Appendix E: Geotechnical Assessment Report

1 November 2007
Project No. 4644.01

Dr. Glenn Boyce
Jacobs Associates
465 California Street, Suite 1000
San Francisco, California 94104

Subject: Summary of Geotechnical Assessment
Vista Grande Drainage Basin Alternative Analysis Project
Daly City, California

Dear Dr. Boyce:

This letter summarizes the results of our geotechnical assessment for storm water drainage alternatives for the Vista Grande Drainage Basin in Daly City. The purpose of our geotechnical assessment is to collect geotechnical information from available sources. The information collected will be used to develop a geotechnical exploration program when the storm water drainage alternative(s) is selected.

PROJECT BACKGROUND

The Vista Grande Drainage Basin Alternatives Analysis Project has been undertaken by the City of Daly City to address storm-related flooding in the Vista Grande Watershed Drainage Basin, specifically the downstream area around the Vista Grande canal and tunnel at Lake Merced Boulevard and John Muir Drive. The underground system in this area conveys storm flows generated within the basin to Lake Merced Boulevard and then north to the Vista Grande canal, where it is discharged via a tunnel and outfall structure into the Pacific Ocean near Fort Funston.

Ten initial alternatives were developed by Jacobs Associates to address the flood problem. The City compared the alternatives and identified seven alternatives (Alternatives 1A, 4, 5B, 6, 7, 9, and 10) for further investigation. These seven alternatives are summarized below:

- Alternative 1A includes possible tunnel alignment running from the north side of the Westlake Senior Center, beneath The Olympic Club to a new outfall structure near Thorton State Beach.
- Alternative 4 includes a possible tunnel alignment running from the Westlake Park, beneath Northgate Avenue to a new outfall structure near Thorton State Beach.
- Alternative 5B includes a possible tunnel alignment running from a point approximately 800 feet from the beginning of the Vista Grande Canal to the existing outfall structure.
- Alternative 6 includes a possible tunnel alignment running from a point approximately 2,100 feet from the beginning of the Vista Grande Canal to the existing outfall structure.
- Alternative 7 includes a possible large-diameter tunnel or a microtunnel alignment running from a point approximately 3,500 feet from the beginning of the Vista Grande Canal to the existing outfall structure.

- Alternative 9 includes a stormwater detention structure located beneath Westlake Park which, following the peak runoff flow, would pump temporary stored water back into the box culvert connected to the Vista Grande Canal.

- Alternative 10 introduces a groundwater recharge feature.

These seven alternatives rely in varying degrees upon the existing system. The components of the existing system are:

- Vista Grande tunnel
- Vista Grande canal
- Daly City beach outfall
- Daly City offshore outfall
- Daly City treatment plant
- 27-inch force main
- Storm drain trunk lines.

Alternatives 1A,4, 5B, 6, and 7 assume that the existing Vista Grande tunnel will remain in service as part of the system, either as the main conveyance or as an along-side conveyance. In addition, each of the alternatives assumes the construction of a parallel tunnel (Northern alignment) or a new alignment tunnel (Southern alignment). The Northern alignment will be parallel to and nearby the existing Vista Grande tunnel. The Southern alignment will be located just south of the County Line, starting from the back parking lot of the Doelger Community Center, aligning perpendicular to the coastline, and ending at a new beach outfall structure on Thornton state beach. Alternative 9 will also include a stormwater detention structure located beneath Westlake Park. Alternative 10 will also include a groundwater recharge feature to the nearby Lake Merced and development of wetlands along John Muir Drive.

LITERATURE RESEARCH

We reviewed available literature from our files and the City of Daly City regarding the geotechnical conditions along the Northern and Southern alignments. The approximate locations of previous geotechnical investigations are presented on Figure 1. A list of pertinent maps, reports, and other literature used during our research is presented in Attachment A (References). Copies of borehole logs, site plans, maps are presented in Attachment B.

Available geotechnical information in the vicinity of the Northern alignment consists of a plan and profile drawing of the nearby Lake Merced sewer tunnel (owned by City and County of San Francisco). The Lake Merced sewer tunnel is parallel to the Vista Grande tunnel and is located about 100 feet north of Vista Grande tunnel. The profile extends from the start of the east end of the Lake Merced sewer tunnel near Lake John Muir Drive (also referenced as Lake Merced Boulevard) to the tunnel outfall at the beach. The profile also includes information from six borings drilled from the ground surface to about Elevation -

5 to -10 feet (datum not specified), which corresponds to a depth of about 5 feet below the bottom of the Lake Merced sewer tunnel.

Available geotechnical information in the vicinity of the Southern alignment primarily consists of relatively shallow borings (20 to 70 feet in total depth). Two deep borings (110 to 120 feet) were drilled in the vicinity of the Skyline Boulevard and the Southern alignment.

Gilpin Geosciences Inc. (GGI), our subconsultant, performed a geologic reconnaissance, reviewed historic aerial photographs, and researched the Bay Area libraries and archive resources to locate any documents addressing the geology in the site vicinity. Results of GGI's geologic assessment, which includes discussions on regional and site geology and site seismicity, is presented in a separate letter.

SUBSURFACE CONDITIONS

Northern Alignment

Subsurface information along the proposed Northern alignment is based on available information along the Lake Merced sewer tunnel. Two unnamed probable fault traces were mapped along the Lake Merced sewer tunnel alignment. The ground surface along the vicinity of the Northern alignment is blanketed by Dune sand, Colma formation, or Merced formation. Starting from John Muir Drive (also referenced as Lake Merced Boulevard in previous studies) to about 600 feet east, Colma formation was encountered at the ground surface. The formation consists of uncemented to moderately cemented sand (Colma sand) and contains varying amounts of clay and silt. Between about 600 feet east of John Muir Drive to the bluffs near Fort Funston, Dune sand is present above the Colma sand. The Merced formation outcrops along the bluffs west of Fort Funston. The Merced Formation is characterized by poorly consolidated and cemented sand and interbedded fine-grained units deposited in nearshore ocean environments.

Groundwater was shown to vary between about Elevation 12 feet (datum was omitted from reference) near Lake Merced Boulevard to about Elevation 0 feet at the beach.

Southern Alignment

Available information indicates subsurface conditions in the vicinity of the start of the Southern alignment consist of Dune sand to about 30 to 40 feet below the ground surface (bgs). The Dune sand varies from very loose to medium dense near the surface to dense to very dense at depth. Locally, the Dune sand may be overlain by fill. The Dune sand is underlain by Colma formation to maximum depths previously explored of 70 feet bgs.

Near the end of the Southern alignment, at Thornton state beach, subsurface information indicates the vicinity is blanketed by 30 to 40 feet of Colma formation. The upper 5 to 10 feet of Colma formation consist of loose to medium dense sand with varying amounts of silt and clay. This surficial, looser material is underlain by medium dense to very dense sand, also with varying clay and silt content that extends to a depth of about 40 feet bgs. The Colma formation is underlain by clays and sands of the Merced formation to the maximum depth explored of 120 feet bgs.

Groundwater was not encountered in any of the previous borings in the vicinity.

Westlake Park

Available information indicates subsurface conditions in the vicinity of Westlake Park consist of up to 10 feet of loose to medium dense sandy fill. The fill is likely underlain by medium dense to dense sand and silty sand layers to depths of about 30 to 40 feet. Beneath depths of 30 to 40 feet are dense to very dense sand with variable amounts of silt and thin layers of silt and clay to the maximum depths previously explored of 72 feet bgs.

Groundwater was encountered in between depths of 20 to 40 feet bgs.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Available subsurface information is insufficient for us to develop final geotechnical conclusions and recommendations for the proposed alternatives. However, we preliminarily conclude the Northern alignment appears to be feasible based on our geologic reconnaissance and document review. Based on historic landslide impacts to existing developments and the estimated depth of the failure plan (as presented in the geologic evaluation letter prepared for this project), the Southern alignment is not considered as a feasible alignment to route tunnels or pipes.

Our preliminary conclusions regarding construction considerations for the tunnel alignments, stormwater detention basin, and groundwater recharge are presented below.

Tunnel Alignments

We anticipate temporary shoring and dewatering will be required for the construction of the approach pits for tunneling. The type of shoring and dewatering will depend on the site specific soil and groundwater conditions. After the City has selected a design alternative, we should advance deep borings (about 200 feet deep) along the tunnel alignments to evaluate the subsurface soil and groundwater conditions and perform engineering analyses to provide final design recommendations for excavation, shoring, dewatering, and other geotechnical issues in support of the tunnel construction. Other construction considerations include performing environmental assessment of the soil and groundwater waste that will be generated from the tunneling operations and classifying such waste for proper disposal.

Stormwater Detention Basin

We anticipate construction of the stormwater detention basin will include excavating to depths of about 40 to 50 feet bgs. We should perform a field investigation to evaluate the soil and groundwater conditions at the site and perform engineering analyses to develop recommendations for excavation, temporary shoring and bracing, dewatering, design lateral earth pressures, foundation design criteria, tiedowns to resist hydrostatic uplift, and other geotechnical and foundation issues, as deemed appropriate. Other construction considerations should include appropriate environmental assessment of the soil and groundwater that will be generated as part of the excavation. This is necessary for proper disposal of the excavated soil and dewatering groundwater.

Recharge and Infiltration

The rate of groundwater recharge will depend on the existing soil and groundwater conditions. Based on available subsurface information in the vicinity of John Muir Drive and the Lake Merced Impound Lake, we anticipate the subsurface conditions likely consists of medium dense to very dense sand with variable amounts of silts and potentially be interbedded with thin layers of silt and clay. We estimate the infiltration rate in the area may be on the order of $1x10^{-5}$ cm/s. This value should be confirmed by field exploration and laboratory and field testing programs.

We trust this letter provides you with the information you need at this time. If you have any questions, please call.

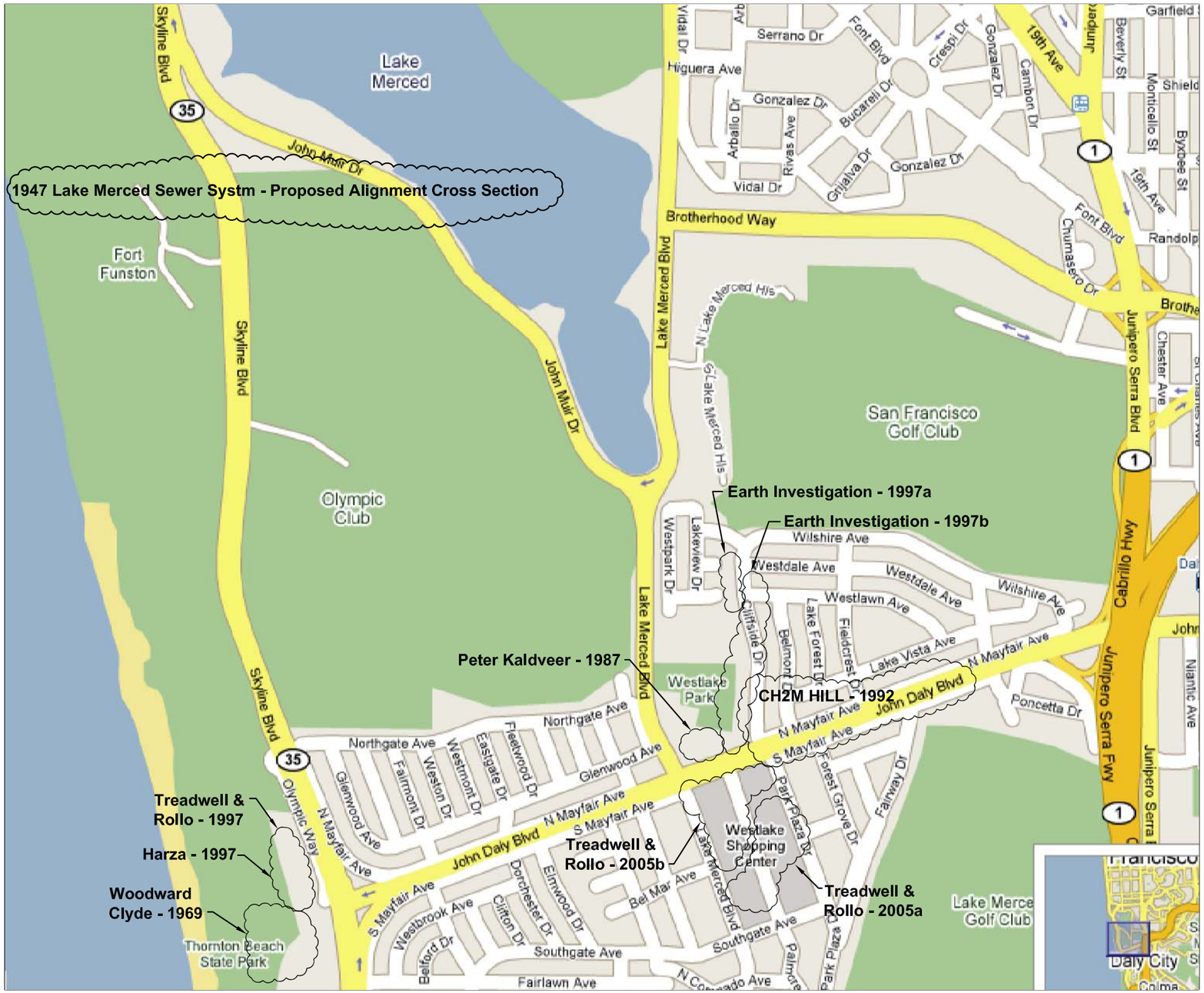
Sincerely yours,
TREADWELL & ROLLO, INC.

Linda H. Liang, G.E.
Senior Engineer

Ramin Golesorkhi, Ph.D., G.E.
Principal

46440101r1.OAK

Attachments: Figure 1 - Site Plan
Attachment A - References
Attachment B - Borehole logs, Site Plans, and Maps



EXPLANATION

Approximate area of borings performed

0 1000 2000 Feet

Approximate scale

VISTA GRANDE
DRAINAGE BASIN ALTERNATIVES
Daly City, California

SITE PLAN

Date 10/31/07	Project No. 4644.01	Figure 1

Treadwell&Rollo

S:\Trgraphics—Oak\4600's\4644.01\4644.01 Site Plan2.dwg 11/01/07

ATTACHMENT A: REFERENCES

CH2M HILL California, LLC., *Geotechnical Exploration, North Mayfair Avenue Sewer Trunk, Daly City, California*, February 1992.

City and County of San Francisco, Department of Public Works, Bureau of Engineering, *Lake Merced Sewer System, Section "D", Plan and Profile*, 1974.

Earth Investigations Consultants, *Geotechnical Investigation, Embankment Stability, Westlake Waterline Restoration Project Between El Portal Way & Parkside Avenue, Daly City, California*, 1997.

Earth Investigations Consultants, *Geotechnical Services, Soil Exploration, Proposed Sewer Improvements, Cliffside Drive @ John Daly Boulevard, Daly City, California*, 24 December1997.

Harza Consulting Engineers and Scientists, *Preliminary Geological Review and Feasibility Geotechnical Investigation, Daly City Oceanfront Property, Daly City, California*, 5 August 1995.

Peter Kaldveer and Associates, Inc., *Geotechnical Engineering Services for Proposed Treatment Plant Expansion, Daly City, California*, 27 January 1987.

Treadwell & Rollo, Inc., *Geological and Geotechnical Feasibility Investigation, Proposed Olympic Gate Development, Daly City, California*, 2 December 1997, Project 2196.01.

Treadwell & Rollo, Inc., *Geotechnical Investigation, Buildings J and K, Westlake Center, Daly City, California*, 8 April 2005, Project 3754.05.

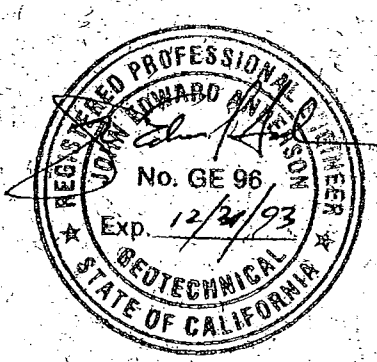
Treadwell & Rollo, Inc., *Geotechnical Investigation, Proposed Structures N, P, V, and W, Westlake Center, Daly City, California*, 28 October 2005, Project 3754.06.

Woodward-Clyde & Associates, 14 August 1969 (site plan and boring logs).

ATTACHMENT B: BOREHOLE LOGS, SITE PLANS, AND MAPS

Report ID: CH2MH-92
5 borings

GEOTECHNICAL EXPLORATION
NORTH MAYFAIR AVENUE
SEWER TRUNK
DALY CITY, CALIFORNIA



Prepared for
City of Daly City

February, 1992

by

CH2M HILL CALIFORNIA, INC.
6425 Christie Avenue, Suite 500
Emeryville, California 94608

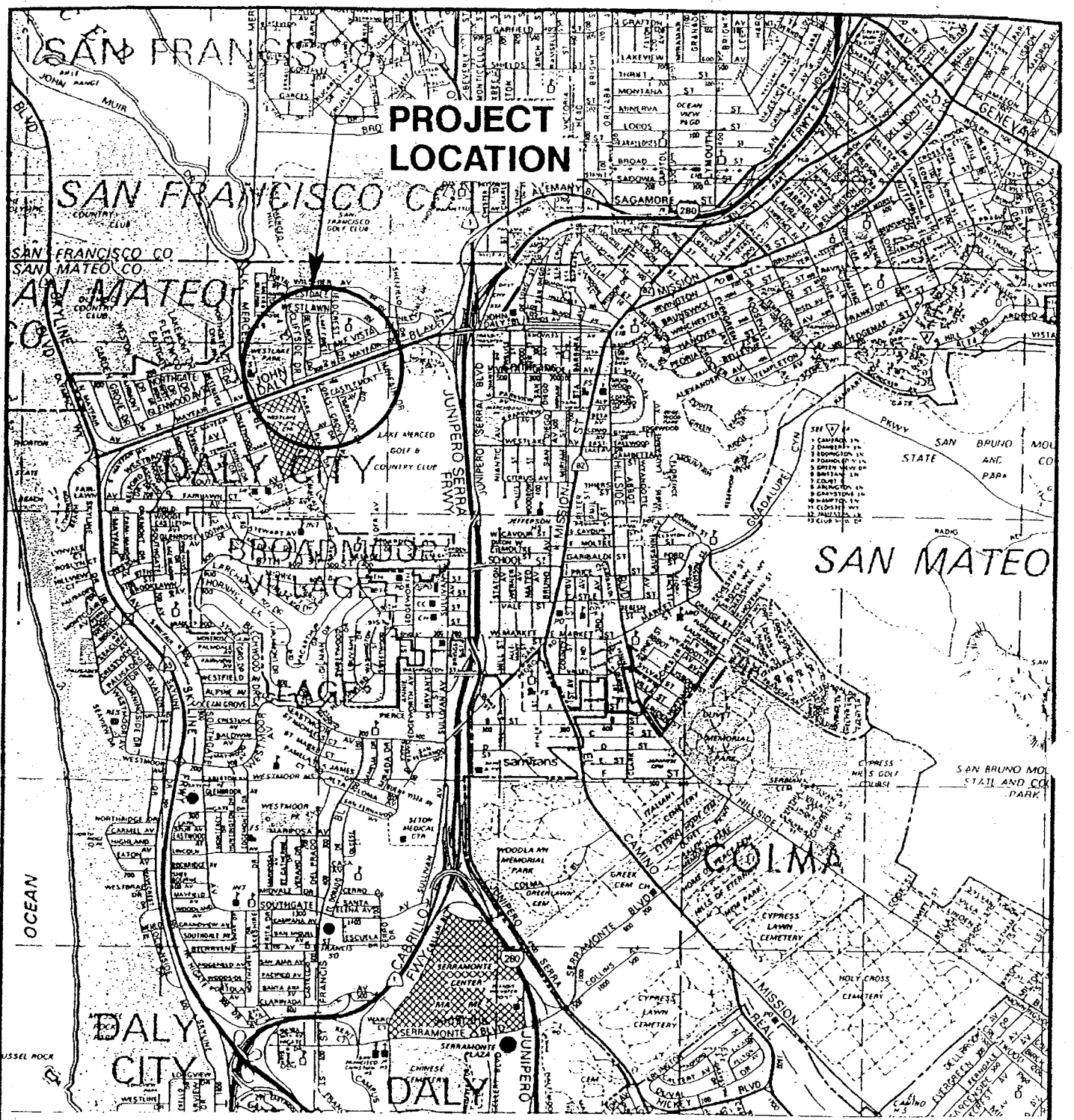


FIGURE 1
SITE LOCATION MAP
North Mayfair Avenue Sewer Trunk
Daly City, California

SFO24892.A1

CH2M HILL

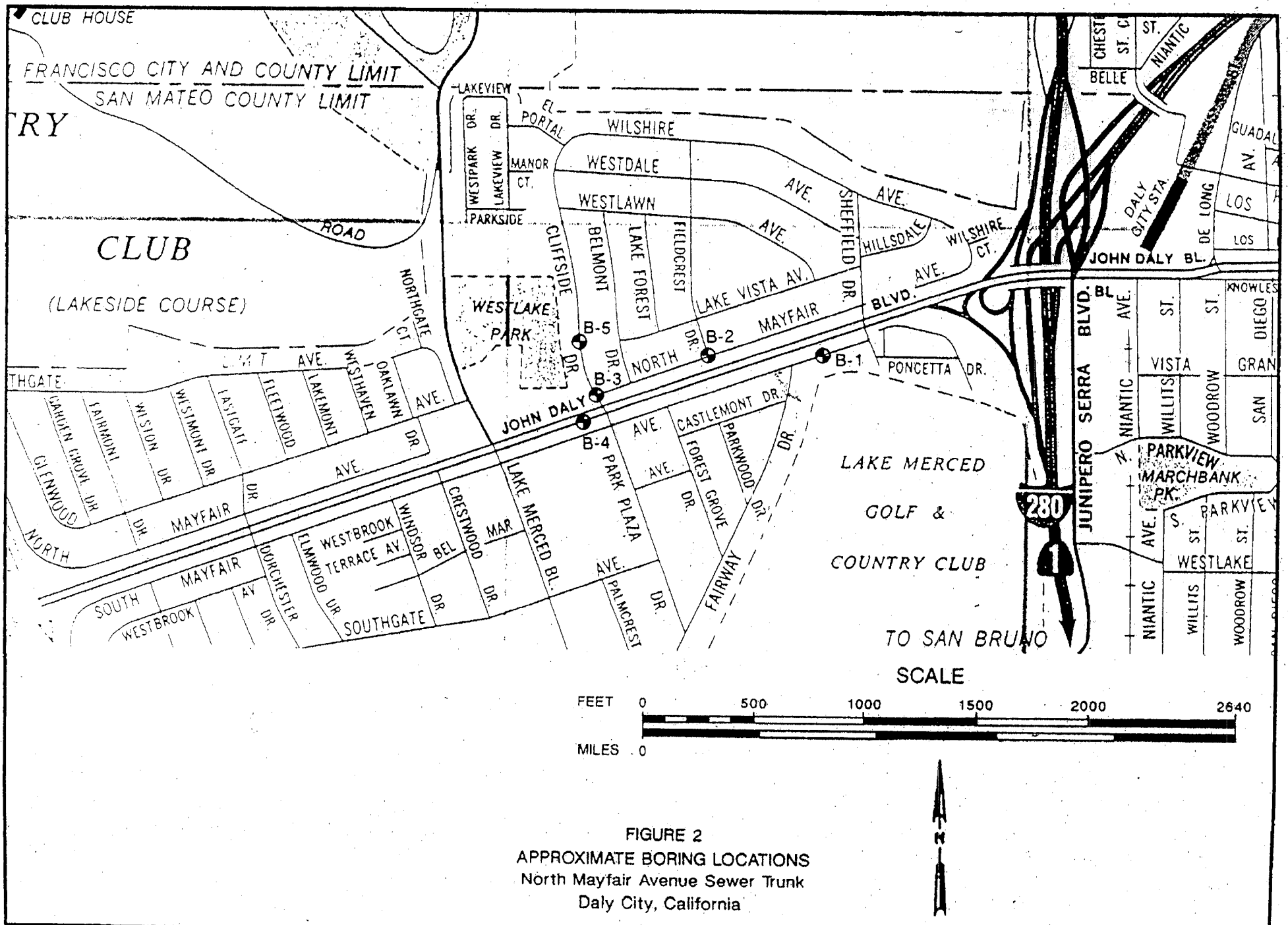


FIGURE 2
APPROXIMATE BORING LOCATIONS
North Mayfair Avenue Sewer Trunk
Daly City, California

SFO24892.A1

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION Approx. 200 ft east of Fairway on S. Mayfair

ELEVATION Approx. 122 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/17/91 FINISH 10/17/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					3" asphalt	
					POORLY GRADED SAND WITH SILT (SP-SM), brown and orangish brown, moist, medium-fine grains	
5.0	5.0					
	6.5	S-1	1.1	5-5-3 (8)	POORLY GRADED SAND WITH SILT, (SP-SM), dark brown, moist, loose, medium-fine grains	
	7.5					
	9.0	S-2	1.5	1-2-3 (5)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above	
10.0	10.0					
	11.5	S-3	1.5	1-2-3 (5)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above	
	12.5					
	14.0	S-4	1.5	2-2-3 (5)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above	
15.0	15.0					
	16.5	S-5	1.5	2-5-6 (11)	top 1": Similar to above bottom: POORLY GRADED SAND WITH SILT, (SP-SM), brown, moist, medium loose, medium-fine grains	
	20.0					
20.0	21.5	S-6	1.5	5-8-10 (18)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above	
					Total Depth = 21.5 ft	
25.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-2 SHEET 1 OF 1

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION At the intersection of Fieldcrest and N. Mayfair

ELEVATION Approx. 95 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/17/91 FINISH 10/17/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	2.5				3" asphalt	
	4.0	S-1	1.0	5-14-27 (41)	POORLY GRADED SAND, (SP), brown, some orange stains near bottom, dry dense, medium-fine grains	
5.0	5.0					
	6.5	S-2	1.0	12-27-35 (>50)	POORLY GRADED SAND, (SP), brown, grading to light olive brown, 2" orange stain 6" from bottom, moist, very dense, medium-fine grains	
	7.5					
	9.0	S-3	1.3	17-28-30 (>50)	POORLY GRADED SAND, (SP), light olive brown, similar to above	
10.0	10.0					
	11.5	S-4	1.4	10-23-23 (46)	POORLY GRADED SAND, (SP), similar to above, orange stains and pink putty-like lenses (1/8" thick) at tip	
	12.5					
	14.0	S-5	1.4	15-30-33 (>50)	POORLY GRADED SAND, (SP), light olive brown, some orange staining, moist, very dense, medium-fine grains, moister than above	
15.0	15.0					
	16.5	S-6	1.2	19-37-50 (>50)	POORLY GRADED SAND, (SP), similar to above	
	20.0					
20.0	21.5	S-7	1.4	17-40-35 (>50)	POORLY GRADED SAND, (SP), similar to above	
					Total Depth = 21.5 ft	
25.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-3
	SHEET 1 OF 2

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION At the intersection of N. Mayfair and Cliffside

ELEVATION Approx. 82 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/17/91 FINISH 10/17/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					3" asphalt	
5.0	5.0					
	6.5	S-1	1.1	12-22-33 (>50)	POORLY GRADED SAND, (SP), olive brown, some black staining, moist, very dense, medium-fine grains	
10.0	10.0					
	11.5	S-2	1.3	12-22-30 (>50)	POORLY GRADED SAND, (SP), light olive brown with orange lenses, moist, very dense, medium-fine grains	
15.0	15.0					
	16.5	S-3	1.2	15-30-50/5.5 (>50)	POORLY GRADED SAND, (SP), similar to above	
20.0	20.0					
	21.5	S-4	1.3	19-35-50/4 (>50)	POORLY GRADED SAND, (SP), similar to above	
25.0	25.0					
	26.5	S-5	1.3	13-30-30 (>50)	POORLY GRADED SAND, (SP), similar to above, no staining	
	30.0					

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-3 SHEET 2 OF 2

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION At the intersection of N. Mayfair and Cliffside

ELEVATION Approx. 82 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/17/91 FINISH 10/17/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	30.0	S-6	1.3	14-24-39 (>50)	POORLY GRADED SAND, (SP), olive brown, moist, very dense medium-fine grains	
	31.5					
	35.0					
35.0	36.5	S-7	1.3	10-25-37 (>50)	POORLY GRADED SAND, (SP), similar to above	
					Total Depth = 36.5 ft	
40.0						
45.0						
50.0						
55.0						

CH2M HILL

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-4 SHEET 1 OF 2

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION Approx. 200 ft west of Cliffside on John Daly

ELEVATION Approx. 80.5 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/18/91 FINISH 10/18/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					3" asphalt	
	5.0					
5.0		S-1	1.4	4-5-4 (9)	POORLY GRADED SAND WITH SILT, (SP-SM), brown, moist, loose, medium-fine grains	
	6.5					
	7.5					
		S-2	1.5	3-3-5 (8)	POORLY GRADED SAND WITH SILT, (SP-SM), yellowish brown, orange staining, moist, loose, medium-fine grains, pockets of cementation	
	9.0					
	10.0					
10.0		S-3	1.5	2-3-3 (6)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above, more orange	
	11.5					
	12.5					
		S-4	1.5	2-2-2 (4)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above, fairly dry	
	14.0					
	15.0					
15.0		S-5	1.5	2-6-7 (13)	POORLY GRADED SAND WITH SILT, (SP-SM), orangish brown, fairly dry, medium-loose, medium-fine grains	
	16.5					
	20.0					
20.0		S-6	1.3	6-6-4 (10)	POORLY GRADED SAND WITH SILT, (SP-SM), yellowish to olive brown, fairly dry, medium-loose, medium-fine grains	
	21.5					
	25.0					
25.0		S-7	1.3	7-15-19 (34)	top 5": POORLY GRADED SAND WITH SILT, (SP-SM), similar to above, orangish brown bottom: POORLY GRADED SAND, (SP), light olive brown with olive gray lenses, moist, dense, medium-fine grains	
	26.5					
	30.0					

CRM HILL

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-4 SHEET 2 OF 2

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION Approx. 200 ft west of Cliffside on John Daly

ELEVATION Approx. 80.5 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/18/91 FINISH 10/18/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	30.0	S-8	1.1	12-22-33 (>50)	POORLY GRADED SAND, (SP), olive gray/brown, some orange staining, moist, very dense, medium-fine grains	
	31.5					
	35.0					
35.0	36.5	S-9	1.2	7-19-25 (44)	POORLY GRADED SAND, (SP), similar to above, dense	
	40.0					
	41.5	S-10	1.2	15-22-25 (47)	POORLY GRADED SAND, (SP), similar to above	
					Total Depth = 41.5 ft	
45.0						
50.0						
55.0						

PROJECT NUMBER	BORING NUMBER
SF024892.A1.SR	B-5
	SHEET 1 OF 1

SOIL BORING LOG

PROJECT North Mayfair Avenue Trunk Sewer LOCATION Approx. 400 ft north of N. Mayfair on Cliffside

ELEVATION Approx. 76 feet DRILLING CONTRACTOR GUESS

DRILLING METHOD AND EQUIPMENT 8" hollow stem auger, B-53 drill rig

WATER LEVELS Groundwater not encountered START 10/18/91 FINISH 10/18/91 LOGGER A. Cantey

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					3" asphalt	
5.0	5.0					
	6.5	S-1	1.5	3-5-8 (13)	POORLY GRADED SAND WITH SILT, (SP-SM), brown, moist, medium-loose, medium-fine grains	
	7.5					
	9.0	S-2	1.3	10-16-14 (30)	top: Similar to above, some orange staining bottom 3": POORLY GRADED SAND WITH SILT, (SP-SM), yellowish brown, moist, medium-dense, medium-fine grains	
10.0	10.0					
	11.5	S-3	1.5	7-10-10 (20)	POORLY GRADED SAND WITH SILT, (SP-SM), yellowish to olive brown, some orange staining, moist, medium density, medium-fine grains	
	12.5					
	14.0	S-4	1.5	6-11-18 (29)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above, medium-dense	
15.0	15.0					
	16.5	S-5	1.5	7-12-14 (26)	POORLY GRADED SAND WITH SILT, (SP-SM), similar to above	
20.0	20.0					
	21.5	S-6	1.5	6-9-13 (22)	POORLY GRADED SAND WITH SILT, (SP-SM), olive brown with orange staining, moist, medium density, medium-fine grains	
					Total Depth = 21.5 ft	
25.0						

Report ID: EI-97a
4 borings

109

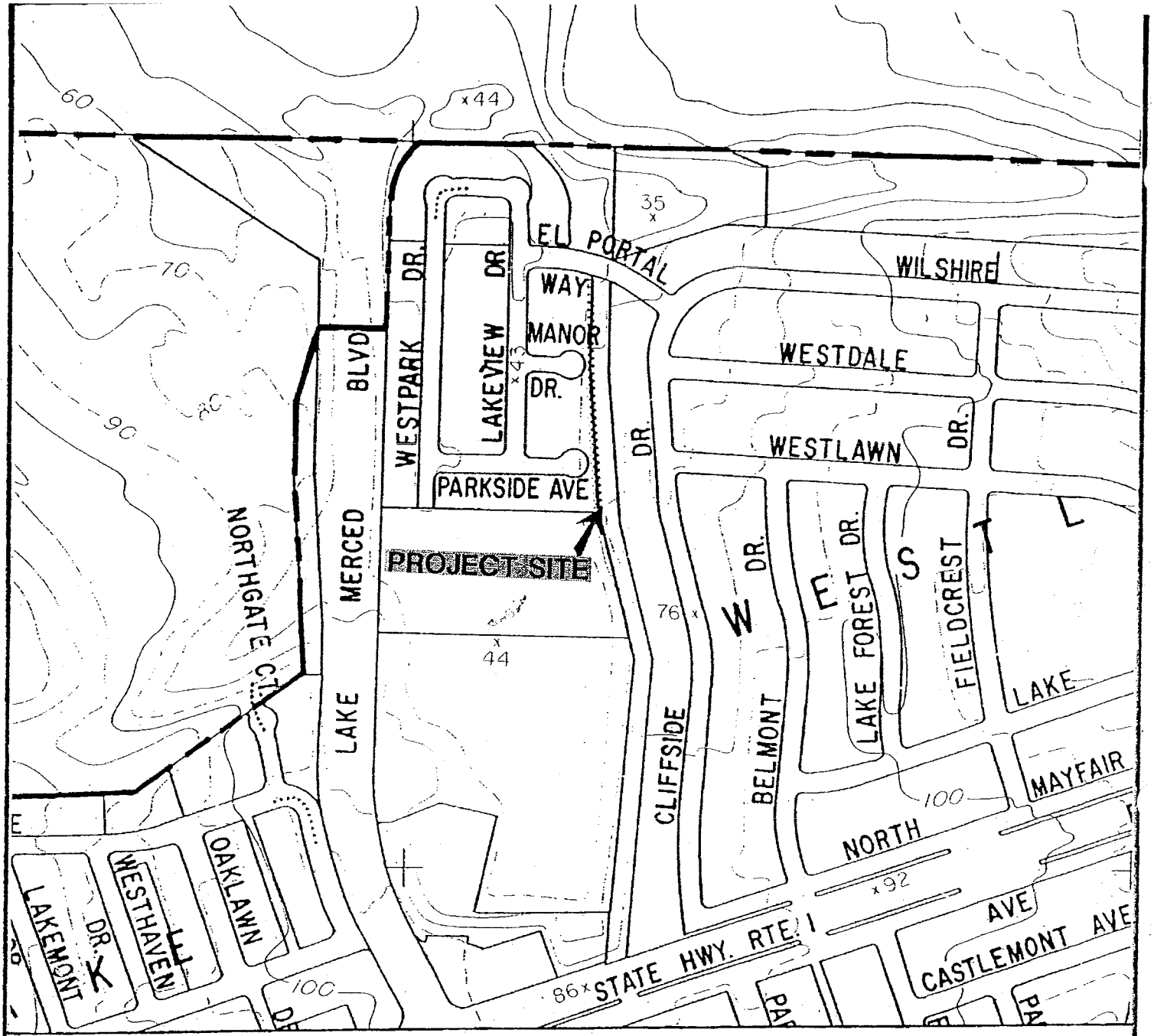
GEOTECHNICAL INVESTIGATION

Embankment Stability
Westlake Waterline Restoration Project
Between El Portal Way & Parkside Avenue
Daly City, California

PREPARED FOR:
City of Daly City
Department of Engineering
333 90th Street
Daly City, California 94015-1895

ATTENTION: Mr. Angelo Vinturelli, Project Engineer

Earth Investigations Consultants
P.O. Box 673
505 Tunnel Avenue, Suite 6
Brisbane, California 94005
415 467-6645

