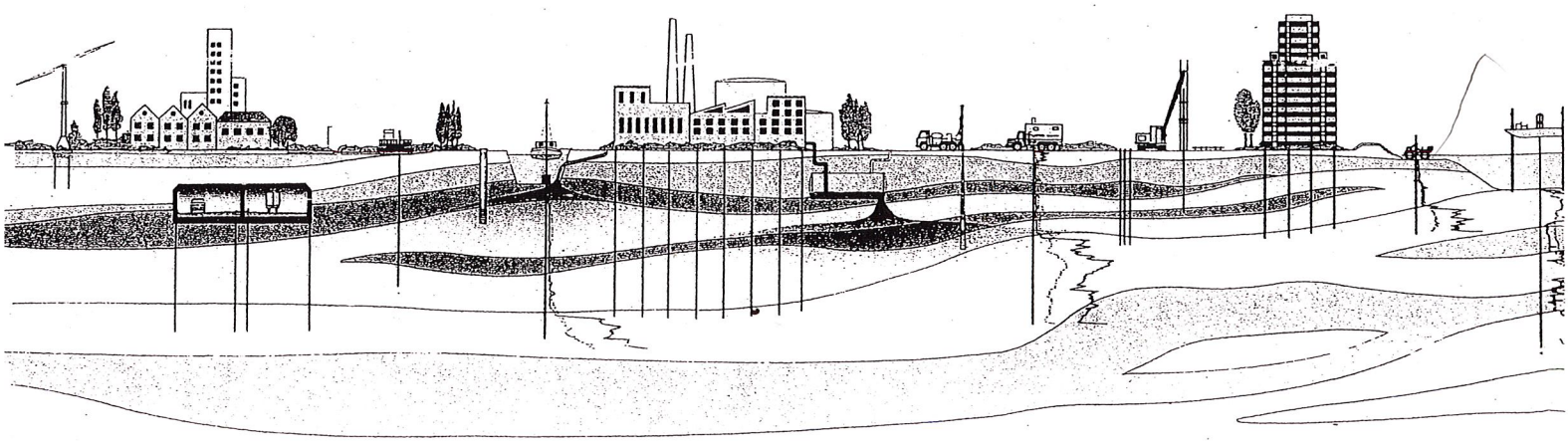
FUGRO WEST, INC.

GEOTECHNICAL DATA REPORT
CENTRAL STATION PROJECT
OAKLAND, CALIFORNIA
PROJECT NUMBER: 1492.001

Prepared for:
Central Station Land, LLC

October 3, 2002



FUGRO WEST, INC.

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Tel: (510) 268-0461
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October 3, 2002
Project No. 1492.001

Central Station Land, LLC
1500 Park Avenue, Suite 200
Emeryville, California 94608

Attention: Mr. Rick Mariano

Subject: Geotechnical Data Report, Central Station Project

Dear Mr. Mariano:

Fugro is pleased to submit this geotechnical data report presenting the results of our field investigation and laboratory-testing program for portions of the Central Station project in Oakland, California.

We appreciate this opportunity to be of continued service to Central Station Land, LLC. Please call if you have any questions regarding the information presented in this report.

Sincerely,

FUGRO WEST INC.

REGISTERED PROFESSIONAL ENGINEER
ARIYAPUTHIRAR BALAKRISHNAN
NO. C63109
Exp. 6/30/06
CIVIL
STATE OF CALIFORNIA

Bala A. Balakrishnan, Ph.D., P.E.
Project Engineer

Robin Bartlett, PE, GE
Associate Engineer

AB:RB/kel

Copies Submitted: (4)

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PLATES

APPENDICES

1.0 INTRODUCTION

This data report presents the results of a geotechnical field investigation and laboratory-testing program by Fugro West, Inc. (Fugro) for a portion of the Central Station project in Oakland, California. The project is located north of Wood Street between 10th Street and West Grand Overpass in Oakland California, as shown on the Vicinity Map, Plate 1.

1.1 PROJECT DESCRIPTION

The Central Station project consists of a series of contiguous lots that extend from 10th Street to West Grand Avenue and are between Wood Street and the Caltrans I-880 right-of-way. We understand that the project will likely involve constructing multi-unit housing developments and parking structures on the majority of the site and self-storage facilities on the southwest side of the site.

Most of our recent investigation was confined to the area that is approximately bounded by Wood Street to the south, the existing abandoned railroad station building to the west, the Caltrans right-of-way to the north and West Grand Avenue to the east as indicated on Plate 2. In addition, we performed a limited investigation of the "self-storage/panhandle" area is located between 10th Street and 13th Street along the Caltrans I-880 right-of-way as indicated on Plate 3.

1.2 SCOPE OF SERVICES

The purpose of our geotechnical field investigation and laboratory-testing program was to obtain information on subsurface conditions for use in evaluating the geotechnical aspects of the project. The scope of our services performed for this phase of work included:

- Compiling and reviewing available existing geotechnical data for the project area.
- Performing a field investigation (including drilled borings and cone penetration tests) and laboratory-testing program to supplement the available information on subsurface conditions for the eastern portion of the project.
- Performing limited cone penetration testing (CPT) to identify the subsurface conditions for the proposed "self-storage/panhandle" area of the project.
- Preparing this geotechnical data report, which presents the results of our geotechnical field investigation and laboratory testing.

2.0 REVIEW OF EXISTING DATA

Prior to performing our field investigation and laboratory testing, Fugro reviewed pertinent boring logs from Caltrans for the I-880 freeway and relevant geologic information and aerial photographs contained in our files. All of the Caltrans borings were on the north portion of the project site. The results of our review indicates that the north portion of the project area is characterized by non-uniform fill overlying marsh deposits and Bay Mud which in-turn overlies

alluvial deposits, and the south portion characterized by alluvial deposits with no Young Bay Mud or marsh deposits.

The locations of the Caltrans borings that are closest to the project site are presented on Plates 2 and 3. The subsurface conditions encountered in these previous borings are included in the cross-sections on Plates 6 to 10.

3.0 FIELD INVESTIGATION AND LABORATORY TESTING

The field investigation and laboratory-testing program described herein was developed to provide general characterization of the subsurface materials and obtain data for evaluation of surcharge options for preparation of the site.

3.1 FIELD INVESTIGATION

The field investigation program was conducted in two separate areas, one on the eastern portion of the project site and other in the "self-storage/panhandle" area. In eastern portion, four borings and ten CPTs were conducted between on July 10 and July 11, 2002. The borings, designated B-1 through B-4, were drilled with a truck-mounted drill rig using rotary wash drilling methods and extended from depths of approximately 42 to 52 feet. The CPTs, designated CPT-1 through CPT-10, extended to depths ranging from 50 to 82 feet. In the "self-storage/panhandle" area, three CPTs, designated CPT-11 to CPT-13, were conducted on August 2, 2002. Each of these CPTs extended to a depth of 40 feet. The approximate locations of the borings and CPTs are shown on the site plans, Plates 2 and 3.

Logs of the borings and CPTs, and details regarding the field explorations together with copy of logs from the relevant Caltrans borings and CPTs are included in Appendix A. The subsurface conditions encountered in the borings and CPTs are summarized in Section 4.0 below.

3.2 LABORATORY TESTING

The soil samples retrieved in the borings were further examined in Fugro's laboratory to confirm field classifications and to select samples for geotechnical laboratory testing. Tests performed included moisture content and dry density, particle-size analysis, consolidation tests, and unconsolidated-undrained triaxial shear strength (TXUU). The laboratory test results are presented in Appendix B and on the boring logs at the appropriate sample depths.

4.0 SITE AND SUBSURFACE CONDITIONS

4.1 SITE GEOLOGY

The site lies within the California Coast Range geomorphic province. Basement rocks in the project vicinity consist of the late Jurassic and Cretaceous age Franciscan Group. The Franciscan Group is a tectonic mixture of intensely deformed sedimentary, volcanic, and metamorphic rocks including serpentinite. The San Francisco Bay sits within a broad depression

in the Franciscan bedrock resulting from an east-west extension between the San Andreas and the Hayward fault systems. The bedrock surface could lie approximately 400 to 500 feet deep in the study area. The surface geology has been mapped by numerous researchers, and consists of artificial fill (overlying Young Bay Mud) and Merritt Sand as shown on the Geologic Map, Plate 4.

4.2 SEISMICITY

The site is located in a seismically active area of Northern California and is likely to be subject to strong ground shaking during the life of the facility. The site is not within a special Studies Zone (Alquist-Priolo Zone). The known active faults mapped closest to the site are summarized below:

Regional Faults and Seismicity[1]

Fault	Approximate Distance from Site	Direction from Site	Maximum Moment Magnitude	Fault Type
Hayward (north segment)	6.7 km (4.2 mi)	Northeast	7.1	A
San Andreas (peninsula segment)	23.1 km (14.3 mi)	Southwest	7.9	A
Calaveras (north segment)	23.4 km (14.5 mi)	Southeast	6.8	B
San Gregorio	28.1 km (17.5 mi)	Southwest	7.3	A
Concord – Green Valley	28.4 km (17.7 mi)	Northeast	6.9	B
Rodgers Creek	30.3 km (18.8 mi)	North	7	A

Earthquakes on these or other smaller or more distant faults could cause strong ground shaking at the site. Earthquake intensities vary throughout the Bay Area depending upon the magnitude of the earthquake, the distance of the site from the causative fault, the type of materials underlying the site, and other factors.

4.3 SURFACE CONDITIONS

At the time our investigation the site was primarily undeveloped with the exception of a few minor structures. Two railroad spurs cross the eastern area and a concrete crushing and

[1] Maximum Moment Magnitude and Fault Type are based on 1997 UBC designations.

processing area was in operation on the northeastern half of the eastern area. There was little vegetation at the site.

4.4 SUBSURFACE CONDITIONS

Prior to performing our field investigation, we roughly divided the entire Central Station site into three areas based on anticipated soil conditions (based on geologic and existing data) as follows and as indicated on the Historical Map, Plate 5:

1. Area 1 – Area 1 is the southeastern portion of the site that is east of the historic San Francisco Bay. We anticipate that this area is underlain by loose to dense sands of the Merritt and San Antonio Formations.

2. Area 2 – Area 2 is to the west of the historic shoreline. This area is underlain by man-made fill that is between likely between 5 to 10 feet thick. The fill is underlain by Young Bay Mud and loose marine sand. Previous borings near the site performed by Caltrans and our recent limited investigation indicate that the Young Bay Mud is likely between 3 to 20 feet thick and is underlain by the Merritt Sand and/or San Antonio Formation.

3. Area 3 – Area 3 is located on the eastern side of the site in an historic wetlands area. The subsurface conditions in this area are characterized by man-made fill overlying marsh deposits that consist of Young Bay Mud, loose sands and soft organic rich soils. The fill in this area is likely between 5 to 10 feet thick and could be locally deeper in historic channel or slough areas. The thickness of Young Bay Mud likely between 10 to 40 feet, which are underlain by predominantly alluvial soils of the San Antonio Formation.

Our current investigation was primarily conducted in the eastern portion of the site within the zone previously defined as Area 1 with a limited investigation being performed in the "self-storage/panhandle" in the zone previously defined primarily as Area 2. During this investigation, the subsurface explorations performed at the project site encountered four main strata units. These units from ground surface down are, fill, Young Bay Mud (YBM), Firm Sedimentary Deposits (FSD), and deposits of Merritt and San Antonio Formation (M/SA). Idealized subsurface profiles taken along 5 different sections are presented on Plates 6 through 10.

The subsurface conditions encountered in the eastern portion indicate that the near surface fill materials generally consist of silty or clayey sand and thin layers of gravel and typically extends to a depth of 3 to 6 feet. The fill is underlain by soft to medium stiff fat clay called YBM. The thickness of YBM generally ranges from 18 to 35 feet with thicker layer near B-1 and CPT-5. In B-4, approximately 8-feet thick very soft organic clay layer was encountered at the bottom of YBM layer. Underlying YBM is a stiff sandy fat clay material called FSD with the maximum thickness of approximately 12 feet. The FSD is underlain by Merritt and/or San Antonio Formations (M/SA), extends to the maximum depth of our explorations. The Merritt Formation contains loose to dense sand material and the San Antonio Formation contains alternate layers of lean clay or clayey sand and sand.

The subsurface conditions on self-storage area generally consist of about 5 to 6 feet thick fill material on top of marine deposits/Young Bay Mud which includes sands, silts and clays. The thickness of marine deposits in the self-storage area ranges from 2 to 4 feet. The marine deposit on the self-storage area is significantly less compared to YBM thickness on the eastern portion of the project. Below the marine deposit is the Merritt and/or San Antonio Formation as encountered on the eastern portion of the project.

4.5 GROUNDWATER

Groundwater was encountered in one of the borings at depths of about 4 feet at the time of drilling, corresponding to about Elevation 0 feet, City of Oakland datum. Groundwater levels recorded in the Caltrans borings are in the same range. When measuring the water depth, the borings may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. In addition, fluctuations in the groundwater level should be anticipated due to seasonal variations and other factors.

5.0 LIMITATIONS

Our services consist of professional opinions, conclusions, and recommendations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The analyses and recommendations contained in this report are based on the data obtained from the four borings and thirteen cone penetration tests, which were performed for this study, as well as previous explorations by Caltrans. These explorations indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. Variations may exist and conditions not observed or described in this report could be encountered during construction. Our conclusions and recommendations are based on our analysis of the observed conditions. If conditions other than those described in this report are encountered, we should be notified so that we can provide additional recommendations, if warranted.

This report has been prepared for the exclusive use of Central Station Land, LLC and their consultants for specific application to the Central Station Project as described herein. In the event that there are any changes in the ownership, nature, design, or location of the proposed

project, or if any future additions are planned, the conclusions and recommendations contained in this report should not be considered valid unless (1) the project changes are reviewed by Fugro, and (2) conclusions and recommendations presented in this report are modified or verified in writing. Reliance on this report by others must be at their risk unless we are consulted on the use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practices, or regulations subsequent to performance of services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for unconsulted use of segregated portions of this report.

PLATES

NOTE:

This Vicinity Map Is Based On A Thomas Guide Map For San Francisco, Alameda And Contra Costa Counties, California, Map 649, YEAR 2000

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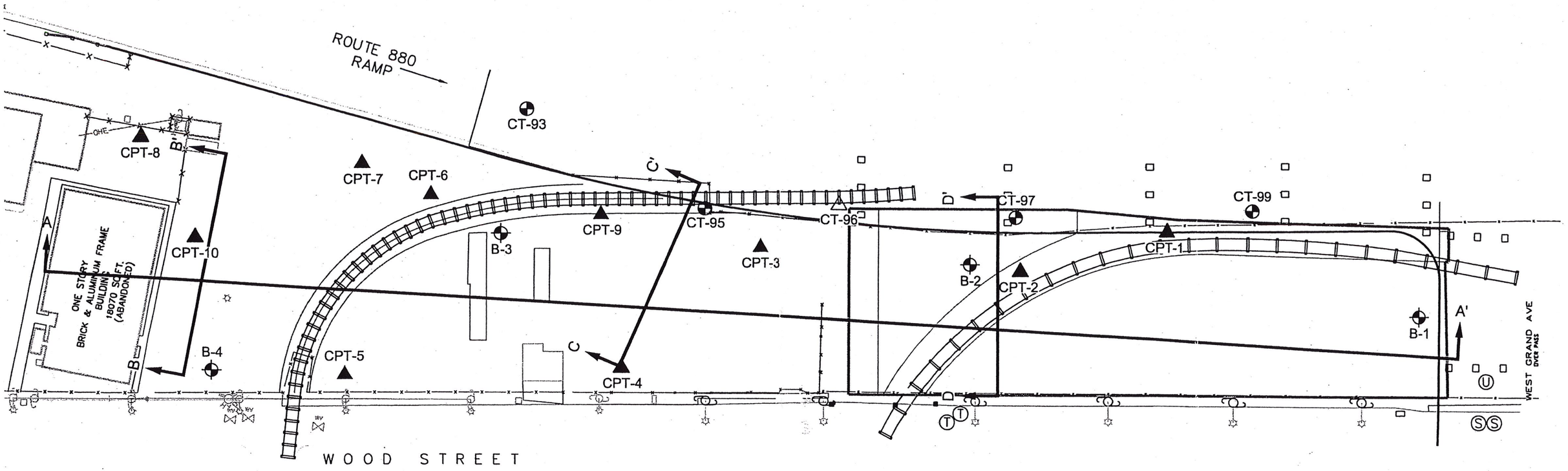
SITE MAP
Central Station
Oakland, California

PLATE 1



LEGEND

CT-97	APPROXIMATE LOCATION OF CALTRANS BORING
CT-96	APPROXIMATE LOCATION OF CALTRANS CONE PENETROMETER TEST
B-2	APPROXIMATE LOCATION OF FUGRO BORING
CPT-3	APPROXIMATE LOCATION OF FUGRO CONE PENETROMETER TEST

NORTH

0 100 200
FEET

SITE PLAN FOR INITIAL INVESTIGATION
Central Station
Oakland, California

BASE MAP SOURCE: This Site Plan is Adated From A Drawing Titled "Overall Survey For Holiday Developement, LLC," Produced by Slooten Consulting, Inc., Dated 9/28/02, Job Number 6540.

PLATE 2

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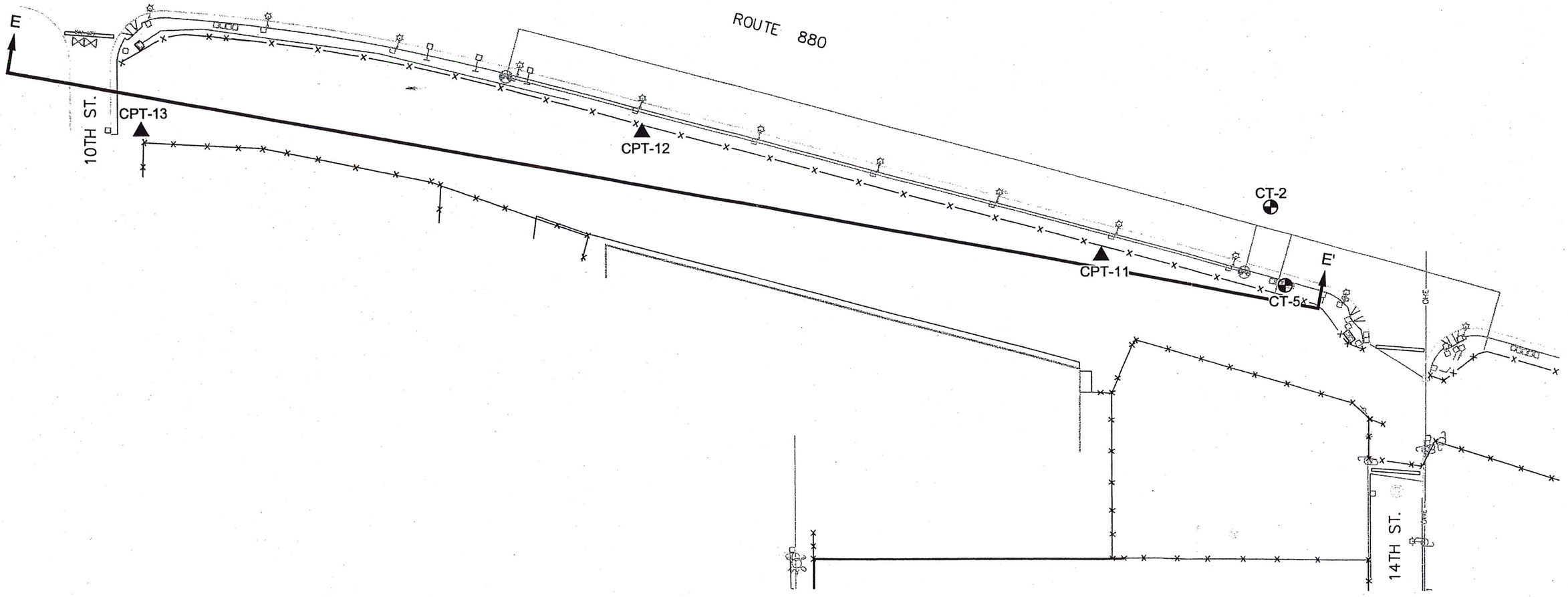

LEGEND

▲ CPT-11 — APPROXIMATE LOCATION OF FUGRO CONE PENETROMETER TEST

⊕ CT-2 — APPROXIMATE LOCATION OF CALTRANS BORING

SITE PLAN FOR SELF-STROAGE AREA INVESTIGATION
Central Station
Oakland, California

BASE MAP SOURCE: This Site Plan is Adated From A Drawing Titled "Overall Survey For Holiday Developement, LLC," Produced by Slooten Consulting, Inc., Dated 9/28/02, Job Number 6540.

PLATE 3

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CPT-6
98 ft, West

B-3
63 ft, West

CPT-9
89 ft, West

CPT-4
67 ft, East

CT-95
102 ft, West

CPT-3
65 ft, West

B-2
61 ft, West

CT-97
111 ft, West

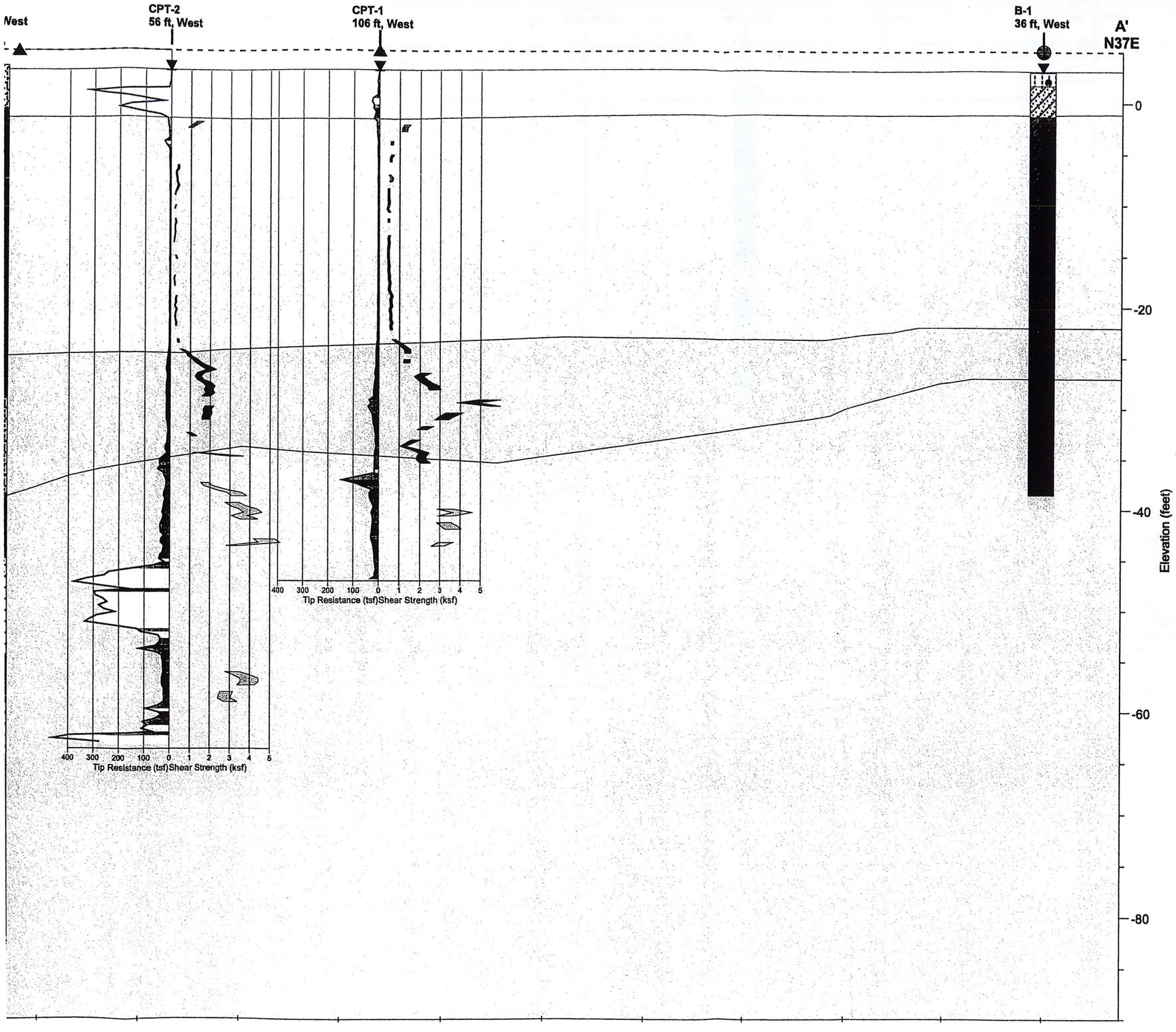
CPT-
56 ft

400 300 200 100 0 1 2 3 4 5
Tip Resistance (tsf)Shear Strength (ksf)

400 300 200 100 0 1 2 3 4 5
Tip Resistance (tsf)Shear Strength (ksf)

400 300 200 100 0 1 2 3 4 5
Tip Resistance (tsf)Shear Strength (ksf)

400 300 200 100
Tip Resistance (ts



FUGRO

NOTES:

1) The soil stratigraphy shown is approximate. Actual conditions may vary from those shown.

10ft

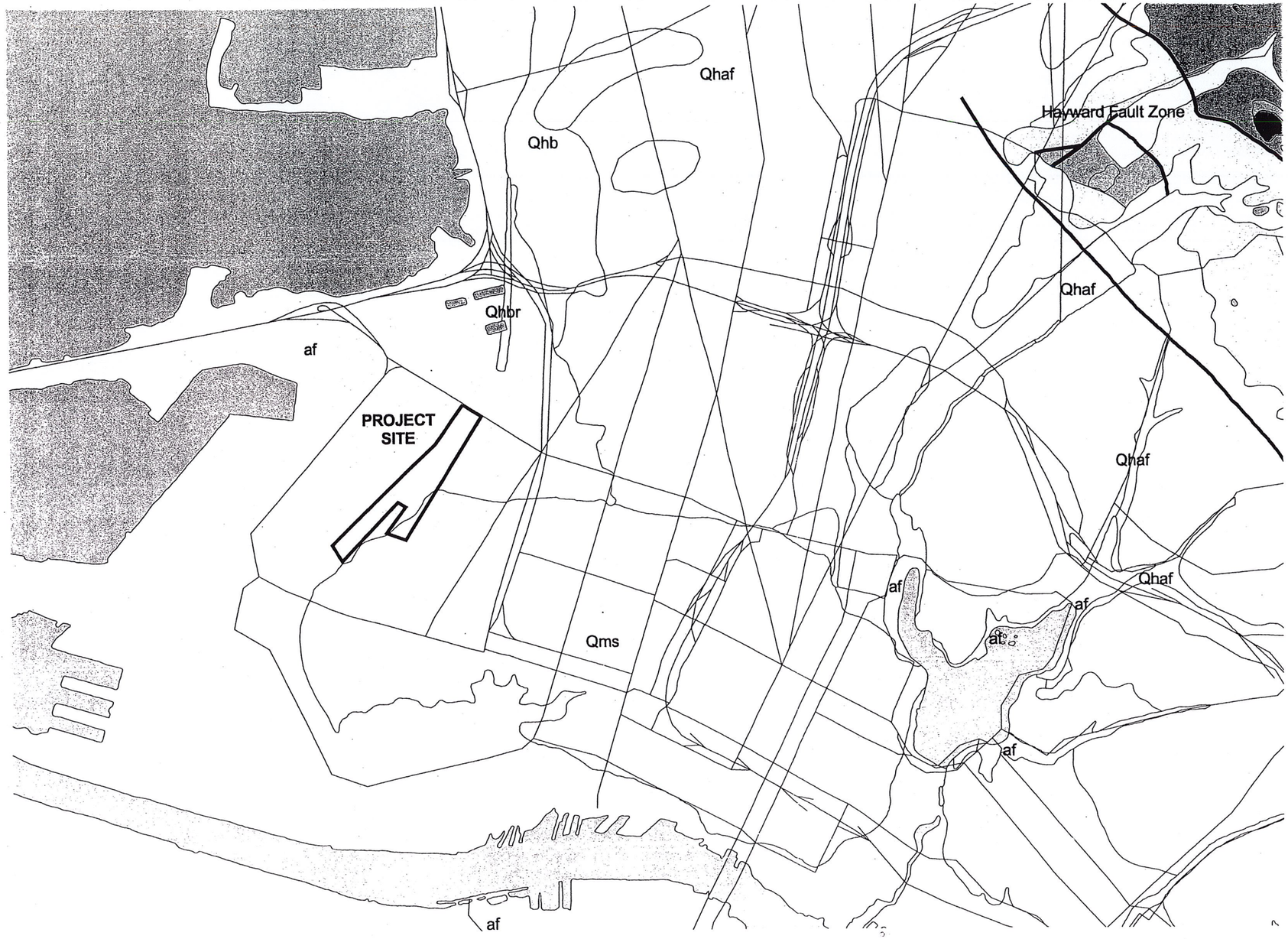
40ft

KEY TO STRATA UNITS

FILL	Artificial Fill
YBM	Young Bay Mud
FSD	Firm Sedimentary Deposits
MSA	Merritt and San Antonio Formation

CROSS SECTION A - A'

PLATE 6



KEY TO GEOLOGIC UNITS

af	Artificial Fill (Historic)
Qhaf	Alluvial fan and fluvial deposits (Holocene)
Qms	Merritt sand (Holocene and Pleistocene)
Qhbr	Beach ridge deposits (Holocene)
Qhb	Basin deposits (Holocene)
	Fault

NOTES:

1) The geologic data has been extracted from "Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California," by R.W. Graymer, 2000.

