Appendix E: Preliminary Soils and Engineering Geologic Investigation

Appendices

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THE PLANNING CENTER

Governmental Services
Planning & Urban Design
Environmental Studies
Landscape Architecture

1580 Metro Drive
Costa Mesa, CA 92626
Phone: 714.966.9220
Fax: 714.966.9221
Email:costamesa@planningcenter.com

Transmittal

Date: June 11, 2003

To: Claremont Unified School District
2080 N. Mountain Avenue
Claremont, CA 91711

Attn: Paula McGuane

From: Andrea Brewer

Subject: Geologic Investigation

Project No.: CLR – 01.0E

The following items are transmitted via: [x] U.S. mail [ ] messenger [ ] express mail [ ] blueprinter

- One (1) copy Preliminary Soils and Engineering Geologic Investigation for proposed La Puerta Elementary School dated February 14, 2002
- One (1) Addendum to Preliminary Soils and Engineering Geologic Investigation for proposed La Puerta Elementary School dated February 12, 2003

The items above are transmitted: [x] at your request [ ] for your review [ ] for your files [ ] for your information

General Remarks:

Please contact me if you have any questions.

From: Andrea Brewer

ADOLPH ZIEMBA, AIA & ASSOCIATES, INC.
111 N. First Street, Suite 204, Burbank, CA 91502
Phone: (818) 841-2585 Fax: (818) 841-7782

LETTER OF TRANSMITTAL

DATE	JOB NO
10/17/02	010111

RE: LA PUERTA ELEMENTARY SCHOOL
GEOLOGIC INVESTIGATION REPORT

TO
Dwayne Mears
The Planning Center
1580 Metro Drive
Costa Mesa, Ca. 92626

WE ARE SENDING YOU: ☐ Attached ☐ under separate cover via UPS, REGULAR the following items:

☐ Prints ☐ Shop drawings ☐ Plans ☐ Specifications ☐ Samples
☐ Change Order ☐ Copy of letter ☒ GEOLOGIC INVESTIGATION REPORT

COPIES	DATE	NO	DESCRIPTION
1	2/14/02		Soils and Engineering Report, Geologic Investigation for La Puerta Elementary School
1	9/24/02		Addendum to the Preliminary Soils and Engineering Geologic Investigation

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ for approval ☐ No Exception Taken ☐ Make Corrections Noted
☒ for your use ☐ Rejected ☐ Revise and Resubmit
☒ As requested ☐ For your records ☐ Return _____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

COPY TO Al Ziemba
John Maddox
File

E-2
SIGNED: _____
CHRISTOPHER SCHUMAN

If enclosures are not as noted, kindly notify us at once.

PRELIMINARY SOILS AND ENGINEERING GEOLOGIC INVESTIGATION FOR PROPOSED GRADE K-12 CLASSROOM BUILDINGS AMPHITHEATER AND PARKING AREAS (LA PUERTA ELEMENTARY SCHOOL) 2475 N. FORBES AVENUE CLAREMONT, CALIFORNIA

FEBRUARY 14, 2002 **GS01-1209**

GEOSYSTEMS

ENVIRONMENTAL
LAND SURVEYING
ENGINEERING-GEOLOGY
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PRELIMINARY SOILS AND ENGINEERING GEOLOGIC INVESTIGATION FOR PROPOSED GRADE K-12 CLASSROOM BUILDINGS AMPHITHEATER AND PARKING AREAS (LA PUERTA ELEMENTARY SCHOOL) 2475 N. FORBES AVENUE CLAREMONT, CALIFORNIA

FEBRUARY 14, 2002 GS01-1209

FOR

CLAREMONT UNIFIED SCHOOL DISTRCT
2080 NORTH MOUNTAIN AVENUE
CLAREMONT, CA 91711

ATTN: MR. JOHN KETTLE

312 WESTERN AVENUE GLENDALE CALIFORNIA 91201-2836 PH. 818 - 500 - 9533 FAX 818 - 500 - 0134

GEOSYSTEMS

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PRELIMINARY SOILS AND ENGINEERING-GEOLOGIC INVESTIGATION FOR PROPOSED GRADE K-12 CLASSROOM BUILDINGS, AMPHITHEATER AND PARKING AREAS (LA PUERTA ELEMENTARY SCHOOL) 2475 N. FORBES AVENUE CLAREMONT, CALIFORNIA

INTRODUCTION

This report presents the results of our preliminary soils and engineering-geologic investigation performed at the site located on the southwest corner of Forbes Avenue and Miramar Avenue, in the city of Claremont, California. The report includes a description and an evaluation of the subsurface materials, discusses the soil conditions, and provides soils and engineering-geologic recommendations for the proposed grade K-12 classroom building, amphitheater and parking areas at the subject site.

This report is intended for submittal to the appropriate governmental authorities that control the issuance of necessary permits and provides recommendations for the proposed structures at the subject site.

312 WESTERN AVENUE GLENDALE CALIFORNIA 91201-2338 PH. 818 - 500 - 9533 FAX 818 - 500 - 0134

Objective

The primary objective of this investigation was to provide our best estimate of the geotechnical factors that pertain to the gross stability of the site and to evaluate alternatives for a foundation system.

The scope of our investigation involved the completion of the following:

1. Review of available regional geotechnical and groundwater data and previous reports for the adjacent properties.

2. Review of potentially active fault data including:

   a) State of California Special Studies Zones, 2000, Mount Baldy Quadrangle, Los Angeles County, California; California Division of Mines and Geology, Scale = 1:24,000.

   b) Geologic Guide to the San Bernardino Mountains, Southern California, 1976, (Preliminary Map of Cucamonga Fault Zone, March 1976); Association of Engineering Geologist.

3. Excavation and detailed logging of (14) fourteen borings, using a hollow-stem auger to a maximum depth of 46-feet below the existing grade.

4. Preparation of a formal report addressing site stability and liquefaction potential with design recommendations for site grading, foundations, temporary excavation, on-grade slabs, retaining walls, pavement and drainage.

Location

The property is located at the southwest corner of Forbes Avenue and Miramar Avenue, in the city of Claremont, California. The property includes the street addresses 2325 through 2475 Forbes Avenue.

PROPOSED DEVELOPMENT

Information concerning the proposed development was provided by the project architect, Adolph Ziemba, AIA & Associates, Inc. The proposed development consists of demolition of the existing structures except for building 2475 Forbes Avenue (Building 'A') which fronts Forbes Avenue. The construction consist of six classroom buildings (Buildings 'B' through 'G'), amphitheater, playground area (northwest corner), and parking areas at the site. Building 'A" will remain "as is" with minor remodeling. The proposed building layout is depicted on the attached Geotechnical Map (Plate 1).

SITE CONDITIONS

The site consists of a square-shaped parcel which measures approximately 660-feet by 660-feet. The site is essentially level with a slight gradient to the south-southwest and has an overall elevation difference of 25-feet across the property. The northern portion of the site is occupied by two classroom buildings and parking area. The central and southern portion of the site are currently vacant and undeveloped. The vacant portion of the site is barren with sporadic groundcover.

Neighboring development consists of one and two-story wood framed single family residences to the north and south of the site and a recreational park to the west of the site. Drainage is by uncontrolled sheet flow to the adjacent street at the northern portion of the site, and along the existing natural gradient and infiltration to the subsurface soils at the central and southern portion of the site.

FIELD INVESTIGATION

The site was explored on December 27 & 28, 2001 by drilling fourteen borings to a maximum depth of 46-feet utilizing a hollow-stem auger to evaluate the subsurface conditions.

The "Standard Penetration Test" was conducted by driving a 2-inch O.D. split spoon into the soil using blows from a 140-pound hammer dropped 30-inches. The mechanism for hammer release was an automatic mechanical "trip" hammer drop system. The number of blows required to advance the split spoon the final 12-inches of a 18-inch drive is defined as the "Standard Penetration Resistance," N-value, and is shown on the attached Boring Logs. The N-value can generally be correlated with some significant physical properties of the soil encountered especially for coarse-grained material.

Soil samples were obtained for laboratory testing. The earth materials were logged in detail and are presented in the Log of Borings (Plates B-1 through B-14). The approximate boring locations are shown on Plate 1.

Groundwater

Groundwater was not encountered in our exploratory boring drilled at the subject site. However, it must be noted that local fluctuations in groundwater level may occur due to seasonal variations in rainfall, irrigation and water line leaks.

According to the Department of Conservation, Division of Mines and Geology, Open-File Report 2000-005 (Mount Baldy 7.5-Minute Quadrangle) the historic high groundwater in the vicinity of the subject site is greater than 50-feet below existing ground surface.

EARTH MATERIALS

The earth material encountered at the site consists of artificial fill and alluvial fan deposits typical of the area.

Artificial Fill

Based on our field observations stock piles of artificial fill were located along the central and western portion of the site. However, due to the past use of the site, various thickness of fill or demolition debris may remain at the site between the exploration borings. The artificial fill is not suitable for slab, pavement or foundation support.

Alluvial Fan Deposits (Qof)

The alluvial fan deposits encountered at the site consists of gravelly silty sands, gravelly sands, cobbley sands and sandy gravels. The fan deposits are dark brown, brown, light brown, slightly moist to dry, dense to very dense, with numerous large granitic rock fragments. In general, the alluvial fan deposits are coarser and denser with depth.

FAULTING AND SEISMICITY

No known faults with potential for surface rupture underlie the site. According to State of California Alquist Priolo Special Studies Zones, Mount Baldy Quadrangle, the subject site is now called not located within any Alquist Priolo Special Studies Zone. The subject site lies between the Earthquake Fault Zones. Cucamonga fault and San Jose fault, but the Cucamonga and San Jose faults are not mapped as a Alquist Priolo Special Studies Zones.

Groundshaking

It is our opinion that future structures should be designed in accordance with the current seismic building code as determined by the structural engineer. The subject site is located within Seismic Zone 4 and Soil Profile Type S_d as outlined in the 1997 Uniform Building Code. The parameters presented on the following table may be utilized for the seismic design:

Fault Type	Fault Name/Distance	Seismic Coefficient (Ca)	Seismic Coefficient (Cv)	Near-Source Factor (Na)	Near-Source Factor (Nv)
A	Cucamonga / 0.2 km	0.66	1.28	1.5	2.0
B	San Jose / 0.1 km	0.57	1.02	1.3	1.6

Ground shaking resulting from a moderate to major earthquake (Magnitude 6.0 or greater) can be expected during the life span of the proposed structure. Property owners and the general public should be aware that any structure or slope in the southern California region could be subject to significant damage as a result of a moderate or major earthquake. The potential exists throughout southern California for strong ground motion similar to that which struck the Los Angeles region during the January 17, 1994, Northridge Earthquake. Several such destructive earthquakes have struck southern California during the span of recorded history.

Present building codes and construction practices, and the recommendations presented in this report are intended to minimize structural damage to buildings and loss of life as a result of a moderate or a major earthquake. They are not intended to totally prevent damage to structures, graded slopes and natural hillsides due to moderate or major earthquakes. While it may be

possible to design structures and graded slopes to withstand strong ground motion, the construction costs associated with such designs are usually prohibitive, and the design restrictions may be severely limiting. Earthquake insurance is often the only economically feasible form of protection for your property against major earthquake damage. Damage to sidewalks, steps, decks, patios and similar exterior improvements can be expected as these are not normally controlled by the building code.

Major foundation problems are not anticipated as a result of earthquake induced liquefaction, fault ground rupture or displacement, and differential settlement of natural earth materials, provided the foundation system is constructed as herein recommended, within the limitations presented above.

Structural and cosmetic problems to sidewalks, steps, curbs, decks, and other such appurtenances, may be anticipated as these structures are not normally controlled by the building code.

LABORATORY TESTING

Laboratory tests were conducted on representative samples to determine certain physical properties of the earth materials, consolidation, sieve analysis, maximum compaction, and shear strength characteristics were determined from these tests.

Direct Shear

Direct shear tests were conducted on representative samples to determine their shear strength characteristics. The samples were saturated under normal load before testing. Shear loads were applied at a rate of 0.05-inch per minute in accordance with the undrained shear test

procedure. Ultimate shear strength values for the sample tested is shown on Plates DS-1 and DS-2 and Table I:

TABLE I

Sample Location	Depth (ft)	Soil Type	Unit Weight (pcf)	Moisture Content (pcf)	Cohesion (psf)	Friction Angle (degrees)
B-2	5	Qof	114.3	3.9	100	40
B-2	10	Qof	115.1	9.6	325	32

Consolidation

Consolidation tests were performed on in-situ moisture and saturated specimens of the alluvium. The consolidometer, like the direct shear machine, is designed to receive the specimens in the field condition. Porous stones placed at the top and bottom of the specimens permits free flow of water into and from the specimens during the test. Successive load increments are applied to the top of the specimens and progressive and final settlements under each load increment are recorded to an accuracy of 0.001-inch. The consolidation curves of the results are shown in the Appendix (Plates C-1 through C-9).

Maximum Laboratory Compaction

The maximum laboratory compaction and optimum moisture content of a typical soils was determined in accordance with ASTM Method D1557-90. The compaction test was made on the sample portion passing a #4 sieve. The soil is placed in a 4-inch diameter mold having a 1/30 cubic foot volume and compacted with 25 blows of a 10 pound hammer falling 18-inches

on each of five layers. The maximum compaction of the alluvium was 135 pcf at an optimum moisture content of 8.0 percent (see Plate M-1).

Sieve Analysis

A sieve analysis was performed on a representative material to verify field classification and aid in evaluation of the shear strength parameters and liquefaction potential of the soils. The test results are attached in the appendix (Plates SV-1 through SV-4).

Liquefaction Potential

The evaluation of liquefaction potential of the soils at the subject site is based on the following factors: material type, water level, relative density, gradation and intensity and duration of ground shaking.

Soil liquefaction is the sudden decrease of the shearing resistance of a loose state, saturated cohesionless soil under seismic condition. Typically fine sands and silts are potentially subject to liquefaction under these conditions.

The alluvial fan deposits which underly the site consists of gravelly silty sands, gravelly sands, cobbley sands and sandy cobbles. Neither of these materials are considered to be prone to liquefaction above groundwater.

Due to the depth of groundwater in the region (see Groundwater section), soil type (coarse sands and cobbles), densities and high blow counts it is our professional opinion that the liquefaction potential at the subject property is very low.

CHEMICAL TESTING

Sample Location	Depth (ft)	pH	Chloride Content CALTRANS 422 (ppm)	Sulfate Content CALTRANS 417 (%)	Minimum Resistivity CALTRANS 532 (ohm-cm)
B-1	0-5	7.28	120	0.006	6100

Based on the results of the resistivity testing, the on-site material is considered mildly corrosive to ferrous metals. We recommend "underground steel utilities be given a high quality protective coating such as 40 mil extruded polyethylene, 20 mil plastic tape over primer per AWWA Standard C209, or hot applied coal tar enamel or tape per AWWA Standard C203". In addition, cathodic protection is recommended for underground steel utilities. No special precautions are required for copper, asbestos-cement or plastic utilities placed under-ground from a corrosion viewpoint. However, any iron valves or fittings should be protected as mentioned above.

Based on the sulfate and chloride content of the material, standard construction practices and concrete mixes may be used for concrete in contact with the on-site soils using types I, II or III cement.

RECOMMENDATIONS

Based on the findings of our investigation, the site is considered to be suitable from a soils engineering standpoint for the proposed structures provided the recommendations included herein are followed and integrated into the foundation and grading plan.

Site Preparation

Based on field observation the upper 1- to 2-feet of older fan deposits are loose and porous. Based on our field observation the older fan deposits contain large granitic boulders which are not suitable foundation support. On-site materials are considered suitable for compaction provided that all deleterious materials and rock fragments larger than 6-inches in length are removed prior to compaction. These materials should be removed and recompacted to a minimum of 90 percent of maximum compaction at about 2 percent above optimum moisture content for foundation and slab support. *The bottom of the exposed competent soil should be saturated for at least 24 hours before placing of compacted fill, to minimize the collapsibility potential beneath 5-feet.* A minimum of 3-feet of compacted fill shall be provided below the base of all foundations. Removal and recompaction should extend to at least 5-feet beyond the proposed building outlines, where applicable.

Imported materials required to obtained finished grade should be a sandy type of material and approved by Soils Engineer prior to compaction. The bottom of the exposed competent soil should be observed and approved by soils engineer prior to compaction work. Please refer to the attached grading guideline.