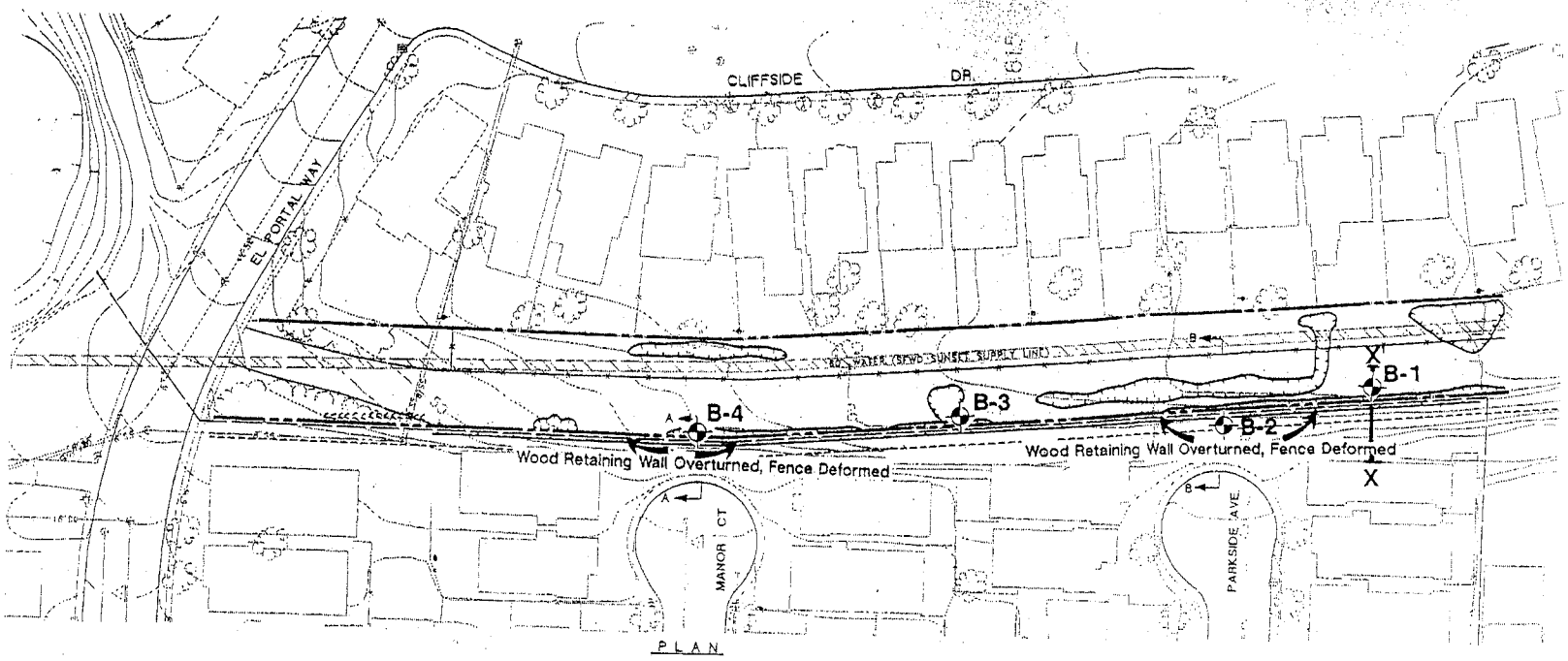


N

0 400 ft.
Scale

San Mateo County Topographic Map 1B (1/1/86)

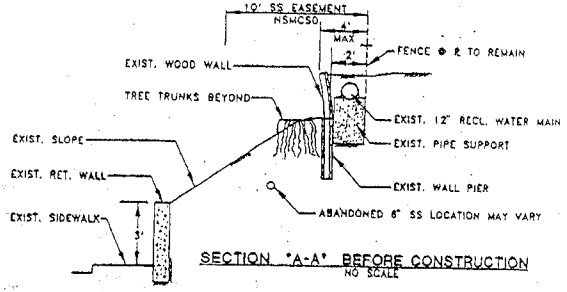
Earth Investigations Consultants	Job No. 1311.01.00 Approved Date 3/31/97	VICINITY MAP Westlake Waterline Restoration Project Daly City, California	Plate 1



PLAN

EXPLANATION

- Depression
- Erosion gully
- Approximate boring location
- X — X' Slope profile applied to slope stability analysis



SECTION "A-A" BEFORE CONSTRUCTION
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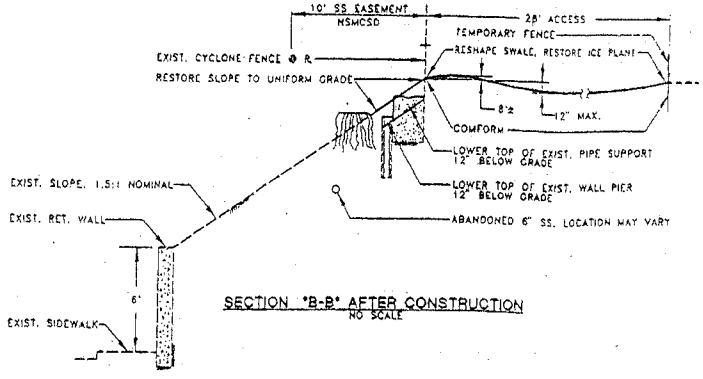

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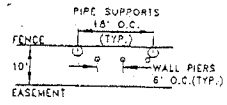


EXISTING PIER SPACING
NO SCALE

0 60 ft.
Scale

Base map from the City of Daly City (3/97)

Earth Investigations Consultants	Job No. 1311.01.00 Approved Date 3/31/97	SITE PLAN Westlake Waterline Restoration Project Daly City, California	Plate 2

LOG OF BORING 1

Equipment Truck Mounted Auger

Elevation 64' Date 3/24/97

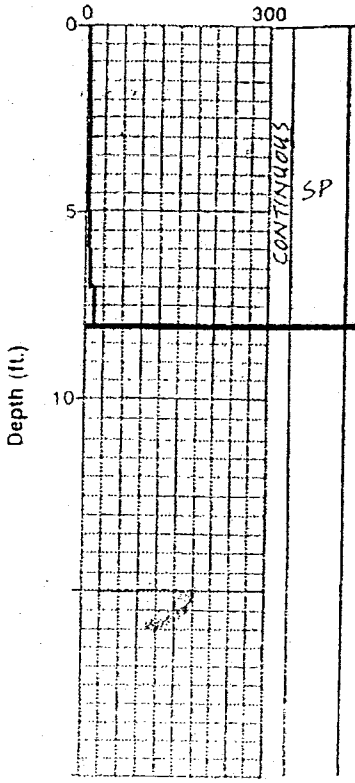
Dry Density (pcf)	Moisture Content (%)	Blows/Foot (SPT)	DEPTH (ft)	Sample	
			0		Dark yellowish brown Silty SAND, damp, loose
98.5	14.5	10	5		Grades to loose to medium dense
101.6	9.1	55	10	SP	Color change to yellowish brown at 10', grades to moist and very dense
101.2	6.6	63/6"	15		
92.7	7.7	81	20		
			25		
99.5	7.3	113/9"	30		Terminated at 28½'

Earth Investigations Consultants	Job No. 1311.01.00 Approved Date 3/31/97	LOG OF BORING Westlake Waterline Restoration Project Daly City, California	Plate 3

LOG OF BORING 2

Equipment: Portable Percussion Rig
Elevation: 60' Date: 3/26/97

Dry Density (pcf)	Moisture Content (%)	Pocket Pen (tsf)
100.3	5.6	4.0
107.5	6.6	3.0
105.4	7.2	2.5



Dark brown and dark yellowish brown Silty SAND, moist, loose to very loose.

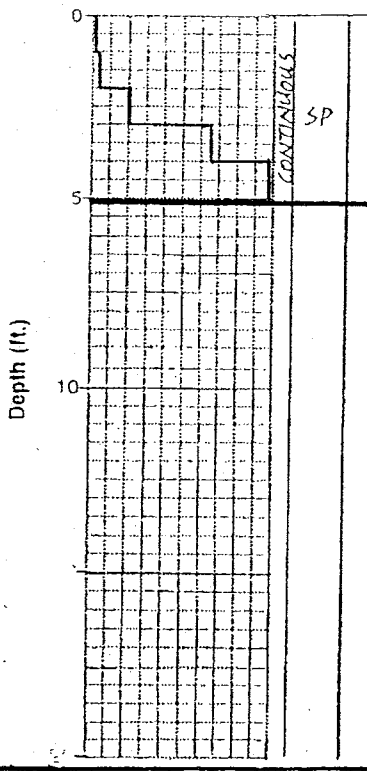
Color change to very dark brown

Terminated at 8'

LOG OF BORING 3

Elevation: 60' Date: 3/26/97

Dry Density (pcf)	Moisture Content (%)	Pocket Pen (tsf)
109.5	13.2	>4.5
110.3	7.4	>4.5



Dark yellowish brown Silty SAND, damp, loose
Grades to moist, medium dense at 2'

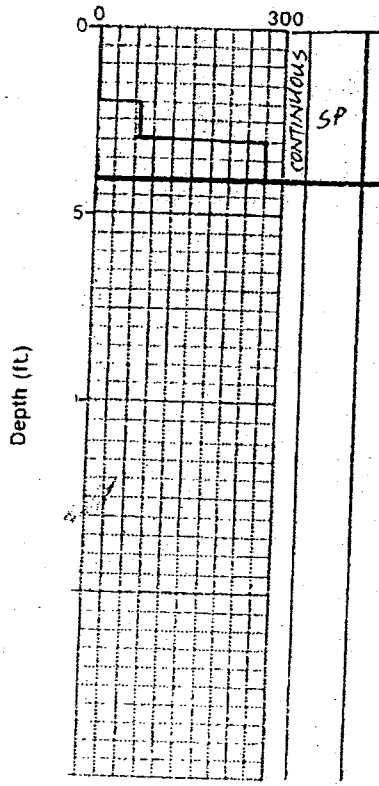
Terminated at 5' (REFUSAL)

Earth Investigations Consultants	Job No. 1311.01.00 Approved Date 3/31/97	LOGS OF BORINGS Westlake Waterline Restoration Project Daly City, California	Plate 4

LOG OF BORING 4

Equipment: Portable Percussion Rig
Elevation: 55'
Date: 3/26/97

Dry Density (pcf)	Moisture Content (%)	Pocket Pen (tsf)
92.3	8.6	1.0
93.7	11.5	>4.5



Dark yellowish brown and black Silty SAND, moist, loose
Color change to dark yellowish brown at 2', grades to medium dense

Terminated at 4'
(REFUSAL)

Earth Investigations Consultants	Job No. 1311.01.00 Approved Date 3/31/97	LOGS OF BORINGS Westlake Waterline Restoration Project Daly City, California	Plate 5

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

	U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
	200	40	10	4	3/4"	3"	12"	
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS	
	FINE	MEDIUM	COARSE	FINE	COARSE			

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

From:

Unified Soil Classification System (ASTM D-2487)

Earth Investigations Consultants	Job No. 1311.01.00 Date 3/31/97	KEY TO BORINGS Westlake Waterline Restoration Project Daly City, California	Plate 6

Report ID: EI-976
3 borings

GEOTECHNICAL SERVICES

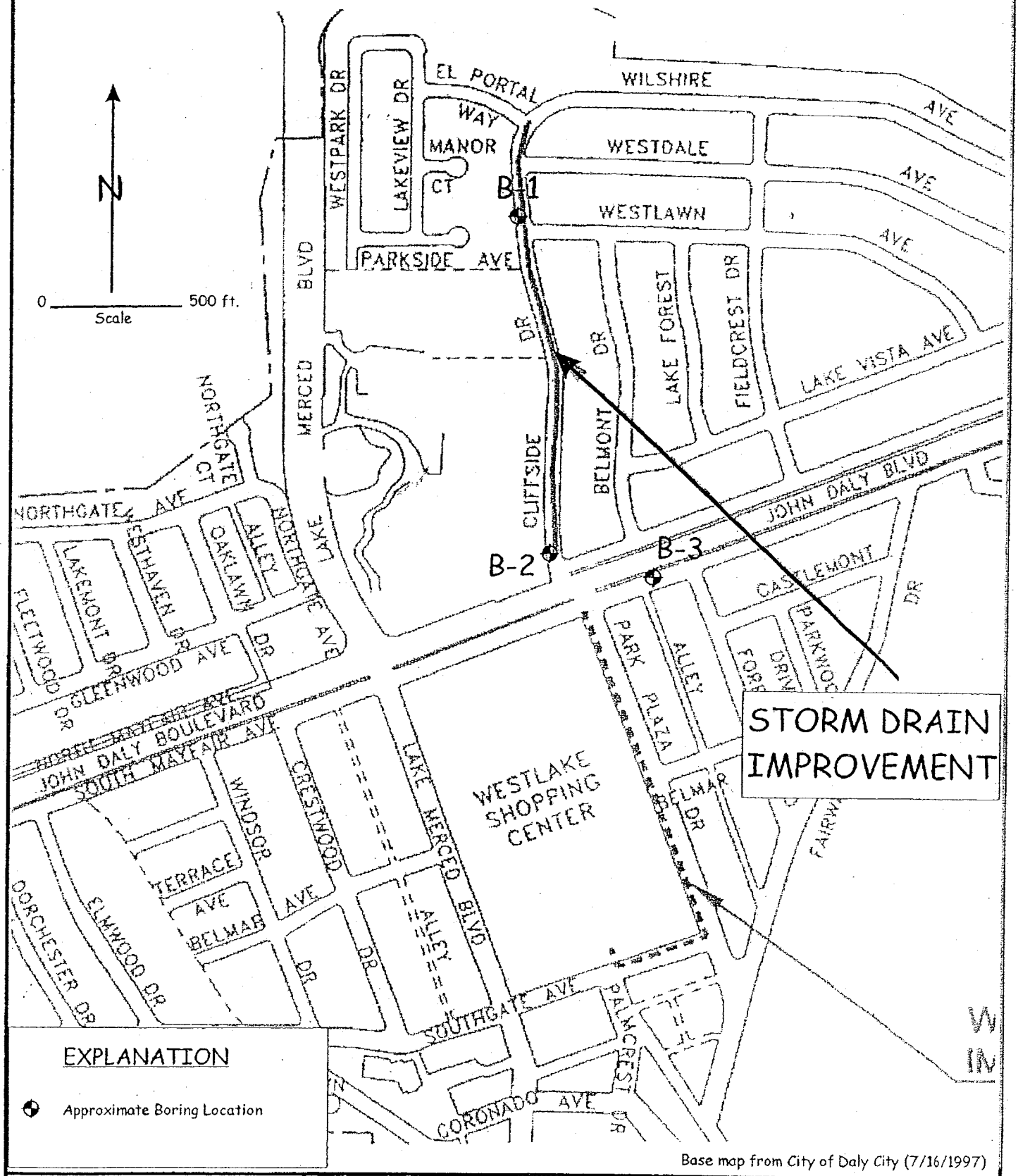
Soil Exploration
Proposed Sewer Improvements
Cliffside Drive @ John Daly Boulevard
Daly City, California

Prepared for:
City of Daly City Public Works Department
333 90th Street
Daly City, California 94015-1885

Attention: Mr. Rich McGough, P.E.

December 24, 1997

Earth Investigations Consultants
P.O. Box 673
505 Tunnel Avenue, Suite 6
Brisbane, California 94005
415 467-6645



EXPLANATION

Approximate Boring Location

Base map from City of Daly City (7/16/1997)

Earth Investigations Consultants	Job No. 1311.05.00 Approved Date 12/15/97	VICINITY MAP Cliffside Drive at John Daly Boulevard Daly City, California	Plate 1

BORING 1

Equipment Truck Monted CME-55 Auger

Elevation 62' Date 12/5/97

Dry Density (pcf)	Moisture Content (%)	Blows/Foot (SPT)	Depth (ft.)	Sample	USCS	
			0			Approximately 4" of asphaltic concrete and 6"of baserock; Yellowish brown Silty SAND, damp, dense
		50	5			
		54/10"	10		SM	
		42/7"	15			
		80	20			
						Terminated at 21 ½'
			25			

Earth Investigations Consultants	Job No. 1311.05.00 Approved Date 12/15/97	LOG OF BORING Cliffside Drive at John Daly Boulevard Daly City, California	Plate 2

BORING 2

Equipment Truck Monted CME-55 Auger

Elevation 81' Date 12/5/97

Dry Density (pcf)	Moisture Content (%)	Blows/Foot (SPT)	Depth (ft.)	Sample	USCS	
			0			Approximately 4" of asphaltic concrete and 6" of baserock; Yellowish brown Silty SAND, damp, medium dense to dense
		36	5			
			10			Contains some Clay at 9' to 12'
		35			SM	
		47	15			
			20			
		56/10"				
			25			
		52/11"				Terminated at 26 ½ '
			30			

Earth Investigations Consultants	Job No. 1311.05.00 Approved Date 12/15/97	LOG OF BORING Cliffside Drive at John Daly Boulevard Daly City, California	Plate 3

BORING 3

Equipment Truck Monted CME-55 Auger

Elevation 86' Date 12/5/97

Dry Density (pcf)	Moisture Content (%)	Blows/Foot (SPT)	Depth (ft.)	Sample	USCS	
			0			Approximately 3" of asphaltic concrete and 7" of baserock; Yellowish brown Silty SAND, moist, loose
		6	5			
		7	10		SM	Becomes damp and medium dense to dense
		53/10"	15			
		55/9"	20			
		55/8"	25			Terminated at 26 ½'
			30			

Earth Investigations Consultants	Job No. 1311.05.00 Approved Date 12/15/97	LOG OF BORING Cliffside Drive at John Daly Boulevard Daly City, California	Plate 4

Primary Divisions			GROUP SYMBOL	Secondary Divisions
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Orangic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

Definition of Terms

U.S. Standard Series Sieve — **Clear Square Sieve Openings**

200	40	10	4	3/4"	3"	12"

SILTS AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

Grain Sizes

SAND AND GRAVELS	BLOWS/FOOT*
VERY LOOSE	0 -4
LOOSE	4 -10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

Relative Density

SILTS AND CLAYS	STRENGTH **	BLOWS/FOOT*
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

Consistency

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586)

** Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

Sample location; blow counts listed are from the bottom 12 inches of 18- inch drive sample.

Unified Soil Classification System (ASTM D-2487)

Earth Investigations Consultants	Job No. 1311.05.00 Date 12/15/97	KEY TO BORINGS Cliffside Drive at John Daly Boulevard Daly City, California	Plate 5

Report ID: HARZA-97
5 borings

Preliminary Geological Review and Feasibility Geotechnical Investigation

Daly City Oceanfront Property
Daly City, California
Project No. L902-G
August 5, 1997

Prepared For:

Windsor Residential Companies
4144 North Central Expressway, Suite 1200 LB-9
Dallas, TX 75204

Prepared By:

Harza Consulting Engineers and Scientists
425 Roland Way
Oakland, CA 94621

Dennis M. Laduzinsky, R.G., C.E.G.
Senior Engineering Geologist

Patrick Stevens, P.E., G.E.
Vice President

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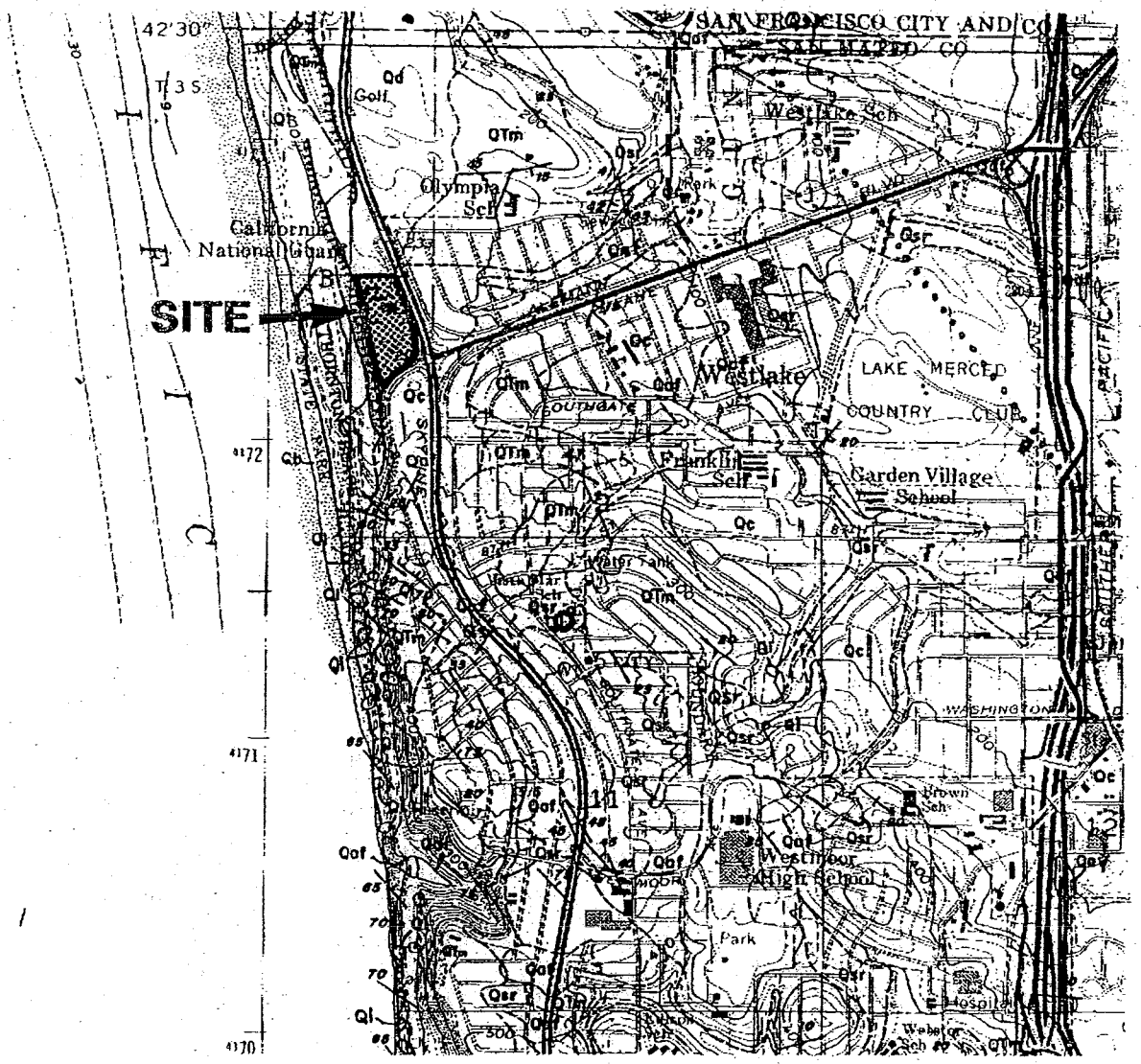
08-05-97

HARZA



LEGEND

Qaf	ARTIFICIAL FILL
Ql	LANDSLIDE DEPOSITS
Qb	BEACH DEPOSITS
Qd	DUNE SAND
Qsr	SLOPE DEBRIS
Qc	COLMA FORMATION
QTm	MERCED FORMATION
35	STRIKE AND DIP OF BEDDING
	GEOLOGIC CONTACT
	TOP OF LANDSLIDE SCARP

BASE: BONILLA (1971)

APPROXIMATE SCALE IN FEET

0 2000 4000

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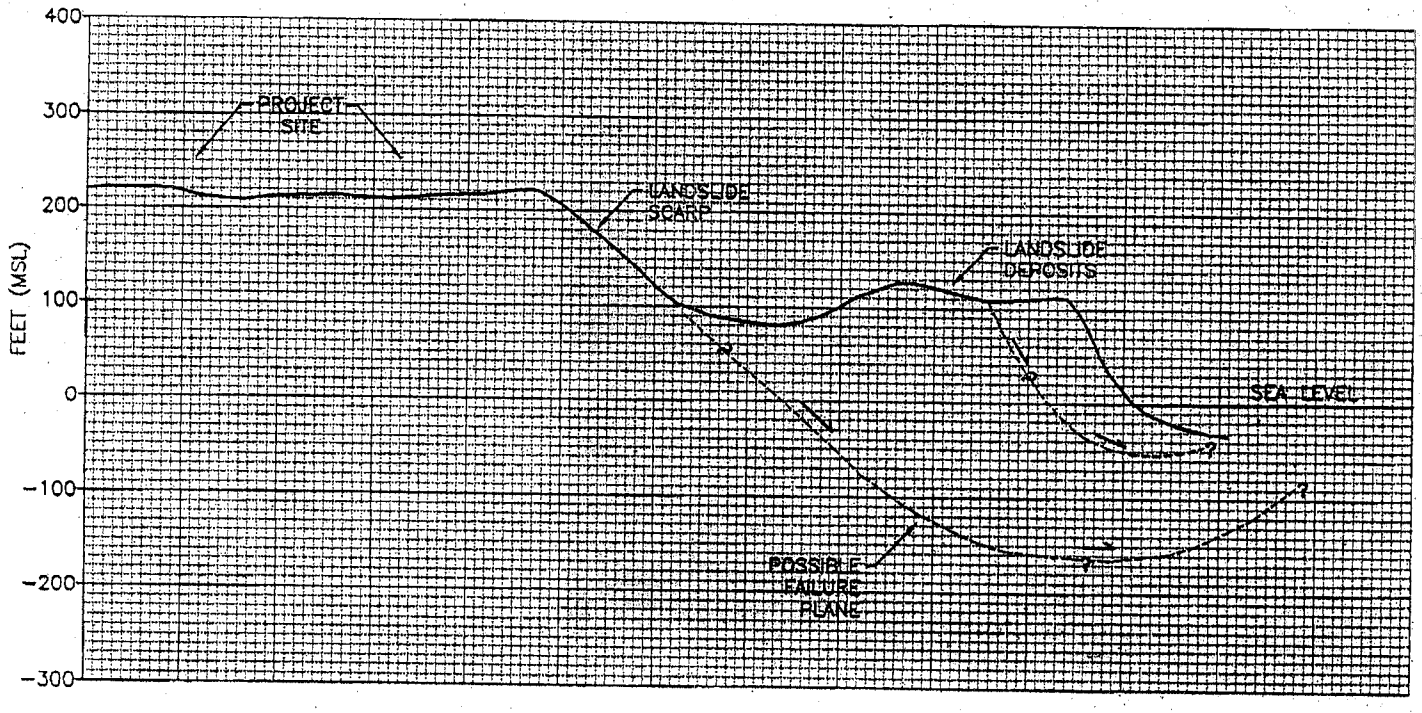
Date		GEOLOGIC MAP	Figure
8/97	HARZA	DALY CITY OCEANFRONT PROPERTY Daly City, California	2
Project No. L902-G			



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Date		GENERALIZED E-W CROSS SECTION	Figure
8/97	HARZA	DALY CITY OCEANFRONT PROPERTY Daly City, California	3
Project No. L902-G			

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		grf	ltr	Description
Coarse Grained Soils	Gravel And Gravelly Soils		GW	Well-graded gravels or gravel sand mixtures, little or no fines
			GP	Poorly-graded gravels or gravel sand mixture, little or no fines
			GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sand And Sandy Soils		SW	Well-graded sands or gravelly sands, little or no fines
			SP	Poorly-graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, and-clay mixtures

Major Divisions		grf	ltr	Description
Fine Grained Soils	Silts And Clays LL < 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silt-clays of low plasticity
	Silts And Clays LL > 50		MH	Inorganic silts, micaceous or diatomaceous fine or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat and other highly organic soils

GRAIN SIZES

U.S. STANDARD SERIES SIEVE: 200 | 40 | 10 | 4

CLEAR SQUARE SIEVE OPENINGS: 3/4" | 3" | 12"

Silts and Clays	Sand			Gravel		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

RELATIVE DENSITY

Sands and Gravels	Blows/Foot*
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

CONSISTENCY

Silts and Clays	Blows/Foot*	Strength (tsf)**
Very Soft	0 - 2	0 - 1/4
Soft	2 - 4	1/4 - 1/2
Firm	4 - 8	1/2 - 1
Stiff	8 - 16	1 - 2
Very Stiff	16 - 32	2 - 4
Hard	Over 32	Over 4

*Number of Blows for a 140-pound hammer falling 30 inches, driving a 2-inch O.D. (1-3/8" I.D.) split spoon sampler.

**Unconfined compressive strength.

SYMBOLS

- Standard Penetration sample
- Modified California sample
- Shelby Tube sample
- Ground Water level during drilling
- Stabilized Ground Water level

Increasing Visual Moisture Content

Dry
Damp
Moist
Wet
Saturated

HARZA
Consulting Engineers & Scientists

KEY TO EXPLORATORY BORING LOGS

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	FIGURE NO.
L902G	August 1997	A-1

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	220 feet	LOGGED BY	JJT
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/23/97

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
SAND (SP-SM), dark brown, fine- to medium-grained, trace silt, damp	Medium Dense				9				Passing #200 Sieve=13%
SAND (SP), brown, fine- to medium-grained, trace silt, damp	Loose				6				
SAND (SC), brown, fine- to coarse-grained, some clay, trace to some gravel (fine, subrounded), damp	Medium Dense		5		6				
SAND (SP), light brown, fine- to medium-grained, trace silt, damp	Loose								
SAND (SP-SC), light brown, fine- to medium-grained, trace clay, damp	Medium Dense		10		19				
SAND (SW), light brown, fine- to coarse-grained, trace clay, damp	Dense		15		20				
			20		32				

Bottom of Boring = 21-1/2 Feet

Notes:

1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A. An automatic hammer was used to drive the samplers.
3. Groundwater was not encountered at the time of drilling.
4. The boring was backfilled with native soil cuttings immediately upon completion of drilling.

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Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-1

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	219 feet	LOGGED BY	JJT
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/23/97

DESCRIPTION AND CLASSIFICATION			DEPTH	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE	(FEET)						
SAND (SW-SM), brown, fine- to coarse-grained, trace to some gravel (fine, subrounded), trace silt	Very Dense				44				
	Dense				27				
SAND (SP-SM), light brown, fine- to medium-grained, trace silt, damp	Medium Dense								
	Loose		5		4				For Sieve See Fig.B-1
	Medium Dense		10		9				
SAND (SP-SC), brown, fine- to medium-grained, trace clay, damp	Medium Dense		15		13				
	Dense		20		27				

Bottom of Boring = 21-1/2 Feet

Notes:

1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A. An automatic hammer was used to drive the samplers.
3. Groundwater was not encountered at the time of drilling.
4. The boring was backfilled with native soil cuttings immediately upon completion of drilling.

HARZA
Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-2

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	220 feet	LOGGED BY	JJT
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/24/97

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
SAND (SM), light brown, fine- to medium-grained, some silt, damp	Medium Dense				15				Passing #200 Sieve=16%
(grades brown)			5		9				
SAND (SP-SC), orange brown, fine- to medium-grained, trace clay	Dense				22				
SAND (SP), light brown, fine- to medium-grained, trace clay, damp	Dense		10		23				
(trace gravel (fine, subrounded) at 18 feet)	Very Dense		15		36				
(occasional lenses of SAND (SP-SC))			20		50				

HARZA
Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-3

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	220 feet	LOGGED BY	JJT
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/24/97

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
SAND (SP-SC), light brown, fine- to medium-grained, trace clay, damp	Very Dense								
					60				
			30						
(occasional lenses of SAND (SP))									
					47				
			35						
SAND (SM), grey, fine-grained, silty	V. Dense				50/6"				
SAND (SP), grey, fine- to medium-grained, trace silt, damp, slightly cemented	V. Dense								

Bottom of Boring = 38-1/2 Feet

Notes:

1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A. An automatic hammer was used to drive the samplers.
3. Groundwater was not encountered at the time of drilling.
4. The boring was backfilled with native soil cuttings immediately upon completion of drilling.

HARZA
Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-3

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	218 feet	LOGGED BY	JJ1
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/24/97

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
SAND (SP-SM), black, fine- to medium-grained, trace silt, damp	Dense				27				
	Loose				4				
(grades dark brown)			5						
SAND (SP-SC), orange-brown, fine- to medium-grained, trace clay, damp	Medium Dense				7				For Sieve See Fig.B-1
(grades light brown)	Dense		10		27				
			15		22				
SAND (SP), light brown, fine- to medium-grained, trace clay, damp	Dense								
(occasional lenses of SAND (SP-SC))			20		33				

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Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-4

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	218 feet	LOGGED BY	JJT
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/24/97

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
SAND (SP), continued (trace coarse-grained sand at 26 feet)	Dense				31				
	Very Dense		30		35				
SAND (SP-SC), mottled brown and red-brown, fine- to medium-grained, trace clay, damp	Dense		35		19				
SAND (SP), grey, fine- to medium-grained, trace silt, damp	Very Dense		40		49				

Bottom of Boring = 41-1/2 Feet

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A. An automatic hammer was used to drive the samplers.
3. Groundwater was not encountered at the time of drilling.
4. The boring was backfilled with native soil cuttings immediately upon completion of drilling.

HARZA
Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-4

DRILL RIG: CME 55, HSA, AH	SURFACE ELEVATION 220 feet	LOGGED BY JJT
DEPTH TO GROUND WATER Not Encountered	BORING DIAMETER 8-inch	DATE DRILLED 7/24/97

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
SAND (SP-SM), light brown, fine- to medium-grained, trace silt, damp	Medium Dense				7				Passing #200 Sieve=10%
					18				
SAND (SP-SC), orange-brown, fine- to medium-grained, trace clay, damp	Medium Dense		5		19				
(occasional clayey lenses of SAND (SC))	Dense		10		23				
SAND (SP), light brown, fine- to medium-grained, trace clay, damp	Dense		15		26				
SAND (SP-SC), light brown, fine- to medium-grained, trace clay, damp	Dense		20		31				

HARZA
Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-5

DRILL RIG	CME 55, HSA, AH	SURFACE ELEVATION	220 feet	LOGGED BY	JJT
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	7/24/97

DESCRIPTION AND CLASSIFICATION			DEPTH	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE	(FEET)						
SAND (SP-SC), continued (occasional lense of SAND (SC))	Medium Dense				12				
			30						
SAND (SP), grey, fine- to medium-grained, trace silt, trace coarse-grained sand					15				
	Dense		35		24				
			40						
CLAY (CL), olive, silty, trace sand (fine-grained), damp (grey at 41-1/2 feet)	Hard				21				

Bottom of Boring = 41-1/2 Feet

Notes:

1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A. An automatic hammer was used to drive the samplers.
3. Groundwater was not encountered at the time of drilling.
4. The boring was backfilled with native soil cuttings immediately upon completion of drilling.

HARZA
Consulting Engineers & Scientists

EXPLORATORY BORING LOG

DALY CITY OCEANFRONT PROPERTY
Daly City, California

PROJECT NO.	DATE	BORING NO.
L902G	August 1997	EB-5

Report ID: PK-87
10 borings

GEOTECHNICAL ENGINEERING SERVICES
FOR
PROPOSED TREATMENT PLANT EXPANSION
DALY CITY, CALIFORNIA

Peter Kaldveer and Associates, Inc.

Geotechnical Consultants

Peter Kaldveer and Associates, Inc.

Geotechnical Consultants

425 ROLAND WAY, OAKLAND, CALIFORNIA 94621, 415/568-4001

Peter Kaldveer, P.E.
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Ronald Bajuniemi, P.E.
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Patrick Stevens, P.E.

Michael McRae, P.E.

Dawn Rinaldi, P.E.

John North, P.E.

January 27, 1987
K363-13A, 09330

John Carollo Engineers
450 N. Wiget Lane
Walnut Creek, California 94598

Attention: Mr. Mike Britten

RE: SUPPLEMENTAL FOUNDATION INVESTIGATION
NEW MAINTENANCE BUILDING
NORTH SAN MATEO COUNTY SANITATION DISTRICT
DALY CITY, CALIFORNIA

Gentlemen:

In accordance with your request, we have performed a supplemental foundation investigation for the proposed maintenance building to be located north of the existing maintenance building for the San Mateo County Sanitation District treatment plant. The treatment plant is located at 153 Lake Merced Boulevard and south of Westlake Park in Daly City, California, as shown on the Site Plan, Figure 1. The new maintenance building is to be constructed in conjunction with the proposed treatment plant expansion. Our firm has previously conducted a foundation investigation for the proposed expansion and the results are presented in our report titled, "Geotechnical Engineering Services for Proposed Treatment Plant Expansion, Daly City, California", dated November 5, 1986.

The purpose of our investigation was to evaluate the foundation soils and provide foundation design parameters and recommendations for the new maintenance building.

Based on the information indicated on the Site Plan as well as on our conversations with Mr. Mike Britten, the development will consist of a one-level, L-shaped, at-grade maintenance building. The building will contain 8 truck stalls. It is our understanding that the proposed future utility tunnel which will connect to the future equalization and secondary sedimentation basins will be constructed adjacent to the proposed New Maintenance Building. However, at the present time, the New Maintenance Building will not be designed for these future structures.

SCOPE

The scope of work performed in this investigation included a site reconnaissance, subsurface exploration, laboratory testing, engineering

analyses of the field and laboratory data and the preparation of this letter report. The data obtained and the analyses performed were for the purpose of providing design and construction criteria for site earthwork, building foundations and slab-on-grade floors.

SITE CONDITIONS

A supplemental subsurface investigation was performed using a truck-mounted, 6-inch diameter continuous flight auger to investigate and sample the subsurface soils. One exploratory boring was drilled on January 15, 1987, to a depth of 20½ feet. The approximate locations of this boring and the nine previous borings are shown on the Site Plan, Figure 1. The log of the boring drilled for this investigation, a key for soil classification (Figure 2) and the results of our laboratory tests (Table 1) are attached for your reference.

The site of the proposed maintenance building is essentially level. At the time of our field investigation, the northern portion of the building site was part of the grass-covered Westlake Park playing field. The southern portion of the site was within the existing treatment plant facilities. This area within the treatment plant was the truck loading and access area for the existing maintenance shop which was surfaced with asphaltic concrete and concrete slabs. A brick wall separated these two portions of the site. Large bushes were present along the north side of this wall.

The soils encountered in our one exploratory boring drilled for this investigation and our previous Borings 2 and 4 were fill materials generally consisting of medium dense to dense silty sands which extended to about 6 to 9 feet below existing grade. In our previous Boring number 4, we encountered a 2½-foot thick layer of silty clay possible fill material at a depth of 7½ feet. Underlying these fill materials were loose to dense fine-grained sands with variable amounts of silt which extended to the maximum depth explored of 72½ feet. Detailed descriptions of the soils encountered in the boring drilled for this are presented on the attached boring log.

Free groundwater was not encountered at the time of drilling. The boring was backfilled immediately after drilling. In our previous investigation at the site, the groundwater level was measured at depths of about 21½ feet. We should note that fluctuations in the groundwater level may occur due to variations in rainfall and other possible factors.