GEOLOGIC MAP

PLATE 4

FUGRO

B S44E

B-4
31 ft, East

CPT-10
14 ft, West

CPT-8
90 ft, West

B' N44W

Elevation (feet)

0
-20
-40
-60

Tip Resistance (tsf) Shear Strength (ksf)

200 150 100 50 0 1 2 3 4 5

NOTES:

1) The soil stratigraphy shown is approximate. Actual conditions may vary from those shown

10ft
20ft

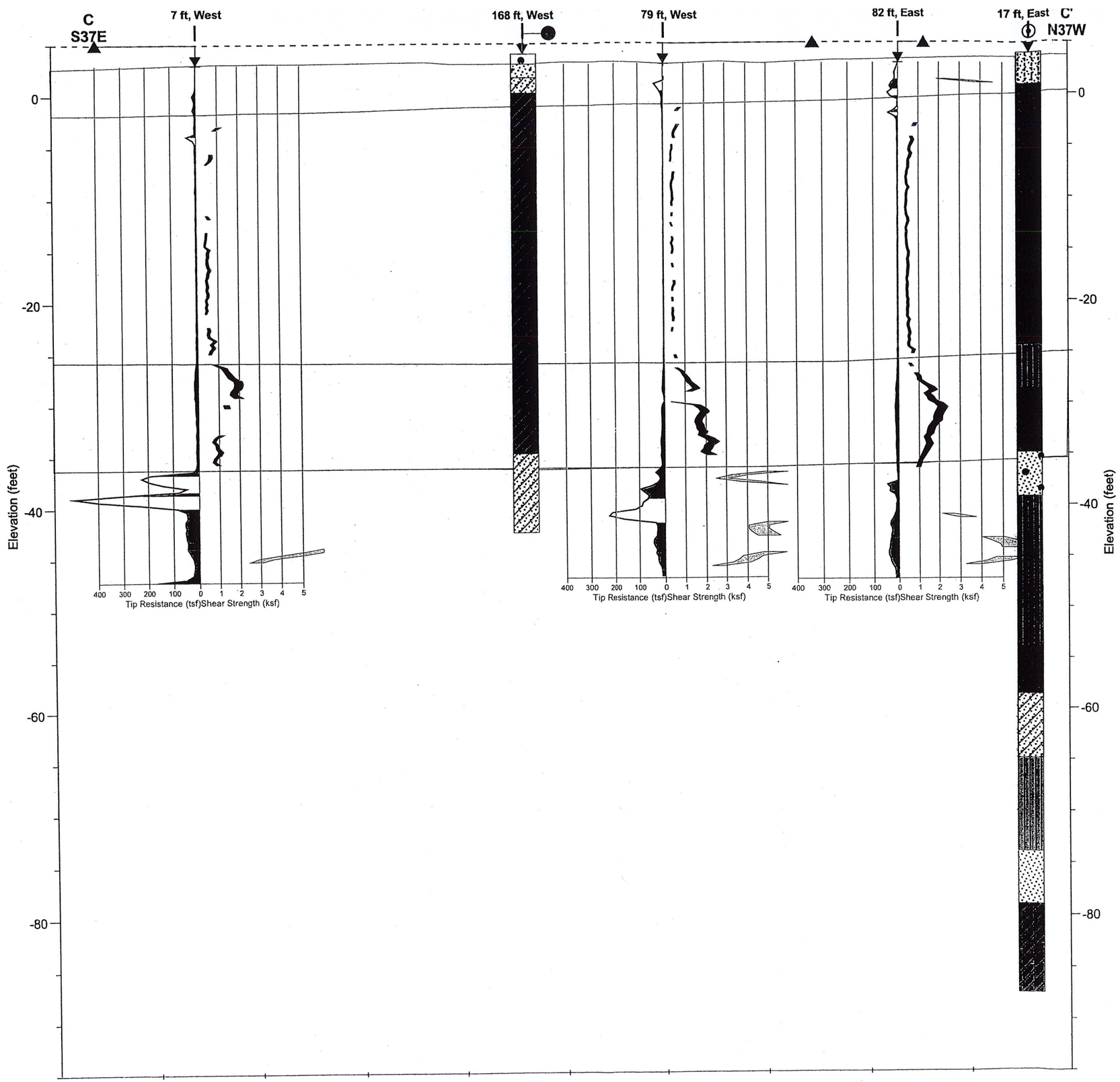
KEY TO STRATA UNITS

FILL	Artificial Fill
YBM	Young Bay Mud
FSD	Firm Sedimentary Deposits
	Merritt and San Antonio Formation

CROSS SECTION B - B'

PLATE 7

Central Station
Project No. 1492.001



NOTES:

1) The soil stratigraphy shown is approximate. Actual conditions may vary from those shown.

10ft

20ft

KEY TO STRATA UNITS

FILL	Artificial Fill
YBM	Young Bay Mud
FSD	Firm Sedimentary Deposits
	Merritt and San Antonio Formation

CROSS SECTION C - C'

PLATE 8

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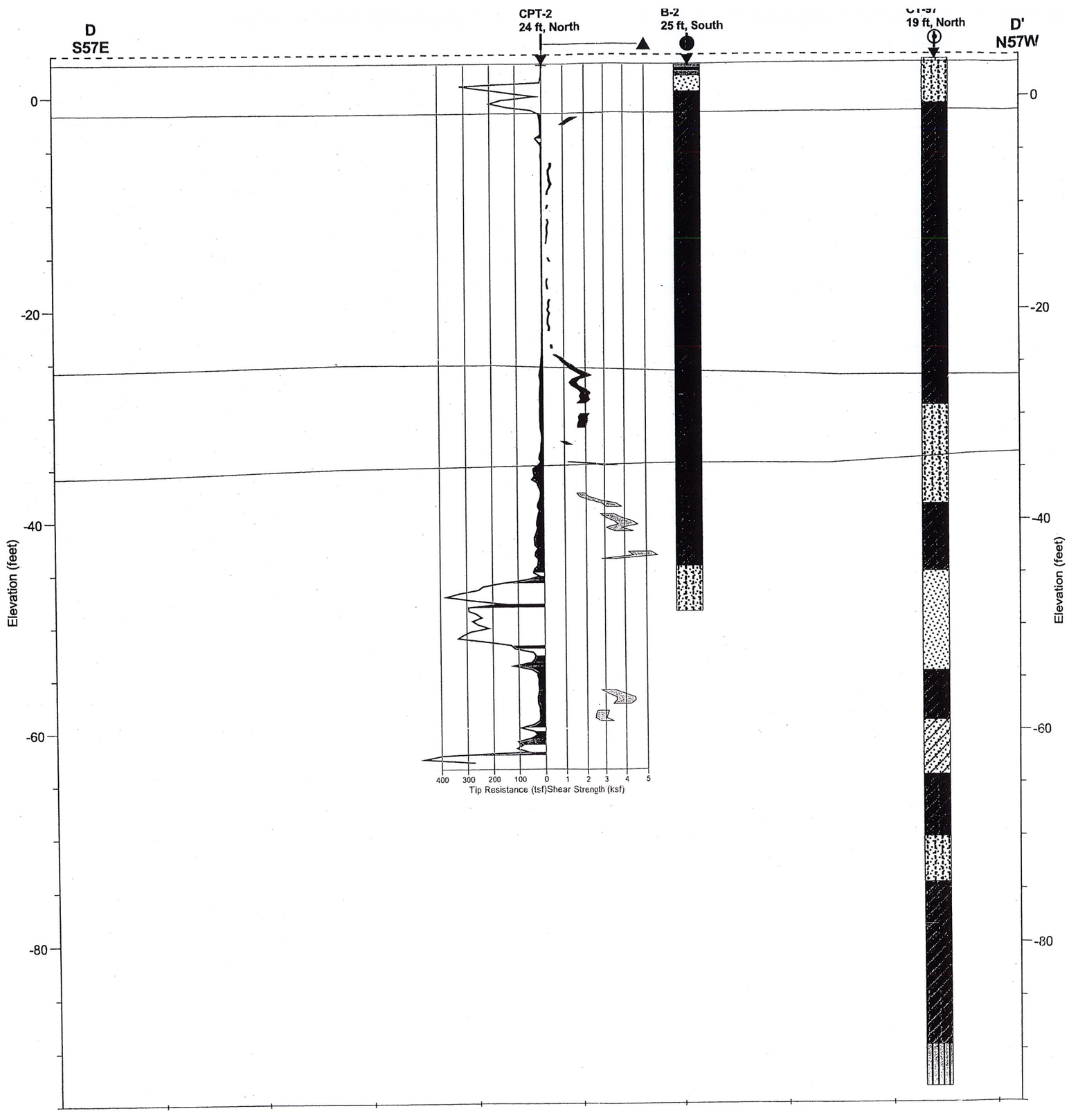
Central Station
Project No. 1492.001



NOTES:

1) The soil stratigraphy shown is approximate. Actual conditions may vary from those shown.

10ft
20ft

KEY TO STRATA UNITS

FILL	Artificial Fill
YBM	Young Bay Mud
FSD	Firm Sedimentary Deposits
	Merritt and San Antonio Formation

CROSS SECTION D - D'

PLATE 9

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Central Station
Project No. 1492.001

E
S45W

E'
N45E

CPT-13
49 ft, East

CPT-12
42 ft, West

CPT-11
8 ft, West

CT-2
88 ft, West

CT-5
16 ft, West

Tip Resistance (tsf)Shear Strength (ksf)

Elevation (feet)

0
-20
-40
-60
-80
-100
-120

20ft
100ft

NOTES:

1) The soil stratigraphy shown is approximate. Actual conditions may vary from those shown.

KEY TO STRATA UNITS

FILL	Artificial Fill
YBM	Young Bay Mud
FSD	Firm Sedimentary Deposits
	Merritt and San Antonio Formation

CROSS SECTION E - E'

PLATE 10

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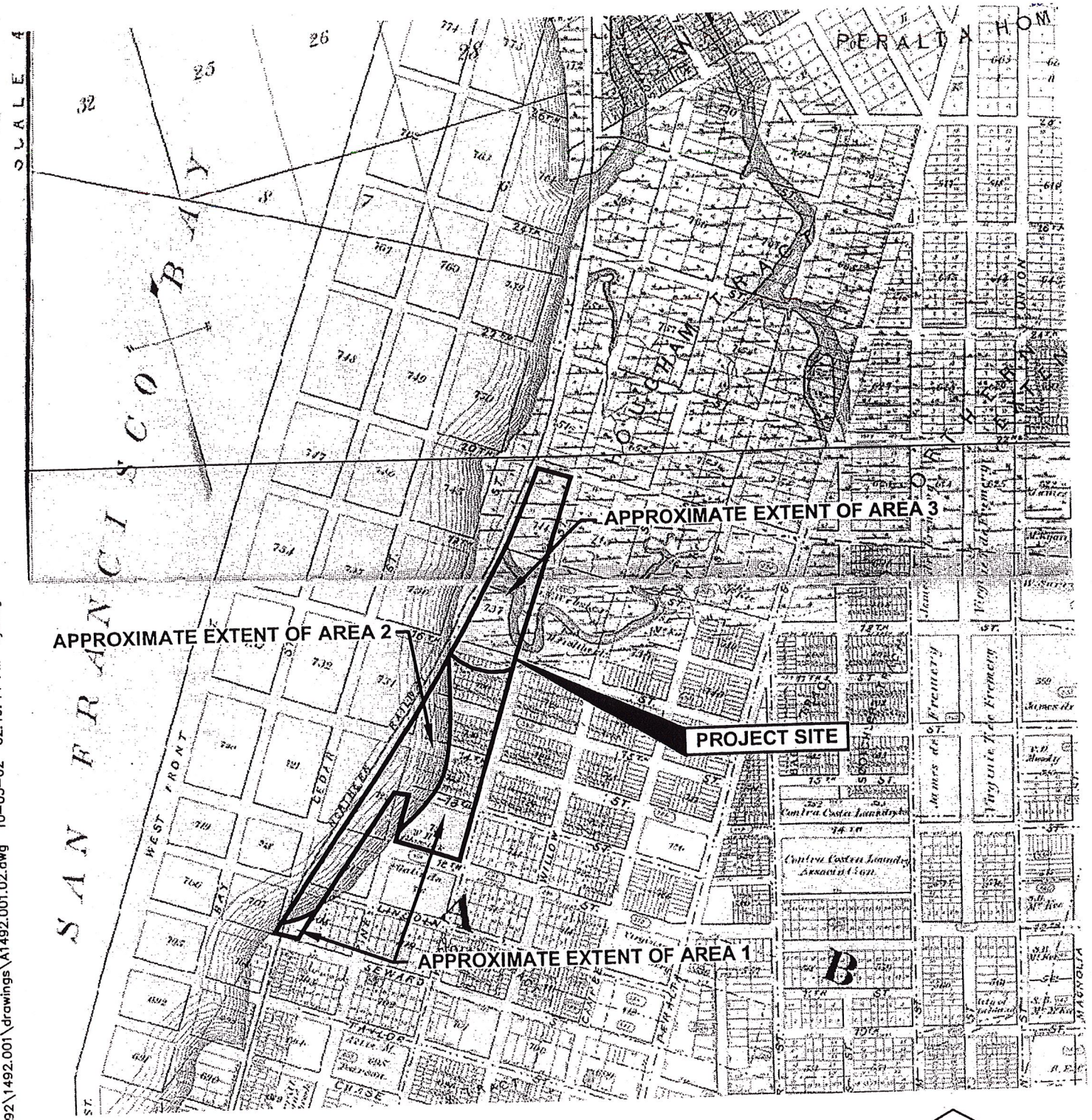
FUGRO



NOTE:

This Map is Adapted from A Historical Atlas of Alemeda County, Tompson & West, 1858.

NORTH

NOT TO SCALE

HISTORICAL MAP (1858)
Central Station
Oakland, California

PLATE 5

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APPENDIX A
FIELD EXPLORATIONS

APPENDIX A
FIELD EXPLORATIONS

Our field explorations consisted of four borings designated Borings B-1 through B-4, and 13 cone penetration tests designated CPT-1 through CPT-13. The Borings were done by Pitcher drilling Company and CPTs were conducted by Gregg In-Situ, Inc. The detail of the drilled borings and the presentation of CPT data prepared by Gregg in situ Inc. are presented here.

The borings were drilled with a Mud Rotary Wash drill rig and extended to maximum depths ranging from 42 to 52 feet below the ground surface. Upon completion of our field explorations, the borings were backfilled with neat cement grout. The approximate locations of the borings are shown on the Site Plan, Plate 2. The soils encountered in the borings were logged in the field by our representative. The soils are described in accordance with the Unified Soil Classification System (ASTM D2487). The logs of the borings, as well as a key for the classification of the soil (Plate A-1), are included as part of this appendix.

Representative soil samples were obtained from the borings at regular intervals using a Modified California split-barrel drive sampler (outside diameter of 3.0 inches, inside diameter of 2.5 inches), a Standard Penetration Test (SPT) split-barrel drive sampler (outside diameter of 2.0 inches, inside diameter of 1.375 inches) and a Shelby Tube thin-wall sampler (diameter of 3.0 inches). All samples were transmitted to our laboratory for evaluation and appropriate testing. In the field, our field engineer visually examined the samples and measured soil strengths using pocket penetrometer. These strength measurements were converted to shear strength values and included in our boring logs.

Resistance blow counts were obtained with the samplers by dropping a 140-pound hammer through a 30-inch free fall using a rope and cathead system. The sampler was driven 18 inches, and the number of blows was recorded for each 6 inches of penetration. The blows per foot recorded on the boring logs represent the accumulated number of blows that were required to drive the last 12 inches. When the split-spoon sampler was used, these blow counts are the standard penetration resistance values (N values). However, due to the larger diameter of the Modified California sampler, the blow counts recorded for this sampler are not standard penetration resistance values. The Shelby sampler was pushed into the ground by hydraulic pressure.

Groundwater was encountered in one of the boring (B-3) at the time of drilling at depths of about 4 feet, corresponding to Elevation 0 feet with the city of Oakland datum.

The attached boring logs and related information show our interpretation of the subsurface conditions at the dates and locations indicated, and it is not warranted that they are representative of subsurface conditions at other locations and times.

SOIL TYPES


Well graded GRAVEL (GW)


Poorly graded GRAVEL (GP)


GRAVEL with sand (GP or GW)


GRAVEL with clay (GP or GW)


Clayey GRAVEL (GC)


GRAVEL with silt (GP or GW)


Silty GRAVEL (GM)


Well graded SAND (SW)


Poorly graded SAND (SP)


SAND with gravel (SP or SW)


SAND with clay (SP-SC)


Clayey SAND (SC)


Silty SAND (SM)


SAND with silt (SP-SM)


Fat CLAY(CH)


Sandy fat CLAY (CH)


Lean CLAY (CL)


Sandy lean CLAY (CL)


Silty CLAY (CL-ML)


Elastic SILT (MH)


SILT (ML)


Sandy SILT (ML)


Clayey silt (ML/CL)


Highly plastic ORGANICS (OH)


Low plasticity ORGANICS (OL)


SANDSTONE (Rx)


SILTSTONE (Rx)


CLAYSTONE (Rx)


Interbedded Rock Strata (Rx)


CONGLOMERATE (Rx)


PAVEMENT

WATER LEVEL SYMBOLS

- Initial or perched water level
- Final groundwater level
- Seepages encountered

SAMPLERS


Thin-Walled 3-inch Tube


2-1/4-inch Driven Tube


Modified California Liner


SPT


Bulk Bag


Rock Core (Interior symbol represents percent recovery)

TUBE AND LINER SAMPLERS

PUSH	Pushed thin-walled 3" tube.

SPT AND MODIFIED CALIFORNIA LINER SAMPLERS

Samplers were driven with a 140-pound above- deck hammer dropped approximately 2-1/2 feet.

20	Number of blows to produce 12" of penetration after the initial 6" of seating.
86/11"	Number of blows required to produce the indicated penetration after an initial 6" seating.
Ref/3"	50 blows produced the indicated penetration during the initial 6" interval.

STRENGTH OF COHESIVE SOILS

Consistency	SPT Blow Counts
Very Soft	> 2
Soft	2 to 4
Medium Stiff	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	> 30

DENSITY OF GRANULAR SOILS

Descriptive Term	SPT Blow Counts
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	> 50

KEY TO TERMS AND SYMBOLS USED ON LOGS

Central Station

BORING:	B-1 (OE02B001)	LOGGED BY:	Fugro	DRILLING METHOD:	Wet Rotary Wash
COMPLETION DEPTH:	41.5 ft.	START DATE:	7/10/2002	TYPE HAMMER:	Rope and Cathead
DEPTH TO WATER:	Unknown	COMPLETION DATE:	7/10/2002	HAMMER WEIGHT:	140
BACKFILLED WITH:	Cement Bentonite Grout	DRILLER:	Pitcher Drilling Co.	DROP HEIGHT:	30 inches

ELEVATION, ft. / DEPTH, ft.	SOIL TYPE	SAMPLE NO.	SAMPLER	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR, Su, ksf
					GROUND ELEVATION: 3 FT (City of Oakland)							
0		2 3		42 11	Silty GRAVEL with sand (GM), brown, dense, dry, fine to coarse with fine to coarse drained sand (FILL) (4.3')							
		4		3	Clayey SAND with gravel (SC), brown to black, loose, dry to moist, fine to coarse grains (4.3')	102	66	55				JU0.50
10		5		PUSH	Fat CLAY (CH), gray to dark gray, soft, with organics and seashell fragments (Young Bay Mud)							
10		6 7		1		91	47	93				
20				0	(24')							
20		8 9		22	Sandy fat CLAY (CH) with dark gray pockets, bluish gray, stiff, fine grained sand (29')	125	101	24				PP1.30
30		10 11		19	Lean CLAY with sand (CL), yellowish brown, stiff	95	73	30				PP1.80 JU0.38
30		12 13		14		123	96	29				PP1.00
					Lean CLAY (CL), light olive brown, very stiff							
40		14 15		35	TOTAL DEPTH: 41.5' BACKFILLED WITH: Cement Bentonite Grout							
40												
50												
50												
60												
60												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

LOG OF BORING B-1
Central Station

Report Date: 09/26/02

Project No. 1492.001
Central Station

FUGRO

BORING:	B-2 (OE02B002)	LOGGED BY:	Fugro	DRILLING METHOD:	Wet Rotary Wash
COMPLETION DEPTH:	51.6 ft.	START DATE:	7/10/2002	TYPE HAMMER:	Rope and Cathead
DEPTH TO WATER:	Unknown	COMPLETION DATE:	7/10/2002	HAMMER WEIGHT:	140
BACKFILLED WITH:	Cement Bentonite Grout	DRILLER:	Pitcher Drilling Co.	DROP HEIGHT:	30 inches

GROUND ELEVATION: 3 FT (City of Oakland)

SAMPLE NO.	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR, Su, ksf
1	60	CONCRETE and fine gravel (FILL) (1')							
2	55	Poorly graded SAND (SP), and Fat CLAY (CH), black, medium dense, stiff, dry, fine to medium grained, some brick fragments (FILL) (2.5')	137	122	13				
3	3	Gravelly CLAY with sand (CL), dark gray with brown mottling, very stiff, dry, with fine gravel and sand (5')	99	61	64				UU0.36
4	PUSH	Fat CLAY (CH), gray with dark gray, soft with minor sand lenses (Young Bay Mud)							
5 / 6	2	-with some orange mottling at 15.5'	91	49	87				
7 / 8	0		91	48	92				
9 / 10	3	-with organics and coarse sand at 26' (31')	87	43	101				
11	PUSH	Sandy Fat CLAY (CH), bluish gray, stiff, fine to coarse sand, trace fine to coarse gravel							
12 / 13	15	(37.8')							PP1.40
14	20	Fat CLAY (CH), gray to dark gray, medium stiff to stiff, with organics (43')	118	91	31				PP1.00
15 / 16	33	Lean CLAY (CL), olive with light brown, stiff, with trace fine to coarse sand (47.3')							PP1.00
17	51	Silty SAND, bluish gray, dense, fine grained				31			

TOTAL DEPTH: 51.6' BACKFILLED WITH: Cement Bentonite Grout

DEPTH, ft.: 10, 20, 30, 40, 50, 60
ELEVATION, ft.: 0, -10, -20, -30, -40, -50, -60

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

LOG OF BORING B-2
Central Station

Report Date: 09/26/02

FUGRO

BORING:	B-3 (OE02B003)	LOGGED BY:	Fugro	DRILLING METHOD:	Wet Rotary Wash
COMPLETION DEPTH:	46.5 ft.	START DATE:	7/11/2002	TYPE HAMMER:	Rope and Cathead
DEPTH TO WATER:	4 ft.	COMPLETION DATE:	7/11/2002	HAMMER WEIGHT:	140
BACKFILLED WITH:	Cement Bentonite Grout	DRILLER:	Pitcher Drilling Co.	DROP HEIGHT:	30 inches

GROUND ELEVATION: 4 FT (City of Oakland)

ELEVATION, ft.	DEPTH, ft.	SAMPLE NO.	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR, Su, ksf
		1	50/5"	(1')							
		2	26	Sandy GRAVEL (GP), light brown, dense, dry, fine, with fine gravel (FILL) (2.3')							
0		3, 4	4	Well graded SAND (SW), brown, medium dense, dry, fine to coarse grained with trace clay and brick fragments (FILL) (3.8') ▽ (4')	108	74	47				
				Clayey SAND (SC), brown with gray and yellowish brown mottling, medium dense, moist to wet, fine to coarse grained fine gravel							
	10	5	PUSH	Fat CLAY (CH), bluish gray to gray, soft, wet, with organics, fine to medium grained sand, seams from 4' to 5.5' (Young Bay Mud)							
-10		6, 7	2		92	49	88				
	20	8, 9	0	with some sand pockets and seashell fragments at 21'	92	50	85				
-20		10, 11	2								
	30	12	PUSH	(31.5') Fat CLAY (CH), dark gray, stiff							
-30		13, 14	18	with some sand at 36.5' (38.8')	113	80	41				UU0.46 PP1.30
	40	15, 16	58	Interlayered SAND (SP) and sandy CLAY (CL), gray, dense to very dense/hard, coarse grained sand with fine gravel							
-40		17, 18	53								
				TOTAL DEPTH: 46.5' BACKFILLED WITH: Cement Bentonite Grout							
	50										
-50											
	60										
-60											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

LOG OF BORING B-3
Central Station

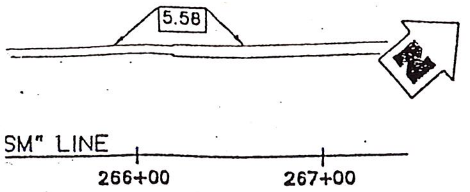
Report Date: 09/26/02

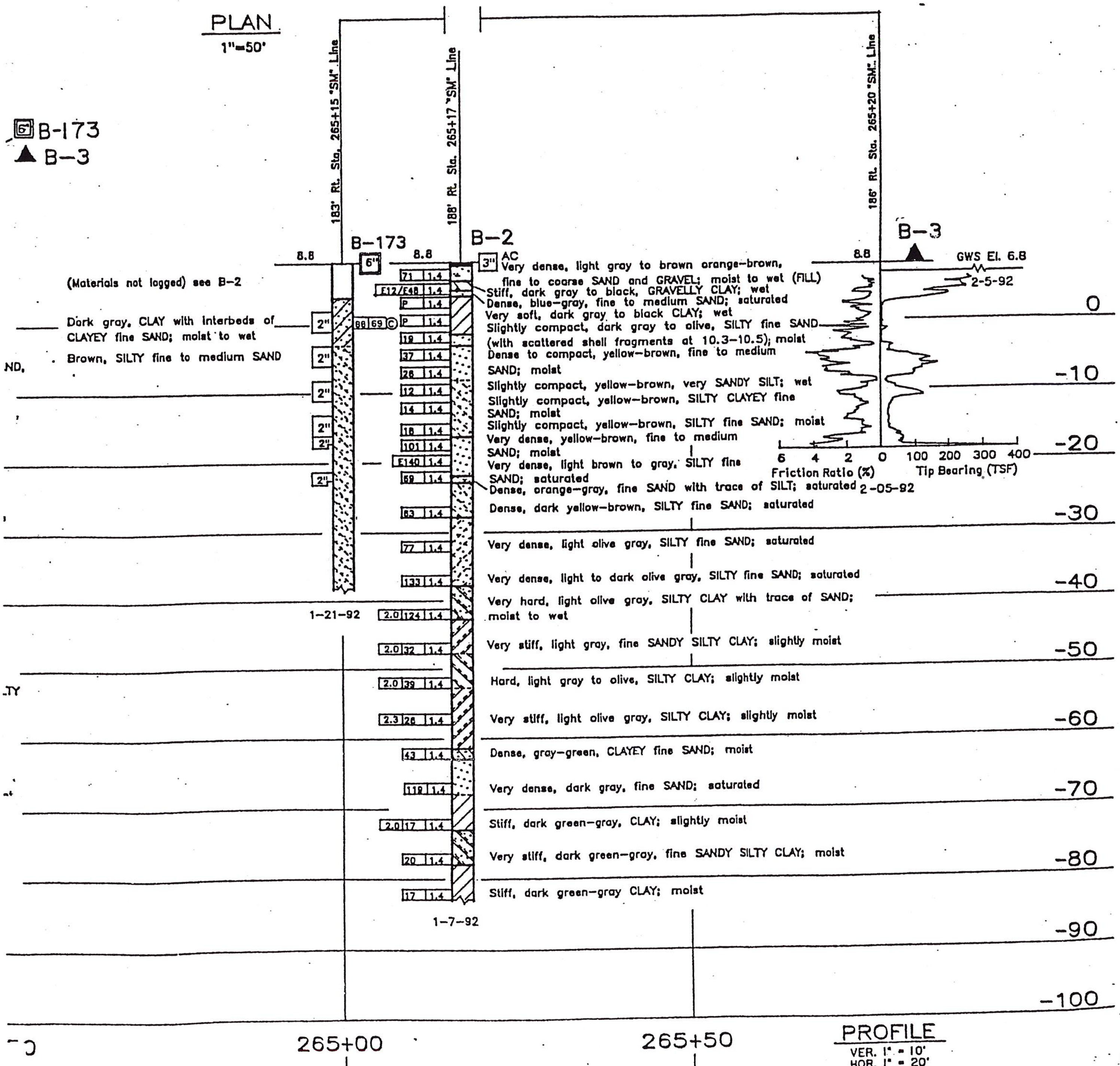
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.
04	Ala	880	34.0/34.3	132

R.C. Wilhelms
CERTIFIED ENGINEERING GEOLOGIST

REGISTERED GEOLOGIST R.C. WILHELMS No. 560 Exp. 8-30-94 CERTIFIED ENGINEERING GEOLOGIST STATE OF CALIFORNIA

8-23-93
PLANS APPROVAL DATE





PLAN
1"=50'
B-173
B-3
183' Rt. Sta. 265+15 "SM" Line
188' Rt. Sta. 265+17 "SM" Line
186' Rt. Sta. 265+20 "SM" Line
B-173
B-2
B-3
8.8
AC
GWS El. 6.8
2-5-92
(Materials not logged) see B-2
Dark gray, CLAY with interbeds of CLAYEY fine SAND; moist to wet
Brown, SILTY fine to medium SAND
Very dense, light gray to brown orange-brown, fine to coarse SAND and GRAVEL; moist to wet (FILL)
Stiff, dark gray to black, GRAVELLY CLAY; wet
Dense, blue-gray, fine to medium SAND; saturated
Very soft, dark gray to black CLAY; wet
Slightly compact, dark gray to olive, SILTY fine SAND (with scattered shell fragments at 10.3-10.5); moist
Dense to compact, yellow-brown, fine to medium SAND; moist
Slightly compact, yellow-brown, very SANDY SILT; wet
Slightly compact, yellow-brown, SILTY CLAYEY fine SAND; moist
Slightly compact, yellow-brown, SILTY fine SAND; moist
Very dense, yellow-brown, fine to medium SAND; moist
Very dense, light brown to gray, SILTY fine SAND; saturated
Dense, orange-gray, fine SAND with trace of SILT; saturated
Dense, dark yellow-brown, SILTY fine SAND; saturated
Very dense, light olive gray, SILTY fine SAND; saturated
Very dense, light to dark olive gray, SILTY fine SAND; saturated
Very hard, light olive gray, SILTY CLAY with trace of SAND; moist to wet
Very stiff, light gray, fine SANDY SILTY CLAY; slightly moist
Hard, light gray to olive, SILTY CLAY; slightly moist
Very stiff, light olive gray, SILTY CLAY; slightly moist
Dense, gray-green, CLAYEY fine SAND; moist
Very dense, dark gray, fine SAND; saturated
Stiff, dark green-gray, CLAY; slightly moist
Very stiff, dark green-gray, fine SANDY SILTY CLAY; moist
Stiff, dark green-gray CLAY; moist
6 4 2 0
Friction Ratio (%)
100 200 300 400
Tip Bearing (TSF)
2-05-92
1-21-92
1-7-92
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
265+00
265+50
PROFILE
VER. 1" = 10'
HOR. 1" = 20'

State of
CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN

BRIDGE NO. 33-611 R/L
POST MILE 34.0

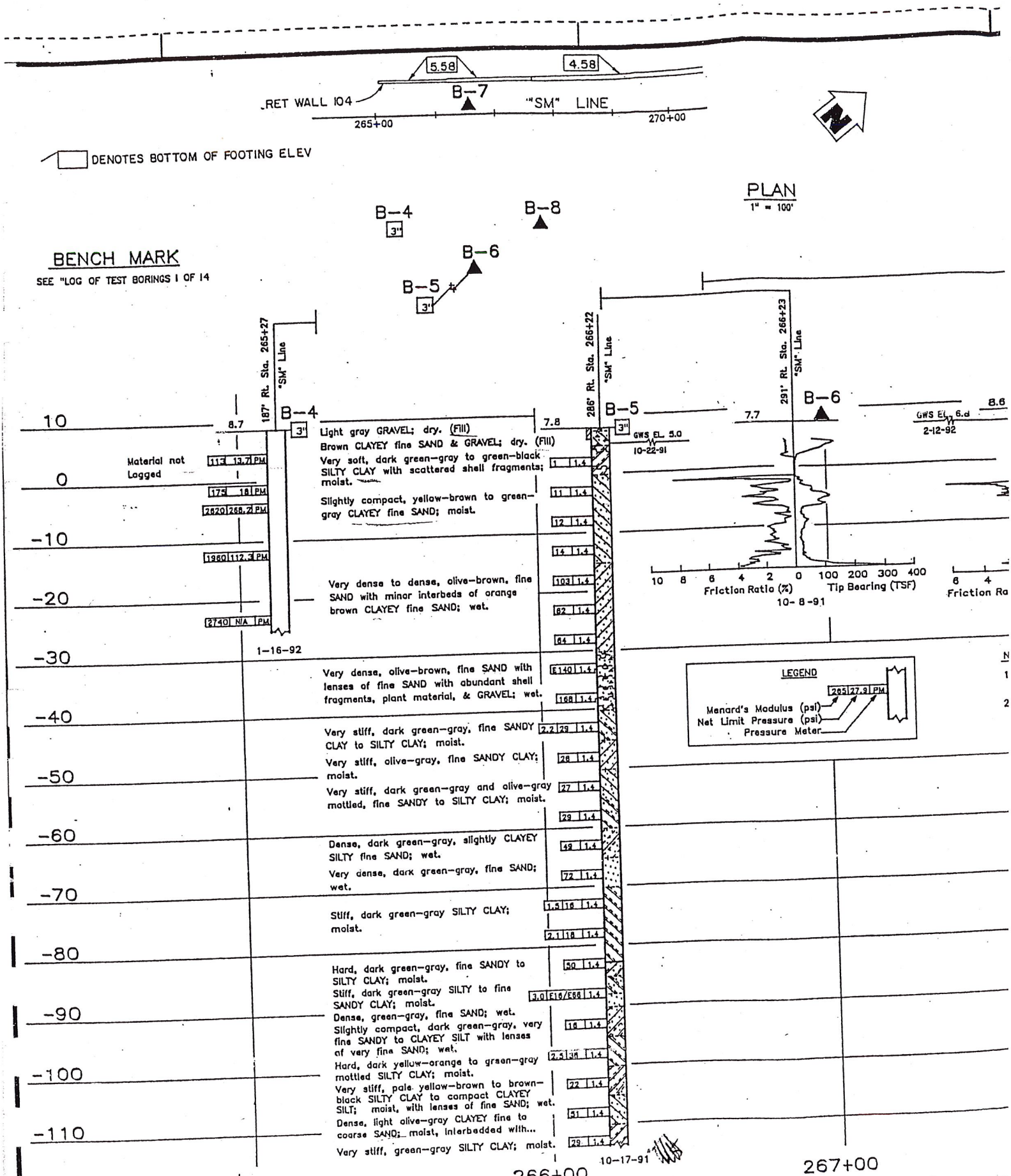
EAST BAY VIADUCT-ALTERN...
LOG OF TEST BORINGS 3 O...

