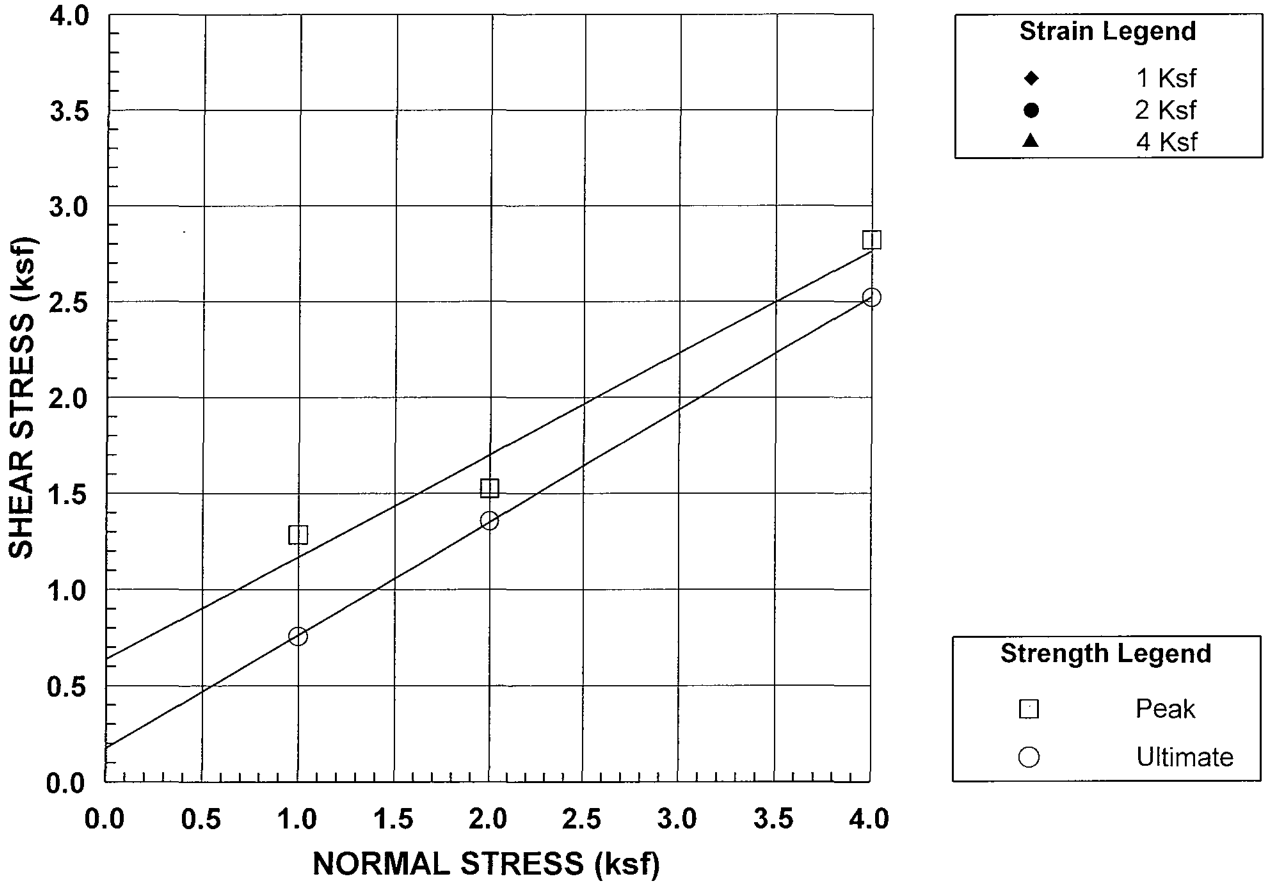
LOCATION	DEPTH	SYMBOL	LL	PI	CLASSIFICATION
B-2	10'	●———●			Silty Sand (SM)
		■- - - - -■			
		▲— - - ▲			
		◆— · — ◆			

Job No: 2088.00
Plate No: B-2

Specimen No.	1	2	3
Normal Stress (ksf)	1	2	4
Peak Stress (ksf)	1.284	1.524	2.82
Peak Displacement (in)	0.061	0.1005	0.12
Ultimate Stress (ksf)	0.756	1.356	2.52
Ultimate Displacement (in)	0.246	0.246	0.246
Initial Dry Density	105.7	103.2	105.4
Initial Moisture Content (%)	3.91	3.91	3.91
Strain Rate (in/min)	0.040		







SAMPLE LOCATION	SAMPLE TYPE	SAMPLE DESCRIPTION
B-1 @ 4'	Undisturbed - In-Situ	Silty Sand (SM)

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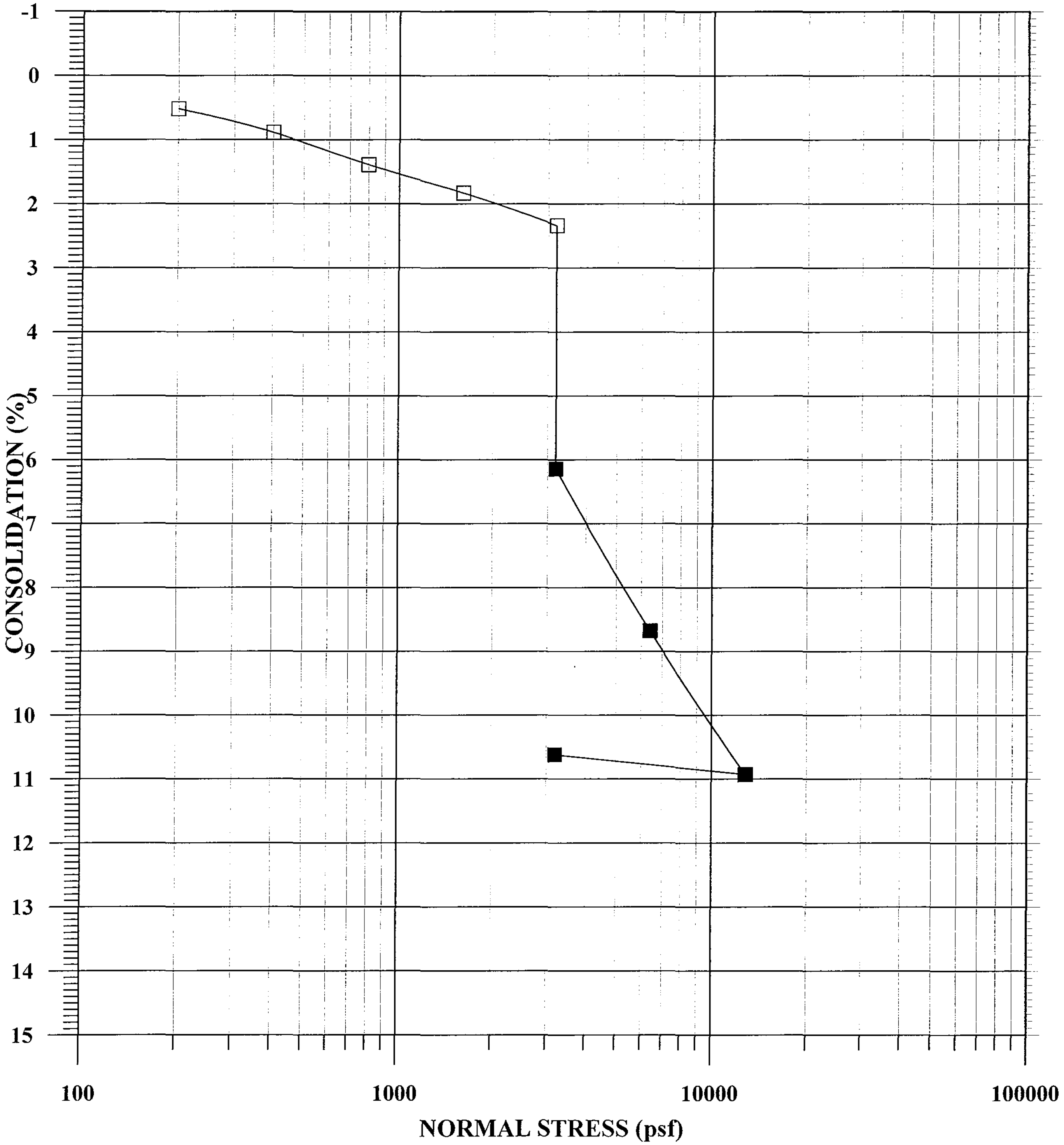
DIRECT SHEAR

Job No: 2088.00

Plate No: B-3



Sample Location:	**B-1**	**Initial Dry Density (pcf):**	**101.3**		
Sample Depth:	**2'**	**Initial Moisture Content (%):**	**4.7**	**Legend**	
Classification:	**SM**	**Final Moisture Content (%):**	**13.1**	☐ ☐ ☐ **Field Moisture** ■ ■ ■ **Saturated**	