Site Clearance

Demolition debris and other unsuitable materials should be stripped and removed from the site. Water lines or other old utility lines or installations to be abandoned should be removed or crushed in place. Old septic tanks and cesspools, if any should be backfield in accordance with regulations of the controlling agencies. Holes resulting from removal of buried obstructions which extend below finished site grades should be backfield with compacted soils.

Foundations

Conventional spread footings are adequate for foundation support. Footings should be supported entirely on compacted fill. Continuous footings may be designed using a bearing pressure of 1500 psf, and should be a minimum of 15-inches in width and 12-inches (one-story) and 18-inches (two-story) in depth into the recommended bearing materials.

Independent footings may be designed using a bearing pressure of 2000 psf, and should be a minimum of 2-feet square and 2-feet in depth into the recommended bearing materials. Footings should be reinforced with a minimum of 2 #4 bar of steel near the base of the footing and 2 #4 bar of steel near the top of the foundation wall.

Footings should be located below a line measured at a 45 degree angle from the bottom of any utility trench, unless reviewed and approved by the Soils Engineer.

General

The bearing pressure given is for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading which includes the effects of wind or seismic forces.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of the foundations and by passive earth pressure within the compacted fill. An allowable coefficient of friction of 0.3 may be used with the dead load forces.

Passive earth pressure may be computed as an equivalent fluid having a density of 300 pcf with a maximum earth pressure of 4500 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

Excavations

Excavations will be required for removal and recompaction of the upper loose, older fan deposits (5±-feet in vertical height). The excavations are expected to expose gravelly sands to cobbley sands which are not suitable for vertical excavations. All excavation should be trimmed back to a 1:1 slope ratio.

All excavations should be continuously observed by our representative and stabilized within 30 days. Water should not be allowed to pond along the top of the excavation nor to flow over the edge. No vehicular surcharge should be allowed within 10-feet of the top of cut.

Floor Slabs

Slabs should be supported on compacted fill and reinforced with a minimum of #4 bar spaced at 16-inches on center. Slabs to be covered with flooring should be protected by plastic vapor barrier. To prevent punctures and aid in the concrete cure, the barrier should be covered with a 2-inch layer of sand. The actual reinforcement for the slab should be determined by the project structural engineer.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial load application. The maximum settlement is not expected to exceed ½-inch. Differential settlement is not expected to exceed 1/4-inch within a span of 30-feet. These estimates may be exceeded in the event of strong or severe ground shaking resulting from a major earthquake.

Retaining Walls

Retaining walls may be necessary to obtain desired grades and may be designed for active pressures per the following table:

Surface Slope of Retained Material Horizontal to Vertical	Equivalent Fluid Weight (pcf)
LEVEL	30
5 to 1	32
4 to 1	35
3 to 1	38
2 to 1	43
1 ½ to 1	55

All walls should be effectively waterproofed, provided with a subdrain, and backfilled with clean sand or gravel. Where the backfill area is confined, the use of CalTrans Class II permeable material is recommended. The surface of the backfill should be covered by an approved filter fabric and 18-inches of compacted soil.

While all backfill should be compacted to the required density, care should be taken when working close to new walls to prevent excessive lateral pressure.

Drainage Control

Final grading shall provide positive drainage away from the footings and from the lot. Proper drainage shall also be provided away from the building footing and from the lot during construction. Maintaining a proper drainage system will minimize the shrink/swell potential of the subsoils.

Drainage Protection

All pad and roof drainage should be collected and transferred to the adjacent street in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation.

Expansive Soil

Based on the soil classification along with in-situ moisture content, and in-situ density, the on-site surficial soils are considered to be very low in expansion potential. No special treatment of the soils is required.

Pavement

We recommend that the upper two-feet of on-site soils (alluvial fan deposits) and any fill materials be removed and recompacted within the area to receive pavement section.

Prior to placing pavement, the subgrade should be scarified to a depth of 6-inches, moistened or dried out to optimum moisture content, and recompacted to at least 90 percent of the maximum dry density, as determined by ASTM Method D1557-91.

A flexible pavement section consisting of 3-inches of asphalt concrete over 4-inches of base material should be used. The base material may be crushed aggregate.

As an alternative, a rigid pavement section consisting of Portland Cement Concrete (PCC) can be used. The traffic loading is expected to be primarily light vehicles. Recommendations for the rigid concrete pavement design is provided herein in the following Table II:

TABLE II

Compressive Strength of Concrete @ 28 days	3500 psi
Modulus of Rupture of Concrete @ 28 days	550 psi
Concrete Thickness: *for Light vehicles*	5 inches
for Service and Truck Lane	7 inches
90 Percent Compacted Subbase	12 inches
Contraction Joint Spacing	10 ft.
Depth of Joint	1 inch

Concrete slabs should be separated from other structures or fixed objects within or abutting the paved area by isolation joints. This serves to offset the effects of the differential horizontal and vertical movements of the structures which may fracture the concrete slab. When isolation joints are located where wheel and other loads are applied, the pavement edge at the joint should be thickened by 20 percent or two inches, whichever is greater.

A joint filler should be applied to any new isolated joints within the concrete slab. The joint filler should extend through the slab thickness and should be recessed below the pavement surface so that the joint can be sealed with joint sealant material. The types of joint filler materials recommended include bituminous mastic, bituminous impregnated cellulose or cork, sponge rubber, or resin-bound cork. Joint filler materials should be installed in accordance with the recommendations of the manufacturer.

Approval

A set of foundation and grading plans should be submitted to this office for review and approval prior to initiation of construction.

It is recommended that all foundation excavations be approved by this firm prior to placing concrete or steel. Any fill which is placed should be tested for compaction if used for engineering purposes. All cut-slopes and temporary excavations should be observed by a representative of this firm. Should the observation reveal any unforeseen hazard, appropriate treatment will be recommended.

It is advised that the client contact **GEOSYSTEMS** at least **1 week** in advance of commencing grading to allow for contractual agreements for geotechnical services during the construction phases of your project.

Please advise this office at least **24 hours** prior to any required verification.

Representatives of **GEOSYSTEMS** will observe work in progress, perform tests on soil, and observe excavations and trenches. It should be understood that the contractor or others shall supervise and direct the work and they shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during the performance of the work.

Periodic observation by **GEOSYSTEMS** is not intended to include verification of dimensions or review of the adequacy of the contractor's safety measures in, on, or near the construction site.

Remarks

The conclusions and recommendations contained herein are based on the findings and observations made at the boring locations. While no great variations in soil conditions are anticipated, if conditions are encountered during construction which appear to differ from those disclosed, **GEOSYSTEMS** should be notified, so as to consider the need for modifications.

This report has been compiled for the exclusive use of **CLAREMONT UNIFIED SCHOOL DISTRICT**, and their authorized representatives. It shall not be transferred to, or used by, a third party, to another project or applied to any other project on this site, other than as described herein, without consent and/or thorough review by this facility.

Should the project be delayed beyond the period of **one year** after the date of this report, the site should be observe and the report reviewed to consider possible changed conditions.

This report is issued with the understanding that it is the responsibility of the owner, or their representative, to assure that the information and recommendations contained herein are called to the attention of the designers and builders for the project.

The limits of our liability for data contained in this report and our warranty is presented on the following page.

GEOSYSTEMS,

Steve S. Tsai, Vice President
GE 2268, Exp. 3-31-02

Vincent J. Carnegie, President
CEG 1608, Exp. 10-31-03

Attachments: 33 Plates, see Appendix

CC: 5 to Client

GR:SST/jsc

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REGISTERED PROFESSIONAL ENGINEER
STEVE SHI-SHEN TSAI
No. 2268
GEOTECHNICAL
STATE OF CALIFORNIA

REGISTERED GEOLOGIST
VINCENT J. CARNEGIE
No. 1608
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

GEOSYSTEMS

LIMITATIONS

This report is based on the development plans provided to our office. In the event that any significant changes in the design or location of the structure(s); as outlined in this report are planned, the conclusions and recommendations contained in this report may not be considered valid unless the changes are reviewed and the conclusions of this report are modified or approved by the soil engineer.

The subsurface conditions and excavation characteristics described herein have been projected from individual borings or test pits placed on the subject property. The subsurface conditions and excavation characteristics data should in no way be construed to reflect any variations which may occur between these borings or test pits.

It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time measurements were made and reported herein. **GEOSYSTEMS,** assumes no responsibility for variations which may occur across the site.

If conditions encountered during construction appear to differ from those disclosed, this office shall be notified so as to consider the need for modifications. No responsibility for construction compliance with the design concepts, specifications or recommendations is assumed unless on-site construction review is performed during the course of construction which pertains to the specific recommendations contained herein.

This report has been prepared in accordance with generally accepted practice. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report.

GRADING GUIDELINES

Site Clearing

Any existing brush, loose fill and porous soils shall be excavated to competent native materials. Prior to the placement of any fill soils, the exposed surface shall be scarified, cleansed of debris and recompacted to 90 percent of the laboratory standard under the direction of the Soils Engineer in accordance with the following "Placing, Spreading, and Compacting Fill Materials".

Preparation

After the foundation for the fill has been cleared, and scarified, it shall be brought to a proper moisture content and compaction to not less than 90 percent of the maximum dry density in accordance with ASTM D1557-91.

Materials

On-site materials may be used in the fill if cleansed of debris. Imported fill materials shall be approved by the Soils Engineer and may be obtained from any other approved source. The materials used should be free of excessive organic matter and other deleterious substances and shall not contain rocks or lumps greater than 6 inches in maximum dimension.

Placing, Spreading and Compacting Fill Materials

Fill materials shall be placed in layers which when compacted shall not exceed 6 inches in thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to ensure uniformity of material and moisture of each layer.

Where the moisture content of the fill material is below the optimum value determined by the Soils Engineer, water shall be uniformly added to obtain the approximate optimum moisture content.

Where the moisture content of the fill materials is higher than the optimum value determined by the Soils Engineer, the fill materials shall be aerated by blading disking or mixing with dry materials until the optimum moisture content is obtained.

After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than 90 percent of the maximum dry density in accordance with ASTM D1557-91. Cohesionless soil having less than 15 percent finer than 0.005 millimeters (such as base material or pea gravel) shall be compacted to a minimum of 95 percent of the maximum dry density.

Compaction shall be by sheepfoot roller, tract rolling or other types of acceptable compaction equipment of such design that they will be able to compact the fill material to the specified density. Rolling shall be accomplished while the fill material is at the specified moisture content, to ensure that the desired density has been obtained. The final surface of the areas to review slabs-on-grade should be rolled to a dense smooth surface.

GRADING GUIDELINES *(Continued)*

Field density tests shall be made by the Soils Engineer at intervals not to exceed 2 feet of fill height. Where sheepfoot rollers are used, the soil may be disturbed to a depth of several inches and density reading shall be taken in the compaction material below the disturbed surface. When these readings indicate the density of any fill or portion thereof is below the required 90 percent density, the particular layer of portion shall be reworked until the required density has been obtained.

The grading specifications should be a part of the project specifications.

The Soils Engineer shall review the grading plan prior to grading.

APPENDIX

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-1

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
					SW	**0-46' ALLUVIAL FAN DEPOSITS (Qof)**
114.6	3.3	29	SPT	5		@5' Gravelly Sand, light brown to brown, slightly moist, dense, medium to coarse grained, with subangular to subrounded granitic rock fragments (up to 2" in length)
122.0	1.1	66	SPT	10		@10' Gravelly Sand, light brown to brown, slightly moist, very dense, medium to coarse grained, with subangular to subrounded granitic rock fragments (up to 2" in length)
		50(3")	SPT	15	SW/GW	@15' Gravelly Sand to Sandy Gravel, light brown to brown, slightly moist, very dense, coarse grained with subangular to subrounded granitic rock fragments (up to 3" in length)
112.9	9.2	72(9")	SPT	20	SW	@20' Gravelly Sand, brown to orange brown, moist, very dense, medium grained, with large granitic rock fragments (up to 2" in length)
98.0	3.7	70(4")	SPT	25		@25' Gravelly Sand, brown to orange brown, moist, very dense, medium grained, with large granitic rock fragments (up to 2" in length)
119.8	4.3	75(6")	SPT	30		@30' Gravelly Sand, brown to orange brown, moist, very dense, medium grained, with large granitic rock fragments (up to 2" in length)
119.3	2.0	95(5")	SPT	35	GW	@35' Cobbley Sands to Sandy Gravels, light brown, dry, very dense, coarse grained, large granitic rock fragments (up to 5" in length)
106.5	1.7	100(5")	SPT	40		@40' Cobbley Sands to Sandy Gravels, light brown, dry, very dense, coarse grained, large granitic rock fragments (up to 5" in length)
117.3	3.7	67(3")	SPT	45		@45' Cobbley Sands to Sandy Gravels, light brown, dry, very dense, coarse grained, large granitic rock fragments (up to 5" in length)
				50		@46' REFUSAL
				55		
				60		

No Groundwater Encountered
No Caving
Total Depth: 46.0 ft.

GEOSYSTEMS
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PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue & Miramar Avenue
Claremont, California
Date Drilled: 12/27/01 Elevation:
Rig Type: 8 in. o.d. Hollow Stem
Logged By: GR
GS #: 01-1209

This log of subsurface conditions applies only at the specific location and the date indicated. Subsurface conditions may differ at other locations and times.

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)

(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-2

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
				1–20	SW/GW	0–18' ALLUVIAL FAN DEPOSITS (Qof)
114.3	3.9	117(9")	R	5		@5' Gravelly Sand to Cobbley Sand, light brown to brown, moist, very dense, medium to coarse grained with large subangular to subrounded granitic rock fragments (up to 3" in length)
115.1	9.6	78	R	10		@10' Gravelly Sand to Cobbley Sand, orange brown, moist, very dense, medium to coarse grained with large subangular to subrounded granitic rock fragments (up to 3" in length)
119.7	4.1	102	R	15		@15' Cobbley Sand to Sandy Gravel, light brown to brown, slightly moist to dry, very dense, with large subangular to subrounded granitic rock fragments (up to 5" in length)
				18		@18' REFUSAL

No Groundwater Encountered
No Caving
Total Depth: 18.0 ft.

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PLATE B-2

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)

(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-3

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
				1	SW/GW	0-17' ALLUVIAL FAN DEPOSITS (Qof)
				2		
				3		
				4		
107.0	2.4	62	R	5		@5' Gravelly Sand to Cobbley Sand, light brown to brown, moist, very dense, medium to coarse grained with large subangular to subrounded granitic rock fragments (up to 3" in length)
				6		
				7		
				8		
				9		
119.5	3.9	88(9")	R	10		@10' Gravelly Sand to Cobbley Sand, orange brown, moist, very dense, medium to coarse grained with large subangular to subrounded granitic rock fragments (up to 3" in length)
				11		
				12		
				13		
				14		
116.5	4.1	50(3")	R	15		@15' Cobbley Sand to Sandy Gravel, light brown to brown, slightly moist to dry, very dense, with large subangular to subrounded granitic rock fragments (up to 5" in length)
				16		
				17		@17' REFUSAL
				18		
				19		
				20		

No Groundwater Encountered
No Caving
Total Depth: 17.0 ft.

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R = Ring Sampler (2.41" i.d.)
(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-4

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
					SW/GW	**0-20' ALLUVIAL FAN DEPOSITS (Qof)**
						0-5' Gravelly Sand to Sandy Gravel, grey brown, dry, moderately dense to dense, with granitic boulders (up to 10"-12" in length)
119.9	3.4	61	R	5		@5' Gravelly Sand to Sandy Gravel, grey brown, dry, very dense, coarse grained, with large granitic rock fragments (up to 3" in length)
128.3	3.0	80	R	10	SW	@10' Gravelly Sand, orange brown, slightly moist, very dense, medium grained, large granitic rock fragments (up to 3" in length)
117.5	4.4	58	R	15	SW/GW	@15' Gravelly Sand to Sandy Gravel, light brown, dry, very dense, coarse grained, with large granitic rock fragments (up to 3" in length)
109.3	3.1	90	R	20		@20' Gravelly Sand to Sandy Gravel, light brown, dry, very dense, coarse grained, with large granitic rock fragments (up to 3" in length)
				25		
				30		
				35		
				40		

No Groundwater Encountered
No Caving
Total Depth: 20.0 ft.

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PLATE B-4

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (fi) = Joint
(f) = Fault

BORING LOG B-5

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.
104.7	7.6	50	R	2	SW
		53(5")	R	5	

Lithologic Description

0-6' ALLUVIAL FAN DEPOSITS (Qof)

@2' Gravelly Silty Sand, dark brown, moist, dense, numerous small to large subangular granitic rock fragments (up to 2" in length)

@5' Gravelly Sand, dark brown, moist, dense, numerous small to large subangular granitic rock fragments (up to 2" in length) -NO RECOVERY

@6' REFUSAL (Large Cobbles)

No Groundwater Encountered
No Caving
Total Depth: 6.0 ft.