SCALE IN INCHES ... PLANS 0 1 2 3

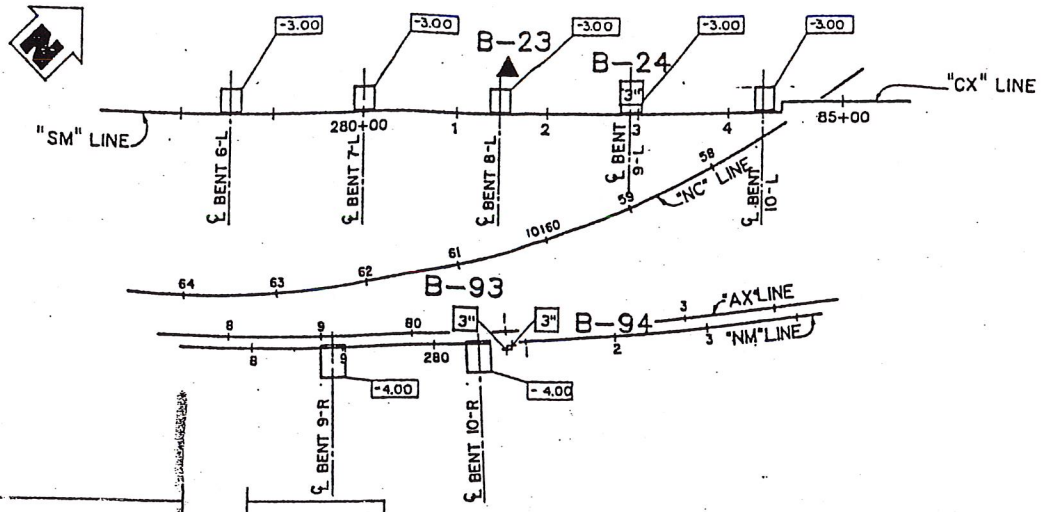
CU 04195
EA 192221

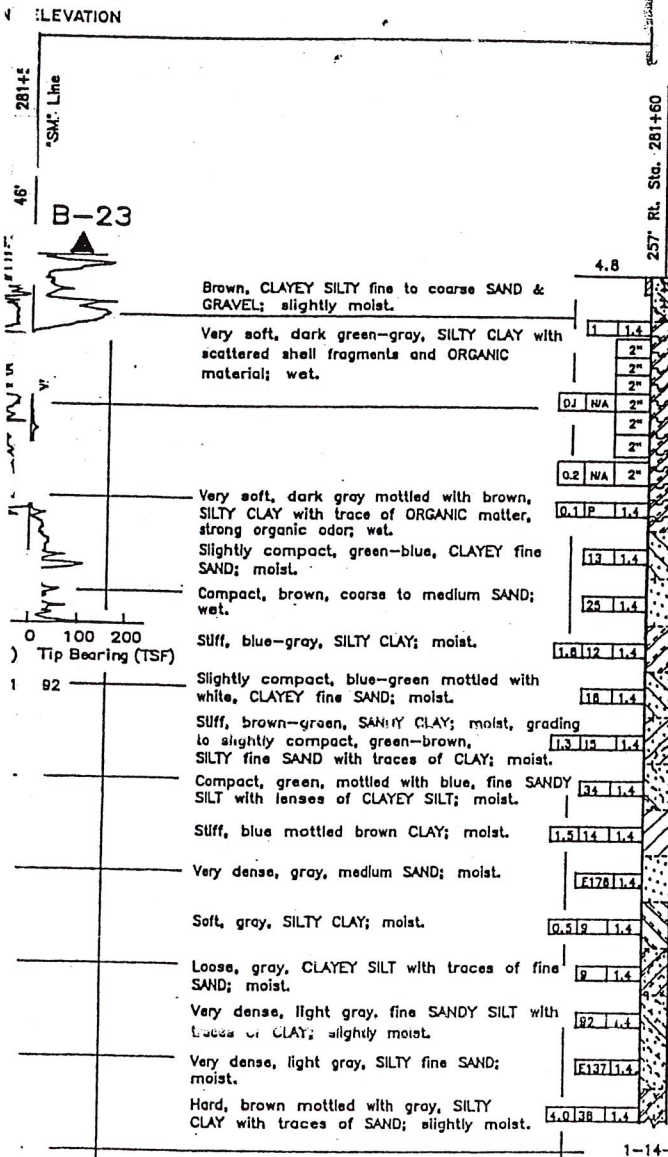
DISREGARD PRINTS BEARING EARLIER REVISION DATES

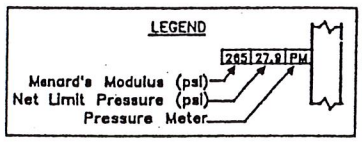
REVISION DATES (PRELIMINARY STAGE ONLY) 7/7/92 4-93



OFFICE OF TRANSPORTATION MATERIALS & RESEARCH	ENGINEERING GEOLOGY BRANCH	FIELD INVESTIGATION BY: M. WILLIAN	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION
DRAWN BY: IRMA GAMARRA 4/92			
CHECKED BY:		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3	



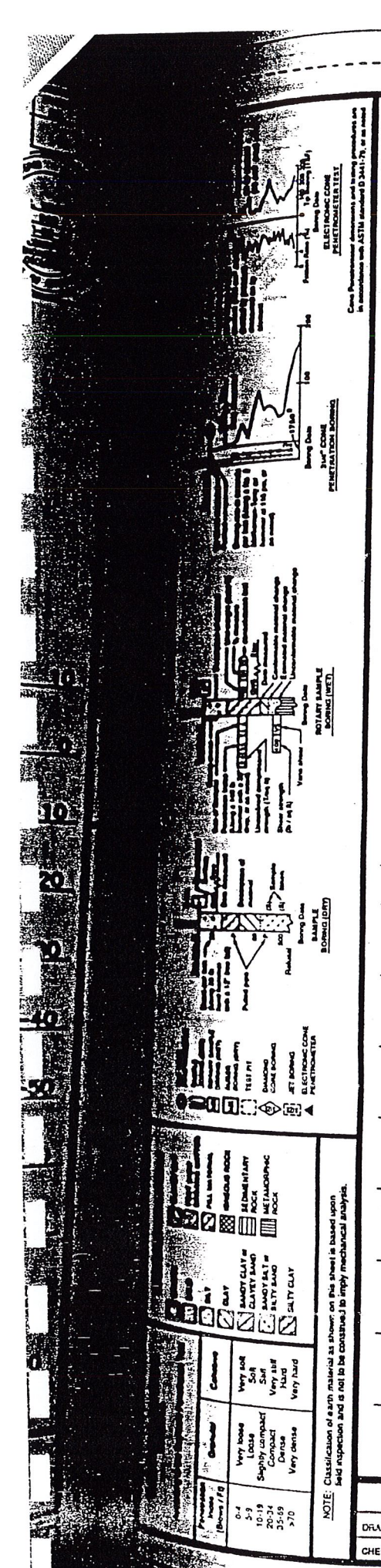


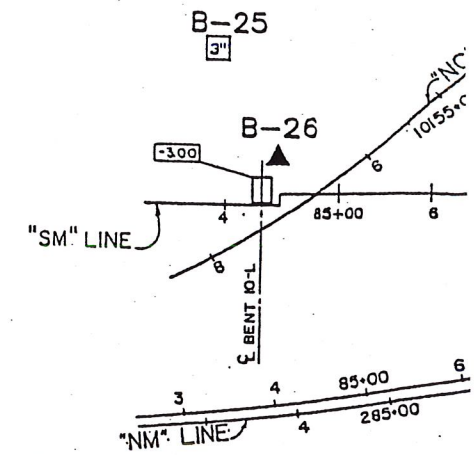


Coarse GRAVEL and ligh
Compact, brown GRAVEL
Very soft, black CLAY w
Very loose, dark gray S
Very soft, gray CLAY; m
Very soft, gray CLAY wit
Slightly compact, light
Stiff, light brown-gray,
Stiff, gray, SILTY CLAY;
Very stiff, gray, SILTY CL
SAND; moist
Compact, brown, SILTY
Very stiff, brown, SANDY
Compact, brown, CLAYEY
Compact, gray SAND; moi
Very stiff, gray, SILTY CL
Soft, gray, fine SANDY C
Compact, dark gray SAND;
Very stiff, gray, SANDY C
Stiff, gray, SANDY CLAY;
Very dense, green-brown
Very stiff, gray, SANDY C
GRAVEL; moist.
Very stiff, green-gray SIL
moist.

281+00 281+50 282+00 282+50

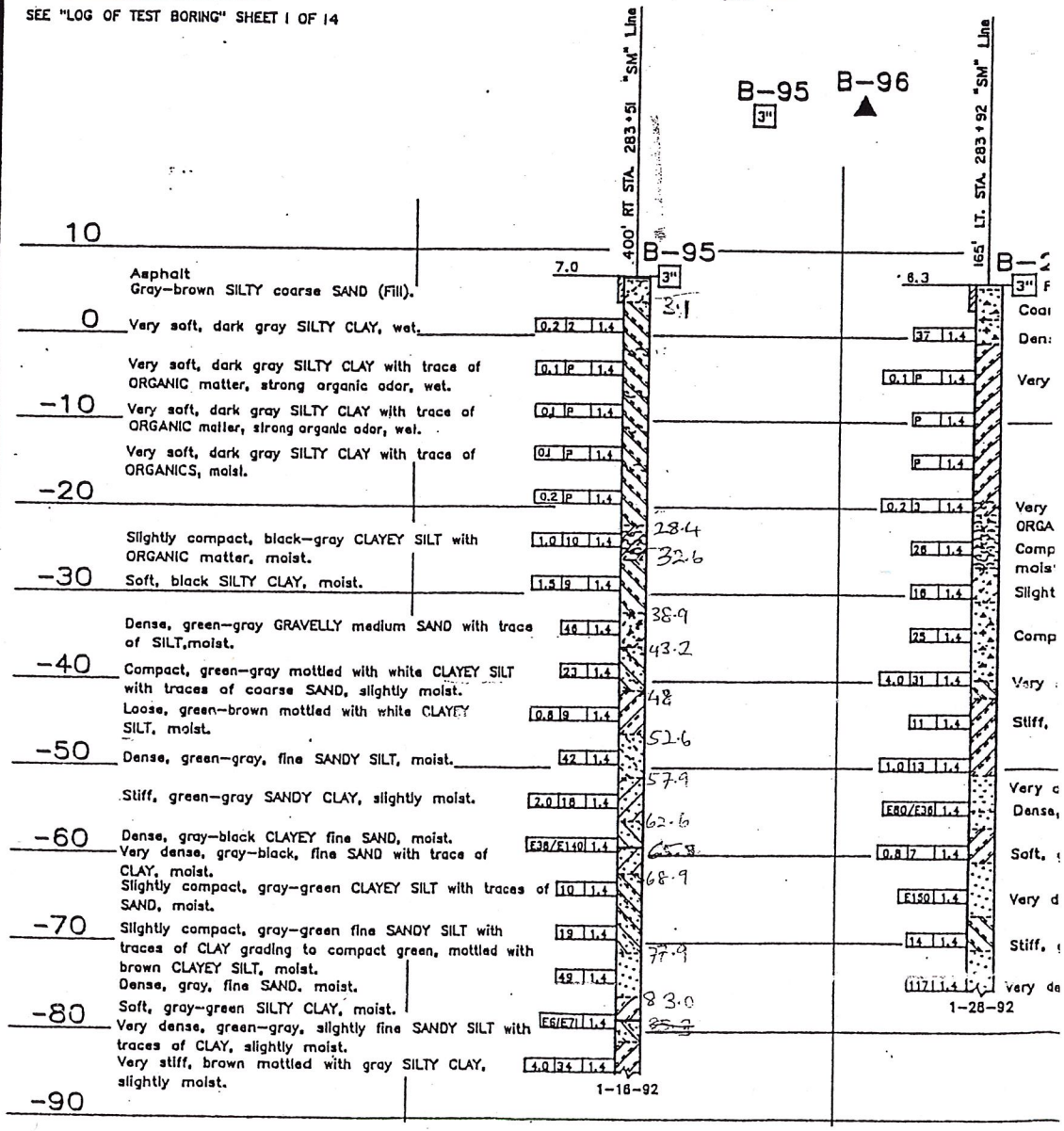
ENGINEERING GEOLOGY BRANCH	FIELD INVESTIGATION BY: M. WILLIAN	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 33-61 R/L; POST MILE 34.0
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3			CU 04195 EA 192221	DISREGARD PRINTS B EARLIER REVISION DA





BENCH MARK

SEE "LOG OF TEST BORING" SHEET 1 OF 14



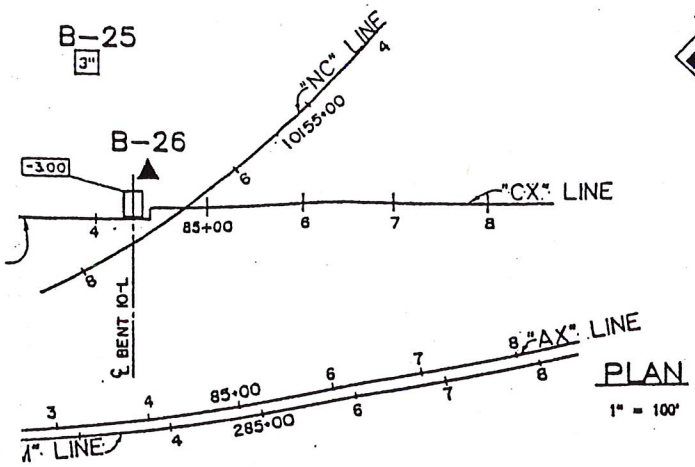
OFFICE OF TRANSPORTATION MATERIALS & RESEARCH	ENGINEERING GEOLOGY BRANCH	FIELD INVESTIGATION BY:
DRAWN BY: K. WAHL 4-92		M. WILLIAN
CHECKED BY:		

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

DIST.	COUNTY	ROU
04	Ala	8

R.C. Wilke
CERTIFIED ENGINEERING GE

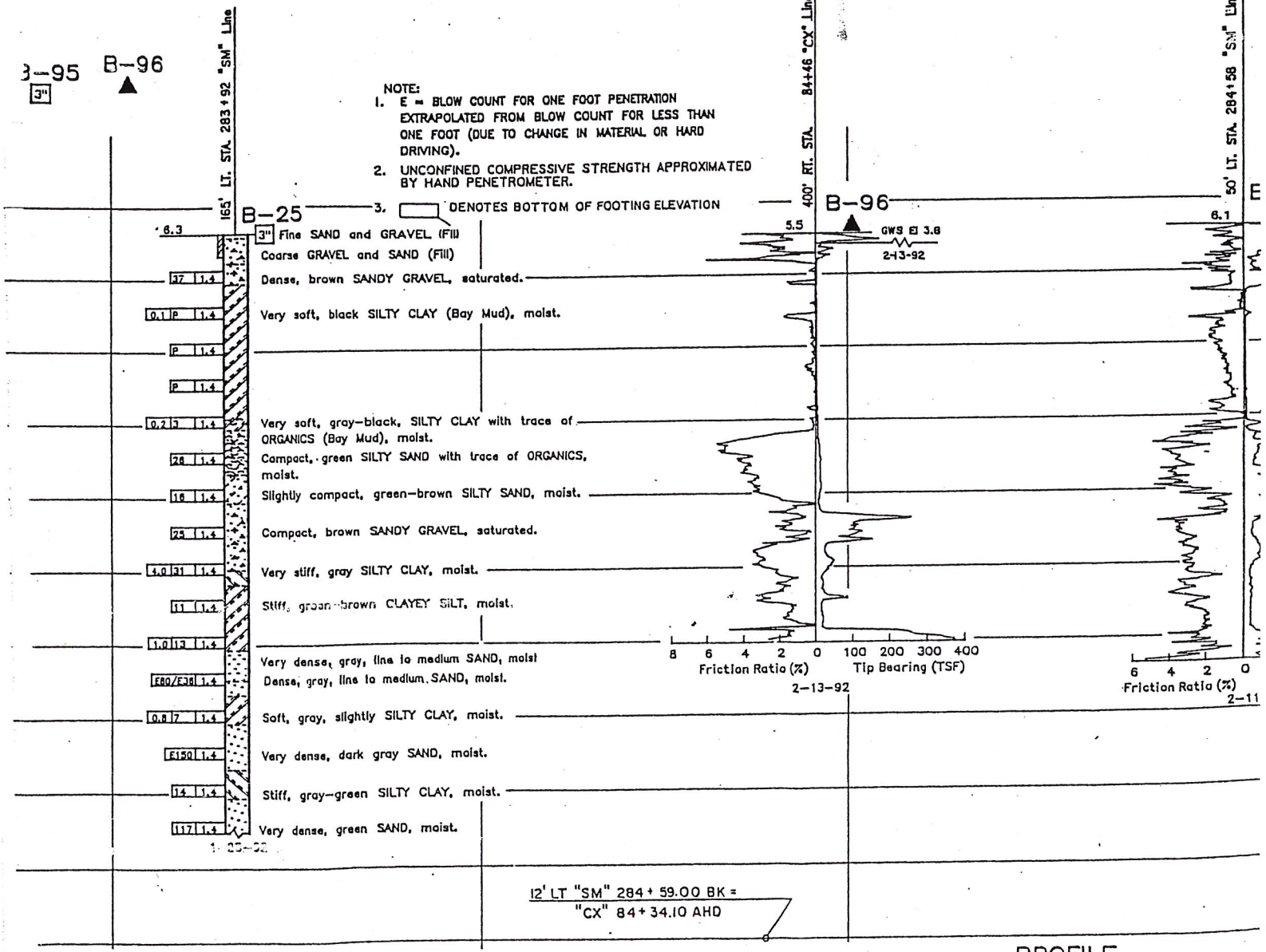
8-23-93
PLANS APPROVAL DATE



PLAN
1" = 100'

B-95 B-96

NOTE:
1. E = BLOW COUNT FOR ONE FOOT PENETRATION EXTRAPOLATED FROM BLOW COUNT FOR LESS THAN ONE FOOT (DUE TO CHANGE IN MATERIAL OR HARD DRIVING).
2. UNCONFINED COMPRESSIVE STRENGTH APPROXIMATED BY HAND PENETROMETER.
3. ▭ DENOTES BOTTOM OF FOOTING ELEVATION

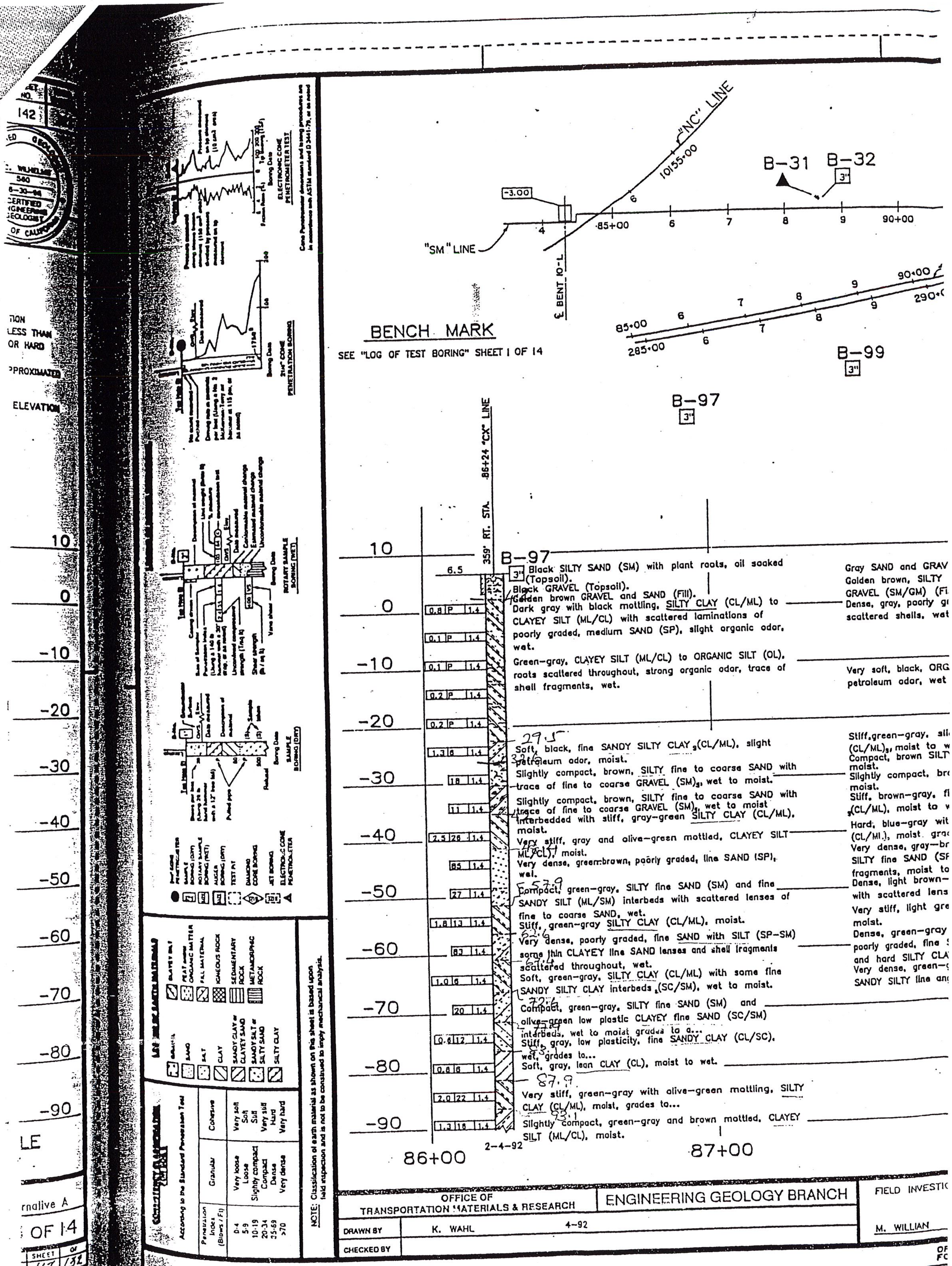


12' LT "SM" 284+59.00 BK =
"CX" 84+34.10 AHD

283+50 284+00 84+50

PROFILE
1" = 10'

FIELD INVESTIGATION BY: M. WILLIAN	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 33-611R/L POST MILE 34.0	EASTBAY V LOG OF TEST
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3		CU 04195 EA 192221	DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES (PRELIMIN 7/7/92 4-11



"NC" LINE
10155+00
B-31
B-32
-3.00
"SM" LINE
85+00
90+00
℄ BENT 10-L
BENCH MARK
SEE "LOG OF TEST BORING" SHEET 1 OF 14
85+00
285+00
290+00
B-99
B-97
86+24 "CX" LINE
359' RT. STA.
B-97
6.5
Black SILTY SAND (SM) with plant roots, oil soaked (Topsoil).
Black GRAVEL (Topsoil).
Golden brown GRAVEL and SAND (Fill).
Dark gray with black mottling, SILTY CLAY (CL/ML) to CLAYEY SILT (ML/CL) with scattered laminations of poorly graded, medium SAND (SP), slight organic odor, wet.
Green-gray, CLAYEY SILT (ML/CL) to ORGANIC SILT (OL), roots scattered throughout, strong organic odor, trace of shell fragments, wet.
Soft, black, fine SANDY SILTY CLAY (CL/ML), slight petroleum odor, moist.
Slightly compact, brown, SILTY fine to coarse SAND with trace of fine to coarse GRAVEL (SM), wet to moist.
Slightly compact, brown, SILTY fine to coarse SAND with trace of fine to coarse GRAVEL (SM), wet to moist interbedded with stiff, gray-green SILTY CLAY (CL/ML), moist.
Very stiff, gray and olive-green mottled, CLAYEY SILT (ML/CL), moist.
Very dense, green-brown, poorly graded, fine SAND (SP), wet.
Compact, green-gray, SILTY fine SAND (SM) and fine SANDY SILT (ML/SM) interbeds with scattered lenses of fine to coarse SAND, wet.
Stiff, green-gray SILTY CLAY (CL/ML), moist.
Very dense, poorly graded, fine SAND with SILT (SP-SM) some thin CLAYEY fine SAND lenses and shell fragments scattered throughout, wet.
Soft, green-gray, SILTY CLAY (CL/ML) with some fine SANDY SILTY CLAY interbeds (SC/SM), wet to moist.
Compact, green-gray, SILTY fine SAND (SM) and olive-green low plastic CLAYEY fine SAND (SC/SM) interbeds, wet to moist grades to a...
Stiff, gray, low plasticity, fine SANDY CLAY (CL/SC), wet, grades to...
Soft, gray, lean CLAY (CL), moist to wet.
Very stiff, green-gray with olive-green mottling, SILTY CLAY (CL/ML), moist, grades to...
Slightly compact, green-gray and brown mottled, CLAYEY SILT (ML/CL), moist.
29.5
57.9
87.9
93.1
2-4-92
86+00
87+00
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Gray SAND and GRAV
Golden brown, SILTY
GRAVEL (SM/GM) (Fi
Dense, gray, poorly g
scattered shells, wet
Very soft, black, ORG
petroleum odor, wet
Stiff, green-gray, sil
(CL/ML), moist to w
Compact, brown SILT
moist.
Slightly compact, br
moist.
Stiff, brown-gray, fi
(CL/ML), moist to w
Hard, blue-gray wit
(CL/ML), moist, grac
Very dense, gray-br
SILTY fine SAND (SF
fragments, moist to
Dense, light brown-
with scattered lens
Very stiff, light gre
moist.
Dense, green-gray
poorly graded, fine
and hard SILTY CLA
Very dense, green-
SANDY SILTY fine an
CONSISTENCY CLASSIFICATION
According to the Standard Penetration Test
Penetration Index (Blows / Ft) | Granular | Cohesive
0-4 | Very loose | Very soft
5-9 | Loose | Soft
10-19 | Slightly compact | Stiff
20-34 | Compact | Very stiff
35-69 | Dense | Hard
>70 | Very dense | Very hard
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.
OFFICE OF TRANSPORTATION MATERIALS & RESEARCH
ENGINEERING GEOLOGY BRANCH
FIELD INVESTIG
DRAWN BY K. WAHL 4-92
CHECKED BY
M. WILLIAM
ELEVATION
APPROXIMATED
Alternative A
OF 14
SHEET 117 OF 132

DIST.	COUNTY	ROUTE	POST MILE: TOTAL PROJE
04	Ala	880	34.0/34

R.C. Wilhelms
CERTIFIED ENGINEERING GEOLOGIST

8-23-93
PLANS APPROVAL DATE

"CX" LINE

00 1

0+00 "AX" LINE
290+0 "NM" LINE

PLAN
1" = 100'

NOTE:
1. E = BLOW COUNT FOR ONE FOOT PENETRATION EXTRAPOLATED FROM BLOW COUNT FOR LESS THAN ONE FOOT (DUE TO CHANGE IN MATERIAL OR HARD DRIVING).
2. UNCONFINED COMPRESSIVE STRENGTH APPROXIMATED BY HAND PENETROMETER TEST.
3. ▭ DENOTES BOTTOM OF FOOTING ELEVATION

19' LT. STA. 88+59 "CX" LINE

B-32

7.0 | 3"

nd GRAVEL (R.R. Ballast).
, SILTY fine to coarse SAND with
/GM) (Fill).
orly graded, fine SAND (SP) with
, wet.