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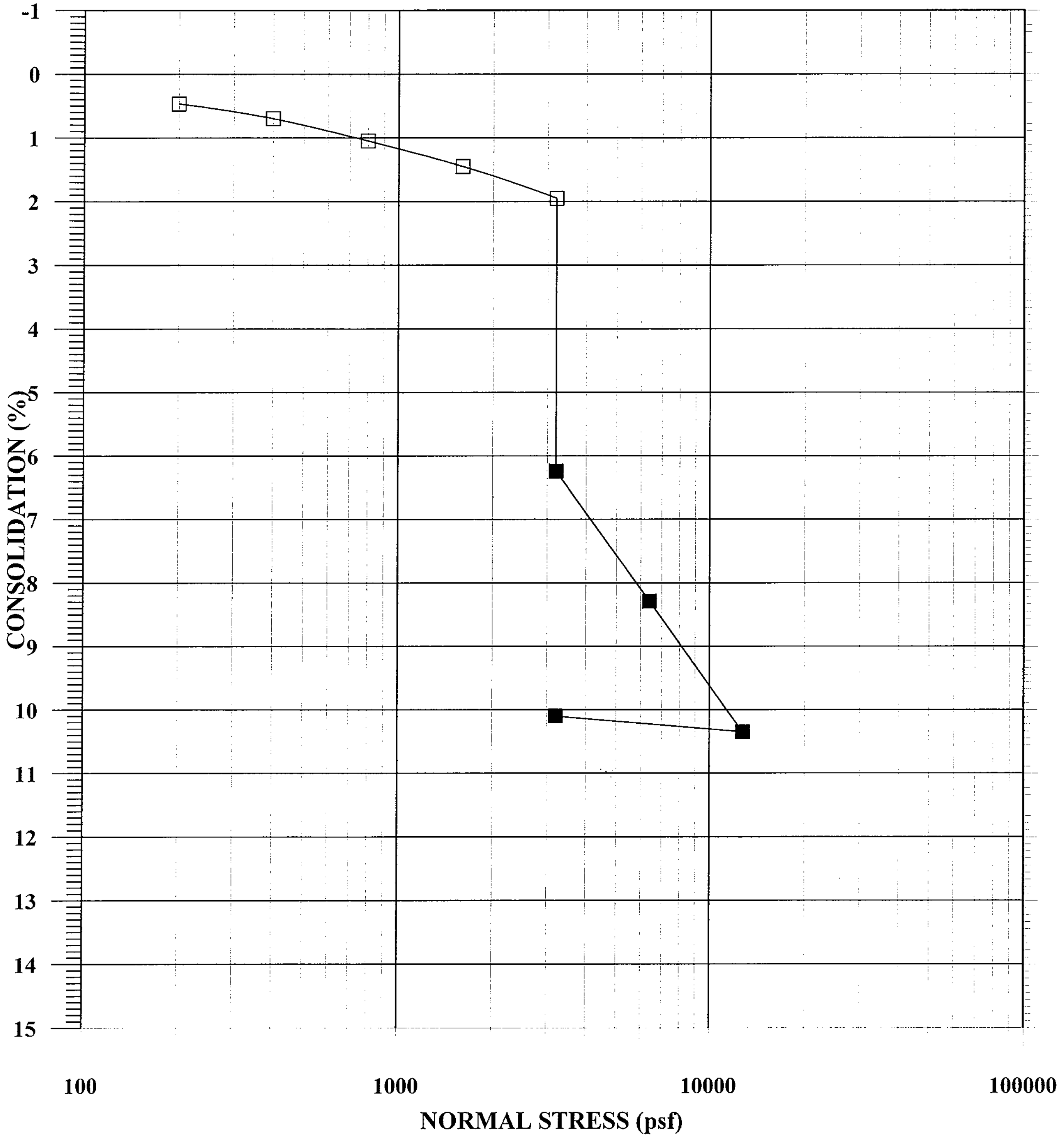
CONSOLIDATION TEST RESULTS

Job No: 2088.00

Plate No: B-4



Sample Location: B-1	**Initial Dry Density (pcf):** 104.7	
Sample Depth: 4'	**Initial Moisture Content:** 4.3	**Legend** □ □ □ Field Moisture ■ ■ ■ Saturated
Classification: SM	**Final Moisture Content:** 13.8	

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EXPLORATION LOG

Project: **Hotel Development**
Boring No.: **Legend**
Location: **888 N Sepulveda Blvd, El Segundo, Ca**
Elevation:
Job No.: **2173.00**
Client: **Barnard Ventures**
Date:
Drill Method:
Driving Weight:
Logged By:

Depth (Feet)	Lith-ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests

EXPLANATION

Solid lines separate geologic units and/or material types.

Dashed lines indicate unknown depth geologic unit change or material type change.

■ **Solid black rectangle** in Core column represents California Split-Spoon sampler (2.5in. ID, 3in. OD).

⧗ **Double triangle** in core column represents SPT sampler.

○ **Open circle** in Core coumn represents sample not recovered.

▒ **Light gray rectangle** in Bulk column represents large bag sample.

Other Laboratory Tests:

MAX = Maximum Dry Density/Optimum Moisture Content
SO4 = Soluble Sulfate Content
EI = Expansion Index
COR = Corrosion Series
DSR = Direct Shear, Remolded
DS = Direct Shear, Undisturbed
SA = Sieve Analysis (1" through #200 sieve)
PSA = Particle Size Analysis (SA with Hydrometer)
-200 = Percent Passing #200 Sieve
HYD = Hydrometer Only
CON = Consolidation
SE = Sand Equivalent
RVAL = R-Value
ATT = Atterberg Limits
PER = Permeability.

EXPLORATION LOG

Project: **Hotel Development**
Boring No.: **B-1**
Location: **888 N Sepulveda Blvd, El Segundo, Ca**
Elevation: **+-111'**
Job No.: **2173.00**
Client: **Barnard Ventures**
Date: **5/23/13**
Drill Method: **Hollow-Stem Auger**
Driving Weight **140 lbs / 30 in**
Logged By: **JC**

Depth (Feet)	Lith- ology	Material Description	Water	Samples: Blows Per Foot	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
	⁙	**DUNE SAND (Qs)** Silty Sand (SM): Light reddish-brown; damp; medium dense; fine-grained sand.				░			MAX PSA
	⁙			16	■	░	4.2	108.1	
5	⁙	**LAKEWOOD FORMATION (Qlw)** Silty Sand (SM): Reddish-brown; damp; dense; fine- to medium-grained sand; oxidation staining.		33	■		7.4	119.2	CON DS
	⁙			50	■		11.5	124.2	
	▨	Clayey Sand (SC): Reddish-brown; moist; very dense; fine-grained sand.							
10	▨			30	■		13.3	115.2	
15	⁙	Silty Sand (SM): Light reddish-brown; dry to damp; loose; fine-grained sand.		12	■		3.6	101.0	
20	⁙	@ 20', becomes medium dense.		19	■		3.8	98.7	

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Plate A-2

E X P L O R A T I O N L O G

Project: **Hotel Development**		Boring No.: **B-1**
Location: **888 N Sepulveda Blvd, El Segundo, Ca**		Elevation: **+-111'**
Job No.: **2173.00**	Client: **Barnard Ventures**	Date: **5/23/13**
Drill Method: **Hollow-Stem Auger**	Driving Weight: **140 lbs / 30 in**	Logged By: **JC**

Depth (Feet)	Lith-ology	Material Description	Water	Samples: Blows Per Foot	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		@ 25', becomes light reddish-brown to tan, very dense, less fines.		40	⧗				
		Sand (SP-SM): Light reddish-brown; damp; very dense; fine-grained sand.							
30				59	■		3.3	100.4	
35				67	⧗				
40				43	■		3.5	95.6	
		Sandy Silt (ML): Tan; dry to damp; hard; fine-grained sand.							
45				50/5"	⧗				

Plate A-3

EXPLORATION LOG

Project: **Hotel Development**
Boring No.: **B-1**
Location: **888 N Sepulveda Blvd, El Segundo, Ca**
Elevation: **+-111'**
Job No.: **2173.00**
Client: **Barnard Ventures**
Date: **5/23/13**
Drill Method: **Hollow-Stem Auger**
Driving Weight **140 lbs / 30 in**
Logged By: **JC**

Depth (Feet)	Lith-ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
	▨			60	■		5.6	98.5	
		Total Depth 51 feet No Ground Water Boring backfilled with soil cuttings.							
55									
60									
65									
70									

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EXPLORATION LOG

Project:	**Hotel Development**	Boring No.:	**B-2**
Location:	**888 N Sepulveda Blvd, El Segundo, Ca**	Elevation:	**+-107'**
Job No.:	**2173.00**	Date:	**5/23/13**
Client:	**Barnard Ventures**	Logged By:	**JC**
Drill Method:	**Hollow-Stem Auger**	Driving Weight	**140 lbs / 30 in**

Depth (Feet)	Lith- ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
		LAKEWOOD FORMATION (Qlw) Silty Sand (SM): Dark brown; damp; medium dense; fine-grained sand; minor porosity.							
				13	■		7.0	110.7	
		Sandy Clay / Clayey sand (CL/SC): Dark brown; moist; stiff; fine-grained sand.				▨			EI SO4 PSA ATT CON
5				18	■	▨	15.5	112.9	
		Clayey Sand (SC): Brown to reddish-brown; moist; dense; fine-grained sand. @ 7', some caliche.		17	■	▨	16.9	111.6	
10				24	■		15.3	115.5	CON
		Silty Sand (SM): Reddish-brown; dry to damp; medium dense; fine-grained sand.							
15				17	■		3.3	99.1	
20		@ 20', becomes very dense.		26	⧗				
		Sand (SP): Light reddish-brown; dry to damp; dense to very dense; fine-grained sand.							

