URS Greiner Woodward Clyde
A Division of URS Corporation

500 12th Street, Suite 280
Oakland, CA 94607-4014
Tel: 510.893.3600
Fax: 510.874.3268
Offices Worldwide

October 12, 1999
Project No. 51-951273NB.00

Mr. Mike Kincaid, P.E.
Winzler & Kelly Consulting Engineers
200 Pine Street, Suite 600
San Francisco, California 94104

Subject: **Geotechnical Data Report**
Concrete Arch Culvert Relining and CMP Replacement
Glen Echo Creek Project
Oakland, California

Dear Mr. Kincaid:

Enclosed are two draft copies of our Geotechnical Data Report for the Concrete Arch Culvert Relining and CMP Replacement portion of the Glen Echo Creek Drainage Improvement Project in Oakland, California. Upon receipt of your comments, we will issue a final version of this report.

Should you have any questions, please call Jeff Fippin at (510) 874-3066 or Mark Freitas at (510) 874-1748.

Sincerely yours,
URS Greiner Woodward Clyde

Jeff Fippin
Senior Staff Engineer

Mark Freitas
Associate

Attachments

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ENVIRONMENTAL WORKPLAN OUTLINE
GLENN ECHO CREEK PROJECT
URS 1/16/00

The Glenn Echo Creek Project will involve removal of portions of a concrete box culvert an underlying soil in order to lower the grade and replace portions of the culvert for Glenn Echo Creek. This work will involve excavation of some volume of oily soil found beneath the existing concrete and removal of oily water from the excavation. The outline of the actions to handle and dispose of the soil and water described below:

1. Develop a Work Plan for Soil and Water Handling for Regulatory Review

2. Work Plan for Handling of Excavated Soil

   A-Develop Health and Safety Plan for Construction Workers

   B- Excavate and separate soil into:1) Contaminated Soil Stockpile and, 2) Uncontaminated Soil Stockpile. Field techniques may include: visible stains, oily odor and sheen, detectable vapors using Organic Vapor Analyzer. Soil will be placed on plastic sheeting, and will be covered with plastic sheeting for dust control.

   2B.1-Contaminated Stockpile Sampling

   The contaminated soil stockpile will be sampled in accordance with the requirements of the Class II Landfill selected for disposal. Anticipate four point composite samples for a selected volume of soil (each 100 yards)

   2B.2- Uncontaminated Soil Sampling

   The uncontaminated soil stockpile will also be sampled in accordance with the requirements of the Class III Landfill selected for disposal. A similar four point composite sample for a selected volume of soil is anticipated, based upon the landfill requirements.

3. Work Plan for Handling Removed Water from Excavation
   (Note: Glenn Echo Creek flow will be diverted around the construction area)
   A- Obtain Permit for disposal of removed water to the Sanitary Sewer
   B- Anticipate less than 50,000 gallons of water to be removed for disposal

   3B.1-Perform Pre-Treatment of water as required by Permit

   Install Pre-Treatment system as required (possible activated carbon system), and sample as required by permit for discharge to the sanitary sewer. Submit test results to Sanitary District on the required frequency during operations.

3B.2- Perform sampling of Treatment system equipment for shutdown.

Rinse and sample rinsate from treatment tanks as required for removal from site.

4. Reporting

A- Soil Excavation and Disposal

Prepare a report documenting the volume of soil excavation, and the disposal of the excavated soil. Report will contain a discussion of the laboratory tests and the characterization of the disposed soil. It will contain documentation of the cleanup of the stockpile area, and will contain laboratory reports, manifests, and supporting information.

B- Water Removal and Disposal

As required by the Permit progress reports will be prepared documenting that the disposed water meets the disposal permit requirements. At the conclusion of disposal of water a report will be prepared documenting the volume of water disposed, the laboratory analyses of the disposed water, and the shut down and removal of the treatment system, and treatment materials.

Albert Ridley
01/09/2001 10:37 AM

To: Mary Esper/Oakland/URSCorp@URSCORP
cc: David Young/Oakland/URSCorp@URSCORP
Subject: Glenn Echo Creek

Mary:

Today I spoke with Ariu Levi at Alameda County Health Care Services. 510 567-6862

He said that we still need a transfer letter from Oakland so he can start this review process. Leroy Griffith has a new job as Fire Chief, and now we need to talk to Jernan Gomez at the City- 510-238-7253 fax 238-7761. Jernan will make a decision to send the case to the County and will prepare a memo to the County.

Ariu said that the County will need an agreement with the client to be paid for their hourly services. He said that he can assign a case worker next week if he gets the letter from the City. He will assign this to Eva Chu -County Caseworker.
His e mail address is alevi@co.alameda.ca.us and Eva is at echu@co.alameda.ca.us

Al

17th & MLK
12 30 pm.

October 12, 1999
Project No. 51-951273NB.00

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GEOTECHNICAL DATA REPORT

CONCRETE ARCH CULVERT RELINING
AND CMP REPLACEMENT
GLEN ECHO CREEK
DRAINAGE IMPROVEMENT PROJECT
OAKLAND, CALIFORNIA

PROJECT NO.: 51-951273NB.00

PREPARED FOR: WINZLER & KELLY

Prepared by ***URS Greiner Woodward Clyde*** October 11, 1999

GEOTECHNICAL DATA REPORT

CONCRETE ARCH CULVERT RELINING
AND CMP REPLACEMENT
GLEN ECHO CREEK
DRAINAGE IMPROVEMENT PROJECT
OAKLAND, CALIFORNIA

PROJECT NO.: 51-951273NB.00

PREPARED FOR: WINZLER & KELLY

Prepared by ***URS Greiner Woodward Clyde*** October 11, 1999

INTRODUCTION AND SCOPE OF WORK

This report presents the results of URS Greiner Woodward Clyde's (URSGWC) geotechnical investigations and describes the expected conditions along the underground portion of Glen Echo Creek in Oakland, California. The purpose of this study was to explore the subsurface conditions at the site and describe the subsurface conditions encountered. The descriptions of the subsurface and existing culvert conditions presented in this report are based on information presented in previous reports as well as recently completed field work.

Reports reviewed in compiling this data report include:

- "Materials Testing and Evaluation: Glen Echo Creek Culvert, 29th Avenue, Oakland," Testing Engineers, Inc., August 6, 1996.
- "Technical Memorandum: Glen Echo Creek Tunnel, Alameda County, California," Woodward-Clyde Consultants, August 1996.
- "Geotechnical Engineering Study, Bridge and Flood Walls, Glen Echo Creek Drainage Improvement Project, Oakland, California," Woodward-Clyde International Americas, July, 1998.

This study was performed in accordance with the scope of work outlined in the September 17, 1997 addendum to the original contract between Woodward-Clyde International Americas (WC), a predecessor firm of URSGWC, and Winzler and Kelly Consulting Engineers (WK) dated May 17, 1996.

PROJECT DESCRIPTION

Glen Echo Creek flows through the city of Oakland, generally parallel to Broadway, and into Lake Merritt and consists of a series of closed conduits interspersed with sections of open channel. The channel hydraulics were studied by WK in 1996, and the results indicated the 25-year and 100-year storm events would cause short term, but wide flooding along the creek between Lake Merritt and Frisbee Street. In order to reduce flooding, it was decided to perform several improvements on the creek system.

Near 29th Street, the creek enters an arch culvert and flows underground in a series of culverts, pipes and short stretches of open channel for approximately 2700 feet until emptying into Lake Merritt. The culvert beneath 29th Street is approximately 300 feet long, and 8.3-feet high by 7-feet wide. In June 1996, WC performed an evaluation of the culvert. The results indicated that the culvert appears to be unreinforced concrete and laboratory and field testing showed the concrete to have relatively low strength (i.e. as low as 710 psi). In order to decrease the risk of damage to the overlying structures caused by a potential structural failure, the culvert is to be relined with shotcrete as a part of this work.

Immediately downstream of the arch culvert, the creek is contained in a 100 foot long section of 80-inch diameter corrugated metal pipe (CMP) that ends under a cul-de-sac on 28th Street. Based on visual inspection and probes drilled through the CMP walls, the CMP appears to be encased in concrete. It is planned to excavate and remove the 80-inch CMP and replace it with a cast-in-place 6 foot by 12 foot reinforced concrete culvert. Because of the existence of a protected tree directly over the alignment of the CMP, the replacement operation will require tunneling.

FIELD EXPLORATION AND LABORATORY TESTS

Two exploratory borings were drilled in July of 1999 (borings MM-1 and MM-2) to examine the subsurface conditions along the arch culvert and CMP. Additionally, 3 borings (Borings 1, 2, and 3) from our 1998 study and report provide pertinent data for the project. The approximate locations of all of the borings are shown in the Boring Location Map, Figure 1. Boring MM-1 was drilled to the uphill side of the protected tree near the carport on 28th Street. Boring MM-2 was drilled along the alignment of the creek, near the existing transition from the arch culvert to the CMP. Boring 1 was drilled on 29th Street near where the arch culvert crosses the street. Boring 2 was drilled in the carport located at the cul-de-sac on 28th Street, near the downstream terminus of the 80-inch diameter CMP. Boring 3 was drilled in a church parking lot, at the top of the slope approximately 30 feet left and 20 feet above the crown of the 80-inch CMP centerline.

Borings MM-1 and MM-2 were drilled July 29 and 30, 1999. The previous borings were drilled in May of 1998. All the exploratory borings were drilled under the supervision of Mr. Jeff Fippin, a Civil Engineer with our firm who logged the soils encountered in the

borings. Borings MM-1 and MM-2 were drilled using a solid flight auger and a minute-man drill rig. Borings 1 through 3 were drilled using rotary wash drilling techniques. All of the borings were approximately 40 feet deep, with the exception of Boring 3 which was drilled to a depth of approximately 70 feet. Two open standpipe piezometers were installed in Borings 1 and 2 to evaluate the groundwater levels. The depth of the screened interval in the piezometers is shown in the boring logs in Appendix B.

Samples of the soil were recovered from the borings and transported to our Pleasant Hill laboratory for further inspection and testing. Logs of the exploratory borings were prepared based on soil classifications made in the field and on laboratory test results. Results of the laboratory tests are presented at the corresponding sample locations in the boring logs (see Appendix A and B). A more detailed discussion of the field exploration and laboratory testing program is presented in the Appendices of this report.

The condition of the concrete lining of the arch culvert was examined by Testing Engineers, Inc. (TEI) in 1996. TEI removed eight 3-inch nominal diameter cores from the culvert lining. The cores were removed using a water cooled diamond bit core drill. Compressive strength testing was performed by TEI in accordance with ASTM C42 (dry). TEI also drilled twenty four 3/4-inch diameter diameter probe holes through the culvert walls to determine the thickness of the concrete. Eight additional probe holes were drilled inside the CMP. The probe holes were advanced using a HILTI TE 54 hammer drill with a 32" long drill bit. TEI also measured the height and width of the culvert at each station where a probe hole was drilled. A copy of TEI's report is enclosed as Appendix C.