ORGANIC SILT (OL), strong
wet to moist.

, slightly fine SANDY SILTY CLAY
to wet.
SILTY fine to coarse SAND (SM),
act, brown CLAYEY SILT (ML/CL),
ray, fine SANDY SILTY CLAY
:o wet.
with white mottling, SILTY CLAY
, grading to CLAYEY SAND (SC).
ray-brown, poorly graded, slightly
ND (SP-SM) with scattered shell
to wet.
n-gray, SILTY fine SAND (SM)
inses of shell fragments, wet.
it green-gray SILTY CLAY (CL/ML).
ay interbedded, slightly SILTY
SAND (SP-SM), shell lenses,
LAY (CL/ML), wet to moist.
-gray, slightly fine to coarse
ie angular GRAVEL (GM)$_3$, wet.

1-16-92

278' RT. STA. 89+15 "CX" LINE

B-99

6.5 | 3"

Light brown, slightly SILTY and SANDY GRAVEL (Fill).
Very soft, dark to light gray SILTY CLAY (Bay Mud) with trace of ORGANICS, moist (wet).
Soft, dark gray to black CLAYEY SILT with traces of ORGANICS, moist.
Stiff, light brown, SILTY CLAY with traces of SAND, moist.
Very soft, light brown, slightly fine SANDY SILTY CLAY, moist.
Very stiff, light gray to light brown, SILTY CLAY, moist.
SAND
Stiff, light green to gray SILTY CLAY, moist.
Slightly compact, light brown mottled with gray CLAYEY fine SAND, moist.
Very stiff, green-gray SILTY CLAY, moist.
Stiff, light gray mottled with brown SILTY CLAY, moist.
Dense, dark gray, fine SAND with CLAYEY lenses, moist.
Soft, dark gray CLAY with traces of fine SAND, moist.
Soft, dark gray CLAY with traces of fine SAND and trace of ORGANICS, moist.
Coarse SAND.
Dense, green-gray SAND with traces of CLAY and GRAVEL, moist.
Hard, green-gray CLAY with mottled brown SAND, moist.
SAND
Very stiff, light brown mottled with gray SILTY CLAY, moist.
Very stiff, light brown SILTY CLAY, moist.

1-15-92

20' LT. STA. 88+56 "CX" LINE

B-31

7.0

8 6 4 2 0 100 200 3
Friction Ratio (%) Tip Bearing

02-06-92

88+00 89+00 90+00

PRO
VER. 1"
HOR. 1"

TIGATION BY:	State of CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES STRUCTURE DESIGN	BRIDGE NO. 33-611R/L	EAST BAY VIADUCT -A
			POST MILE 34.0	LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES CU 04196 REVISION DATES (PRELIMINARY STAGE ON Y)

PRESENTATION OF CONE PENETRATION TEST DATA

CENTRAL STATION

7TH AND WOOD
OAKLAND, CALIFORNIA

Prepared for:

FUGRO

Prepared by:

GREGG IN SITU, INC.
Martinez, California
02-100MA

Prepared on:

August 7, 2002

TABLE OF CONTENTS

PRESENTATION OF CONE PENETRATION TEST DATA

1.0 INTRODUCTION

This report presents the results of a Cone Penetration Testing (CPT) program carried out at the Central Station site located in Oakland, CA. The work was performed on August 2nd, 2002. The scope of work was performed as directed by Fugro personnel.

2.0 FIELD EQUIPMENT & PROCEDURES

The Cone Penetration Tests (CPT) were carried out by GREGG IN SITU, INC. of Martinez, CA using an integrated electronic cone system. The CPT soundings were performed in accordance with ASTM standards (D 5778-95). A 20 ton capacity cone was used for all of the soundings (figure 1). This cone has a tip area of 15 cm^2 and friction sleeve area of 225 cm^2. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.85.

The cones used during the program recorded the following parameters at 5 cm depth intervals:

- Tip Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (U)

The above parameters were printed simultaneously on a printer and stored on a computer diskette for future analysis and reference.

The pore water pressure element was located directly behind the cone tip. The pore water pressure element was 5.0 mm thick and consisted of porous plastic. Each of the elements were saturated in silicon oil under vacuum pressure prior to penetration. Pore pressure dissipations were recorded at 5 second intervals when appropriate during pauses in the penetration.

A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

The cones were pushed using GREGG IN SITU's CPT rig, having a down pressure capacity of approximately 20 tons. Three CPT soundings were performed. The penetration tests were carried to depths of approximately 40 feet below ground surface. Test locations and depths were determined in the field by Fugro personnel.

3.0 CONE PENETRATION TEST DATA & INTERPRETATION

The cone penetration test data is presented in graphical form. Penetration depths are referenced to existing ground surface. This data includes CPT logs of measured soil parameters and a computer tabulation of interpreted soil types along with additional geotechnical parameters and pore pressure dissipation data.

The stratigraphic interpretation is based on relationships between cone bearing (qc), sleeve friction (fs), and penetration pore pressure (U). The friction ratio (Rf), which is sleeve friction divided by cone bearing, is a calculated parameter which is used to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone bearing and generate large excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little in the way of excess pore water pressures.

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Interpreted output requires that depth of water be entered for calculation purposes, where depth to water is unknown an arbitrary depth in excess of 10 feet of the deepest sounding is entered as the groundwater depth.

GREGG IN SITU, INC.
August 7, 2002
02-100ma

FUGRO
Central Station
Oakland, Ca.

We hope the information presented is sufficient for your purposes. We recommend that all data be carefully reviewed by qualified personnel to verify the data and make appropriate recommendations. If you have any questions, please do not hesitate to contact our office at (925) 313-5800.

Sincerely,
GREGG IN SITU, INC.

Mary Walden
Operations Manager

APPENDIX

ELECTRICAL PIEZOCONE

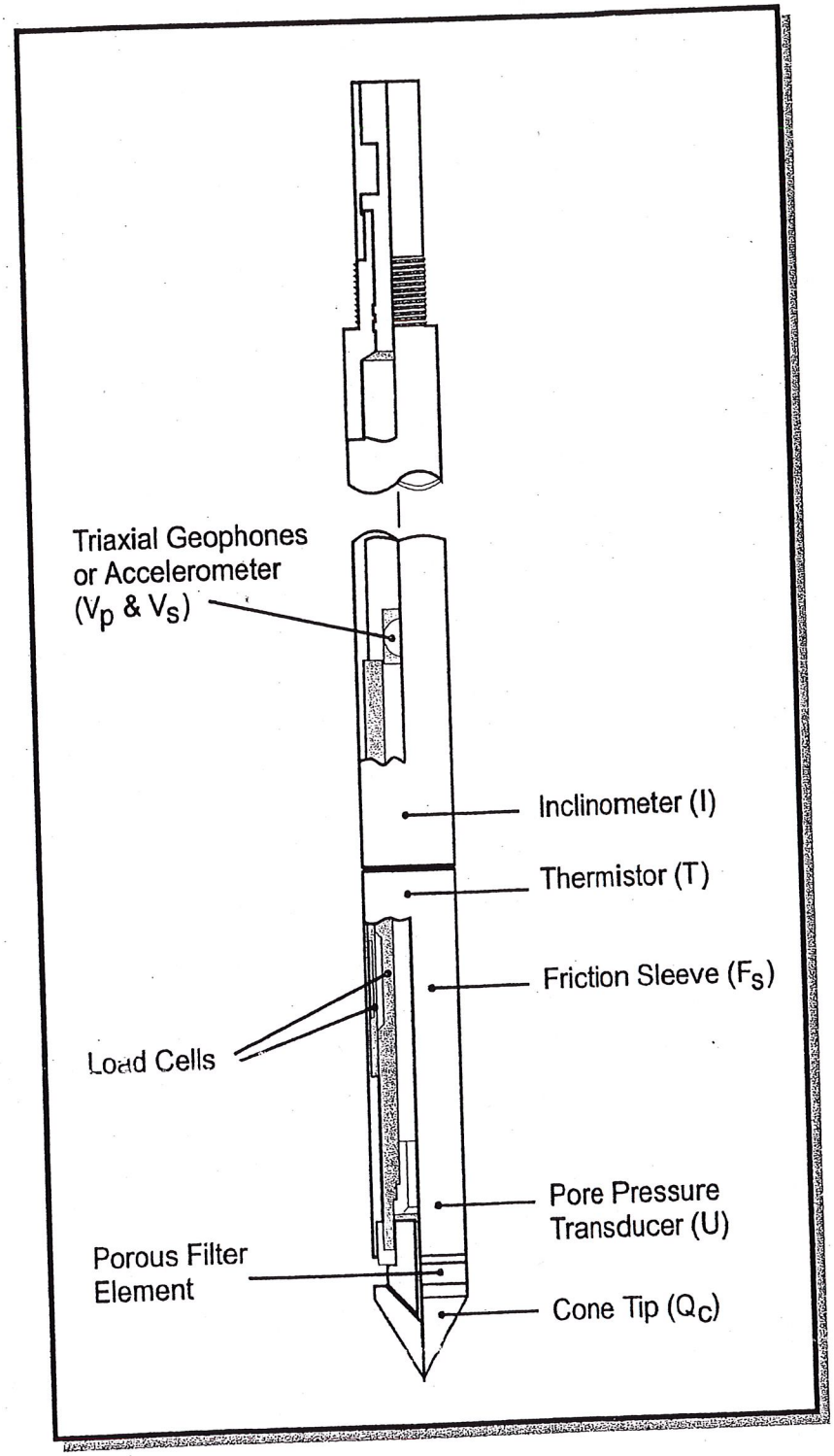
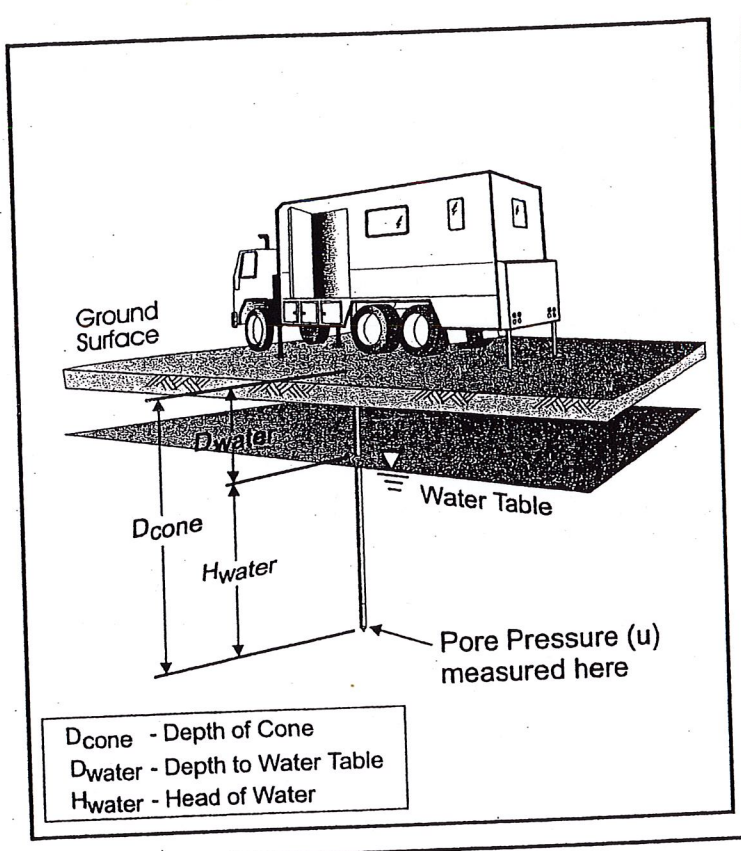
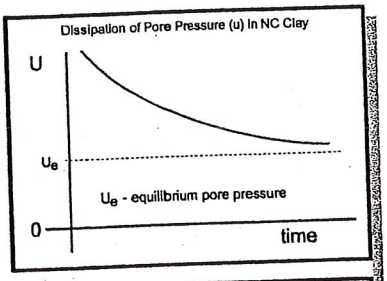
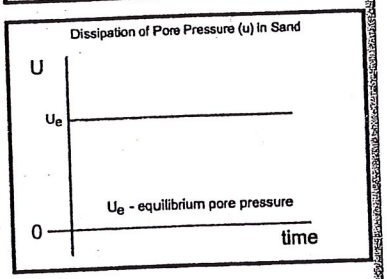


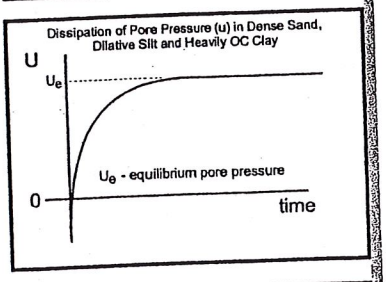
Figure 1

PPDT CORRELATION









Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

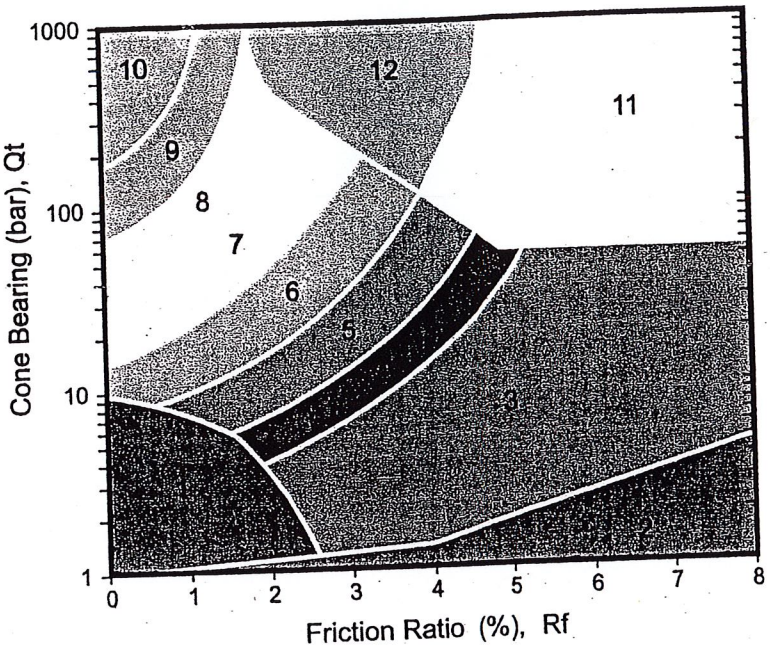
where $H_{water} = U_e$ (depth units)

Useful Conversion Factors:

1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

Figure 2

SOIL CLASSIFICATION CHART



Zone	Q_t / N	Soil Behaviour Type
1	2	sensitive fine grained
2	1	organic material
3	1	clay
4	1.5	silty clay to clay
5	2	clayey silt to silty clay
6	2.5	sandy silt to clayey silt
7	3	silty sand to sandy silt
8	4	sand to silty sand
9	5	sand
10	6	gravelly sand to sand
11	1	very stiff fine grained *
12	2	sand to clayey sand *

* overconsolidated or cemented

After Robertson and Campenella

Figure 3

REFERENCES

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PRESENTATION OF CONE PENETRATION TEST DATA

CENTRAL STATION

OAKLAND, CALIFORNIA

Prepared for:

FUGRO

Prepared by:

GREGG IN SITU, INC.
Martinez, California
02-080ma

Prepared on:

July 17, 2002

TABLE OF CONTENTS

PRESENTATION OF CONE PENETRATION TEST DATA

1.0 INTRODUCTION

This report presents the results of a Cone Penetration Testing (CPT) program carried out at the Central Station site located in Oakland, CA. The work was performed on July 11th and 12th, 2002. The scope of work was performed as directed by Fugro personnel.

2.0 FIELD EQUIPMENT & PROCEDURES

The Cone Penetration Tests (CPT) were carried out by GREGG IN SITU, INC. of Martinez, CA using an integrated electronic cone system. The CPT soundings were performed in accordance with ASTM standards (D 5778-95). A 20 ton capacity cone was used for all of the soundings (figure 1). This cone has a tip area of 15 cm^2 and friction sleeve area of 225 cm^2. The cone is designed with an equal end area friction sleeve and a tip end area ratio of 0.85.

The cones used during the program recorded the following parameters at 5 cm depth intervals:

- Tip Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (U)

The above parameters were printed simultaneously on a printer and stored on a computer diskette for future analysis and reference.

The pore water pressure element was located directly behind the cone tip. The pore water pressure element was 5.0 mm thick and consisted of porous plastic. Each of the elements were saturated in silicon oil under vacuum pressure prior to penetration. Pore pressure dissipations were recorded at 5 second intervals when appropriate during pauses in the penetration.

A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

The cones were pushed using GREGG IN SITU's CPT rig, having a down pressure capacity of approximately 20 tons. Ten CPT soundings were performed. The penetration tests were carried to depths of approximately 85 feet below ground surface. Test locations and depths were determined in the field by Fugro personnel.

3.0 CONE PENETRATION TEST DATA & INTERPRETATION

The cone penetration test data is presented in graphical form. Penetration depths are referenced to existing ground surface. This data includes CPT logs of measured soil parameters and a computer tabulation of interpreted soil types along with additional geotechnical parameters and pore pressure dissipation data.

The stratigraphic interpretation is based on relationships between cone bearing (qc), sleeve friction (fs), and penetration pore pressure (U). The friction ratio (Rf), which is sleeve friction divided by cone bearing, is a calculated parameter which is used to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone bearing and generate large excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little in the way of excess pore water pressures.

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GREGG IN SITU, INC.
July 17, 2002
02-080ma

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Mary Walden
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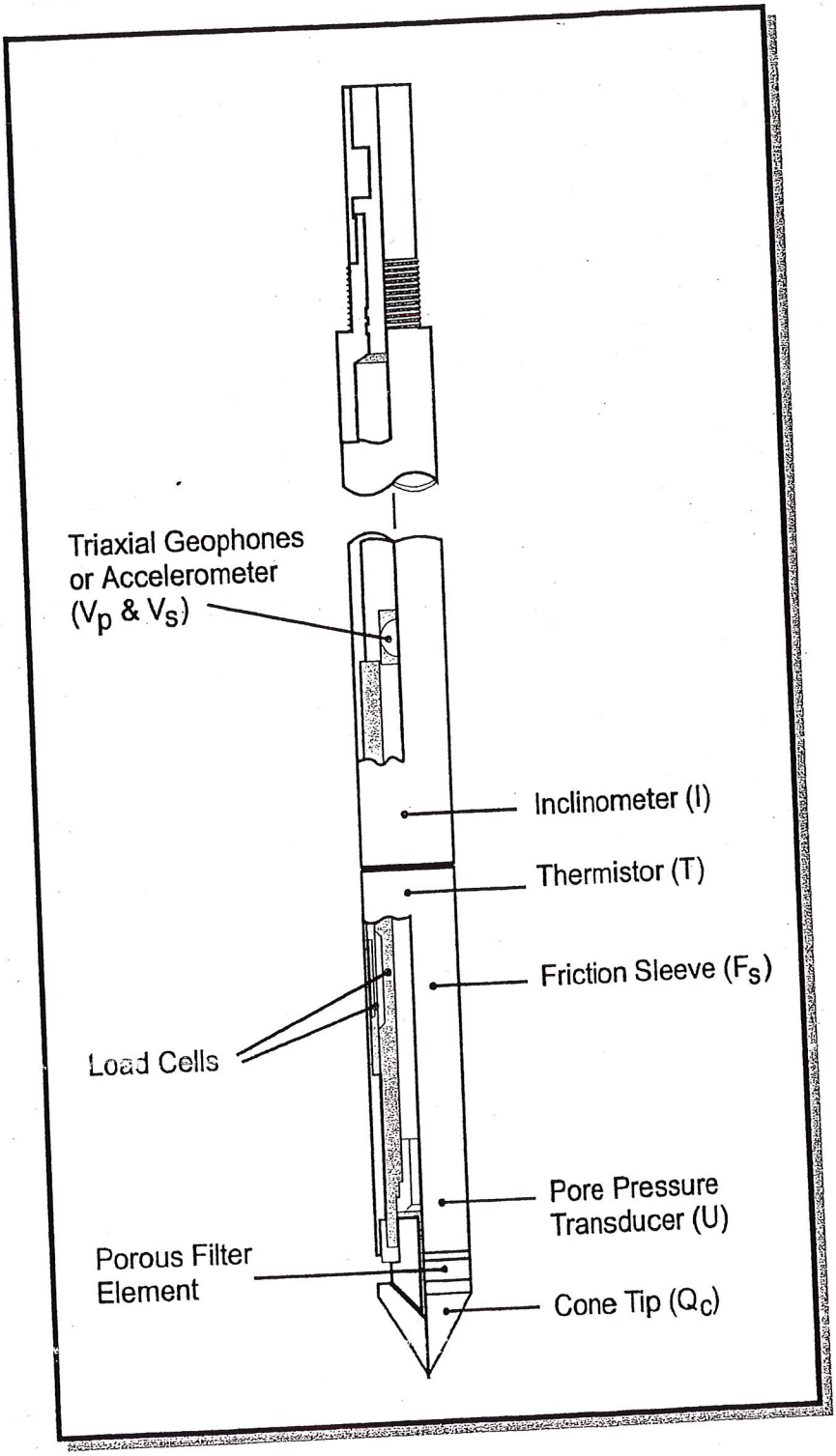

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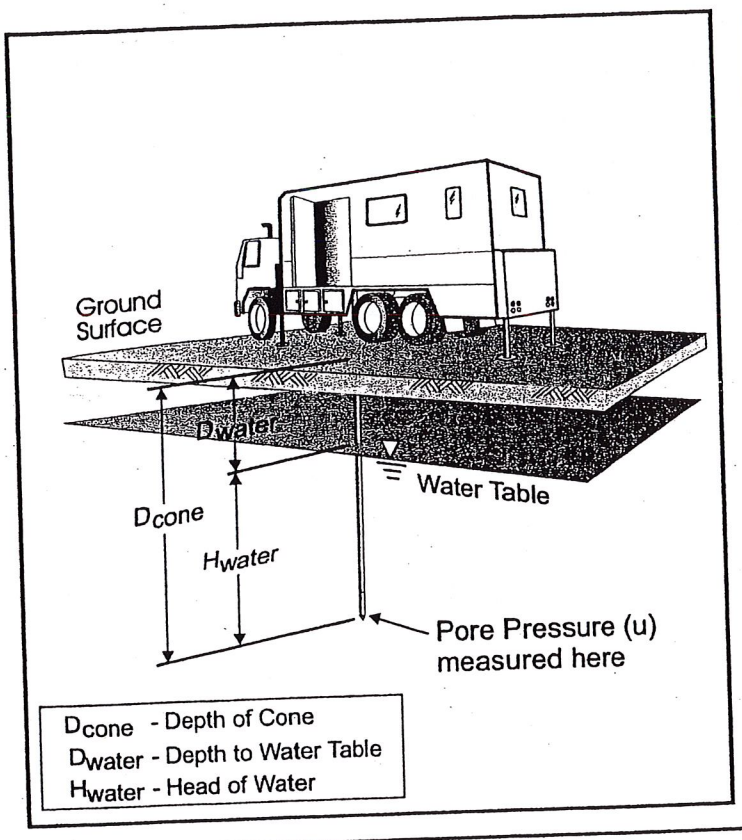

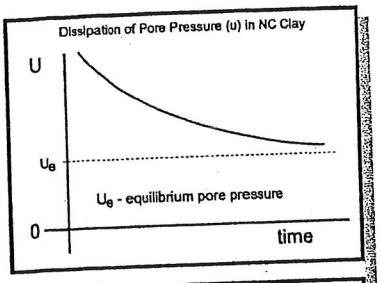

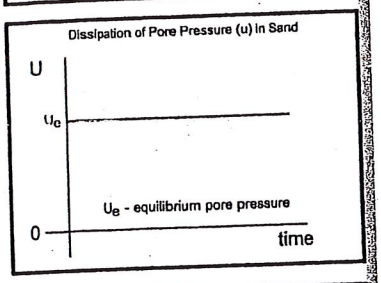

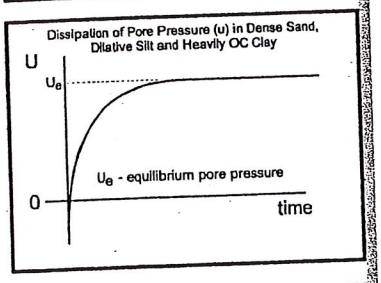

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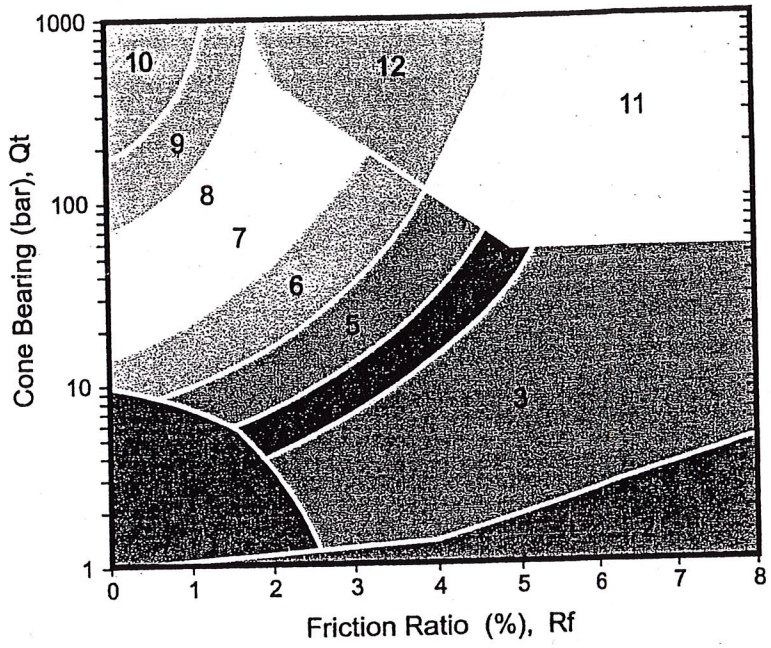

Zone	Q_t / N	Soil Behaviour Type
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2	1	organic material
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After Robertson and Campenella

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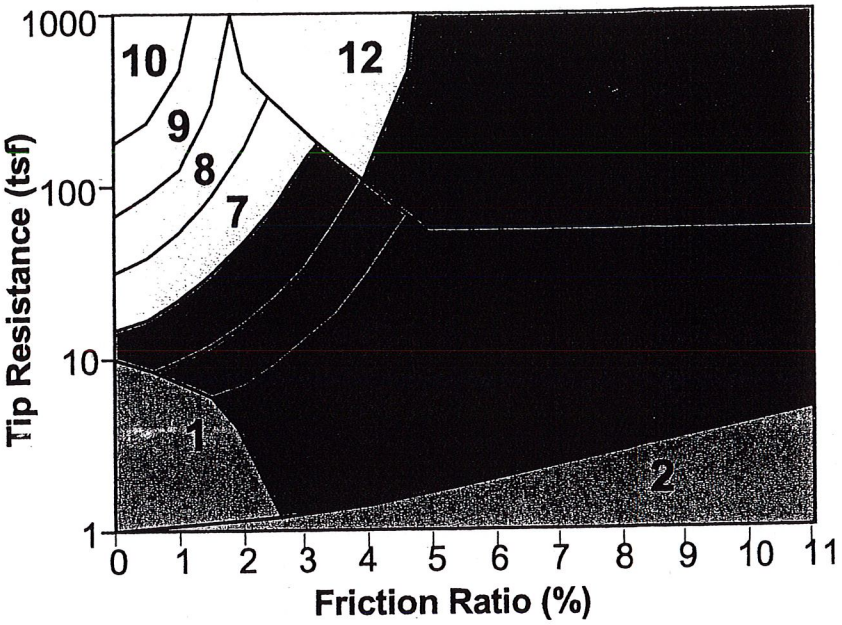


Zone	Soil Behavior Type	U.S.C.S.
1	Sensitive Fine-grained	OL-CH
2	Organic Material	OL-OH
3	Clay	CH
4	Silty Clay to Clay	CL-CH
5	Clayey Silt to Silty Clay	MH-CL
6	Sandy Silt to Clayey Silt	ML-MH
7	Silty Sand to Sandy Silt	SM-ML
8	Sand to Silty Sand	SM-SP
9	Sand	SW-SP
10	Gravelly Sand to Sand	SW-GW
11	Very Stiff Fine-grained *	CH-CL
12	Sand to Clayey Sand *	SC-SM

*overconsolidated or cemented

CPT CORRELATION CHART
(Robertson and Campanella, 1984)