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PLATE B-5

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-6

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
				1	SW/GW	**0-15' ALLUVIAL FAN DEPOSITS (Qof)**
110.1	10.3	31	R	2	SW	0-2' Gravelly Sand to Sandy Gravel, grey brown, dry, moderately dense, with granitic boulders (up to 18" in length)
				3		
				4		
116.8	2.8	50(5")	R	5	SW/GW	@2' Gravelly Silty Sand, dark brown, moist, dense, numerous small to large subangular granitic rock fragments (up to 2" in length)
				6		
				7		@5' Gravelly Sand to Sandy Gravel, grey brown, dry, very dense, coarse grained, with large subangular to subrounded granitic rock fragments (up to 3" in length)
				8		
				9		
123.4	4.0	94	R	10	SW	@10' Gravelly Sand, light brown to orange brown, moist, very dense, medium grained, with granitic rock fragments
				11		
				12		
				13		
				14	SW/GW	
112.4	2.5	56(6")	R	15		@15' Gravelly Sand to Sandy Gravel, grey brown, dry, very dense, coarse grained, with large subangular to subrounded granitic rock fragments (up to 3" in length)
				16		
				17		
				18		
				19		
				20		

No Groundwater Encountered
No Caving
Total Depth: 15.0 ft.

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SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding
(f) = Fault
(jt) = Joint

BORING LOG B-7

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
				1–20	SW	0–10' ALLUVIAL FAN DEPOSITS (Qof)
121.4	2.1	50(4")	R	5		@5' Gravelly Silty Sand to Gravelly Sand, light brown to dark brown, dry, dense, with granitic rock fragments (up to 2" in length)
116.2	1.8	57(6")	R	10		@10' Gravelly Sand, light brown, dry, dense, with large granitic rock fragments (up to 2' in length)

No Groundwater Encountered
No Caving
Total Depth: 10.0 ft.

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SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)

(b) = Bedding
(f) = Fault

(jt) = Joint

BORING LOG B-8

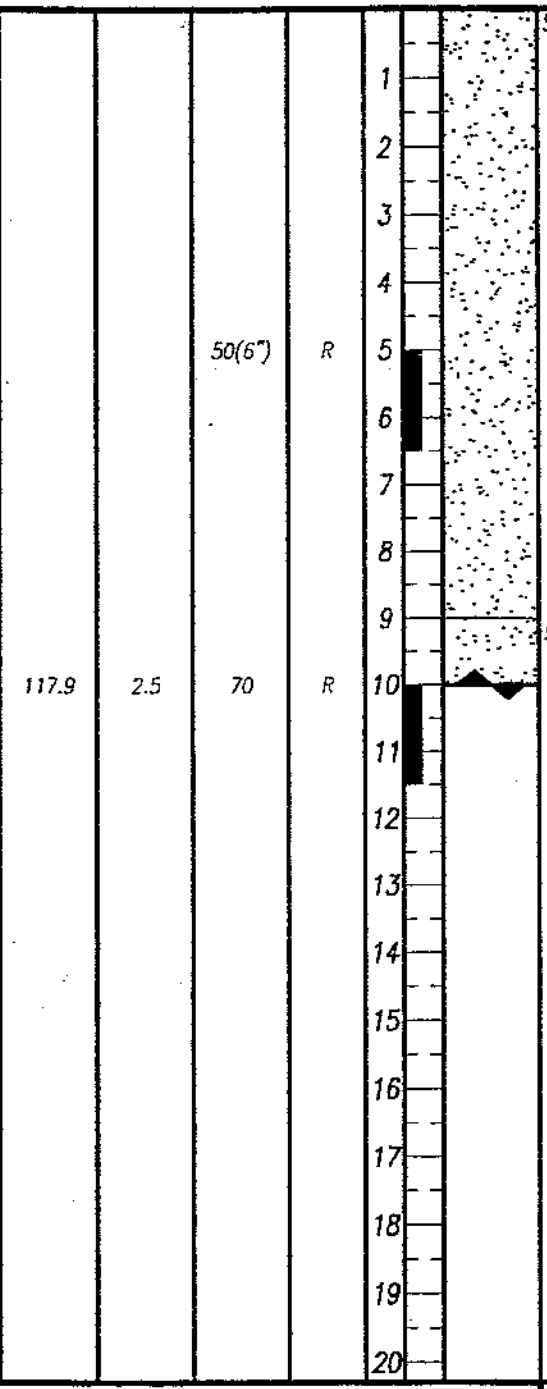

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PLATE B-8

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)

(b) = Bedding
(f) = Fault

(jt) = Joint

BORING LOG B-9

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
				1–4	SW	0-14' ALLUVIAL FAN DEPOSITS (Qof)
108.5	5.6	65	R	5–6		@5' Grovelly Silty Sand, dark brown, moist, dense, numerous small to large subangular granitic rock fragments (up to 3" in length)
		50(3")	R	10–11		@10' Grovelly Sand, dark brown, dry, dense, numerous small to large subangular granitic rock fragments (up to 3" in length) – NO RECOVERY
				14		@14' REFUSAL (Large Boulders)

No Groundwater Encountered
No Caving
Total Depth: 14.0 ft.

GEOSYSTEMS
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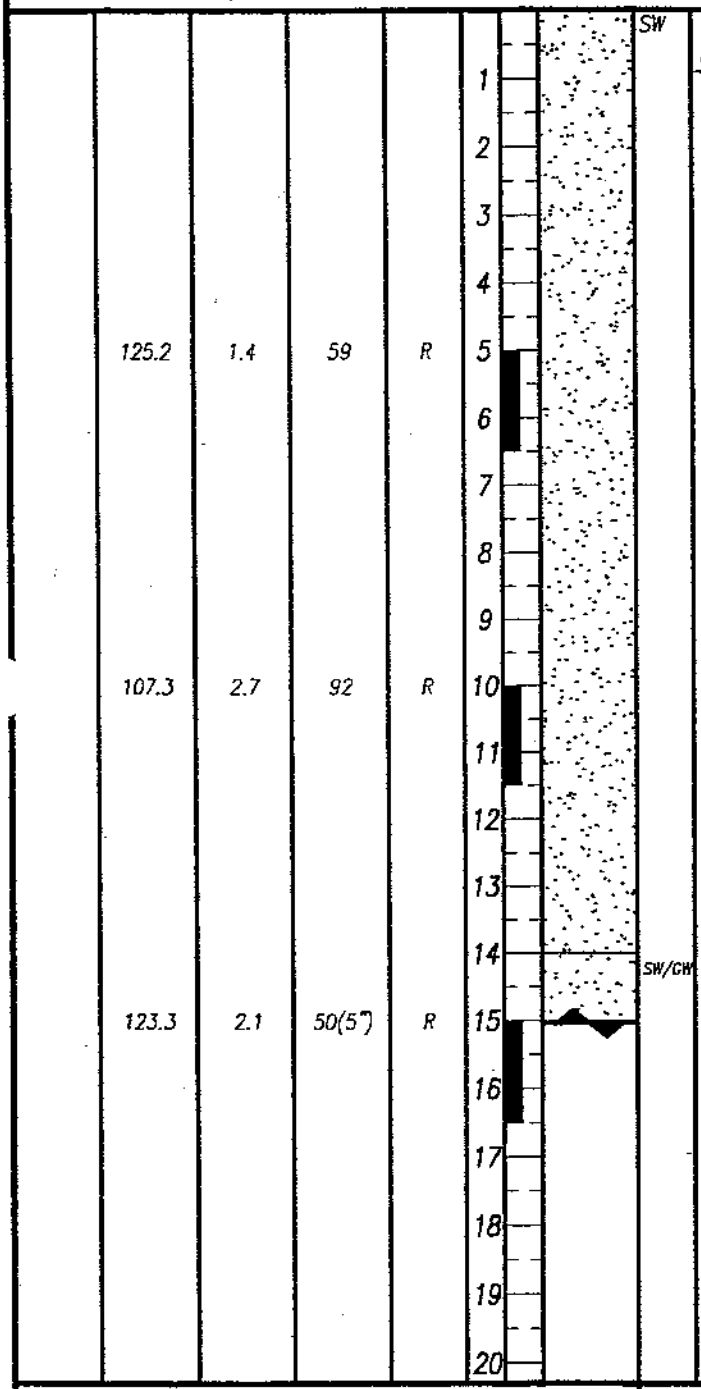
SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (f) = Fault (jt) = Joint

BORING LOG B-10



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Rig Type: 8 in. o.d. Hollow Stem
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PLATE B-10

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-11

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
				1	SW	**0-10' ALLUVIAL FAN DEPOSITS (Qof)**
112.6	7.4	39	R	2		@2' Gravelly Silty Sand, dark brown, moist, dense, numerous subangular granitic rock fragments (up to 3" in length)
				3		
				4		
114.6	4.1	80	R	5		@5' Gravelly Sand, brown, dry, very dense, numerous subangular to subrounded granitic rock fragments (up to 3" in length)
				6		
				7		
				8		
				9		
119.2	2.4	55(6")	R	10		@10' Gravelly Sand, brown, dry, very dense, numerous subangular to subrounded granitic rock fragments (up to 3" in length)
				11		
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		

No Groundwater Encountered
No Caving
Total Depth: 10.0 ft.

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Rig Type: 8 in. o.d. Hollow Stem
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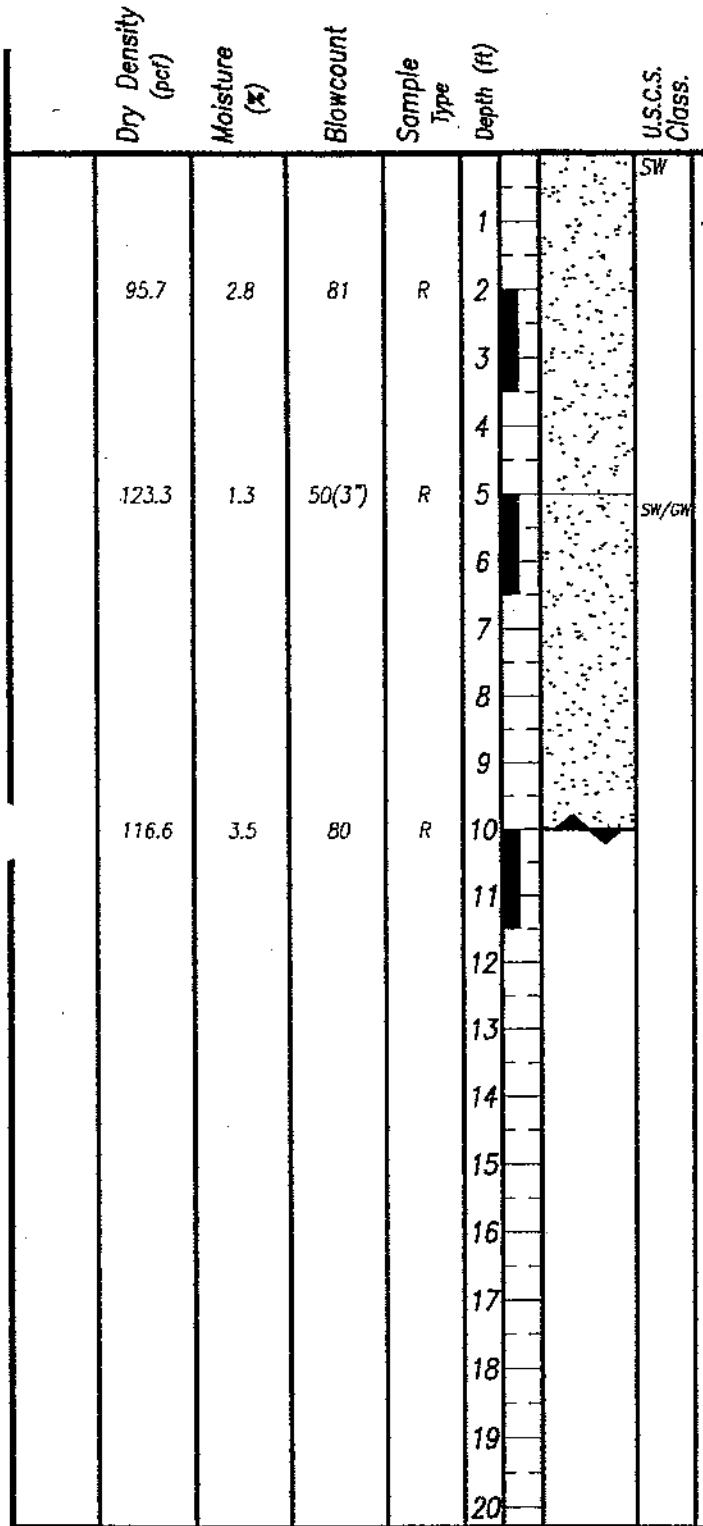
PLATE B-11

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (f) = Fault (jt) = Joint

BORING LOG B-12



Lithologic Description

0-10' ALLUVIAL FAN DEPOSITS (Qof)

@2' Gravelly Silty Sand, dark brown to brown, moist, very dense, large subangular to subrounded granitic rock fragments (up to 3" in length)

@5' Sandy Gravel to Gravelly Sand, grey brown, dry, very dense, large subangular granitic rock fragments (up to 3" in length)

@10' Sandy Gravel to Gravelly Sand, grey brown, dry, very dense, large subangular granitic rock fragments (up to 3" in length)

No Groundwater Encountered
No Caving
Total Depth: 10.0 ft.

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(b) = Bedding (jt) = Joint
(f) = Fault

BORING LOG B-13

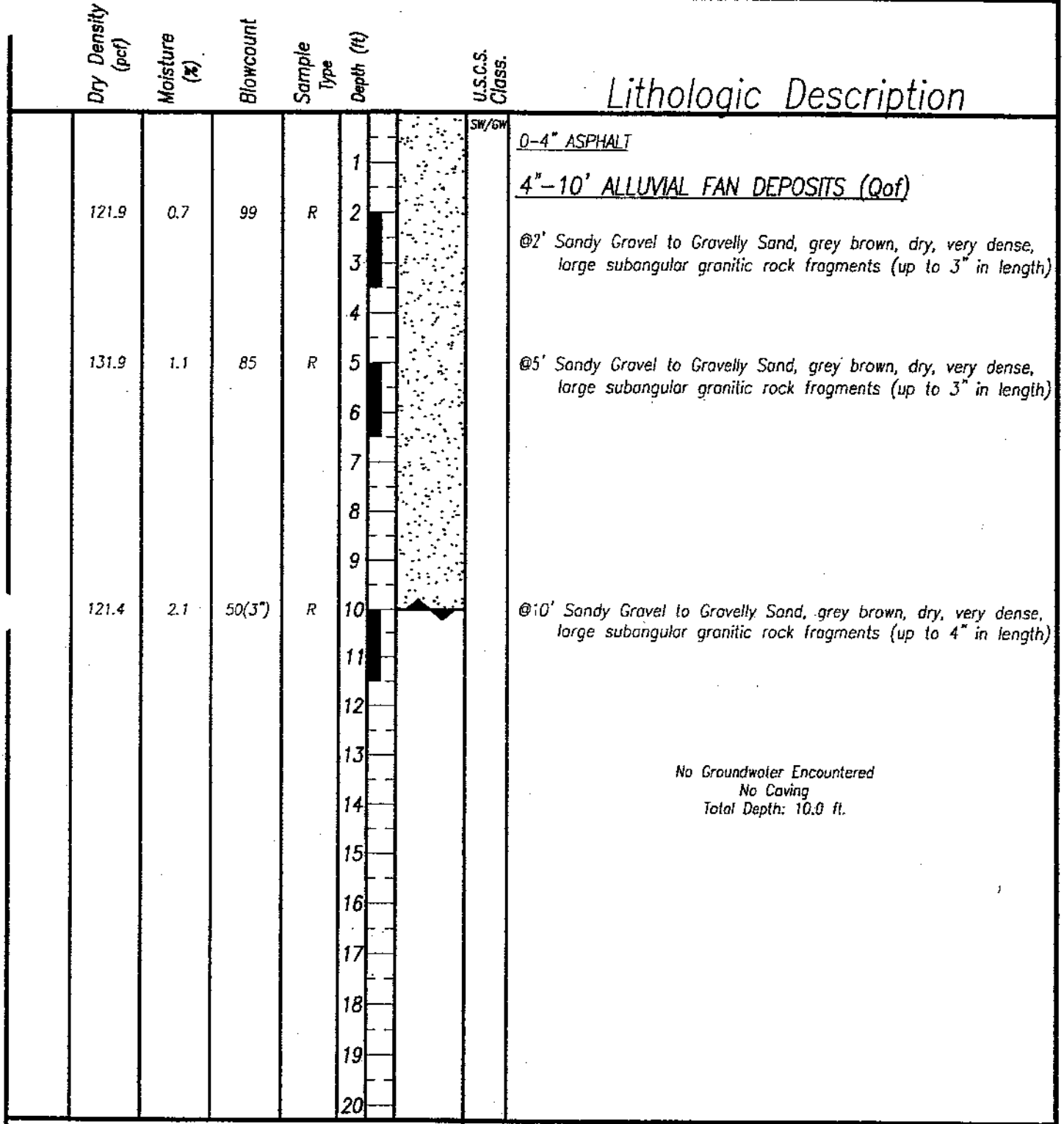

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PLATE B-13

SPT = Standard Pen Sampler
R = Ring Sampler (2.41" i.d.)
(b) = Bedding (f) = Fault (jt) = Joint