SITE AND SUBSURFACE CONDITIONS

The soils encountered in the borings were typically composed of a variable thickness of fill overlying native, silty/clayey sands. The fill encountered was typically loose to medium dense silty and clayey sands. At Boring 1, however, the fill encountered was a stiff silty clay. At Boring 3, about 7 feet of clayey gravels were encountered in the fill beginning at approximately 4 feet above the top of the tunnel. Sandy gravels were encountered in Boring

2 beginning around the same depth as the CMP invert. Figure 2 shows a profile along the centerline of the creek. Figure 3 shows a section cut perpendicular to the creek.

The piezometers installed in Borings 1 and 2 indicated groundwater levels at Elevations 6 and 12.5, respectively, based on July 22, 1998 readings. Groundwater was encountered during drilling at Elevations 9 and 10.5 in borings MM-1 and MM-2, respectively. Bedrock was not encountered within the depth drilled in any of the borings.

CULVERT AND CMP CONDITIONS

The cores removed from the arch culvert had compressive strengths between 710 psi and 2,550 psi with an average value of approximately 1,275 psi as reported by TEI. Table 2 in Appendix C presents the results of the probing of the culvert and CMP walls performed by TEI. The probe results showed an average thickness of concrete of 20.4 inches on the East Wall and 21.4 inches on the West Wall. The average thickness of the concrete on the crown was determined to be 14 inches, and the invert had an average thickness 9.1 inches. The section measurements performed by TEI (Appendix C Table 3) show the average width of the culvert to be 7 foot 2 inches with an average height of 8 feet nine inches.

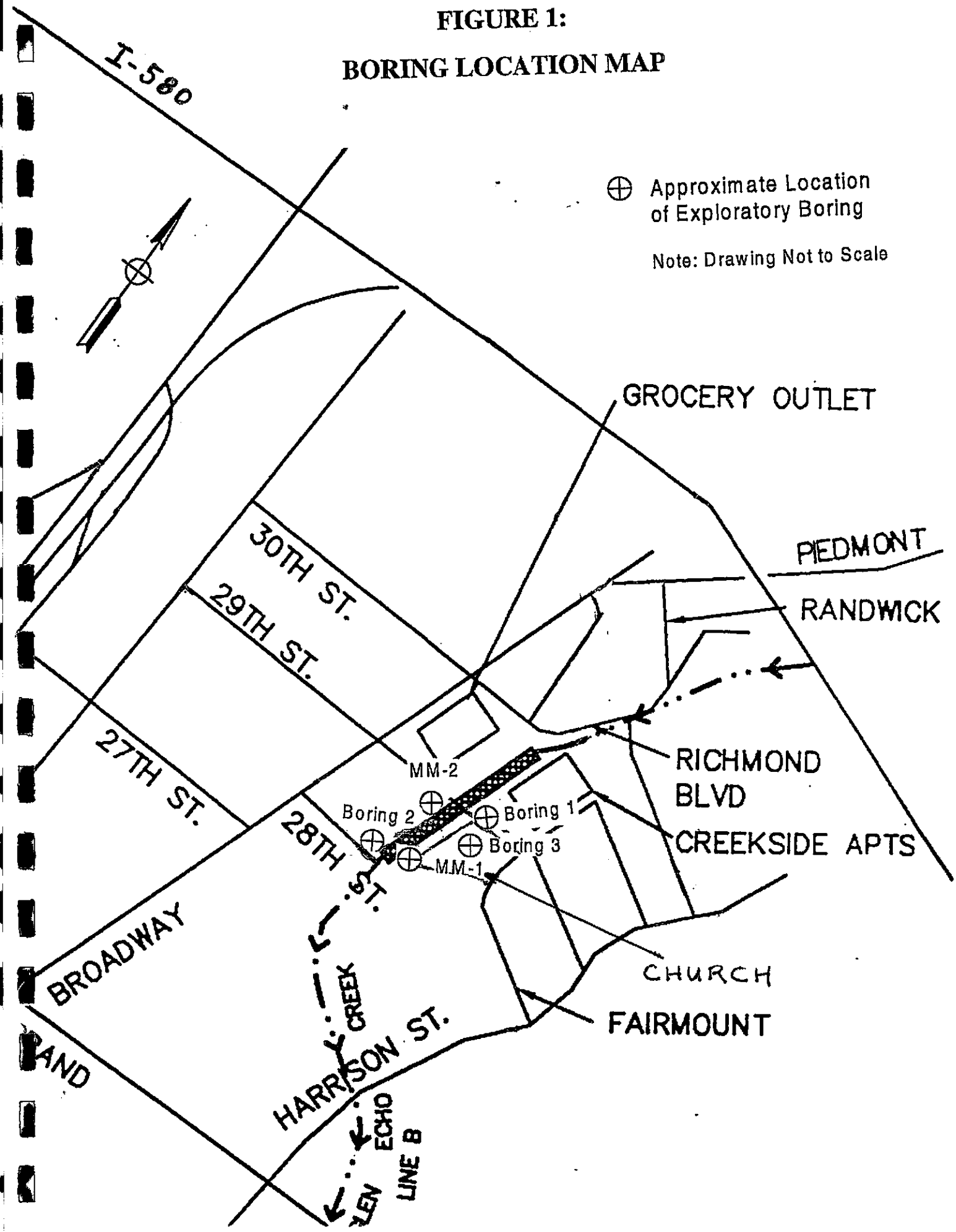
Visual inspection of the CMP revealed visible concrete in sections of the CMP where the metal lining had worn away. The Probing of the walls showed the thickness of concrete outside the CMP to vary from a minimum of 10 inches to greater than 32 inches. Probing was performed at two stations within the CMP. The results are presented in Appendix C, Table 2. The results of this testing lead to the conclusion that the thickness of concrete outside the CMP varies greatly.

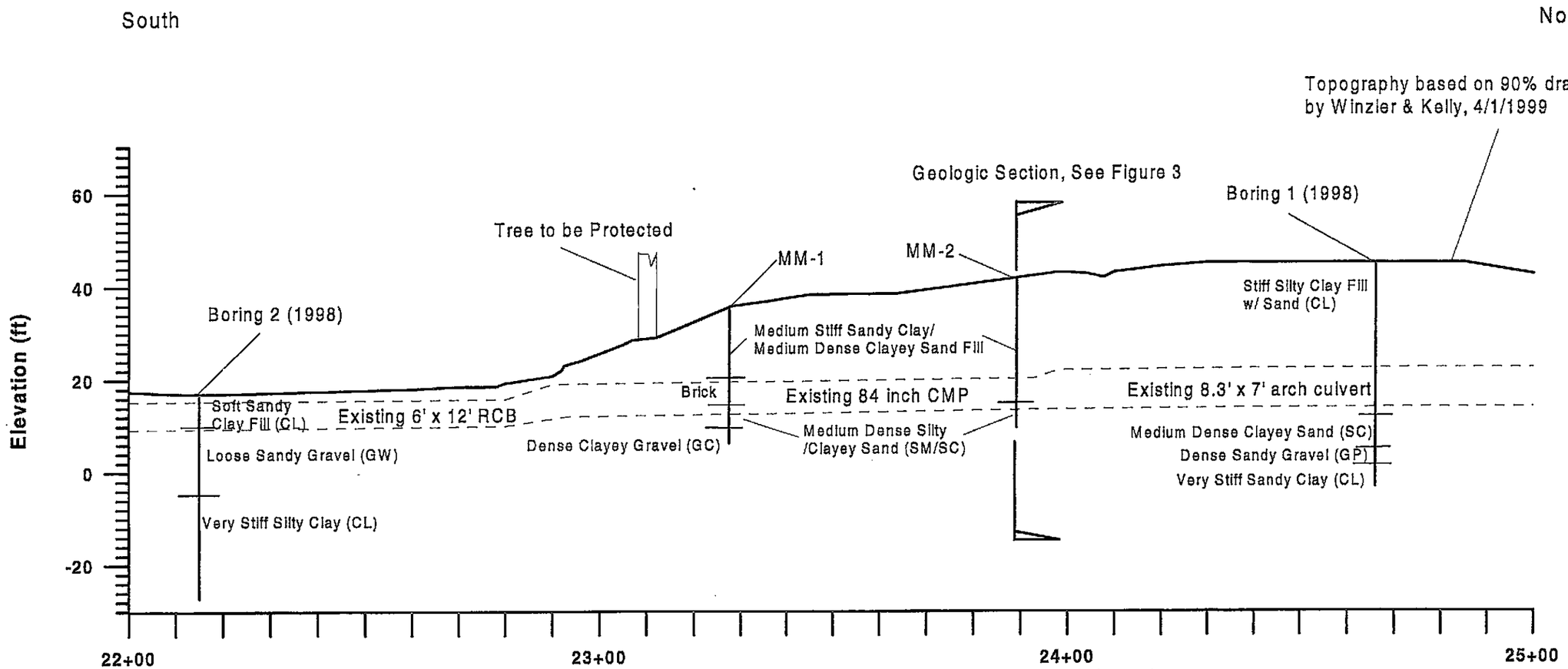
LIMITATIONS

The discussion of the conditions along the project length are based on five borings as well as tunnel investigations performed by TEI. It is assumed that the soil conditions do not deviate appreciably from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, the geotechnical engineer should be consulted for recommendations.