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Plate A-5

EXPLORATION LOG

Project: **Hotel Development**		Boring No.: **B-2**	
Location: **888 N Sepulveda Blvd, El Segundo, Ca**		Elevation: **+-107'**	
Job No.: **2173.00**	Client: **Barnard Ventures**	Date: **5/23/13**	
Drill Method: **Hollow-Stem Auger**	Driving Weight **140 lbs / 30 in**	Logged By: **JC**	

				Samples			Laboratory Tests		
Depth (Feet)	Lithology	Material Description	Water	Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
				41	■		3.5	92.9	
30				59	⧗				
35				41	■		2.8	101.7	
		Sandy Silt (ML): Light brown to tan; dry to damp; hard.							
40				76	⧗				
		Total Depth 41.5 feet No Ground Water Boring backfilled with soil cuttings.							
45									

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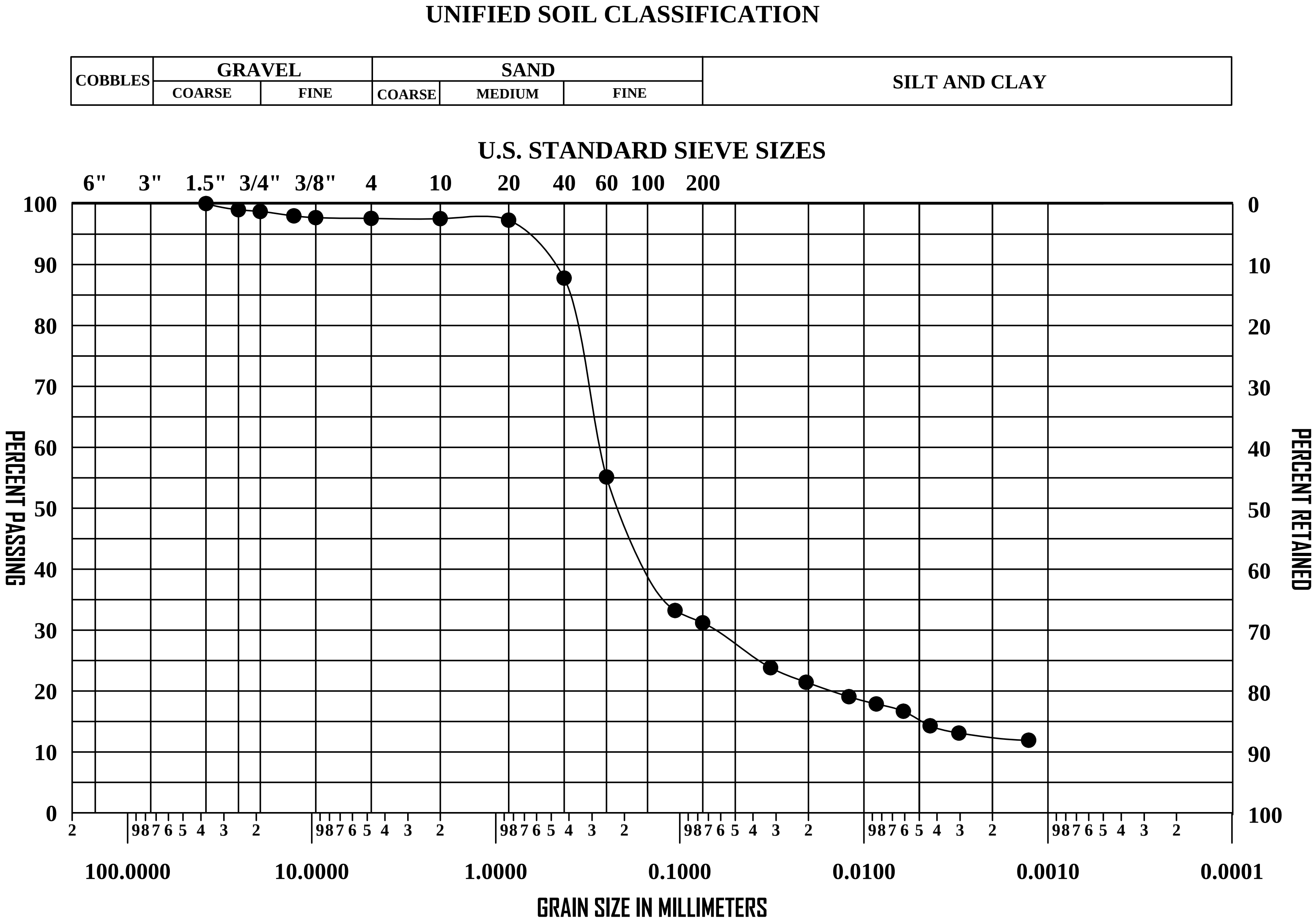
GRAIN SIZE DISTRIBUTION

Job No: 2173.00
Plate No: B-1



LOCATION	DEPTH	SYMBOL	LL	PI	CLASSIFICATION
B-1	0-5'	●——●			Silty Sand (SM)
		■- - - -■			
		▲— - - ▲			
		◆- · — ◆			

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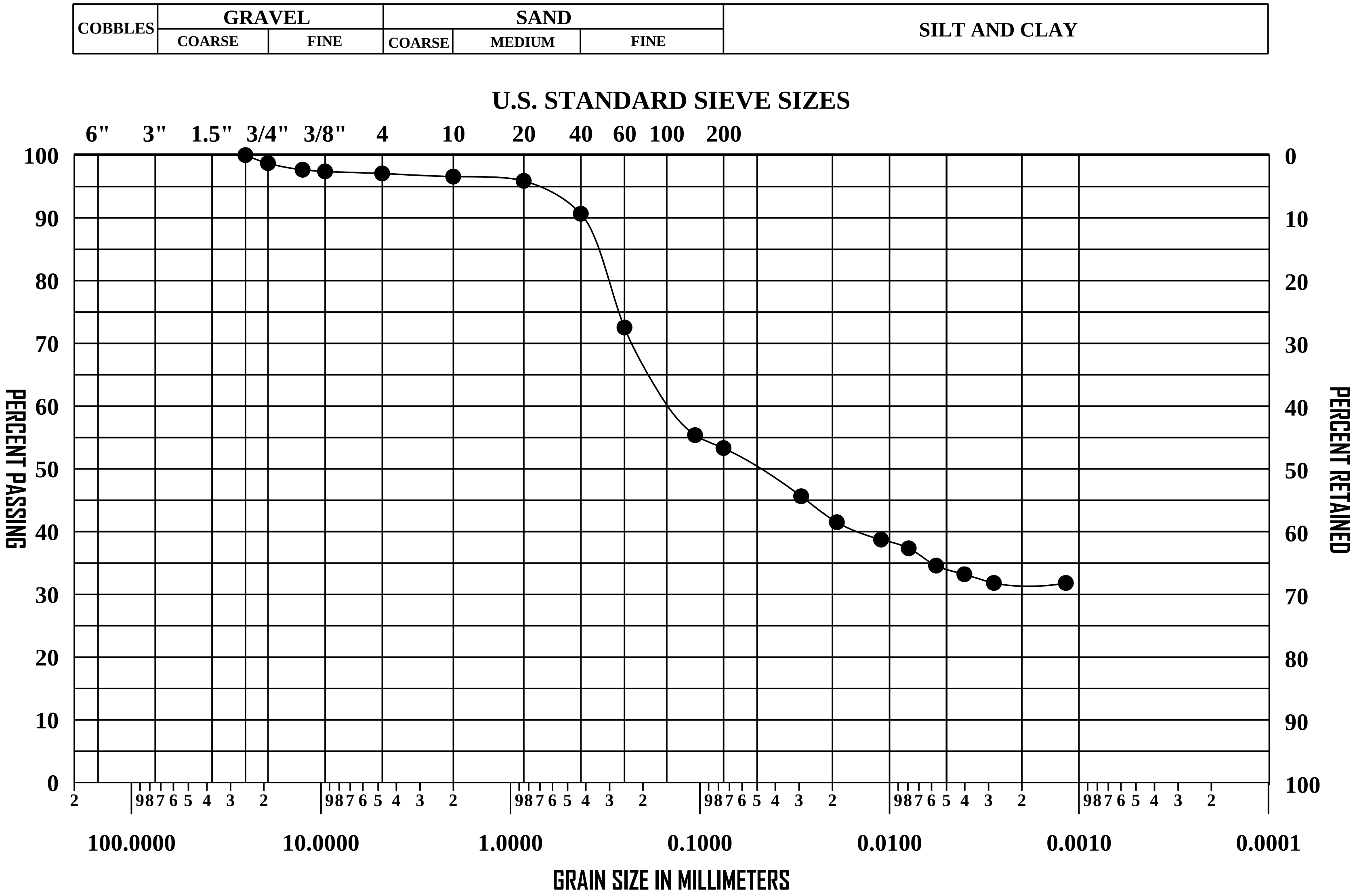
GRAIN SIZE DISTRIBUTION