CONCLUSIONS AND RECOMMENDATIONS

From a soil and foundation engineering standpoint, it is our opinion that the site is suitable for the proposed maintenance building provided that the conclusions and recommendations presented in this report are incorporated in the design and construction of the project to avoid possible soil and foundation problems.

A. Earthwork

The earthwork recommendations for the proposed maintenance building are presented in our previous report for the treatment plant expansion. In addition, we recommend that the site should be cleared of all obstructions including the wall and its associated foundations, designated portions of the asphaltic concrete, concrete slabs and associated baserock, any designated underground utility lines, shrubs and their root systems and debris.

B. Foundations

1. Footings

We recommend that the new maintenance building be supported on conventional continuous and isolated spread footings bearing on either undisturbed natural sands or compacted fills. All footings should be founded at least 24 inches below lowest adjacent finished grade. In addition, footings located adjacent to other footings or utility trenches should have their bearing surfaces situated below an imaginary 1.5 horizontal to 1 vertical plane projected upward from the bottom edge of the adjacent footings or utility trench.

At the above depths, the footings can be designed for an allowable bearing pressure of 1500 pounds per square foot due to dead loads, 2500 pounds per square foot due to dead plus live loads and 3500 pounds per square foot for all loads including wind or seismic. These allowable bearing pressures are net values; therefore, the weight of the footing can be neglected for design purposes. Footings should not, however, have a width of less than 12 inches.

To develop uplift resistance, the weight of the material within a 1 horizontal to 1 vertical plane projected off the footing can be used. We recommend an average unit weight of 145 pounds per cubic foot can be used for the concrete slab and Class 2 Aggregate Base which overlies the footings. In addition, frictional resistance can be developed against the sides of the footing. The friction on the side of the footing can be calculated by multiplying 60 pounds per cubic foot times the depth times the coefficient of friction.

All continuous footings should be designed with adequate top and bottom reinforcement to provide structural continuity and permit spanning of local irregularities. To assure that footings are founded on appropriate material, we recommend that we observe the footing excavations prior to placing reinforcing steel or concrete.

Settlements under building loads are expected to be within tolerable limits for the proposed structure.

2. Heavily Loaded Slabs

The interior heavily loaded slabs can be supported directly on a 6-inch leveling course of Class 2 Aggregate Base which is placed directly on the properly prepared subgrade. Prior to final construction of the slab, the subgrade surface should be proof-rolled to provide a smooth, firm surface for slab support. Slab reinforcing should be provided in accordance with the anticipated use and loading of the slab.

3. Retaining Walls

Retaining walls must be designed to resist both lateral earth pressures and any additional lateral loads caused by surcharge loads on the adjoining ground surface.

We recommend that restrained walls be designed to resist an equivalent fluid pressure of 35 pounds per cubic foot plus an additional uniform lateral pressure of 7H pounds per square foot where H = height of backfill above the top of the wall footing in feet. In addition, walls that have a backfill that slopes upward away from the wall should be designed for an additional equivalent fluid pressure of 1 pound per cubic foot for every 2 degrees of slope inclination.

Wherever the restrained walls will be subjected to surcharge loads, they should be designed for an additional uniform lateral pressure equal to one-half the anticipated surcharge load.

The preceding pressures assume sufficient drainage behind the walls to prevent the build-up of hydrostatic pressures from surface water infiltration. Adequate drainage may be provided by means of either weep holes with permeable material installed behind the walls or by means of a system of subdrains.

Backfill which is placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. If heavy compaction equipment is used, the walls should be appropriately designed for the heavy equipment and/or temporarily braced.

Retaining walls should be supported on spread footing foundations designed in accordance with the recommendations presented previously under Item B.1, "Footings". Lateral load resistance for the walls can be developed in accordance with the recommendations presented below under Item B.4, "Lateral Loads".

4. Lateral Loads

Lateral load resistance for the building and walls can be developed in friction between the foundation bottom and the supporting subgrade. A

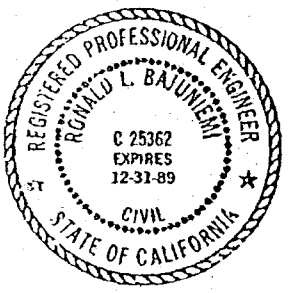
friction coefficient of 0.40 is considered applicable. As an alternative, a passive resistance equal to an equivalent fluid weighing 350 pounds per cubic foot acting against the foundations may be used. If the foundations are poured neat against the soil, friction and passive resistance can be used in combination.

The analysis and recommendations submitted in this letter report are based in part upon the data obtained from the soil boring. The nature and extent of variations between the borings may not become evident until construction. If variations then become apparent, it will be necessary to re-evaluate the recommendations of this report.

We recommend that our firm be retained to provide soil engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications and recommendations and to allow design changes in the event that subsurface conditions differ from that anticipated prior to the start of construction.

The conclusions and recommendations presented in this letter report are meant to supplement our previous report and were prepared in accordance with generally accepted soil and foundation engineering principles and practices.

If you have any questions concerning this letter report, please call.



Very truly yours,

PETER KALDVEER AND ASSOC., INC.

Ronald L. Bajuniemi
Vice President Engineering

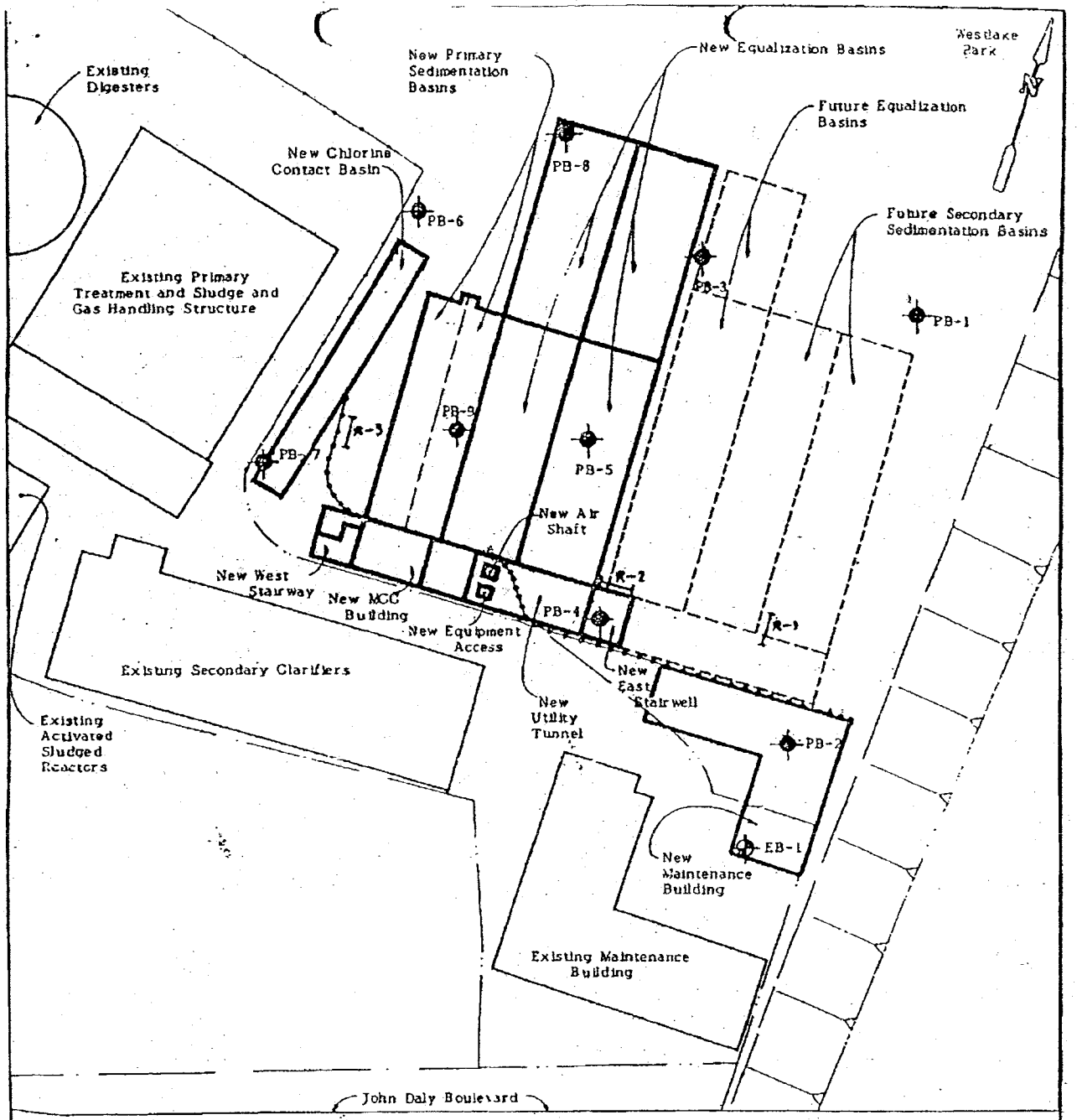
RLB:jb
Copies: Addressee (3)
Attachments (3)
Vogel and Meyer Partnership (1)
Attention: Mr. John Meyer

TABLE 1

LABORATORY INVESTIGATION

The natural water content was determined on four samples of the materials recovered from the borings in accordance with ASTM Test Designation D-2216. These water contents are recorded on the boring log at the appropriate sample depths.

The percent passing the #200 sieve was determined on two samples of the subsurface soils to aid in the classification of these soils. These tests were performed in accordance with ASTM Test Designation D-1140. The results of these tests are shown on the boring log at the appropriate sample depths.



PETER KALDVEER
AND ASSOCIATES, INC.
Consulting Geotechnical Engineers

SITE PLAN

NEW MAINTENANCE BUILDING
Daly City, California

PROJECT NO.	DATE	
K365-11A	January 1987	Figure 1

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4"	3"	12"	
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

PETER KALDVEER
AND ASSOCIATES, INC.
Geotechnical Consultants

KEY TO EXPLORATORY BORING LOGS
Unified Soil Classification System (ASTM D-2487)
NEW MAINTENANCE BUILDING
Daly City, California

PROJECT NO.	DATE	
K363-13A	January 1987	Figure 2

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION --	LOGGED BY BK
DEPTH TO GROUNDWATER Not Encountered	BORING DIAMETER 6 Inches	DATE DRILLED 01/15/87

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
3" Asphalt over 8" Baserock									
SAND (fine grained), silty, trace of clay	brown	dense	SM	1					
	black brown			2					
				3		33	10		
(lense of asphalt 3" thick)				4					
	rust					30	13		
(grading without clay and some silt)				5					
	black			6					
				7					
(FILL)				8					
				9		45	7		
SAND (fine grained), trace of silt	rust	loose	SM	10					
Passing #200 Sieve = 16%	brown			11					
				12		7			
				13					
(grading with some sand)				14					
				15					
Passing #200 Sieve = 21%				16					
				17		7			
Note: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.				18					
				19					
		medium							
Bottom of Boring = 20½ Feet	rust	dense		20		15	6		

PETER KALDVEER
AND ASSOCIATES, INC.
Geotechnical Consultants

EXPLORATORY BORING LOG

NEW MAINTENANCE BUILDING
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13A	January 1987	1

Peter Kaldveer and Associates, Inc.

Geotechnical Consultants

425 ROLAND WAY, OAKLAND, CALIFORNIA 94621, 415/568-4001

Peter Kaldveer, P.E.
President

Richard Short, P.E.
Executive Vice President

Ronald Bajuniemi, P.E.
Vice President Engineering

Patrick Stevens, P.E.

Michael McRae, P.E.

Dawn Rinaldi, P.E.

November 5, 1986
K363-13, 08699

John Carollo Engineers
450 North Wiget Lane
Walnut Creek, California 94598

Attention: Mr. Walt Bishop

RE: GEOTECHNICAL ENGINEERING SERVICES
PROPOSED TREATMENT PLANT EXPANSION
DALY CITY, CALIFORNIA

Gentlemen:

In accordance with your request, we have performed geotechnical engineering services for the proposed expansion of the North San Mateo County Sanitation District treatment plant. The accompanying report presents the results of our field investigation, laboratory tests, and engineering analysis. The soil and foundation conditions are discussed and recommendations for the soil and foundation engineering aspects of the project are presented. The conclusions and recommendations contained herein are based upon applicable standards of our profession at the time this report has been prepared. Copies of this report are furnished only to provide the factual data which were gathered and which were summarized in the report.

We refer you to the text of the report for detailed recommendations. If you have any questions concerning our findings, please call us.

Very truly yours,

PETER KALDVEER AND ASSOC., INC.

Dawn Rinaldi

Dawn Rinaldi, P.E.

Ronald L. Bajuniemi
Vice President Engineering

DR/RLB:jb
Copies: Addressee (6)
City of Daly City (1)
Attention: Mr. Peter Archuleta, Director of Public Works
North San Mateo County Sanitation District (1)
Attention: Mr. Paul Fako, Plant Superintendent

GEOTECHNICAL ENGINEERING SERVICES

For
PROPOSED TREATMENT PLANT EXPANSION
DALY CITY, CALIFORNIA

To
John Carollo Engineers
450 North Wiget Lane
Walnut Creek, California 94598

November 1986

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(continued)

GEOTECHNICAL ENGINEERING SERVICES
FOR
PROPOSED TREATMENT PLANT EXPANSION
DALY CITY, CALIFORNIA

INTRODUCTION

In this report, we present the results of our geotechnical investigation for the proposed expansion of the North San Mateo County Sanitation District treatment plant. The expansion will be located immediately northeast of the existing treatment plant located at 153 Lake Merced Boulevard and on the south end of the existing Westlake Park in Daly City, California, as shown on the Site Plan, Figure 1. The purpose of our investigation was to evaluate the foundation soils and provide recommendations concerning the soil and foundation engineering aspects of the project.

Since our draft report dated August 7, 1986, the proposed treatment plant expansion project has been modified. Based on the information indicated on the Site Plan as well as on our conversations with Mr. Walt Bishop, with John Carollo Engineers, it is our understanding that the development will consist of adding four equalization basins, two primary sedimentation basins, a chlorine contact basin, and a utility tunnel. Future plans provide for the addition of two equalization basins, two secondary sedimentation basins and an extension of the utility tunnel at the east end of the site. All of the structures will be constructed below existing grade. The base of the equalization basins and primary sedimentation basins will be approximately 39½ and 44½ feet below existing grade or Elevations +8½ and +3½, respectively. The utility tunnel will step down to each of the adjoining basin levels and the associated east and west stairwells will extend 42½ and 48 feet below grade, respectively. The chlorine contact basin will extend about 27½ feet below grade or Elevation +27½. Datum for the above elevations is unknown. Extensive grading will be required to develop the site for the subject project.

SCOPE

The scope of work performed in this investigation included a site reconnaissance, subsurface exploration, in situ soil resistivity tests, laboratory and sulfate testing, a review of previous soils reports prepared by others at or near the site, a review of available published and unpublished soil and geologic data on the immediate site area, engineering analyses of the field and laboratory data and the preparation of this report. The data obtained and the analyses performed were for the purpose of providing design and construction criteria for site earthwork, below grade basin and tunnel structural mats, below grade retaining walls and pavements.

This report has been prepared for the exclusive use of City of Daly City and John Carollo Engineers and their consultants for specific application to the proposed expansion of the North San Mateo County Sanitation District treatment plant in accordance with generally accepted soil and foundation

engineering practices. In the event that there are any changes in the nature, design or location of the basins or utility tunnel or if any future additions are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

SITE INVESTIGATION

A subsurface investigation was performed using a truck-mounted, 5-inch diameter, rotary wash auger system to investigate and sample the subsurface soils. Nine exploratory borings were drilled on July 15, 16 and 17 and October 15, 1986, to a maximum depth of 73½ feet. In addition, three in-situ field resistivity tests were performed on July 16, 1986 using a Vibroground apparatus to estimate the potential for galvanic corrosion. The approximate locations of the borings and resistivity lines are shown on the Site Plan, Figure 1. The logs of the borings, resistivity data and details regarding the field investigation are included in Appendix A, and the results of our laboratory tests are discussed in Appendix B.

A. Surface

The site is rectangular in shape and has maximum plan dimensions of approximately 190 by 240 feet. Topographically, the site gradually slopes from the south down to the north. The difference in elevation is approximately 5 feet. At the time of our field investigation, the site was a grass covered playing field with a softball diamond at the southeast corner. A large chain link-style backstop and associated metal bleachers on a concrete slab were located at the southeast corner of the diamond. An asphalt walkway partially extended towards the softball diamond backstop from the east side of the existing sewage treatment plant. The west and south sides of the site were bounded by the existing Sewage Treatment Plant. A slatted chain link fence was located along the perimeters of the treatment plant west of the site. To the south of the site, the treatment plant was bordered by a concrete wall. Large bushes grew along the fence and walls within the field area. Immediately inside of the fence and wall was a paved truck access road for the existing facility. Directly east of the site is a natural slope with an inclination of approximately 2 horizontal to 1 vertical; possibly steeper on the upper half of the slope. The majority of this slope was vegetated with bushes and mature pine trees.

B. History of the Site

Up to the 1930's, the site was formerly an old marshy slough which ran diagonally across from the southeast to the northwest corners of the site. A holding pond was also created in the general vicinity of the site. During the filling operation, which occurred in the 1950's, these soft and unstable marshy areas were unable to support the grading equipment. Therefore, the sandy fill materials were end dumped over the existing site. A concrete basin associated with the treatment plant was constructed in the location of the playing field at the southeast corner of the site. Sometime later, this tank had been removed.

C. Subsurface

In general, the site is underlain by fill materials overlying the native sands. The surface fill materials encountered in our exploratory borings extended to depths of about 5½ to 10 feet. These fill materials generally consisted of loose to medium dense fine-grained sands with some silt. Underlying these fill materials were loose to medium dense fine-grained sands interbedded with thin layers of firm silty clays and clayey silts which extended to depths of approximately 9½ to 21½ feet. In Boring 9, these clayey materials were encountered at depths of 20½ to 30 feet. The native alluvial materials, which are probably associated with the old slough, are relatively weak and slightly compressible. The general soil stratifications encountered across the site are shown on Figures 2 and 3, Cross-Sections A-A' and B-B', respectively.

Below these upper materials were older, more competent alluvial materials consisting of medium dense to dense fine-grained sands and stiff silty clays which extended to depths of 12 to 47½ feet. The deeper, very dense fine-grained sands, characteristic of the Colma formation, extended to the maximum depth explored of 72½ feet. Detailed descriptions of the soils encountered in each of the exploratory borings are presented in Appendix A.

The attached boring logs, cross-sections, and related information depict subsurface conditions only at the specific locations shown on the Site Plan and on the particular date designated on the logs. Also, the passage of time may result in changes in the subsurface conditions due to environmental changes. The locations of the borings and resistivity lines were approximately determined by pacing and should be considered accurate only to the degree implied by the method used.

C. Groundwater

Due to the rotary wash auger drilling method, we were unable to determine the free groundwater level at the time of drilling. However, Borings 1 and 6 were converted to piezometers. All other borings were backfilled immediately after drilling. On July 29, 1986, the groundwater level in Borings 1 and 6 were measured at depths of 40 and 22 feet below existing grade, or Elevations +7 and +24 feet, respectively. (Datum is unknown) On September 30, 1986, the groundwater level was measured again in Borings 1 and 6 at depths of 39 feet and 21½ feet below existing grade, respectively, or Elevations +8 and +24½ feet. During a previous investigation performed by others for the existing treatment plant, the groundwater level was measured as high as Elevation +26 feet on February, 1975. It should be noted that fluctuations in the groundwater level could occur due to change in seasons, variations in rainfall, and other factors.

D. Geology and Seismicity

Geologically, the site is underlain by Quaternary age artificial fills overlying the Pleistocene age Colma Formation. The Colma Formation in

the general area of the site consists of friable, well sorted, fine to medium grained sand containing a few beds of sandy silt, clay and gravel.

The San Francisco Bay Area is located in one of the most seismically active regions in the United States. Significant earthquakes that have occurred in the Bay Area are believed to be associated with crustal movements along a system of subparallel fault zones that generally trend in a northwesterly direction. The site is located approximately 2 miles northeast and 18 and 29 miles west, respectively, of the active San Andreas, Hayward and Calaveras fault zones. In addition, the San Bruno and City College faults are located ¼ and 2¼ miles northeast of the site, respectively. The latter two faults are considered inactive.

Earthquake intensities vary throughout the Bay Area, depending upon the magnitude of earthquake, the distance of the site from the causative fault, and the type of materials underlying the site. Nevertheless, the site will be subjected to at least one moderate to severe earthquake that will cause strong ground shaking. However, during such an earthquake, the hazard associated with surface ground rupture is considered to be low.

Soil liquefaction is a phenomenon in which a saturated cohesionless soil layer located close to the ground surface loses strength during cyclic loading, such as imposed by earthquakes. During the loss of strength, the soil acquires a "mobility" sufficient to permit both horizontal and vertical movements. Soils that are most susceptible to liquefaction are clean to silty, loose, saturated, uniformly graded, fine-grained sands that lie within 50 feet of the ground surface.

We did encounter layers of loose fine-grained sands in our exploratory borings. These loose sand layers contained various amounts of silt. However, these materials were located above the groundwater level and therefore, the chance of liquefaction occurring at the site is considered to be remote.

CONCLUSIONS AND RECOMMENDATIONS

From a soil and foundation engineering standpoint, it is our opinion that the site is suitable for the proposed plant expansion. However, all of the conclusions and recommendations presented in this report should be incorporated in the design and construction of the project to avoid possible soil and foundation problems. The primary considerations for foundation design include the following: 1) the relatively high groundwater level and 2) the proposed excavations of up to 44½ feet for construction of the below grade basins.

It is our understanding that the proposed below grade equalization and primary sedimentation basins and utility tunnel will extend below the existing groundwater level. We recommend using a design groundwater level of approximately 22 feet below existing grade, or Elevation +28 (Datum is unknown). The basins and tunnel structural mats and walls should be designed to resist hydrostatic pressures.

Excavations for the basins and tunnel will encounter free groundwater. Therefore, dewatering will be required to establish a stable working base during construction. In addition, temporary shoring, soil nailing and/or temporary construction slopes will be required for the excavations to avoid damage to the adjacent natural slope to the east and the adjacent treatment plant access roads and structures.

Detailed earthwork and foundation recommendations for use in design and construction of the project are presented below. We recommend that our firm be provided the opportunity for a general review of the final design and specifications in order that the earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications. If our firm is not accorded the privilege of making this recommended review, we can assume no responsibility for misinterpretation of our recommendations.

A. Earthwork

1. Clearing and Site Preparation

The site should be cleared of all obstructions including the softball diamond and its associated structures, i.e. the chain link backstop and post foundations, and the bleachers, concrete slab and associated baserock; surrounding fence and concrete wall; the large bushes and associated root systems; and debris. In addition, it should be noted that we encountered some concrete rubble in Boring 7 at a depth of 3½ feet. Additional rubble may be encountered during construction. Holes resulting from the removal of underground obstructions that extend below the proposed finish grade should be cleared and backfilled with suitable material compacted to the requirements given below under Item A.5, "Compaction". We recommend that the backfilling operations for any excavations to remove deleterious material be carried out under the observation of the soil engineer, so that these excavations will be properly backfilled.

After clearing, the portions of the site containing surface vegetation or organic laden topsoil should be stripped to an appropriate depth to remove these materials. At the time of our field investigation, we estimated that a stripping depth of approximately 3 inches would be required. The amount of actual stripping should be determined in the field by the soil engineer at the time of construction. The cleared and stripped materials should be removed from the site or stockpiled for later use in landscaping, if desired.

2. Dewatering

The excavations for the below grade structures will require dewatering to provide dry working conditions and to prevent pumping and instability of the bottom of the excavations during construction. We recommend that the groundwater table be temporarily drawn down at least 2 feet below the deepest excavation. The dewatering system should be designed by a specialty contractor.

2. Temporary Shoring and Construction Slopes

a. Temporary Construction Slopes

We recommend temporary construction slopes conform to the OSHA's "Guidelines for Excavations and Temporary Sloping". We recommend a maximum slope inclination of 2:1 (horizontal to vertical) in the looser sands which extend to the underlying medium dense to dense sands located at depths of about 17 to 21 feet below grade (Elevations +32 to +25 feet). The exact depth of the bottom of the upper looser sands should be determined in the field at the time of construction by the soil engineer. In the underlying denser sands, we recommend a maximum slope inclination of 1:1.

In addition, we recommend all vehicles be kept at least 10 feet away from the top of temporary slopes, the temporary slopes be protected from excessive drying and/or saturation during construction and that we have the opportunity to observe all excavated slopes for conformance with the anticipated soil conditions.

b. Temporary Shoring

We understand that excavations on the order of 27½ to 44½ feet are anticipated to construct the below grade basins and tunnel. As an alternative to temporary construction slopes, vertical excavations can be temporarily shored using a braced, tied-back or a cantilevered soldier beam and lagging shoring scheme.

We recommend that cantilevered walls be designed based on an active lateral pressure calculated using an equivalent fluid pressure of 35 pounds per cubic foot. The available passive pressure below the wall can be determined using an equivalent fluid pressure of 400 pounds per cubic foot. For soldier beams, the passive pressure can be used against twice the projected area. However, the developed passive pressure must be reduced by the amount of the active pressure. The cantilevered wall should also be designed for additional surcharge loads due to traffic loads of the adjacent treatment plant access road and due to the footing loads of adjacent structures. The added surcharge load should be taken as 1/3 of the vertical load. To prevent excessive surcharging of the walls from heavy construction equipment vehicles, such as concrete trucks, we recommend that such vehicles be kept at least 5 feet from the top of the excavation. With the vehicle at least 5 feet from the excavation, the shoring should be designed to resist an additional uniform pressure of 100 pounds per square foot for the upper 10 feet of the wall. The cantilevered wall should be sufficiently rigid to prevent detrimental movements of the adjacent ground surface.

We recommend that the lateral soil pressures presented on Figure 4, "Lateral Earth Pressures, Braced Shoring", for braced soldier beam and

lagging shoring be used in design of the braced temporary shoring. As indicated on Figure 4, the temporary tied-back or braced shoring should be designed for additional surcharge due to any adjacent structures. To prevent excessive surcharging of the walls from heavy construction, vehicles such as concrete trucks, we recommend that such vehicles be kept at least 5 feet from the top of the excavations. With the vehicles kept 5 feet from the excavation, the shoring must be designed to resist the additional lateral loads shown on Figure 4. In addition, all shoring schemes should be designed with sufficient rigidity to prevent detrimental displacements at the top of the walls.

Passive lateral load resistance can be developed against the soldier piles, and raker kicker blocks by passive resistance equal to an equivalent fluid weighing 400 pounds per cubic foot. These passive pressures can be used against the projected area of the kicker blocks and twice the projected area of the soldier pile shafts.

Vertical support of the soldier piles should be determined on the basis of an average allowable skin friction value of 500 pounds per square foot. Vertical support for the raker kicker blocks can be taken as 3,000 pounds per square foot for the blocks founded at least 1.5 feet below lowest adjacent grade into competent medium dense to dense Colma sand.

The lateral earth pressures presented on Figure 4 can also be used in the design of tied-back shoring. Allowable design friction values of 500 pounds per square foot can be used to design the tie-backs. All tie-backs should be proof loaded to at least 125 percent of their design values. The anchorage of the tie-backs should be limited to a zone behind a theoretical failure plane sloped 30 degrees from the vertical. The tie-backs should extend at least 16 feet beyond the theoretical failure plane. The projection should begin from the bottom of the excavation as shown on Figure 5. We recommend that our office and the structural engineer's office review the final temporary shoring plans to assure that the recommendations presented herein have been properly incorporated into the contract documents. In addition, we recommend that a representative from our office observe the installation of the temporary shoring system. All appropriate requirements of OSHA should be incorporated into the design of the temporary shoring system.

3. Subgrade Preparation

After the site has been properly cleared and stripped and any necessary excavations made, the exposed soils in those areas to receive at-grade structural fill, slabs or pavements should be scarified to a depth of 6 inches, moisture conditioned and compacted to the requirements for structural fill.

In below grade areas where the structural mat extends below the original groundwater level, the subgrade will probably be unstable. To provide a stable working base, a geotextile fabric, such as Mirafi 500x or equivalent, should be placed directly on the subgrade and covered with 18 inches of locally available baserock. The actual amount of subgrade preparation shall be determined in the field by the soil engineer at the time of construction.

4. Material for Fill

All on-site soils below the stripped layer and having an organic content of less than 3 percent by volume can be used as fill. However, all fill placed at the site including on-site soils should not contain rocks or lumps larger than 6 inches in greatest dimension with not more than 15 percent larger than 2.5 inches. In addition, any import fill should be predominantly granular with a plasticity index of 12 or less.

5. Compaction

All structural fill should be compacted to at least 95 percent relative compaction as determined by ASTM Test Designation D1557-78. Fill material should be spread and compacted in lifts not exceeding 8 inches in uncompacted thickness.

6. Pipe Bedding

Pipeline bedding and fine-grading material should be placed to a minimum depth of 6 inches below the pipe and to a minimum depth of 6 inches above the pipe and compacted to at least 95% relative compaction. The bedding and fine-grained materials should conform to follow John Carollo Engineers specification or a similar material consisting of hard, durable particles or fragments of stone or gravel, screened or crushed to the required size and grading. The material shall be free from vegetable matter, lumps or balls of clay, or other deleterious matter, and shall conform to the following gradations when tested in accordance with ASTM C136.

GRADATION REQUIREMENTS
FOR
ABC MATERIAL
(Aggregate Base Course)

Sieve Size (Square Openings)	Percentage by Weight Passing Sieves
1 - 1/8" Screen	100
No. 4 Sieve	38 to 70
No. 200 Sieve	3 to 12

In addition to the above requirements, all material used shall conform to the following gradation relationships:

A. Of that fraction of the material passing, the No. 4 sieve, 58 percent to 100 percent shall pass the No. 10 sieve.

B. Of that fraction of the material passing the No. 10 sieve, 28 percent to 70 percent shall pass the No. 40 sieve.

C. Of that fraction of the material passing the No. 10 sieve, 8 percent to 23 percent shall pass the No. 200 sieve.

D. Of that fraction of the material passing the No. 40 sieve, 14 percent to 45 percent shall pass the No. 200 sieve.

Coarse aggregate (retained on the No. 4 sieve) shall have a percentage of wear of not more than 40 percent when tested by the Los Angels Test, ASTM C131. Coarse material shall be crushed or wasted and fine material shall be added or wasted to meet the grading requirements set forth above.

The plasticity index of the fraction passing the No. 40 sieve shall not exceed 5 when tested in accordance with ASTM D424.

The Aggregate Base Course Material (ABC) may be substituted with Class 2 aggregate base as specified in Section 26 Aggregate Base in the State of California Business and Transportion Agency Department of Transportation Standard Specifications. The maximum aggregate size is 1 - ½ inch.

7. Trench Backfill

Pipeline trenches should be backfilled with fill placed in lifts of approximately 8 inches in uncompacted thickness. However, thicker lifts may be used provided the method of compaction is approved by the soil engineer and the required minimum degree of compaction is achieved. On-site and imported sand can also be used for backfilling trenches provided it is compacted to at least 90 percent relative compaction. Sufficient water should be added during the trench backfilling operations to prevent the soil from "bulking" during compaction. In structural mat, slab and pavement areas, the upper three feet of backfill should be compacted to at least 95 percent relative compaction for on-site soils and imported sand backfill.

8. Drainage

Positive surface gradients should be provided adjacent to the tops and toe of slopes so as to direct surface water away from the slopes toward suitable discharge facilities. Drainage measures should also be incorporated in the project construction to prevent water flowing over the tops of slopes. Ponding of surface water should not be allowed adjacent to slopes or on pavements.

9. Guide Specifications

All earthwork should be performed in accordance with the Guide Specifications - Site Earthwork presented in Appendix C. It should be pointed out, however, that these specifications are only general in nature and the actual job specifications should also incorporate all requirements contained in this report.

B. Foundations

1. Structural Mat for Equalization, Primary Sedimentation and Chlorine Contact Basins and Utility Tunnel

We recommend that the equalization and primary sedimentation basins and adjoining tunnel be supported on a structural mat constructed on a 6-inch leveling course of Class 2 aggregate base placed over the properly prepared subgrade. The preparation of the subgrade was presented under Item A.4, "Subgrade Preparation".

The structural mat for the equalization basin, primary sedimentation basin, and the adjoining utility tunnel should be designed for an allowable net bearing pressure of 3500 pounds per square foot for dead loads, 5000 pounds per square foot for dead plus live loads and 6500 pounds per square foot for all loads including seismic.

The chlorine contact basin should be designed for an allowable net bearing pressure of 2000 psf for dead loads, 3000 psf for dead plus live loads and 4000 psf for all loads including seismic.

These allowable loads are net values; therefore, the weight of the mat can be neglected for evaluating bearing capacity. In addition, a modulus of subgrade reaction of 300 pounds per square inch per inch can be used for the design of the mats.

We should note that there may be areas under the structural mat subgrade where loose sands are encountered, such as in the vicinity of Boring 9. If these loose materials are encountered, they should be over-excavated down to the more competent sands. The amount of over-excavation should be determined in the field by the soil engineer at the time of construction. The over-excavated area should be backfilled with lean concrete as part of the structural mat.

Since a major portion of the basins will be below the groundwater table, the structures will be subjected to hydrostatic uplift pressures. Resistance to uplift should be provided by the weight of the mat and structures. We recommend a unit weight for the soil of 120 pounds per cubic foot above the design groundwater level and 58 pounds per cubic foot below the design groundwater level.

We recommend that the subgrade be proof-rolled just prior to construction of the mat to provide a smooth, unyielding surface for mat support.

Settlement caused by static loads of the structure supported on a mat foundation should be within tolerable limits of the structures.

2. Below Grade Basins and Tunnel Walls

The below grade basins and tunnel walls must be designed to resist both lateral earth pressures and any additional lateral loads caused by surcharge loads on the adjoining ground surface.

We recommend that the active lateral earth pressures against the walls with a level backfill be designed to resist equivalent fluid pressures as shown on Figure 6. Additional active pressures, including seismic and surcharge loads, are also shown on Figure 6. The seismic loads on the walls were based on a maximum credible earthquake from the San Andreas fault of 8.3, a bedrock acceleration of 0.75g and an effective ground surface acceleration of 0.35g.

At-rest lateral earth pressures for the below grade walls are shown in Figure 7.

In addition, walls that have a backfill that slope upward away from the wall should be designed for an additional equivalent fluid pressure of 1 pound per cubic foot for every 2 degrees of slope inclination. Wherever walls will be subjected to surcharge loads, they should be designed for an additional uniform lateral pressure equal to one-third or one-half the anticipated surcharge load for active and at-rest cases, respectively.

All backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. If heavy compaction equipment is used, the walls should be appropriately designed for the heavy equipment and/or temporarily braced.

Retaining walls should be supported on the structural mat foundations designed in accordance with the recommendations presented previously under Item B.1. Lateral load resistance for the walls can be developed in accordance with the recommendations presented below under Item B.4, "Lateral Loads".

4. Lateral Loads

Lateral load resistance for the below grade basins and tunnel can be developed in friction between the foundation bottom and the supporting subgrade. A friction coefficient of 0.40 is considered applicable. As an alternative, a passive resistance equal to an equivalent fluid weighing 400 pounds per cubic foot acting against the foundations may be used. If the foundations are poured neat against the soil, friction and passive resistance can be used in combination.

C. Corrosion Potential

Three resistivity traverses were made at the site using a four-electrode

Vibroground apparatus at the locations shown on Figure 1. Generally, the traverse shows that the approximate resistivities of the soils in this area are from 2443 to 6706 ohm-cm. The results of the traverse is shown in Appendix A on Table A-1. Therefore, as shown on the table below, the soils are slightly to moderately corrosive.

Conductivity (mho-cm)	Resistivity (ohm-cm)	Corrosivity	Life Span (years)
>2500	<400	Extremely Severe	<5
1100-2500	400-900	Very Severe	5-10
670-1100	900-1500	Severe	10-15
300-670	1500-3500	Moderate	15-20
125-300	3500-8000	Mild	20-30
50-125	8000-20,000	Slight	30-50
<50	>20,000	Very Slight	>50

D. Soil Sulphate Content

Sulfate content determinations were performed on two selected samples of the subsurface soils. These tests indicated sulfate contents ranging from less than 0.001 to 0.007 percent. The complete results of the sulfate tests are shown in Appendix B. Therefore, as shown below, these results indicate that the soils underlying the site have a negligible potential for sulfate attack on concrete.

POTENTIAL FOR SULFATE ATTACK ON CONCRETE

Relative Degree of Sulfate Attack	Water-Soluble Sulfate, as SO_4, (%)
Negligible	0.00 - 0.10
Positive +	0.10 - 0.20
Considerable ++	0.20 - 0.50
Severe	over 0.50

\+ Use type II cement
++ Use type V cement

E. Pavements

One "R" (resistance) value test was performed on a representative bulk sample of the surface materials at the site. The results of this test are presented in Appendix B and indicate an "R" value of 66. However, because of the durability of the sands, we recommend using a maximum "R" value of 50 for design. Combining this information with an appropriate traffic index for the proposed heavy truck access areas, we have developed the following alternative pavement sections using Procedure

301-F of the State of California Department of Public Works, Division of Highways for a pavement life of 20 years.

RECOMMENDED PAVEMENT DESIGN ALTERNATIVES

Location	Pavement Components: Asphaltic Concrete (inches)	Pavement Components: Aggregate Base Class 2 (inches)	Total Thickness (inches)
Truck Access Areas (T.I. = 6.5 for 20-year life)	3	6	9*

*Minimum recommended section

The traffic indices used in our pavement designs are considered reasonable values for the proposed development and should provide the indicated pavement lives with only a normal amount of pavement maintenance. Selection of the design traffic parameters, however, was based on engineering judgement and not on an equivalent wheel load analysis developed from a traffic study or furnished to us.