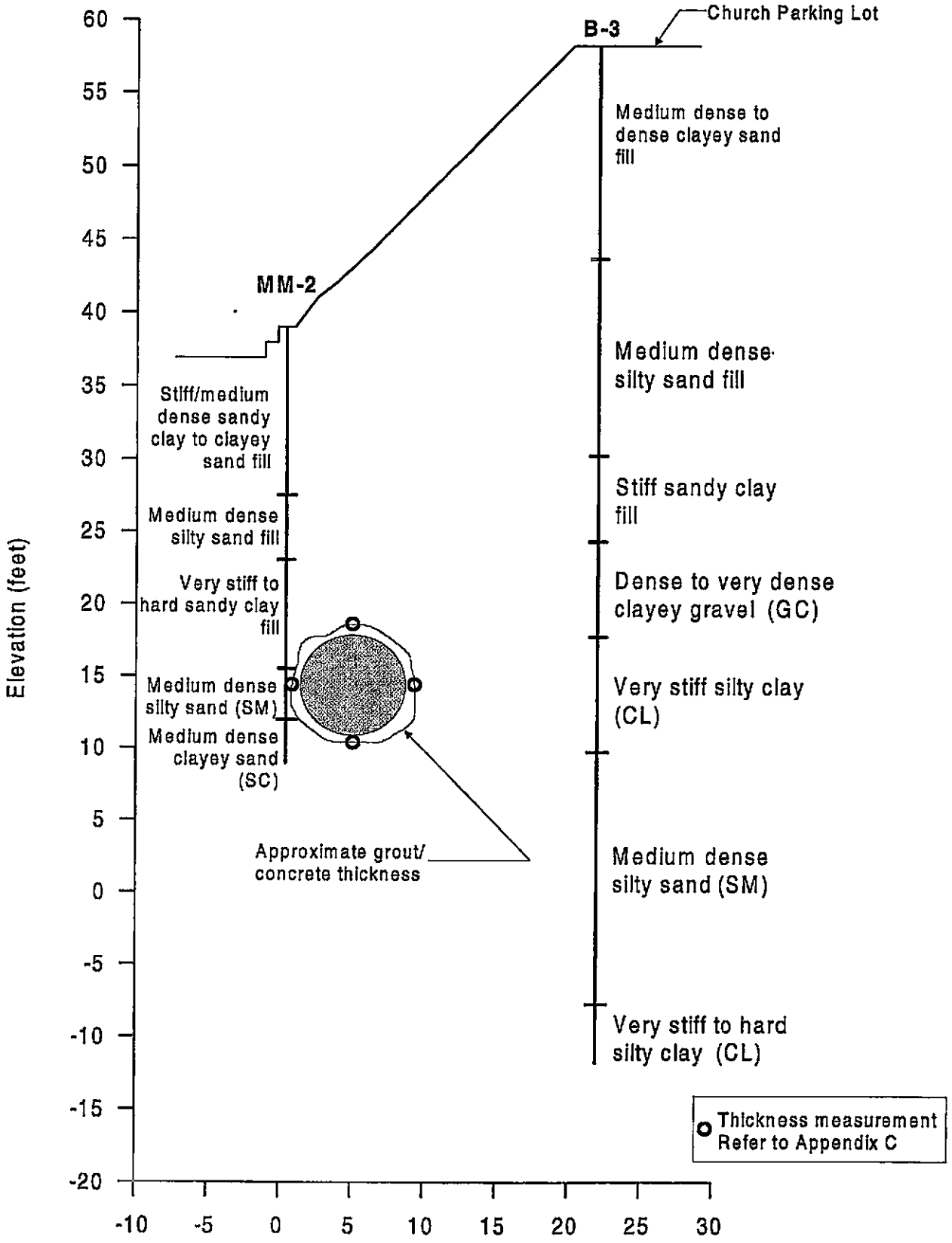
FIGURE 1:

BORING LOCATION MAP





Project No. 51-951273NB.00	Glen Echo Creek Concrete Arch Culvert Relining and CMP Replacement	**Profile View Along Centerline of Creek Showing Approximate Locations of Borings**	Figure 2
	URS Greiner Woodward Clyde		



Project No. 51-951273NB.00	Glen Echo Creek Concrete Arch Culvert Relining and CMP Replacement	Geologic Section	Figure 3
URS Greiner Woodward Clyde			

APPENDIX A

FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

FIELD EXPLORATION

For this phase of work, two exploratory borings were drilled along the alignment of the existing buried corrugated metal pipe (CMP) at the approximate loacations shown on the Site and Boring Location Plan, Figure 1. Boring MM-1 was drilled uphill of the carport at the end of 28th Street, while boring MM-2 was drilled near the existing transition between the CMP and the buried concrete arch culvert. Boring MM-1 was drilled to a depth of approximately 29 feet, while boring MM-2 was drilled to approximately 32 feet deep.

Drilling was performed on July 29 and 30, 1999 by Access Drilling. The borings were drilled using soild flight augers and a minuteman drill rig. The drilling operations were supervised by Mr. Jeff Fippin of WC who also logged the soils encountered during drilling.

Samples of soil encountered in the borings were obtained using a 2-inch diameter modified California drive sampler with thin brass liners. The sampler was driven 18 inches into the material at the bottom of the hole with a 140-pound hammer falling 30 inches. The hammer was supported over the borehole using a tripod. Blow counts for the last 12 inches of driving were recorded for each sample taken, and are shown on the boring logs. The brass liners containing the sample were removed from the sampler, sealed to preserve the natural moisture content of the sample, and delivered to our laboratory in Pleasant Hill, California.

The materials encountered in the borings were logged and classified according to the Unified Soil Classification System. No suspicious sample odors or discoloration which may indicate the presence of contaminants were observed during drilling.

LABORATORY TESTING PROGRAM

A laboratory testing program was performed on selected representative soil samples recovered from the borings. The following tests were performed at WC's laboratory in Pleasant Hill.

Moisture Content and Unit Weight

Moisture content and dry density determinations were made on selected samples recovered from the borings. These tests were conducted in accordance with ASTM D-2216 and D-2937. Results of the individual tests are presented in the boring logs at the respective locations of the samples.

Unconfined Compressive Strength

Unconfined compressive strength determinations were made on selected samples. The compressive strength tests were performed in accordance with ASTM D-2166. The results of these tests are presented in the boring logs along with moisture content and dry density for each sample tested.

Particle Size Analysis

Particle size sieve analyses were performed on representative samples in order to determine their particle size distributions. The tests were performed in accordance with ASTM C-422.

Proje .) Creek
Project Loca... ... kland, California
Project Number: 51-951273NB.00

Key to Log of Boring

Sheet 1 of 1

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level (MSL) or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Sampling Resistance:** Number of blows required to advance driven sampler 12 inches beyond first 6-inch interval, or distance noted, using a 140-lb hammer with a 30-inch drop.

6 **Recovery:** Percentage of driven sample length recovered; "NA" indicates data not recorded.

7 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

8 **Material Description:** Description of material encountered; may include color, moisture, grain size, and density/consistency.

9 **Water Content:** Water content of soil sample measured in laboratory, expressed as percentage of dry weight of specimen.

10 **Dry Unit Weight:** Dry density of soil sample measured in laboratory, expressed in pounds per cubic feet (pcf).

11 **Unconfined Compressive Strength:** Unconfined compressive strength of soil sample measured in laboratory, expressed in psf.

12 **Remarks and Other Tests:** Comments and observations regarding drilling or sampling made by driller or field personnel. Other field and laboratory test results, using the following abbreviations:

CONS	One-dimensional consolidation test
LL	Liquid limit (Atterberg Limits test), percent
PI	Plasticity index (Atterberg Limits test), percent

TYPICAL MATERIAL GRAPHIC SYMBOLS

SAND (SP/SW)
Silty SAND
Clayey SAND
CLAY (CL)
Silty CLAY (CL)
SILT (ML)
CLAY (CH)
Silty CLAY (CH)
SILT (MH)
GRAVEL (GP/GW)
Brick
Topsoil

TYPICAL SAMPLER GRAPHIC SYMBOLS

Modified California (2.5-inch OD)
Standard Penetration Test (SPT)
Shelby Tube
California (3-inch OD)
Pitcher Tube
Rock Core Barrel

OTHER GRAPHIC SYMBOLS

First water encountered at time of drilling and sampling (ATD)
Static water level measured in boring at specified time after drilling
Change in material properties within a lithologic stratum
Inferred contact between strata or gradational change in lithology

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 51-951273NB.00

Log of Boring MM-1

Sheet 1 of 1

Date(s) Drilled	7/29/99	Logged By	J. Fippin	Checked By	M. Freitas
Drilling Method	Solid Flight Auger	Drill Bit Size/Type	3-1/2-inch auger bit	Total Depth of Borehole	29.0 feet
Drill Rig Type	Minuteman	Drilling Contractor	Access Drilling	Approximate Surface Elevation	~~Not available~~ 30
Groundwater Level and Date Measured	Approx. 26 feet ATD	Sampling Method(s)	Modified California	Hammer Data	Safety hammer, 140 lbs, 30-inch drop
Borehole Backfill	Drill cuttings	Location	Uphill of tree near carport on 28th Street; refer to site plan		

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						6 inches of topsoil (removed to make drill pad)				
			1-1	18	100		SILTY SAND (SM) [Fill] Medium dense, slightly moist, light brown mottled with dark brown, fine-grained, with decomposed brick, abundant roots, organic odor				
			1-2	19	100						
	5							6.2	103	2035	24%<#200 sieve
			1-3	20	100		CLAYEY SAND to SANDY CLAY (SC/CL) [Fill] Medium dense / very stiff, dry, dark brown, fine-grained sand, some brick fragments				
								10.0	92	755	
	10		1-4	12	100						
								9.1	95		
			1-5	11	100		CLAYEY SAND (SC) [Fill] Medium dense, moist, light brown and dark brown, with weathered siltstone and sandstone fragments				23%<#200 sieve
	15										Approximate crown of new tunnel
20			1-6	50/2.5"	10		Brick; intact and hard; difficult drilling				
			1-7	34	50		CLAYEY SAND (SC) Medium dense, moist, gray mottled with light brown, fine-grained, some roots				
	20		1-8	11	100						
								23.5	99	1130	26%<#200 sieve
10	25						▽				
a							CLAYEY GRAVEL (GC) Dense to very dense, wet, gray and brown, gravel to 1 inch, with coarse-grained sand				Approximate invert of new tunnel
			1-9	64	90						17%<#200 sieve
	30						Bottom of boring at 29.0 feet				
	35										

Report: GEO_10B1_OAK; File: GLENECHO.GPJ; 8/24/99

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Figure A-2

Project: Glen Echo Creek Project Location: Oakland, California Project Number: 51-951273NB.00	Log of Boring MM-2 Sheet 1 of 1

Date(s) Drilled	7/30/99	Logged By	J. Fippin	Checked By	M. Freitas
Drilling Method	Solid Flight Auger	Drill Bit Size/Type	3-1/2-inch auger bit	Total Depth of Borehole	32.0 feet
Drill Rig Type	Minuteman	Drilling Contractor	Access Drilling	Approximate Surface Elevation	~~Not available~~ 42
Groundwater Level and Date Measured	Approx. 31.5 feet ATD	Sampling Method(s)	Modified California, SPT	Hammer Data	Safety hammer, 140 lbs, 30-inch drop
Borehole Backfill	Drill cuttings	Location	Refer to site plan		

Elevation feet	Depth, feet	SAMPLES Type	Number	Sampling Resistance, blows / foot	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	REMARKS AND OTHER TESTS
	0						6 inches of topsoil (removed to make drill pad)				
			2-1	18	80		SANDY CLAY to CLAYEY SAND (CL/SC) [Fill] Stiff / medium dense, dry, light brown, with weathered claystone and sandstone fragments, roots, organic odor				
			2-2	23	90		Abundant highly weathered sandstone cobbles				
	5		2-3	37	100		Becomes hard / dense	7.5	114		Highly weathered sandstone in sampler.
	10		2-4	49	100						
			2-5	18	100		SILTY SAND (SM) [Fill] Medium dense, moist, dark brown, fine-grained, organic odor	9.4	108	3150	40%<#200 sieve
	15		2-6	21	100		SANDY CLAY (CL) [Fill] Very stiff to hard, moist, dark brown, with weathered rock and concrete fragments				Approximate crown of new tunnel
			2-7	28	90						
	20		2-8	23	100		Becomes mottled with gray, red, and light brown	13.3	117	13030	60%<#200 sieve
								12.4	115	7905	
			2-9	11	60		SILTY SAND (SM) Medium dense, moist, light brown mottled with red, fine-grained				Difficult drilling; possible concrete piece at bottom of fill. 14%<#200 sieve
	25		2-10	12	100		CLAYEY SAND (SC) Medium dense, moist, red-brown mottled with gray and brown				43%<#200 sieve Approximate invert of new tunnel
	30		2-11	17	100		Becomes wet ▽	17.9	113	1585	
							Bottom of boring at 32.0 feet				
	35										

Report: GEO_1081_OAK; File: GLENECHO.GPJ; 8/24/99

URS Greiner Woodward Clyde

Figure A-3

APPENDIX B

FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

FIELD EXPLORATION

Five exploratory borings were drilled at the proposed Glen Echo Creek drainage improvement project site at the approximate locations shown in the Site and Boring Location Plan, Figure 1. Boring 1 was drilled on 29th street, adjacent to the line of the concrete arch culvert. Boring 2 was drilled in the carport at the end of 28th Street, adjacent to the 80-inch CMP. Boring 3 was drilled in the northwestern corner of the parking lot of the First Christian Church of Oakland, at the top of the slope above the 80-inch CMP. Borings 4 and 5 were drilled on the north and south sides, respectively, of the existing bridges crossing Glen Echo Creek at 30th Street and Richmond Boulevard. Boring 3 was drilled to a depth of approximately 70 feet, while all the other borings were drilled to approximately 40 feet deep.