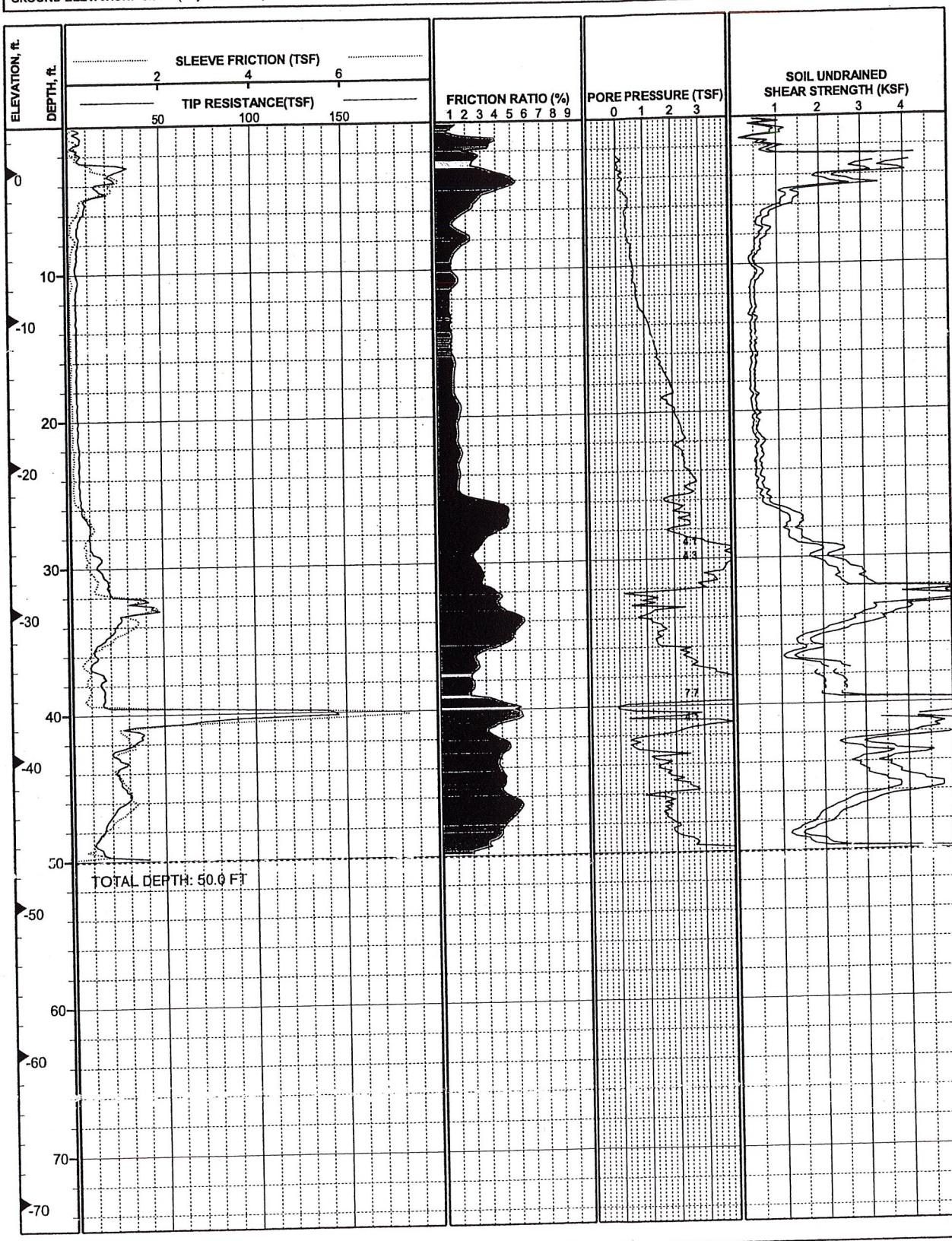
Central Station

PLATE A-2

October 2002
Project No. 1492.001

FUGRO

SOUNDING:	CPT-1	COORDINATES:	E1481972 N485014	OPERATOR	Gregg
GROUND ELEVATION:	3.0 FT (City of Oakland)	LOCATION:		TEST DATE:	7/12/2002

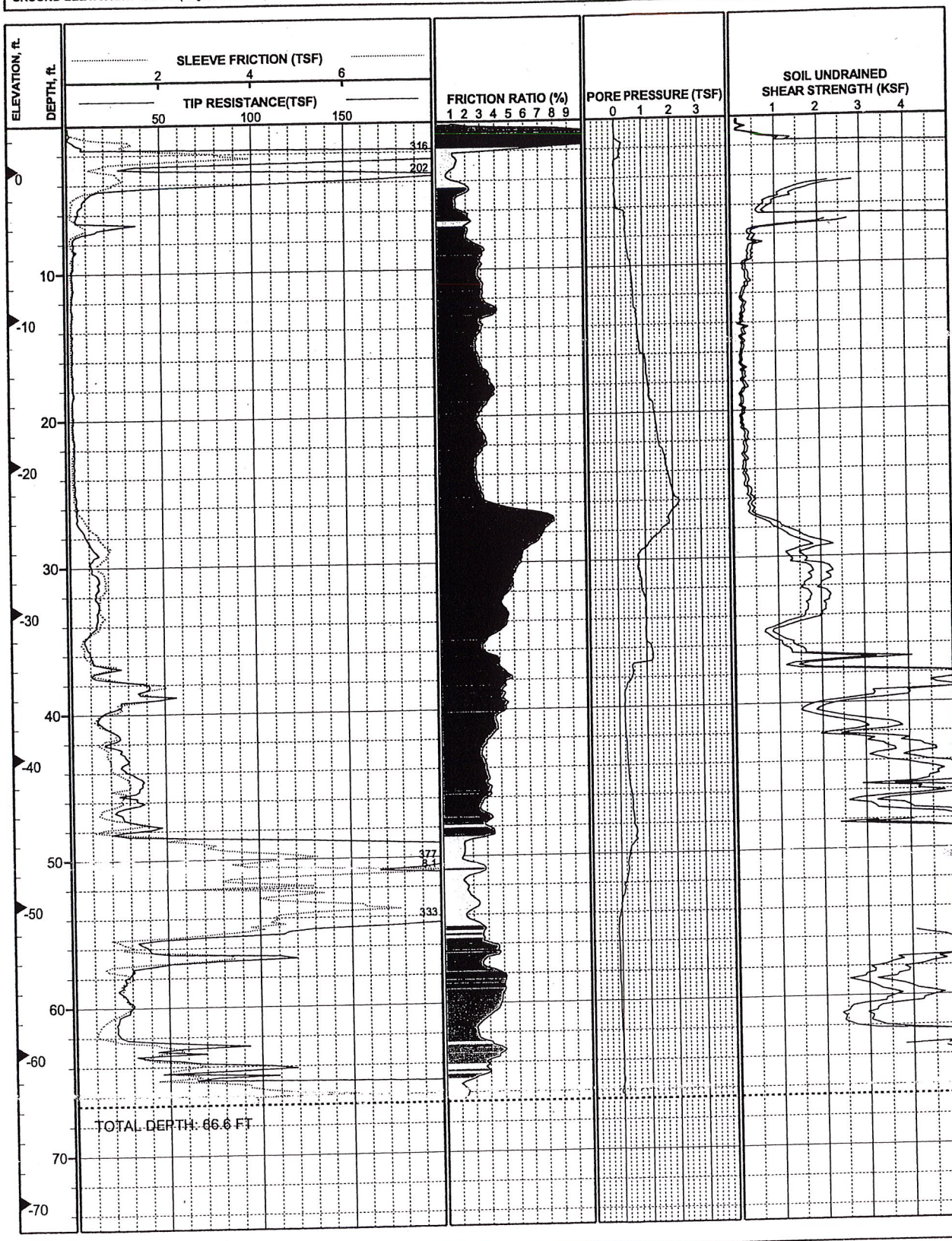


LOG OF CPT
SOUNDING CPT-1
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-2	**COORDINATES:**	E1481925 N484870	**OPERATOR**	Gregg
GROUND ELEVATION:	3.0 FT (City of Oakland)	**LOCATION:**		**TEST DATE:**	7/11/2002

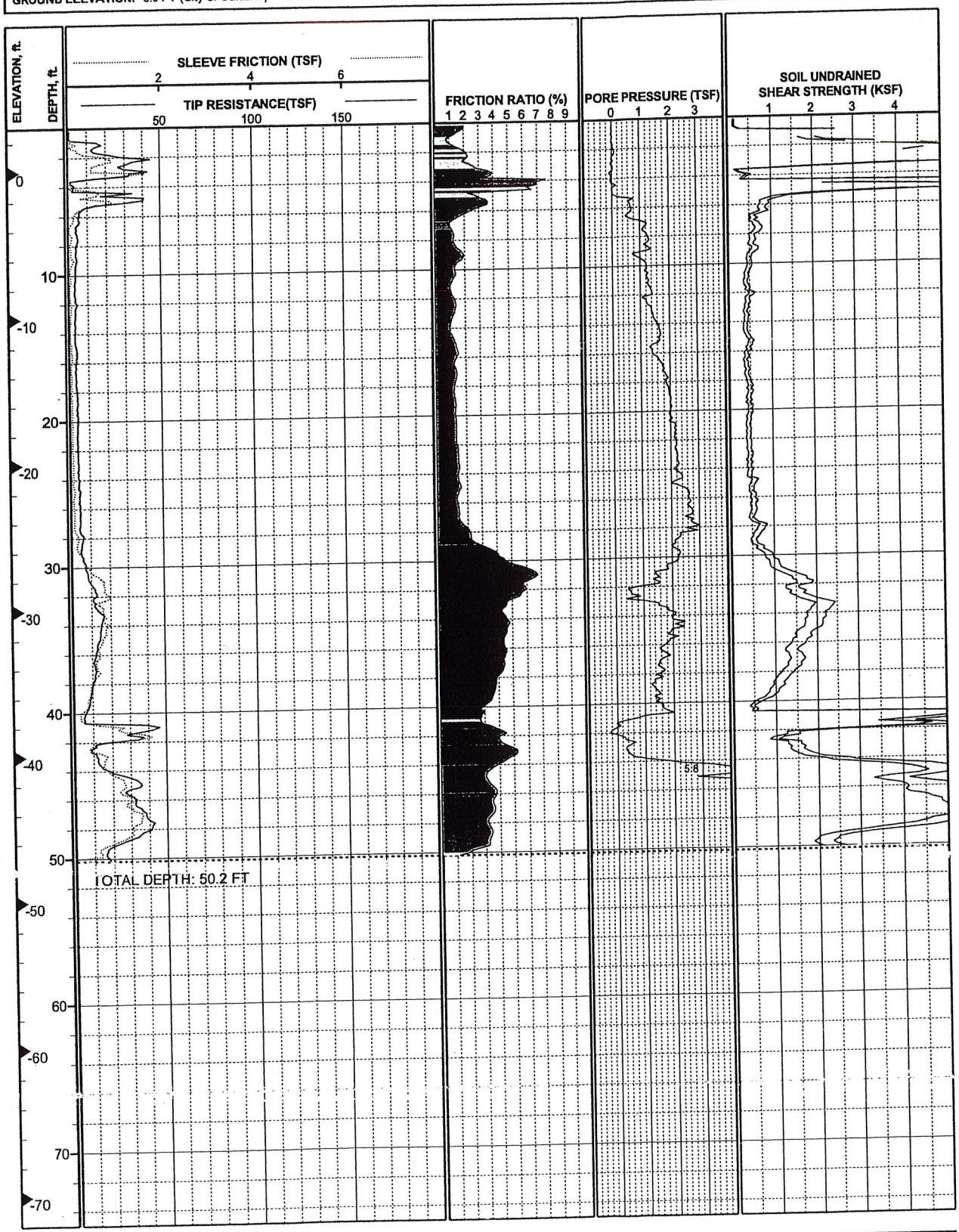


LOG OF CPT
SOUNDING CPT-2
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-3	**COORDINATES:**	E1481759 N484664	**OPERATOR**	Gregg
GROUND ELEVATION:	3.0 FT (City of Oakland)	**LOCATION:**		**TEST DATE:**	7/12/2002

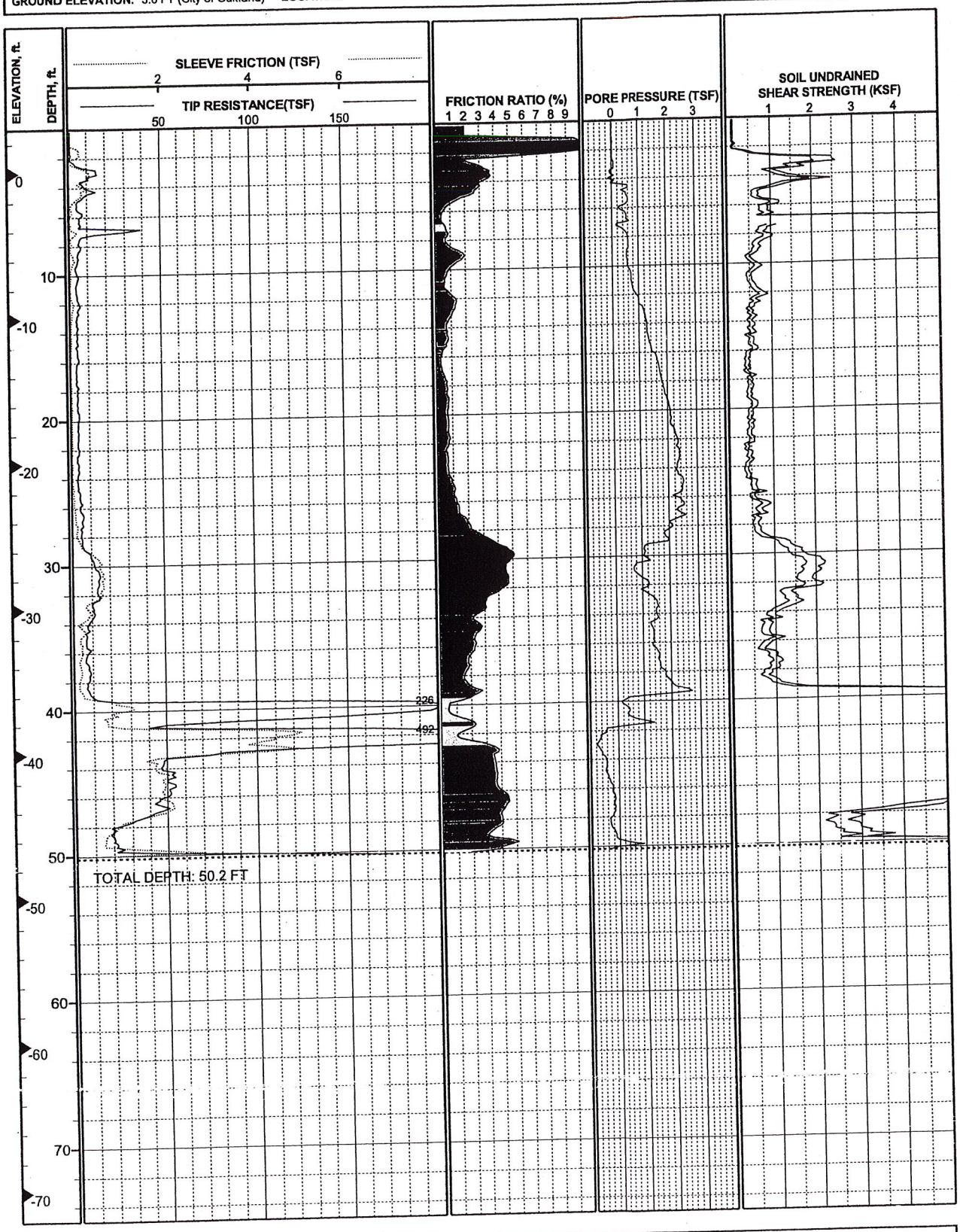


LOG OF CPT
SOUNDING CPT-3
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-4	COORDINATES:	E1481785 N484480	OPERATOR	Gregg
GROUND ELEVATION:	3.0 FT (City of Oakland)	LOCATION:		TEST DATE:	7/12/2002



LOG OF CPT
SOUNDING CPT-4
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-5	**COORDINATES:**	E1481637 N484245	**OPERATOR**	Gregg
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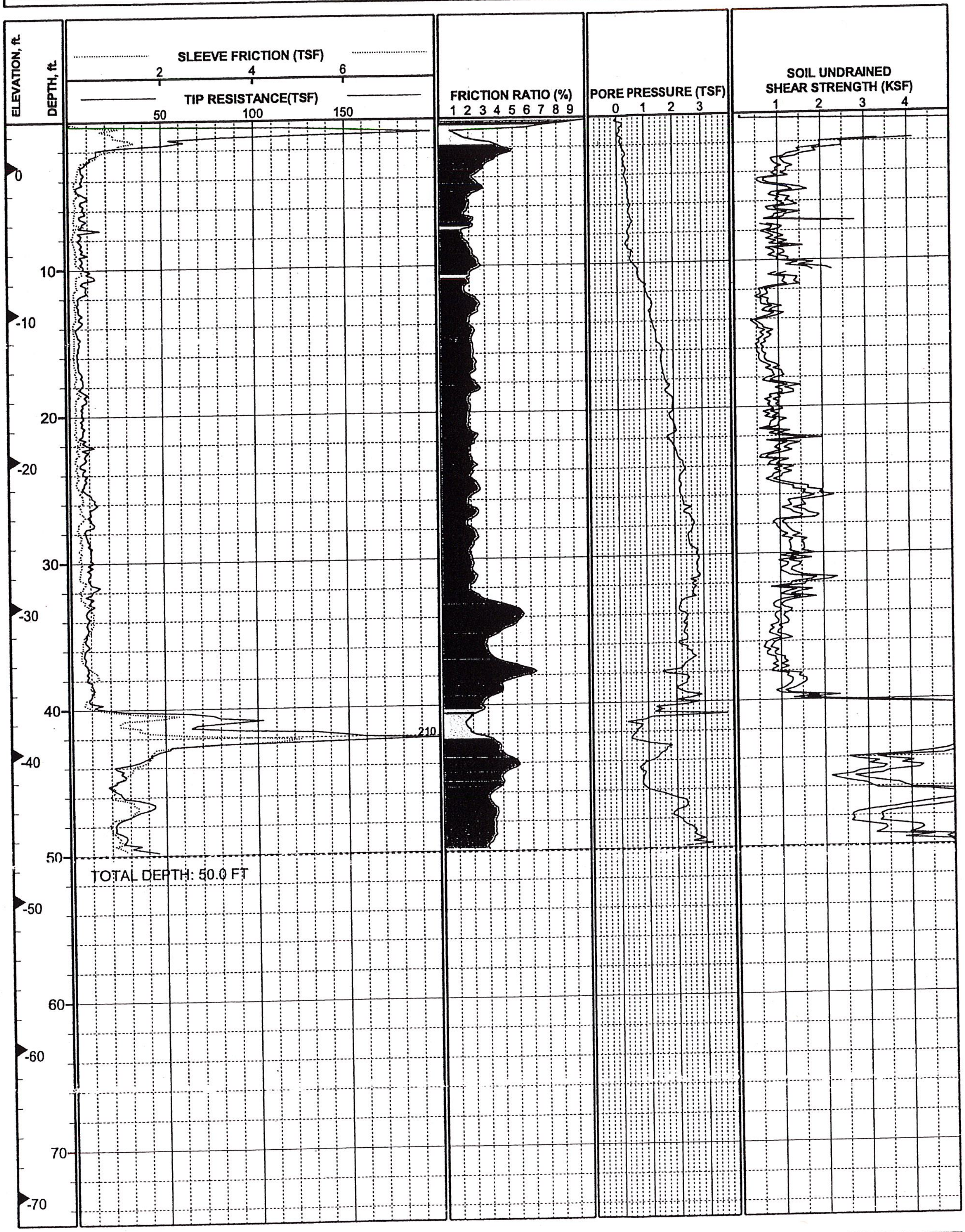
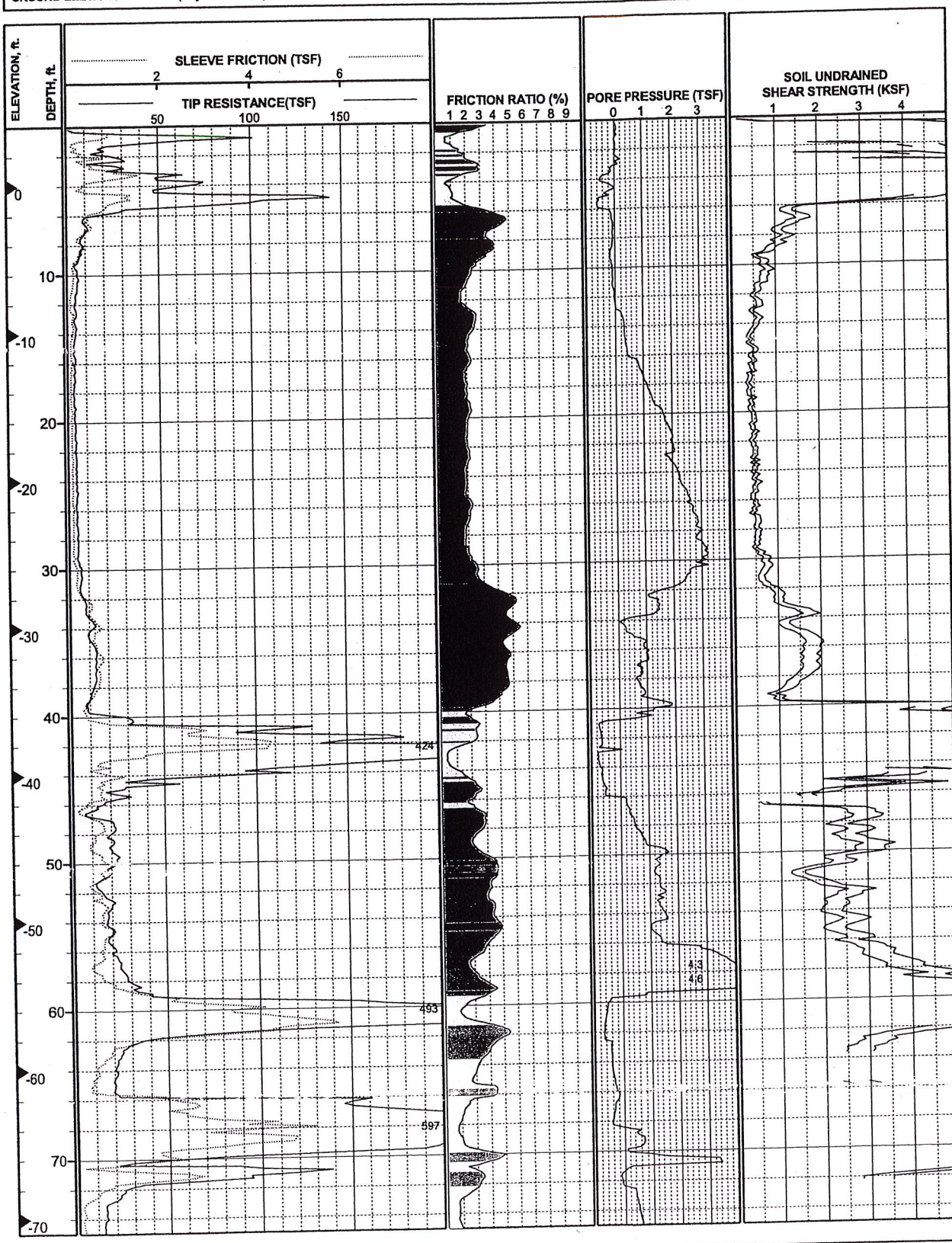


LOG OF CPT
SOUNDING CPT-5
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-6	**COORDINATES:**	E1481532 N484418	**OPERATOR**	Gregg
GROUND ELEVATION:	4.0 FT (City of Oakland)	**LOCATION:**		**TEST DATE:**	7/11/2002



LOG OF CPT

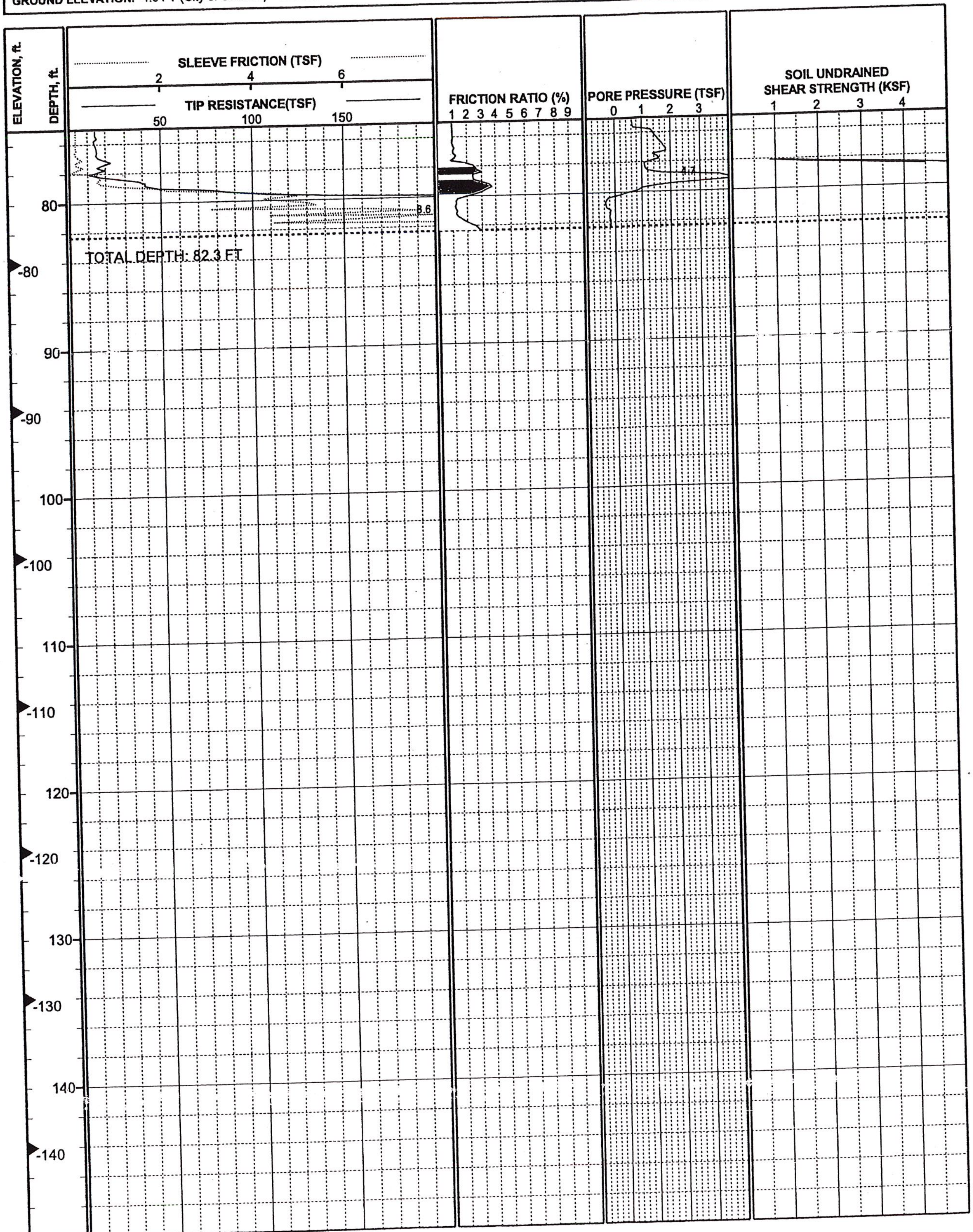
SOUNDING CPT-6

Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-6	COORDINATES:	E1481532 N484418	OPERATOR	Gregg
GROUND ELEVATION:	4.0 FT (City of Oakland)	LOCATION:		TEST DATE:	7/11/2002



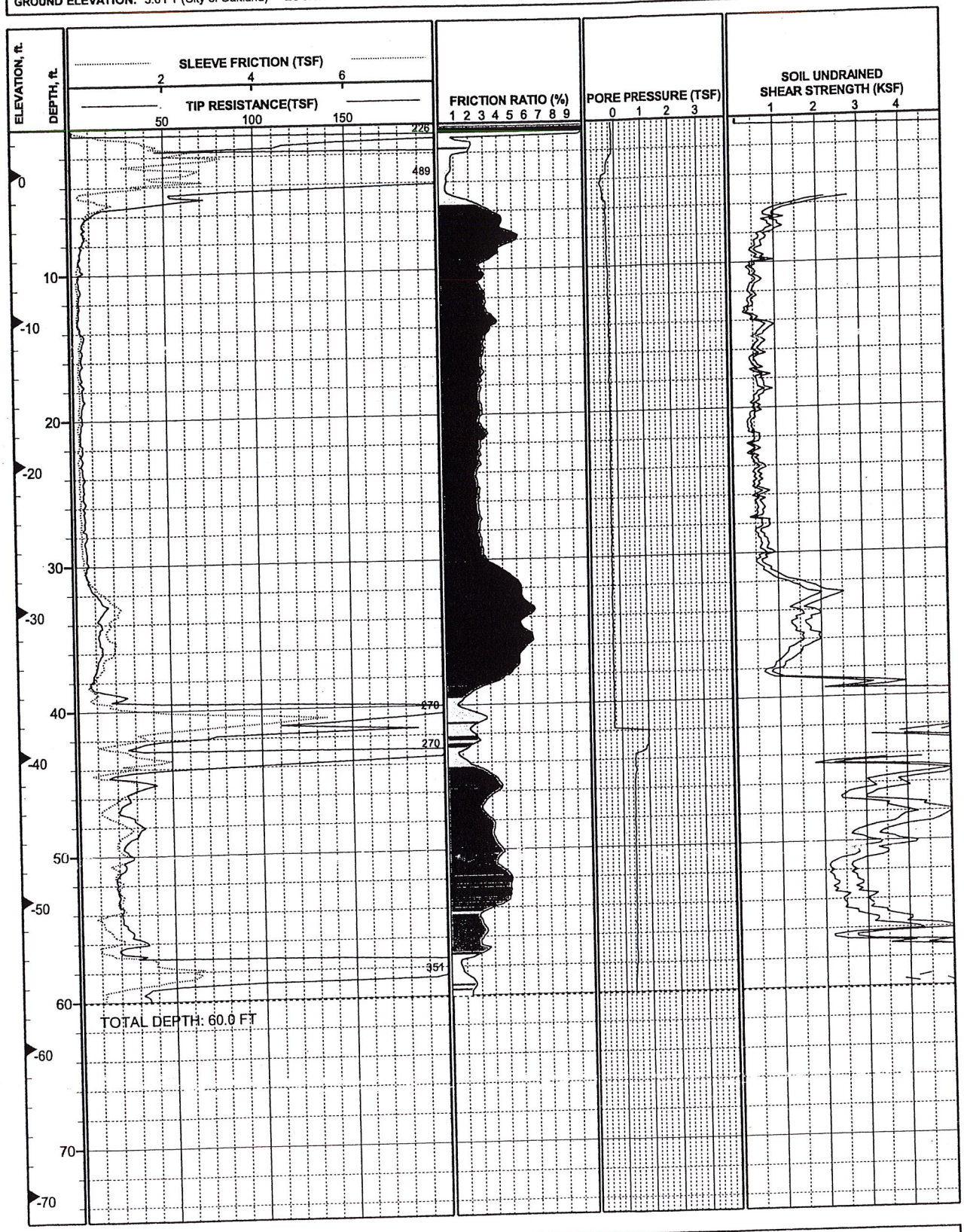
LOG OF CPT
SOUNDING CPT-6
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