Asphaltic concrete, aggregate base and preparation of the subgrade should conform to and be placed in accordance with the Guide Specifications - Asphalt Paving presented in Appendix D.

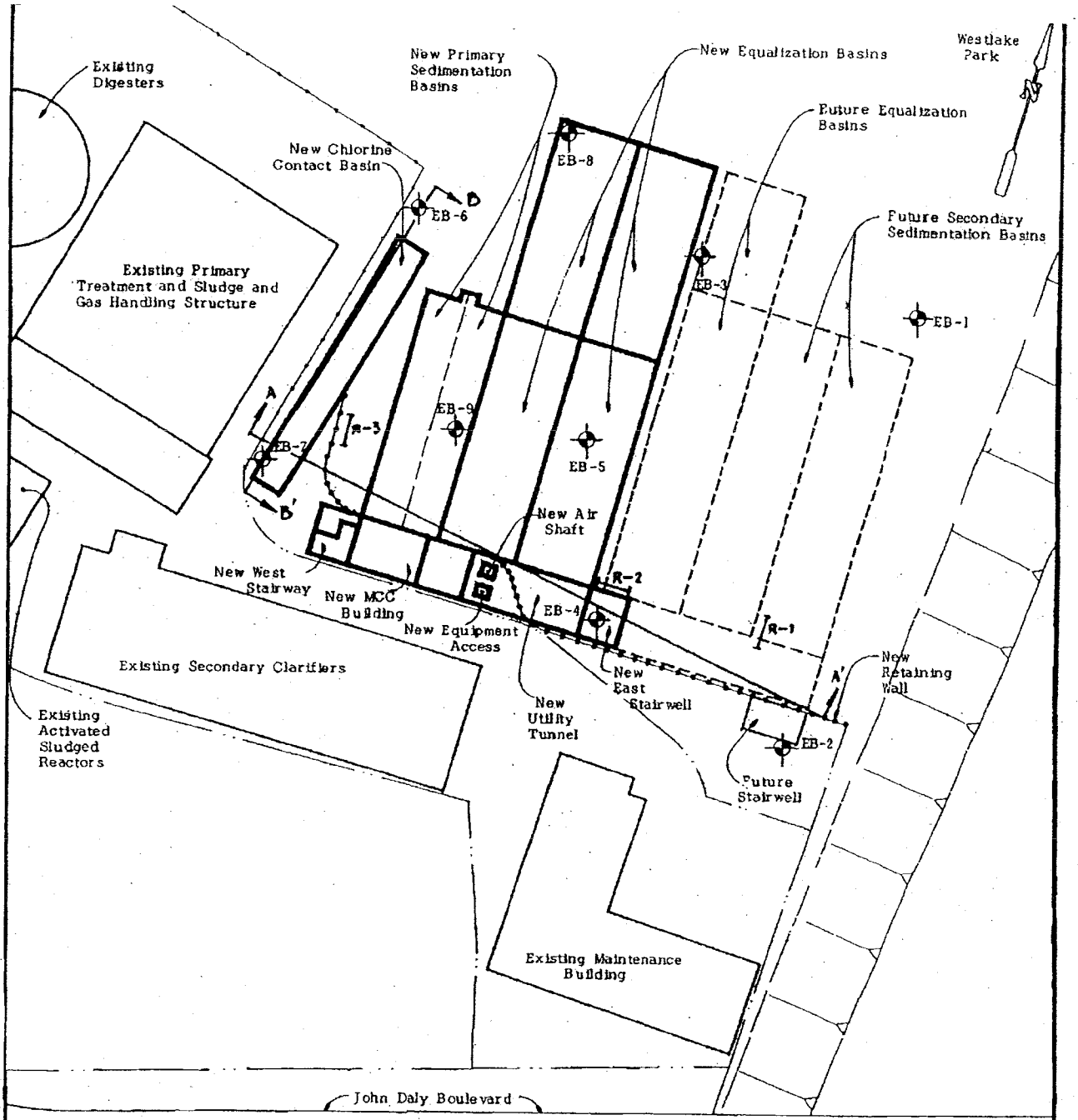
In areas where the pavements will abut planted areas, the pavement baserock layer should be protected against saturation from water in the planters. This can be accomplished by extending the concrete curbs to the bottom of the baserock layer, forming a cut-off wall between the planter and the pavement section.

F. Construction Observation

The analysis and recommendations submitted in this report are based in part upon the data obtained from the nine soil borings. The nature and extent of variations between the borings may not become evident until construction. If variations then become apparent, it will be necessary to re-evaluate the recommendations of this report.

We recommend that our firm be retained to provide soil engineering services during the excavation and foundation construction phases of the work. This is to observe compliance with the design concepts, specifications and recommendations and to allow design changes in the event that subsurface conditions differ from that anticipated prior to the start of construction.

* * * * * * * * * * * * * * * * * *



Base: "General Plot Plan" by John Carollo Engineers, dated September 24, 1986.

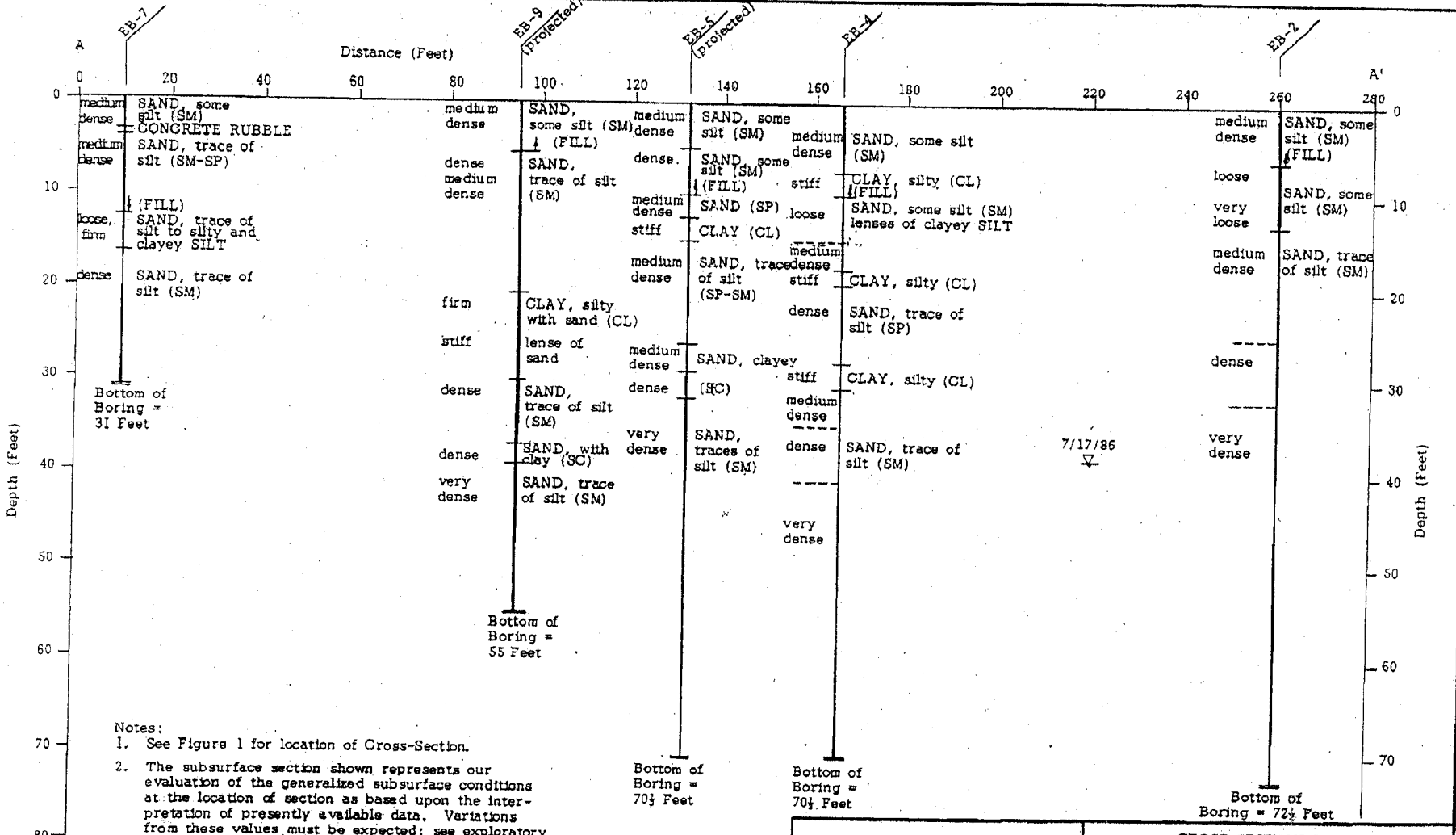
PETER KALDVEER AND ASSOCIATES, INC.

Consulting Geotechnical Engineers

SITE PLAN

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	
K363-13	November 1986	Figure 1



Notes:

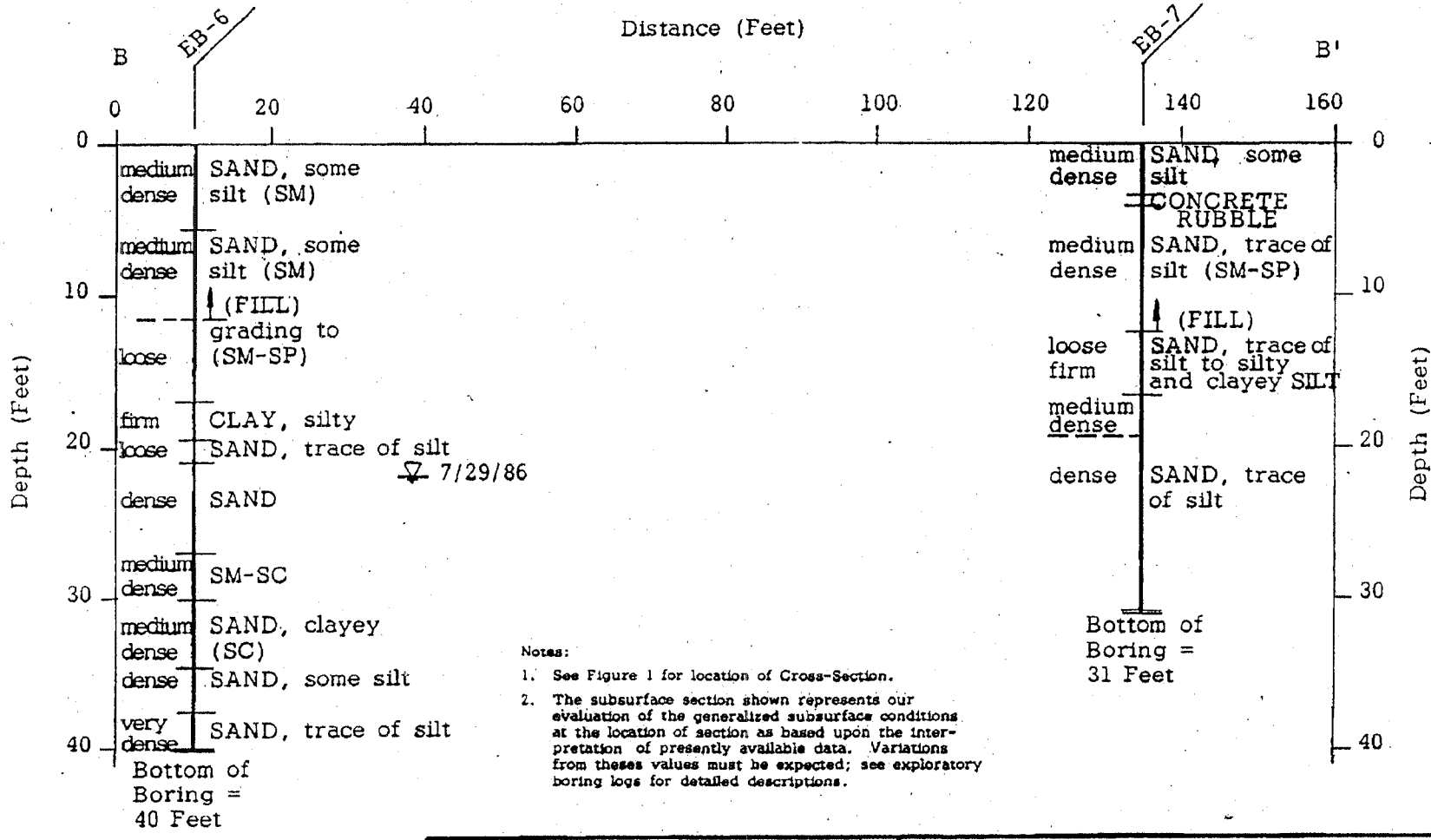
1. See Figure 1 for location of Cross-Section.
2. The subsurface section shown represents our evaluation of the generalized subsurface conditions at the location of section as based upon the interpretation of presently available data. Variations from these values must be expected; see exploratory boring logs for detailed descriptions.

PETER KALDVEER AND ASSOCIATES, INC.
Geotechnical Consultants

CROSS-SECTION A-A'

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	Figure
K363-13	November 1986	2



Notes:

1. See Figure 1 for location of Cross-Section.
2. The subsurface section shown represents our evaluation of the generalized subsurface conditions at the location of section as based upon the interpretation of presently available data. Variations from theses values must be expected; see exploratory boring logs for detailed descriptions.

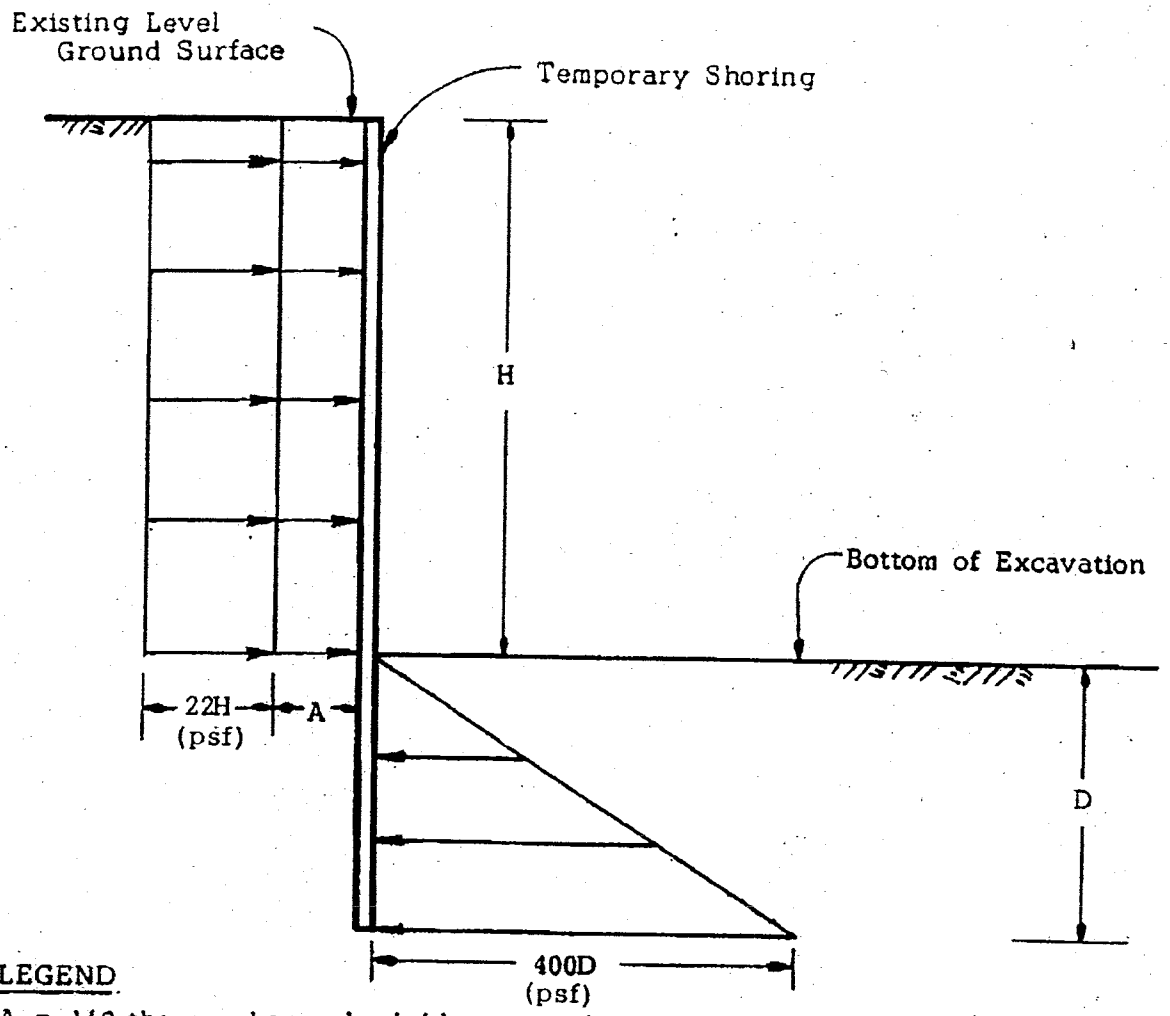
PETER KALDVEER AND ASSOCIATES, INC.

Geotechnical Consultants

CROSS-SECTION B-B'

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	Figure
K363-13	November 1986	3



LEGEND

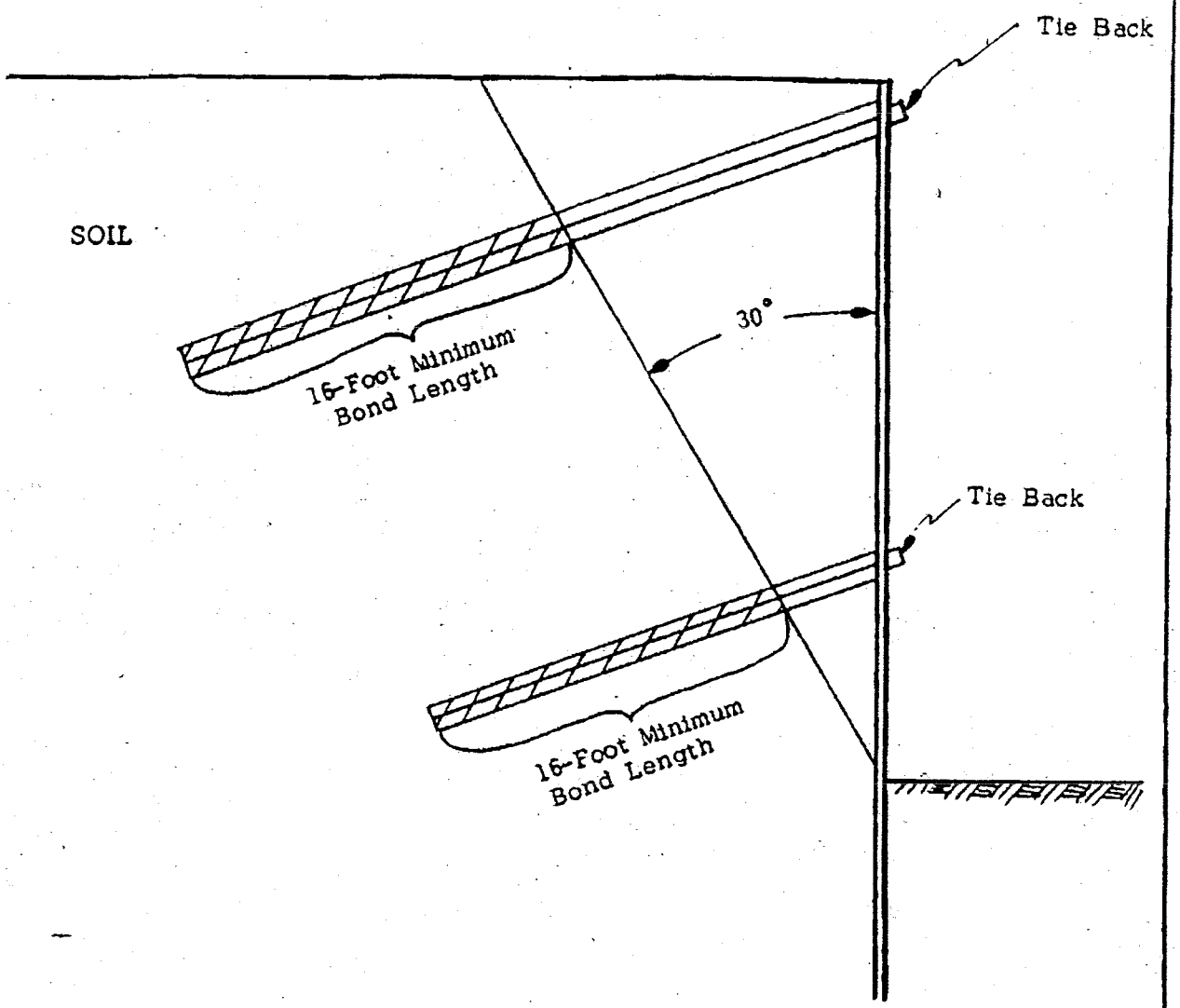
A = 1/2 the surcharge load (due to traffic loads 5 feet from wall use 100 psf for upper 10 feet of wall), psf
H = Height of temporary shoring above bottom of excavation, feet
D = Depth of embedment of verticle members, feet

Notes:

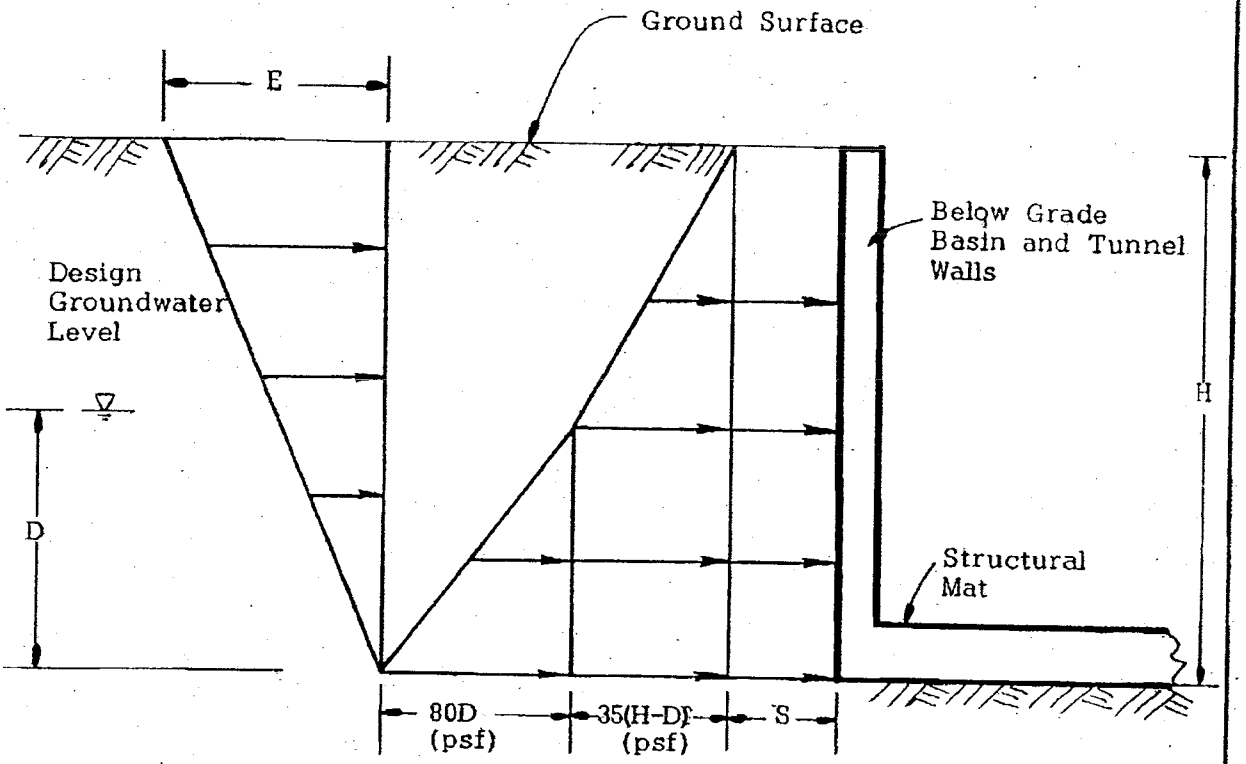
1. The above pressures are for walls with a level surface behind them; these pressures must be increased if the ground behind the temporary shoring slopes upward.

2. Passive pressures can be used over twice the projected area of the soldier pile.

PETER KALDVEER AND ASSOCIATES, INC. *Geotechnical Consultants*	LATERAL EARTH PRESSURE BRACED SHORING	
	PROPOSED TREATMENT PLANT EXPANSION Daly City, California	
	PROJECT NO. K363-13 / DATE November 1986	Figure 4



PETER KALDVEER AND ASSOCIATES, INC. *Geotechnical Consultants*	TIE-BACK ANCHORAGE LIMIT ZONE	
	PROPOSED TREATMENT PLANT EXPANSION Daly City, California	
	PROJECT NO. K363-13	DATE November 1986
		Figure 5



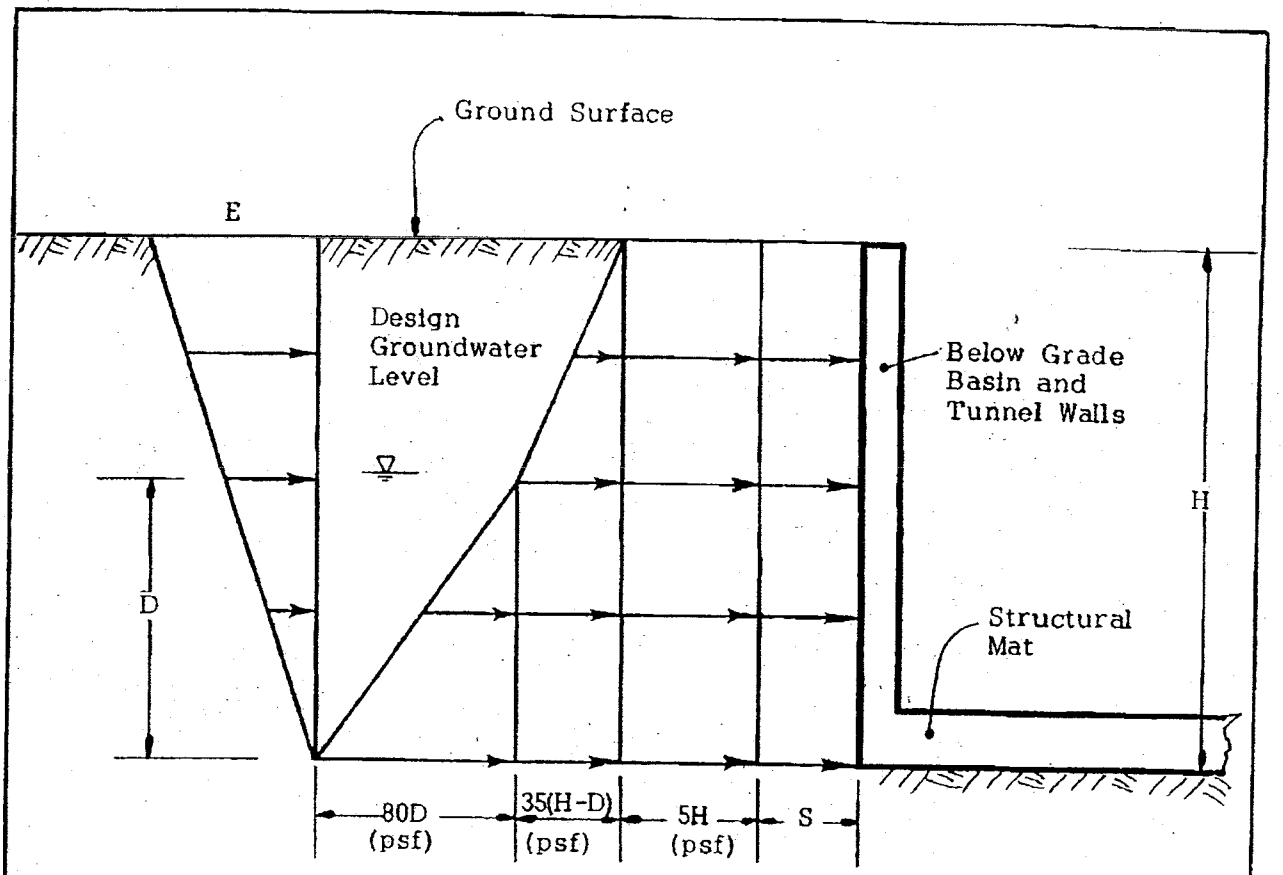
H = Height of below grade wall above bottom of structural mat, feet.

D = Height of design groundwater level above bottom of structural mat, feet.

S = 1/3 the surcharge load, psf. If wall subjected to vehicular surcharge, the walls should be designed for a uniform pressure of 100 pounds per square foot for the upper 10 feet of wall.

E = Maximum lateral pressure due to earthquake loading of 33H psf.

PETER KALDVEER AND ASSOCIATES, INC. *Geotechnical Consultants*	ACTIVE LATERAL EARTH PRESSURES FOR BELOW GRADE WALLS PROPOSED TREATMENT PLANT EXPANSION Daly City, California	
	PROJECT NO. K363-13 / DATE November 1986	Figure 6



H = Height of below grade wall above bottom of structural mat, feet.

D = Height of design groundwater level above bottom of structural mat, feet.

S = 1/3 the surcharge load, psf. If wall subjected to vehicular surcharge, the walls should be designed for a uniform pressure of 100 pounds per square foot for the upper 10 feet of wall.

E = Maximum lateral pressure due to earthquake loading of 33H psf.

PETER KALDVEER AND ASSOCIATES, INC. *Geotechnical Consultants*	AT REST LATERAL EARTH PRESSURES FOR BELOW GRADE WALLS PROPOSED TREATMENT PLANT EXPANSION Daly City, California	
	PROJECT NO. K 363-13	DATE November 1986
		Figure 7

APPENDIX A - FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using a truck-mounted, rotary wash auger system. Nine 5-inch diameter exploratory borings were drilled on July 15, 16 and 17 and October 15, 1986, to a maximum depth of 73½ feet. The locations of the exploratory borings are shown on the Site Plan, Figure 1. The soils encountered in the borings were continuously logged in the field by our representative. The soils are described in accordance with the Unified Soil Classification System (ASTM D-2487). The logs of the borings as well as a key for the classification of the soil (Figure A-1) are included as part of this appendix.

Representative soil samples were obtained from the exploratory borings at selected depths appropriate to the soil investigation. Undisturbed samples were obtained using a 3-inch O.D. Modified California sampler and disturbed samples were obtained using the 2-inch O.D. split spoon sampler. All samples were transmitted to our laboratory for evaluation and appropriate testing. Both sampler types are indicated in the "Sampler" column of the boring logs as designated below:

☐ Split Spoon

☒ Modified California

Resistance blow counts were obtained with the split spoon sampler by dropping a 140-pound hammer through a 30-inch free fall. However, for the Modified California sampler, the resistance blowcounts were obtained by dropping a 400-pound hammer through an 18-inch fall through the drilling mud. The samplers were driven 18 inches, or a shorter distance where hard resistance was encountered, and the number of blows were 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, or the number of inches indicated where hard resistance was encountered. When the split spoon sampler was used, these blow counts are the standard penetration resistance values. However, due to the larger diameter of the Modified California sampler and the larger sized "down-hole" hammer, the blow counts recorded for this sampler are not standard penetration resistance values. Consequently, these values are followed by an asterisk (*) on the boring logs. In order to convert these values to standard penetration resistance values, the indicated blow counts should be multiplied by a factor of 0.58.

The attached boring logs, cross sections 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.

Field resistivity tests were performed on July 16, 1986 using a Vibroground apparatus to estimate the potential for galvanic corrosion.

The locations of the resistivity tests are shown on Figure 1. The results of the field resistivity tests performed are shown on Table A-1.

TABLE A-1

RESULTS OF FIELD RESISTIVITY TESTS

Traverse Numbers	Resistivity (ohm-cm) Depth (feet) 0-2.5	0-5.0	0-7.5	0-10
R-1	6706	4694	3734	4022
R-2	5748	2490	3877	4788
R-3	6227	2490	3159	5937

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4"	3"	12"	
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

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KEY TO EXPLORATORY BORING LOGS
Unified Soil Classification System (ASTM D-2487)

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	
K363-13	November 1986	Figure A-1

DRILL RIG Rotary Wash	SURFACE ELEVATION ±47 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER 38½' (see note 2)	BORING DIAMETER 5 Inches	DATE DRILLED 7/16/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), traces of silt	orange yellow tan	loose	SM	1					
(FILL)				5		8	15		
SAND (fine grained), some silt	dark brown	loose	SM						
		medium dense		10		12			
SAND (fine grained), some silt	orange brown	very dense	SM						
(grading with more silt)				15		67	14		
(interbedded lenses with more silt and trace of clay and of clayey SILT with sand)	grey			20		87/11½"			
				25					
				30					
(grading to traces of silt)	orange brown			35			▽		
				40		63/6"			

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	1

DRILL RIG Rotary Wash	SURFACE ELEVATION ±47 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER 38½' (see note 2)	BORING DIAMETER 5 Inches	DATE DRILLED 7/16/86

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
SAND (fine grained), traces of silt (continued)	orange brown	very dense	SM	41					
				45					
	brown					89/11"	19	112	
				50					
						48/6"			
				55					
				60					
	grey brown					70/6"			
Notes: 1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual. 2. Groundwater level was measured at 38½ feet one day after drilling. This boring was converted into a 70 foot piezometer.				65					
				70					
Bottom of Boring = 73½ Feet						50/5½"			
				75					
				80					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	1

DRILL RIG Rotary Wash	SURFACE ELEVATION ±51 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/16/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt	tan	medium dense	SM	1					
SAND (fine grained), some silt, occasional angular gravels (FILL)	dark grey	medium dense	SM	5		11	14		
SAND (fine grained), with some silt	tan	loose	SM						
	brown	very loose		10		3			
SAND (fine grained), traces of silt, trace of organics (thin roots) Passing #200 Sieve = 14% (grading with less silt)	brown	medium dense	SM	15		19	21		
			SP-SM						
	brown orange			20		28			
	orange tan	dense		25		41			
	yellow brown	very dense		30		78			
				35					
				40					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	2

DRILL RIG Rotary Wash	SURFACE ELEVATION ±51 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/16/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), traces of silt (continued)	orange tan	very dense	SP-SM	41					
						83/11"	20		
				45					
				50					
Passing #200 Sieve = 7%						84/11½"	21		
				55					
				60					
						50/6"			
				65					
				70					
						50/5"			
Bottom of Boring = 72½ Feet				75					
Note: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.				80					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	2

DRILL RIG Rotary Wash	SURFACE ELEVATION ±47 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/17/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt (FILL)	tan	loose	SM	1					
SAND (fine grained), some silt, occasional pea gravel (POSSIBLE FILL)	blue grey / brown	medium dense	SM	5		16	15		
SAND (fine grained), some silt, trace of organics, wood (lense of silty CLAY, with sand)	dark grey	loose	SM						
		medium dense		10		8	78		
(lense of sandy, clayey SILT)				15		21	32		
(lenses of silty CLAY at 18 feet)									
		dense		20					
(grading to traces of silt)						37			
				25					
		very dense		30		55/9"			
				35					
SAND (fine grained), traces of silt	orange tan	very dense	SM-SP	40					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	3

DRILL RIG Rotary Wash	SURFACE ELEVATION ±47 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/17/86

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
SAND (fine grained), traces of silt (continued)	orange tan	very dense	SM	41					
						92/11"	27		
(lense with rounded gravels)				45					
(grading with more silt)									
				50					
						70/9"			
(grading to traces of silt and with traces of pea gravel)	orange grey, brown		SM-SP	55					
				60					
						50/4½"			
				65					
				70		50/5"			
Bottom of Boring = 70½ Feet									
Note: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.				75					
				80					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	3

DRILL RIG Rotary Wash	SURFACE ELEVATION ±50½ Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt	tan	loose	SM	1					
SAND (fine grained), some silt, trace of angular gravels and organics (roots) (FILL)	grey black	medium dense	SM	5		27			
CLAY, silty with some sand, trace of organics (POSSIBLE FILL)	grey black	stiff	CL				32		
SAND (fine grained), with some silt, trace of organics (thin interbedded layers of clayey SILT with variable amounts of sand and silty)	grey	loose	SM	10		9*	28	84	0.2
		medium dense		15		13	41		
CLAY, silty	dark grey	stiff	CL						
SAND (fine grained), trace of silt Passing #200 Sieve = 15%	grey	dense	SM	20		31			
CLAY, silty, some sand (very fine grained) (lenses of clayey SILT)	grey black	stiff	CL	25					
SAND (fine grained), silty with some clay	grey	medium dense	SC	30		20*	27	96	
SAND (fine grained), with trace of silt	grey	medium dense	SM						
SAND (fine grained), trace of silt	orange tan	dense	SM	35					
				40		37	22		

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	4

DRILL RIG Rotary Wash	SURFACE ELEVATION ±50½ Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), trace of silt (continued)	orange tan	dense	SM	41		37	22		
		very dense	SP-SM	45					
				50		89	20		
				55					
				60		70/6"			
				65					
				70		66/6"			
Bottom of Boring = 70½ Feet				75					
				90					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*) see first page, Appendix A.