Drilling was performed between May 18 and May 22, 1990 by Pitcher Drilling Company of Palo Alto. The borings were drilled using rotary wash method by a Failing 1500 drill rig. The drilling operations were supervised by Mr. Jeff Fippin of WC who also logged the soils encountered during drilling.

Samples of soil encountered in the borings were obtained using a 2-inch diameter modified California drive sampler with thin brass liners. The sampler was driven 18 inches into the material at the bottom of the hole with a 140-pound hammer falling 30 inches. Blow counts for the last 12 inches of driving were recorded for each sample taken, and are shown on the boring logs. The brass liners containing the sample were removed from the

sampler, sealed to preserve the natural moisture content of the sample, and delivered to our laboratory in Pleasant Hill, California.

Piezometers were installed in Borings 1 and 2. Each piezometer consists of 2-inch I.D., Schedule 40 PVC pipe with a 20-foot long perforated section. The boring holes were backfilled with No. 3 sand to above the top of the screened section, approximately two feet of bentonite pellets, and neat cement grout up to about the ground surface. All the other borings were filled with neat cement grout and topped off with approximately 4 inches of cold patch asphalt.

The materials encountered in the borings were logged and classified according to the Unified Soil Classification System. No suspicious sample odors or discoloration which may indicate the presence of contaminants were observed during drilling.

LABORATORY TESTING PROGRAM

A laboratory testing program was performed on selected representative soil samples recovered from the borings. The following tests were performed at WC's laboratory in Pleasant Hill.

Moisture Content and Unit Weight

Moisture content and dry density determinations were made on selected samples recovered from the borings. These tests were conducted in accordance with ASTM D-2216 and D-2937. Results of the individual tests are presented in the boring logs at the respective locations of the samples.

Unconfined Compressive Strength

Unconfined compressive strength determinations were made on selected samples. The compressive strength tests were performed in accordance with ASTM D-2166. The results of these tests are presented in the boring logs along with moisture content and dry density for each sample tested.

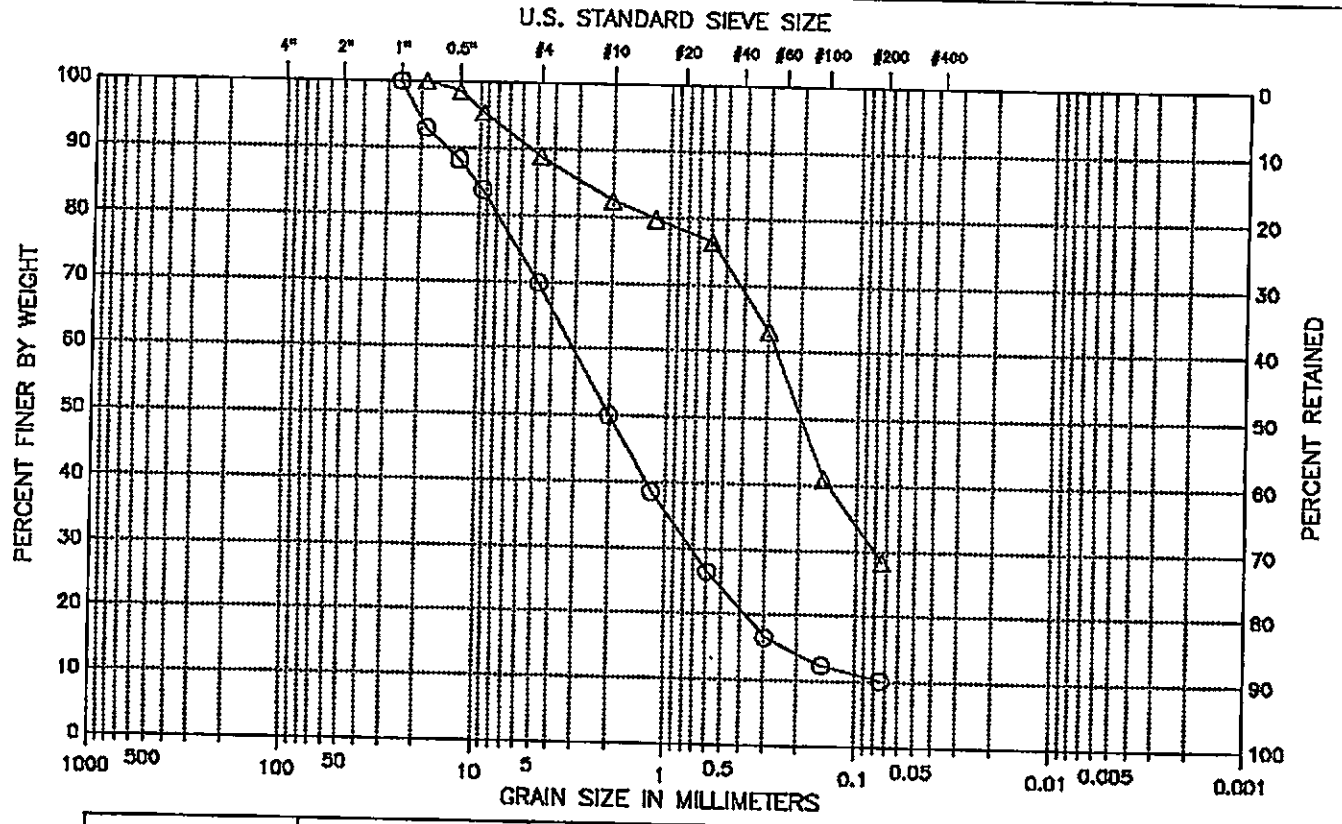
Particle Size Analysis

Particle size sieve analyses were performed on representative samples in order to determine their particle size distributions. The tests were performed in accordance with ASTM C-422. The results of the sieve analyses are presented in Figures B-1 and B-2.

Atterberg Limits

Atterberg limit tests (liquid and plastic limits) were performed on a sample from Boring 1. The liquid limit (LL) and plastic limit (PL) tests were performed in accordance with ASTM D-4318. The plasticity index (PI) of the sample was determined from the equation PI = LL-PL. The results of the Atterberg limit test are presented at the corresponding sample location on the boring logs and in Figure B-3.

Project : GLEN ECHO CREEK
Project No.: 951273NB-3100
Location: OAKLAND, CA
Date : Tue Jun 16 1998

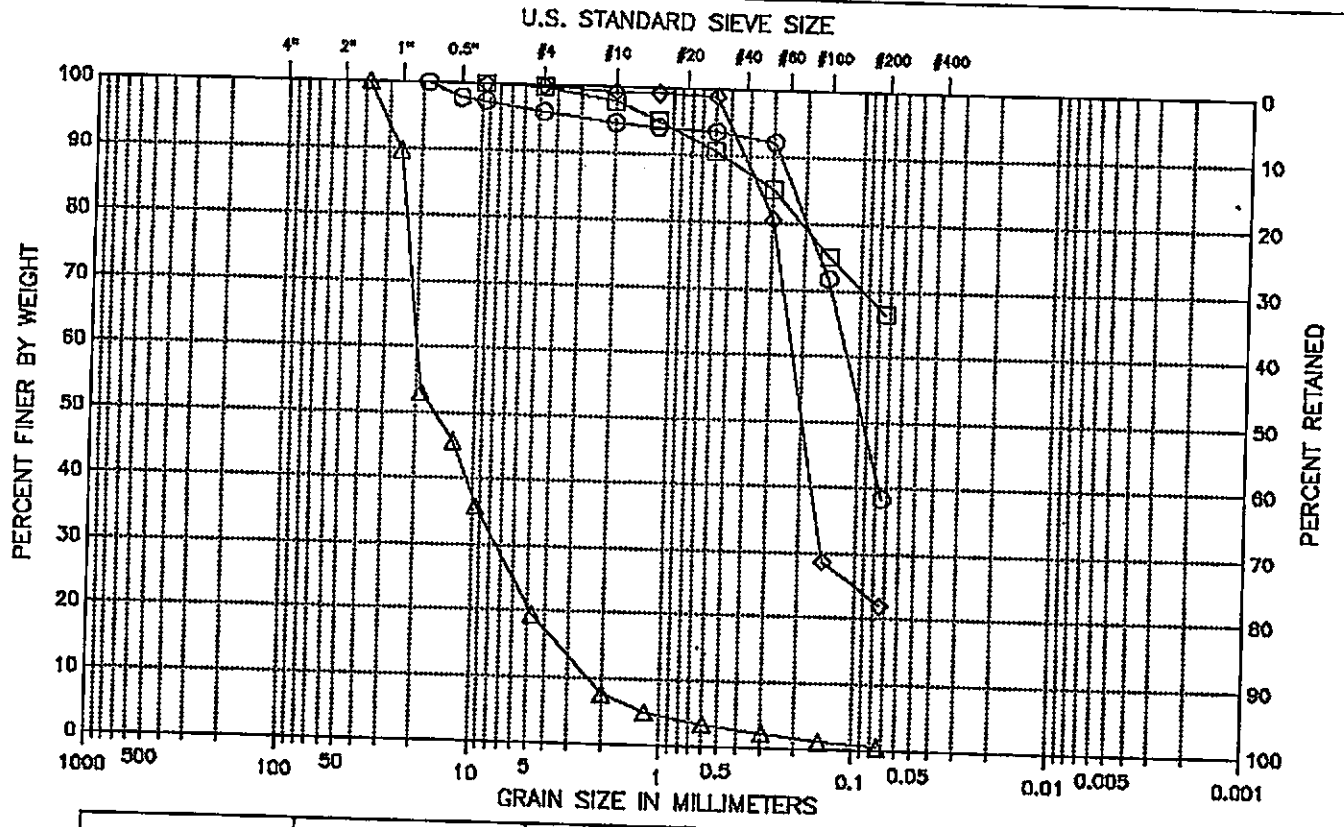


Symbol	Boring No.	Sample No.	Depth	Filename	Classification	Description
⊖	4-3	4	15 feet	4-3-4	SW-SM	Well-graded sand with silt and gravel
△	5-3	4	15 feet	5-3-4	SM	Silty sand