BORING LOG B-14

Dry Density (pcf)	Moisture (%)	Blowcount	Sample Type	Depth (ft)	U.S.C.S. Class.	Lithologic Description
					SW/GW	0-4" ASPHALT
						4"-37' ALLUVIAL FAN DEPOSITS (Qof)
118.0	1.7	52	SPT	5		@5' Gravelly Sand to Sandy Gravel, grey brown, dry, dense to very dense, medium to coarse grained, with subangular to subrounded granitic rock fragments (up to 2" in length)
116.7	2.8	76	SPT	10		@10' Gravelly Sand to Sandy Gravel, grey brown, dry, very dense, medium to coarse grained, with subangular to subrounded granitic rock fragments (up to 2" in length)
113.0	4.7	56	SPT	15		@15' Gravelly Sand to Sandy Gravel, orange brown, dry, very dense, medium to coarse grained, with subangular to subrounded granitic rock fragments (up to 5" in length)
126.2	3.0	52	SPT	20		@20' Gravelly Sand to Sandy Gravel, orange brown, dry, very dense, medium to coarse grained, with subangular to subrounded granitic rock fragments (up to 5" in length)
116.2	3.3	86	SPT	25	SW	@25' Gravelly Sand, orange brown, dry, very dense, medium to coarse grained, large granitic rock fragments (up to 3" in length)
109.7	3.3	60(6")	SPT	30		@30' Gravelly Sand, light brown, dry, very dense, medium to coarse grained, large granitic rock fragments (up to 5" in length)
97.3	4.5	65(6")	SPT	35		@35' Gravelly Sand, light brown, dry, very dense, medium to coarse grained, large granitic rock fragments (up to 5" in length)
				40		@37' REFUSAL (Large Boulders)

No Groundwater Encountered
No Caving
Total Depth: 37.0 ft.

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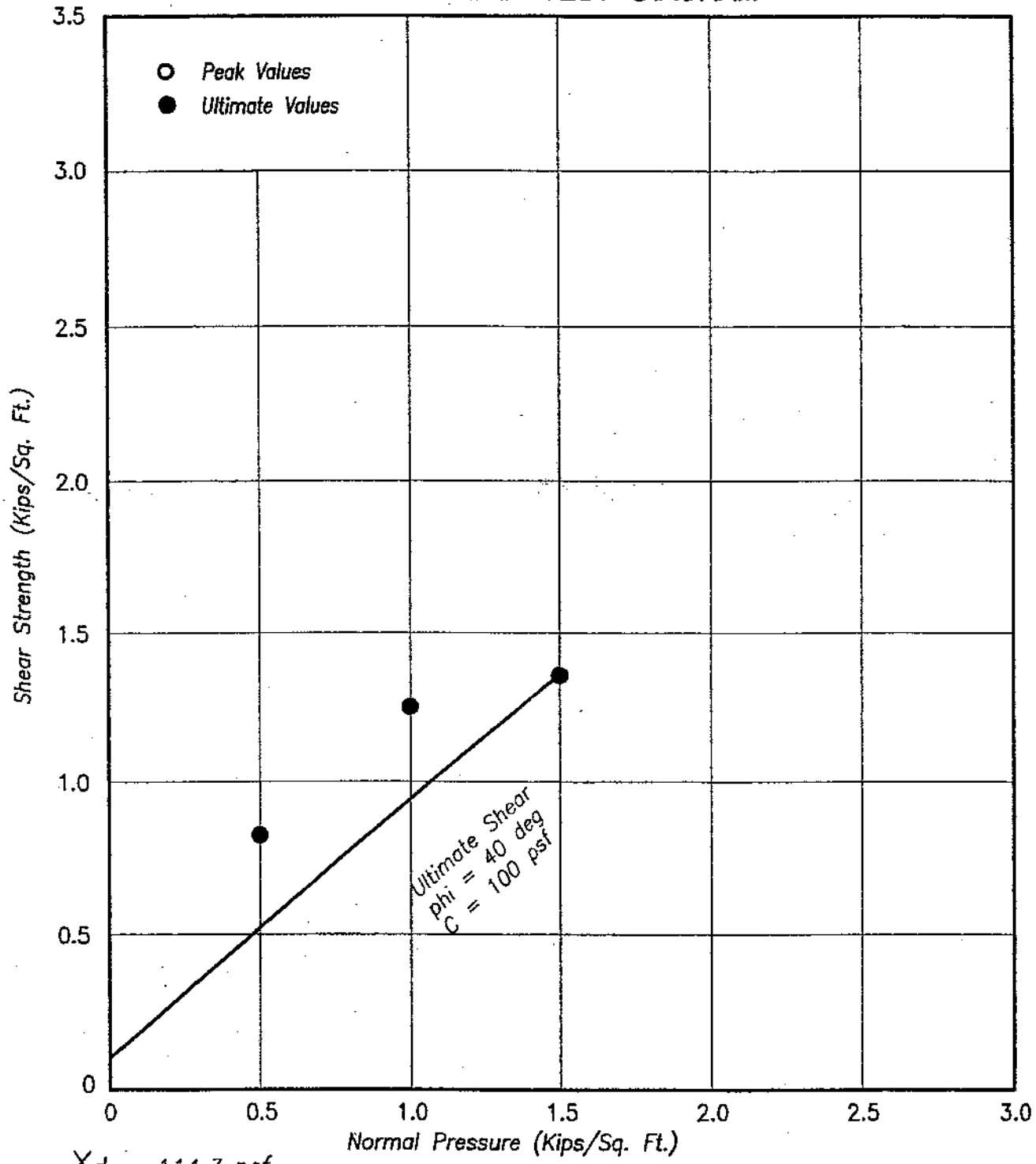
DIRECT SHEAR TEST DIAGRAM



γd = 114.3 pcf

Wi = 3.9 %

Wf = 13.6 %

Sample Location: B-2 Depth: 5 ft.

Material: (Qof) Gravelly Sand Saturated, Undisturbed

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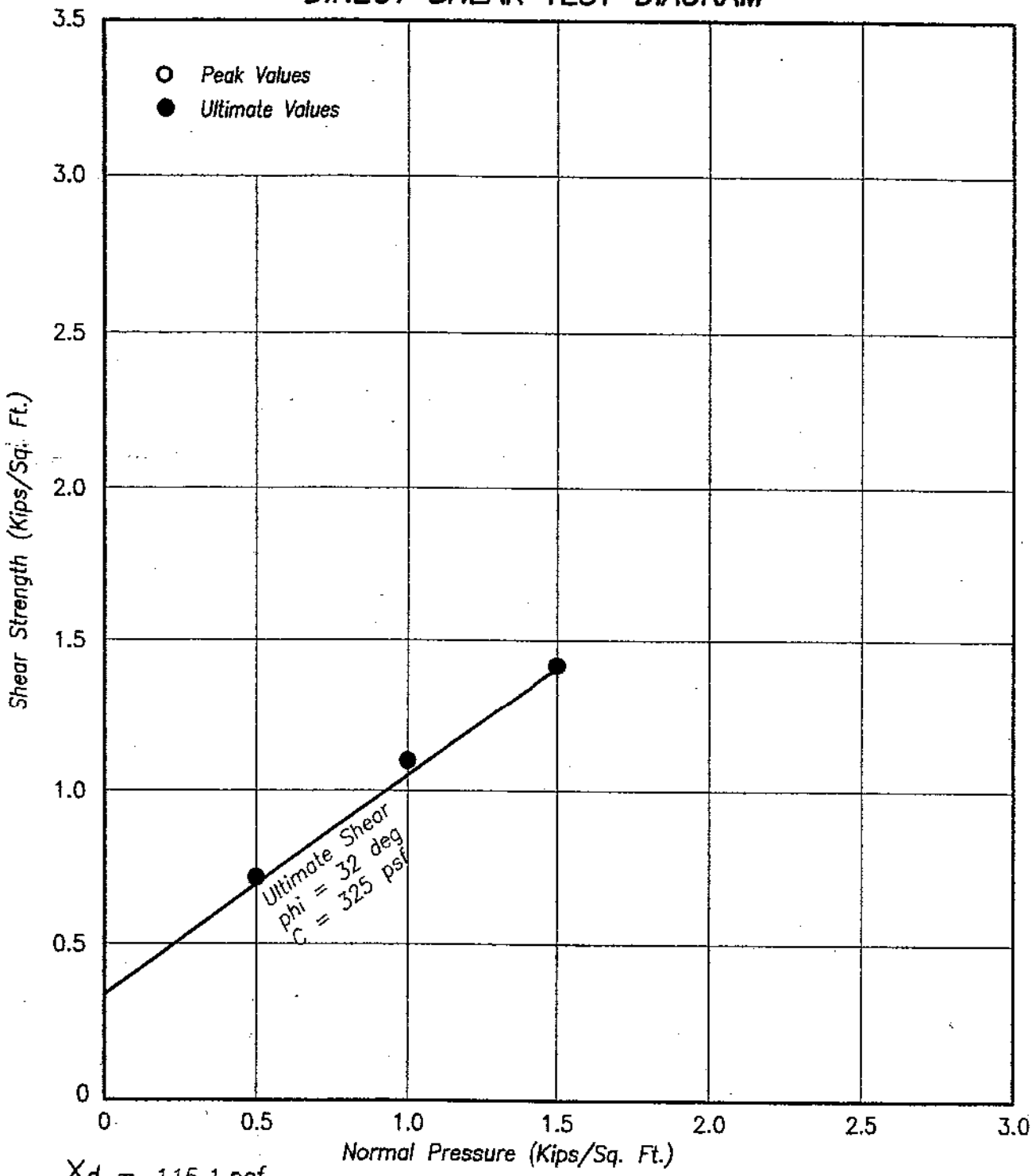
1.97

PLATE DS-1

DIRECT SHEAR TEST DIAGRAM



γd = 115.1 pcf

Wi = 9.6 %

Wf = 17.7 %

Sample Location: B-2 Depth: 10 ft.

Material: (Qof) Gravelly Sand Saturated, Undisturbed

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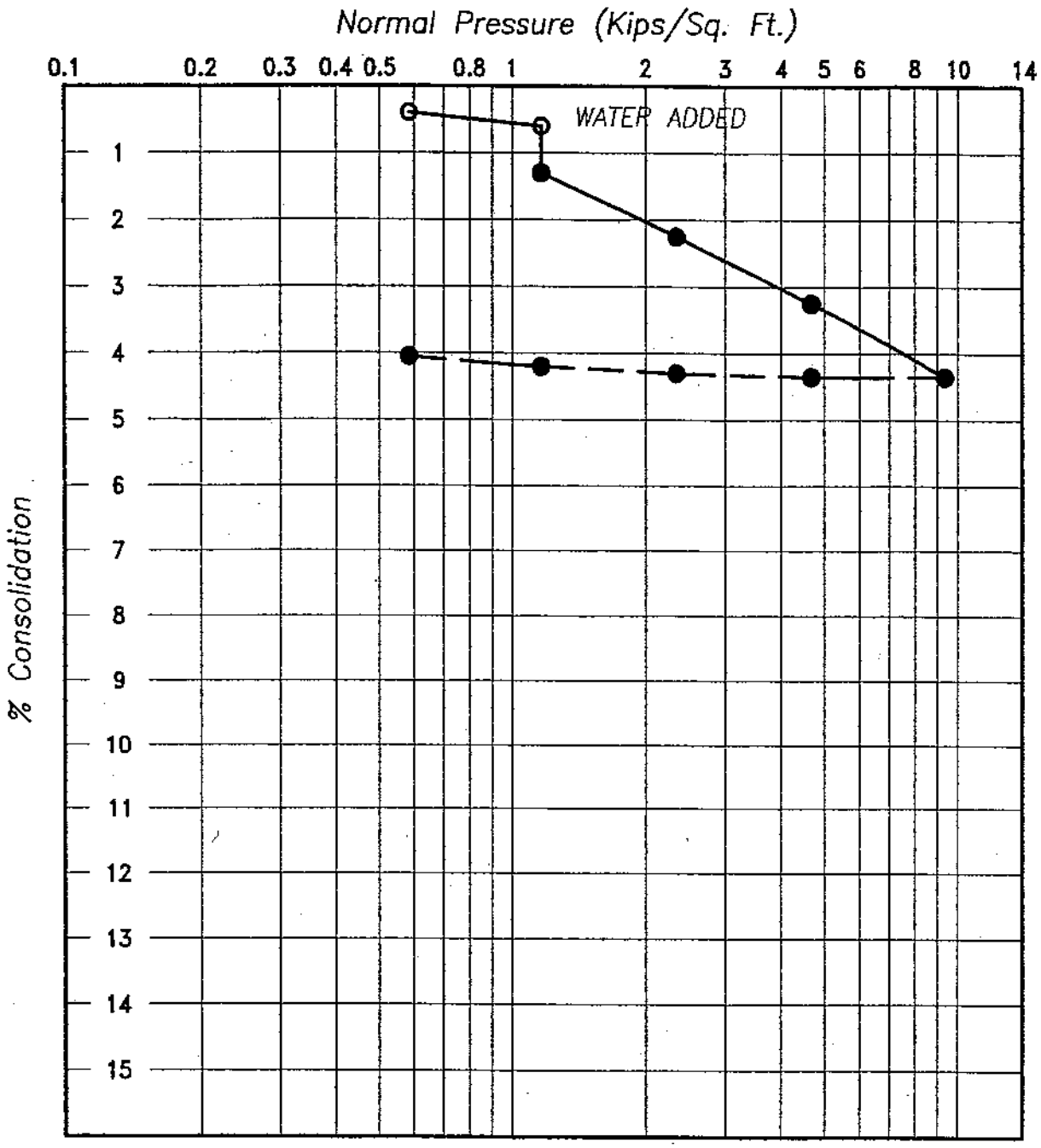
PLATE DS-2



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 119.5 pcf

Wi = 3.9 %

Wf = 11.4 %

Sample Location: B–3

Depth: 10 ft.

