

City box number Materials Lab (IV)

Title/cover page w/the following info:

- Company (author) name
- Report Date (2nd page)
- Project name
- Company's job number (2nd page) 3394
- City DCLU project number (7-digit number)
- City Permit number (6-digit number)
- Kroll map index number (3-digit number, w/E,W,N,S)
- Green label
- Site address (may be on 1st or 2nd page of text)

- Executive Summary and associated figures
- Table of Contents
- Project Location Plan/Map or Vicinity Map
- Site Plans, Boring Location Plans, or Exploration Plans
- Survey
- Geologic Maps
- Cross Sections/Subsurface Profiles
- Fill or Peat Thickness Maps and Contour Maps
- Boring Logs
- Geology Text (if no logs)
- Soil Classification Key/Boring Log Key
- Probe Logs
- Test Pit Logs
- Monitoring Well Logs
- Cone Penetrometer Logs
- Shear Wave Velocity Measurements
- Groundwater Maps
- GW Elevation Tables/Data
- Soils Lab Testing (Geotechnical) Summary Tables
 - Grain Size Analyses/Hydrometer Analyses
 - Atterberg Limits
 - Strength tests: Triaxial, Unconfined, Direct Shear
 - Organic Content
 - ¹⁴C or Radiocarbon Testing
 - Other _____
- Soil Chemical Analytical Testing Summary Tables
- Water/Groundwater Chemical Analytical Summary Tables
- Comments _____

Date Copied 9/5/00 By Suzanne



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Consulting Geotechnical
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June 26, 1986

Seattle Engineering Department
806 Seattle Municipal Building
600 Fourth Avenue
Seattle, Washington 98104

Attention: Mr. Jon Shimada
Mr. Ron Bard

Gentlemen:

We are submitting three copies of our "Report, Geotechnical Consultation and Construction Monitoring, Northwest 105th Street Storm Drain Rebuild, Seattle, Washington." The scope of our services was developed in discussions with Mr. Jon Shimada and Mr. Ron Bard of the City of Seattle Engineering Department and is described in our confirming agreement dated March 11, 1986. Our services are authorized as Supplement No. 3C to Agreement No. E82-18 between the Seattle Engineering Department and GeoEngineers, Inc. dated March 25, 1986.

We provided you with design criteria for auxiliary support of the drop structure in a letter dated February 3, 1986. In addition, we have transmitted to you copies of our daily field reports describing geotechnical aspects of the rebuild.

We appreciate the opportunity to provide these services for this interesting project. Please call if you have any questions regarding this report.

Yours very truly,

GeoEngineers, Inc.