Figure B-1

Woodward-Clyde

Project : GLEN ECHO CREEK
Project No.: 951273NB-3100
Location: OAKLAND, CA
Date : Tue Jun 16 1998



Symbol	Boring No.	Sample No.	Depth	Filename	Classification / Description
◇	1-6	4	30 feet	1-6-4	Reddish gray brown clayey silty sand
△	2-2	4	10 feet	2-2-4	GW Well-graded gravel with sand
⊞	3-5	4	25 feet	3-05-4	orange brown sandy silty clay
◈	3-10	4	50 feet	3-10-4	SM Silty sand

Figure B-2

Woodward-Clyde

ATTERBERG LIMITS

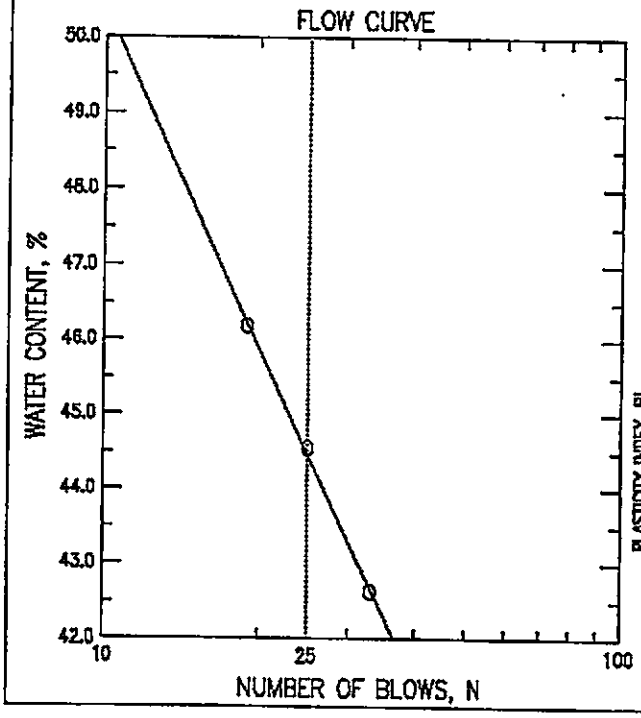
PROJECT	PROJECT NUMBER	TESTED BY	BORING NUMBER
GLEN ECHO CREEK	951273NB-3100	C. WASON	1-3
LOCATION		CHECKED BY	SAMPLE NUMBER
OAKLAND, CA		C. CAPPS	4
SAMPLE DESCRIPTION		DATE	FILENAME
BLUISH GRAY SLIGHTLY BROWN SILTY CLAY		Tue Jun 16 1998	1-3-4

LIQUID LIMIT DETERMINATIONS

CONTAINER NUMBER	18	21	44		
WT. WET SOIL + TARE	24.04	23.68	23.41		
WT. DRY SOIL + TARE	20.08	19.8	19.48		
WT. WATER	3.96	3.88	3.93		
TARE WT.	10.79	11.09	10.97		
WT. DRY SOIL	9.29	8.71	8.51		
WATER CONTENT, W_N (%)	42.63	44.55	46.18		
NUMBER OF BLOWS, N	33	25	19		
ONE-POINT LIQUID LIMIT, LL	44.08	44.55	44.67		

PLASTIC LIMIT DETERMINATIONS

CONTAINER NUMBER	98				
WT. WET SOIL + TARE	26.13				
WT. DRY SOIL + TARE	24.63				
WT. WATER	1.5				
TARE WT.	15.62				
WT. DRY SOIL	9.01				
WATER CONTENT (%)	16.65				



SUMMARY OF RESULTS	
NATURAL WATER CONTENT, W (%)	27.2
LIQUID LIMIT, LL	44.5
PLASTIC LIMIT, PL	16.6
PLASTICITY INDEX, PI	27.8
LIQUIDITY INDEX, LI*	0.38

*LI = (W - PL)/PI

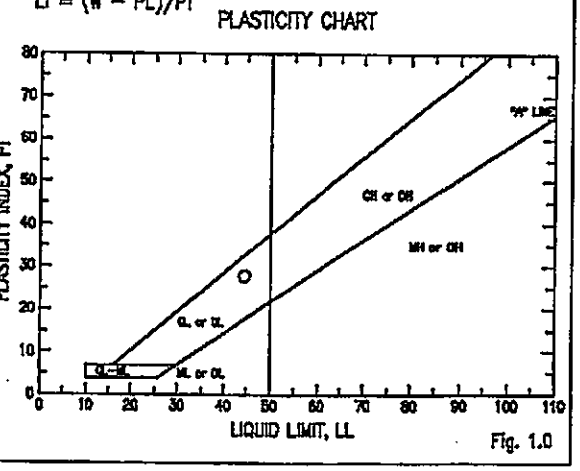
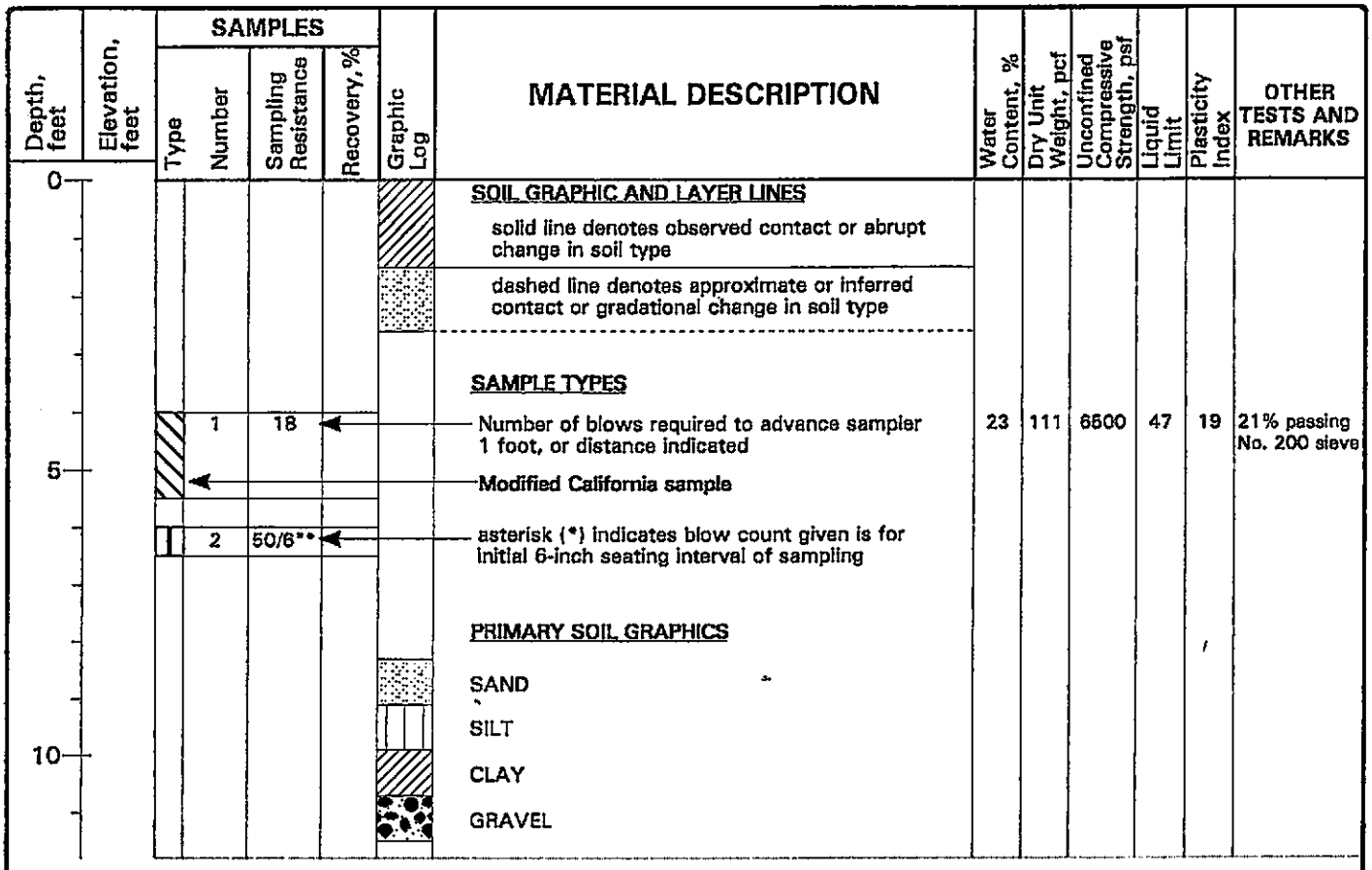


Fig. 1.0

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 951273NB

Key to Log of Boring



NOTES

1. Soil classifications are based on the Unified Soil Classification System and include relative density/consistency, moisture, and color. Descriptions of formation material include color, weathering, rock strength and/or hardness, and moisture. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
2. Surface elevations are based on approximate locations and topographic maps.
3. Water level, where encountered, was measured at the time of drilling.
4. Laboratory test data reported in "Other Tests and Remarks" column include: percent passing the No. 200 sieve as determined by mechanical sieving or by wash on the No. 200 sieve.
5. Descriptions on these boring logs apply only at the specific boring locations and at the time the borings were made. They are not warranted to be representative of subsurface conditions at other locations or

Project: Glen Echo Creek Project Location: Oakland, California Project Number: 951273NB	**Log of Boring 1** Sheet 1 of 2

Date(s) Drilled	5/22/98	Logged By	J. Fippin	Checked By	M. Freitas
Drilling Method	Rotary Wash	Drill Bit Size/Type	3-1/2-inch rotary bit	Total Depth of Borehole	42.5 feet
Drill Rig Type	Failing 1500	Drilling Contractor	Pitcher Drilling	Borehole Backfill	Piezometer installed
Groundwater Depth and Date Measured	Not measured at time of drilling	Hammer Type	Rope and cathead	Hammer Weight/Drop	140 lbs / 30 Inches
Location	29th Street	Surface Elevation	39 feet (est.)	Elevation Datum	Alameda County

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
0							3 inches asphalt concrete over 6 inches sandy gravel (aggregate base).						
							SILTY CLAY (CL) [Fill] Stiff, damp, dark brown with tan mottling, some brick and concrete rubble to 2 inches.						
5			1	12	80			25	95	2370			
	30						SILTY CLAY with SAND (CL) Medium stiff to stiff, damp, bluish gray with black mottling.						
10			2	6	40			26	96	2020			
							6-inch gravel lens						
15			3	10	30			27	95	1250	45	28	
	20												
20			4	10	50			29	93	1450			
25			5	14	30								
							CLAYEY SAND (SC) Medium dense, damp, dark gray, fine-grained sand, low fines content, abundant 1/8-inch roots, some weathered greenstone and red sandstone fragments.						
	10												
30													