Job No: 2173.00

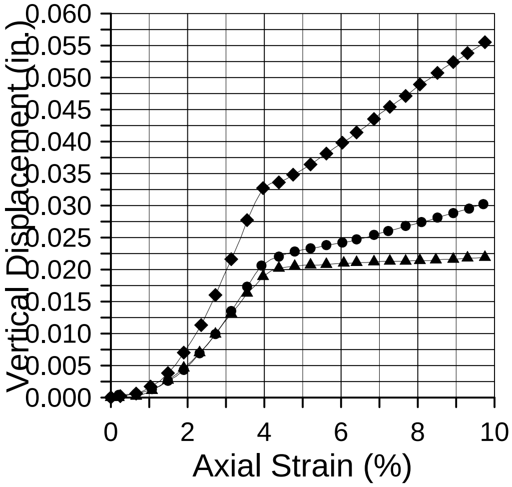
Plate No: B-2

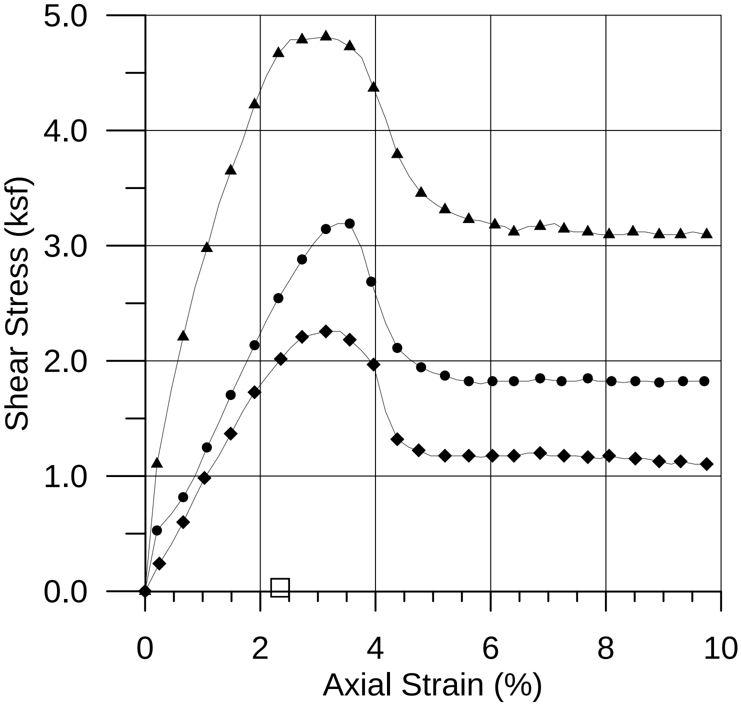
UNIFIED SOIL CLASSIFICATION

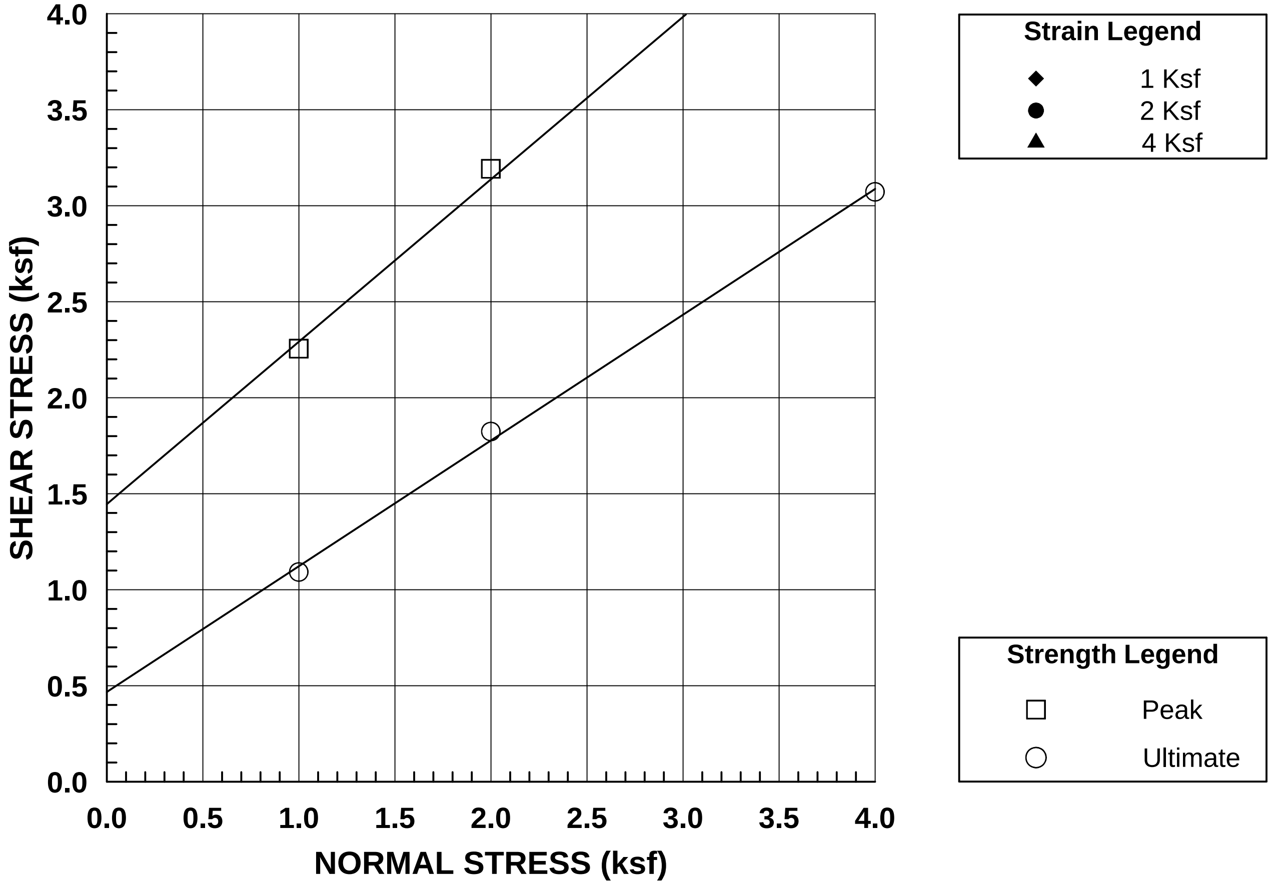


LOCATION	DEPTH	SYMBOL	LL	PI	CLASSIFICATION
B-2	3'-8'	●——●			Sandy Clay (CL)
		■- - - -■			
		▲— - - ▲			
		◆- · —◆			

Specimen No.	1	2	3
Normal Stress (ksf)	1	2	4
Peak Stress (ksf)	2.256	3.192	4.812
Peak Displacement (in)	0.076	0.081	0.0755
Ultimate Stress (ksf)	1.092	1.824	3.072
Ultimate Displacement (in)	0.246	0.245	0.246
Initial Dry Density	116.5	116.5	118.6
Initial Moisture Content (%)	7.419	7.419	7.419
Strain Rate (in/min)	0.040		