Material: Gravelly Sand

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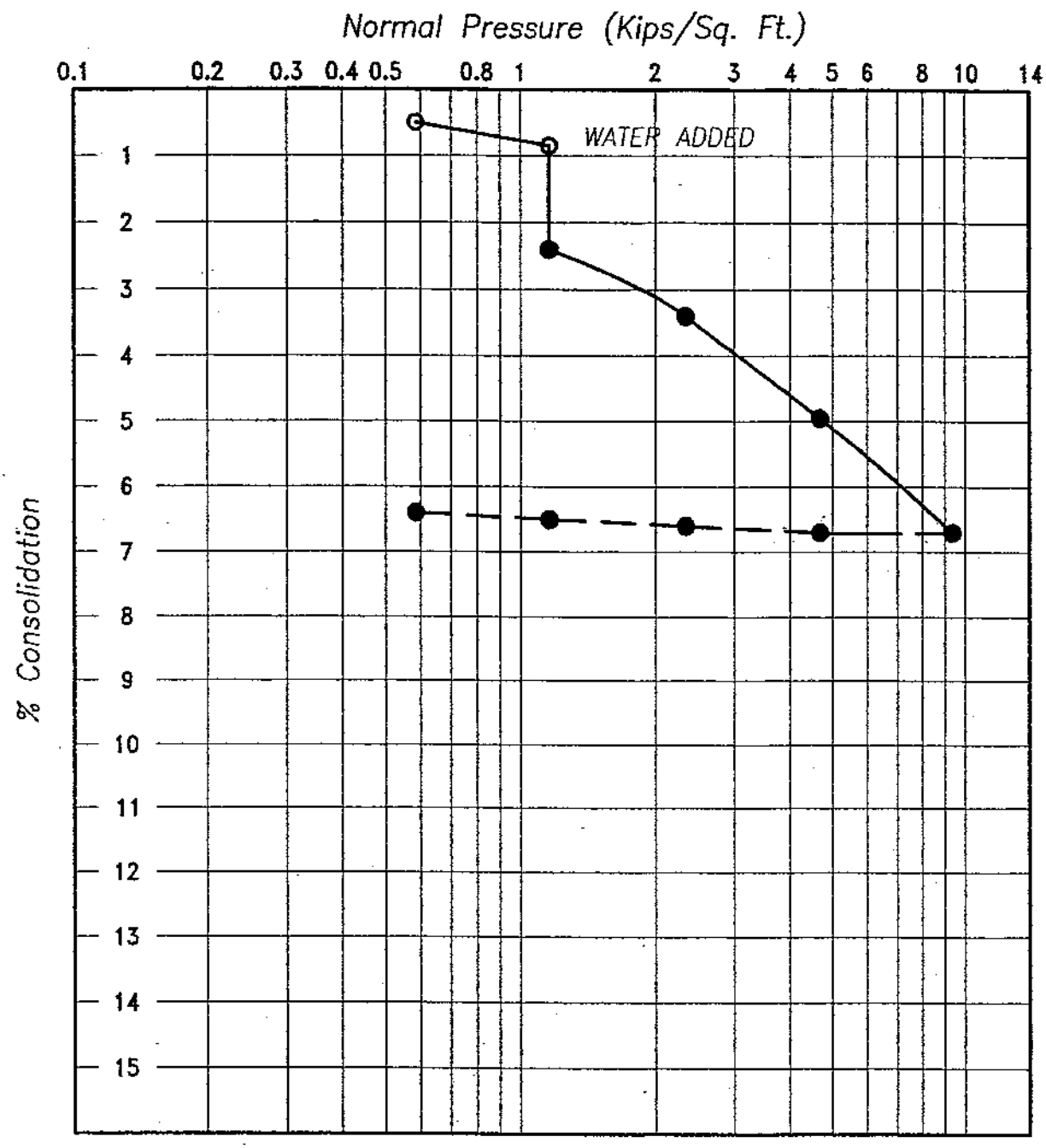
PLATE C–1



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 116.5 pcf

Wi = 4.1%

Wf = 12.1%

Sample Location: B–3

Depth: 15 ft.

Material: Cobbley Sand

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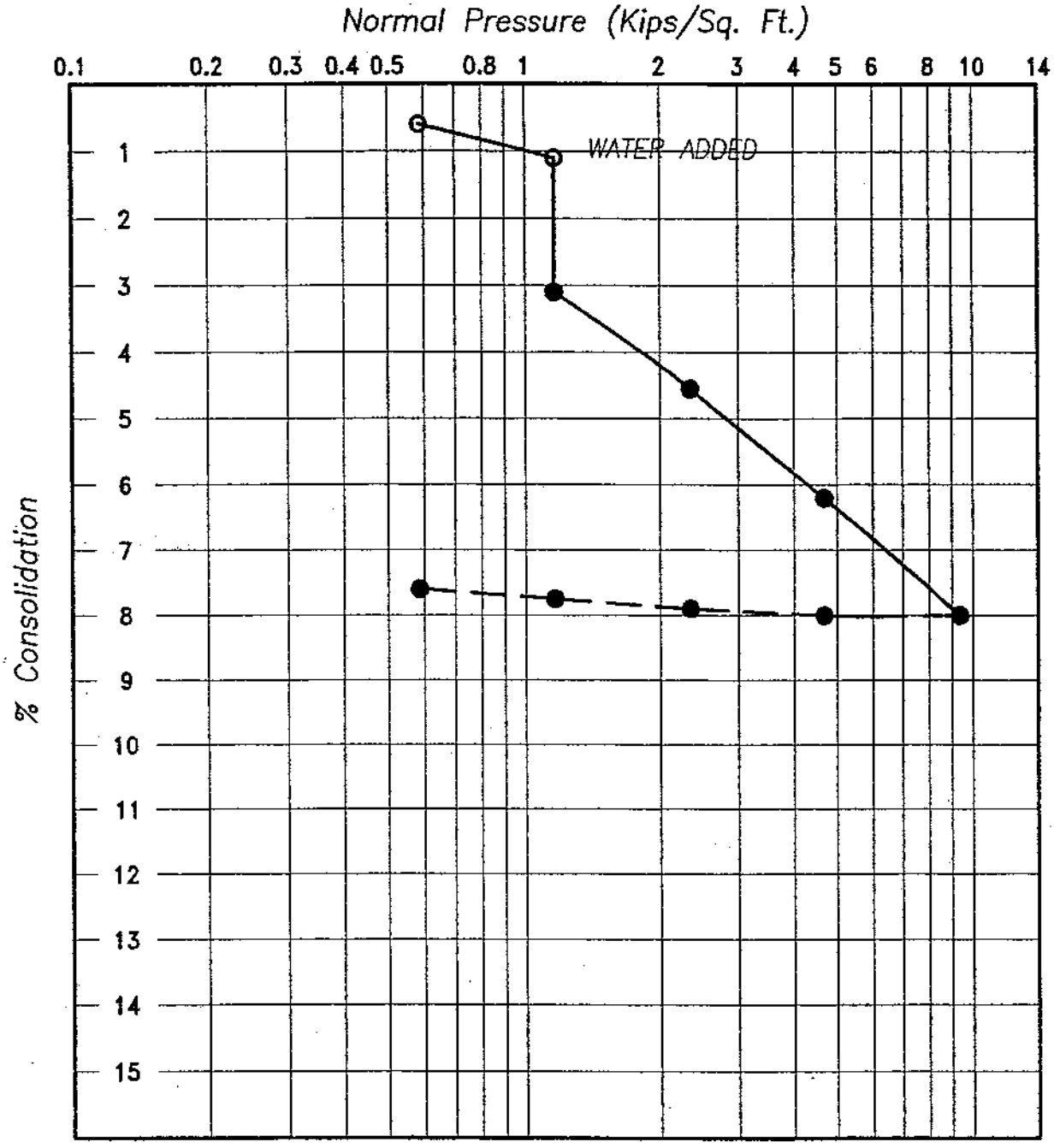
GS # 01–1209

PLATE C–2



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 110.1 pcf

Wi = 10.3 %

Wf = 14.6 %

Sample Location: B-6

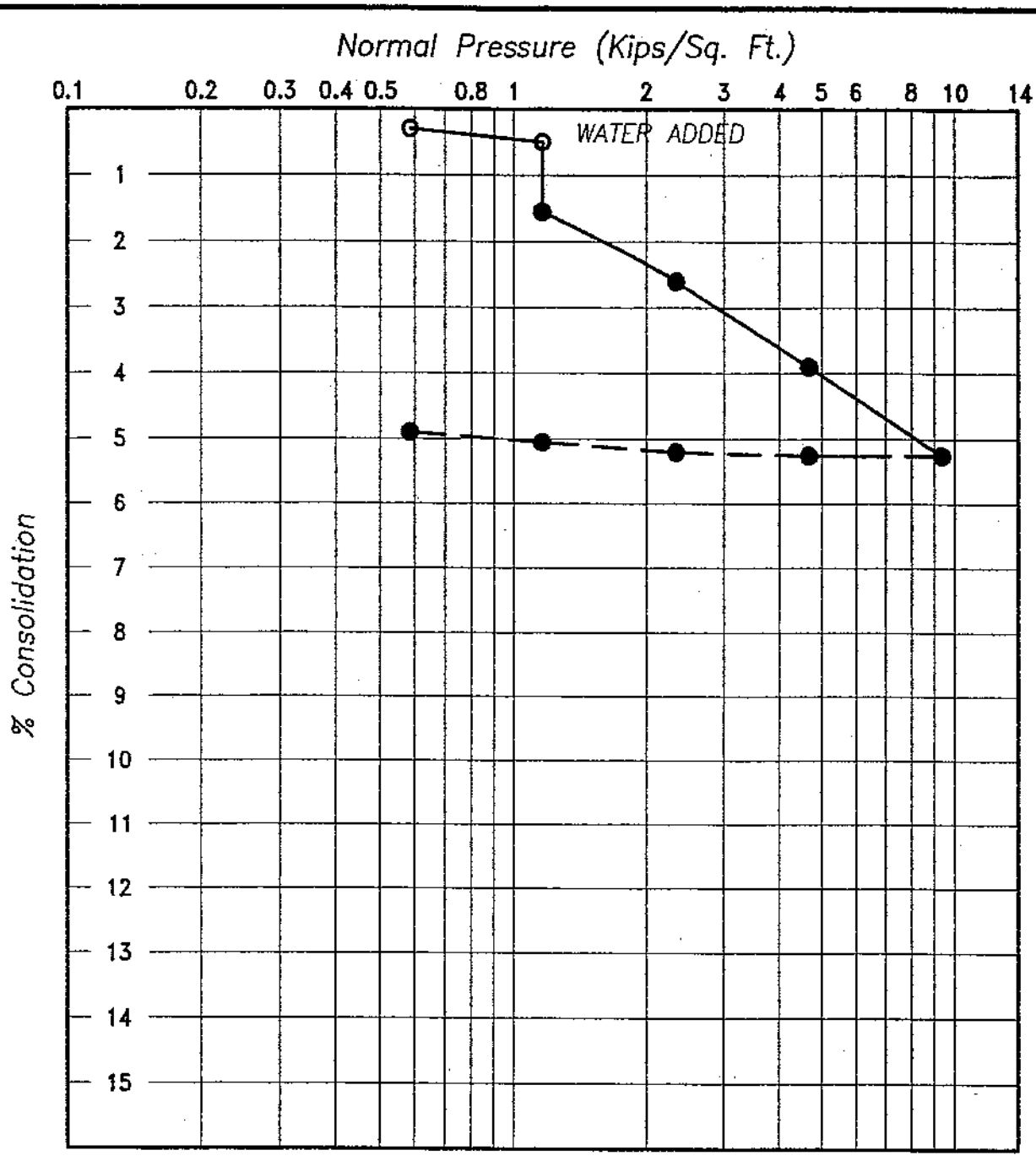
Depth: 2 ft.

Material: Gravelly Sand

GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS
312 WESTERN AVE GLENDALE CA 91201-2836
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/4/01
Plotted By: GR
GS # 01-1209

PLATE C-3



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 116.8 pcf

Wi = 2.8 %

Wf = 12.3 %

Sample Location: B–6

Depth: 5 ft.

Material: Gravelly Sand

GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS
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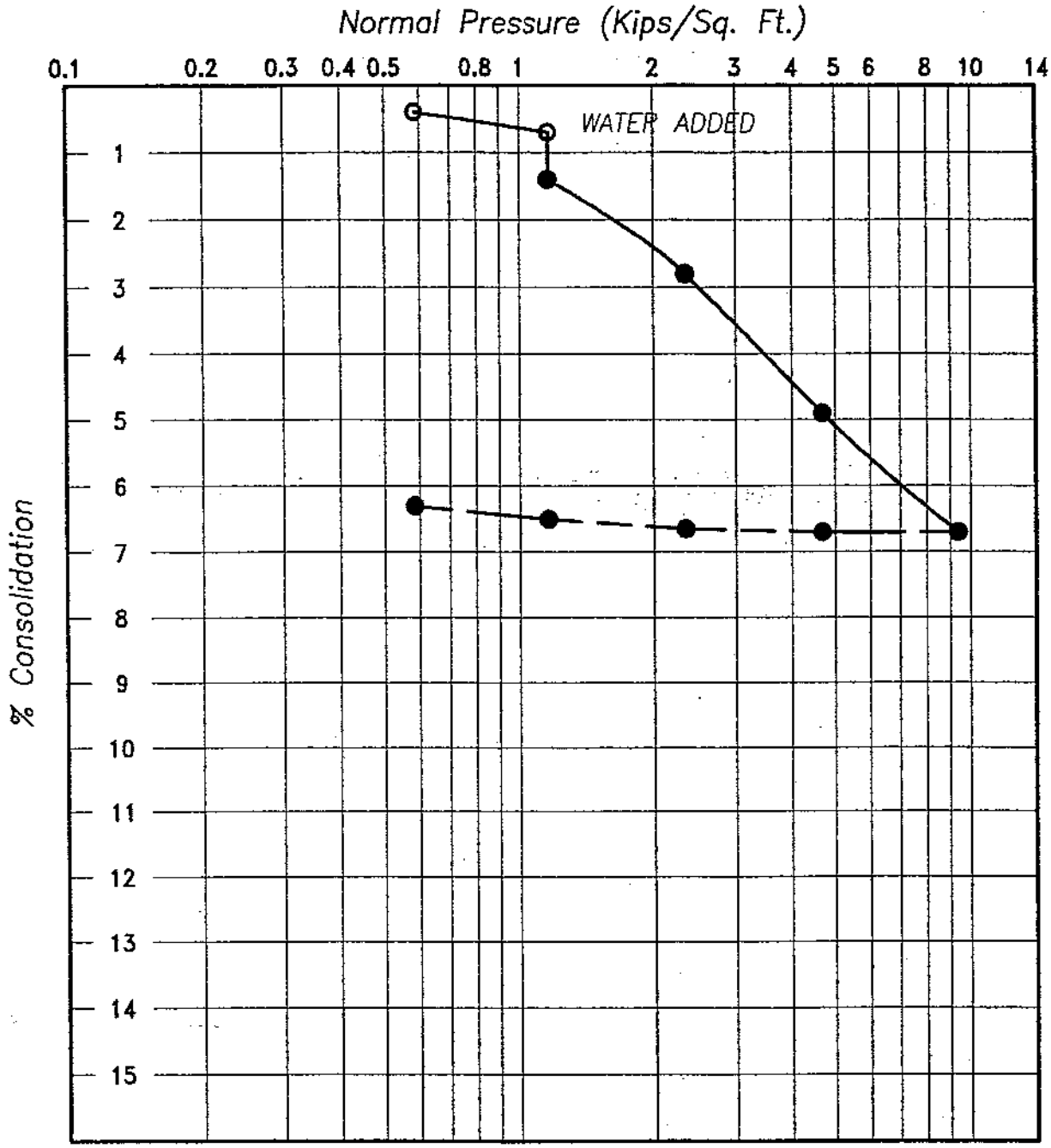
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/4/01
Plotted By: GR
GS # 01-1209

PLATE C–4



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 112.6 pcf

Wi = 7.4 %

Wf = 13.1 %

Sample Location: B–11

Depth: 2 ft.