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	4

DRILL RIG Rotary Wash	SURFACE ELEVATION ±49 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), with some silt	tan	medium dense	SM	1					
SAND (fine grained), with some silt, traces of clay (grading with more clay)	dark grey	medium dense	SM						
SAND (fine grained), some silt	olive	dense	SM	5					
SAND (fine grained), with some silt, trace of angular pea gravel (FILL)	gold orange, tan	dense	SM			38			
SAND (fine grained), trace of silt Passing #200 Sieve = 10%	dark grey	medium dense	SP-SM	10		17			
CLAY, silty, trace of organics, roots	dark grey	stiff	CL						
SAND (fine grained), trace of silt and organics Passing #200 Sieve = 6% (alternating thin lenses of silty CLAY)	dark grey	medium dense	SP	15		24*	9	97	
				20		18			
SAND (fine grained), clayey, trace of organics	black	medium dense	SC	25					
SAND (fine grained), with traces of silt and organics (grading with clay)	dark grey to black	dense	SM SC	30					
SAND (fine grained), trace of silt	grey	very dense	SM			46/8½"	20		
SAND (fine grained), trace of silt Passing #200 Sieve = 11%	orange & gold tan	very dense	SP-SM	35					
				40		63			

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	5

DRILL RIG Rotary Wash	SURFACE ELEVATION ±49 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), trace of silt (continued)	orange tan	very dense	SP-SM	41					
				45					
				50		89	20		
				55					
				60		69/9"			
				65					
				70		59/6"			
Bottom of Boring = 70½ Feet				75					
Notes: 1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual. 2. For an explanation of penetration resistance values marked with an asterisk (*) see first page, Appendix A.				80					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	5

DRILL RIG Rotary Wash	SURFACE ELEVATION	LOGGED BY DYR
DEPTH TO GROUNDWATER	BORING DIAMETER 5 Inches	DATE DRILLED 7/17/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt (FILL)	orange tan	medium dense	SM	1					
SAND (fine grained), traces of silt, trace of organics and pea gravel (thin lenses of clayey SILT) Passing #200 Sieve = 10%	dark grey	medium dense	SP-SM	5		16	22		
				10		10	14		
		loose				4			
Passing #200 Sieve = 11%				15		7			
CLAY, silty, trace of organics	grey black	firm	CL				56		
SAND (fine grained), some silt and organics Passing #200 Sieve = 23%	dark grey	loose	SM	20		15*	22	91	
		dense				45			
SAND (fine grained), silty, trace of clay	dark grey	medium dense	SM-SC	25					
SAND (fine), clayey	turquoise grey	medium dense	SC	30		21	25		
SAND (fine grained), some silt	dark grey	dense	SM						
SAND (fine grained), clayey	olive grey	very dense	SC	35		34			
SAND (fine grained), trace of silt	orange tan	very dense	SM			67			
Bottom of Boring = 39½ Feet				40					

Notes:
See Boring 5 for Notes 1 and 2
3. This boring as converted into a 38 foot piezometer. The groundwater level was measured at 22 feet on July 29, 1986.

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	6

DRILL RIG Rotary Wash	SURFACE ELEVATION ±49 Feet	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 7/17/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt, trace of organics	dark brown	medium dense	SM	1					
CONCRETE RUBBLE									
SAND (fine grained), trace of silt (FILL)	grey brown	medium dense	SM-SP	5		19			
SILT, clayey, sandy, trace of organics	dark grey	firm	ML	10		21	13		
SAND (fine grained), trace of silt	dark grey	loose	SM			9	29		
SAND (fine grained), very silty, trace of organics Passing #200 Sieve = 51% (lense of clayey SILT, with trace of organics)	dark grey	loose-firm	SM-ML	15		6 25	31		
SAND (fine grained), some silt	dark grey	medium dense	SM	20		42	14		
SAND (fine grained), traces of silt (grading with more silt)	dark grey	dense very dense	SM	25 30		40 76/11½"			
Bottom of Boring = 31 Feet Note: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.				35 40					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	7

DRILL RIG Rotary Wash	SURFACE ELEVATION --	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 10/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt	tan	loose	SM	1					
SAND (fine grained), some silt	brown	loose	SM						
SAND (fine grained), some silt	blue grey	loose	SM						
SAND (fine grained), some silt	tan	loose	SM	5		9			
SAND (fine grained), some silt	blue grey	loose	SM						
SAND (fine grained), trace of silt (thin lense where clean and of sandy SILT) (grading to some silt and traces of organics)	dark grey	medium dense	SM	10		29			
(interbedded with thin lense of silty and sandy clay and with more silt)				15		12	32		
				20		16	27		
(grading clayey)			SC	25		31	21		
Passing #200 Sieve = 40% (grading to some clay and to some silt) (trace of organics)		loose		30		7	32		
		medium dense		35		21			
Passing #200 Sieve = 26%		loose		40		4	24		

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	8

DRILL RIG Rotary Wash	SURFACE ELEVATION —	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 10/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt (continued)	dark grey	loose	SM	41		4	24		
SAND (fine grained), trace of silt	tan grey	medium dense	SM	45		28	20		
	orange tan	very dense		50		74/11"			
				55					
				60		74/11"			
Bottom of Boring = 60 Feet				65					
				70					
				75					
				80					

Note:
The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	8

DRILL RIG Rotary Wash	SURFACE ELEVATION --	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 10/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), some silt	brown	loose	SM	1					
SAND (fine grained), some silt, organics (asphalt chunk, wood) (FILL)	grey black	medium dense	SM						
		dense		5					
SAND (fine grained), trace of silt	tan	dense	SM			43			
SAND (fine grained), trace of silt and organics (alternating with interbedded lense of firm SILT, with sand very fine grained, and some clay	grey	medium dense	SM	10		26	15		
				15					
				20					
CLAY, silty with sand (very fine - fine grained), trace of organics (alternating with interbedded lense of SAND fine grained, with variable amounts of silt and clay)	grey black	firm	CL			6	40		
				25					
		stiff				16	51		
						10			
SAND (fine grained), traces of silt	grey	dense	SM	30		39			
				35		41			
SAND (fine grained), silty, with clay	light olive	dense	SC						
SAND (fine grained), trace of silt	grey	very dense	SM	40		63	19		

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	9

DRILL RIG Rotary Wash	SURFACE ELEVATION --	LOGGED BY DYR
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 5 Inches	DATE DRILLED 10/15/86

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine grained), trace of silt (continued)	grey	very dense	SM	41		63			
				45		58			
				50					
				55		76			
Bottom of Boring = 55 Feet Note: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.				60					
				65					
				70					
				75					
				90					

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EXPLORATORY BORING LOG

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	BORING NO.
K363-13	November 1986	9

APPENDIX B - LABORATORY INVESTIGATION

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site.

The natural water content was determined on thirty-nine samples of the materials recovered from the borings in accordance with ASTM Test Designation D-2216. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry density determinations were performed on four samples of the subsurface soils to evaluate their physical properties. The results of these tests are shown on the boring logs at the appropriate sample depths.

The percent passing the #200 sieve was determined on twelve samples of the subsurface soils to aid in the classification of these soils. These tests were performed in accordance with ASTM Test Designation D-1140. The results of these tests are shown on the boring logs at the appropriate sample depths.

Gradation tests were performed on six samples of the subsurface soils in accordance with California Test Method No. 202. These tests were performed to assist in the classification of the soils and to determine their grain size distribution. The results of these tests are presented on Figures B-1 and B-2.

An unconfined compression test was performed on one undisturbed sample of the subsurface soils to evaluate the undrained shear strengths of these materials. The unconfined test was performed in accordance with ASTM Test Designation D-2166 on the sample having a diameter of 2.4 inches and a height-to-diameter ratio of at least two. Failure was taken as the peak normal stress. The results of this test are presented on the boring logs at the appropriate sample depth.

Direct shear tests were performed on three remolded samples of the subsurface materials to evaluate their strength characteristics. The tests were performed at a constant rate of strain and failure was taken as peak normal stress. The direct shear tests were performed in accordance with ASTM Test Designation D-3080-71. The results of these tests are presented graphically on Figure B-3.

A resistance "R" value test was performed on a representative sample of the surface soils at the site to provide data for pavement design. The test was performed in accordance with California Test Method 301-F and indicated an "R" value of 66 at an exudation pressure of 300 pounds per square inch. The results of the test are presented below:

RESULTS OF "R" VALUE TEST

Description of Material	Dry Density (pcf)	Water Content (%)	Exudation Pressure (psi)	Expansion Pressure (psf)	"R" Value
Brown fine-grained SAND, traces of silt (SM-SP)	115	13	159	0	62
	114	12	414	0	70
	114	12	597	22	74

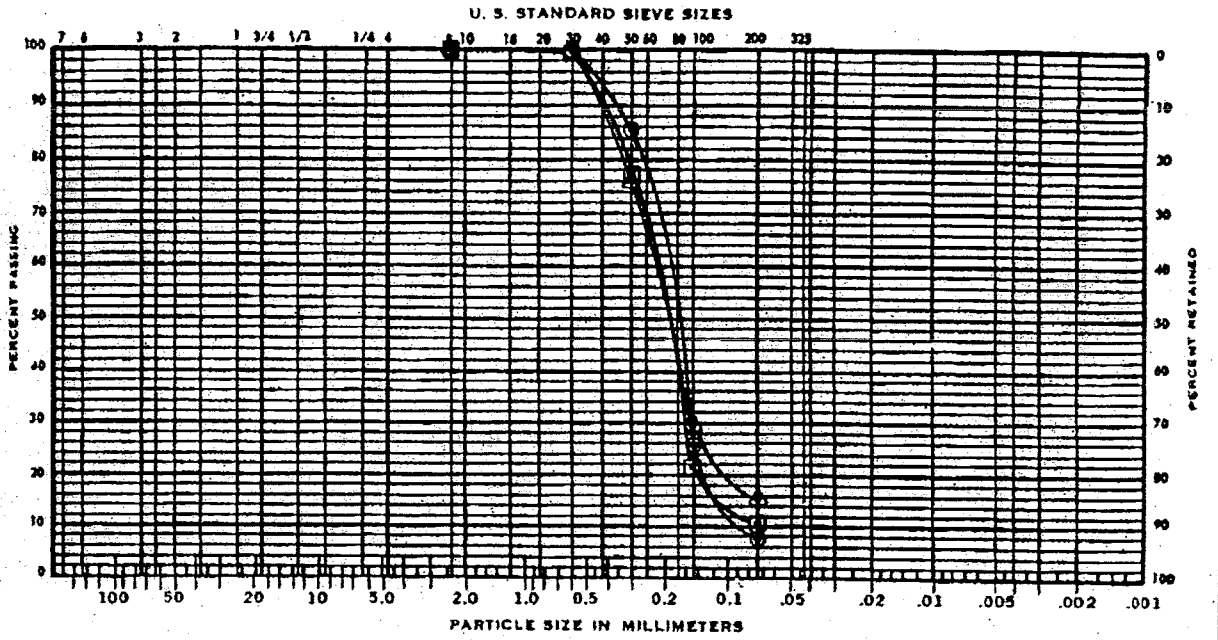
"R" Value = 66 at Exudation Pressure of 300 psi

Sulfate content determinations were performed on two samples of the on-site soils. The results of these tests are tabulated below.

Boring No.	Depth (feet)	Sulfate Content (mg/kg)
1	39	10
5	21	70

UNIFIED SOIL CLASSIFICATION SYSTEM

(ASTM D 422-72)



COBBLES	GRAVEL		SAND			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	ELEV. (feet)	UNIFIED SOIL CLASSIFICATION SYMBOL	SAMPLE DESCRIPTION
⊙	2	53	--	SP/SM	Orange Tan Fine Grained SAND with Trace of Silt
△	4	21	--	SM	Grey Fine Grained SAND with Trace of Silt
⊡	5	40	--	SP/SM	Gold Tan Fine Grained SAND with Trace of Silt

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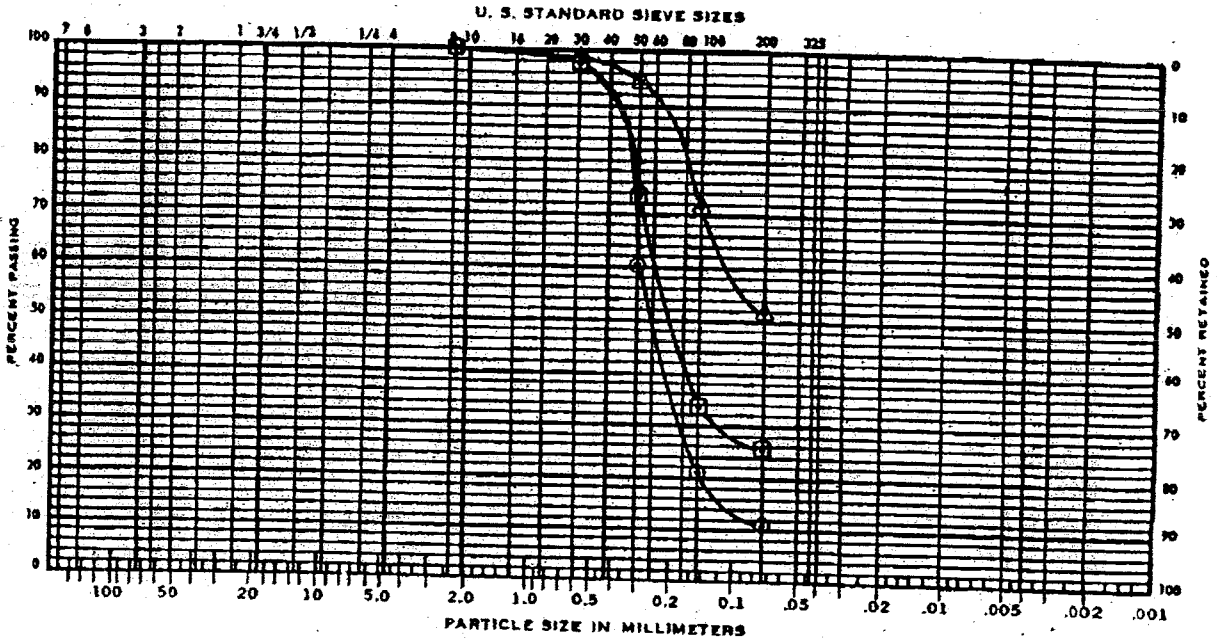
GRADATION TEST DATA

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	Figure
K363-13	November 1986	B-1

UNIFIED SOIL CLASSIFICATION SYSTEM

(ASTM D 422-72)



COBBLES	GRAVEL		SAND			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	ELEV. (feet)	UNIFIED SOIL CLASSIFICATION SYMBOL	SAMPLE DESCRIPTION
⊙	6	15	--	SP/SM	Dark Grey Fine SAND with Trace of Silt
⊙	7	15	--	SM/ML	Dark Grey Fine Grained, Very Sandy SILT
⊡	8	41	--	SM	Grey Fine SAND with some Silt

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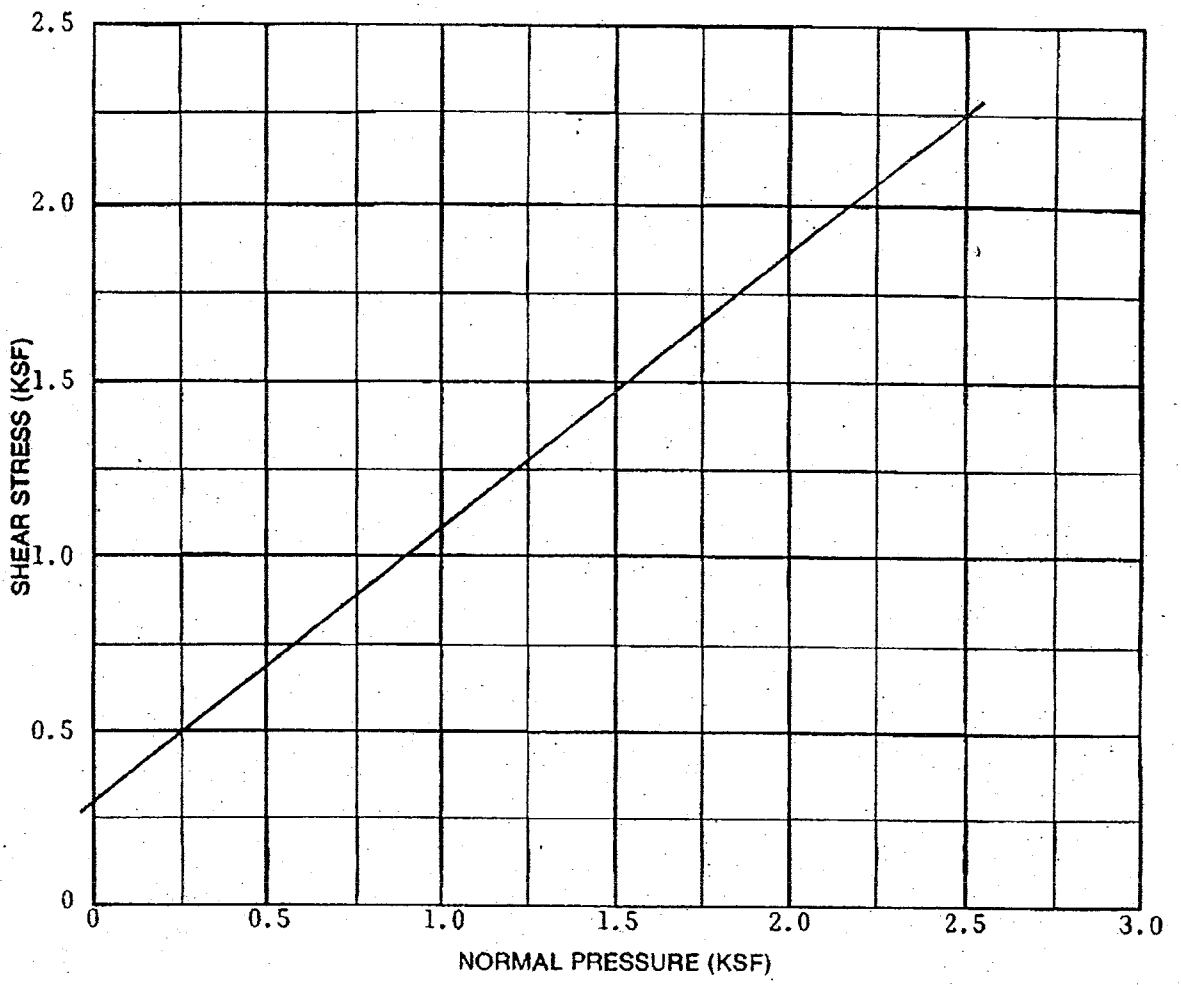
GRADATION TEST DATA

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	Figure
K363-13	November 1986	B-2



SAMPLE DATA	
DESCRIPTION:	
BORING NO.: 1	
DEPTH (ft.): 46-53	ELEVATION (ft): --
TEST RESULTS FIT = 1.0	
APPARENT COHESION (C): 0.29	Tan = 0.8
APPARENT ANGLE OF INTERNAL FRICTION (ϕ): 38.7°	

TEST DATA				
TEST NUMBER	1	2	3	4
NORMAL PRESSURE (KSF)	0.52	1.03	2.07	
SHEAR STRENGTH (KSF)	0.71	1.11	1.95	
INITIAL H_2O CONTENT (%)	18.5	18.5	18.5	
FINAL H_2O CONTENT (%)	18.8	18.4	18.1	
INITIAL DRY DENSITY (PCF)	112.2	112.2	112.2	
FINAL DRY DENSITY (PCF)	111.7	111.6	111.4	
STRAIN RATE: .035 in/min.				

Peter Kaldveer and Associates

Geotechnical Consultants

DIRECT SHEAR TEST DATA

PROPOSED TREATMENT PLANT EXPANSION
Daly City, California

PROJECT NO.	DATE	Figure
K363-13	November 1986	B-3

APPENDIX C
GUIDE SPECIFICATIONS - SITE EARTHWORK
FOR
PROPOSED TREATMENT PLANT EXPANSION
DALY CITY, CALIFORNIA

1. GENERAL

A. Scope of Work

These specifications and applicable plans pertain to and include all site earthwork including, but not limited to, the furnishing of all labor, tools, and equipment necessary for site clearing and stripping, disposal of excess materials, excavation, preparation of foundation materials for receiving fill, and placement and compaction of fill to the lines and grades shown on the project grading plans.

B. Performance

The Contractor warrants all work to be performed and all materials to be furnished under this contract against defects in materials or workmanship for a period of ___years(s) from the date of written acceptance of the entire construction work by the Owner.

Upon written notice of any defect in materials or workmanship during said ___ year period, the Contractor shall, at the option of the Owner, repair or replace said defect and any damage to other work caused by or resulting from such defect without cost to the Owner. This shall not limit any rights of the Owner under the "acceptance and inspection" clause of this contract.

The Contractor shall be responsible for the satisfactory completion of all site earthwork in accordance with the project plans and specifications. This work shall be observed and tested by a representative of Peter Kaldveer and Associates, Inc., hereinafter known as the Soil Engineer. Both the Soil Engineer and the Architect/Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by the Soil Engineer and the Architect/Engineer. No deviation from the specifications shall be made except upon written approval of the Soil Engineer or Architect/Engineer.

No site earthwork shall be performed without the physical presence or approval of the Soil Engineer. The Contractor shall notify the Soil Engineer at least twenty-four hours prior to commencement of any aspect of the site earthwork.

The Soil Engineer shall be the Owner's representative to observe the grading operations during the site preparation work and the placement and compaction of fills. He shall make enough visits to the site to familiarize himself generally with the progress and quality of the work. He shall make a sufficient number of tests and/or observations to enable him to

form an opinion regarding the adequacy of the site preparation, the acceptability of the fill material, and the extent to which the compaction of the fill, as placed, meets the specification requirements. Any fill that does not meet the specification requirements shall be removed and/or recompacted until the requirements are satisfied.

In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for working conditions at the job site, including safety of all persons and property during performance of the work. This requirement shall apply continuously and shall not be limited to normal work hours.

Any construction review of the Contractor's performance conducted by the Soil Engineer is not intended to include review of the adequacy of the Contractor's safety measures in, on or near the construction site.

Upon completion of the construction work, the Contractor shall certify that all compacted fills and foundations are in place at the correct locations, have the correct dimensions, are plumb, and have been constructed in accordance with sound construction practice. In addition, he shall certify that the materials used are of the types, quantity and quality required by the plans and specifications.

C. Site and Foundation Conditions

The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the soil report titled, "Geotechnical Engineering Services, Proposed Treatment Plant Expansion, Daly City, California", dated November 5, 1986. The Contractor shall not be relieved of liability under the contract for any loss sustained as a result of any variance between conditions indicated by or deduced from the soil report and the actual conditions encountered during the course of the work.

The Contractor shall, upon becoming aware of surface and/or subsurface conditions differing from those disclosed by the original soil investigation, promptly notify the Owner as to the nature and extent of the differing conditions, first verbally to permit verification of the conditions, and then in writing. No claim by the Contractor for any conditions differing from those anticipated in the plans and specifications and disclosed by the soil investigation will be allowed unless the Contractor has so notified the Owner, verbally and in writing, as required above, of such changed conditions.

D. Dust Control

The Contractor shall assume responsibility for the alleviation or prevention of any dust nuisance on or about the site or off-site borrow areas. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

II. DEFINITION OF TERMS

STRUCTURAL FILL - All soil or soil-rock material placed at the site in order to raise grades or to backfill excavations, and upon which the Soil Engineer has made sufficient tests and/or observations to enable him to issue a written statement that, in his opinion, the fill has been placed and compacted in accordance with the specification requirements.

ON - SITE MATERIAL - Material obtained from the required site excavations.

IMPORT MATERIAL - Material obtained from off-site borrow areas.

ASTM SPECIFICATIONS - The 1980 edition of the American Society for Testing and Materials Standards.

DEGREE OF COMPACTION - The ratio, expressed as a percentage, of the in-place dry density of the compacted fill material to the maximum dry density of the same material as determined by ASTM Test Designation D 1557-78.

III. SITE PREPARATION

A. Clearing and Grubbing

The Contractor shall accept the site in its present condition and shall remove from the area of the designated project earthwork all obstructions including the softball diamond and its associated structures, i.e. the chain link backstop and post foundations and the bleachers, concrete slab and associated baserock; the fence and concrete wall; the large bushes and associated root systems; the concrete rubble; and any other matter determined by the Soil Engineer to be deleterious. Such material shall become the property of the Contractor and shall be removed from the site. Holes resulting from the removal of underground obstructions that extend below finish grades shall be cleared and backfilled with structural fill.

B. Stripping

Where vegetation exists, the site shall be stripped to a minimum depth of 3 inches or to such greater depth as the Soil Engineer in the field may consider as being advisable to remove all surface vegetation and organic laden topsoil. Stripped topsoil with an organic content in excess of 3 percent by volume shall be stockpiled for possible use in landscaped areas.

IV. EXCAVATION

All excavation shall be performed to the lines and grades and within the tolerances specified on the project grading plans. All overexcavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the specifications. The Contractor shall assume full responsibility for the stability of all temporary construction slopes at the site.

V. SUBGRADE PREPARATION

At-grade surfaces to receive compacted fill, and those on which concrete slabs and pavements will be constructed, shall be scarified to a minimum depth of 6 inches and compacted. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill material shall be approved by the Soil Engineer prior to the placement of any fill material.

In below grade areas where the structural mat extends below the original groundwater level, the subgrade will probably be unstable. To provide a stable working base, a geotextile fabric, such as Mirafi 500x or equivalent, should be placed directly on the subgrade and covered with 18 inches of locally available baserock. The actual amount of subgrade preparation shall be determined in the field by the soil engineer at the time of construction.

VI. GENERAL REQUIREMENTS FOR FILL MATERIAL

All fill material must be approved by the Soil Engineer. The material shall be a soil or soil-rock mixture which is free from organic matter or other deleterious substances. The fill material shall not contain rocks or rock fragments over 6 inches in greatest dimension and not more than 15 percent shall be over 2.5 inches in greatest dimension. On-site material having an organic content of less than 3 percent by volume is suitable for use as fill in all areas.

All imported fill material shall be nonexpansive with a plasticity index of 12 or less.

VII. PLACING AND COMPACTING FILL MATERIAL

All structural fill shall be compacted by mechanical means to produce a minimum degree of compaction of 95 percent as determined by ASTM Test Designation D 1557-78. Field density tests shall be performed in accordance with either ASTM Test Designation D 1556-64 (Sand-Cone Method) or ASTM Test Designation D 2922-71 and D 3017-72 (Nuclear Probe Method). The locations and number of field density tests shall be determined by the Soil Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work shall be judged by the Soil Engineer.

VIII. TRENCH BACKFILL

Pipeline trenches shall be backfilled with compacted structural fill placed in lifts not exceeding 8 inches in uncompacted thickness. Onsite soil and imported sand can be used for backfilling trenches provided it is compacted to at least 90 percent. Sufficient water shall be added during the trench backfilling operations to prevent the soil from bulking during compaction. In all building pad and pavement areas, the upper 3 feet of trench backfill shall be compacted to a minimum degree of compaction of 95 percent for onsite soils and imported sand backfill.

IX. TREATMENT AFTER COMPLETION OF EARTHWORK

After the earthwork operations have been completed and the Soil Engineer has finished his observation of the work, no further earthwork operations shall be performed except with the approval of and under the observation of the Soil Engineer.

It shall be the responsibility of the Contractor to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

APPENDIX D
GUIDE SPECIFICATIONS - ASPHALT PAVING
FOR
PROPOSED TREATMENT PLANT EXPANSION
DALY CITY, CALIFORNIA

1. GENERAL

This portion of the work shall include all labor, materials, tools and equipment necessary for and incidental to the completion of the pavement shown on the plans and as herein specified.

II. DEFINITION OF TERMS

PAVEMENT - Both asphalt concrete, and aggregate base materials.

SUBGRADE - That portion of the construction on which asphalt concrete and aggregate base is to be placed.

STANDARD SPECIFICATIONS - Standard Specifications of the State of California Department of Transportation, July 1984.

ASTM SPECIFICATIONS - The 1980 edition of the American Society for Testing and Materials Standards.

III. MATERIALS

A. Asphalts:

(1) Asphalt for prime coat shall be liquid asphalt, grade MC-70 conforming to the provisions of Sections 39 and 93 of the Standard Specifications.

(2) Asphalt for tack coat and seal coat shall be SS-1h asphalt emulsion conforming to Sections 37 and 94 of the Standard Specifications.

(3) Paving asphalt to be mixed with aggregate shall be steam refined asphalt conforming to the provisions of Section 92 of the Standard Specifications for viscosity grade AR 4000.

B. Mineral Aggregate for Asphalt Concrete:

Type B Aggregate as specified in the Standard Specifications, Section 39, 3/4 inch maximum size, medium grading.

IV. CONSTRUCTION

A. Subgrade Preparation:

The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades and dimensions

given on the plans. Isolated unstable areas shall be stabilized by recompaction or excavation and replacement of materials. The upper 6 inches of the subgrade soil shall be compacted to a density not less than 95 percent of that obtained in the laboratory according to test Method ASTM D1557-78.

B. Aggregate Base:

Aggregate base shall be spread and compacted in conformance with Standard Specifications Section 26 for Class 2 Aggregate Base. Finished aggregate base shall have the minimum depth shown and finished grade shall not vary more than 0.05 foot above or below the established grade. The aggregate base shall be compacted to a density not less than 95 percent of that obtained in the laboratory according to test Method ASTM D1557-78.

C. Prime Coat:

Apply prime coat at an approximate total rate of 0.25 gallons per square yard to all areas receiving asphalt concrete. Conform to Section 39 of Standard Specifications.

D. Tack Coat:

Apply a "tack coat" to all vertical faces, against which asphalt concrete is to be placed. Apply at a rate of from 0.02 gallon to 0.10 gallon per square yard. Conform to Section 39 of Standard Specifications.

E. Seal Coat:

Seal coat shall be diluted with an equal amount of water and applied at the rate of 0.10 gallon of the diluted emulsion per square yard of surface. The surface shall be free of dust and loose material prior to application.

F. Asphalt Concrete:

Asphalt concrete shall be spread and compacted on the prepared base in conformance with the lines, grades and dimensions shown on the drawing and as specified in Section 39 of the Standard Specifications. In addition to the compaction requirements described in section 39 of the Standard Specifications, each layer of asphaltic concrete (surface or base) shall be compacted to a density no less than 95 percent of that obtained in the laboratory according to ASTM Test Method D 2041-69.

G. Improper Workmanship:

Cracks, settling of surface, improper drainage and sloppy connection to previously laid surfaces will be construed as improper workmanship and will not be acceptable.

T&R
2196.01

Report ID:
T&R-97

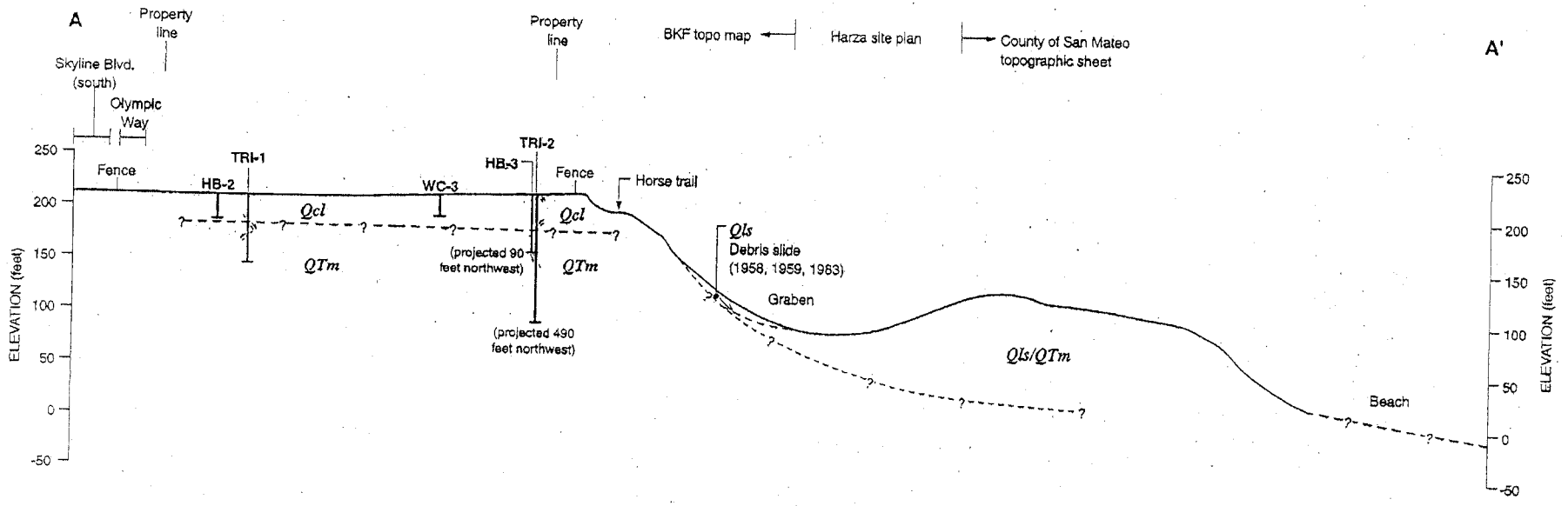
GEOLOGICAL AND GEOTECHNICAL FEASIBILITY INVESTIGATION
PROPOSED OLYMPIC GATE DEVELOPMENT
Daly City, California

1.0 INTRODUCTION

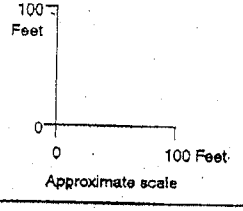
This report presents the results of the geological and geotechnical feasibility investigation performed by Treadwell & Rollo, Inc. and Gilpin Geosciences, Inc. for the proposed Olympic Gate development in Daly City, California. The project site is northeast of the intersection of John Daly Boulevard and Skyline Boulevard, as shown on Figure 1.

The project site is comprised of three parcels encompassing about eight acres. The northern portion of the site is currently occupied by Mar Vista Stables; the southern portion is vacant. Palo Mar Stables abuts the north property line followed by Thornton State Beach and Olympic Club property. The site is bordered by an abandoned portion of Highway 1 to the south, a frontage road (Olympic Way) to the east, and a coastal bluff overlooking Thornton State Beach to the west. Plans are to acquire site access through Highway 1 owned by the State of California along the southern edge of the property.

The proposed development of the site, as shown on Figure 2, includes construction of a one-story restaurant, a three-story, 50- to 60-room hotel, six 4-story apartment buildings containing approximately 240 units, and a 3-story condominium building. The apartment buildings, condominium building, and restaurant will be constructed over a one-level parking garage that will cover much of the site (see Figure 2 for garage footprint). A separate one-level parking garage will also be constructed below the hotel. Both parking garages will be partially below grade, with the floor slabs about 4 to 5 feet below the surrounding grade. Site development also includes construction of on-grade parking and a driveway in the Olympic Way right-of-way on



Notes: 1. Subsurface profile lines shown on Figure 3.
2. Site topography from Brian Kangas Foulk, dated 31 July 1997. Offsite topography from San Mateo County orthophoto topographic map Sheet 16, dated 1 January 1986.
3. Geologic contacts interpolated between subsurface exploration points.

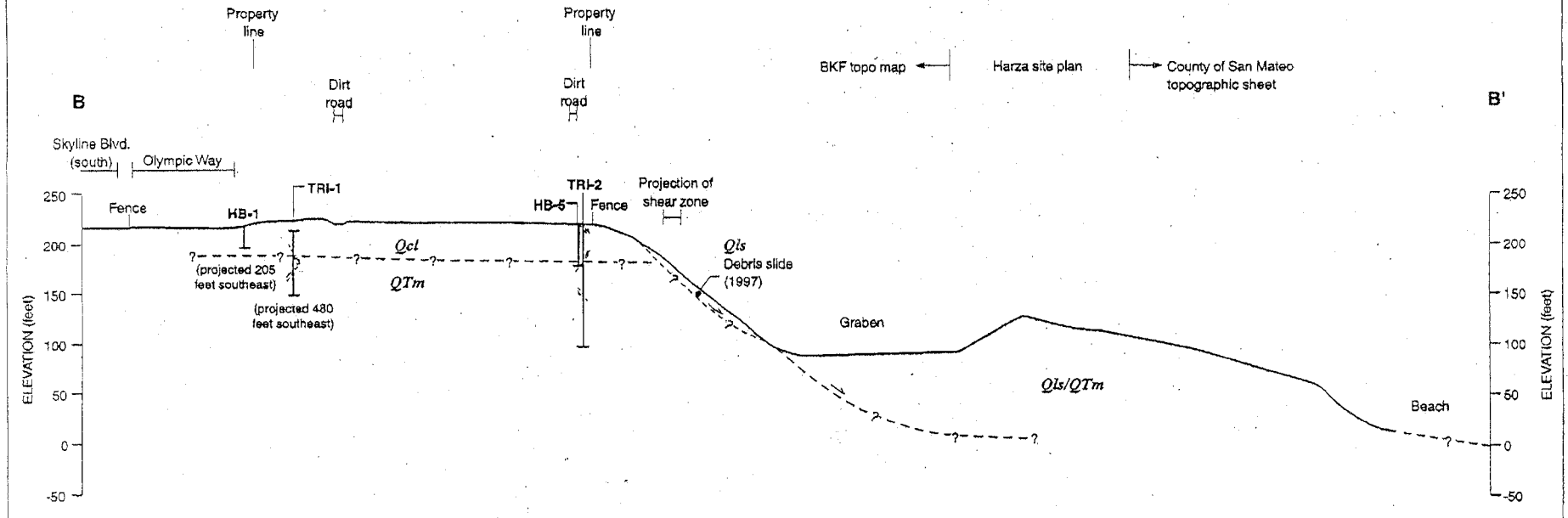


OLYMPIC GATE
Daly City, California

SCHEMATIC SUBSURFACE PROFILE
A–A'

Project No. 2196.01 | Figure 7

Treadwell&Rollo



Notes: 1. Subsurface profile lines shown on Figure 3.
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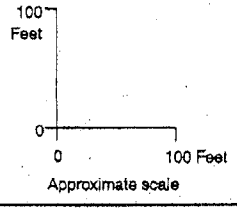


OLYMPIC GATE
Daly City, California

SCHEMATIC SUBSURFACEPROFILE B–B'

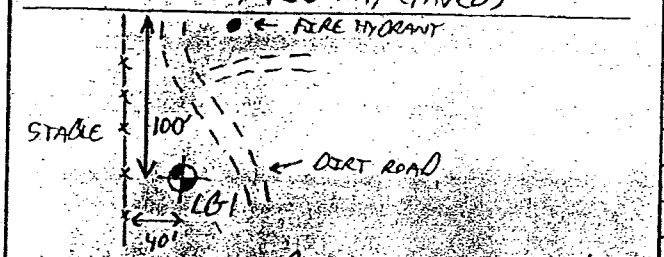
Project No. 2196.01 | Figure 8

Treadwell&Rollo

TREADWELL & ROLLO, INC.