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 951273NB

Log of Boring 1

Sheet 2 of 2

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
30			6	19	60		CLAYEY SAND (SC), medium dense, damp, dark gray, fine-grained sand, low fines content, abundant 1/8-inch roots, some weathered greenstone and red sandstone fragments (continued).						
							SANDY GRAVEL (GP) Dense, damp, red, white, and green, gravel to 1 inch.						
35			7	41	70								
	0						SANDY CLAY (CL) Very stiff to hard, damp, bluish gray.						
40			8	29	100			22	103	8040			
							Bottom of boring at 42.5 feet.						
45													
	-10												
50													
55													
	-20												
60													
65													

Project: Glen Echo Creek	Log of Boring 2
Project Location: Oakland, California	Sheet 1 of 2
Project Number: 951273NB	

Date(s) Drilled	5/21/98	Logged By	J. Fippin			Checked By	M. Freitas
Drilling Method	Rotary Wash	Drill Bit Size/Type	3-1/2-inch rotary bit			Total Depth of Borehole	41.5 feet
Drill Rig Type	Failing 1500	Drilling Contractor	Pitcher Drilling			Borehole Backfill	Piezometer Installed
Groundwater Depth and Date Measured	5 feet at time of drilling			Hammer Type	Rope and cathead	Hammer Weight/Drop	140 lbs / 30 inches
Location	Carport area			Surface Elevation	17 feet (est.)	Elevation Datum	Alameda County

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
0							← 3 inches asphalt concrete SANDY CLAY (CL) [Fill] Soft, damp, grayish blue, some roots, brick fragments.						
5			1	3	0		← Becomes wet ▽						
	10						← Becomes medium stiff to stiff						
10			2	19	60		WELL-GRADED GRAVEL with SAND (GW) Loose to medium dense, damp, grayish blue.						
15			3	9	60			24	100				
	0												
20			4	20	75								
							SILTY CLAY (CL) Very stiff to hard, damp, greenish gray with brown mottling, some fine-grained sand.	17	116	1600			
25			5	29	60								
	-10						← Decreasing sand						
30													

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 951273NB

Log of Boring 2

Sheet 2 of 2

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
30			6	33	80		SILTY CLAY (CL), very stiff to hard, damp, greenish gray with brown mottling, trace to little fine-grained sand (continued).						
35	-20		7	30	70								
40			8	52			Bottom of boring at 41.5 feet.						
45	-30												
50													
55	-40												
60													
65													

Project: Glen Echo Creek Project Location: Oakland, California Project Number: 951273NB	**Log of Boring 3** Sheet 1 of 3

Date(s) Drilled	5/20/98	Logged By	J. Fippin	Checked By	M. Freitas
Drilling Method	Rotary Wash	Drill Bit Size/Type	3-1/2-inch rotary and tricone bits	Total Depth of Borehole	71.5 feet
Drill Rig Type	Failing 1500	Drilling Contractor	Pitcher Drilling	Borehole Backfill	Grout with 6-inch asphalt cold patch
Groundwater Depth and Date Measured	Not measured at time of drilling	Hammer Type	Rope and cathead	Hammer Weight/Drop	140 lbs / 30 inches
Location	Church parking lot	Surface Elevation	58.5 feet (est.)	Elevation Datum	Alameda County

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
0							1-1/2 inches asphalt concrete over 6 inches sandy gravel (aggregate base).						
							CLAYEY SAND (SC) [Fill] Medium dense to dense, dry, brown with white mottling, some brick and concrete pieces.						
5			1	20	80			10	96	1660			
	50						Increasing debris (rubble, concrete, bricks)						
10			2	69/9"	70			14	109	1030			
15			3	18	80		SILTY SAND (SM) Medium dense, damp, reddish brown, fine-grained, some organics (very fine roots throughout).	13	104				21% passing No. 200 sieve
	40												
20			4	17	90								
25			5	16	80			14	111	1250			
	30						SANDY CLAY (CL) Stiff, damp, bluish gray with black mottling, low plasticity fines, fine-grained sand.						
30													

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 951273NB

Log of Boring 3

Sheet 2 of 3

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
30			6	22	100		SANDY CLAY (CL), stiff, damp, bluish gray with black mottling, low plasticity fines, fine-grained sand (continued).	24	98	2130			
35	20		7	32/11.5"	75		CLAYEY GRAVEL (GC) Dense to very dense, damp, dark gray, gravel to 1/4 inch.						
40			8	39	60		SILTY CLAY (CL) Very stiff, damp, reddish brown with black mottling, low plasticity fines, some fine-grained sand.	20	109	4980			92% passing No. 200 sieve
45	10		9	27	100		Becomes less mottled; decreasing sand	29	94	6100			
50			10	35	90		SILTY SAND (SM) Medium dense, damp, reddish brown, fine-grained.						
55	0												
60			11	41				25	100	3450			
65													

Woodward-Clyde

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 951273NB

Log of Boring 3

Sheet 3 of 3

Depth, feet	Elevation, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Sampling Resistance	SAMPLES: Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
65							SILTY SAND (SM), medium dense, damp, reddish brown, fine-grained (continued).						
							SILTY CLAY (CL) Very stiff to hard, damp, bluish gray.						
	-10												
70			12	46									
							Bottom of boring at 71.5 feet.						
75													
	-20												
80													
85													
	-30												
90													
95													
	-40												
100													

Project: Glen Echo Creek Project Location: Oakland, California Project Number: 951273NB	**Log of Boring 4** Sheet 1 of 2

Date(s) Drilled	5/18/98 and 5/21/98	Logged By	J. Fippin	Checked By	M. Freitas
Drilling Method	Rotary Wash	Drill Bit Size/Type	3-1/2-inch rotary bit	Total Depth of Borehole	41.5 feet
Drill Rig Type	Failing 1500	Drilling Contractor	Pitcher Drilling	Borehole Backfill	Grout with 6-inch asphalt cold patch
Groundwater Depth and Date Measured	9.5 feet at time of drilling	Hammer Type	Rope and cathead	Hammer Weight/Drop	140 lbs / 30 inches
Location	Richmond Boulevard	Surface Elevation	25 feet (est.)	Elevation Datum	Alameda County

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
0							3 inches asphalt concrete						
							SILTY CLAY (CL) Soft to medium stiff, damp, red.						
							SANDY CLAY (CL) Medium stiff to stiff, damp, gray with reddish brown mottling.						
5	20		1	15	75			21	105	1500			
							SILTY, CLAYEY SAND with GRAVEL (SC-SM) Dense, damp, gray and black.						
10			2	64	60			12	125	2280			14% passing No. 200 sieve
15	10		3	47	60		Becomes medium dense to dense; increasing gravel	13	120				
							CLAYEY GRAVEL (GC) Dense, damp, gray and black, gravel to 1/4 inch.						
20			4	58	75								11% passing No. 200 sieve
							SILTY CLAY (CL) Stiff, damp, gray with brown mottling, some fine-grained sand, some organics.						
25	0		5	21	75			32	90	3500			
30													

Project: Glen Echo Creek
Project Location: Oakland, California
Project Number: 951273NB

Log of Boring 4

Sheet 2 of 2

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
30			6	32	100		SILTY CLAY (CL), stiff, damp, gray with brown mottling, some fine-grained sand, some organics (continued).						
35	-10		7	41	90			25	100	2650			
40			8	55									
							Bottom of boring at 41.5 feet.						
45	-20												
50													
55	-30												
60													
65	-40												

Project: Glen Echo Creek Project Location: Oakland, California Project Number: 951273NB	Log of Boring 5 Sheet 1 of 2

Date(s) Drilled	5/18/98	Logged By	J. Fippin	Checked By	M. Freitas
Drilling Method	Rotary Wash	Drill Bit Size/Type	3-1/2-inch rotary bit	Total Depth of Borehole	41.5 feet
Drill Rig Type	Failing 1500	Drilling Contractor	Pitcher Drilling	Borehole Backfill	Grout with 6-inch asphalt cold patch
Groundwater Depth and Date Measured	Not measured at time of drilling	Hammer Type	Rope and cathead	Hammer Weight/Drop	140 lbs / 30 inches
Location	Apartment parking lot	Surface Elevation	30 feet (est.)	Elevation Datum	Alameda County

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
0	30						6 inches concrete GRAVELLY CLAY (CL) Medium stiff, damp, light brown.						
							SILTY SAND (SM) Dense, damp, reddish brown with red, gray, and white mottling, some sandstone fragments.						
5			1	35	100			10	107	650			15% passing No. 200 sieve
							SANDY CLAY (CL) Stiff to very stiff, damp, gray with reddish brown mottling, low plasticity fines, fine-grained sand.						
10	20		2	44	60			19	118	1440			
							Decreasing fines, increasing sand and fine gravel						
15			3	29	30								
20	10		4	23	50		SILTY CLAY (CL) Very stiff to hard, damp, gray.	33	89	6000			
25			5	31	60								
30	0												

Project: Glen Echo Creek Project Location: Oakland, California Project Number: 951273NB	Log of Boring 5 Sheet 2 of 2

Depth, feet	Elevation, feet	SAMPLES Type	Number	Sampling Resistance	Recovery, %	Graphic Log	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight, pcf	Unconfined Compressive Strength, psf	Liquid Limit	Plasticity Index	OTHER TESTS AND REMARKS
30	0		6	40	75		SILTY CLAY (CL), very stiff to hard, damp, gray (continued).	29	97	9210			
35			7	30	100								
40	-10		8	35	100								
							Bottom of boring at 41.5 feet.						
45													
50	-20												
55													
60	-30												
65													

APPENDIX C

MATERIALS TESTING AND EVALUATION BY TESTING ENGINEERS, INC.

MATERIALS TESTING & EVALUATION

PROJECT:

GLEN ECHO CREEK CULVERT
29TH AVENUE, OAKLAND

PRESENTED TO:

MR. HEI YIP LEE
PROJECT MANAGER
WOODWARD-CLYDE
500 12TH STREET, SUITE 100
OAKLAND, CALIFORNIA 94607

AUGUST 6, 1996

Testing Engineers, Inc.

Materials Consultation · Testing & Inspection · Metallurgical & NDT Services

OAKLAND SANTA CLARA SACRAMENTO

Testing Engineers, Inc.

Quality Assurance Services
Materials Consulting
Since 1954

WOODWARD-CLYDE
500 12th Street, Suite 100
Oakland, California 94607

Work Request No. 96155

ATTENTION: Mr. Hei Yip Lee, Project Manager

SUBJECT: Material Testing & Evaluation
Glen Echo Creek Culvert
29th Ave., Oakland

Dear Mr. Lee:

As requested, we have performed materials testing and evaluation at the subject culvert (see Photos 1 & 2).