Material: Gravelly Silty Sand

GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS
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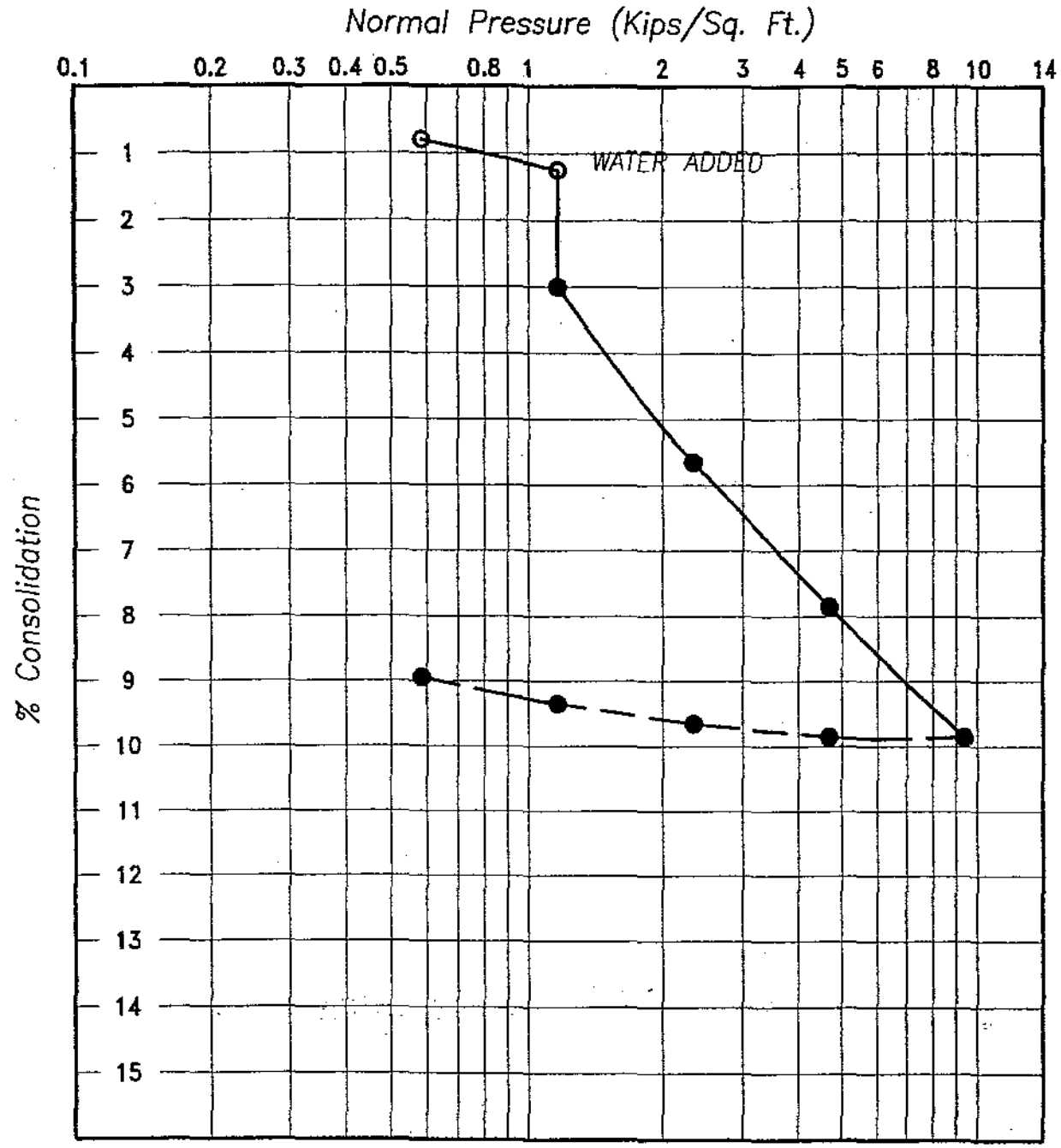
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/4/01
Plotted By: GR
GS # 01–1209

PLATE C–5



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 114.6 pcf

Wi = 4.1 %

Wf = 12.3 %

Sample Location: B–11

Depth: 5 ft.

Material: Gravelly Sand

GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS
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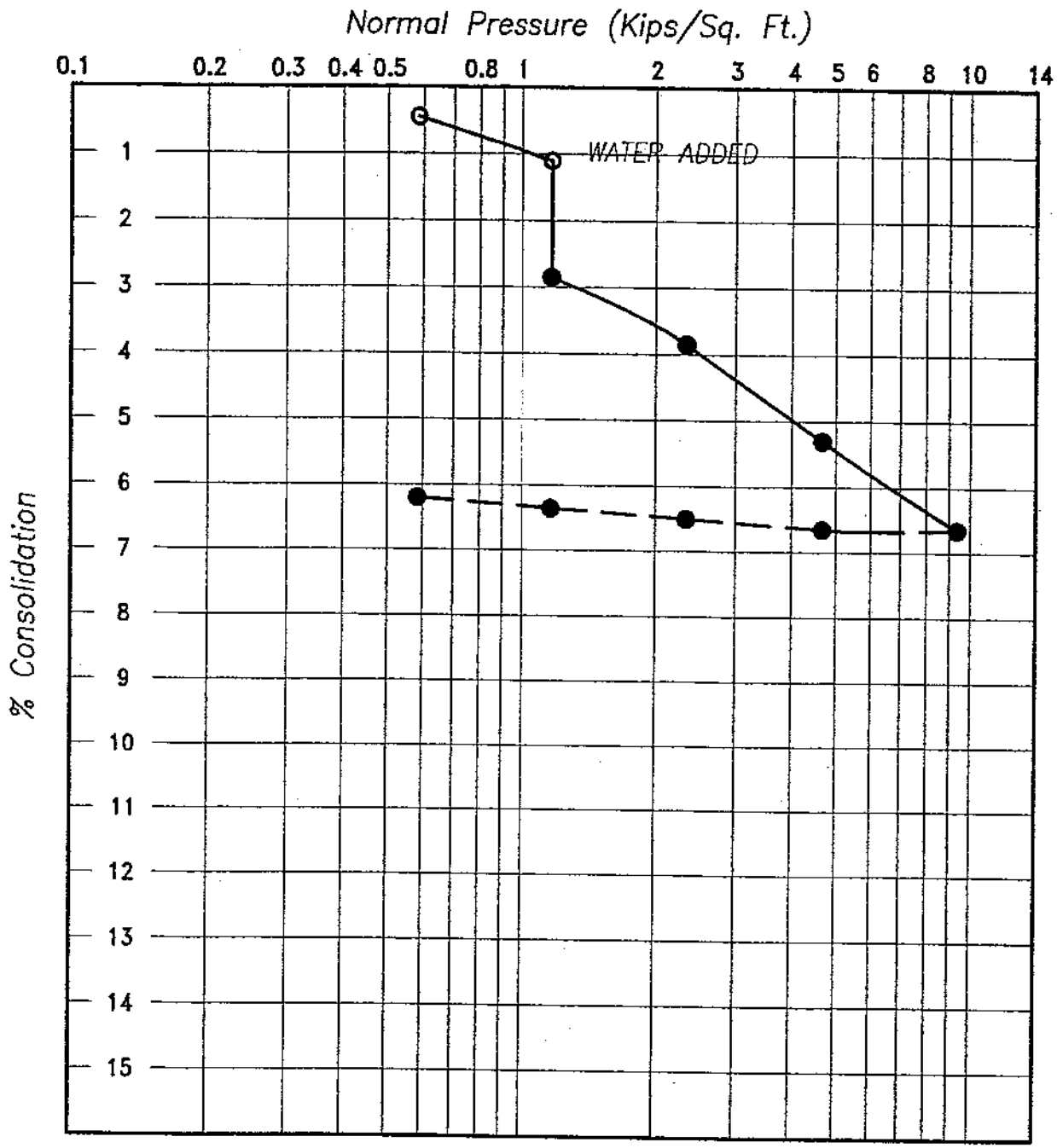
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/4/01
Plotted By: GR
GS# 01-1209

PLATE C-6



CONSOLIDATION--PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 123.3 pcf

Wi = 1.3 %

Wf = 10.5 %

Sample Location: B-12

Depth: 5 ft.

Material: Gravelly Sand

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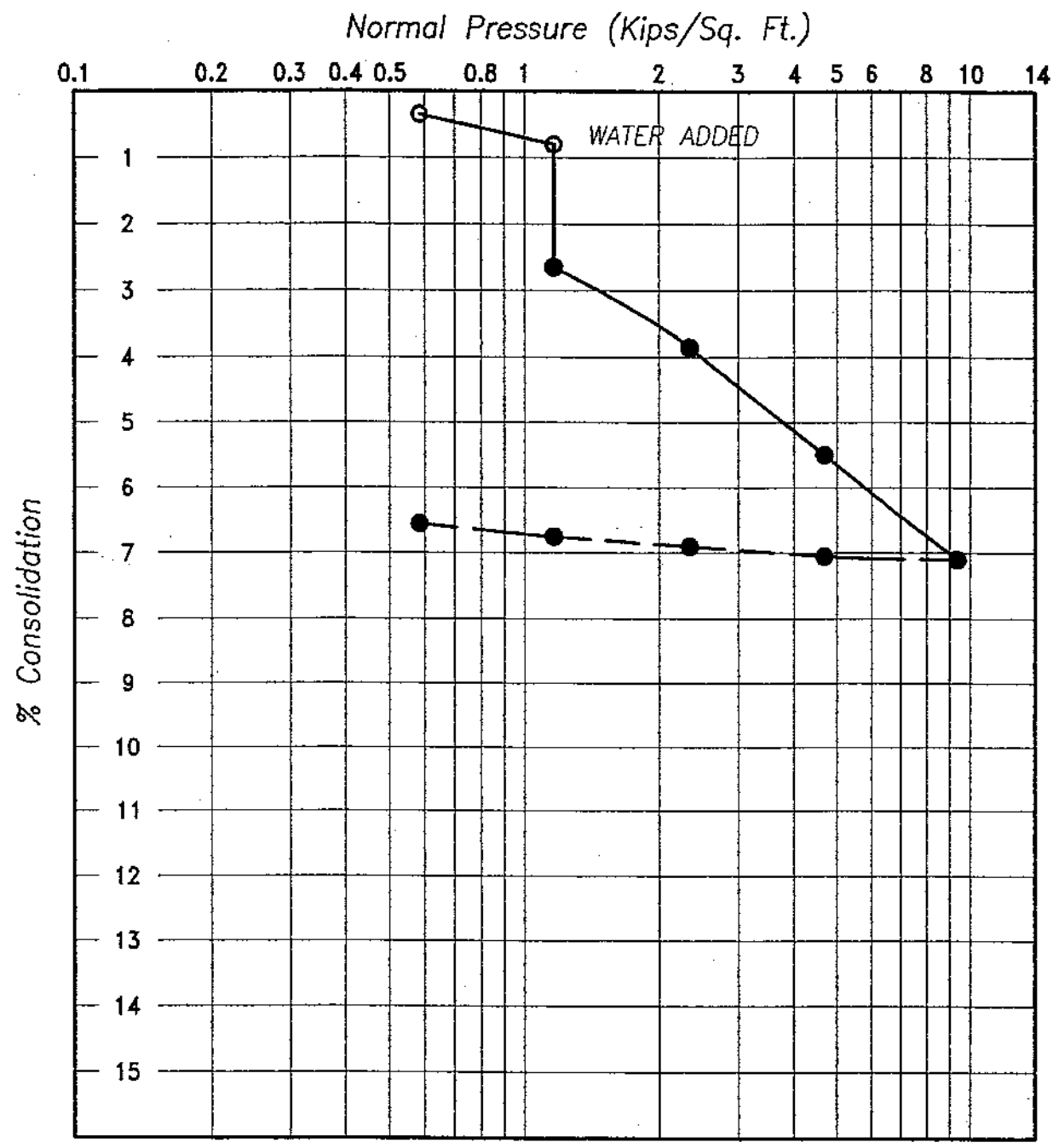
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/4/01
Plotted By: GR
GS# 01-1209

PLATE C-7



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 116.6 pcf

Wi = 3.5 %

Wf = 12.1 %

Sample Location: B–12

Depth: 10 ft.

Material: Gravelly Sand

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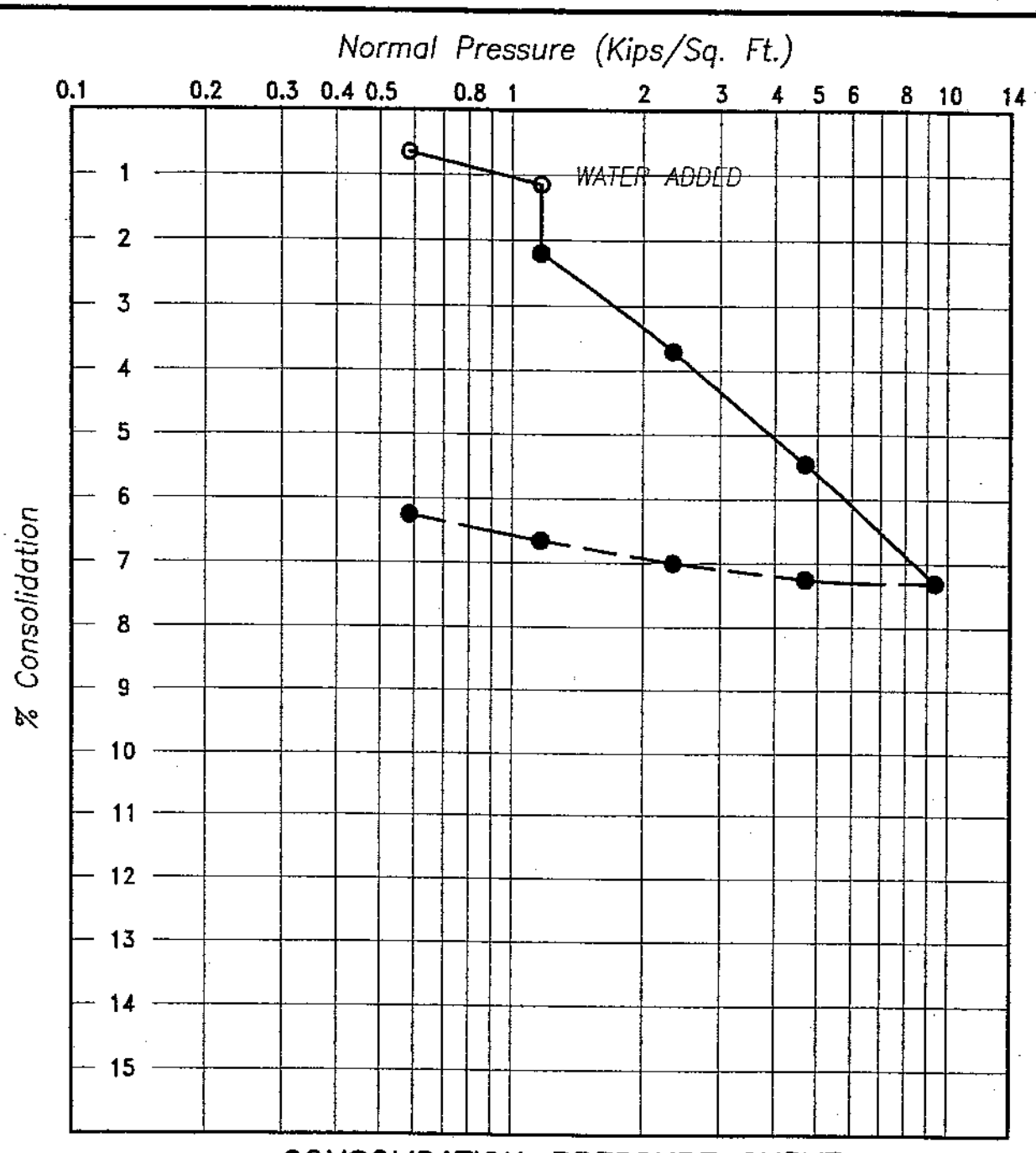
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/4/01
Plotted By: GR
GS# 01–1209

PLATE C–8



CONSOLIDATION–PRESSURE CURVE

○ Field Moisture

● Effect of Adding Moisture

— — — Rebound Curve

γd = 113.3 pcf

Wi = 4.9 %

Wf = 13.4 %

Sample Location: B–4

Depth: 15 ft.