FUGRO

SOUNDING:	CPT-7	COORDINATES:	E1481468 N484378	OPERATOR	Gregg
GROUND ELEVATION:	3.0 FT (City of Oakland)	LOCATION:		TEST DATE:	7/11/2002



LOG OF CPT
SOUNDING CPT-7
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-8	**COORDINATES:**	E1481320 N484210	**OPERATOR**	Gregg
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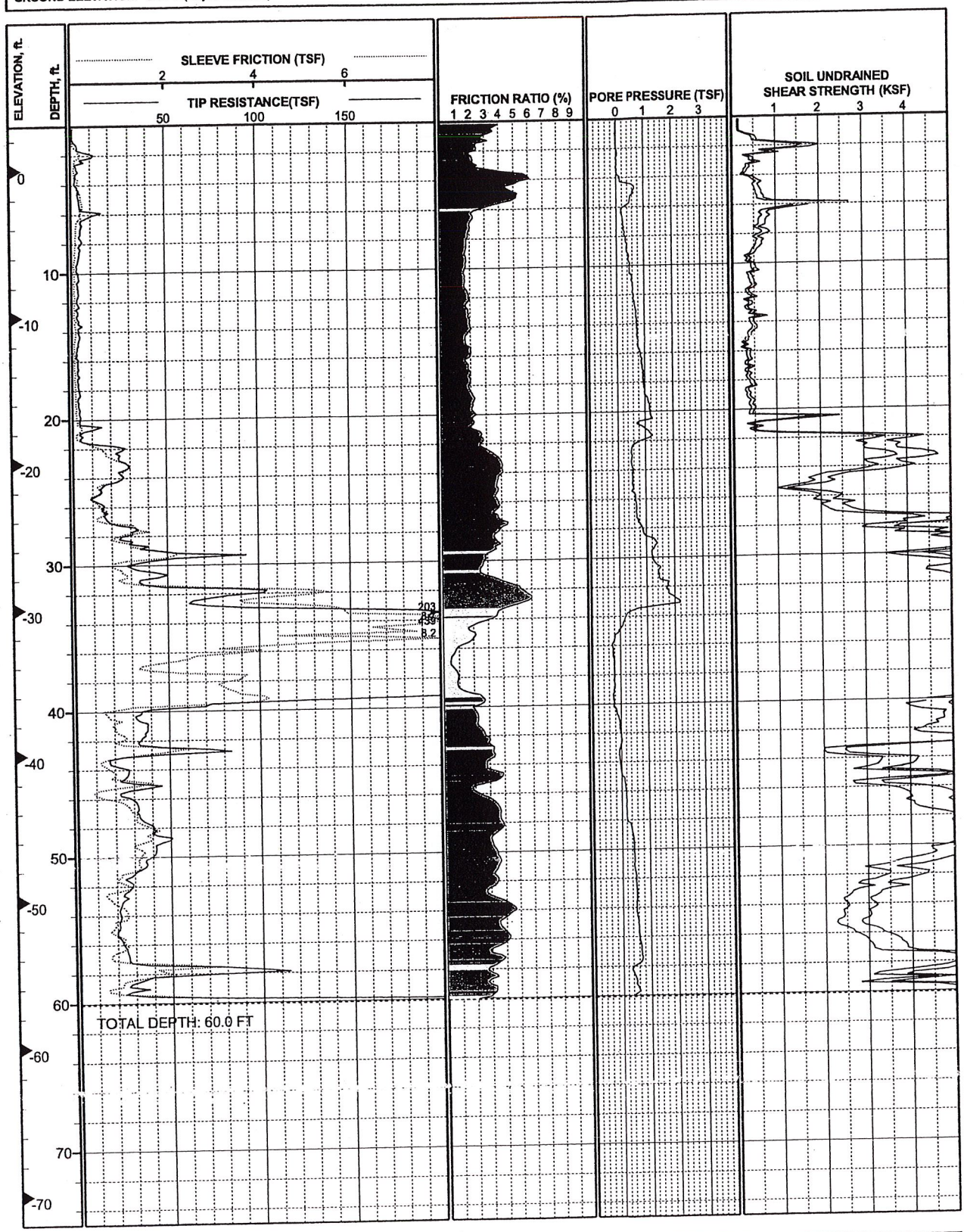


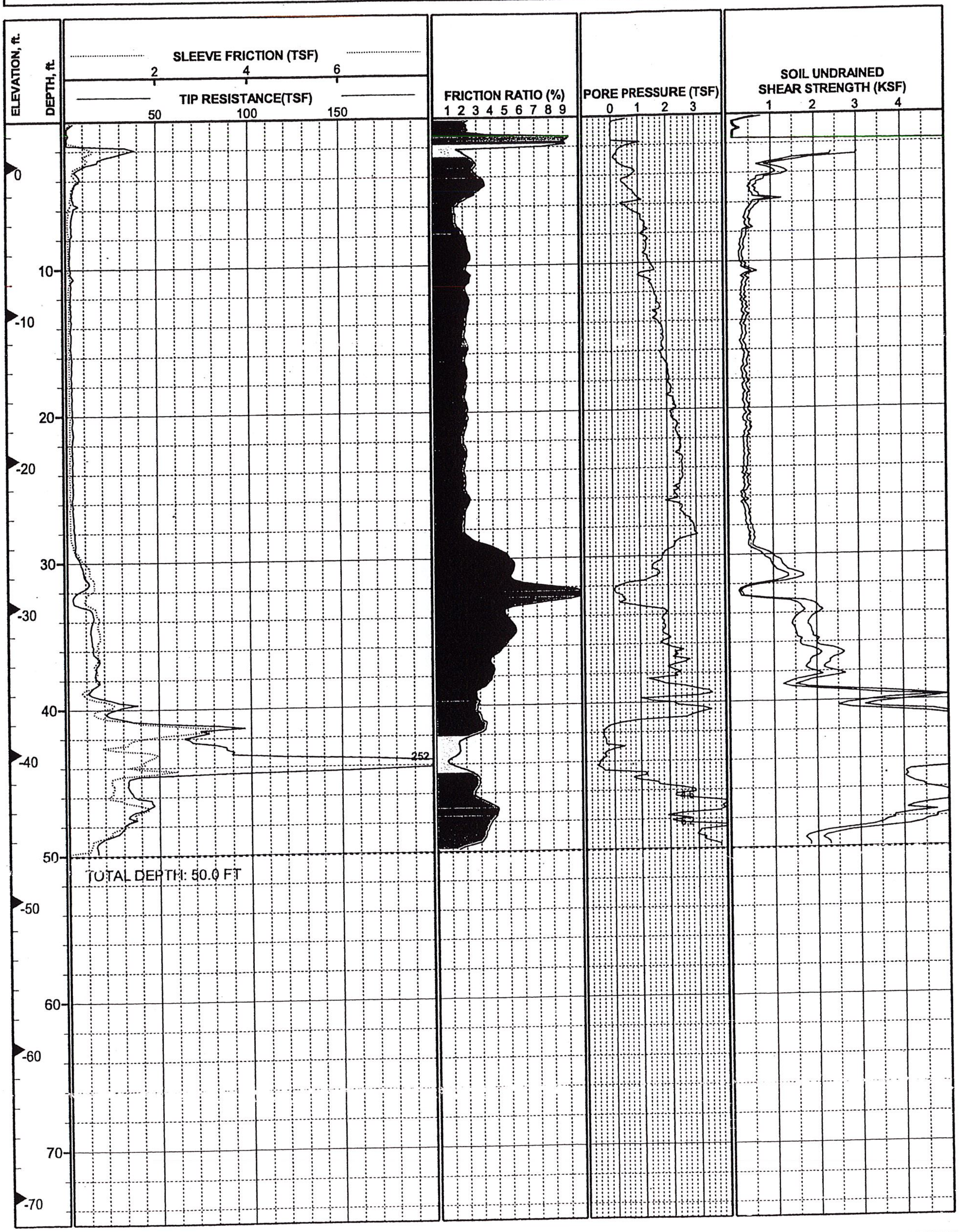
LOG OF CPT

SOUNDING CPT-8

Central Station

Report Date: 10/01/02

SOUNDING:	CPT-9	COORDINATES:	E1481643 N484550	OPERATOR	Gregg
GROUND ELEVATION:	3.0 FT (City of Oakland)	LOCATION:		TEST DATE:	7/12/2002

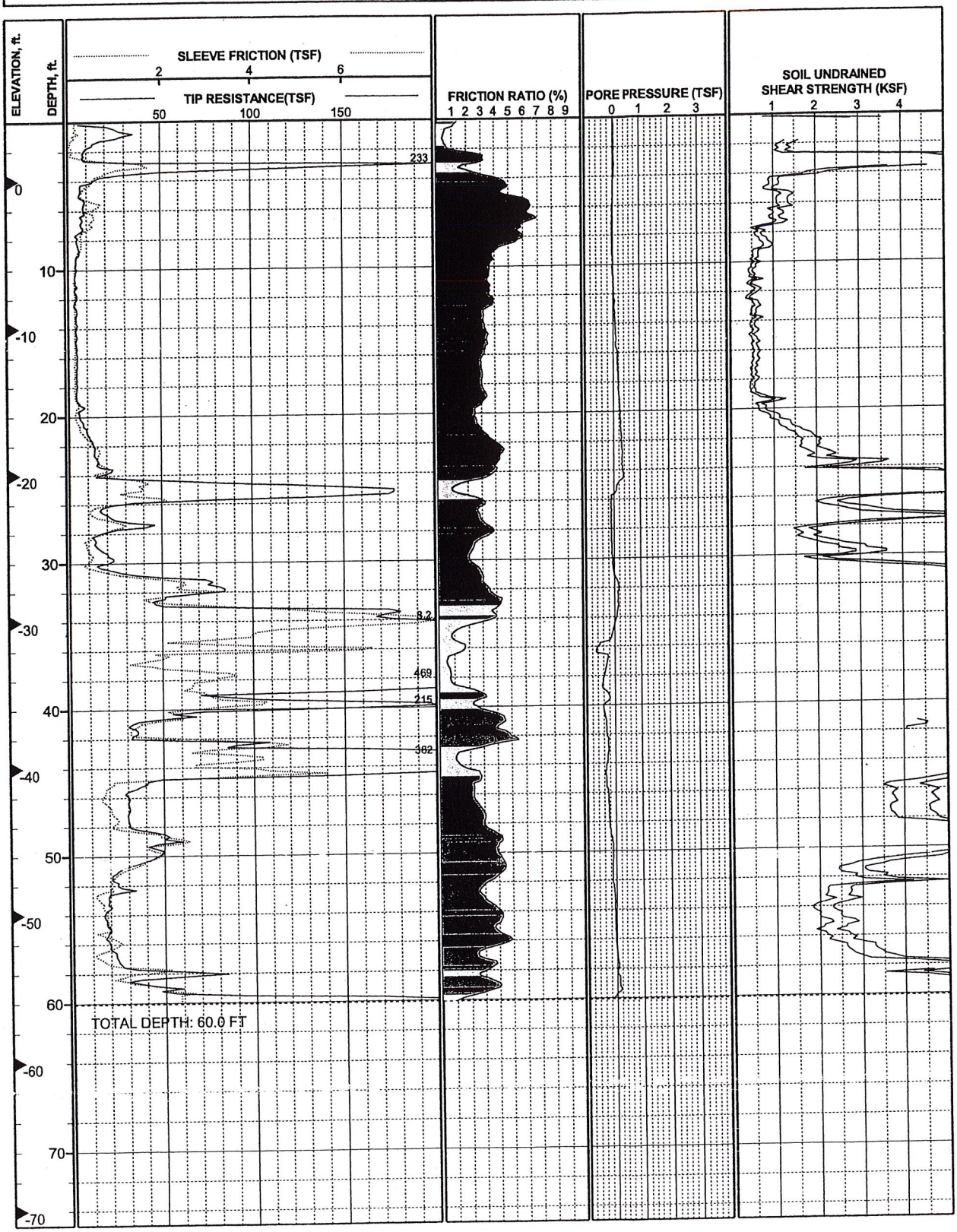


LOG OF CPT
SOUNDING CPT-9
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-10	**COORDINATES:**	E1481438 N484197	**OPERATOR**	Gregg
GROUND ELEVATION:	4.0 FT (City of Oakland)	**LOCATION:**		**TEST DATE:**	7/11/2002



LOG OF CPT

SOUNDING CPT-10

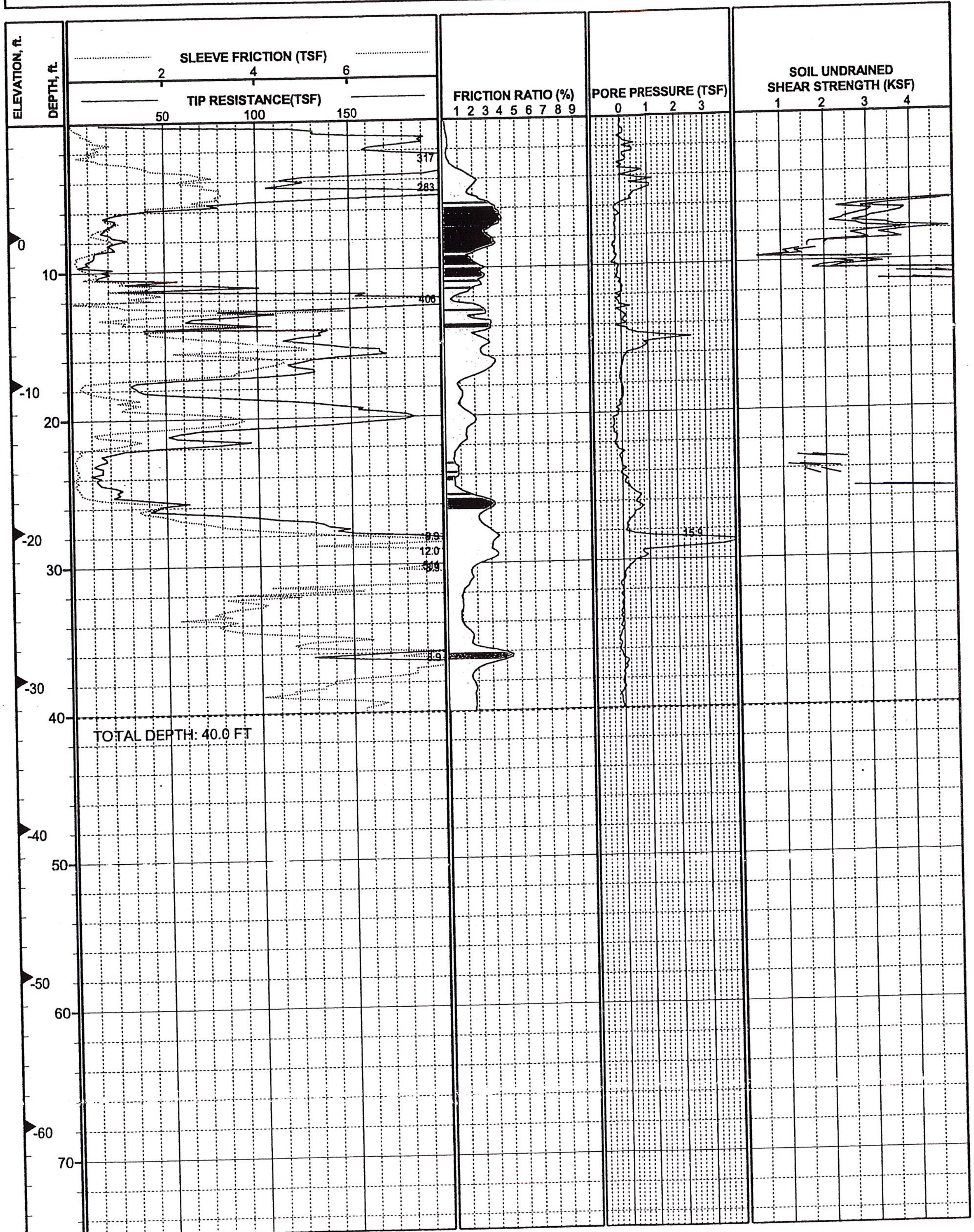
Central Station

Report Date: 10/01/02

FUGRO

October 2002
Project No. 1492.001

SOUNDING:	CPT-11	**COORDINATES:**	E1480243 N483329	**OPERATOR**	Gregg
GROUND ELEVATION:	7.5 FT (City of Oakland)	**LOCATION:**		**TEST DATE:**	8/2/2002

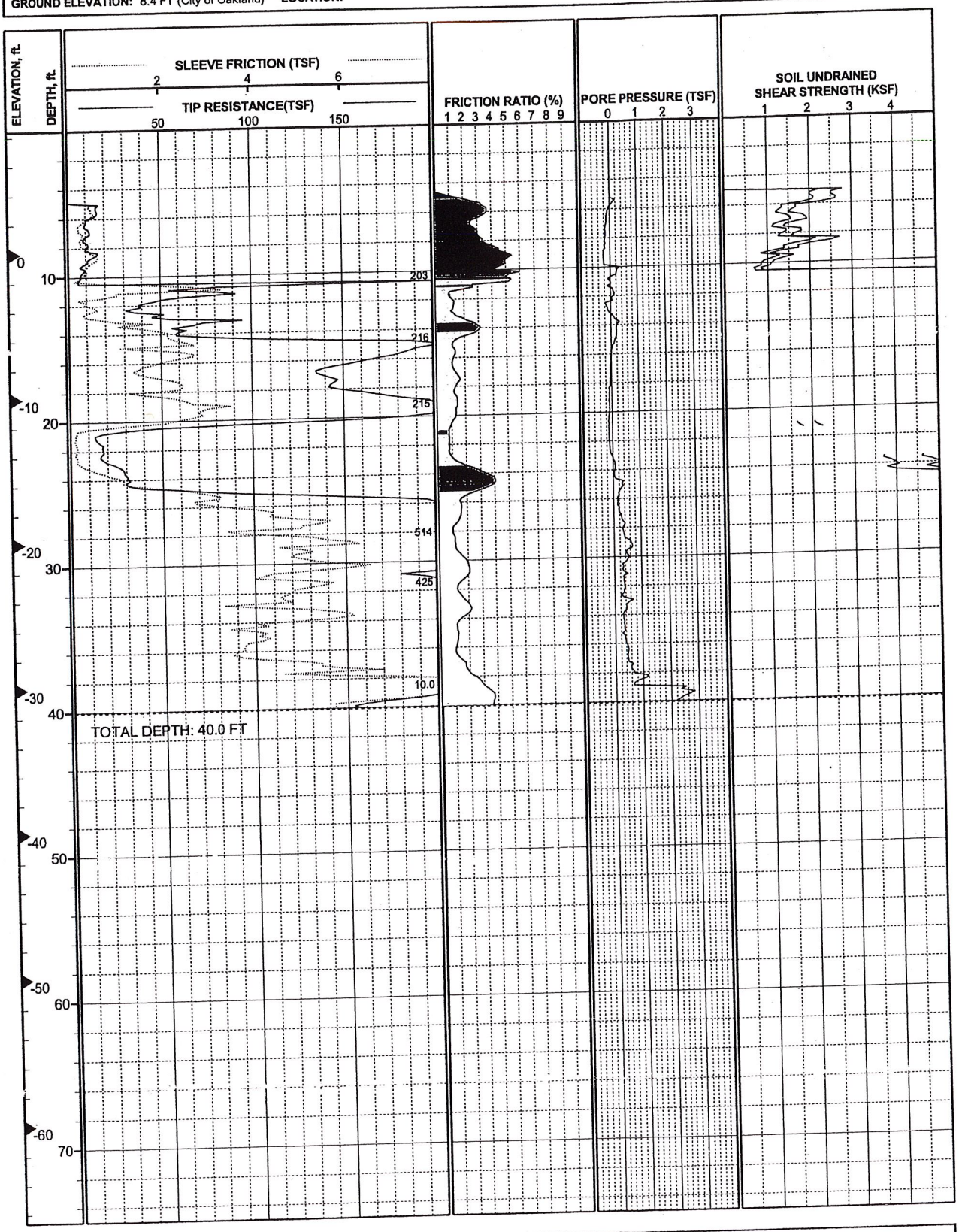


LOG OF CPT
SOUNDING CPT-11
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-12	**COORDINATES:**	E1479896 N483024	**OPERATOR**	Gregg
GROUND ELEVATION:	8.4 FT (City of Oakland)	**LOCATION:**		**TEST DATE:**	8/2/2002

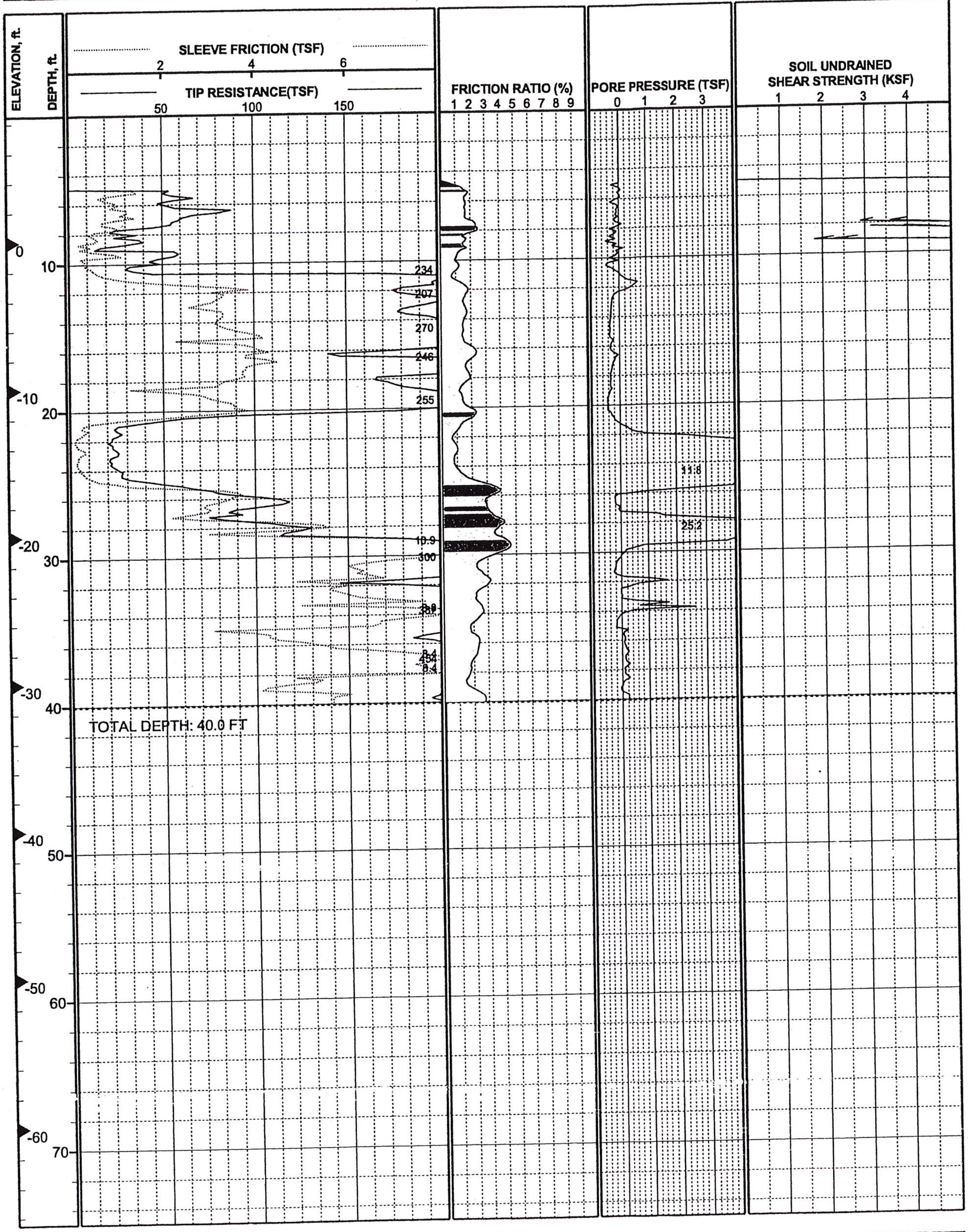


LOG OF CPT
SOUNDING CPT-12
Central Station

Report Date: 10/01/02

October 2002
Project No. 1492.001

SOUNDING:	CPT-13	COORDINATES:	E1479626 N482620	OPERATOR	Gregg
GROUND ELEVATION:	8.5 FT (City of Oakland)	LOCATION:		TEST DATE:	8/2/2002



LOG OF CPT
SOUNDING CPT-13
Central Station

Report Date: 10/01/02

APPENDIX B
LABORATORY TESTING PROGRAM

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LABORATORY TESTING PROGRAM

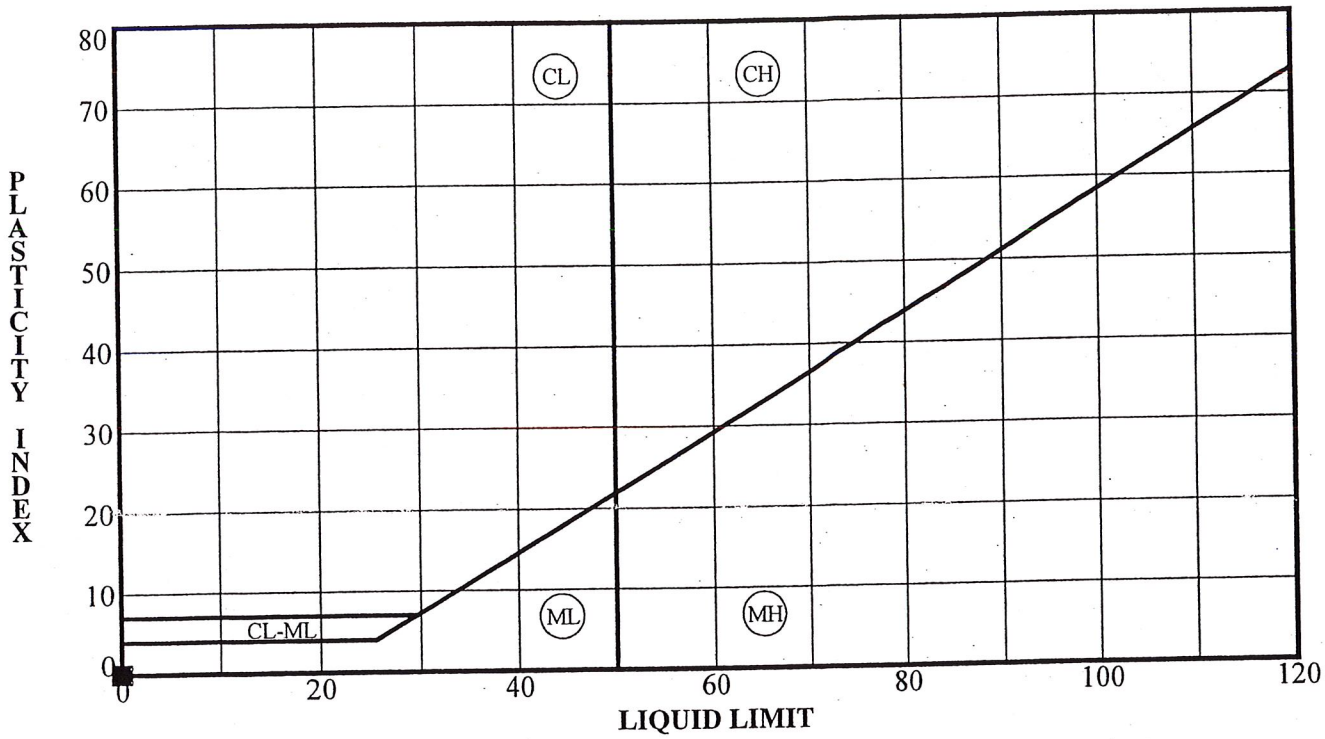
The purpose of the laboratory testing program was to provide data to assist in our evaluation of the physical and mechanical properties of the soils underlying the site.

The natural water content and dry density was determined on sixteen samples of the materials recovered from the borings in accordance with ASTM Test Designation D2216. These water contents and dry densities are recorded on the boring logs at the sample depths.

Particle size (-200) analysis was performed on two samples to evaluate the fines content of the soil and aid in soil classification. The test was performed in accordance with ASTM Test Designation D1140. The results of the tests are presented on the appropriate boring log and sample depth.

Unconsolidated undrained triaxial tests were performed on five samples to evaluate the undrained shear strength of the materials. Failure was taken as the half of the peak deviator stress. The results of the tests are presented on the boring logs at the appropriate sample depths and the stress-strain relationship is presented in this Appendix.