Jack K. Tuttle
Principal

HRP:JKT:wd

File No. 129-25

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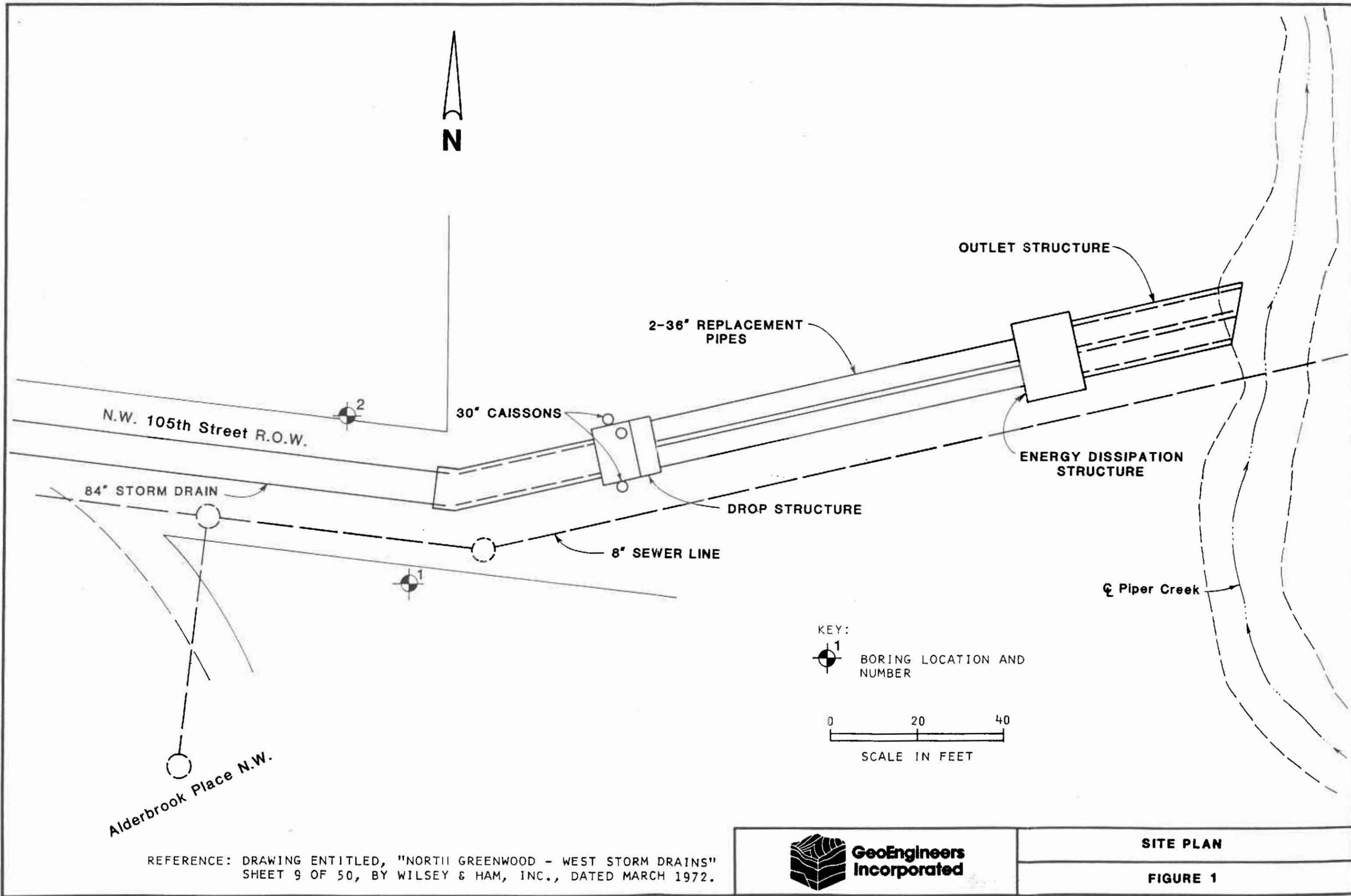
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REFERENCE: DRAWING ENTITLED, "NORTH GREENWOOD - WEST STORM DRAINS"
 SHEET 9 OF 50, BY WILSEY & HAM, INC., DATED MARCH 1972.



SITE PLAN
FIGURE 1

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50	INORGANIC	ML	SILT
			CL	CLAY
	SILT AND CLAY LIQUID LIMIT 50 OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
	HIGHLY ORGANIC SOILS			PT

NOTES:

- Field classification is based on visual examination of soil in general accordance with ASTM D2488-83.
- Soil classification using laboratory tests is based on ASTM D2487-83.
- Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

- Dry - Absence of moisture, dusty, dry to the touch
- Moist - Damp, but no visible water
- Wet - Visible free water or saturated, usually soil is obtained from below water table



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SOIL CLASSIFICATION SYSTEM

FIGURE A-1

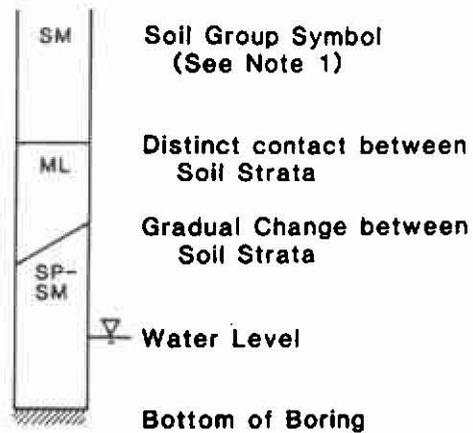
129-25 HRP:RS 2/2: 6

G. 5-85

LABORATORY TESTS:

- AL Atterberg limits
- CP Compaction
- CS Consolidation
- DS Direct shear
- GS Grain-size analysis
- HA Hydrometer analysis
- K Permeability
- M Moisture content
- MD Moisture and density
- SP Swelling pressure
- TX Triaxial compression
- UC Unconfined compression

SOIL GRAPH:



BLOW-COUNT/SAMPLE DATA:

Blows required to drive sampler 12 inches or other indicated distances using 300 pound hammer falling 30 inches.