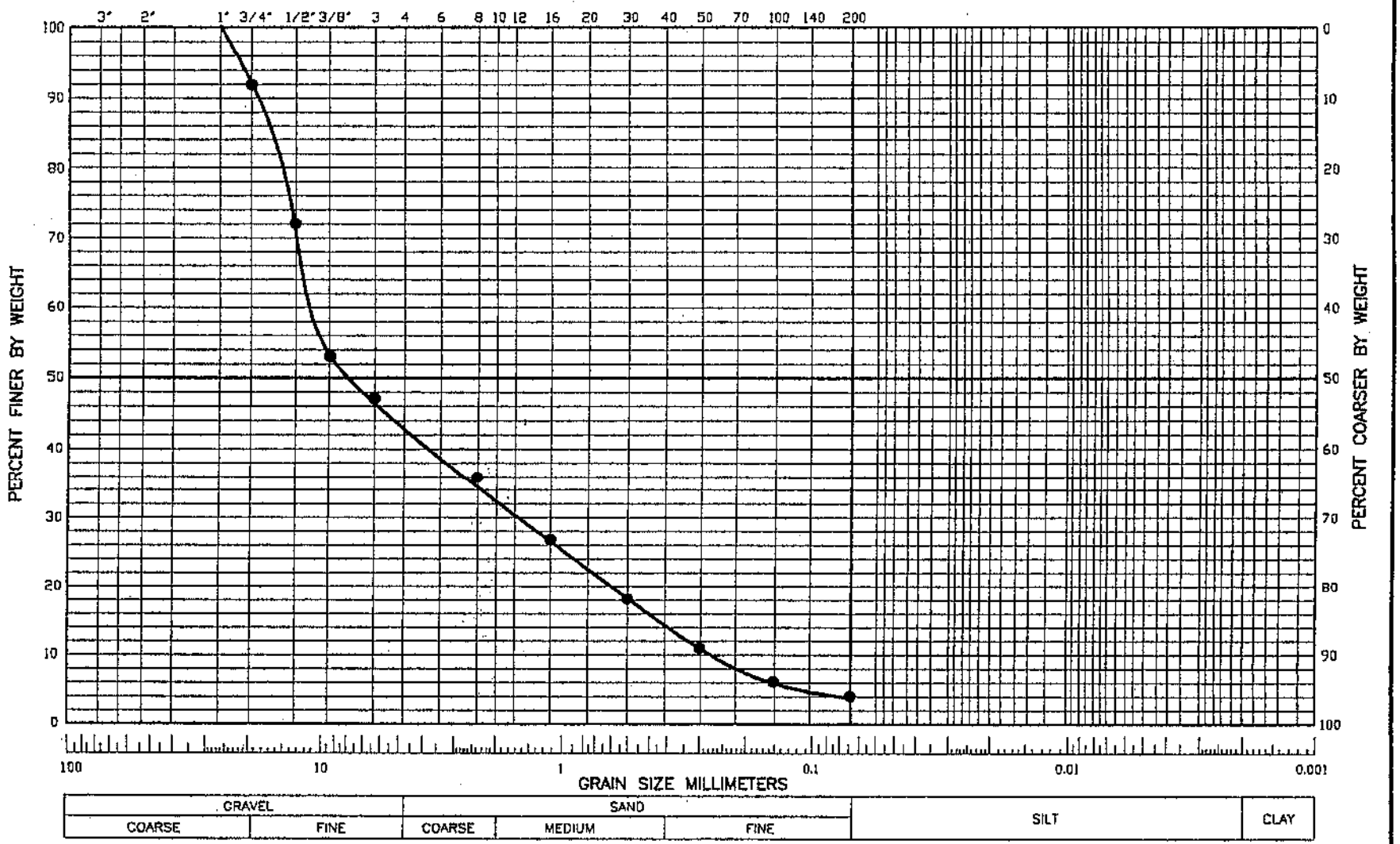
Material: Cobbley Sand

GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS
312 WESTERN AVE GLENDALE CA 91201-2836
PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue
Claremont, California
Date: 2/11/02
Plotted By: GR
GS # 01–1209

PLATE C–9

GRAIN SIZE DISTRIBUTION DIAGRAM



GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

312 WESTERN AVE GLENDALE CA 91201-2636
PHONE 818-500-9533 FAX 818-500-0134

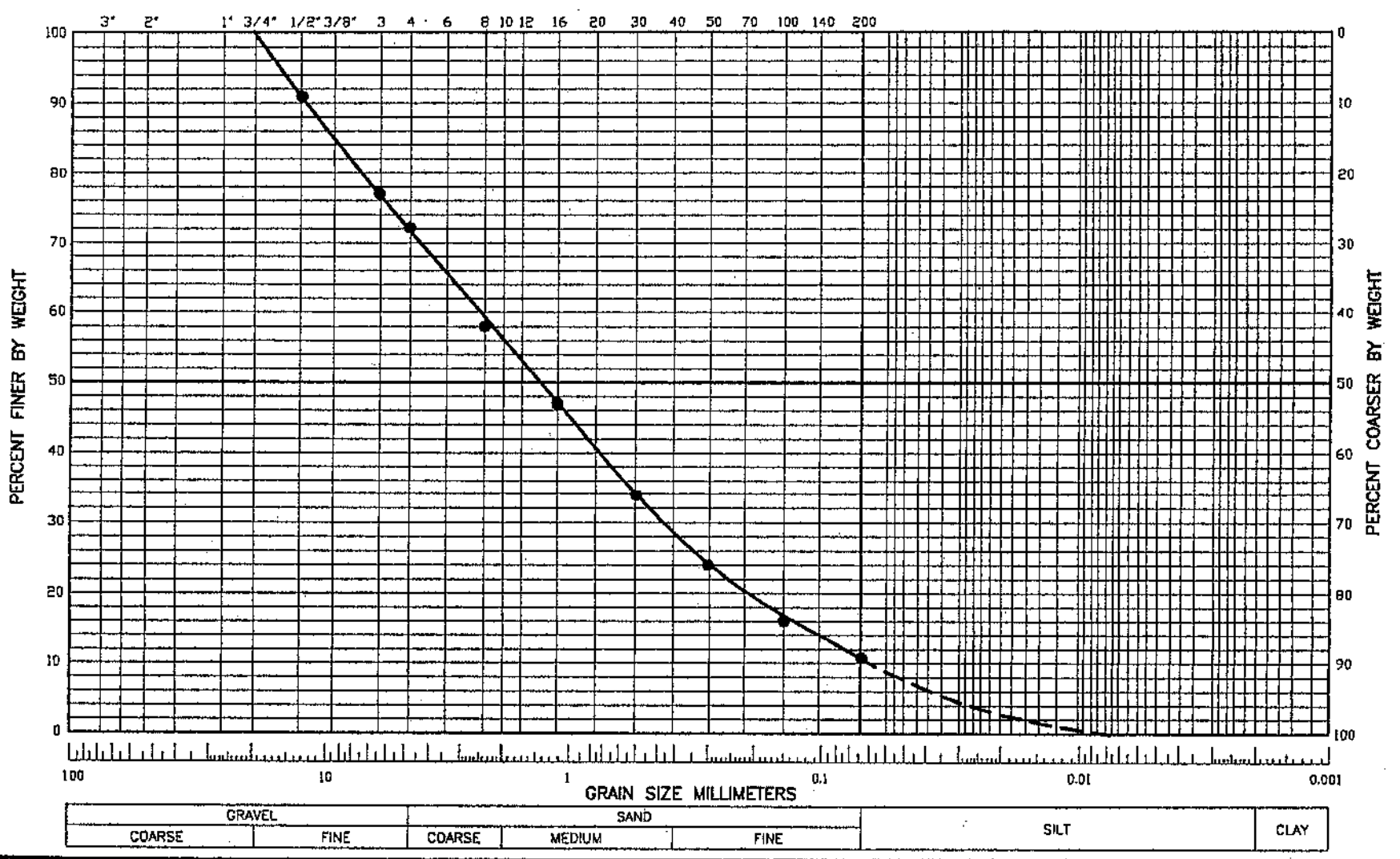
Sample Location: B-1
Depth: 5 ft.

SIEVE ANALYSIS

Forbes Avenue
Claremont, California

DATE: Feb., 2002	GS 01-1209	PLATE SV-1

GRAIN SIZE DISTRIBUTION DIAGRAM



GEOSYSTEMS

ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

312 WESTERN AVE GLENDALE CA 91201-2836

PHONE 818-500-9533 FAX 818-500-0134

Sample Location: B-1

Depth: 15 ft.

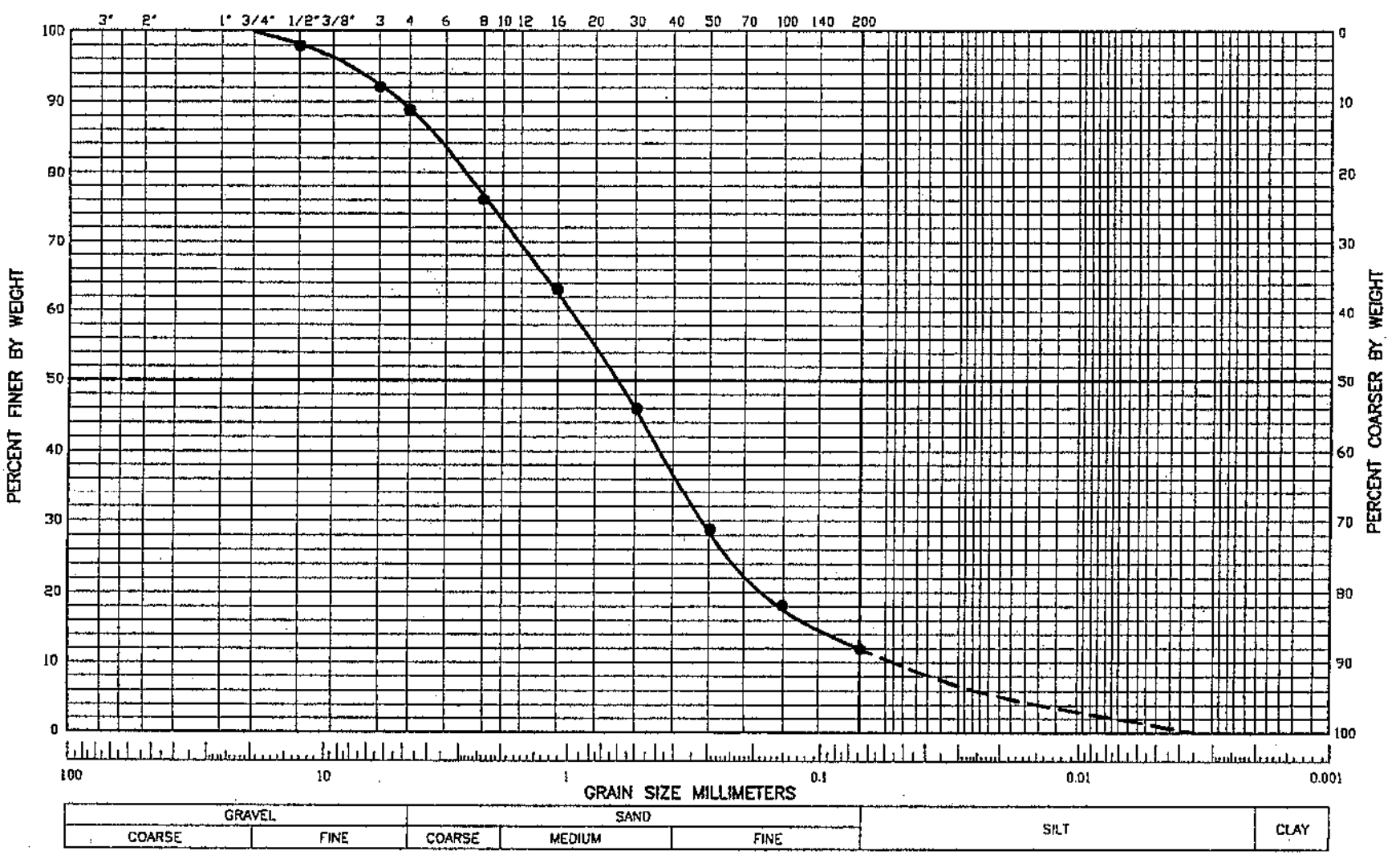
SIEVE ANALYSIS

Forbes Avenue

Claremont, California

DATE: Feb., 2002	GS 01-1209	PLATE SV-2

GRAIN SIZE DISTRIBUTION DIAGRAM



GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

312 WESTERN AVE GLENDALE CA 91201-2836
PHONE 818-500-9533 FAX 818-500-0134

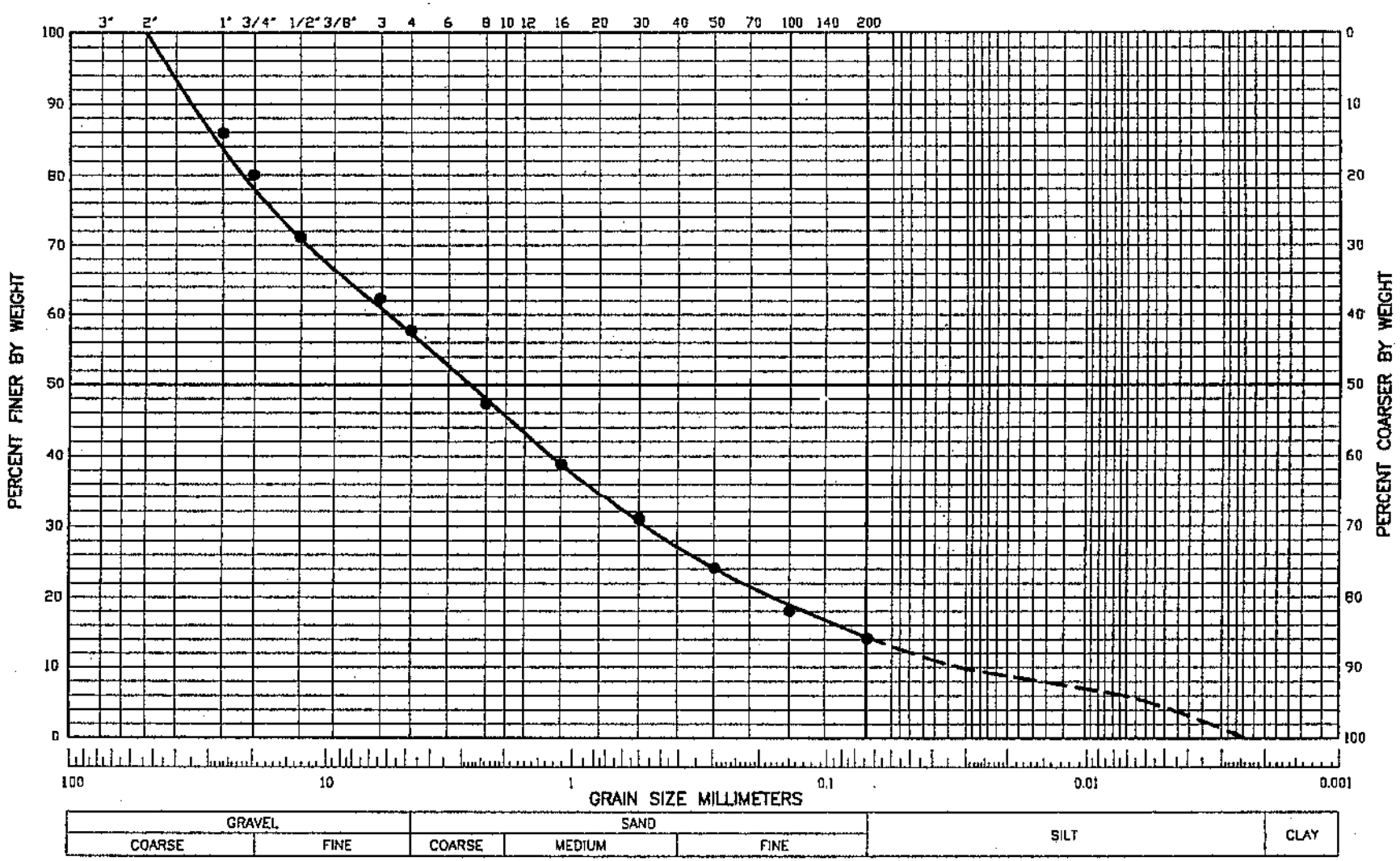
Sample Location: B-1
Depth: 20 ft.

SIEVE ANALYSIS

Forbes Avenue
Claremont, California

DATE: Feb., 2002	GS 01-1209	PLATE SV-3

GRAIN SIZE DISTRIBUTION DIAGRAM



GEOSYSTEMS
ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

312 WESTERN AVE GLENDALE CA 91201-2836
PHONE 818-500-9533 FAX 818-500-0134

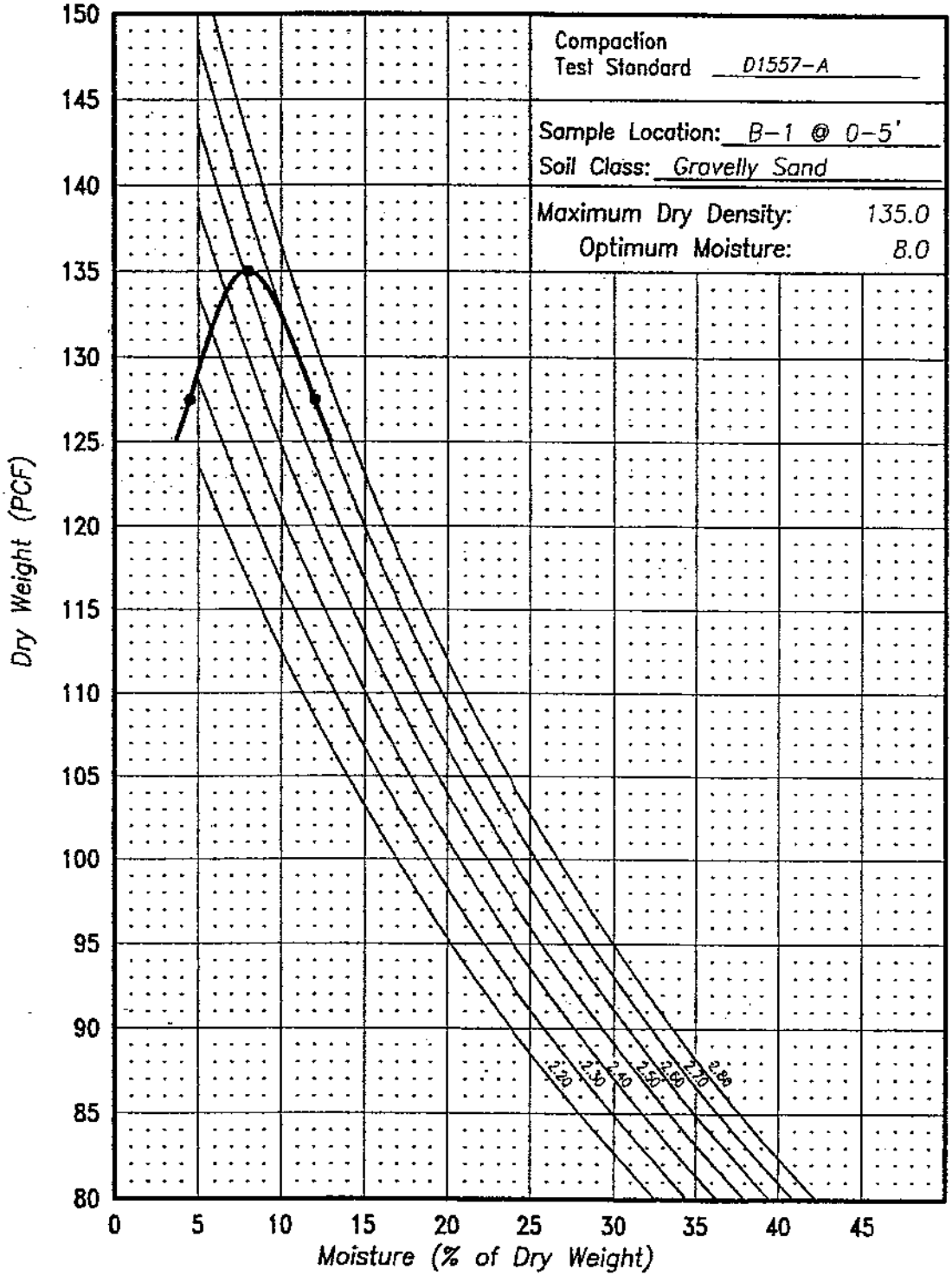
Sample Location: B-1
Depth: 35 ft.