One-dimensional consolidation tests were performed on six samples. The consolidation properties were determined in accordance with ASTM Test Designation D2435-90. These data can be used to determine the compression characteristics of the soil in order to calculate the soil's potential to settle under load in the field. The results of the tests are presented in this appendix.



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	B-4	36.0	NP	NP	---	---	13	SM
⊠	B-4	41.0	NP	NP	---	---	50	SM/ML

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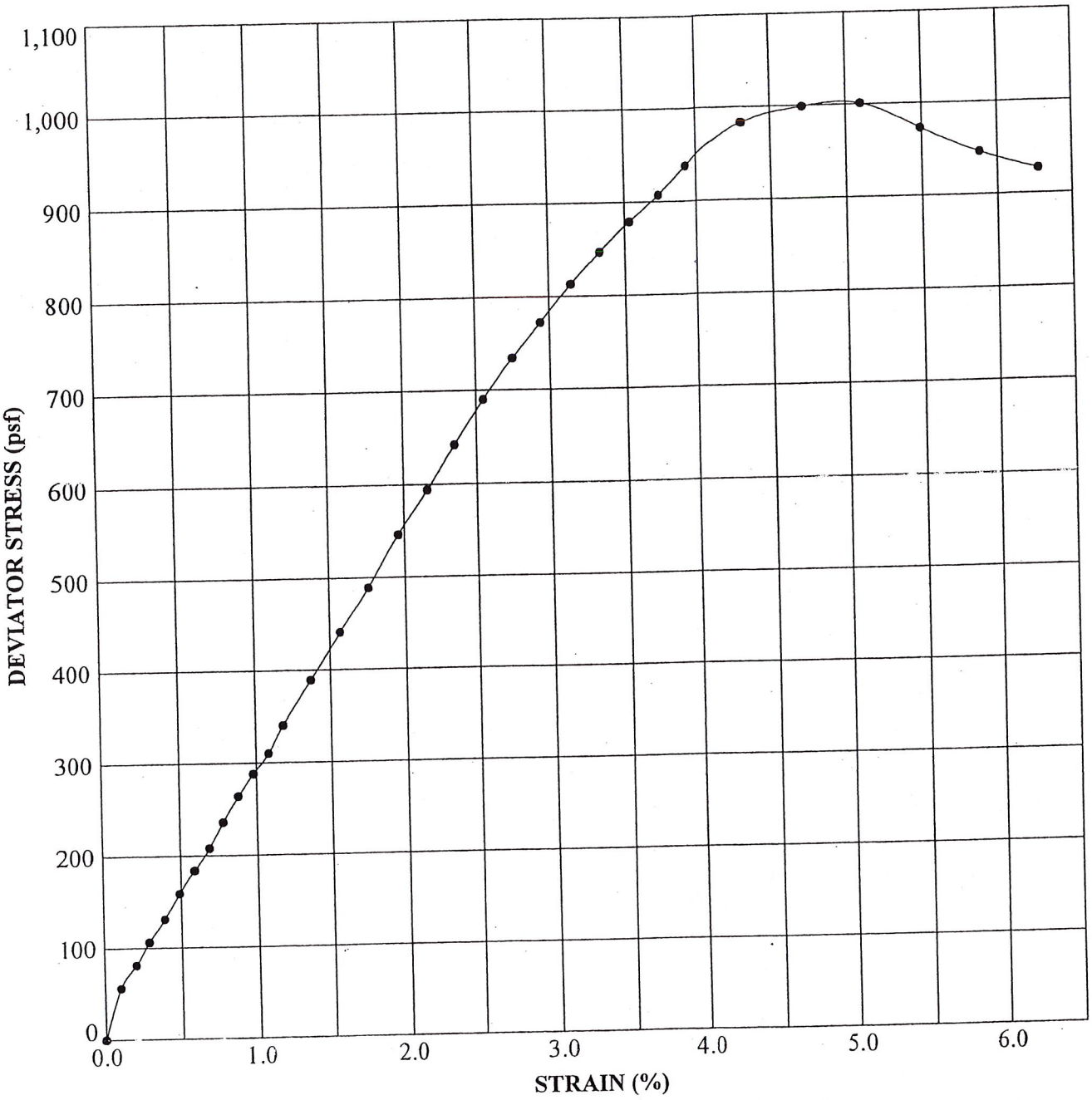
PLASTICITY CHART AND DATA

CENTRAL STATION
Oakland, California

FIGURE
B-1
PROJECT No.
1492.001

File Name: H:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: ATT_B Output Date: 8/2/02



Key Symbol	Boring	Depth (Feet)	Sample Description (USCS)	Dry Density (pcf)	Water Content (%)	Peak Deviator Stress (psf)	Strain (%)
●	B-1	6.0	Dark gray silty CLAY, some sand (CH/CL)	65.8	54.9	1,001	5.1

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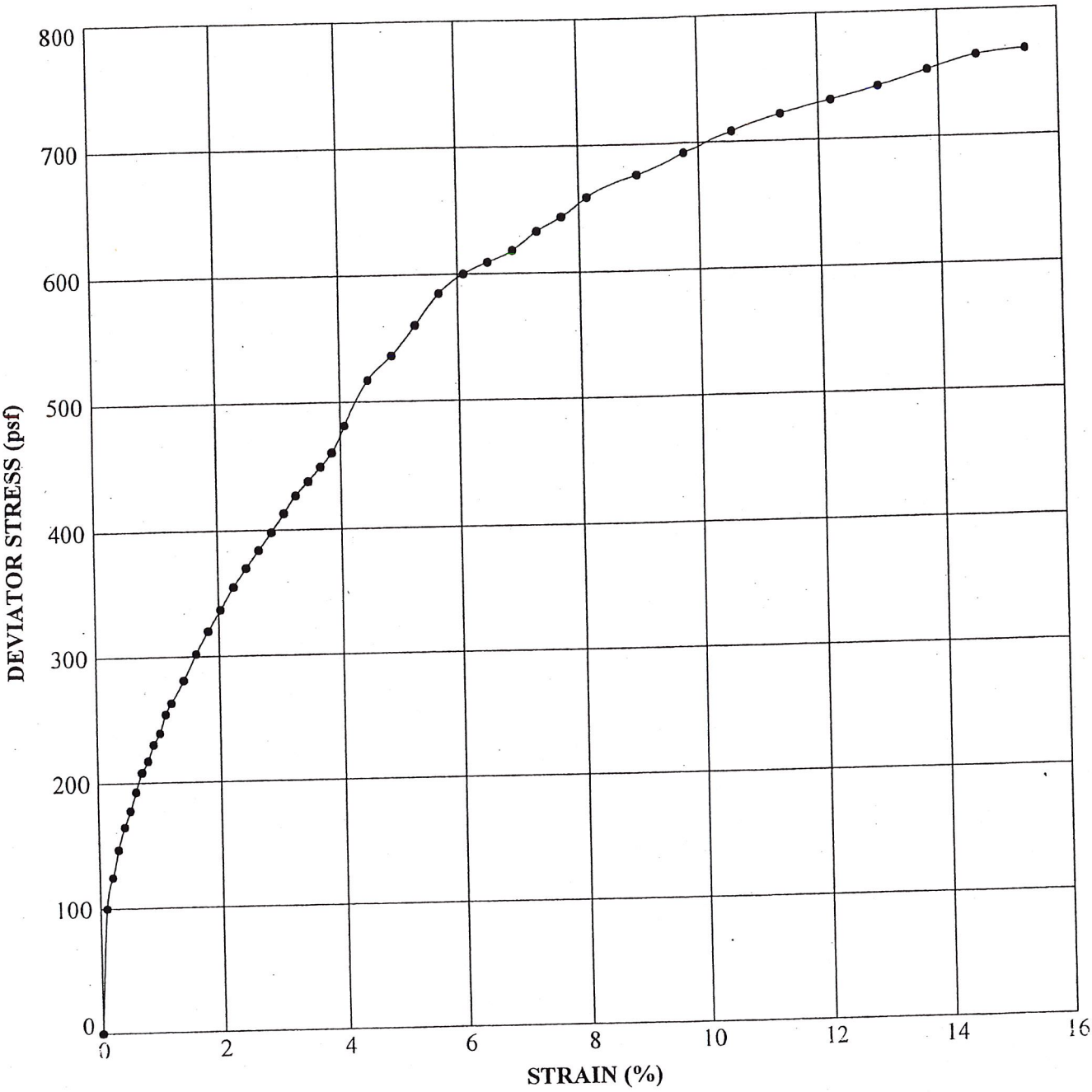
TRIAXIAL COMPRESSION TEST DATA

CENTRAL STATION
Oakland, California

FIGURE
B-2
PROJECT No.
1492.001

File Name: H:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: TRIAXIAL Output Date: 8/2/02



Key Symbol	Boring	Depth (Feet)	Sample Description (USCS)	Dry Density (pcf)	Water Content (%)	Peak Deviator Stress (psf)	Strain (%)
●	B-1	30.5	Light brown silty CLAY, some sand (CL)	73.1	29.5	768	15.5

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DATE: 8/2/02

DWG FILE: 1492001.GPJ

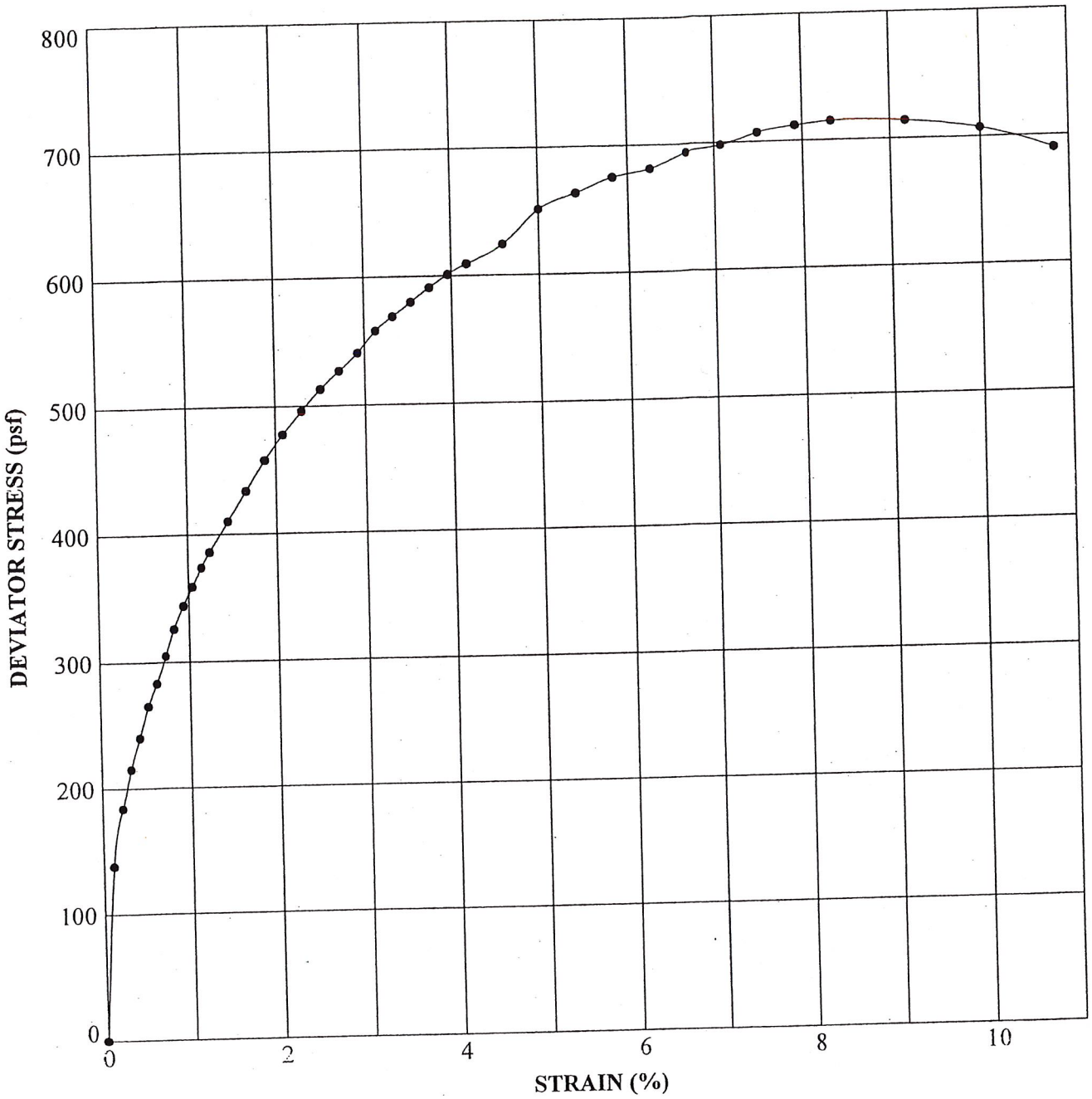
TRIAXIAL COMPRESSION TEST DATA

CENTRAL STATION
Oakland, California

FIGURE
B-3

PROJECT No.
1492.001

File Name: H:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: TRIAXIAL Output Date: 8/2/02



Key Symbol	Boring	Depth (Feet)	Sample Description (USCS)	Dry Density (pcf)	Water Content (%)	Peak Deviator Stress (psf)	Strain (%)
●	B-2	6.0	Gray silty CLAY, some sand (CH/MH)	61.6	63.9	715	8.3

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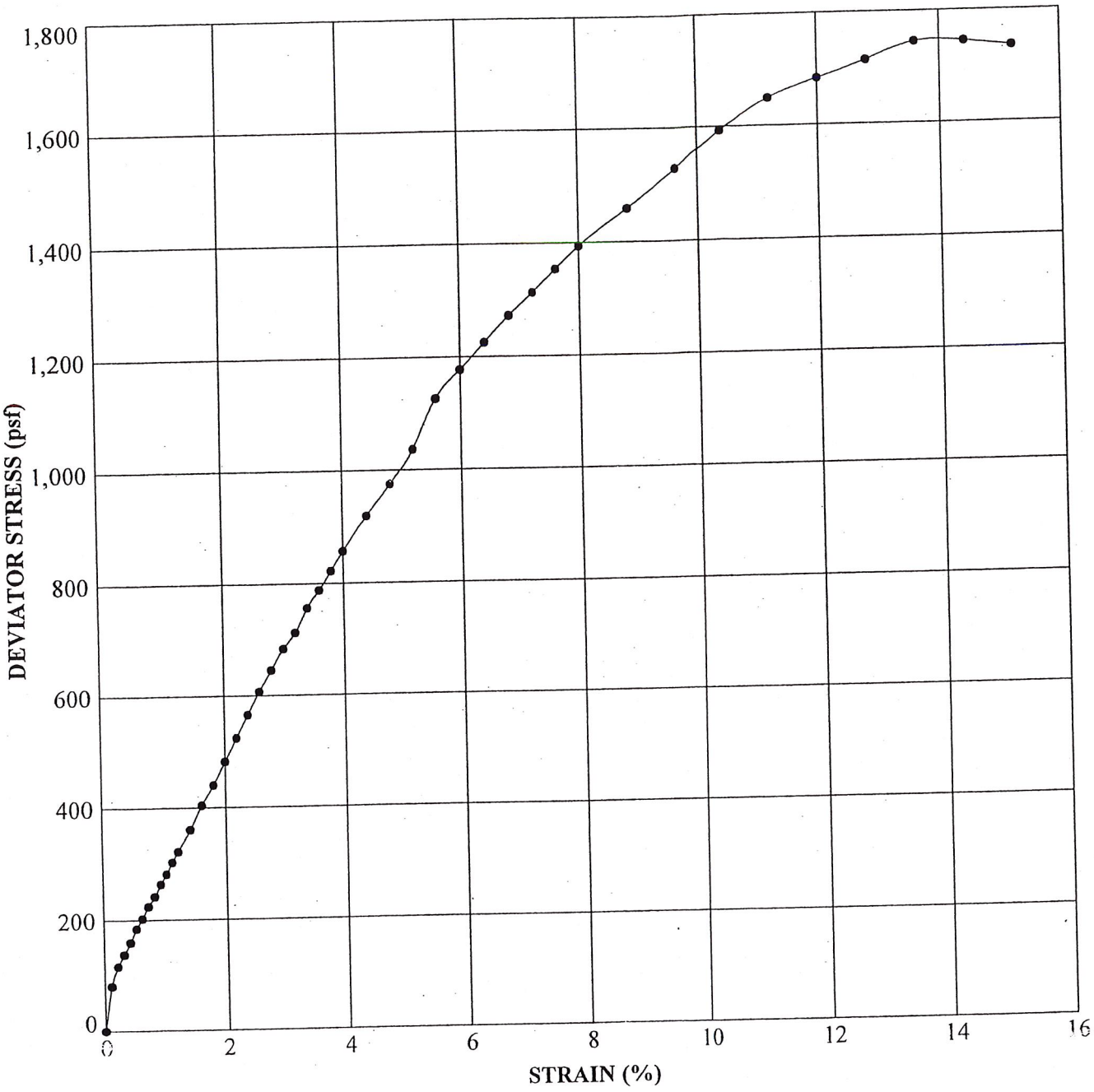
TRIAXIAL COMPRESSION TEST DATA

CENTRAL STATION
Oakland, California

FIGURE
B-4

PROJECT No.
1492.001

File Name: H:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: TRIAXIAL Output Date: 8/2/02



Key Symbol	Boring	Depth (Feet)	Sample Description (USCS)	Dry Density (pcf)	Water Content (%)	Peak Deviator Stress (psf)	Strain (%)
●	B-2	36.0	Green gray silty CLAY w/ sand, tr gravel (CL)	109.1	19.3	1,745	13.6

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DATE:	8/14/02
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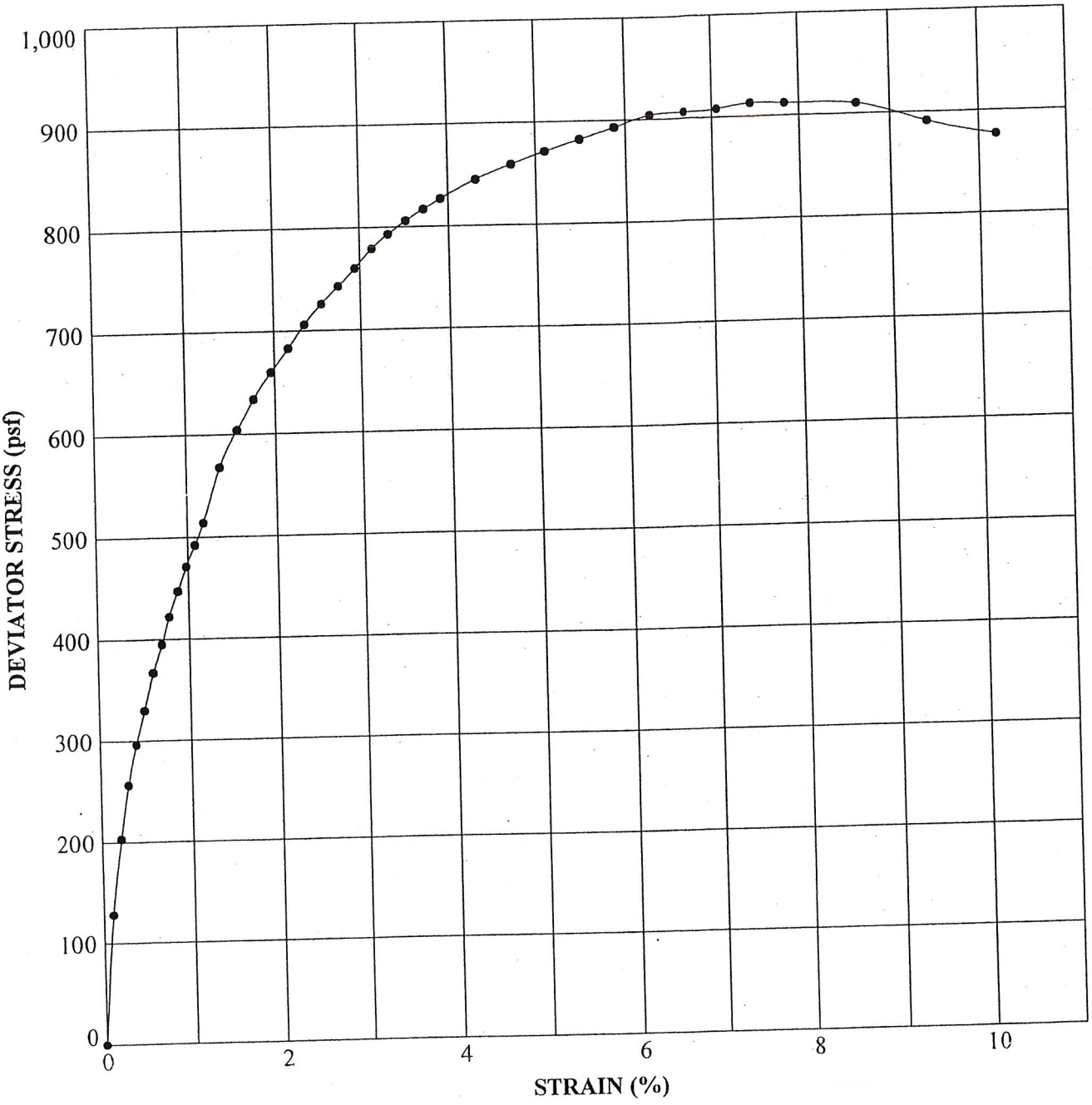
TRIAXIAL COMPRESSION TEST DATA

CENTRAL STATION
Oakland, California

FIGURE
B-5
PROJECT No.
1492.001



Key Symbol	Boring	Depth (Feet)	Sample Description (USCS)	Dry Density (pcf)	Water Content (%)	Peak Deviator Stress (psf)	Strain (%)
●	B-3	36.0	Dark gray silty CLAY, trace sand (CH/CL)	80.4	41.0	913	7.5

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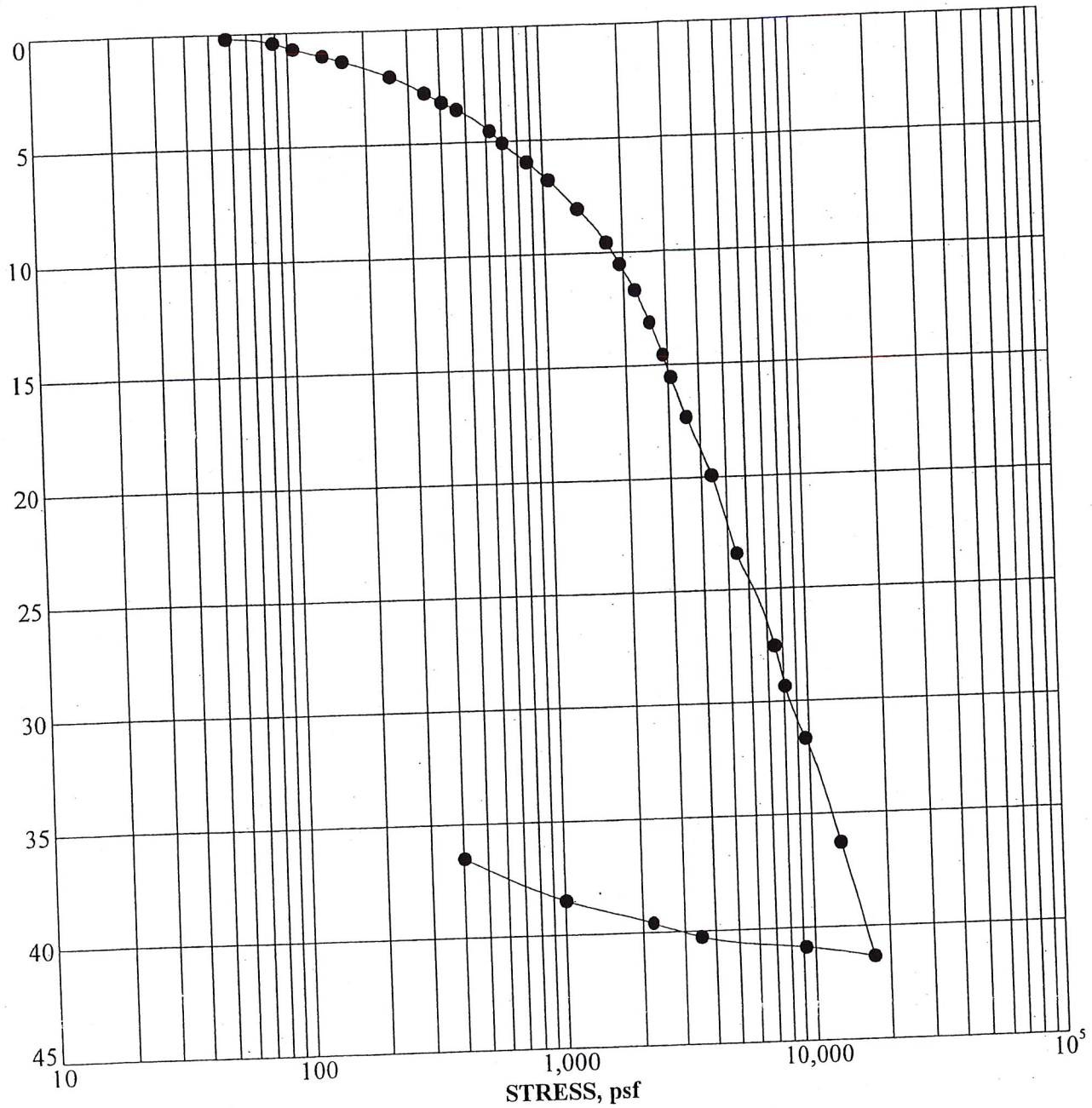
TRIAXIAL COMPRESSION TEST DATA

CENTRAL STATION
Oakland, California

FIGURE
B-6
PROJECT No.
1492.001



Key Symbol	Boring No.	Depth (Feet)	Water Content (%)		Dry Density (pcf)		Void Ratio		Saturation (%)		Max. Past Pressure (psf)	Compr. Index,Cec	Recompr. Index,Cer
			Initial	Final	Initial	Final	Initial	Final	Initial	Final			
●	B-1	12.0	132.1	74.2	37.2	55.8	3.447	1.965	101.6	100.0			

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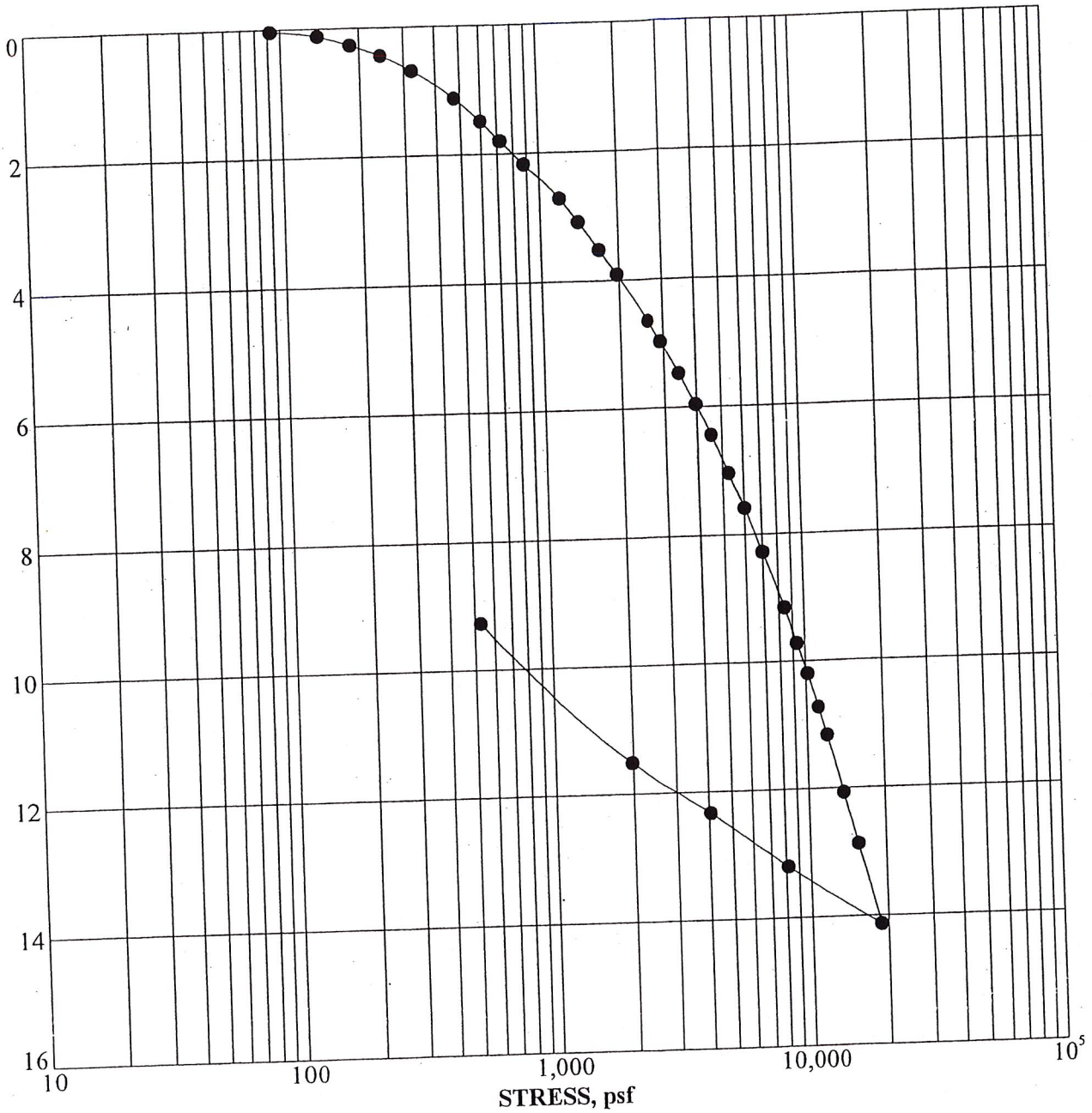
DATE:	8/8/02
DWG FILE:	1492001.GPJ

CONSOLIDATION TEST RESULTS

CENTRAL STATION
Oakland, California

FIGURE
B-7
PROJECT No.
1492.001

Name: H:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: CONSOL_STRAIN Output Date: 8/8/02