"P" indicates sampler pushed with weight of hammer or hydraulics of drill rig.

- 22 ■ Location of relatively undisturbed sample
- 12 ☒ Location of disturbed sample
- P □ Location of sampling attempt with no recovery
- 10 ☑ Location of sample attempt using Standard Penetration Test procedures

NOTES:

1. Soil classification system is summarized in Figure A-1.
2. The reader must refer to the discussion in the report text as well as the exploration logs for a proper understanding of subsurface conditions.



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KEY TO BORING LOG SYMBOLS

FIGURE A-2

4/2/86

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BORING NO. 1

TEST DATA

DEPTH IN FEET	Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION
	Surface Elevation: 234 FEET						
0						GW	BLACK FINE TO COARSE GRAVEL (LOOSE, MOIST) (QUARRY SPALL FILL)
						SM	
					■	SM	BROWN SILTY FINE TO MEDIUM SAND WITH ROOTS (LOOSE, WET) (FORMER TOPSOIL)
5							LIGHT BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL (LOOSE TO MEDIUM DENSE, WET) (FILL)
10	MD	15.0%	116	21	■		
15						SM	LIGHT BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL (VERY DENSE, MOIST)
18	MD	9.7%	125	39	■		
22				50 5"	■		
26		11.3%		50 5"	■		
30				48	■	SP	LIGHT BROWN FINE TO MEDIUM SAND (VERY DENSE, MOIST)
35	MD	4.2%	104	88 11"	■		
40				90 10"	■		

Note: See Figure A-2 for Explanation of Symbols



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LOG OF BORING

FIGURE A-3

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**BORING NO. 1
(CONTINUED)**

DEPTH IN FEET	TEST DATA				Samples	Group Symbol	DESCRIPTION
	Lab Tests	Moisture Content	Dry Density	Blow-Count			
40						SP	
45				50 5 1/2"	■		
50	MD	9.4%	96	50 5 1/2"	■		
55	MD, DS	6.8%	98	50 6"	■		
60	MD	6.0%	102	88 11"	■		
65	MD, DS	6.0%	101	69	■		
70	MD	12.8%	95	26	■		
75	MD, DS	6.3%	99	75	■		
80	MD	23.6%	103	75 10"	■	SP- SM	DARK BROWN FINE SAND WITH SILT (VERY DENSE, WET)

Note: See Figure A-2 for Explanation of Symbols



LOG OF BORING

FIGURE A-4

**BORING NO. 1
(CONTINUED)**

TEST DATA

DEPTH IN FEET	TEST DATA				Samples	Group Symbol	DESCRIPTION
	Lab Tests	Moisture Content	Dry Density	Blow-Count			
80						SP-SM	GRAY FINE SAND WITH SILT (VERY DENSE, WET)
84	MD	21.2%	106	75 11"	■		
88						ML	GRAY CLAYEY SILT AND SANDY SILT (VERY HARD, WET)
90	MD, TX	36.0%	87	42	■		
94	MD, DS	19.6%	109	55	■		

BORING COMPLETED AT 94.0 FEET ON 2/7/86
 PIEZOMETER INSTALLED TO 92.0 FEET
 GROUND WATER LEVEL MEASURED AT 76.0 FEET ON 2/24/86