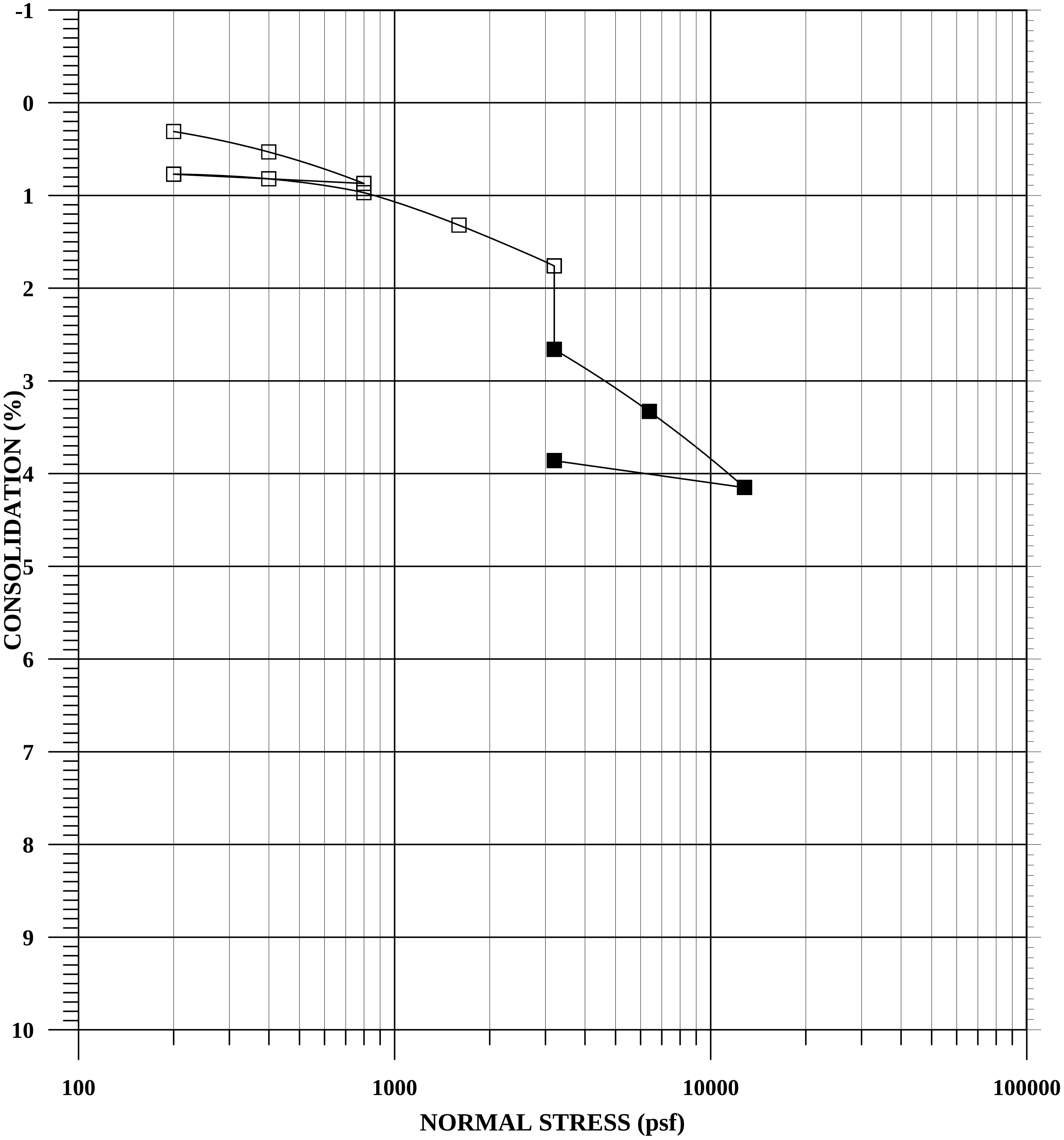






SAMPLE LOCATION	SAMPLE TYPE	SAMPLE DESCRIPTION
B-1 @ 5'	Undisturbed - In-Situ	Silty Sand (SM)

ALBUS-KEEFE & ASSOCIATES, INC. GEOTECHNICAL CONSULTANTS	**DIRECT SHEAR**	**Job No: 2173.00** **Plate No: B-3**



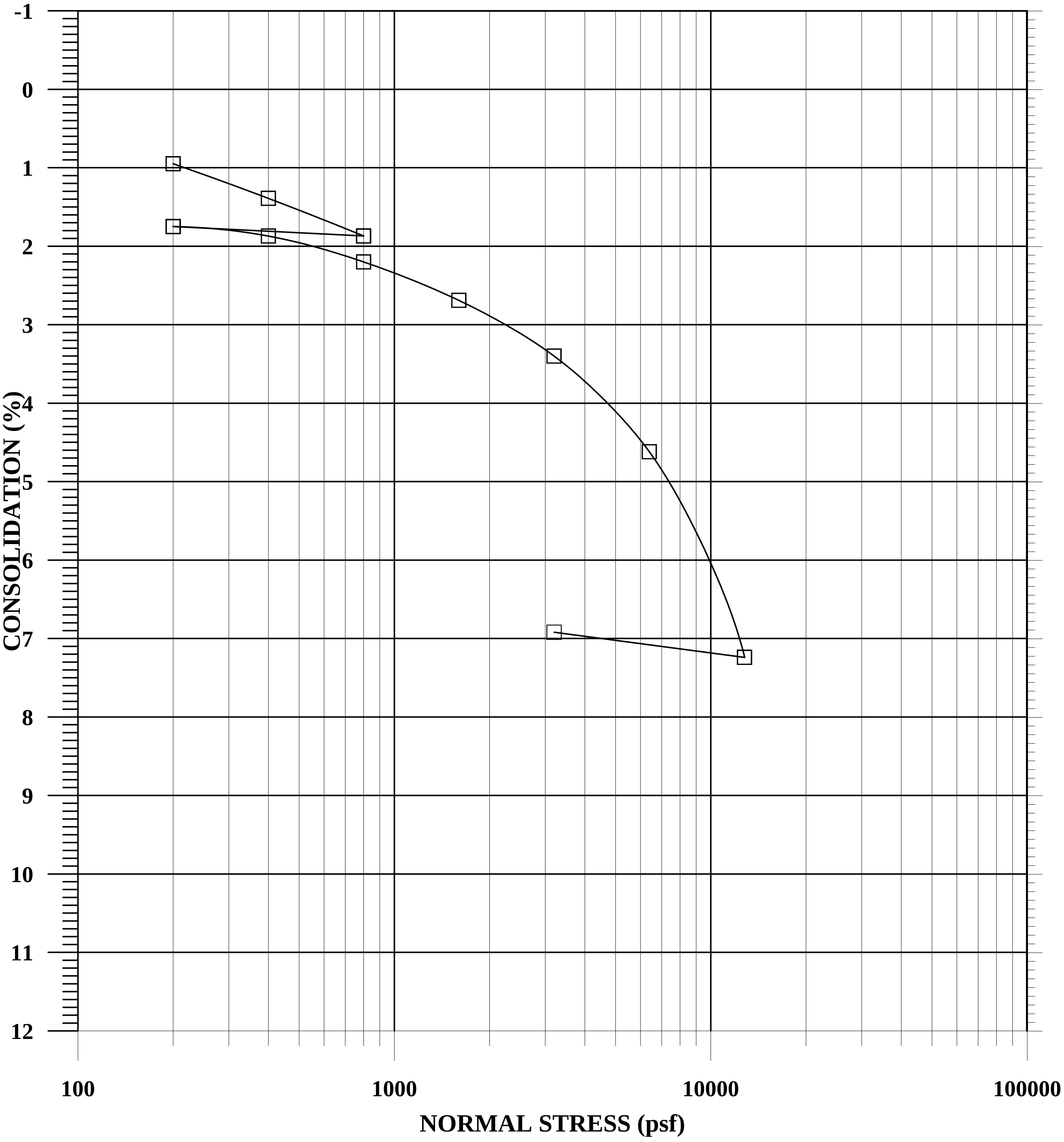
Sample Location:	B-1	**Initial Dry Density (pcf):**	116.8	
Sample Depth:	5'	**Initial Moisture Content (%):**	7.8	**Legend** ☐ ☐ ☐ **Field Moisture** ■ ■ ■ **Saturated**
Classification:	SM	**Final Moisture Content (%):**	10.3	