TRI-VALLEY DRILLING
DAVID & TONY

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01		SHEET 1 OF 4
LOCATION OF BORING: NOT TO SCALE	DRILLING METHOD: 24" BUCKET AUGER		BORING NO.: LB-1
	HAMMER WEIGHT: 3450	DROP: 12"	LOGGED BY: OGK
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
	WATER LEVEL		TIME / TIME
	TIME		7:30 / 12:45
	DATE		DATE / DATE
	CASING DEPTH		8/13/97 / 8/13/97



DATUM: BKF TOPO MAP 7/31/97 ELEVATION: ~ 216'

SURFACE CONDITIONS: RELATIVELY FLAT DIRT AREA

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	
						0	SP	BROWN SAND (SP) - MEDIUM DENSE (?), DRY, FINE-GRAINED, W/ SOME FINE GRAVEL, ROOTS, TRACE SILT
						2	SP	DARK BROWN SAND (SP) - MEDIUM DENSE (?), MOIST, FINE-GRAINED, W/ TRACE FINE GRAVEL
						6	SP	RED BROWN SAND (SP) - MEDIUM DENSE (?), MOIST, FINE-GRAINED, W/ SOME SILT
						10		- DRILLER NOTES CAVING CONDITIONS, CASING WILL BE REQUIRED
						14		- DRILLER NOTES LESS CAVING BELOW 14 FEET
						15		- TRACE FINE GRAVEL, TRACE CLAY BINDER, MOIST TO WET
						19	SC	BROWN CLAYEY SAND (SC) - DENSE, MOIST, FINE TO MEDIUM GRAINED
						20		

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY/OCEANFRONT	PROJECT NO.: 2196.01	SHEET 2 OF 4	
LOCATION OF BORING	DRILLING METHOD:	BORING NO.: LB-1	
	HAMMER WEIGHT: / DROP:	LOGGED BY: DGK	
	SAMPLER(S):	DRILLING	
DATUM: ELEVATION:	BACKFILL MATERIAL:	START / FINISH	
	WATER LEVEL:	TIME / TIME	
	TIME:		
	DATE:	DATE / DATE	
	CASING DEPTH:		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
MC	18/18	1		2		20	SC
		② 20.5		2		21	
				3		22	
						23	
						24	
						25	
						26	
						27	SP
						28	
						29	
MC	18/18			4		30	
		③ 30.5		7		31	
		④ 31.0		12		32	
						33	
						34	
						35	
						36	
						37	
						38	
						39	
						40	

SURFACE CONDITIONS:

BROWN CLAYEY SAND (SC) - DENSE, MOIST, FINE TO MEDIUM GRAINED

BROWN SAND (SP) - DENSE, MOIST, FINE GRAINED, W/ TRACE SILT LOCALLY

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01		SHEET 3 OF 4
LOCATION OF BORING	DRILLING METHOD:		BORING NO.: LB-1
	HAMMER WEIGHT:	DROP:	LOGGED BY: OGK
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM: ELEVATION:	WATER LEVEL		TIME / TIME
	TIME		
	DATE		DATE / DATE
	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
MC	18/18	1		4		40	SP	– GREY-BROWN
		④ 40.5' 41.0'		11 13		41		
						42		
						43		
						44		
						45		
						46		
						47		
						48		
						49		
MC	18/18	2		2		50		MEDIUM-GRAINED SAND
		③ 50.5' ④ 51.0'		6 11		51		
						52		
						53		
						54		
						55		– GRADES BETWEEN FINE AND MEDIUM GRAINED SAND
						56		
						57		
						58		
						59		
						60		

TREADWELL & ROLLO INC.

PROJECT: Daly City / Oceanfront	PROJECT NO.: 2196.01		SHEET 4 OF 4
LOCATION OF BORING	DRILLING METHOD:		BORING NO.: LB-1
	HAMMER WEIGHT:	DROP:	LOGGED BY: OGK
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM: ELEVATION:	WATER LEVEL / TIME / DATE / CASING DEPTH		TIME / TIME / DATE / DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
MC	12/12	② 60.5'		7		60	SP
				11		61	
						62	
						63	
						64	
						65	
						66	
						67	
						68	
						69	
MC	18/18	-		4		70	
		② 70.5'		13		71	
		② 71.0'		37			
						72	
						73	
						74	
						75	
						76	
						77	
						78	
						79	
						80	

SURFACE CONDITIONS:

RED BROWN, VERY DENSE, FINE GRAINED SAND (SP) WITH BASIC STAINING

- DRILLER NOTES SLIGHTLY STIFFER DRILLING BELOW 66 FEET

- SOME CEMENTATION OF GRAINS

UNABLE TO EXTEND HOLE BEYOND ~70' DUE TO CAVING

TREADWELL & ROLLO, INC.

LOU GILPIN'S LOG BY OGK

PROJECT	PROJECT NO. 2196.01	SHEET 1 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ELEVATION	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS: LOU GILPIN'S OBSERVATIONS OGK RECORDS
						0		
						1		
						2		
						3		
						4		
						5		
						6		BREAKOUT (CAVING) AREA FROM 0 TO 9½'
						7		
						8		WEAKLY CEMENTED LT YELLOW BROWN SAND, IRON OXIDE SUBHORIZONTAL [illegible] DENSELY [illegible] ~1 FOOT THICK
						9		
						10		FINE GRAINED SAND, IRON OXIDE LAMINAE, ¼" THICK LAYERING, SUBHORIZONTAL, FEW SUBROUNDED POLISHED PEBBLES, SHARP LOWER CONTACT
						11		
						12		SIMILAR SAND, MORE CEMENTED, W/ SILT, SUBHORIZONTALLY BEDDED, DARK MINERAL LAYERS, ORANGE DISCOLORATION
						13		
						14		- GRAVEL AT 14', ½" MAX DIAMETER, MATRIX SUPPORTED, 3" THICK LAYER
						15		
						16		- GRAVEL LENSES AT 16', NOT CONTINUOUS AROUND HOLE, NW SIDE
						17		
						18		
						19		
						20		- DARK MINERAL LAYERS HORIZONTAL AROUND HOLE

TREADWELL & ROLLO P.C.

PROJECT	PROJECT NO.	SHEET 2 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
DATUM ELEVATION	TIME	DATE / DATE
	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						20	
						21	
						22	
						23	
						24	
						25	
						26	
						27	
						28	
						29	
						30	
						31	
						32	
						33	
						34	
						35	
						36	
						37	
						38	
						39	
						40	

SURFACE CONDITIONS:

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO.	SHEET 3 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	
	BACKFILL MATERIAL:	DRILLING START / FINISH
	WATER LEVEL / TIME / DATE / CASING DEPTH	TIME / TIME, DATE / DATE
DATUM ELEVATION		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS
						40	S	
						41		[illegible] LIQUEFACTION FEATURE [illegible]
						42		[illegible] THICK [illegible] BLACK [illegible] COARSENS [illegible]
						43		[illegible] AT 43' [illegible] VERTICAL [illegible] AT [illegible]
						44		[illegible] NORMAL OFFSET [illegible]
						45		[illegible]
						46		[illegible]
						47		
						48		[illegible]
						49		[illegible] GR[illegible] GRAINED SAND W/ DARK [illegible] LAMINATIONS
						50		
						51		DARK MINERAL LAMINATION AT 51' SAME ORIENTATION AS CONTACT
						52		
						53		BREAKOUT - ALL BLOCKS EXCEPT [illegible] AT 53 [illegible] APPEAR TO BE HORIZONTALLY BEDDED
						54		
						55		- HORIZONTAL BEDDING AT 55'
						56		
						57		- HORIZONTAL BEDDING AT 57'
						58		
						59		- BREAKOUT AT 59' TO 65'
						60		

TREADWELL & ROLLO C.

PROJECT	PROJECT NO.	SHEET 4 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. CB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
DATUM ELEVATION	TIME	DATE / DATE
	DATE	
	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						60		
						61		
						62		
						63		
						64		
						65		
						66		
						67		BREAKER AT 67'
						68		
						69		
						70		
						71		
						72		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

DAVE ROGER'S LOG BY OGK

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO.	SHEET 1 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ELEVATION	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS Dave Rogers [illegible] Dead Record
						0		Soil of Colma [illegible]
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						10		
						11		Ceramic fragment @ 11' by G. Mallen
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO.	SHEET 2 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ELEVATION	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS — [illegible]
						20		
						21		
						22		COLMA — REWORKED MERCED
						23		
						24		
						25		
						26		
						27		SOIL PEDS AT CONTACT
						28		[illegible] IN COLMA [illegible] FAULT STRIKE N[illegible]W [illegible] ALONG HORIZON
						29		
						30		
						31		
						32		
						33		
						34		
						35		— DRAG STRUCTURE PEAK AT 36'
						36		
						37		
						38		
						39		
						40		

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO.	SHEET 3 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
DATUM ELEVATION	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						40	
						41	
						42	
						43	
						44	
						45	
						46	
						47	
						48	
						49	
						50	
						51	
						52	
						53	
						54	
						55	
						56	
						57	
						58	
						59	
						60	

SURFACE CONDITIONS:

SHEAR ZONE AT 46'6"
N 5° E 65° E 67° N 45° E 65° E (46')

CAST / SE WALL (CROSS BEDDING)
N 55° W 26° SW

CROSS BEDDING WEAK 51' DISTINCT
SALT AND PEPPER SAND / LAMINATED SAND CONTACT
BEDDING N 45° W 9° SW

laminae horizontal

Limit of sampling at this location at 60 min

PROJECT	PROJECT NO.	SHEET 4 OF 4
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ELEVATION	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						60		high [illegible] in contact
								1 mm [illegible] cutting across bedding
						1		Strike N60W 31NE
						62		Strike N60W 41N
								[illegible] horizontal planes low tensile
						3		strength [illegible] poles [illegible] structures
								[illegible]
						4		
						5		
						6		
						7		
						8		
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

TREADWELL & ROLLO, INC.

PROJECT		PROJECT NO. 2196.01 TC100	SHEET 1 OF
LOCATION OF BORING		DRILLING METHOD:	BORING NO. TB1-LB-1
		HAMMER WEIGHT: DROP:	LOGGED BY:
		SAMPLER(S):	
		BACKFILL MATERIAL:	DRILLING START / FINISH
		WATER LEVEL	TIME / TIME
		TIME	
DATUM ELEVATION		DATE	DATE / DATE
		CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						10		

TREADWELL & ROLL[illegible] [illegible]C.

PROJECT	PROJECT NO.	SHEET 2 OF ___
LOCATION OF BORING	DRILLING METHOD:	BORING NO. TOT-1 [illegible]
	HAMMER WEIGHT: / DROP:	LOGGED BY:
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ___ ELEVATION ___	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/RID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						20		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						30		
						1		31.5 <N wall gravel lens 3" thick not continuous
						2		
						3		
						4		gravel fill of U-shaped channel bottom @ 34.4 top @ 3[illegible] [illegible] gravel matrix supported some polished [illegible]
						5		Clay filled [illegible] @ 35' SE wall; 35-36.4 fine laminae wrap around vertical plane @ 36 SW wall @ 35
						6		
						7		
						8		
						9		
						40		

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO.
LOCATION OF BORING	DRILLING METHOD:
	HAMMER WEIGHT: / DROP:
	SAMPLER(S):
	BACKFILL MATERIAL:
DATUM / ELEVATION	WATER LEVEL / TIME / DATE / CASING DEPTH

SHEET 3 OF

BORING NO. IAT-1 LB-1

LOGGED BY:

DRILLING: START / FINISH — TIME / TIME — DATE / DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						40		
						1		
						2		
						3		
						4		
						5		
						6		[illegible]
						7		N 10 [illegible]
						8		
						9		
						50		50.5 dip NW clay layer continuous laminar bedding above & below horizontal
						1		
						2		
						3		Cross bedding ends laminar bedding starts @52.8
						4		1/2" (SC) 54.3 Sandy clay layer
						5		
						6		
						7		
						8		58.5
						9		
						60		

TREADWELL & ROLLO

PROJECT	PROJECT NO.	SHEET 4 OF
LOCATION OF BORING	DRILLING METHOD:	BORING NO. SB-1 LB-1
	HAMMER WEIGHT: / DROP:	LOGGED BY:
	SAMPLER(S):	
	BACKFILL MATERIAL:	DRILLING START / FINISH
DATUM ELEVATION	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
	CASING DEPTH	

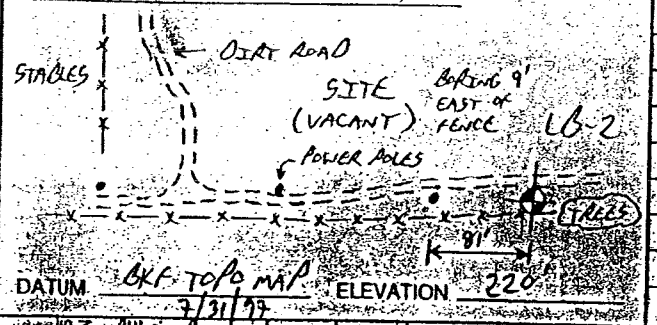
SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

TRI-VALLEY DRILLING
DAVID & TONY

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT

LOCATION OF BORING: OLYMPIC WAY — NOT TO SCALE



DATUM: BKF TOPO MAP 7/31/97 — ELEVATION: 220

PROJECT NO.	2196.01
DRILLING METHOD:	24" BUCKET AUGER
HAMMER WEIGHT:	DROP:
SAMPLER(S):	
BACKFILL MATERIAL:	
WATER LEVEL	
TIME	
DATE	
CASING DEPTH	

SHEET 1 OF 6
BORING NO. LB-2
LOGGED BY: OGK
DRILLING — START: TIME 8:00, DATE 8/14/97 — FINISH: TIME 4:30, DATE 8/14/97

SURFACE CONDITIONS: RELATIVELY FLAT DIRT AREA ADJACENT TO WESTERN SITE BOUNDARY

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						0	SM
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	SC
						16	
						17	
						18	
						19	
						20	

(GRAVEL)

(GROUND SILTY SAND (SM) - LOOSE, DRY, FINE GRAINED, FEW ROOTS, TRACE FINE GRAVEL, ROUNDED

ORANGE-BROWN SAND (SP) - MEDIUM DENSE, MOIST, FINE TO MEDIUM GRAINED, ABUNDANT IRON OXIDE STAINING

INCREASED CLAY CONTENT, VERY MOIST, MEDIUM GRAINED

LIGHT BROWN CLAYEY SAND (SP) - DENSE, MOIST TO VERY MOIST, FINE TO MEDIUM GRAINED, ABUNDANT IRON OXIDE STAINING, DARK MINERAL LAMINATIONS, TRACE FINE GRAVEL, ROUNDED

TREADWELL & ROLLO VC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO. 2196.01		SHEET 2 OF 6
LOCATION OF BORING	DRILLING METHOD: 24" BUCKET AUGER		BORING NO. LB-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: OGK
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
	WATER LEVEL		TIME / TIME
	TIME		
	DATE		DATE / DATE
DATUM BKF TOPO MAP ELEVATION 220'	CASING DEPTH		
7/31/97			

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						20	SC	
						21		DECREASED CLAY CONTENT
						22		
						23	SP	LIGHT BROWN SAND (SP) - DENSE, MOIST, FINE TO MEDIUM GRAINED, ABUNDANT IRON OXIDE STAINING, DARK MINERAL LAMINATIONS, TRACE FINE GRAVEL, ROUNDED
						24		
						25		
						26		
						27		INCREASED GRAVEL CONTENT AT ~ 27'
						28		BROWN GREY, DECREASED IRON OXIDE STAINING
						29		
						30		COLMA/MERCED FM CONTACT?
						31	SP	GREY SAND (SP) - DENSE, MOIST, MEDIUM GRAINED, SOME IRON OXIDE STAINING (MERCED FM - RIPPER?)
						32		
						33		
						34		
9/11	18/18	1		2		35		
		1 35.5 2 36.0		3 5		36		- TRACE FINE GRAVEL, ROUNDED, POLISHED, IRON OXIDE AND DARK MINERAL LAMINATIONS
						37		
						38		
						39		
						40		

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY/OCEANFRONT	PROJECT NO.: 2196.01		SHEET 3 OF 6
LOCATION OF BORING	DRILLING METHOD: 24" BUCKET AUGER		BORING NO.: LB-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: OGK
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
	WATER LEVEL		TIME / TIME
	TIME		
	DATE		DATE / DATE
DATUM ELEVATION	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						40	SP/CL	GREEN GREY CLAY (CL) - STIFF, MOIST, SOFT, MEDIUM PLASTICITY, SOME FINE GRAINED SAND, ABUNDANT IRON OXIDE STAINING.
						41		
						42		
						43	CL	
SPH	18	1		3		44		BLUE GREY SANDY CLAY (CL) - HARD, MOIST, FINE GRAINED SAND, ABUNDANT ALIGNED CRACKS
		2		5		45		
		3		9				
		4	44.5'					
						46		
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
SPH	18	1	-	2		55		
		2	55.5'	4		56		
		3	56.0'	6				
						57		
						58		
						59	CL/SP	GREY BROWN CLAY (CL) - STIFF, MOIST, W/ SOME FINE GRAVEL, ABUNDANT IRON OXIDE STAINING
						60		

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01	SHEET 4 OF 6
LOCATION OF BORING:	DRILLING METHOD:	BORING NO. LG-2
	HAMMER WEIGHT: DROP:	LOGGED BY: OGK
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL:	TIME / TIME
	TIME:	
	DATE:	DATE / DATE
DATUM: ELEVATION:	CASING DEPTH:	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						60	CL / SP	ORANGE GREEN SAND (SP) - DENSE, MOIST, [illegible] GRAINED, [illegible] IRON OXIDE STAINING
						61		
						62		
						63		
						64	SP	
S&H	14 / 14	–		12		65		GREEN BROWN SAND (SP) - VERY DENSE, MOIST, FINE TO MED. GRAINED, IRON OXIDE LAMINATIONS
		(7) / 65.5'		54 30/2"		66		
						67		
						68		
						69		
						70		- MEDIUM GRAINED, LESS IRON OXIDE
						71		
						72		
						73		
						74		
S&H	14 / 14	–		14		75		- LITTLE CEMENTATION
		(8) / 75.5'		30 40/2"		76		
						77		
						78		
						79		
						80		

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01	SHEET 5 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO.: LB-2
	HAMMER WEIGHT: / DROP:	LOGGED BY: OGK
	SAMPLER(S):	DRILLING START / FINISH
	BACKFILL MATERIAL:	
DATUM: ELEVATION:	WATER LEVEL / TIME / DATE / CASING DEPTH	TIME / TIME / DATE / DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						90	SP
						91	
						92	
						93	
						94	
SPT	12 / 12			20		95	
		③ 96.5'		48/6"		96	
						97	
						98	
						99	
						100	
						90	
						91	
						92	
						93	
						94	
BAG		⑩ 96.0'				95	
						96	
						97	
						98	
						99	
						100	

SURFACE CONDITIONS:

- DRILLER NOTES LOOSE SPOT IN SAND AT 93'

- FINE TO MEDIUM GRAINED

TREADWELL & ROLLO INC.

PROJECT DALY CITY / OCEANFRONT	PROJECT NO. 2196.01		SHEET 6 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO. LB-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: OGK
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM _____ ELEVATION _____	WATER LEVEL		TIME / TIME
	TIME		DATE / DATE
	DATE		
	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS:
						100		
						101		
						102		
						103		
						104		
BAG		(11) 105.0'				105		
						106		
						107		
						108		
						109		
						110		
						111		
						112		
						113		
						114		
BAG		(12) 115.0'				115		
						116		- MORE CEMENTATION
						117		
						118		
						119		
						120		DRILLING COMPLETED AT 120'

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01	SHEET 1 OF 6	
LOCATION OF BORING	DRILLING METHOD:	BORING NO.: LB-2	
	HAMMER WEIGHT: / DROP:	LOGGED BY: LMG	
	SAMPLER(S):	DRILLING START TIME / FINISH TIME	
	BACKFILL MATERIAL:		
DATUM ____ ELEVATION ____	WATER LEVEL / TIME / DATE / CASING DEPTH	DATE / DATE	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS: LMG NOTES RECORDED BY OGK

- VERTICAL FRACTURE, NE WALL, FROM 4' TO 5½', WIDE AT 5½', NARROWS TO ZERO AT 4'. TWO CRACKS ON W WALL, W SLOPE BRANCH ~4', DOWNSLOPE BRANCH ~8' FILLED JOINTS, TANS, LOOSE SAND MATRIX. N15°W, N35°E, N10°W (VERTICAL CALC)
- ASSOCIATED W/ DOWNSLOPE VOID
- ASSOCIATED W/ CROSS BEDDING
- DOWNSLOPE VOID DESCRIBED ABOVE PINCHES OUT AT 8'
- BREAKOUT ON SW WALL ~10' - 12'
- HORIZONTAL LAMINATIONS
- BREAKOUT, WEST WALL, 15' - 17'

TREADWELL & ROLLO INC.

PROJECT	PROJECT NO. 2196.01	SHEET 2 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-2
	HAMMER WEIGHT: / DROP:	LOGGED BY: LMG
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
DATUM ELEVATION	WATER LEVEL / TIME / DATE / CASING DEPTH	TIME / TIME / DATE / DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6", SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS: LMG NOTES
						20		
						21		
						22		- BREAKOUT, WEST WALL, 22'-23½'
						23		
						24		- HORIZONTAL BEDDING
						25		
						26		- 1/4" LT. GREY CLAY LAYER, HORIZ, 26'-26½'
						27		
						28		- GRAVEL LENS AT 28', WEST WALL, 2" THICK
						29		
						30		
						31		- BREAKOUT, WEST WALL, 31½'
						32		- 1/4" TO 1/2" LT. GREY CLAY LAYER w/ OXIDATION, HORIZ, 31½', CONTINUOUS AROUND HOLE
						33		- FISSURE, CENTER HOLE @ 33.3' ON WEST WALL
						34		CLAY LENS @ 33.6', MAX THICKNESS → 1", PINCHES TO 3/8" WEST WALL, VERTICAL OFFSET OF 3" ON
						35		SOUTH WALL, EXTENDS FROM SE TO SW, CALCITE MINERAL BAND ON NORTH SHOWS NO OFFSET, OFFSET
						36		ON NW WALL BY 3", DOWN ON NE SIDE, N-S STRIKE, DIPS FROM VERTICAL TO 60° NE, IRON OXIDE STAINING
						37		ALONG FRACTURE AND COUNTERPART SIDE, 2"-3" OFFSET OF BEDS AT 35', 75° NE DIP, OFFSET IN LITHOLOG.
						38		- CONTACT @ 35.5', NW WALL, TWO 1" STEPS, ONE 3" STEP N 10 W 75 NE SOUTH WALL
						39		- VERTICAL FISSURE, 37'-39½', WEST WALL, CUTS THROUGH LAMINATED SANDS, ½" TO 3/4" LT. GREY CLAY ALONG FISSURE, OXIDATION
						40		- MERGED CONTACT, WEST WALL - 39.3' EAST WALL - 40.6' N 15 W 55 NE, SHARP CONTACT, OXIDATION, DARK

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO. 2196.01	SHEET 3 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-2
	HAMMER WEIGHT: DROP:	LOGGED BY: LMG
	SAMPLER(S):	DRILLING START / FINISH
	BACKFILL MATERIAL:	
	WATER LEVEL	TIME / TIME
	TIME	
DATUM ELEVATION	DATE	DATE / DATE
	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS: LMG NOTES RECORDED BY DCK
						40	GRAY CLAY	
						41		- FISSURE (FRACTURE) 3.3' OFFSET, UPPER CONTACT OF MEASURED @ 2 INCHES, OPAQUE FILLING IN NE WALL N15W, 75E
						42	OLIVE CLAY	- GREY CLAY/OLIVE CLAY CONTACT, WEST WALL N16W, 22NE, FISSURE DOES NOT APPEAR TO EXTEND
						43		
						44		
						45		
						46		
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		- SLICK ON EAST WALL
						58		
						59	BROWN CLAY	- LT. BROWN CLAY, SLICKS ON WEST WALL, DIPPING INTO HOLE, LINEATIONS; TREND N65E LOWER CONTACT SHARP, OXIDATION, DIP 10°, N60E PROMINANT SLICK SURFACES DIPPING INTO HOLE, WEST WALL
						60		

ECT

TIO BORING

PROJECT NO.	2196.01
DRILLING METHOD:	
HAMMER WEIGHT:	DROP:
SAMPLER(S):	
BACKFILL MATERIAL:	
WATER LEVEL	
TIME	
DATE	
CASING DEPTH	

SHEET 4 OF 6

BORING NO. LB-2

LOGGED BY: LMG

DRILLING

START	FINISH
TIME	TIME
DATE	DATE

UM ELEVATION

INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
					60	SAND
					61	
					62	
					63	
					64	
					65	
					66	
					67	SAND
					68	
					69	
					70	
					71	
					72	
					73	
					74	
					75	
					76	
					77	
					78	
					79	
					80	

SURFACE CONDITIONS: LMG NOTES RECORDED BY DGK

ORANGE BROWN COARSE SAND

- 1/8" TO 1/4" THICK
- PRESSURE ON GW WALL, OFFSET LOWER CLAY CONTACT BY ?, NORTH SIDE ONLY, EXPOSED ON WEST WALL
- 66.8' SAND, SALT AND PEPPER, MEDIUM TO COARSE GRAINED, POORLY CEMENTED SAND
- 66.5' TO 71' BREAK OUT
- NEARLY HORIZONTAL LAMINITE SET AT ~70'
- ORANGE OXIDATION
- MORE CEMENTED UNIT, 1' THICK, CAPPED BY 1/4" THICK SANDY CLAY LAYER, LOW AT ON NORTH WALL, N85E (?) IS N, GW BARRIER

TREADWELL & ROLLO, INC.

PROJECT		PROJECT NO. 2196.01		SHEET 5 OF 6
LOCATION OF BORING		DRILLING METHOD:		BORING NO. LB-2
		HAMMER WEIGHT:	DROP:	LOGGED BY: LMG
		SAMPLER(S):		DRILLING
		BACKFILL MATERIAL:		START / FINISH
		WATER LEVEL		TIME / TIME
		TIME		
		DATE		DATE / DATE
DATUM	ELEVATION	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS: NO NOTES RECORDED BY DOG
						80	SAND	BREAKOUTS WEST WALL, GOOS
						81		LARGE MASSIVE CRACK, STAINING, EXUDATION
						82		FROM CRACK TO NORTH
						83		
						84		
						85		
						86		AT AND ABOVE WATER LINE
						87	SAND	OBSERVED MEDIUM GRAINED SAND, POORLY
						88		CEMENTED. 1/4" THICK CLAY LAYER AT 19'
						89		IN ROW JOINT
						90		
						91		
						92		
						93		
						94		
						95		
						96		
						97		
						98		
						99		
						100		

TREADWELL & ROLLO, INC.

PROJECT	PROJECT NO. 2196.01	SHEET 6 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-2
	HAMMER WEIGHT: / DROP:	LOGGED BY: LMG
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL / TIME / DATE	TIME / DATE
DATUM ELEVATION	CASING DEPTH	TIME / DATE

SURFACE CONDITIONS: LOG NOTES RECORDED BY DCK

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						100	
						101	
						102	
						103	
						104	
						105	
						106	
						107	
						108	
						109	
						110	
						111	
						112	
						113	
						114	
						115	
						116	
						117	
						118	
						119	
						200	

TREADWELL & ROLLO, INC.

PROJECT DALY CITY / OCEANFRONT	PROJECT NO. 2196.01		SHEET 1 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO. LB-1
	HAMMER WEIGHT:	DROP:	LOGGED BY: O.R.
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM _____ ELEVATION _____	WATER LEVEL		TIME / TIME
	TIME		
	DATE		DATE / DATE
	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS: DRIVE/CORE NOTES RECORDED BY DRILLER

TREADWELL & ROLLO VC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01	SHEET 2 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO.: LB-2
	HAMMER WEIGHT: / DROP:	LOGGED BY: O.R.
	SAMPLER(S):	DRILLING START TIME / FINISH TIME
DATUM: ELEVATION:	BACKFILL MATERIAL:	
	WATER LEVEL / TIME / DATE / CASING DEPTH	DATE / DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						20	
						21	
						22	
						23	
						24	
						25	
						26	
						27	
						28	
						29	
						30	
						31	
						32	
						33	
						34	
						35	
						36	
						37	
						38	
						39	
						40	

SURFACE CONDITIONS: DAVE ROGERS NOTES RECORDED BY OGK

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01		SHEET 3 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO.: LO-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: O.R
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM ELEVATION	WATER LEVEL		TIME / TIME
	TIME		
	DATE		DATE / DATE
	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						40	
						41	
						42	
						43	
						44	
						45	
						46	
						47	
						48	
						49	
						50	
						51	
						52	
						53	
						54	
						55	
						56	
						57	
						58	
						59	
						60	

SURFACE CONDITIONS: DAVID ROGERS NOTES RECORDED BY JCK

- ABUNDANT SLICKS
- WOOD FLAKES (ABUNDANT)

TREADWELL & ROLLO [illegible]C.

PROJECT DALY CITY/OCEANFRONT	PROJECT NO. 2196.01	SHEET 4 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-2
	HAMMER WEIGHT: DROP:	LOGGED BY: DR
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ELEVATION	CASING DEPTH	

SURFACE CONDITIONS: DAVE ROGERS [illegible] RECORDED BY OCR

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	DESCRIPTION
						60		
						61		[illegible] TRUNCATED
						62		
						63		
						64		SAND [illegible] @ 64, [illegible] THICK, LIQUEFACTION [illegible], SALT & PEPPER, SILT FILLED JOINTS CUT THROUGH ON SOUTH WALL
						65		
						66	CLAY	
						67		- SALT & PEPPER SAND, CEMENTED OFFSET
						68	SAND	BY 3" TO 4", N 40 W 81 W SW, 1" THICK, VERTICAL, WEST WALL
						69		- PEBBLE PULLED AT 68
						70		- CROSS BEDDED SANDS, FELDSPAR & BIOTITE RICH ↓
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		SALT & PEPPER SAND ↑
						79		GREY SAND N 80 E 13 N
						80		

TREADWELL & ROLLO, INC.

PROJECT: Daly City / Oceanfront	PROJECT NO.: 2196.01	SHEET 5 OF	
LOCATION OF BORING	DRILLING METHOD:	BORING NO.: LB-2	
	HAMMER WEIGHT:	DROP:	LOGGED BY: DL
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM: ELEVATION:	WATER LEVEL		TIME / TIME
	TIME		
	DATE		DATE / DATE
	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						90	
						91	
						92	
						93	
						94	
						95	
						96	
						97	
						98	
						99	
						100	

SURFACE CONDITIONS: DAILY FIELD NOTES RECORDED BY DOK

CROSS BEDDED SAND, COARSE GRAINED

- CONTACT N75E 12N TRUNCATION

- JOINT @ 99.5' N27E 83 NW

CROSS BED TRUNCATION PLANE
- COARSE GRAINED SAND AT 100'
E-W STRIKE 16 N

TREADWELL & ROLLO, INC.

PROJECT	DALY CITY / OCEANFRONT	PROJECT NO.	2196.01	SHEET 6 OF 6
LOCATION OF BORING		DRILLING METHOD:		BORING NO. LB-2
		HAMMER WEIGHT:	DROP:	LOGGED BY: OGK
		SAMPLER(S):		DRILLING
		BACKFILL MATERIAL:		START / FINISH
DATUM	ELEVATION	WATER LEVEL		TIME / TIME
		TIME		
		DATE		DATE / DATE
		CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						100	
						101	
						102	
						103	
						104	
						105	
						106	
						107	
						108	
						109	
						110	
						111	
						112	
						113	
						114	
						5	
						6	
						7	
						8	
						9	
						0	

SURFACE CONDITIONS: DAVE ROGERS NOTES RECORDED BY OGK

- LARGE GRAINED SAND
- LITHIC, LACKS MICA RICH
- POORLY CEMENTED, NON COHESIVE
- TRUNCATION PLANE @ 105'
- TRUNCATION PLANE @ 107'
- COARSE GRAINED
- N85 E 9N FINE GRAINED FRACTURE

TREADWELL & ROLLO, INC.

PROJECT Daly City Ocean Front
LOCATION OF BORING

DATUM _____ ELEVATION _____

PROJECT NO. 2196.01
DRILLING METHOD:
HAMMER WEIGHT: DROP:
SAMPLER(S):
BACKFILL MATERIAL:

WATER LEVEL					
TIME					
DATE					
CASING DEPTH					

SHEET 1 OF 6
BORING NO. LB-2
LOGGED BY: DGK Noted Lance
DRILLING

START	FINISH
TIME 930	TIME
DATE 8/15/97	DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS: OGK NOTES RECORDED BY LMG

Clay filled fissure @ 5' extends to depth along NE wall

2" void @ 7' fissure zone @ 7½

7½'-8' Jay layer - horizontal not continuous, lt grey 6" long N-NE wall variable offset

Krotovina @ 11½

Dk mineral subhorizontal laminae dip slight SW

12½ 1/4" thick lt brown silty clay continuous slight dip N, south wall offset ½" 11' long vertical fissure west sided down, not continuous 1/4 thick pebble layer gently dipping SW NEW 9'-10', continuous, not offset.

17' Dk mineral laminae continuous, no offsets.

TREADWELL & ROLLO INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01		SHEET 2 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO.: B-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: DGK MCKEE RLMC
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START: TIME / FINISH: TIME
DATUM: ELEVATION:	WATER LEVEL		
	TIME		
	DATE		DATE: 8/15 / DATE
	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						20	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						30	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						40	

SURFACE CONDITIONS: DGK NOTES RECORDED BY LMG

Mixed to sandy, continuous at 2 feet

1/4" thick gravel layer continuous 1/4 - 1/2 offset SW DEG N

Drilled 8 inch dipping water hole on west side.

TREADWELL & ROLLO, INC.

PROJECT	DALY CITY / OCEANFRONT
PROJECT NO.	2196.01
SHEET	3 OF 8
BORING NO.	LB-2
LOGGED BY:	DOK
LOCATION OF BORING	
DRILLING METHOD:	
HAMMER WEIGHT:	DROP:
SAMPLER(S):	
BACKFILL MATERIAL:	
WATER LEVEL / TIME / DATE / CASING DEPTH	
DRILLING START TIME / DATE	
DRILLING FINISH TIME / DATE	
DATUM	ELEVATION

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						40	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						50	
						1	
						2	
						3	Blue green clay
						4	
						5	
						6	
						7	
						8	
						9	Brn clay
						60	

SURFACE CONDITIONS: DGK NOTES RECORDED BY [illegible]

[illegible] well [illegible]

[illegible]

[illegible] clay [illegible]

[illegible] extremely [illegible]

polished slickensided surface exposed
N40W 63SW (1-2" across) [illegible] set of [illegible]
similar direction
→ N50E 72 SE polished surface N80E lineation

increased organics

hairline organic layering not continuous, no shearing evident

Fragment of Brown clay within Blue-Green unit
3" x 10" DIA, 15, N10E [illegible] clearing contact [illegible]
clays.

TREADWELL & ROLLO, INC.

PROJECT DALY CITY OCEAN FRONT	PROJECT NO. 2196.01	SHEET 4 OF 6
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LG-2
	HAMMER WEIGHT: / DROP:	LOGGED BY: DGK
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM / ELEVATION	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS: DGK NOTES RECORDED BY LMG
						60	SP	10°, N45E lower clay over sand
						1	CH	contact @ 61' SP/clay; N73E/15W
						2		
						3		
						4		
						5		
						6		breakout on west wall, ends @ 73'
						7		contact SP/sand cause; SW wall clay filled fracture vertical offsets lowered @ 67.3' 3"-4" vert. offset SW down on S wall 400 no markers on S wall
						8		
						9		N40W85S all of hole @ 69.4'
						70	SP/SW	
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		Mottled oxidation staining @ cementations - see LG notes.
						9		
						80		

TREADWELL & ROLLO, INC.

PROJECT	DALY CITY / OCEANFRONT
LOCATION OF BORING	
DATUM	
ELEVATION	
PROJECT NO.	2196.01
DRILLING METHOD:	
HAMMER WEIGHT:	
DROP:	
SAMPLER(S):	
BACKFILL MATERIAL	
WATER LEVEL	
TIME	
DATE	
CASING DEPTH	
SHEET	5 OF 6
BORING NO.	LB-2
LOGGED BY	DCK [illegible] LMC
DRILLING START TIME / DATE	
DRILLING FINISH TIME / DATE	

SAMPLER TYPE | INCHES DRIVEN / INCHES RECOVERED | SAMPLE NO. / SAMPLE DEPTH | OVM/PID/FID READING | BLOWS/6" SAMPLER | SPT N-VALUE | DEPTH IN FEET | LITHOLOGY

SURFACE CONDITIONS: DCK NOTES RECORDED BY LMC

DEPTH IN FEET	LITHOLOGY	DESCRIPTION
80		
1		
2		
3		
4	SSR	
5		Orange staining bedding 5, N35E
6		
7		
8		
9		
90		
1		
2		
3		
4		
5		
6		bottom of
7		Break-out @ 98 ft on South wall
8		
9		
100		E-W strike 10 N dip

TREADWELL & ROLLS INC.