PURPOSE

The purpose of our work was as follows:

1. To remove concrete cores from the culvert and test in accordance with ASTM C42 (dry), for relative concrete compressive strengths.

2. To drill small diameter holes in the culvert walls, invert, and crown in order to verify concrete thickness.

PROCEDURES & RESULTS

1. A total of eight (8) 3" nominal diameter concrete cores were removed using a water cooled diamond bit core driller. Cored locations were specified by Ms. Galen Nagle of Woodward-Clyde. A view of a typical coring operation is shown in Photo 3. The cores were tested in accordance with ASTM C42 (dry), for relative concrete compressive strengths. The compressive strength results are presented in Table 1. Views of the removed cores and location of removed cores are presented in Photos 4 through 12. A view of the compression test set-up is shown in Photo 13.

   Sample 2A (Sta. 0+85) fell apart during the coring process. The concrete at this location was in very poor condition and exhibited poor strength. Upon inspection of sample 4A (Sta. 2+05), it was apparent that an inclusion was contained within the core sample. A view of the core sample is shown in Photos 14 & 15. Additional core samples were taken at these locations for compressive strength testing.

WOODWARD-CLYDE
Mr. Hei Yip Lee
August 6, 1996

Work Request No. 96155

As seen in Photos 16 and 17, the samples removed from locations #1 and #7 contained many voids and "rock pockets". Compressive strength testing of these samples would not give a true representation of the concrete strength, and the samples were considered untestable.

2. A total of thirty-two (32) 3/4" diameter probe holes were drilled in the culvert walls, invert, and crown in order to determine concrete thickness. A HILTI TE 54 hammer drill with a 32" long drill bit was used to perform this operation. A view of a typical probing operation is shown in Photo 18. A typical cross sectional view of the culvert is shown in Drawing #1. The measured culvert thicknesses are presented in Table #2.

3. As requested, the culvert width and height were measured at the stations where probe testing was performed. Measurements of the height and the width of the culvert are presented in Table 3.

If you have any questions regarding the contents of this report, or if we can be of further assistance, don't hesitate to contact the undersigned at (510) 419-1143.

Sincerely,
TEI CONSULTING ENGINEERS

Sokho Yim
Staff Engineer

sy/
Attachments

cc: Mr. Mark Freitas, Woodward-Clyde
Ms. Galen Nagle, Woodward-Clyde

TABLE 1

COMPRESSIVE STRENGTH RESULTS

SAMPLE ID. NO.	CORED STATION	CORED HT.	DIA. (in)	AREA (sq.in)	LENGTH TESTED (in)	MAX. AGGR. SIZE (in)	COMP. STRENGTH (psi)
1	0+50 EAST	4'-9"	3.00	-	-	-	UNTESTABLE SAMPLE
2	0+85 WEST	3'-2"	3.00	7.07	7.50	1-1/4	1,980
2A	0+85 WEST	4'-6"	-	-	-	-	FELL APART
3	1+55 WEST	3'-5"	3.00	7.07	8.00	1-1/8	800
4	2+05 EAST	4'-8"	3.00	7.07	8.00	1-1/4	910
4A	2+05 EAST	4'-2"	3.00	7.07	7.50	1	2,550
5	2+40 EAST	3'-6"	2.93	6.74	4.20	1	710
6	1+46 EAST	3'-6"	3.00	7.07	5.00	3/4	710
7	0+31 EAST	3'-6"	3.00	-	-	-	UNTESTABLE SAMPLE

NOTE: Cored height is measured from invert surface.

TABLE 2

PROBE TEST RESULTS

	EAST WALL		WEST WALL		CROWN		INVERT	
STA.	THICK.	HT.	THICK.	HT.	THICK.	DIST.	THICK.	DIST.
0+10	22.75"[1]	3'-5"	22.75"[1]	2'-11"	14"[1]	+9"	9.25"[1]	-2'-1"
0+50	19"[2]	3'-8"	19"[1]	2'-9"	14"[1]	-5"	10.25"[1]	+9.5"
1+00	20"[2]	3'-8"	23.5"[1]	3'-2"	15.5"[1]	+1'-4"	10.5"[1]	-12"
1+50	19"[3]	4'-2"	19"[1]	3'-0"	14"[1]	-2'-2"	8"[2,3]	+3'-5"
2+00	20.5"[2]	3'-8"	20"[2]	3'-3"	13.5"[1]	-10"	10.75"[1]	+11.5"
2+50	21"[2]	3'-5"	24"[2]	8"	13"[2]	+1'-11"	6"[1,4]	-3'-0"
AVERAGE	20.4"	-	21.4"	-	14"	-	9.1"	-
**********	**********	**********	**********	**********	**********	**********	**********	**********
3+00	>32"*[2]	2'-1"	20.5"[2]	4'-2"	16.5"[2]	-9"	11.25"[1]	-1'-8"
3+50	>32"*[2]	1'-5"	18"[1]	4'-0"	16.75"[1]	-12"	10"[1]	+1'-3"
AVERAGE	>32"*		19.3"		16.6"		10.6"	

NOTES:

HT. measured from the invert.
\+ measured from the center of the crown to east direction.
\- measured from the center of the crown to west direction.
* actual thickness could not be determined due to limit of drill bit (32" long).

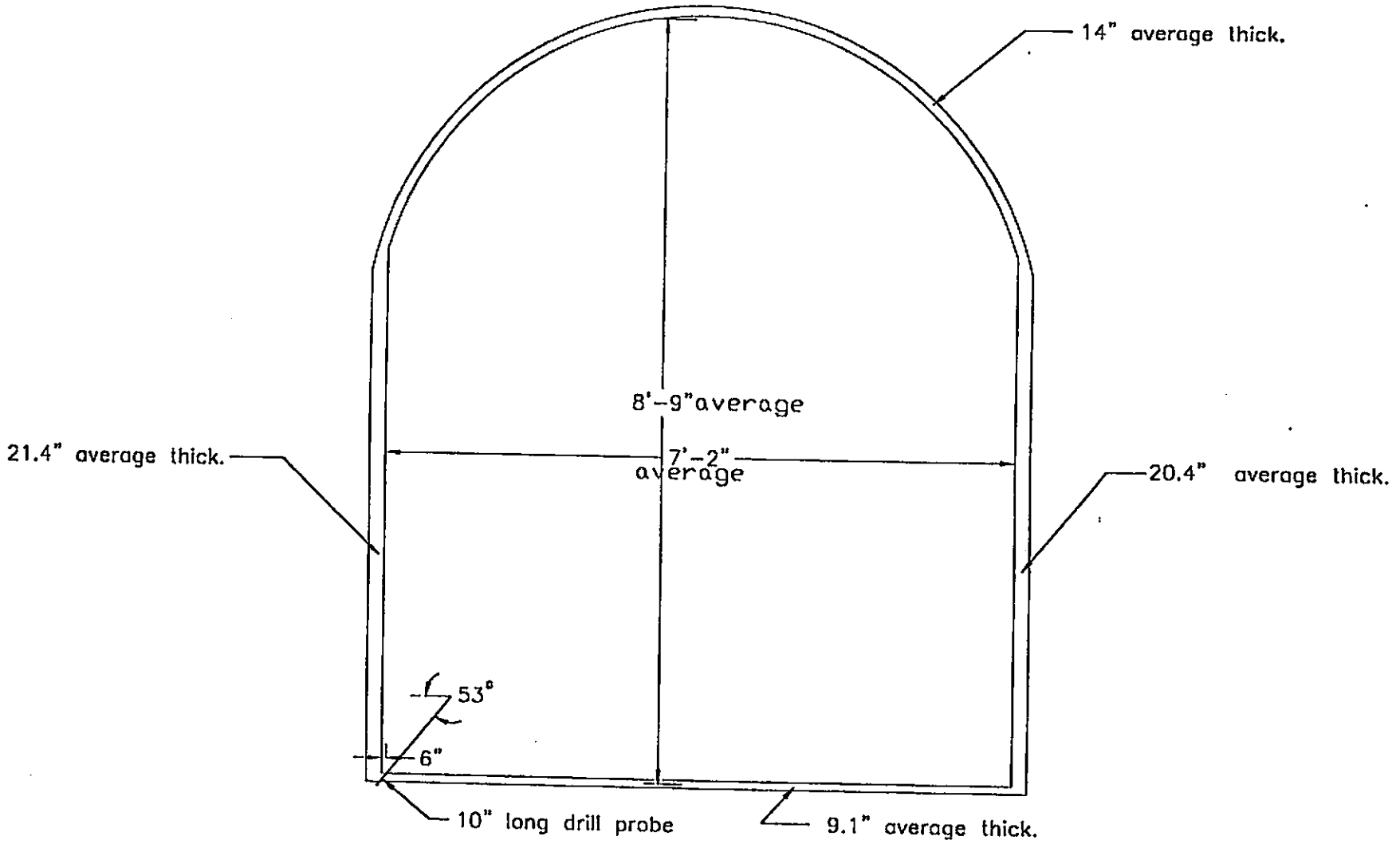
1. Backfill probed, but inconclusive.
2. Sand/clay.
3. 6" void.
4. See Drawing #1

TABLE 3

CULVERT SECTION

STATION	WIDTH	HEIGHT
0+10	7'-1"	9'-1"
0+50	7'-2"	8'-11"
1+00	7'-1"	9'-0.5"
1+50	7'-3"	8'-8"
2+00	7'-1.5"	8'-4"
2+50	7'-0.5"	8'-7"
AVERAGE	**7'-2"**	**8'-9"**