ALBUS-KEEFE & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

CONSOLIDATION TEST RESULTS

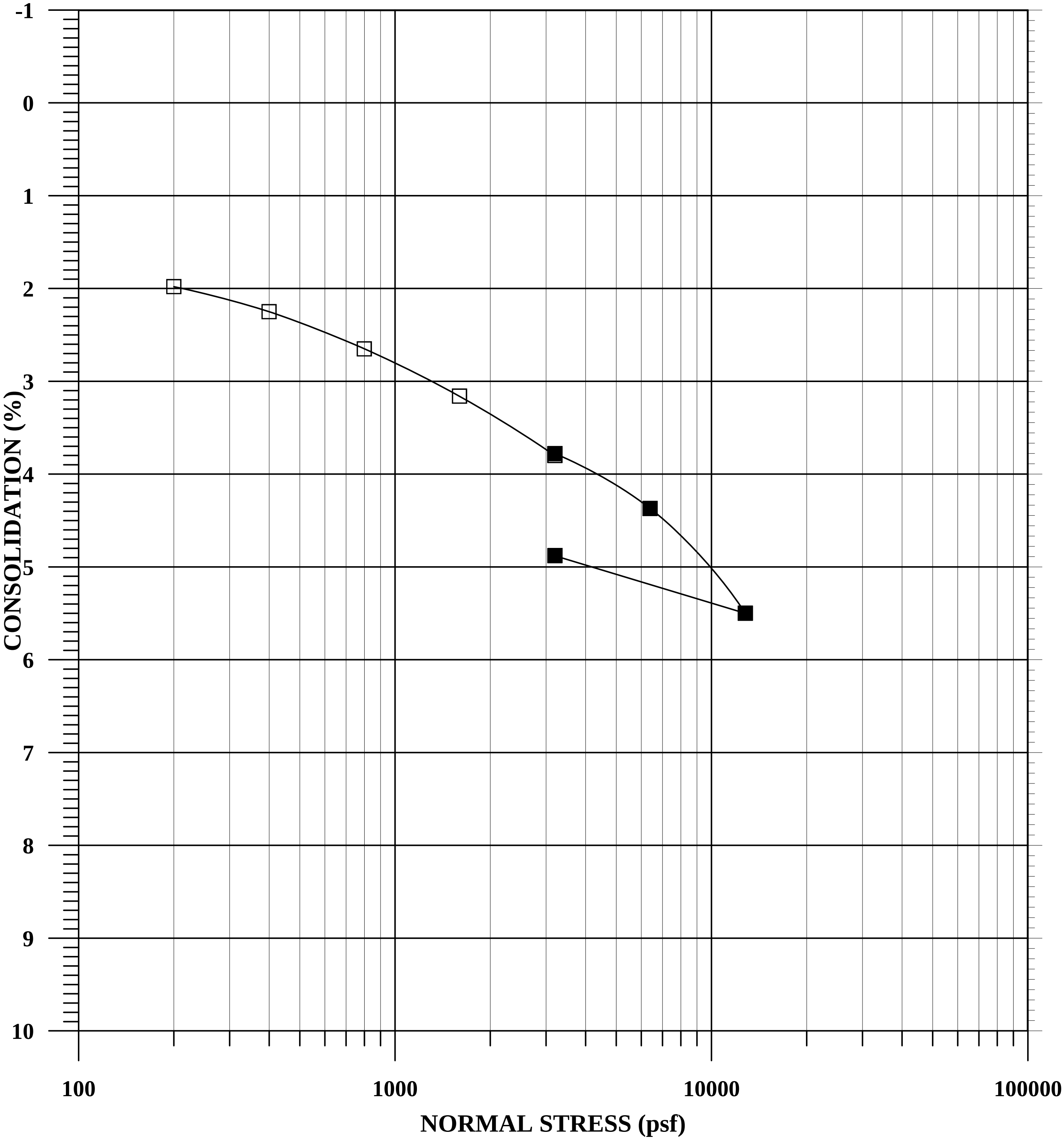
Job No: 2173.00

Plate No: B-4



Sample Location:	B-2	**Initial Dry Density (pcf):**	112.1	
Sample Depth:	5'	**Initial Moisure Content:**	16.1	**Legend** ☐ ☐ ☐ Field Moisture ■ ■ ■ Saturated
Classification: CL		**Final Moisture Content:**	13.6	

ALBUS-KEEFE & ASSOCIATES, INC. GEOTECHNICAL CONSULTANTS	**CONSOLIDATION TEST RESULTS**	**Job No: 2173.00** **Plate No. B-5**



Sample Location:	B-2	**Initial Dry Density (pcf):**	113.5
Sample Depth:	10'	**Initial Moisture Content (%):**	10.0
Classification:	SC	**Final Moisture Content (%):**	16.0

Legend

□ □ □ Field Moisture

■ ■ ■ Saturated

ALBUS-KEEFE & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

CONSOLIDATION TEST RESULTS

Job No: 2173.00

Plate No: B-6

EXPLORATION LOG

Project: **Proposed Building Addition and Renovation Project**		Boring No.: **Legend**
Location: **1222 Grand Ave, El Segundo, Ca**		Elevation:
Job No.: **2189.00**	Client: **Mars Venture, Inc.**	Date:
Drill Method:	Driving Weight:	Logged By:

Depth (Feet)	Lith- ology	Material Description	Water	Samples			Laboratory Tests		
				Blows Per Foot	Core	Bulk	Moisture Content (%)	Dry Density (pcf)	Other Lab Tests
		EXPLANATION							
		Solid lines separate geologic units and/or material types.							
		Dashed lines indicate unknown depth geologic unit change or material type change.							
5									
		Solid black rectangle in Core column represents California Split-Spoon sampler (2.5in. ID, 3in. OD).			■				
		Double triangle in core column represents SPT sampler.			⧗				
10		**Open circle** in Core coumn represents sample not recovered.			○				
		Light gray rectangle in Bulk column represents large bag sample.				▒			
15		**Other Laboratory Tests:** MAX = Maximum Dry Density/Optimum Moisture Content SO4 = Soluble Sulfate Content EI = Expansion Index COR = Corrosion Series DSR = Direct Shear, Remolded DS = Direct Shear, Undisturbed SA = Sieve Analysis (1" through #200 sieve) PSA = Particle Size Analysis (SA with Hydrometer) -200 = Percent Passing #200 Sieve HYD = Hydrometer Only CON = Consolidation SE = Sand Equivalent RVAL = R-Value ATT = Atterberg Limits PER = Permeability.							
20									

EXPLORATION LOG

Project: **Proposed Building Addition and Renovation Project**	Boring No.: **B-1**
Location: **1222 Grand Ave, El Segundo, Ca**	Elevation:
Job No.: **2189.00** / Client: **Mars Venture, Inc.**	Date: **6/17/13**
Drill Method: **Hand Auger** / Driving Weight **Hand Driven**	Logged By: **DDA**

Depth (Feet)	Lith- ology	Material Description	Water	Samples: Blows Per Foot	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		Concrete = 4". Silty Sand (SM): Brown; moist; medium dense; fine- to medium-grained sand.				▨			MAX SO4 DSR RVAL
						▨			
		@ 2', some pinhole pores, dense.			■	▨	5.8	98.0	
						▨			
		@ 4', porous.			■	▨	5.8	100.7	CON
5									
					■		7.2	113.7	CON
		@ 8', becomes lt reddish-brown, more sand.							
10		@ 10', becomes very dense.			■		7.0	106.7	

Total Depth 11 feet
No Ground water
Boring back filled with soil cuttings.

ALBUS-KEEFE & ASSOCIATES, INC.
1011 N. Armando St.
Anaheim, CA 92806-2606
(714) 630-1626 fx(714) 630-1916

EXPLORATION LOG

Project: **Proposed Building Addition and Renovation Project**		Boring No.: **B-2**	
Location: **1222 Grand Ave, El Segundo, Ca**		Elevation:	
Job No.: **2189.00**	Client: **Mars Venture, Inc.**	Date: **6/17/13**	
Drill Method: **Hand Auger**	Driving Weight **Hand Driven**	Logged By: **DDA**	

Depth (Feet)	Lith- ology	Material Description	Water	Samples: Blows Per Foot	Samples: Core	Samples: Bulk	Laboratory Tests: Moisture Content (%)	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Tests
		Asphalt = 2".							
		Silty Sand (SM): Brown; moist; medium dense; fine- to medium-grained sand.							
					■		5.4	115.0	
		@ 4', becomes loose, porous.			■		6.8	98.7	CON
5									
					■		7.3	95.0	
		@ 8', becomes lt reddish-brown.							
10		@ 10', becomes dense.			■		7.4	102.9	
15		@ 15', becomes dense to very dense.			■		4.9	102.6	
		Total Depth 17 feet No Ground water Boring back filled with cuttings.							