PROJECT DALY CITY / OCEANFRONT	PROJECT NO. 2196-01	SHEET 6 OF 8
LOCATION OF BORING	DRILLING METHOD:	BORING NO. LB-1
	HAMMER WEIGHT: DROP:	LOGGED BY: OGK
	SAMPLER(S):	DRILLING
	BACKFILL MATERIAL:	START / FINISH
	WATER LEVEL	TIME / TIME
	TIME	
	DATE	DATE / DATE
DATUM ______ ELEVATION ______	CASING DEPTH	

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY	SURFACE CONDITIONS: OGK NOTES RECORDED BY LMG
						100		
						1		
						2		
						3		
						4		
						105		breakout prominent Start @ 98°
						6		North well fracture .. no cementation or [illegible] [illegible] effects [illegible] by 1/8", no oxidation staining; orientation → ? N30E 85 NW magnetic disturbance ?
						7		
						8		
						9		
						110		
						1		
						2		
						3	BOH	
						4		
						5		
						6		
						7		
						8		
						9		
						120		

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY/OCEANFRONT	PROJECT NO.: 2196.01		SHEET 1 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO.: LB-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: G.P.
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM _____ ELEVATION _____	WATER LEVEL / TIME / DATE / CASING DEPTH		TIME / TIME / DATE / DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS: GEORGE'S NOTES RECORDED BY OGR

- 3'-3.2', SOUTH WALL, 4 CRACK OFFSETS, SMALL OXIDIZED LAYERS, N-S STRIKE, 80° DIP WEST, WEST SIDE DOWN, 1" OFFSET
- NORTH WALL - 65° NW DIP, CRACKS DOWN INTO INTO VERTICAL FRACTURE OBSCURED BY LOW 1/16" OFFSET AT 3'; 1/2" OFFSET AT 3.3', DRAG OFFSET CHANGE INTO MORE CEMENTED SAND
- INCREASED PEBBLE CONTENT, ROOTS
- 12.3' → 12.7' RUSTY SANDY LAYERS, SUBHORIZ., AROUND HOLE, DIPPING S-SW
- CLAY LAYER, 1/2 TO 3/4" THICK, WHITE W/ BROWN IN MIDDLE, OFFSET ON NORTH AND SOUTH WALL
- FINE CRACK, 1/2" OFFSET, DOWN TO WEST, N 10° W/ 78° NE
- IRREGULAR TOP SURFACE (WAVY) - SOUTH SIDE 12.95' (EAST) 13.1' (WEST) - TOP OF CLAY LAYER
- FINE LAMINATIONS, DISRUPTIVE LAYERING
- LAMINATED SANDS BELOW
- GRAVEL LAYER @ 14, SAME DIP AS CLAY LAYER @ 13'
- PEBBLE LAYER @ 18.1'

TREADWELL & ROLLO, INC.

PROJECT	DALY CITY / OCEANFRONT	PROJECT NO.	2198.01	SHEET 2 OF 6
LOCATION OF BORING		DRILLING METHOD:		BORING NO. LB-2
		HAMMER WEIGHT:	DROP:	LOGGED BY: G.P
		SAMPLER(S):		DRILLING
		BACKFILL MATERIAL:		START / FINISH
		WATER LEVEL		TIME / TIME
		TIME		
		DATE		DATE / DATE
DATUM	ELEVATION	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY

SURFACE CONDITIONS: GEORGE'S NOTES RECORDED BY DGK

- LOW ANGLE OPS
- PEBBLE LAYER @ 25.8', 1" THICK, OPS GENTLY TO WEST
- CLAY LAYER @ 26.0', 3" THICK, AROUND HOLE, SLIGHT OP EAST
- WEST WALL 27.4 TO 27.6 SAND AROUND WITH CLAY LAYER, SHARP BASE, TRUNCATE FEATURE?
- STREAK COLORED
- 30.3'
- BROWN TO LT. GREY CLAY LAYER, 1/4" TO 1/2" THICK, AROUND HOLE EXCEPT FOR NORTH SIDE, HORIZONTAL
- CLAY LAYER, 31.5' - 31.6', AROUND HOLE, HORIZON. PUSH UP IN CLAY LAYER NORTH WALL, SHARP BASAL CONTACT W/ SAND
- NO OFFSET ASSOCIATED WITH FISSURE ABOVE 31.5' CLAY LAYER TRUNCATES FISSURE?)
- 0.5 ft dip slip displacement 34 - 34.4 ft clay layer predates upper clay
- 0.2 ft offset on fissure @ 35.0' N5W 65E steepens slightly at depth.
- FISSURE apparent @ 37' NW side of hole 1' thick zone of disturbed sand tapers to few inches @ 35' widens downhole. Probably represents plate of material smeared out zone at downhole zone edge. SE side wall 8" wide to 1.3' drag feature indicate downward movement.

TREADWELL & ROLLO, INC.

PROJECT: DALY CITY / OCEANFRONT	PROJECT NO.: 2196.01		SHEET 3 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO.: LB-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: GP
	SAMPLER(S):		DRILLING
	BACKFILL MATERIAL:		START / FINISH
DATUM: ELEVATION:	WATER LEVEL / TIME / DATE		TIME / TIME
	CASING DEPTH		DATE / DATE

SURFACE CONDITIONS: GENERAL NOTES RECORDED LAYBACK

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						40	DARK BROWN CLAY
						41	LT BROWN CLAY
						42	
						43	
						44	
						45	
						46	
						47	
						48	
						49	
						50	
						51	
						52	
						53	
						54	
						55	
						56	
						57	
						58	
						59	
						60	

- N 20° W/ 80° ORIENTATION OF FISSURE
- CLAY LOCALLY FRACTURED W/ SLICKENSIDED SURFACES
- LT BROWN CLAY / BLUE CLAY CONTACT IS QUITE FLAT (GRADATIONAL CONTACT)
- INCREASED ORGANICS
- 58.6 BASE OF BLUE GREY LAYER
- 59.5 BASE OF LT. BROWN CLAY, HEAVY IRON OXIDE, ABUNDANT SLICKS, WAVY CONTACT COLLECTED HAND SAMPLE

TREADWELL & ROLLO INC.

PROJECT	DALY CITY / OCEANFRONT	PROJECT NO.	2196.01	SHEET	4 OF 6
LOCATION OF BORING		DRILLING METHOD:		BORING NO.	LB-2
		HAMMER WEIGHT:	DROP:	LOGGED BY:	G.P.
		SAMPLER(S):		DRILLING	
		BACKFILL MATERIAL:		START	FINISH
		WATER LEVEL		TIME	TIME
		TIME			
		DATE		DATE	DATE
DATUM	ELEVATION	CASING DEPTH			

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						60	
						61	
						62	
						63	
						64	
						65	
						66	
						67	
						68	
						69	
						70	
						71	
						72	
						73	
						74	
						75	
						76	
						77	
						78	
						79	
						80	

SURFACE CONDITIONS: GEORGE'S NOTES RECORDED BY JACK

- BO 3 TRUNCATES OLDER LAYER TO 62.2'
  LIQUEFACT. STRUCTURE ??
- FLAME STRUCTURES, 61.9' CLAY LAYER INTO SAND,
  LOADING CASTS
  CONTACT 66' NORTH 62.1' SOUTH, CLAY/SAND
  OFFSET ALONG CRACK IN SOUTH WALL, FLAME STRUCTURE?
- HORIZONTAL LAYERING
- START OF CROSS BEDDED SANDS

- 77.5' - 79.8' CROSS BEDDED ZONE
- 77.8' CLAY LAYER, ½" THICK, ARCHED HOLE, SHARP WAVY CONTACT, GRADATIONAL LOWER CONTACT, STEEPENS ON WEST SIDE, EAST SIDE MORE OFFSET 13° IN N85E DIRECTION
- FRIABLE, MED GRAINED SAND

TREADWELL & ROLLO, INC.

PROJECT DALY CITY / OCEANFRONT	PROJECT NO. 2196.01		SHEET 5 OF 6
LOCATION OF BORING	DRILLING METHOD:		BORING NO. LB-2
	HAMMER WEIGHT:	DROP:	LOGGED BY: G.P.
	SAMPLER(S):		DRILLING START TIME / FINISH TIME
	BACKFILL MATERIAL:		
	WATER LEVEL		
	TIME		
	DATE		DATE / DATE
DATUM ELEVATION	CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						90	
						91	
						92	
						93	
						94	
						95	
						96	
						97	
						98	
						99	
						100	

SURFACE CONDITIONS GEORGE'S NOTES, RECORDED BY JGK

-91.8' - 91.1' COARSER GRAINED SAND

TREADWELL & ROLLO INC.

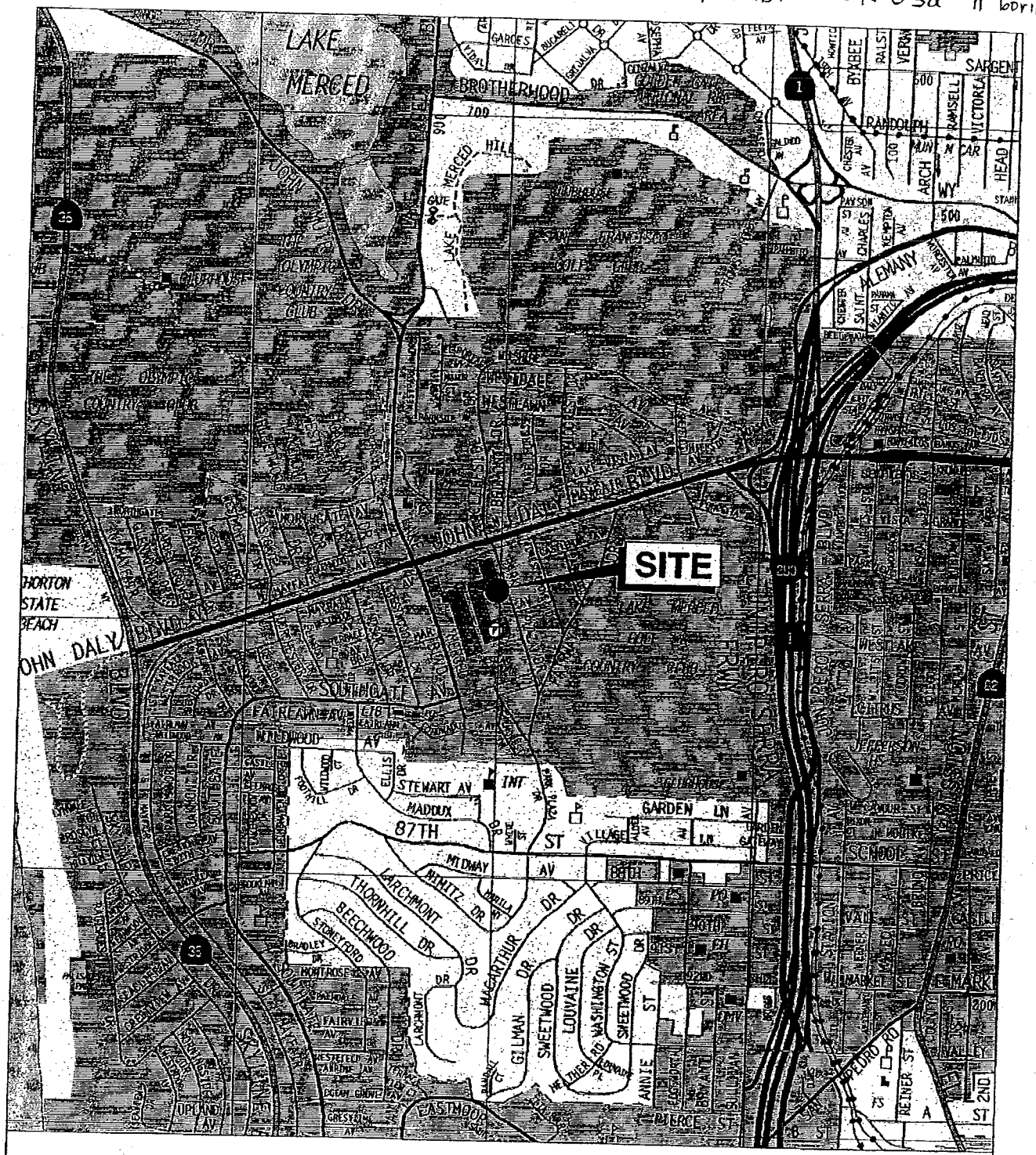
PROJECT	DALY CITY/OCEANFRONT	PROJECT NO.	2196.01	SHEET	6 OF 6
LOCATION OF BORING		DRILLING METHOD:		BORING NO.	LB-2
		HAMMER WEIGHT:	DROP:	LOGGED BY:	GP
		SAMPLER(S):		DRILLING	
		BACKFILL MATERIAL:		START	FINISH
		WATER LEVEL		TIME	TIME
		TIME			
		DATE		DATE	DATE
DATUM	ELEVATION	CASING DEPTH			

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	SAMPLE NO. / SAMPLE DEPTH	OVM/PID/FID READING	BLOWS/6" SAMPLER	SPT N-VALUE	DEPTH IN FEET	LITHOLOGY
						100	
						101	
						102	
						103	
						104	
						5	
						6	
						7	
						8	
						9	
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						0	

SURFACE CONDITIONS: GEORGE NOTES RECORDED BY OGK

HORIZONTAL BEDDING

Report ID: T&R-05a 11 borings



Base map: The Thomas Guide
San Francisco County
1999

0 1/4 1/2 Mile

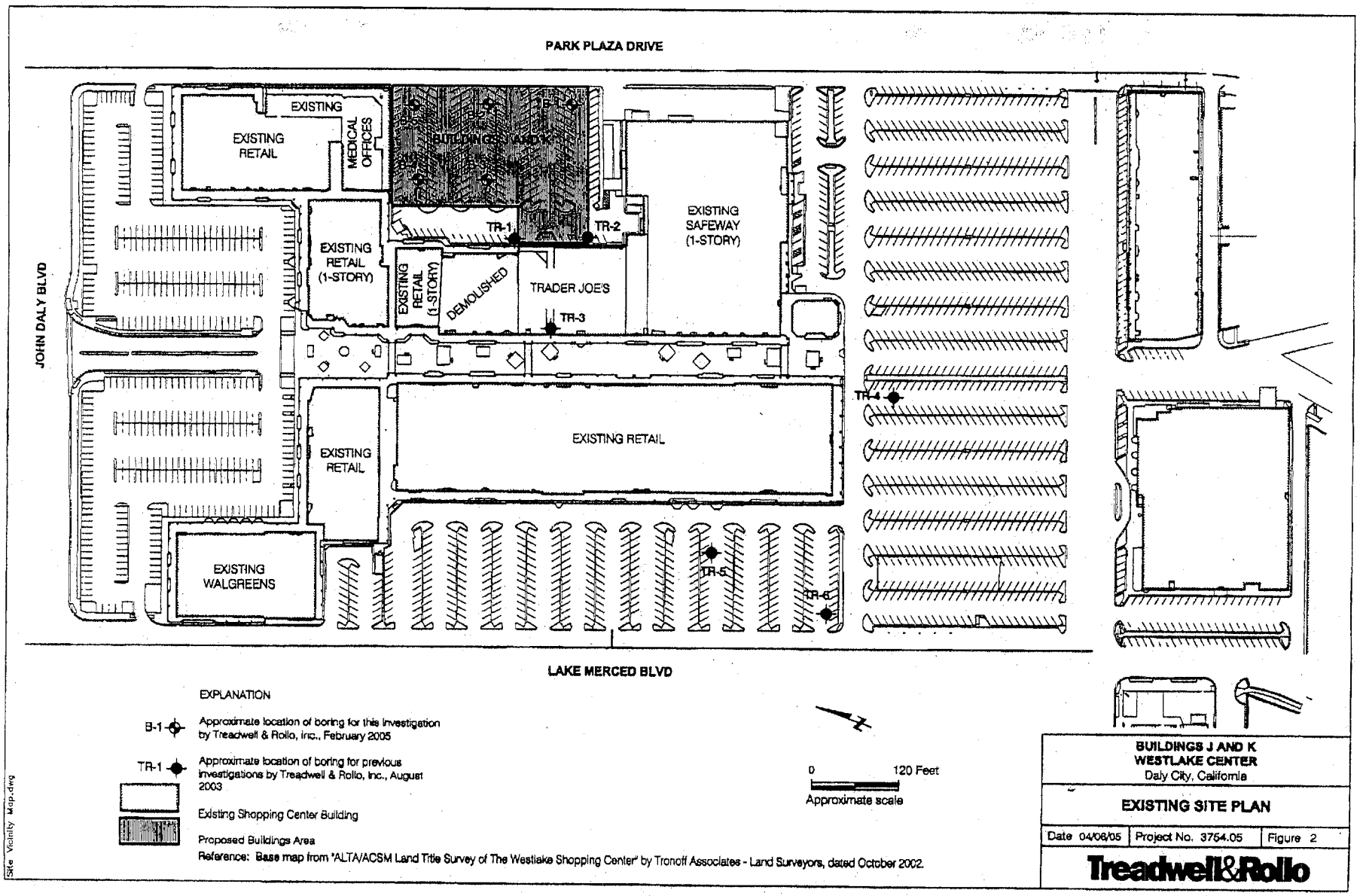
Approximate scale

BUILDINGS J AND K
WESTLAKE CENTER
Daly City, California

SITE LOCATION MAP

Treadwell&Rollo

Date 04/07/05	Project No. 3754.05	Figure 1



BUILDINGS J AND K
WESTLAKE CENTER
Daly City, California

EXISTING SITE PLAN

Date 04/08/05	Project No. 3754.05	Figure 2

Treadwell&Rollo

Site Vicinity Map.dwg

PROJECT: **BUILDINGS J AND K**
WESTLAKE CENTER
Daly City, California

Log of Boring B-1

Boring location: See Figure 2
Logged by: C. Tan
Date started: 2/18/05 | Date finished: 2/18/05
Drilling method: Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
					Ground Surface Elevation: 90.5 feet[2]						
0					2.5-inch of Asphalt Concrete (AC)						
1					7.5-inch of Aggregate Base (AB)						
2					SAND with SILT (SP-SM)						
3	S&H		21		dark brown, medium dense, moist						
4											
5											
6	SPT		30	SP-SM							
7											
8											
9											
10											
11	SPT		11		brown, medium dense				7.1	5.7	
12											
13											
14					SAND with SILT (SP-SM)						
15					yellow-brown, medium dense, moist						
16	SPT		20						11.7	17.2	
17											
18											
19											
20				SP-SM							
21	S&H		30								
22											
23											
24											
25											
26	SPT		24		less fines				9.8	13.3	
27											
28					SAND (SP)						
29	SPT		84	SP	brown, very dense, moist						
30											
31											
32											

LABORATORY TEST DATA

WELL COMPLETION INFORMATION

Christy Box (with bolt down lid flush with landscaping)

Boring terminated at a depth of 30 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-Values using a factor of 1.2.

[2] Ground surface elevation estimated from Sheet C2.04 "Existing Conditions, Westlake Shopping Center" by BKF Engineers/Surveyors/Planners, dated 8 October 2004. Datum is NGVD 29.

Treadwell&Rollo

Project No.: 3754.05 | Figure: B-1

GEOTECH WELL LOG 3754O6.GPJ T&R.GDT 4/8/05

PROJECT: **BUILDINGS J AND K**
WESTLAKE CENTER
Daly City, California

Log of Boring B-2

Boring location: See Figure 2
Logged by: C. Tan
Date started: 2/18/05 Date finished: 2/18/05
Drilling method: Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft	WELL COMPLETION INFORMATION
					Ground Surface Elevation: 88.7 feet[2]							Christy Box (with bolt down lid flush with landscaping)
0					3-inch of Asphalt Concrete (AC)							
1					7-inch of Aggregate Base (AB)							
2					SAND with SILT (SP-SM)							
3	S&H		22		light brown, medium dense, moist, fine- to medium-grained							
4												
5												
6	SPT		19						7.1	16.9		
7												
8				SP-SM								
9												
10												
11	SPT		22									
12												
13												
14												
15												
16	SPT		24									
17					SAND with SILT (SP-SM)							
18					dark brown, medium dense, dry to moist, fine-grained							
19				SP-SM								
20												
21	SPT		13						9.5	8.5		
22												
23												
24					SILTY SAND (SM)							
25					yellow-brown, medium dense, moist							
26	S&H		23	SM					13.1	16.9		
27												
28					SILTY SAND (SM)							
29	SPT		29	SM	yellow-brown, medium dense, moist				14.8	17.8		
30												
31												
32												

Boring terminated at a depth of 30 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-Values using a factor of 1.2.
[2] Ground surface elevation estimated from Sheet C2.04 "Existing Conditions, Westlake Shopping Center" by BKF Engineers/Surveyors/Planners, dated 8 October 2004. Datum is NGVD 29.

Treadwell&Rollo

Project No.: 3754.05
Figure: B-2

GEOTECH WELL LOG 375406.GPJ T&R.GDT 4/8/05

PROJECT: **BUILDINGS J AND K**
WESTLAKE CENTER
Daly City, California

Log of Boring B-3

Boring location: See Figure 2
Logged by: C. Tan
Date started: 2/18/05 Date finished: 2/18/05
Drilling method: Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft	WELL COMPLETION INFORMATION
					Ground Surface Elevation: 88 feet[2]							Christy Box (with bolt down lid flush with landscaping)
0					2.5-inch of Asphalt Concrete (AC)							
1					6-inch of Aggregate Base (AB)							
2	S&H		71/ 11"	SP	SAND (SP) yellow-brown, very dense, moist							
5	SPT		71		SILTY SAND (SM) olive, very dense, moist							
10	SPT		66	SM					20.6	16.6		
15	SPT		113									
20	SPT		83									
25	S&H		35/ 6"	SP-SM	SAND with SILT (SP-SM) brown, very dense, moist				7.6	10.0		
28	SPT		98/ 11"	SP	SAND (SP) olive, very dense, moist							
30												
32												

Boring terminated at a depth of 30 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-Values using a factor of 1.2

[2] Ground surface elevation estimated from Sheet C2.04 "Existing Conditions, Westlake Shopping Center" by BKF Engineers/Surveyors/Planners, dated 8 October 2004. Datum is NGVD 29.

Treadwell&Rollo

Project No.: 3754.05 Figure: B-3

GEOTECH WELL LOG 3754-06.GPJ T&R.GDT 4/8/05

PROJECT: **BUILDINGS J AND K**
WESTLAKE CENTER
Daly City, California

Log of Boring B-4

Boring location: See Figure 2 | Logged by: C. Tan

Date started: 2/18/05 | Date finished: 2/18/05

Drilling method: Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft	WELL COMPLETION INFORMATION
					Ground Surface Elevation: 87 feet[2]							Christy Box (with bolt down lid flush with landscaping)
0					2-inch of Asphalt Concrete (AC)							
1					8-inch of Aggregate Base (AB)							
2					SAND (SP)							
3	S&H		24	SP	brown, medium dense, moist, fine-grained							
4												
5												
6	SPT		10		loose, fine- to medium-grained				4.2	9.2		
7												
8					SAND with SILT (SP-SM)							
9					brown, dense, moist							
10												
11	SPT		36						5.3	11.2		
12												
13												
14												
15					loose							
16	S&H		9						8.8	11.1		
17												
18												
19				SP-SM								
20					very dense							
21	SPT		63									
22												
23												
24												
25					dense							
26	SPT		32									
27												
28												
29					very dense							
30	SPT		82									
31												
32												

Boring terminated at a depth of 30 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-Values using a factor of 1.2.

[2] Ground surface elevation estimated from Sheet C2.04 "Existing Conditions, Westlake Shopping Center" by BKF Engineers/Surveyors/Planners, dated 8 October 2004. Datum is NGVD 29.

Treadwell&Rollo

Project No.: 3754.05 | Figure: B-4

GEOTECH WELL LOG 375406.GPJ T&R.GDT 4/8/05

PROJECT: **BUILDINGS J AND K**
WESTLAKE CENTER
Daly City, California

Log of Boring B-5

Boring location: See Figure 2
Logged by: C. Tan
Date started: 2/18/05 | Date finished: 2/18/05
Drilling method: Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft	WELL COMPLETION INFORMATION
					Ground Surface Elevation: 87.5 feet[2]							Christy Box (with bolt down lid flush with landscaping)
0					3-inch of Asphalt Concrete (AC)							
0.5					6-inch of Aggregate Base (AB)							
1					SAND with SILT (SP-SM) light brown, dense, moist							
3	S&H		36									
5					yellow-brown, medium dense							
6	S&H		20									
10					POSSIBLE FILL							
11	SPT		43	SP-SM	dense							
15												
16	SPT		61		very dense							
20												
21	SPT		22		medium dense				10.1	12.3		
22					olive brown to dark brown SAND with SILT (SP-SM) dark brown, medium dense, moist							
25												
26	S&H		17	SP-SM								
29	SPT		11		loose, with trace of rootlets				11.3	9.4		
31	SPT		11									
32												

GEOTECH WELL LOG 3754.06.GPJ T&R.GDT 4/8/05

Treadwell&Rollo

Project No.: 3754.05 | Figure: B-5a

PROJECT: **BUILDINGS J AND K WESTLAKE CENTER** Daly City, California

Log of Boring B-5

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft	WELL COMPLETION INFORMATION
33					SAND with SILT (SP-SM) (continued)							
34				SP-SM	SAND with SILT (SP-SM) light brown to yellow brown, dense, moist							
35												
36	SPT		30						7.0	6.1		
37												
38												
39												
40												
41												
42												
43												
44												
45												
46												
47												
48												
49												
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60												
61												
62												
63												
64												

Boring terminated at a depth of 36.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-Values using a factor of 1.2.

[2] Ground surface elevation estimated from Sheet C2.04 "Existing Conditions, Westlake Shopping Center" by BKF Engineers/Surveyors/Planners, dated 8 October 2004. Datum is NGVD 29.

Treadwell&Rollo

Project No.: 3754.05

Figure: B-5b

GEOTECH WELL LOG 375406.GPJ T&R.GDT 4/8/05

PROJECT: PROPOSED TRADER JOE'S WESTLAKE CENTER, Daly City, California

Log of Boring TB B-1

Boring location: See Site Plan, Figure 2

Date started: 8/26/03 | Date finished: 8/26/03

Logged by: A. Mencarini

Drilling method: 8-inch Diameter Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches | Hammer type: Safety, Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear-Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
					Ground Surface Elevation: 80 feet[2]						
1					4-inches Asphalt Concrete over 1-inch Aggregate Base						
2					SAND with CLAY (SP-SC) olive-brown and yellow-brown, very dense, moist						
3	S&H		64/ 10"							16.3	113
4											
5											
6	S&H		63/ 11"		decreased sand content						
7				SP-SC							
8											
9											
10					2-inch-thick clay lense at 10 feet, olive gray with orange mottling						
11	S&H		63		fine sand					10.8	106
12											
13											
14					SAND (SP) olive-brown with orange-brown mottling, very dense, moist						
15											
16	SPT		82								
17											
18											
19											
20											
21	SPT		101/ 11"								
22				SP							
23											
24											
25											
26	SPT		103/ 11"								
27											
28											
29											
30											

Treadwell&Rollo

Project No.: 3754.05 | Figure: A-1a

TEST GEOTECH LOG 375401_TRADERJOES.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED TRADER JOE'S WESTLAKE CENTER Daly City, California

Log of Boring TR B-1

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		106/11"		SAND (SP) (continued)						
32											
33											
34											
35											
36	SPT		107/10"								
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at 36 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-values using a factor of 1.2

[2] Ground surface elevation estimated from the base map from "ALTA/ACSM Land Title Survey of The Westlake Shopping Center" by Tronoff Associates - Land surveyors, dated October 2002. Datum not known.

Treadwell&Rollo

Project No.: 3754.05 | Figure: A-1b

TEST GEOTECH LOG 375401 TRADERJOES.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED TRADER JOE'S WESTLAKE CENTER Daly City, California

Log of Boring TR B-2

Boring location: See Site Plan, Figure 2

Logged by: A. Mencarini

Date started: 8/26/03 Date finished: 8/26/03

Drilling method: 8-inch Diameter Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches Hammer type: Safety, Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					3-inches Asphalt Concrete over 6-inches Aggregate Base[2]						
2					SAND (SP)						
3	S&H		28		olive-brown and yellow-brown, medium dense, moist						
4											
5					2-inch-thick clay lense at 5 feet, light olive-brown with orange mottling, dense						
6	S&H		41							16.2	97
7											
8											
9											
10											
11	S&H		53		very dense, moist						
12											
13											
14											
15				SP							
16	SPT		77								
17											
18											
19											
20											
21	SPT		107/11"								
22											
23											
24											
25											
26	SPT		88								
27											
28											
29											
30											

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Project No.: 3754.05 Figure: A-2a

TEST GEOTECH LOG 375401_TRADERJOES_B-2.GPJ_TR.GDT 4/7/05

PROJECT: PROPOSED TRADER JOE'S WESTLAKE CENTER Daly City, California

Log of Boring TR B-2

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		108/11"		SAND (SP) (continued)						
32											
33											
34											
35	SPT		86								
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at 36 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-values using a factor of 1.2
[2] Ground surface elevation not known.

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Project No.: 3754.05 | Figure: A-2b

TEST GEOTECH LOG 375401 TRADERJOES B-2.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED TRADER JOE'S WESTLAKE CENTER
Daly City, California

Log of Boring TR B-3

Boring location: See Site Plan, Figure 2
Logged by: R. Reindl
Date started: 8/27/03 | Date finished: 8/27/03
Drilling method: Solid Flight Auger, Minuteman Rig
Hammer weight/drop: 140 lbs./30-inches | Hammer type: Rope & Cathead
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
					Ground Surface Elevation: 80.9 feet[2]						
					4-inches unreinforced Concrete Slab						
1–2					SAND with CLAY (SP-SC) olive-brown and orange-brown, medium dense, moist						
3	S&H		28								
4–5											
6	S&H		67/ 10"		olive-brown and yellow-brown, dense, decreased clay content						
7–9				SP-SC							
10	SPT		40		dense						
11–14											
15	S&H		63/ 11"		dark brown and orange-brown, very dense				11.8	9.7	115
16–19											
20	SPT		46		SAND with CLAY (SP-SC) olive-brown and yellow-brown, dense, moist						
21–24				SP-SC							
25	S&H		10		SAND (SP) dark brown, loose to medium dense, moist, fine grained, trace clay						
26–27				SP							
28–30											

POSSIBLY FILL

Treadwell&Rollo

Project No.: 3754.05 | Figure: A-3a

TEST GEOTECH LOG 375401_TRADERJOES.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED TRADER JOE'S WESTLAKE CENTER
Daly City, California

Log of Boring TR B-3

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		15	SP	SAND (SP) (continued) olive-brown and yellow-brown, medium dense						
32											
33											
34											
35				SP-SC	SAND with CLAY (SP-SC) olive-brown and yellow-brown, medium dense, moist						
36	S&H		21								
37											
38											
39											
40											
41	SPT		29		orange-brown, decreased clay content						
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at 41.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.6.
[2] Ground surface elevation estimated from the base map from "ALTA/ACSM Land Title Survey of The Westlake Shopping Center" by Tronoff Associates - Land surveyors, dated October 2002. Datum not known.

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Project No.: 3754.05 | Figure: A-3b

TEST GEOTECH LOG 3754-01 TRADER JOES.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED HOME DEPOT
WESTLAKE CENTER
Daly City, California

Log of Boring TR B-4

Boring location: See Site Plan, Figure 2
Logged by: A. Mencarini
Date started: 8/26/03 Date finished: 8/26/03
Drilling method: 8-inch Diameter Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Safety, Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					2-inches Asphalt Concrete over 4-inches Aggregate Base						
2					SAND (SP) olive-brown and yellow-brown, dense, moist						
3	S&H		34							10.4	111
4											
5											
6	S&H		27		medium dense						
7											
8											
9											
10											
11	S&H		62		very dense, trace clay						
12											
13				SP							
14											
15											
16	SPT		96		decreased clay content						
17											
18											
19											
20											
21	SPT		112/ 11"								
22											
23											
24											
25	SPT		60/ 5"		CLAYEY SAND (SC) dark olive-brown, very dense, moist, fine sand, low clay content					22.9	12.3
26											
27				SC							
28											
29											
30											

FILL

Treadwell&Rollo

Project No.: 3754.05 Figure: A-4a

TEST GEOTECH LOG 375401_HOMEDEPOT.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED HOME DEPOT
WESTLAKE CENTER
Daly City, California

Log of Boring TR B-4

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		91/ 10"	SC	CLAYEY SAND (SC) (continued) orange-brown mottling, increased clay content						
32											
33											
34				SP	SAND (SP) olive-brown and yellow-brown, very dense, moist						
35											
36	SPT		114/ 10"								
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at 36 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-values using a factor of 1.2
[2] Ground surface elevations not known.

Treadwell&Rollo

Project No.: 3754.05
Figure: A-4b

TEST GEOTECH LOG 375401 HOMEDEPOT.GPJ TR.GDT 4/7/05

PROJECT: **PROPOSED HOME DEPOT WESTLAKE CENTER** Daly City, California

Log of Boring TR B-5

Boring location: See Site Plan, Figure 2

Logged by: R. Reindl

Date started: 8/28/03 | Date finished: 8/28/03

Drilling method: 8-Inch Diameter Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-Inches | Hammer type: Safety, Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby Tube (ST)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					1-inch Asphalt Concrete over 3-inches Aggregate Base						
2					SAND (SP) olive-brown and yellow-brown, medium dense, moist, with dark brown mottling						
3	S&H		17								
4											
5					6-inch-thick dark brown layer at 4.5 feet						
6	S&H		22							10.4	111
7											
8											
9											
10											
11	SPT		29	SP	FILL						
12											
13											
14											
15											
16	S&H		22								
17											
18											
19											
20											
21	SPT		22								
22					CLAYEY SAND (SC) dark brown to black, medium dense, moist, with wood/root fragments						
23											
24											
25											
26	S&H		6	SC	loose, moist, fine grained, organic odor, no visible organic material, increased clay content				26.7	20.8	96
27											
28											
29											
30					SAND (SP)						

Treadwell&Rollo

Project No.: 3754.05 | Figure: A-5a

TEST GEOTECH LOG 375401_HOMEDEPOT.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED HOME DEPOT
WESTLAKE CENTER
Daly City, California

Log of Boring TR B-5

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		6	SP	SAND (SP) (continued) dark gray-brown, very loose, wet					28.4	
32				ML	SILT (ML) dark gray-brown to black, soft, wet, organic odor Plasticity Index (PI) = 8, Liquid Limit (LL) = 39						
33											
34					SAND (SP) olive-brown and orange-brown, very dense, moist						
35											
36	ST										
37											
38											
39											
40				SP							
41	SPT		80								
42											
43											
44											
45											
46	SPT		80								
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at 46 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-values using a factor of 1.2
[2] Ground surface elevations not known.

Treadwell&Rollo

Project No.: 3754.05
Figure: A-5b

TEST GEOTECH LOG 375401 HOMEDEPOT.GPJ TR.GDT 4/7/05

PROJECT: **PROPOSED HOME DEPOT WESTLAKE CENTER** Daly City, California

Log of Boring TR B-6

Boring location: See Site Plan, Figure 2 | Logged by: R. Reindl

Date started: 8/28/03 | Date finished: 8/28/03

Drilling method: 8-inch Diameter Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches | Hammer type: Safety, Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					1.5-inches Asphalt Concrete over 5-inches Aggregate Base						
2					SAND (SP) olive-brown and yellow-brown, medium dense, moist						
3	S&H		21							7.1	107
4											
5	S&H		28								
6					dark brown lense at 5.5 feet					10.0	114
7											
8											
9											
10	SPT		34		dense						
11											
12											
13				SP							
14											
15	S&H		28		medium dense					9.7	108
16											
17											
18											
19											
20	SPT		48		dense						
21											
22											
23											
24											
25	S&H		8		SAND with CLAY (SP-SC) dark gray, loose, moist				5.9	9.7	99
26					dark gray-brown at 26 feet, with wood/root fragments						
27				SP-SC							
28											
29											
30											

FILL

Treadwell&Rollo

Project No.: 3754.05 | Figure: A-6a

TEST GEOTECH LOG 375401 HOMEDEPOT.GPJ TR.GDT 4/7/05

PROJECT: PROPOSED HOME DEPOT
WESTLAKE CENTER
Daly City, California

Log of Boring TR B-6

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		8	SP-SC	SAND with CLAY (SP-SC) (continued) no wood/organics, with organic odor						
32											
33											
34											
35	ST										
36					SAND (SP) olive-brown and yellow-brown, very dense, moist						
37											
38											
39											
40	SPT		89	SP							
41											
42											
43											
44											
45	S&H		57		▽ (08/28/03)					17.2	120
46				SC	CLAYEY SAND (SC) dark red-brown, very dense, wet, slightly cemented						
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at 46 feet below ground surface.
Boring backfilled with cement grout.
Groundwater encountered at a depth of 45 feet at the end of drilling.

[1] S&H blow counts converted to SPT N-Values using a factor of 0.7; SPT blow counts converted to N-values using a factor of 1.2
[2] Ground surface elevations not known.