DEPTH IN FEET

Note: See Figure A-2 for Explanation of Symbols



LOG OF BORING

FIGURE A-5

129-25 JK1:HRP:RS 2/15/86

BORING NO. 2

TEST DATA

Lab Tests	Moisture Content	Dry Density	Blow-Count	Samples	Group Symbol	DESCRIPTION
Surface Elevation: 234 FEET						
					GW	BLACK FINE TO COARSE GRAVEL (LOOSE, MOIST) (QUARRY SPALL FILL)
					SM	
MD	15.5%	104	8	■	SM	BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL AND ROOTS (LOOSE, WET) (FORMER TOPSOIL)
						LIGHT BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL (LOOSE TO MEDIUM DENSE, MOIST TO WET) (FILL)
			18	■		
					SM	LIGHT BROWN SILTY FINE TO MEDIUM SAND WITH GRAVEL (VERY DENSE, MOIST)
MD	11.2	121	$\frac{50}{6''}$	■		
			84	■		
MD	9.3	114	$\frac{88}{11''}$	■		
			80	■		
					SP	LIGHT BROWN FINE TO MEDIUM SAND (VERY DENSE, MOIST)
MD	6.3	100	$\frac{50}{5''}$	■		
			$\frac{50}{6''}$	■		

Note: See Figure A-2 for Explanation of Symbols



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LOG OF BORING

FIGURE A-6

129-25 -DKT:DR:RS 2/13/86

**BORING NO. 2
(CONTINUED)**

TEST DATA

DEPTH IN FEET	TEST DATA			Blow-Count	Samples	Group Symbol	DESCRIPTION
	Lab Tests	Moisture Content	Dry Density				
40						SP	
44	MD	7.4%	96	50 5 1/2"	■		
49	MD, TX	5.4%	103	50 5"	■		
54	MD, DS	6.5%	100	50	■		
59				85 11"	■		
64	MD, DS	15.3%	100	59	■		
69				49	■		
74				14	□		
79	MD	18.8%	110	50	■		(BECOMES WET)
80							

Note: See Figure A-2 for Explanation of Symbols



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LOG OF BORING

FIGURE A-7

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**BORING NO. 2
(CONTINUED)**

DEPTH IN FEET	TEST DATA				Samples	Group Symbol	DESCRIPTION
	Lab Tests	Moisture Content	Dry Density	Blow-Count			
80						SM	LIGHT GRAY SILTY FINE SAND WITH LENSES OF SANDY SILT (VERY DENSE, WET)
	MD	22.3%	105	50 4"	■		
85						ML	
	MD	36.1%	87	50 6"	■		GRAY CLAYEY SILT AND SANDY SILT (VERY HARD, WET)
90							
	MD	29.6%	95	81	■		
95							

BORING COMPLETED AT 94.0 FEET ON 2/10/86
 PIEZOMETER INSTALLED AT 93.0 FEET
 GROUND WATER LEVEL MEASURED AT 77.2 FEET ON 2/24/86

Note: See Figure A-2 for Explanation of Symbols



LOG OF BORING

FIGURE A-8

120-25 JKT:JRP:RS 2/13/86



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DIRECT SHEAR TEST DATA

<u>BORING NUMBER</u>	<u>SAMPLE ELEVATION</u>	<u>SAMPLE DESCRIPTION</u>	<u>MOISTURE CONTENT (%)</u>	<u>DRY DENSITY (PCF)</u>	<u>CONFINING PRESSURE (PSF)</u>	<u>PEAK STRENGTH (PSF)</u>
1	181 FT.	FINE SAND (SP)	6.8	98	6000	3900
1	171 FT.	FINE SAND (SP)	6.0	101	7000	5100
1	161 FT.	FINE SAND (SP)	6.3	99	8000	6300
1	141 FT.	SILT (ML)	19.6	109	7000	6000
			21.7	108	9000	6400
2	181 FT.	FINE SAND (SP)	6.5	100	6000	4400
2	171 FT.	FINE SAND (SP)	15.3	100	7000	5300

DIRECT SHEAR TEST DATA

FIGURE A-9



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TRIAXIAL COMPRESSION TEST DATA

<u>BORING NUMBER</u>	<u>SAMPLE ELEVATION</u>	<u>SAMPLE DESCRIPTION</u>	<u>MOISTURE CONTENT (%)</u>	<u>DRY DENSITY (PCF)</u>	<u>CONFINING PRESSURE (PSF)</u>	<u>PEAK DEVIATOR STRESS (PSF)</u>
1	146 FT.	CLAYEY SILT (ML)	36.0	87	7920	10,600
1	186 FT.	FINE SAND (SP)	5.4	103	5540	18,070

TRIAXIAL COMPRESSION TEST DATA

FIGURE A-10