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Anaheim, CA 92806-2606
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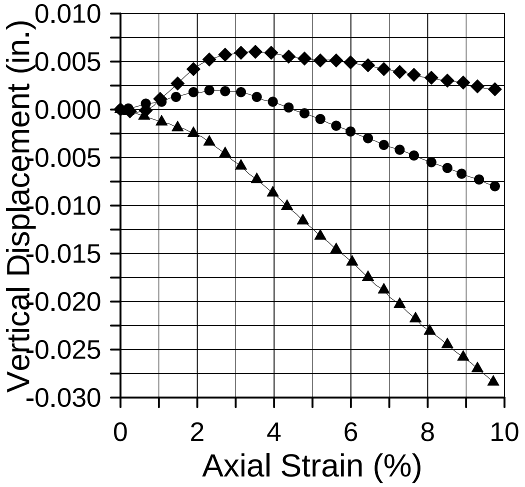
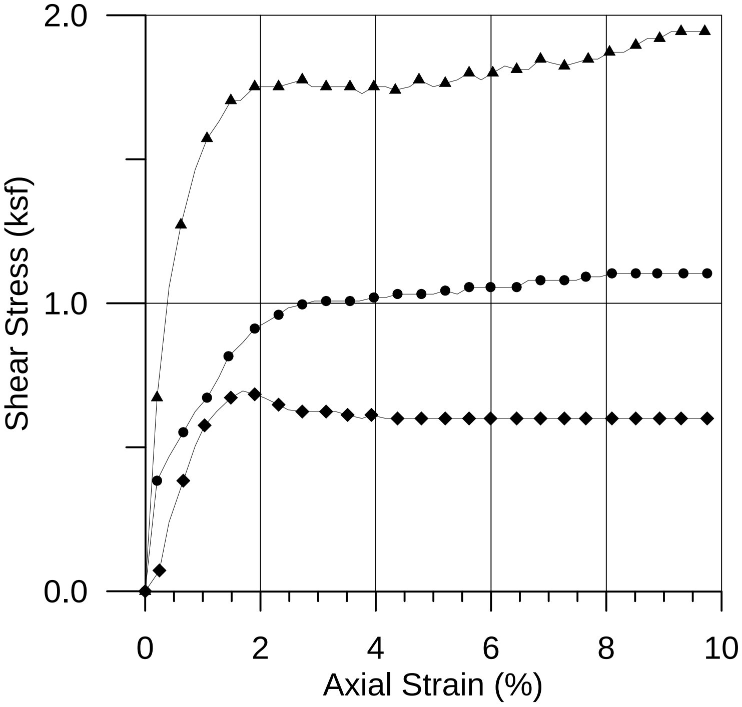
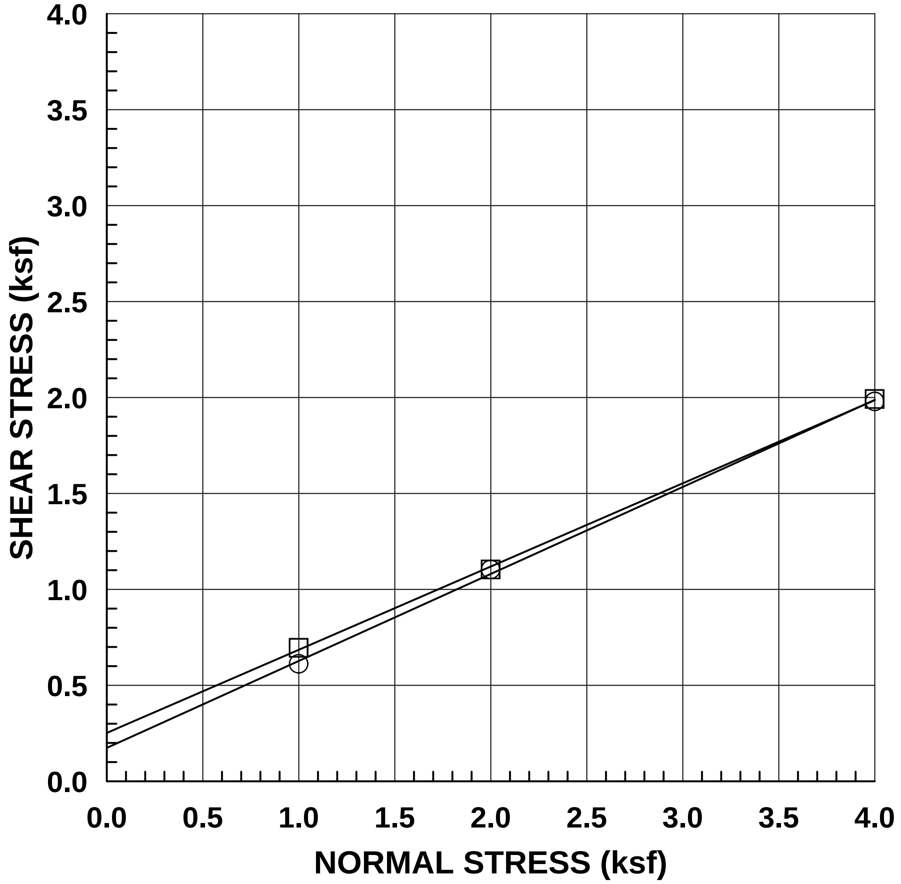
Plate A-3

Specimen No.	1	2	3
Normal Stress (ksf)	1	2	4
Peak Stress (ksf)	0.696	1.104	1.992
Peak Displacement (in)	0.0405	0.1955	0.25
Ultimate Stress (ksf)	0.612	1.104	1.98
Ultimate Displacement (in)	0.246	0.246	0.246
Initial Dry Density	110.7	110.7	110.7
Initial Moisture Content (%)	10.86	10.86	10.86
Strain Rate (in/min)	0.050		







Strain Legend

◆	1 Ksf
●	2 Ksf
▲	4 Ksf

Strength Legend

☐	Peak
○	Ultimate

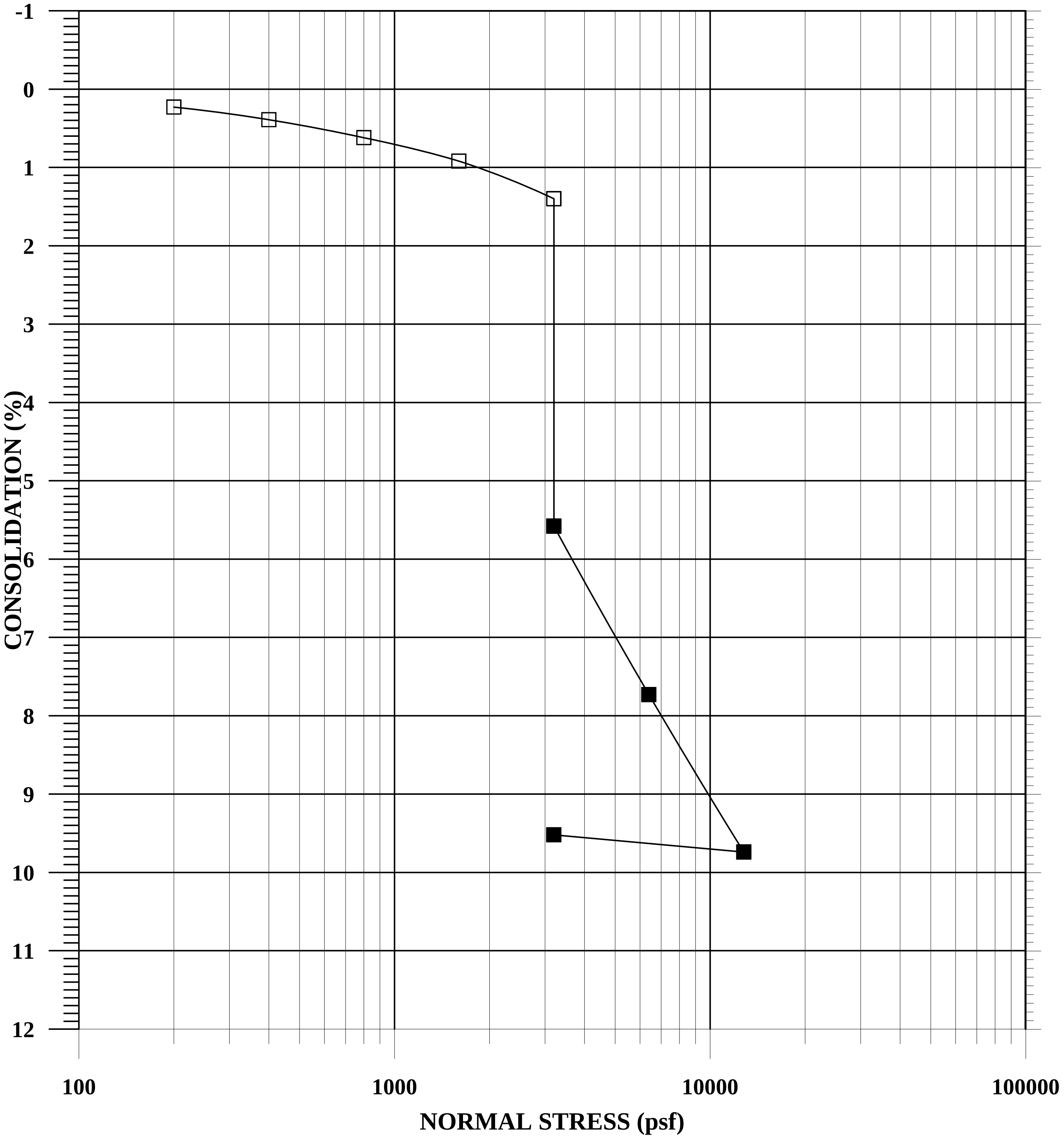
SAMPLE LOCATION	SAMPLE TYPE	SAMPLE DESCRIPTION
B-1 @ 0-5'	Remolded - Saturated	Silty Sand (SM)

ALBUS-KEEFE & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

DIRECT SHEAR

Job No: 2189.00

Plate No: B-1



Sample Location:	**B-1**	**Initial Dry Density (pcf):**	**99.5**	
Sample Depth:	**4'**	**Initial Moisture Content:**	**9.2**	**Legend** □ □ □ **Field Moisture** ■ ■ ■ **Saturated**
Classification:	**SM**	**Final Moisture Content:**	**13.5**	