SIEVE ANALYSIS

Forbes Avenue
Claremont, California

DATE: Feb., 2002	GS 01-1209	PLATE SV-4

MAXIMUM DENSITY & MOISTURE CURVE



GEOSYSTEMS

ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

312 WESTERN AVE GLENDALE CA 91201-2836

PHONE 818-500-9533 FAX 818-500-0134

Project: Forbes Avenue

Claremont, California

Tested By: MM

Date: 1/28/02

GS # 01-1209

PLATE M-1

STABILITY ANALYSIS OF TEMPORARY EXCAVATIONS

Reference: Fig. 10.22, "Foundation Engineering Handbook" edited by Hsai-Yang Fang

MATERIAL STRENGTHS

C = COHESION = 100 psf

ϕ = ANGLE OF SHEARING RESISTANCE = 40 degrees

γ = UNIT WEIGHT OF THE SOIL = 130 pcf

ANGLE OF BACKSLOPE = 0 degrees

$$\text{Tan } \phi_d = \frac{\text{Tan } \phi}{1.25} = \frac{0.839}{1.25} = 0.671 \quad \therefore \ \phi_d = 34^\circ$$

$$C_d = \frac{C}{1.25} = \frac{100}{1.25} = 80$$

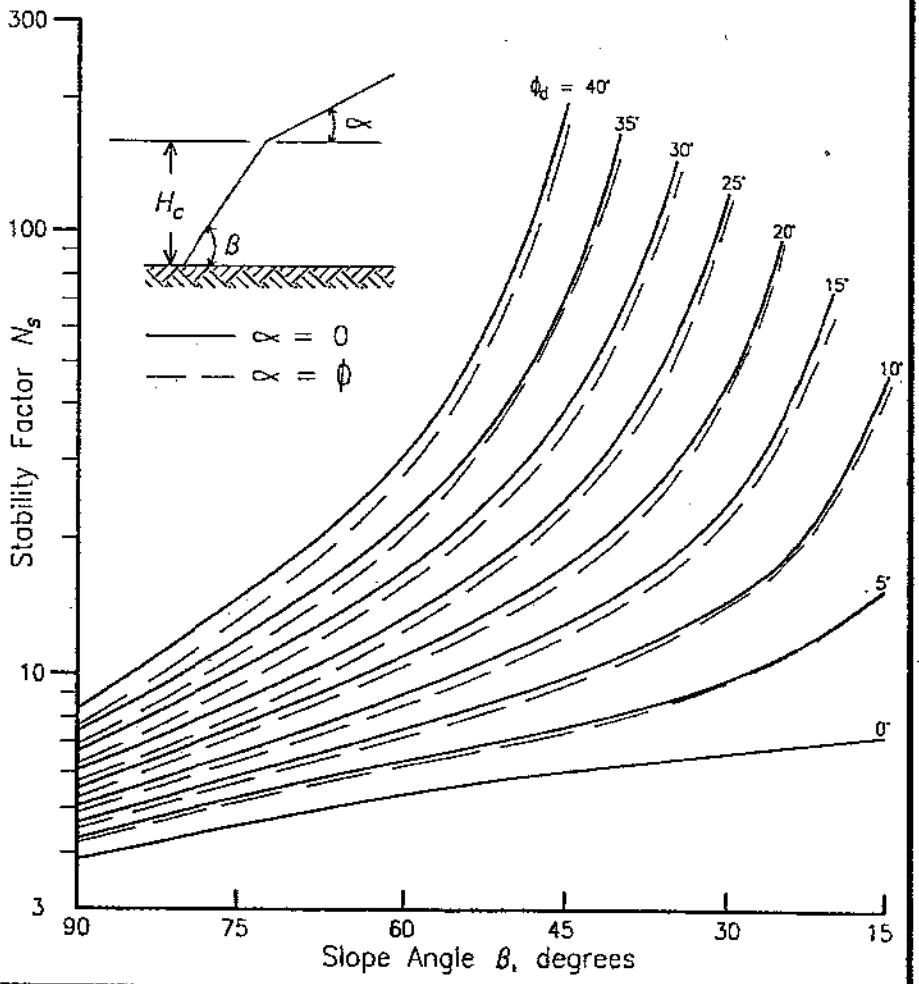
N_s = 7.0 (from chart)

H_c = Critical Height

$$H_c = \frac{N_s \times C_d}{\gamma} = 4.3$$

VERTICAL TEMPORAY EXCAVATIONS ARE NOT RECOMMENDED

ALL EXCAVATION SHOULD SHOULD BE TRIMMED TO A 1:1 GRADIENT.



GEOSYSTEMS

ENVIRONMENTAL AND GEOTECHNICAL CONSULTANTS

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PHONE 818-500-9533 FAX 818-500-0134

ANALYSIS OF TEMPORARY EXCAVATIONS

Forbes Avenue

Claremont, California

DATE Feb., 2002	GS 01-1209	PLATE TS-1

Client Name: GeoSystem, Inc.
Project Name: Forbes Avenue
Project No.: GS01-1209

QCI Project No.: 02-031-001
Date: January 5, 2002
Summarized by: JH

Sample ID	Ph CT-532	Chloride CT-532 (ppm)	Sulfate CT-417 (% by Weight)	Resistivity CT-532 (ohm-cm)
B-1@ 0-5'	7.28	120	0.006	6100

21015 Commerce Pointe Drive, Walnut, California 91789; Tel: 909-869-9166, Fax: 909-869-9056
3 Washington, Irvine, California 92606; Tel: 626-512-0945, Fax: 949-651-0845

PLATE CT-1

LETTER TRANSMITTAL

GEOSYSTEMS

ENVIRONMENTAL, ENGINEERING-GEOLOGY AND GEOTECHNICAL

312 Western Avenue • Glendale CA 91201

Tel. (818) 500-9533 • Fax (818) 500-0134

WEBSITE http:\home.pacbell.net/geosys/

To: The Planning Center
1580 Metro Drive
Costa Mesa, CA 92626

Date: September 24, 2002
Site: **Forbes & Miramar**
Job No: GS01-1209-1

Attn: **Andrea Brewer**

BY:
- X MAIL
- ☐ EXPRESS
- ☐ DELIVERED
- ☐ PICK-UP/COD
- ☐ MESSENGER

We Are Sending You The Following Material:

☐ **Report (s)** X **Addendum (s)** ☐ **Letter (s)** ☐ **Plan/Map (s)** ☐ **Other**

COPIES TO:

1 - Addendum to Preliminary Soils and Engineering-Geologic Investigation Reports.

- x **Per Your Request**
- x **For Your Use**
- x **For Your File**
- ☐ **For Review & Comment**
- ☐ **For Comment and Return**
- ☐ **For Approval and Return**
- X **For Your Distribution**
- ☐ **For Approval**

Copy to: **5- client**

By: Gus Robles

GEOSYSTEMS

ENVIRONMENTAL
LAND SURVEYING
ENGINEERING-GEOLOGY
GEOTECHNICAL

February 12, 2003
GS01-1209-1

Claremont Unified School District
2080 North Mountain Avenue
Claremont, CA 91711

Attn: Mr. John Kettle

SUBJECT: Addendum to Preliminary Soils Engineering Geologic Investigation for Proposed Grade K-12 Classroom Buildings, Amphitheater and Parking Areas (La Puerta Elementary School), 2475 N. Forbes Avenue, Claremont, California.

REFERENCES:

1) Preliminary Soils Engineering Geologic Investigation for Proposed Grade K-12 Classroom Buildings, Amphitheater and Parking Areas (La Puerta Elementary School), 2475 N. Forbes Avenue, Claremont, CA; GeoSystems, dated February 14, 2002, GS01-1209.

2) State of California Special Studies Zones, 2000, Mount Baldy Quadrangle, Los Angeles County, California; California Division of Mines and Geology, Revised June 1, 1995 Scale = 1:24,000.

3) Geologic Guide to the San Bernardino Mountains, Southern California, 1976, (Preliminary Map of Cucamonga Fault Zone, March 1976); Association of Engineering Geologist.

4) UBCSEIS Version 1.02, Thomas F. Blake, Copyright (c)1997.

At the request of your Environmental Analyst, Andrea Brewer of The Planning Center, this letter serves to provide our clarification of two geologic issues.

According to the Mt. Baldy Quadrangle a portion of the Cucamonga fault, the eastern most portion, is mapped as an Alquist Priolo Special Studies Zone. The portion of the Cucamonga fault (western portion) that extends toward the site is not mapped as an Alquist Priolo Special Studies Zone. No known faults with potential for surface rupture underlie the site, the subject site is not located within any Alquist Priolo Special Studies Zone (reference #2).

312 WESTERN AVENUE GLENDALE CALIFORNIA 91201-2836 PH. 818 - 500 - 9533 FAX 818 - 500 - 0134

The distances listed, on page 6 of our referenced report, are the distances of the project site to the respective faults. These distances are to the nearest mapped trace of each fault (references #3 & #4), not to the Alquist Priolo Special Studies Zone.

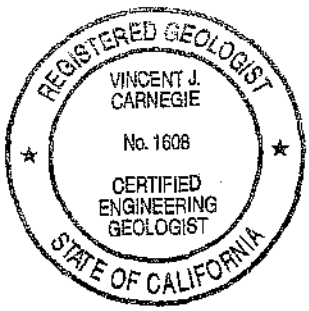
All recommendations presented in the referenced report which are not superseded herein remain applicable and in effect.

Should you have any additional questions or comments, please do not hesitate to contact our office.

GEOSYSTEMS,

Steve S. Tsai, Vice President
GE 2268, Exp. 3-31-06

Vincent J. Carnegie, President
CEG 1608, Exp. 10-31-03



CC: 5 to Client

GR:SST/jsc

GR:\wpwin60\geo01\frbsave1.cla

INVOICE

GEOSYSTEMS
312 Western Avenue
Glendale, CA 91201

818-500-9533 Fax: 818-500-0134

Inv #: 21415GS Inv Date : 09/25/02
S.O. #: 01-1209-1
P.O. #: FORBES AV
Cust #: CLAR120 Ship Via :

INVOICE TO:

Claremont Unified School Dis
Attn: John Kettle
2080 N.Mountain Avenue
Claremont, CA 91711

SHIP TO:

Terms: Due Upon Reciept

Quantity	Description	Price/Rate	Amount
	Addendum to Preliminary Soils and Engineering Geologic Investigation for Proposed Classroom Buildings, Amphitheater & Parking Areas at: 2475 N.Forbes Avenue Claremont, CA		
1.00	Hour-Chief Geot.Engineer	175.000	175.00
		$	175.00

Interest Added at 1 1/2% per Month on
Past Due Invoices.

P.O.# P22808
12-14-01

GEOSYSTEMS
01-1209
ENVIRONMENTAL
LAND SURVEYING
ENGINEERING-GEOLOGY
GEOTECHNICAL

December 3, 2001

Clar120

Claremont Unified School District
2080 N. Mountain Avenue
Claremont, CA 91711

Attn: Mr. John Kettle, Director of Maintenance Operation
and Transportation

SUBJECT: Proposal and Work Authorization for
Soils and Engineering-Geologic Services,
Southwest corner of Forbes Avenue & Miramar Avenue, Claremont, California
(La Puerta Elementary School)

Dear Mr. Ziemba,

GeoSystems is pleased to present this proposal for providing soils and engineering-geologic services to evaluate the new Grade K-12 classroom buildings (Buildings A through G,) amphitheater, parking areas and future structures at the subject site. It is our understanding the structures will be constructed on-grade with parking areas. Liquefaction analysis of the site will be addressed in our scope of work. A dynamic analysis (ground motion study) may be required by the Division of the State Architect (DSA). A separate fee for this scope of work is provided.

Professional services to be performed by this facility for the preparation of a soils and engineering-geologic report will include the *following*:

1. Review available geotechnical data for the area and adjacent properties. General seismic analysis of the region.

2. Field mapping, excavation, logging and sampling of fifteen (15) exploratory borings excavated with a hollow stem auger drill rig to depths ranging from 20 to 50 feet. SPT sampling of these borings will be required for the liquefaction analysis.

3. Laboratory testing, data and liquefaction analysis.

4. Recommended foundation system and allowable vertical and lateral design parameters.

5. Characterization of the natural soils of the site and the site soil classification.

6. Identification of the groundwater conditions and the corrosivity of the on-site soils.

7. Recommendations for the support of the floor slab.

8. Geological and seismic information in accordance with the 1998 California Building Code and DSA.

9. Anticipated differential settlement between adjacent columns.

10. Approximate location and extent of fill materials.

11. Recommendations for excavation and recompaction.

12. Preparation of a formal report addressing our findings on liquefaction potential and our design recommendations for site preparation, foundations, retaining walls, slabs, excavations, pavement and drainage.

13. * Dynamic analysis (Ground Motion Study) in accordance with the current requirements of the Division of the State Architect (DSA) and California Division of Mines and Geology (CDMG).

* ***If required.***

Fee

The soils and engineering-geologic fee for the scope of work (Items 1-12) as outlined is **Ten Thousand Dollars ($10,000.00).** The soils and engineering-geologic fee for the scope of work (Item 13 if required) as outlined is **Two Thousand Five Hundred Dollars ($2,500.00).** Our reports are typically acceptable to the applicable municipal department and the State Architect. We cannot guarantee that additional information or analysis will not be required during the review process. If additional work is required, these services are billed in accordance with our current fee schedule on a time and material basis.

Acknowledgement

Please review our enclosed work authorization and limits of liability. If this proposal is acceptable to you, execute the documents and provide a purchase order prior to initiation of soils and engineering-geologic services on the project with the fee is due prior to release of the report.

Schedule

This facility will perform our professional services in a reasonable and timely manner consistent with sound engineering practices.

INVOICE

GEOSYSTEMS
312 Western Avenue
Glendale, CA 91201

818-500-9533 Fax: 818-500-0134

Inv #: 20366GS
S.O. #: 01-1209
Cust #: CLAR120

Inv Date : 02/15/02
P.O. #: FORBES/MIR
Ship Via :

INVOICE TO:

Claremont Unified School Dis
Attn: John Kettle
2080 N.Mountain Avenue
Claremont, CA 91711

SHIP TO:

Terms: Due Upon Reciept

Quantity	Description	Price/Rate	Amount
	Soils & Engineering Geologic Services to Evaluate the New Grade K-12 Classroom Buildings, Amphitheater, Parking Areas & Future Structures at: SW.Corner of Forbes Ave & Miramar Ave Claremont, California		
1.00	Investigation/Report	10000.000	10000.00
			$ 10000.00

Interest Added at 1 1/2% per Month on Past Due Invoices.

GEOSYSTEMS