Key Symbol	Boring No.	Depth (Feet)	Water Content (%)		Dry Density (pcf)		Void Ratio		Saturation (%)		Max. Past Pressure (psf)	Compr. Index,Cec	Recompr. Index,Cer
			Initial	Final	Initial	Final	Initial	Final	Initial	Final			
●	B-2	30.0	29.4	24.4	93.4	101.6	0.805	0.659	98.7	100.0			

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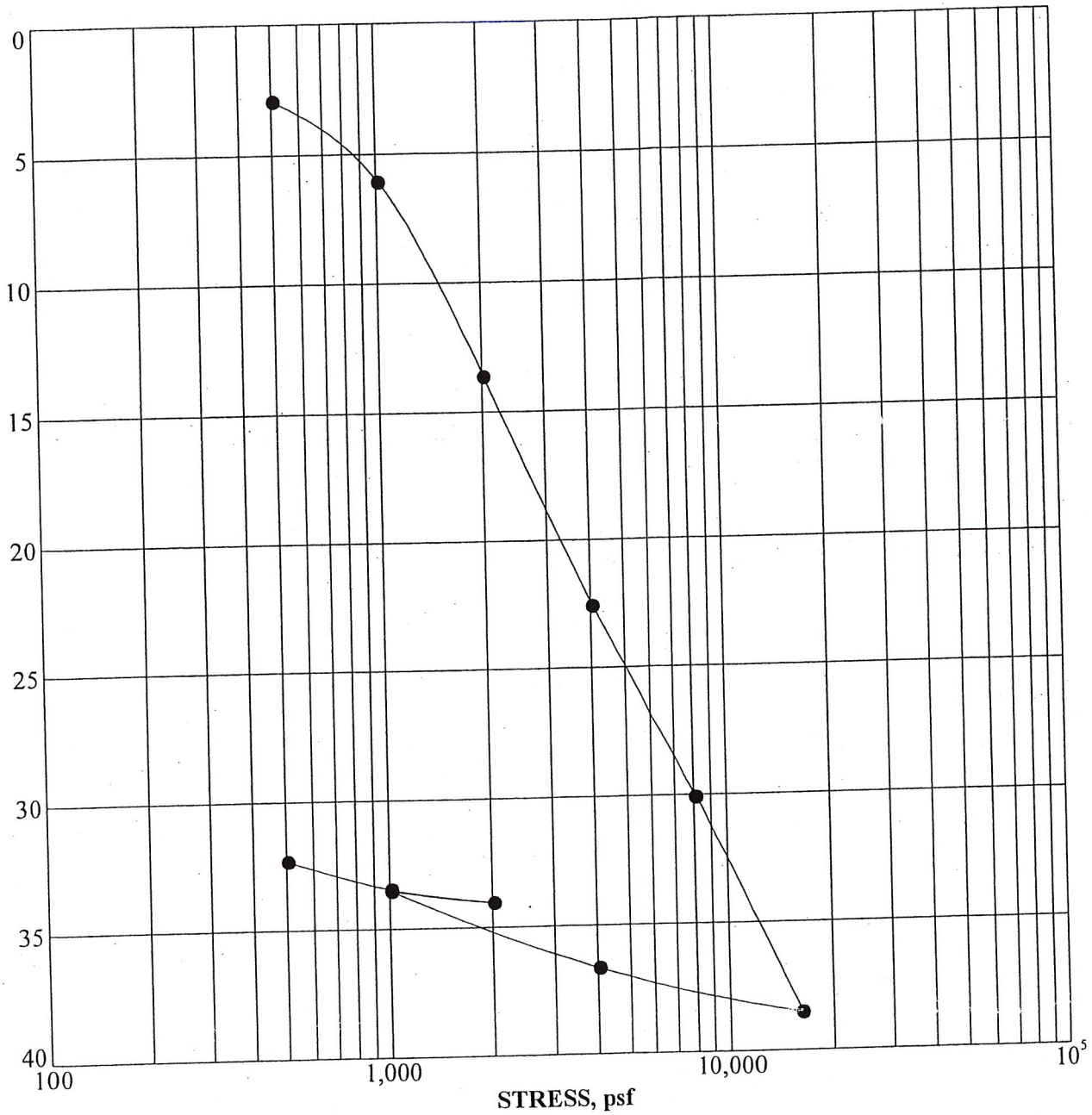
APP'D BY:	
DATE:	8/9/02
DWG FILE:	1492001.GPJ

CONSOLIDATION TEST RESULTS

CENTRAL STATION
Oakland, California

FIGURE
B-8
PROJECT No.
1492.001



Key Symbol	Boring No.	Depth (Feet)	Water Content (%)		Dry Density (pcf)		Void Ratio		Saturation (%)		Max. Past Pressure (psf)	Compr. Index,Cec	Recompr. Index,Cer
			Initial	Final	Initial	Final	Initial	Final	Initial	Final			
●	B-3	10.0	92.3	50.7	47.8	70.6	2.461	1.343	99.4	100.0			

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DATE:	8/14/02
DWG FILE:	1492001.GPJ

CONSOLIDATION TEST RESULTS

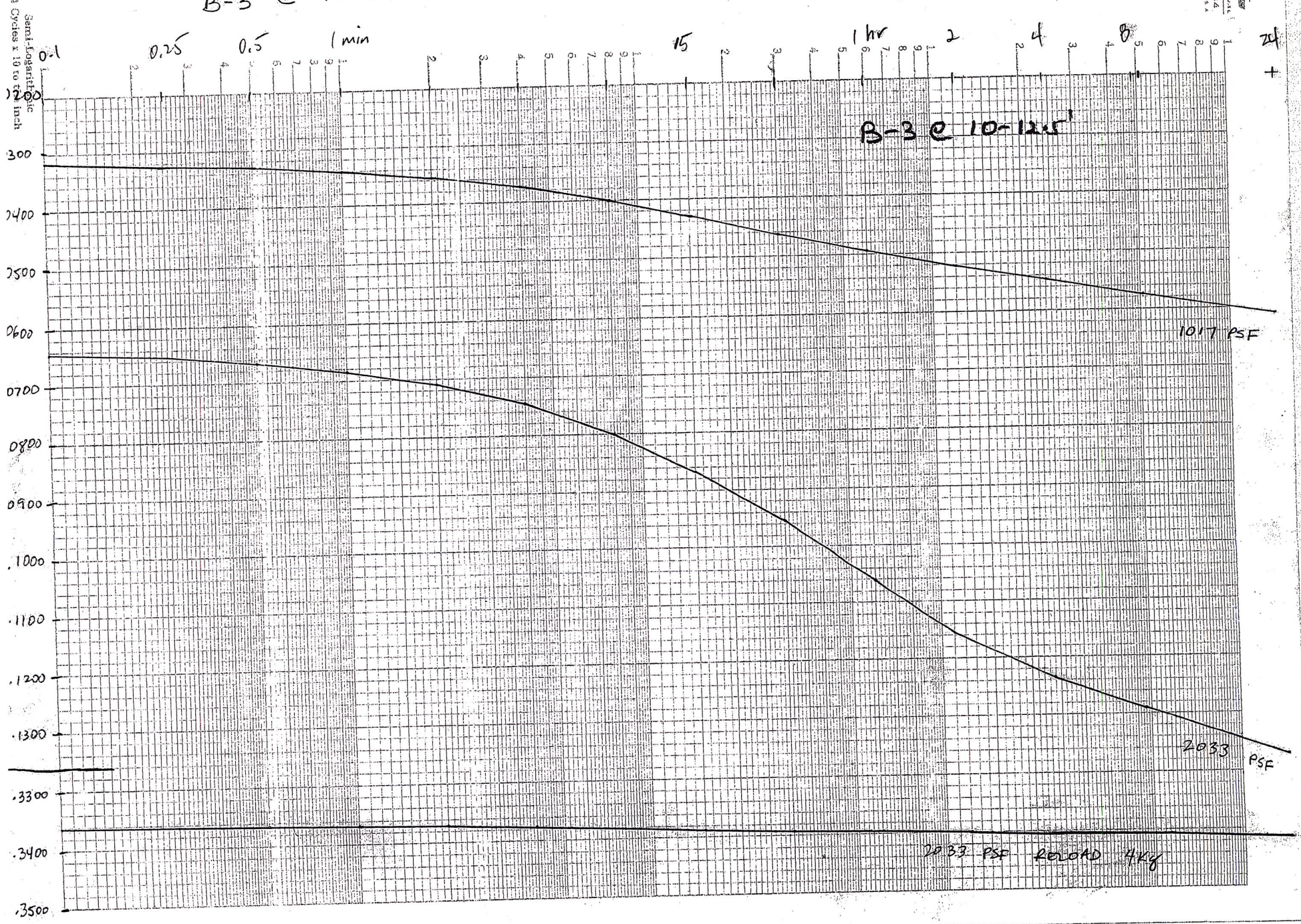
CENTRAL STATION
Oakland, California

FIGURE
B-9
PROJECT No.
1492.001

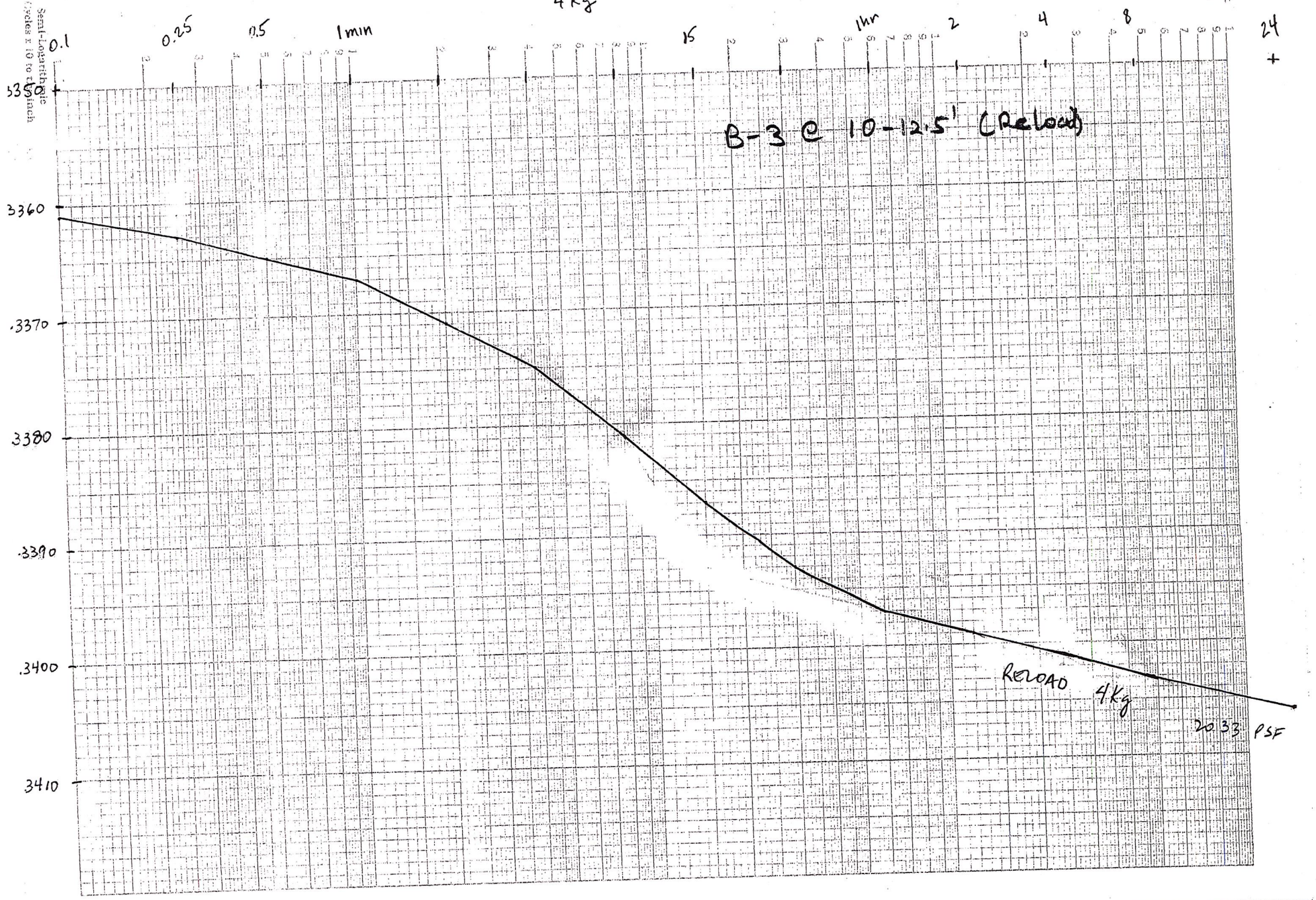
File Name: F:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: CONSOL_STRAIN Output Date: 8/14/02

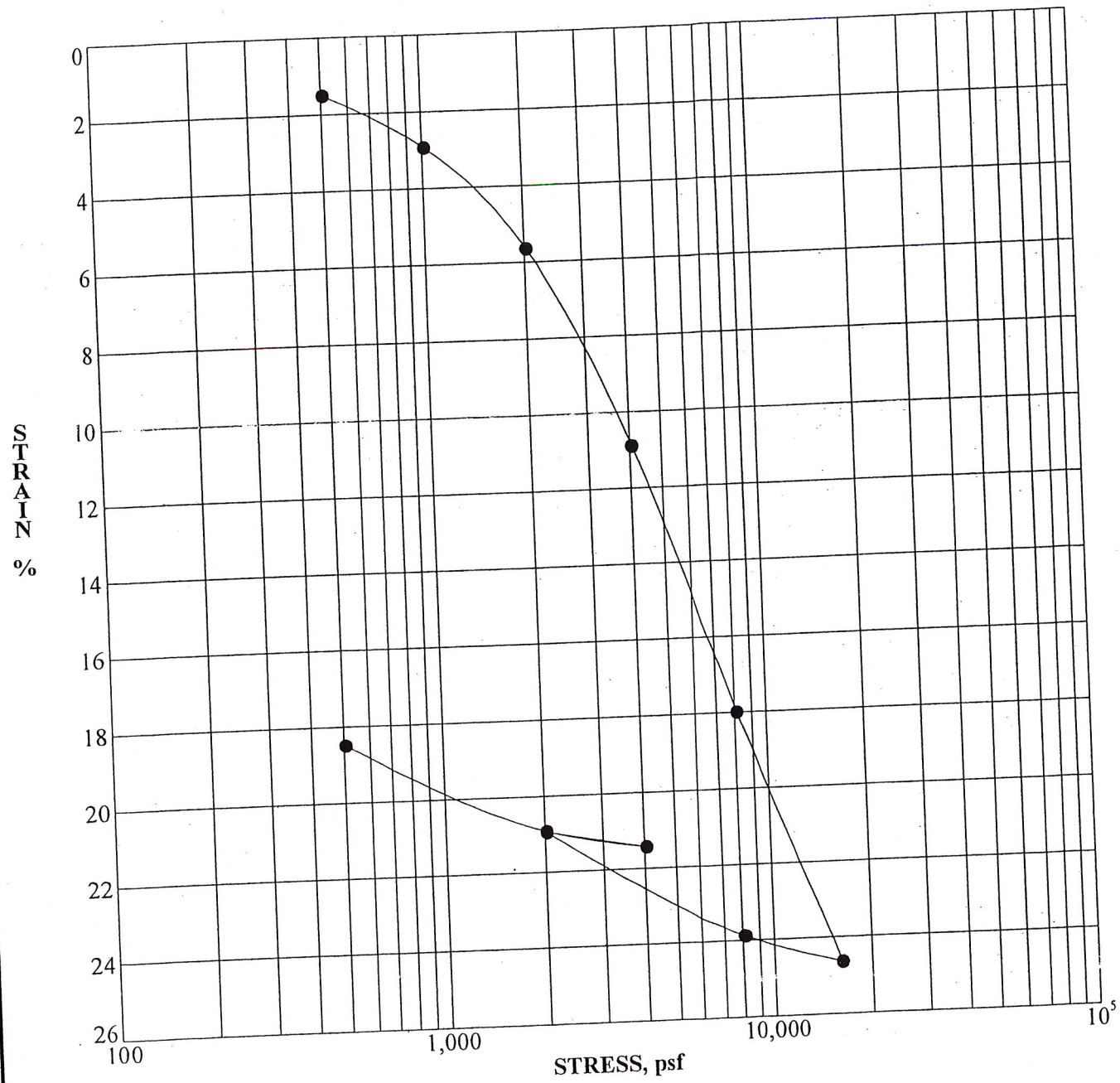
1492.001

B-3 @ 10-12.5



1492.001
B-3 @ 10-12.5 RELOAD
4 Kg





Key Symbol	Boring No.	Depth (Feet)	Water Content (%)		Dry Density (pcf)		Void Ratio		Saturation (%)		Max. Past Pressure (psf)	Compr. Index,Cec	Recompr. Index,Cer
			Initial	Final	Initial	Final	Initial	Final	Initial	Final			
●	B-3	30.5	52.2	35.9	69.1	84.8	1.394	0.951	99.2	100.1			

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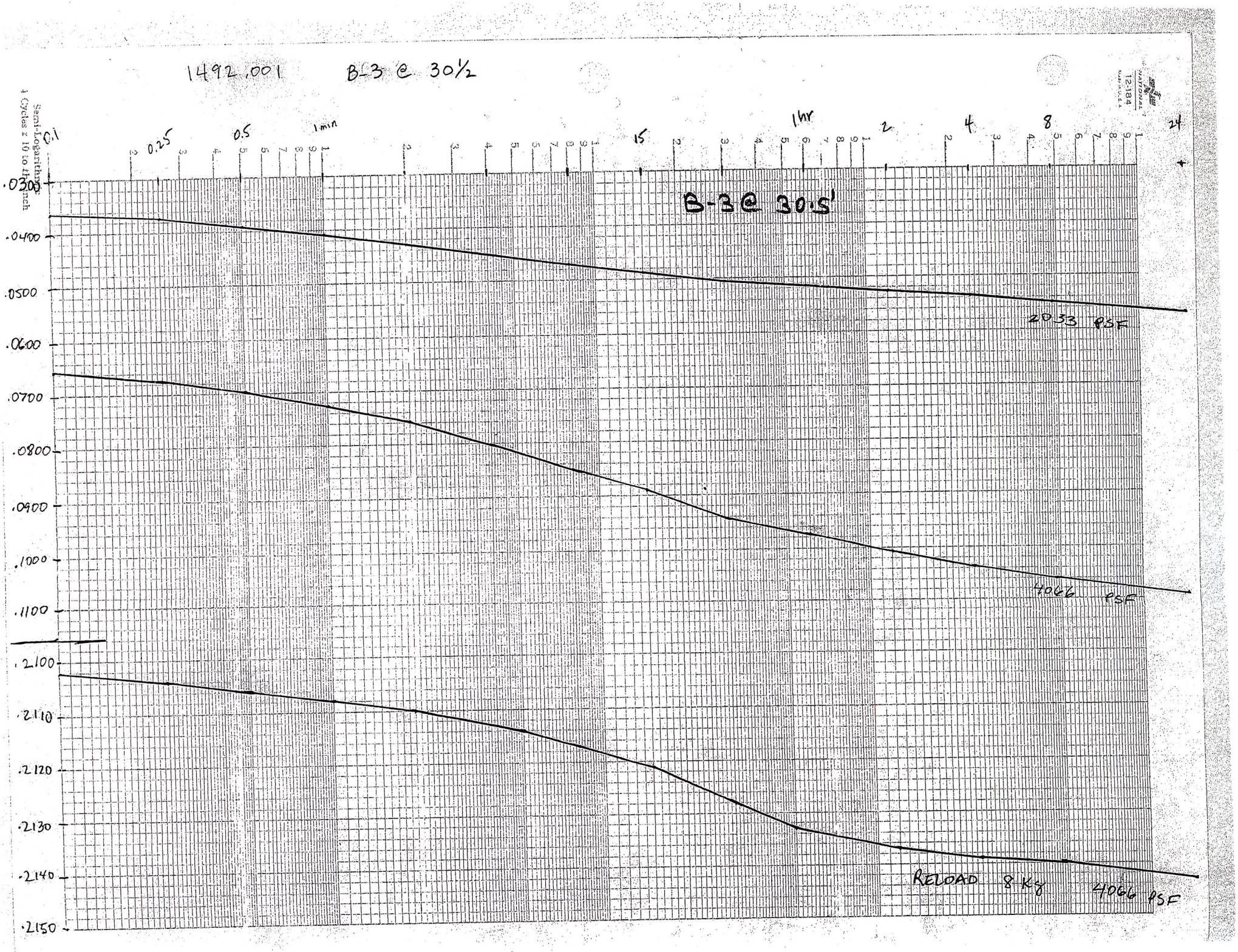
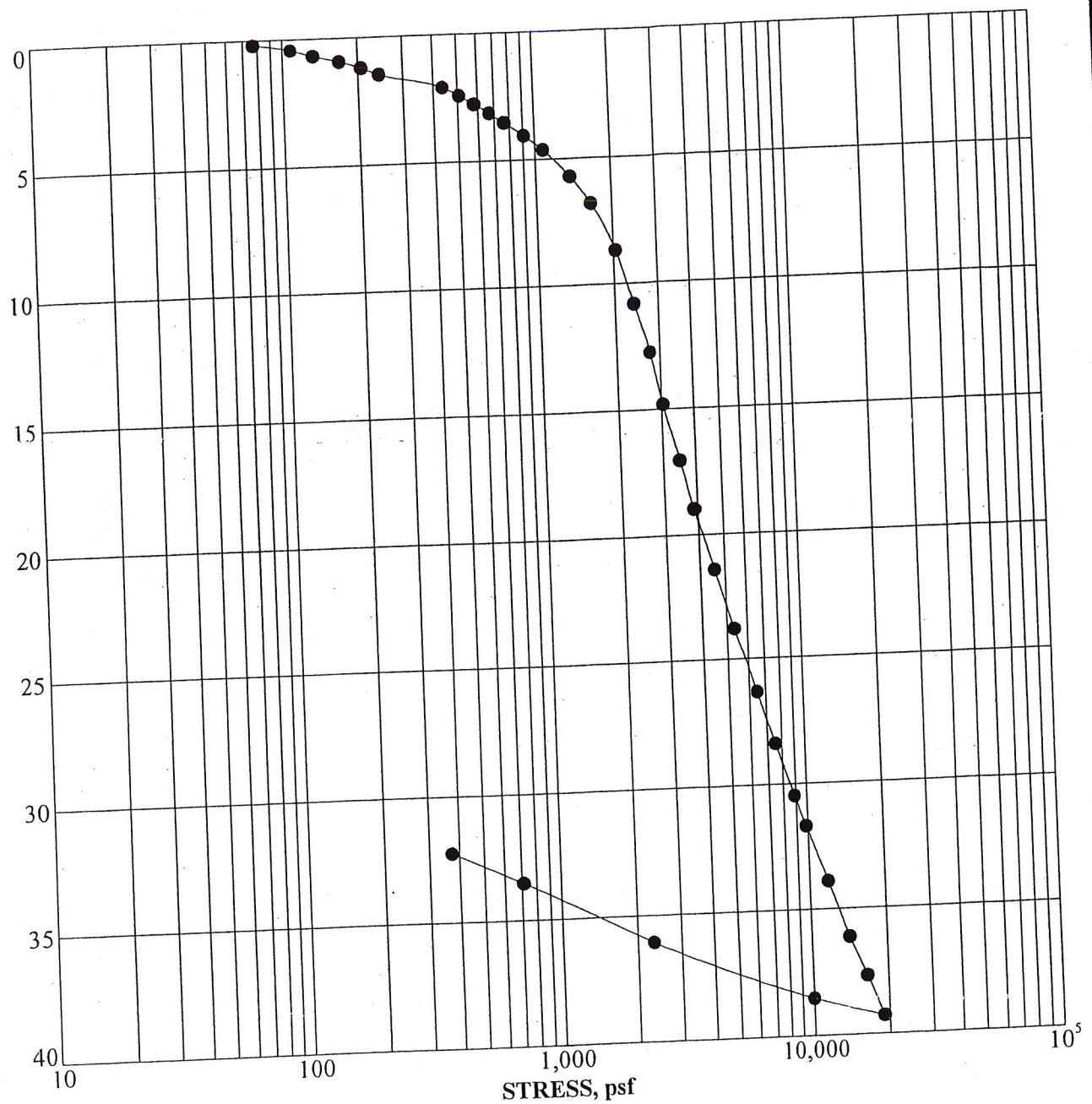
CONSOLIDATION TEST RESULTS

CENTRAL STATION
Oakland, California

FIGURE
B-10
PROJECT No.
1492.001


1492.001
B-3 @ 30½
B-3 @ 30.5'
2033 PSF
4066 PSF
RELOAD 8 KG 4066 PSF
Semi-Logarithmic
4 Cycles x 10 to Inch
0.1
0.25
0.5
1 min
15
1 hr
2
4
8
24
.0300
.0400
.0500
.0600
.0700
.0800
.0900
.1000
.1100
.2100
.2110
.2120
.2130
.2140
.2150



Key Symbol	Boring No.	Depth (Feet)	Water Content (%)		Dry Density (pcf)		Void Ratio		Saturation (%)		Max. Past Pressure (psf)	Compr. Index,Cec	Recompr. Index,Cer
			Initial	Final	Initial	Final	Initial	Final	Initial	Final			
●	B-4	17.0	83.6	46.8	51.2	73.8	2.231	1.242	99.3	99.9			

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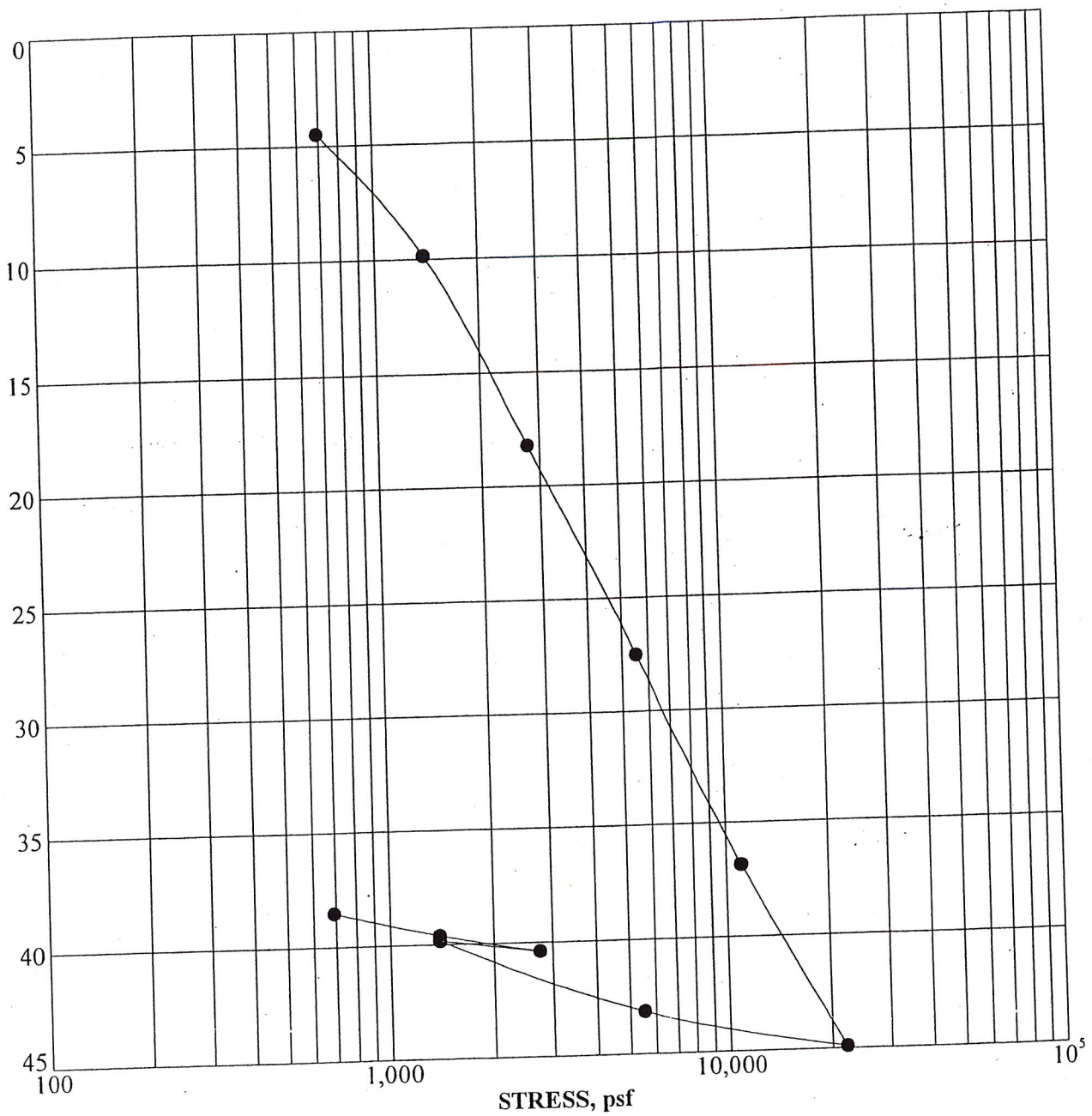
DWG FILE: 1492001.GPJ

CONSOLIDATION TEST RESULTS

CENTRAL STATION
Oakland, California

FIGURE
B-11
PROJECT No.
1492.001

Name: H:\ENGINEER\GINTW\PROJECTS\1492001.GPJ Report Template: CONSOL_STRAIN Output Date: 8/8/02



Key Symbol	Boring No.	Depth (Feet)	Water Content (%)		Dry Density (pcf)		Void Ratio		Saturation (%)		Max. Past Pressure (psf)	Compr. Index,Cec	Recompr. Index,Cer
			Initial	Final	Initial	Final	Initial	Final	Initial	Final			
●	B-4	31.0	165.2	97.7	28.3	46.1	4.846	2.589	90.3	100.0			

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DWG FILE: 1492001.GPJ

CONSOLIDATION TEST RESULTS

CENTRAL STATION
Oakland, California

FIGURE
B-12
PROJECT No.
1492.001