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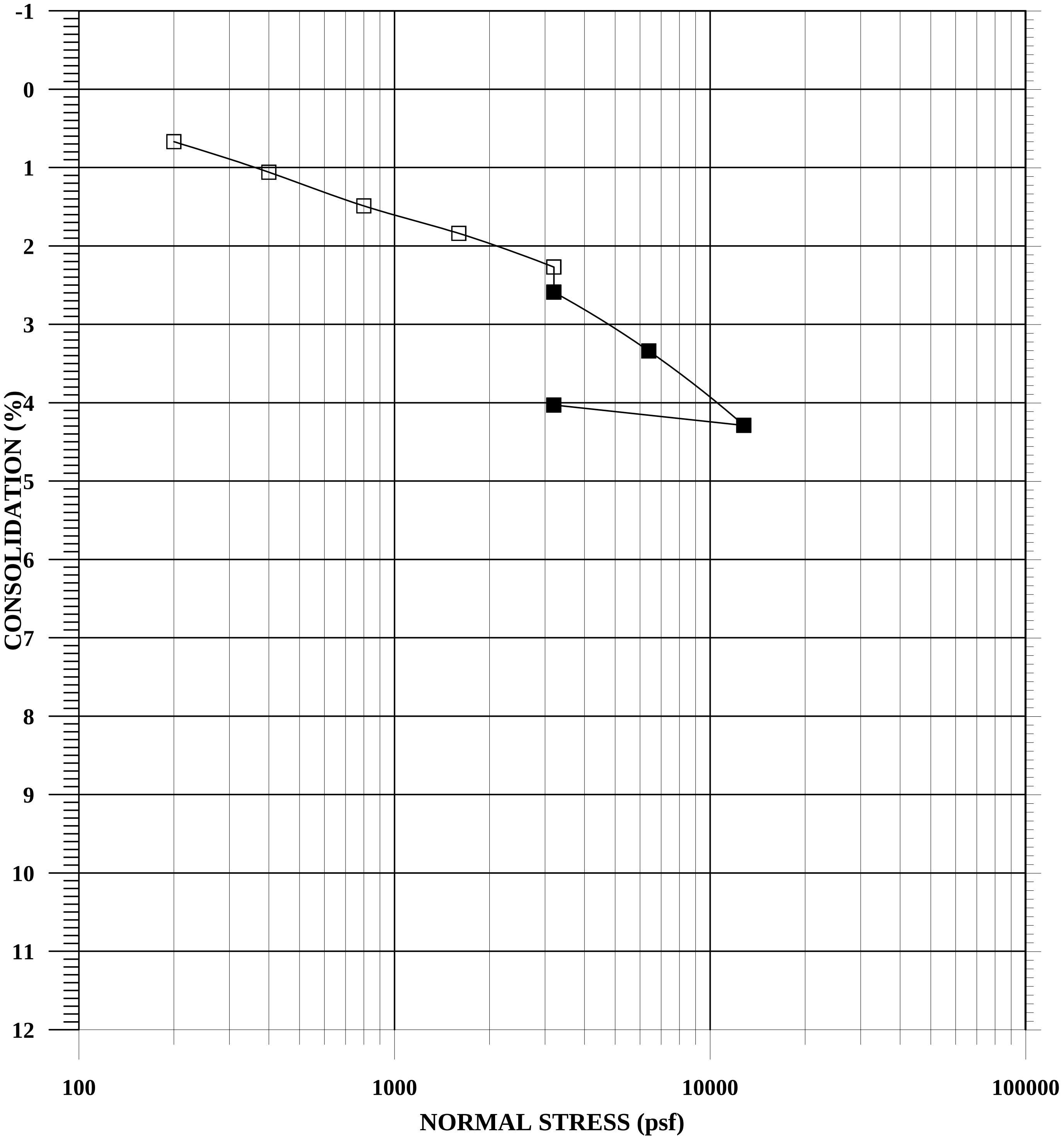
GEOTECHNICAL CONSULTANTS

CONSOLIDATION TEST RESULTS

Job No: 2189.00

Plate No. B-2



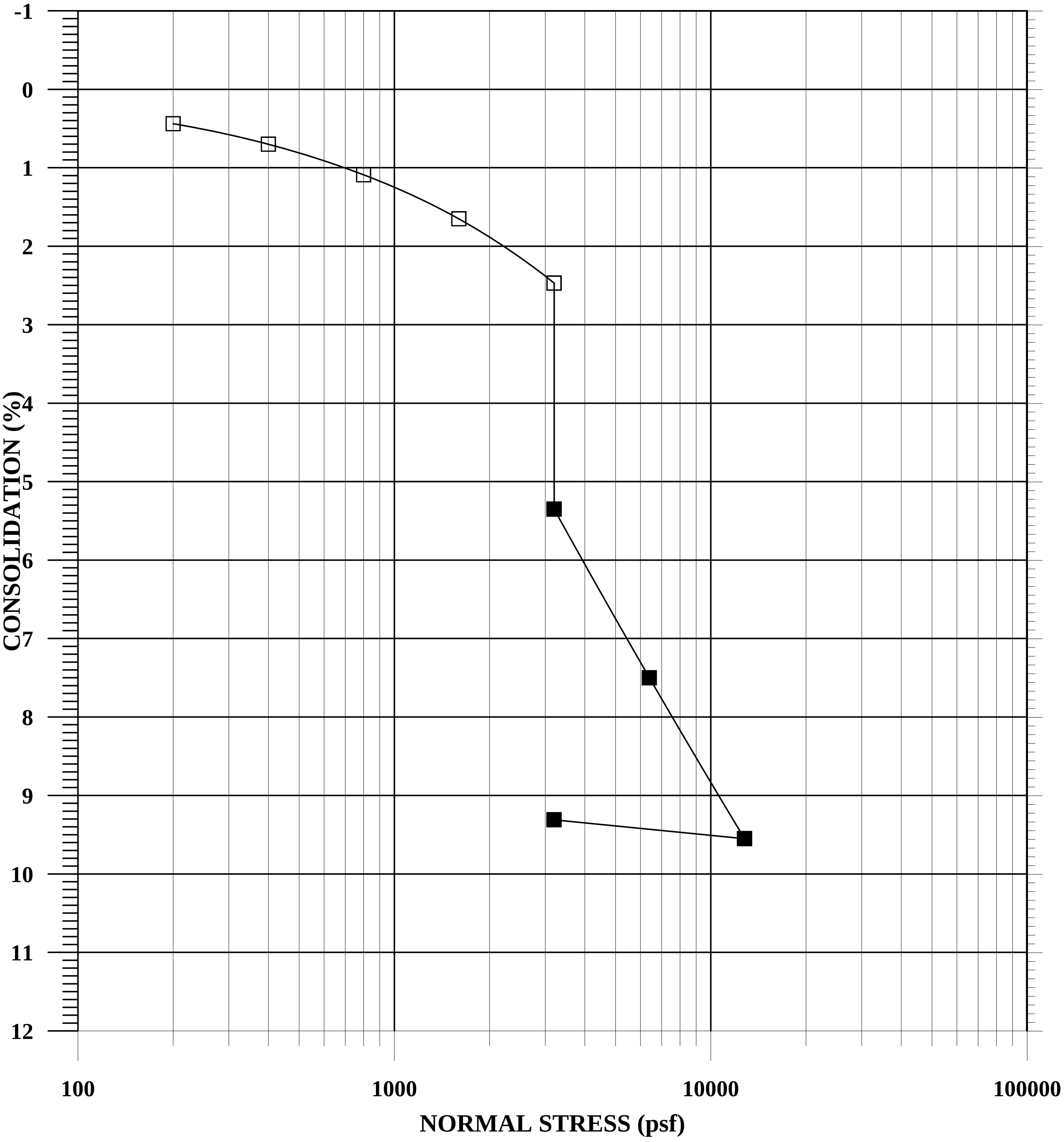
Sample Location:	B-1	Initial Dry Density (pcf):	112.2	
Sample Depth:	6'	Initial Moisture Content:	8.3	Legend ☐ ☐ ☐ Field Moisture ■ ■ ■ Saturated
Classification: SM		Final Moisture Content:	12.1	

ALBUS-KEEFE & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

CONSOLIDATION TEST RESULTS

Job No: 2189.00

Plate No. B-3



Sample Location:	**B-2**	**Initial Dry Density (pcf):**	**101.9**	
Sample Depth:	**4'**	**Initial Moisture Content:**	**8.2**	**Legend** □ □ □ **Field Moisture** ■ ■ ■ **Saturated**
Classification: SM		**Final Moisture Content:**	**14.9**	

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CONSOLIDATION TEST RESULTS

Job No: 2189.00

Plate No. B-4