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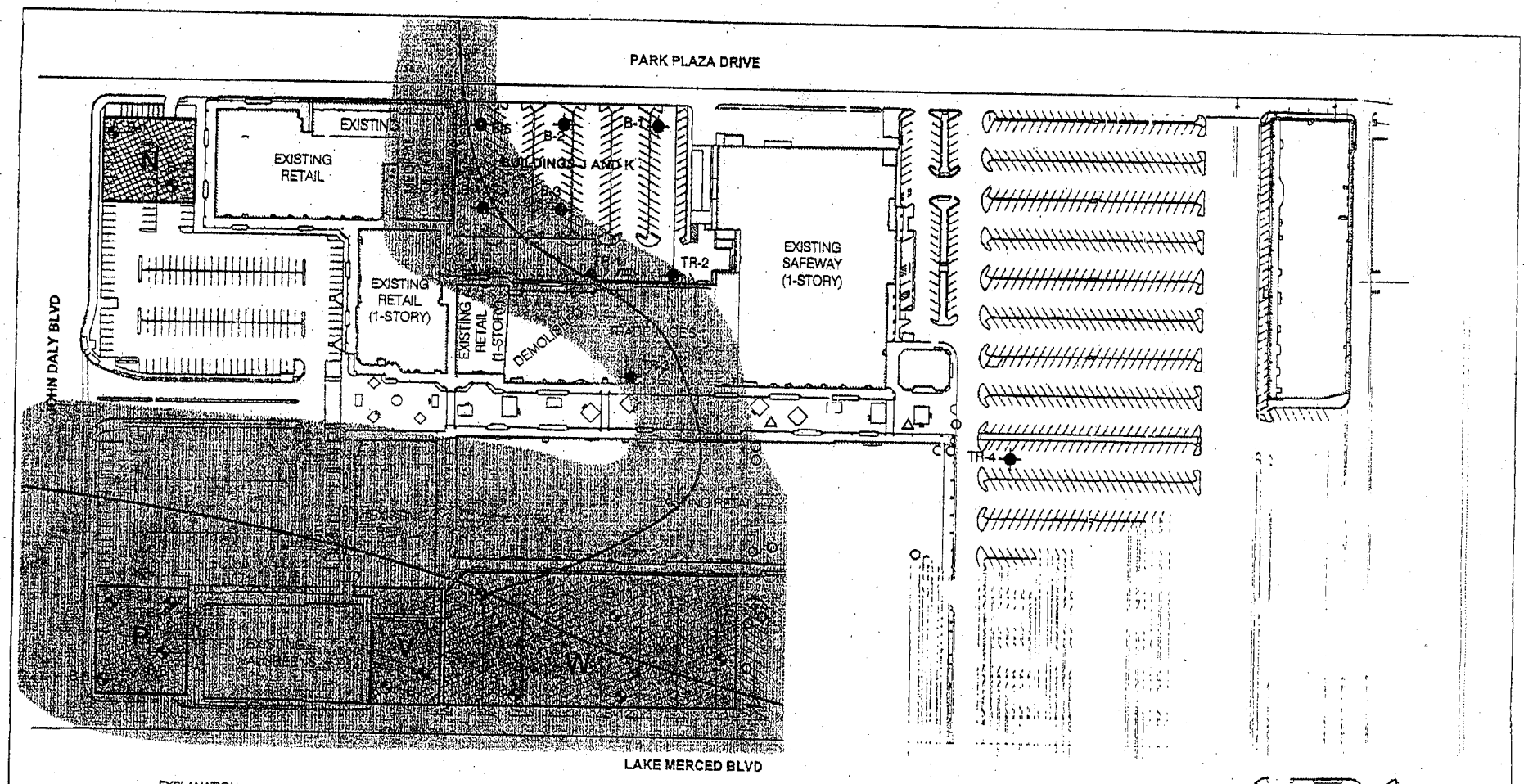
Project No.: 3754.05
Figure: A-6b

TEST GEOTECH LOG 375401 HOMEDEPOT.GPJ TR.GDT 4/7/05



Reference: Base map from "ALTA/ACSM Land Title Survey of The Westlake Shopping Center" by Tronoff Associates - Land Surveyors, dated October 2002.

PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

SITE PLAN

Date 10/27/05	Project No. 3754.06	Figure 2

Treadwell & Rollo

3754.06 Site Plan.dwg

PROJECT:	PROPOSED STRUCTURES N, P, V, AND W WESTLAKE CENTER Daly City, California	**Log of Boring B-1**	PAGE 1 OF 1

Boring location: See Site Plan, Figure 2 | Logged by: R. Nelson

Date started: 8/31/05 | Date finished: 8/31/05

Drilling method: CME75 Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
					Ground Surface Elevation: -1.7 feet[2]						
1					4.5-inches Asphalt						
					6-inches Baserock						
					SAND (SP)						
2					yellow brown, medium dense, moist, fine grained						
3	S&H		29							9.0	103
4											
5					very dense, cemented						
6	S&H		65								
7											
8											
9											
10											
11	S&H		64								
12											
13											
14				SP							
15					mottled rust-colored weathering						
16	SPT		106								
17											
18											
19											
20											
21											
22											
23											
24											
25					trace clay						
26	SPT		92								
27											
28											
29											
30											

Boring terminated at a depth of 26.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No.: 3754.06 | Figure: A-1

TEST GEOTECH LOG 3754.06.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-2

Boring location: See Site Plan, Figure 2
Logged by: E. Gouchon
Date started: 9/2/05 Date finished: 9/2/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					5-inches Asphalt						
					6-inches Aggregate Base						
2					SAND (SP)						
					yellow brown, very dense, moist, cemented, trace silt						
3	S&H		60							6.8	114
4											
5											
6	S&H		44		mottled yellow brown and orange brown, dense						
7				SP							
8											
9											
10											
11	SPT		97		light olive brown, very dense				3.0	9.2	
12											
13											
					SAND with SILT (SP-SM)						
14					orange brown, very dense, moist, with some gray SP-SM seams						
15											
16	SPT		83								
17				SP-SM							
18											
19											
20					mottled olive brown and orange brown						
21	SPT		65/6"								
22											
23											
24											
25											
26											
27											
28											
29											
30											

Boring terminated at a depth of 21 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No. 3754.06 Figure: A-2

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-3

Boring location: See Site Plan, Figure 2 | Logged by: E. Gouchon

Date started: 9/1/05 | Date finished: 9/1/05

Drilling method: CME75 Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value*	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					5-inches Asphalt						
					6-inches Baserock						
2					SAND (SP)						
3	S&H		21	SP	orange brown with mottled olive brown, medium dense, moist						
4											
5											
6	S&H		9		olive brown, loose						
7											
8					SAND with SILT (SP-SM)						
9					orange-brown, very loose, moist						
10											
11	S&H		3						6.5	8.4	99
12				SP-SM							
13											
14											
15											
16	S&H		52		olive, very dense						
17											
18					SAND (SP)						
19					orange-brown, loose						
20											
21	S&H		6	SP					4.6	9.4	105
22											
23											
24					SILTY SAND (SM)						
25					orange brown with dark brown weathering, loose, moist						
26	SPT		5								
27				SM							
28											
29											
30											

FILL

Treadwell&Rollo

Project No.: 3754.06 | Figure: A-3a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-3

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		8	SC	CLAYEY SAND (SC) olive-gray, loose, moist, with some silt						
32					CLAY (CH) olive-gray, moist						
33											
34											
35											
36	S&H		5	CH	CLAY with SILT (CH) blue-gray with yellow-brown mottling, soft, moist	TxUU	2,600	590		43.3	78
37											
38											
39											
40											
41	S&H		31		blue-gray, stiff						
42					SILTY SAND (SM) olive-gray, dense, moist						
43				SM							
44											
45					SAND (SP) olive gray, dense, moist, with some lenses of silty sand						
46	SPT		36								
47											
48				SP							
49											
50											
51	SPT		38								
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 51.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No.: 3754.06
Figure: A-3b

TEST GEOTECH LOG 375405.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-4

Boring location: See Site Plan, Figure 2 | Logged by: E. Gouchon

Date started: 9/1/05 | Date finished: 9/1/05

Drilling method: CME75 Hollow Stem Auger

Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					4-inches Asphalt						
0					6-inches Baserock						
1					SAND (SP)						
2					yellow-brown to orange brown, dense, moist						
3	S&H		41								
4											
5					medium dense, with large piece of asphalt at 5 feet						
6	S&H		26								
7				SP							
8											
9											
10					yellow-brown, dense						
11	S&H		31							7.8	106
12											
13											
14					SAND with SILT (SP-SM)						
15					yellow brown, dense, moist						
16	SPT		42		FILL				7.9	14.2	
17											
18											
19											
20											
21	SPT		37	SP-SM							
22											
23											
24											
25											
26	SPT		40								
27											
28											
29											
30											

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Project No.: 3754.06 | Figure: A-4a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: **PROPOSED STRUCTURES N, P, V, AND W**
WESTLAKE CENTER
Daly City, California

Log of Boring B-4

DEPTH (feet)	Sampler Type	Sample	SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
						LABORATORY TEST DATA					
31	SPT		7		SAND with SILT (SP-SM) (continued) **[FILL]**						
32					2-inch piece of wood debris						
33					SANDY CLAY (CL)						
34					dark brown, medium stiff, moist						
35				CL							
36	S&H		12		stiff	TxUU	3,100	820		40.8	78
37											
38											
39											
40											
41	S&H		10	CH	CLAY (CH)						
42					olive brown, stiff, moist						
43					Pocket Penetrometer: S_u = 750 psf						
44					SAND (SP)						
45					olive with black mottling, dense, moist						
46	S&H		34								
47				SP							
48											
49											
50											
51	SPT		36		trace odor of organics						
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 51.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No.: 3754.06 | Figure: A-4b

TEST GEOTECH LOG 3754GE.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-5

Boring location: See Site Plan, Figure 2
Logged by: E. Gouchon
Date started: 9/2/05 | Date finished: 9/2/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value*	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					5-inches Asphalt						
0					8-inches Baserock						
1					SAND with SILT (SP-SM) orange brown to yellow brown with dark brown mottling, medium dense, moist						
3	S&H		26	SP-SM							
6	S&H		22							10.8	112
8					SILTY SAND (SM) mottled brown and orange brown, medium dense, moist						
11	SPT		25								
16	SPT		20	SM							
21	SPT		13								
26	SPT		6		loose						
27				CH	CLAY (CH) olive with mottled olive brown, medium stiff, moist						
28				SM	SILTY SAND (SM) orange-brown, moist						
30											

FILL

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

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Project No.: 3754.06 | Figure: A-5a

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-5

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31				SM	SILTY SAND (SM) (continued)						
32	ST		400 psi	CH	CLAY (CH) black, stiff, moist					15.5	112
33											
34				SM	SILTY SAND (SM) orange-brown to dark brown						
35											
36	S&H		10	CH	CLAY (CH) dark brown, medium stiff, moist Pocket Penetrometer: S_u = 1,500 psf						
37											
38											
39											
40											
41	S&H		13		stiff, with silt Pocket Penetrometer: S_u = 1,000 psf						
42											
43											
44											
45											
46	S&H		65		SILTY SAND (SM) olive gray, very dense, moist						
47											
48					black, medium dense, moist						
49											
50											
51	SPT		22	SM							
52											
53											
54											
55											
56	S&H		48		yellow-brown, dense						
57											
58											
59											
60											

Boring terminated at a depth of 56.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No.: 3754.06
Figure: A-5b

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-6

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 9/1/05 Date finished: 9/1/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					4-inches Asphalt						
0					6-inches Baserock						
1					SAND (SP)						
2					red brown with mottled dark brown, medium dense,						
3	S&H		22		moist						
4											
5				SP							
6	SPT		20								
7											
8											
9											
10					SILTY SAND (SM)						
11	SPT		30		yellow-brown, dense, moist						
12				SM							
13											
14											
15					SAND with SILT (SP-SM)						
16	SPT		36		yellow-brown, dense, moist						
17											
18											
19											
20											
21	SPT		29		medium dense						
22				SP-SM							
23											
24											
25					dense						
26	SPT		37							12.2	9.3
27											
28											
29											
30											

FILL

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Project No.: 3754.06
Figure: A-6a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-6

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		6	CL	SANDY CLAY (CL) dark olive-brown, medium stiff, moist, with organics, with silt Pocket Penetrometer: S_u = 1000 psf						
32	S&H		6								
33											
34											
35											
36	S&H		10		some lenses of silty sand Pocket Penetrometer: S_u = 800 psf						
37											
38											
39											
40											
41	S&H		12	CH	CLAY (CH) dark gray-brown, stiff, moist, with some sand Pocket Penetrometer: S_u = 1,500 psf						
42											
43					SAND with SILT (SP-SM) olive gray, dense, moist						
44											
45				SP-SM							
46	S&H		48								
47											
48											
49					SILTY SAND (SM) dark gray, medium dense, moist						
50											
51	SPT		17	SM							
52											
53											
54					SAND (SP) olive gray, dense, moist						
55				SP							
56	SPT		47								
57											
58											
59											
60											

Boring terminated at a depth of 56.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No. 3754.06 | Figure: A-6b

TEST GEOTECH LOG 3754.06.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-7

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 8/30/05 Date finished: 8/30/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					SAND (SP) yellow brown, medium dense, moist, fine grained, trace fines						
2											
3	S&H		20								
4											
5					grades clayey						
6	SPT		19								
7											
8											
9					grades less clay, dense						
10											
11	SPT		36								
12				SP							
13											
14											
15											
16	SPT		46		yellow brown, dense, moist, fine grained						
17											
18											
19											
20											
21	SPT		41								
22											
23											
24					CLAYEY SAND (SC) dark brown, medium dense, moist, fine grained						
25											
26	SPT		18	SC							
27											
28											
29				SP	SAND with CLAY (SP)						
30											

FILL

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Project No.: 3754.06
Figure: A-7a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: **PROPOSED STRUCTURES N, P, V, AND W**
WESTLAKE CENTER
Daly City, California

Log of Boring B-7

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		7	SP	SAND with CLAY (SP) (continued) dark brown; loose, moist, fine grained				16.5	11.8	
32											
33											
34											
35				SP	SAND (SP) yellow brown with mottled olive brown, very dense, moist, fine grained						
36	SPT		55								
37											
38											
39											
40											
41	SPT		70		yellow brown						
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 41.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No.: 3754.06
Figure: A-7b

TEST GEOTECH LOG 376406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-8

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 8/30/05 Date finished: 8/30/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					2-inches Concrete 4-inches Baserock						
1					SAND (SP) mottled orange brown and brown, medium dense to dense, moist, trace clay, fine grained						
2											
3	S&H		30								
4											
5				SP							
6	S&H		21		medium dense, grades clayey					11.1	105
7											
8											
9											
10					SAND (SP) light to dark brown, dense, moist						
11	SPT		36								
12											
13											
14											
15					very dense						
16	SPT		64								
17											
18											
19											
20				SP							
21	SPT		52		yellow brown to brown, very dense, moist, fine grained						
22											
23											
24											
25											
26	SPT		83								
27											
28											
29											
30											

FILL

Treadwell&Rollo

Project No.: 3754.06 Figure: A-8a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/28/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-8

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		66		SAND (SP) (continued)						
32											
33											
34											
35											
36	SPT		107	SP							
37											
38											
39											
40											
41	SPT		78								
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 41.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

Treadwell&Rollo

Project No.: 3754.06
Figure: A-8b

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/06

PROJECT: **PROPOSED STRUCTURES N, P, V, AND W**
WESTLAKE CENTER
Daly City, California

Log of Boring B-9

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 9/2/05 Date finished: 9/2/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					4-inches Asphalt						
0.5					6-inches Baserock						
1					SAND with SILT (SP-SM) yellow brown, medium dense, moist						
3	S&H		27		large piece of rock (2-inches)						
6	S&H		20								
10				SP-SM							
11	SPT		47		dense						
16	SPT		35								
20											
21	S&H		16		SAND with SILT (SP-SM) olive brown, medium dense, moist				86	10.9	96
23				SM							
26	S&H		18								
27				SP	SAND (SP) yellow brown to olive brown, medium dense, moist						
28				SM	SILTY SAND (SM) dark brown gray, medium dense, moist						
30											

FILL

Treadwell&Rollo

Project No.: 3754.06 Figure: A-9a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-9

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		11	SM	SILTY SAND (SM) (continued)						
32				CH	SANDY CLAY (CH) dark gray, stiff						
33					SILTY SAND (SM) orange brown with some dark gray and olive brown mottling, very dense, moist						
34											
35											
36	S&H		72	SM							
37											
38											
39					orange brown						
40											
41	SPT		74								
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

FILL

Boring terminated at a depth of 41.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

Treadwell&Rollo

Project No.: 3754.06
Figure: A-9b

TEST GEOTECH LOG 3754.06.GPJ TR.GDT 10/27/05

PROJECT: **PROPOSED STRUCTURES N, P, V, AND W**
WESTLAKE CENTER
Daly City, California

Log of Boring B-10

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 8/31/05 Date finished: 8/31/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					3-inches Asphalt 6-inches Baserock						
1–2					SAND (SP) orange-brown, dense, moist, fine grained						
3	S&H		36								
4–5				SP							
6	SPT		38							11.7	
7–9					FILL						
10					SAND (SP) yellow brown, very dense, moist						
11	SPT		54								
12–15											
16	SPT		78								
17–19											
20				SP							
21	SPT		77								
22–24											
25					orange brown, dense, wet, grades silty						
26	SPT		41								
27–30											

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

Treadwell&Rollo

Project No.: 3754.06 Figure: A-10a

PROJECT: **PROPOSED STRUCTURES N, P, V, AND W**
WESTLAKE CENTER
Daly City, California

Log of Boring B-10

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		35	SP	SILTY SAND (SM) (continued)						
32					SILTY SAND (SM) mottled olive and red brown, very dense, moist, fine grained						
33											
34				SM							
35											
36	SPT		96								
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 36.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

Treadwell&Rollo

Project No. 3754.06 | Figure: A-10b

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-11

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 8/30/05 | Date finished: 8/30/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches | Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					2.5-inches Asphalt 3-inches Baserock						
1–3	S&H		19	SP	SAND (SP) olive brown and orange brown, medium dense, moist, fine gravel, trace fines						
4–8	SPT		13	SP-SM	SAND with SILT (SP-SM) yellow brown and dark brown, medium dense, moist, fine gained				8.7	12.3	
9–10				SP	SAND (SP) red brown, medium dense, moist, fine grained FILL						
11	SPT		12								
12–15											
16	SPT		14		yellow brown with dark brown mottling				4.5	7.9	
17–20				SP	SAND (SP) red brown, dense, moist, fine grained						
21	SPT		49								
22–25											
26	SPT		54		yellow brown, very dense, moist, fine grained, grades to silty						
27–30											

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Project No.: 3754.06 | Figure: A-11a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/28/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-11

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		62	SP	SAND (SP) (continued) grades to less silty						
32											
33											
34											
35											
36	SPT		80								
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 36.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

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Project No.: 3754.06 | Figure: A-11b

TEST GEOTECH LOG 3754GB.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-12

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 8/31/05 Date finished: 8/31/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
1					3-inches Asphalt						
					5-inches Baserock						
2					SAND (SP)						
3	S&H		25	SP	yellow brown, medium dense, moist, fine grained					5.2	107
4					FILL						
5											
6	S&H		26								
7											
8					SAND (SP)						
9					yellow brown, dense, moist, fine grained						
10											
11	SPT		41								
12											
13											
14											
15					very dense						
16	SPT		55								
17											
18											
19				SP							
20											
21	SPT		50								
22											
23											
24											
25					dense						
26	SPT		48								
27											
28											
29											
30											

Treadwell&Rollo

Project No.: 3754.06 Figure: A-12a

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: **PROPOSED STRUCTURES N, P, V, AND W**
WESTLAKE CENTER
Daly City, California

Log of Boring B-12

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
31	SPT		49	SP	SAND (SP) (continued)						
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

Boring terminated at a depth of 31.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

Treadwell&Rollo

Project No.: 3754.06 | Figure: A-12b

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

PROJECT: PROPOSED STRUCTURES N, P, V, AND W
WESTLAKE CENTER
Daly City, California

Log of Boring B-13

Boring location: See Site Plan, Figure 2
Logged by: R. Nelson
Date started: 8/31/05 Date finished: 8/31/05
Drilling method: CME75 Hollow Stem Auger
Hammer weight/drop: 140 lbs./30-inches Hammer type: Automatic
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

DEPTH (feet)	SAMPLES: Sampler Type	SAMPLES: Sample	SAMPLES: SPT N-Value[1]	LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA: Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
0					3-inches Asphalt						
					6-inches Baserock						
1					SAND (SP)						
2					yellow brown, medium dense, moist						
3	S&H		18								
4											
5				SP							
6	S&H		54		dense					15.5	105
7											
8											
9											
10					SAND (SP)						
11	S&H		52		mottled yellow brown & orange brown, very dense					9.8	
12											
13											
14											
15											
16	SPT		59		orange brown						
17											
18				SP							
19											
20											
21	SPT		44		yellow brown, dense, moist						
22											
23											
24											
25											
26	SPT		91		very dense						
27											
28											
29											
30											

FILL

Boring terminated at a depth of 26.5 feet below ground surface.
Boring backfilled with cement grout.
Groundwater not encountered during drilling.

[1] S&H and SPT blow counts converted to N-Values using a factor of 0.8 and 1.2, respectively.
[2] Elevations based on San Francisco City datum.

Treadwell&Rollo

Project No.: 3754.06
Figure: A-13

TEST GEOTECH LOG 375406.GPJ TR.GDT 10/27/05

Report ID = WC-69

5 borings

WOODWARD-CLYDE & ASSOCIATES
CONSULTING SOIL ENGINEERS AND GEOLOGISTS
2730 ADELINE ST. OAKLAND, CALIFORNIA 94607 PHONE (415) 444-1258

Raymond Lun...
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Edward Margason
Lewis L. Oriard
Mahmut Otus

August 14, 1969

Project S 11919

Wells Fargo Bank
464 California Street
San Francisco, California 94120

Attention: Mr. E. T. Peterson

Gentlemen:

In accordance with the request of Mr. E. T. Peterson, we have performed an investigation of the subsurface conditions at the site of the Murray Norton Estate just south of the Mar Vista Riding Academy, west of Skyline Boulevard in Daly City, California.

The accompanying report presents our conclusions regarding site development feasibility as well as the results of the subsurface exploration and laboratory tests.

Very truly yours,

William D. Johnson

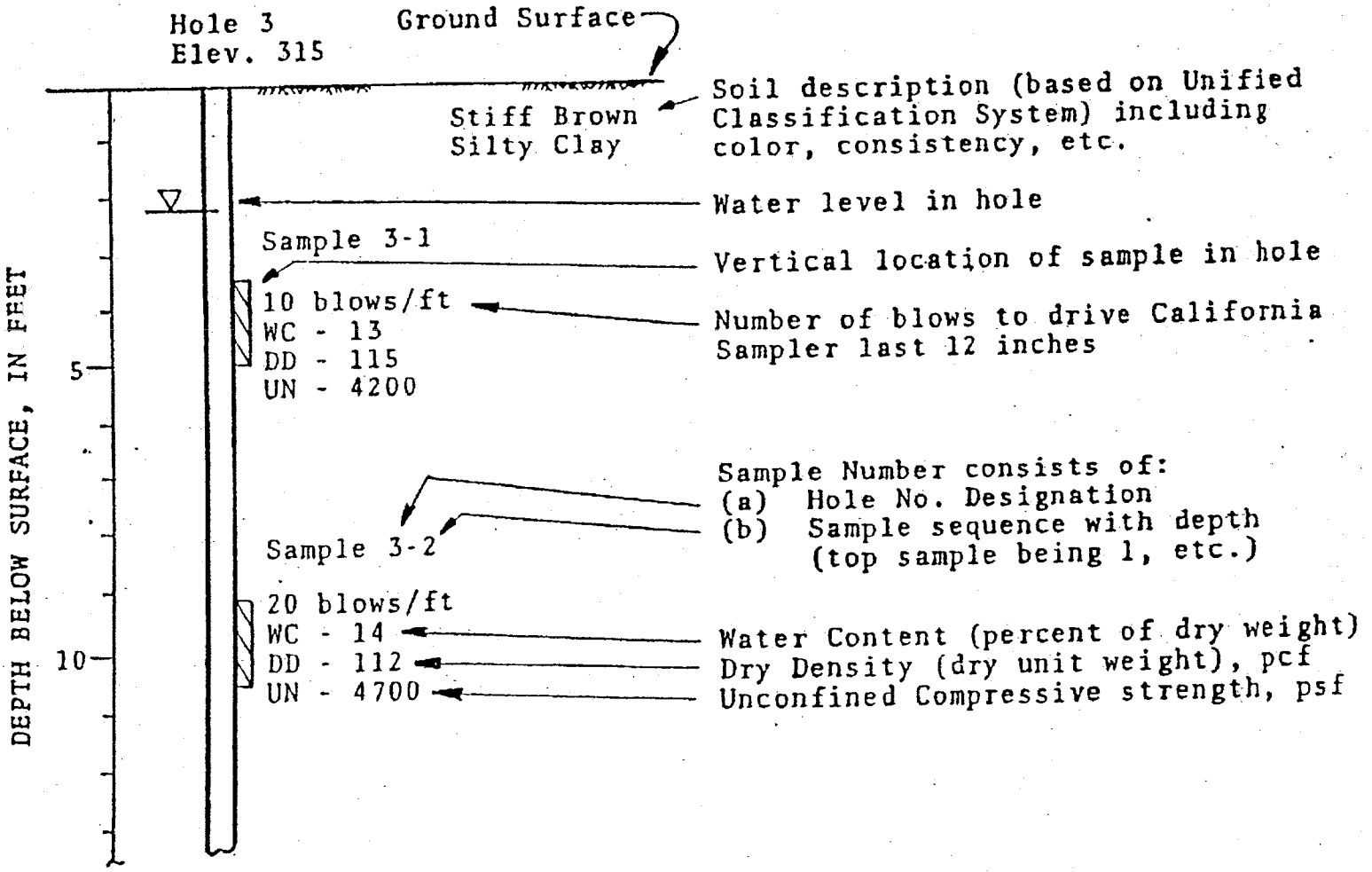
William D. Johnson
Senior Project Engineer

WDJ:mp

APPENDIX B

KEY TO BORING LOGS

1. Borings were advanced with a 6-inch ...



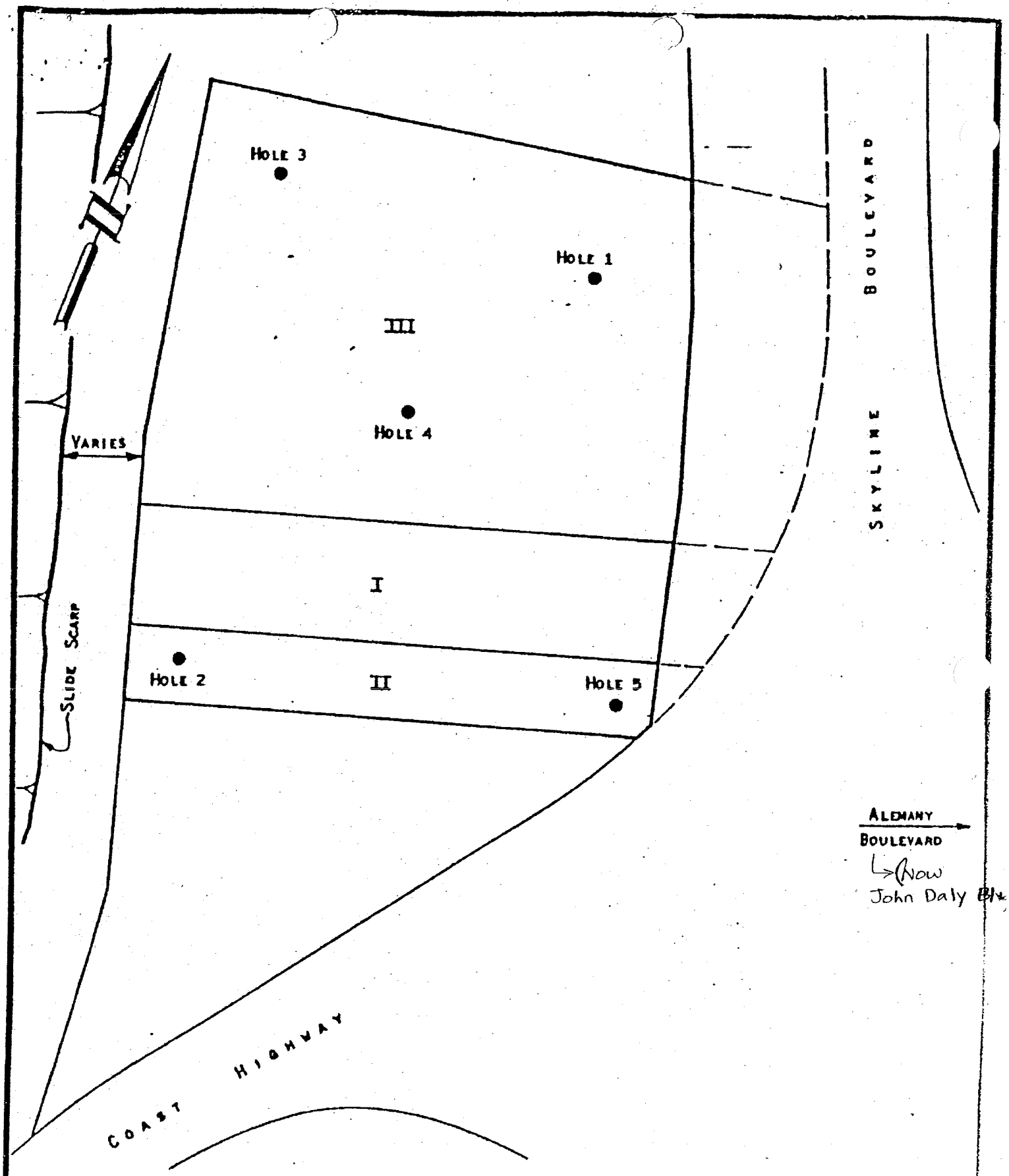


FIG. 1 - SITE PLAN

SCALE: 1" = 100'

NORTON ESTATE

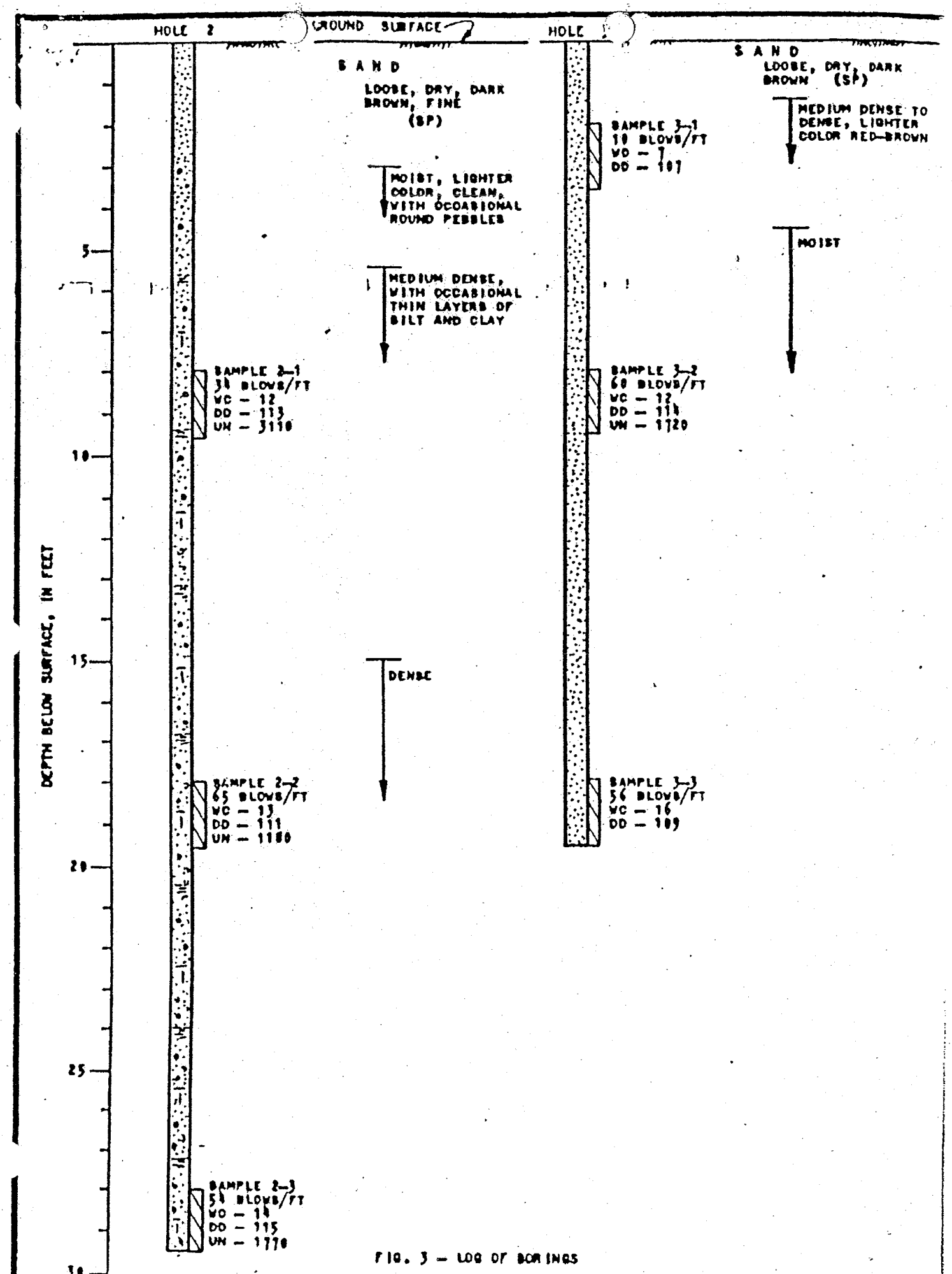


FIG. 3 - LOG OF BORINGS

WOODWARD-CLYDE & ASSOCIATES

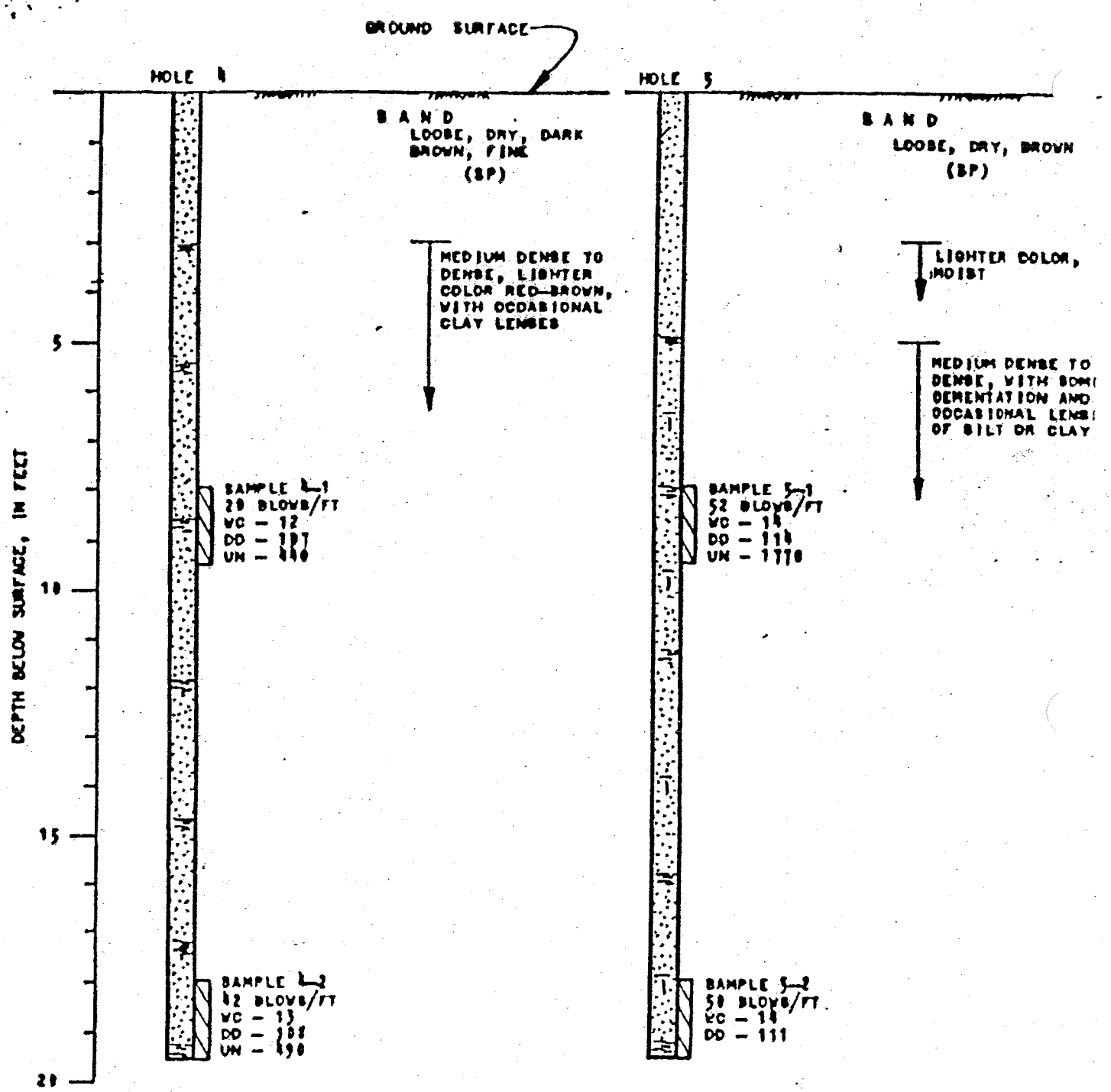


FIG. 4 — LOGS OF BORINGS