Typical Cross Section View of Culvert



GLEN ECHO CULVERT

TEI CONSULTING ENGINEERS		
Drawn by: s.y. Date: 8-6-96	Checked by:	Drawing # 1

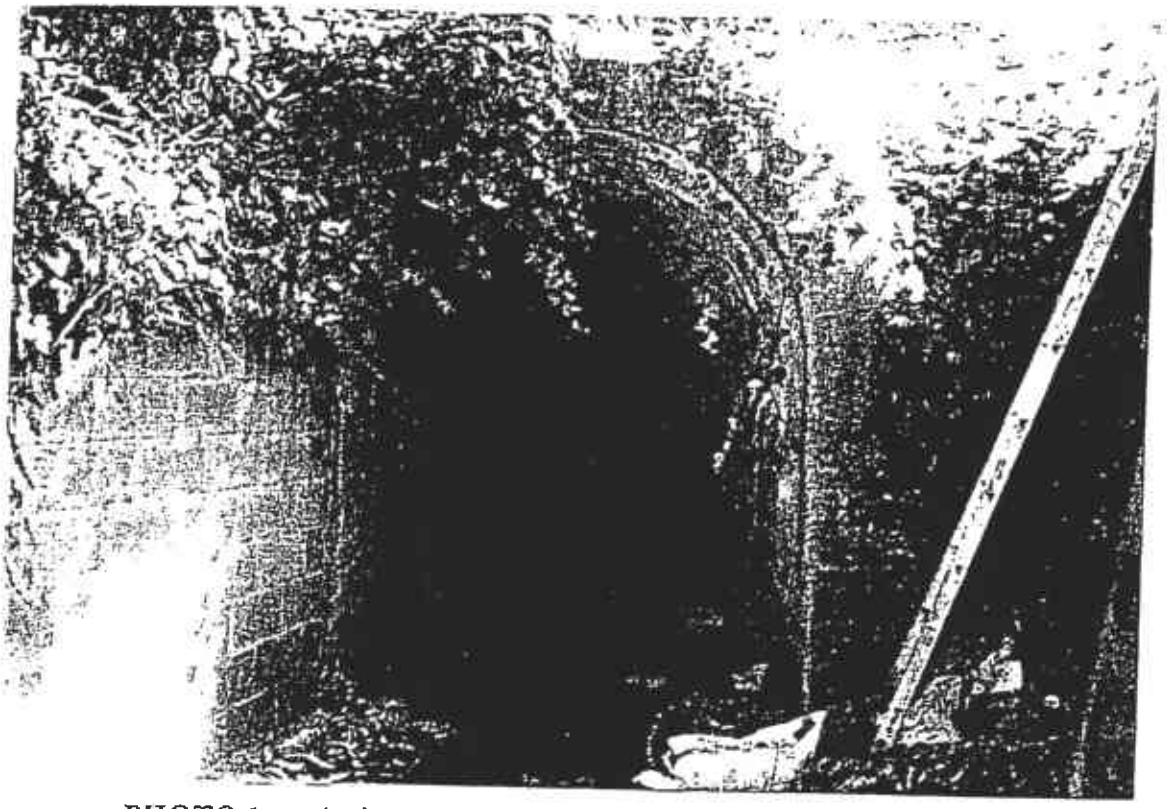


PHOTO 1: A view of the north end of the culvert.

PHOTO 2: A view from inside of culvert (looking north).

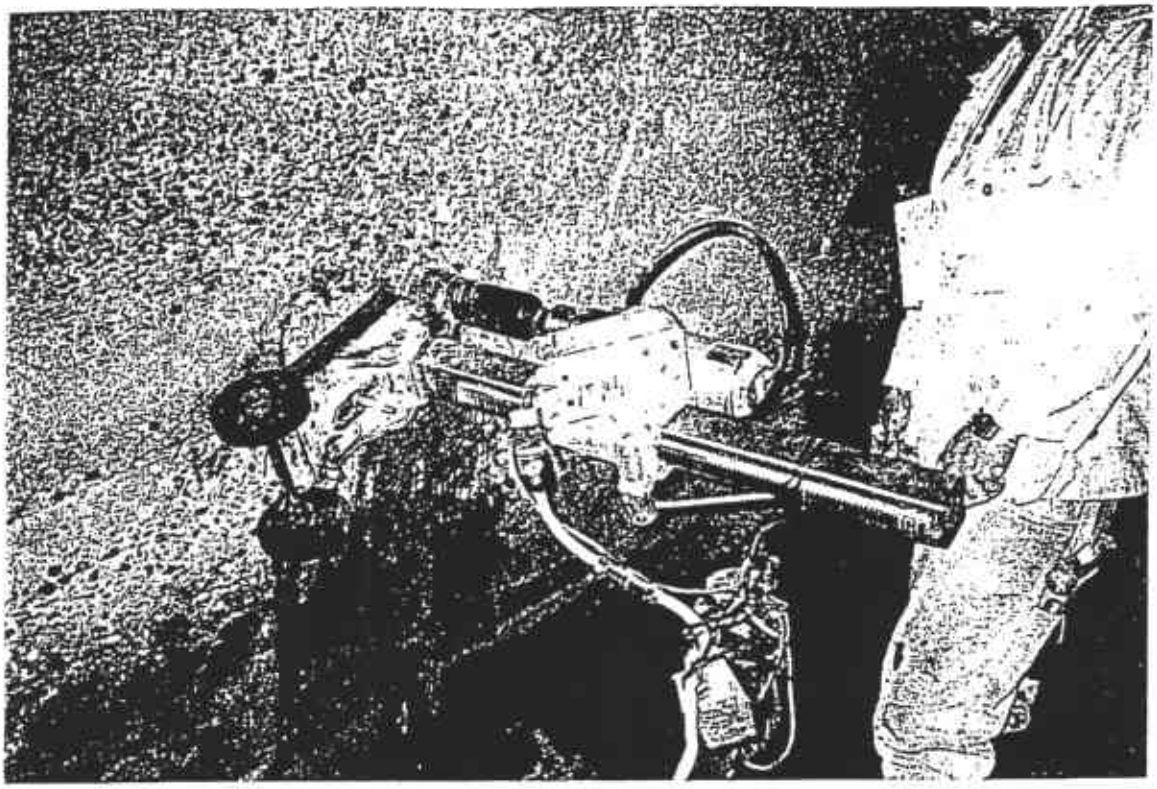


PHOTO 3: A view of typical coring operation @ Sta. 1+55 west.

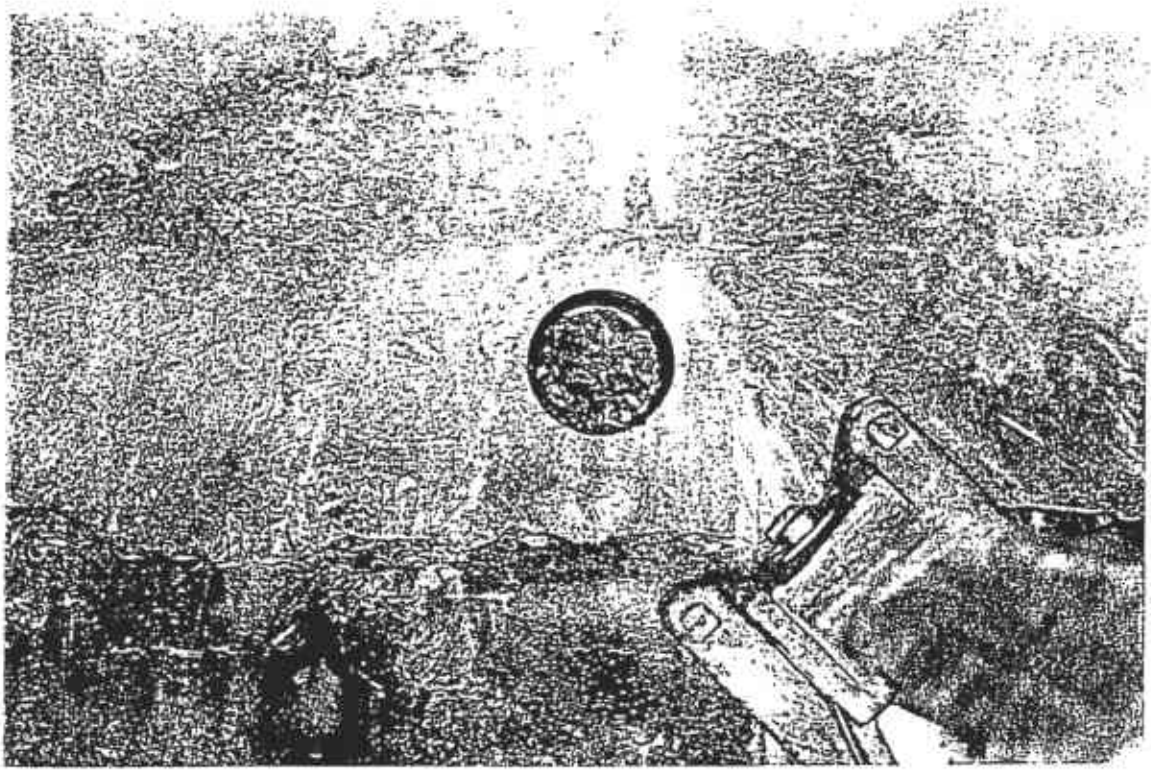


PHOTO 4: A view of cored location @ Sta.0+50 east.

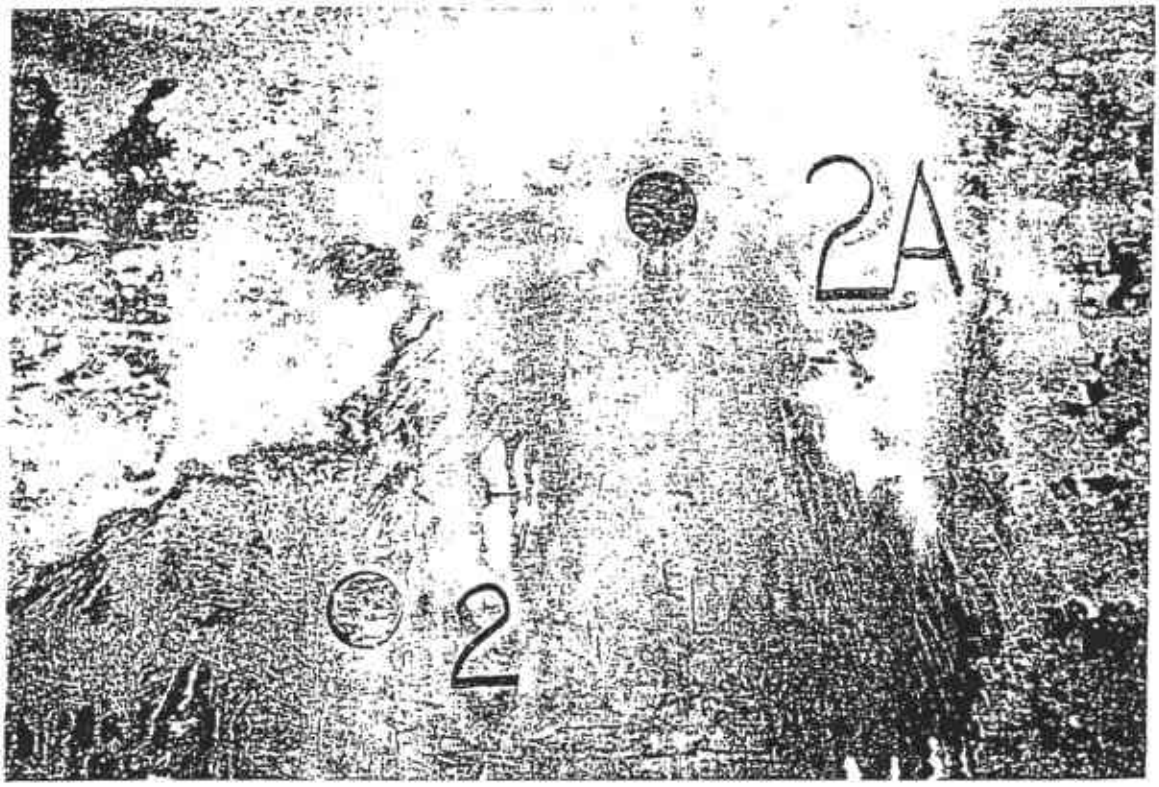


PHOTO 5: A view of cored location @ Sta.0+85 west.

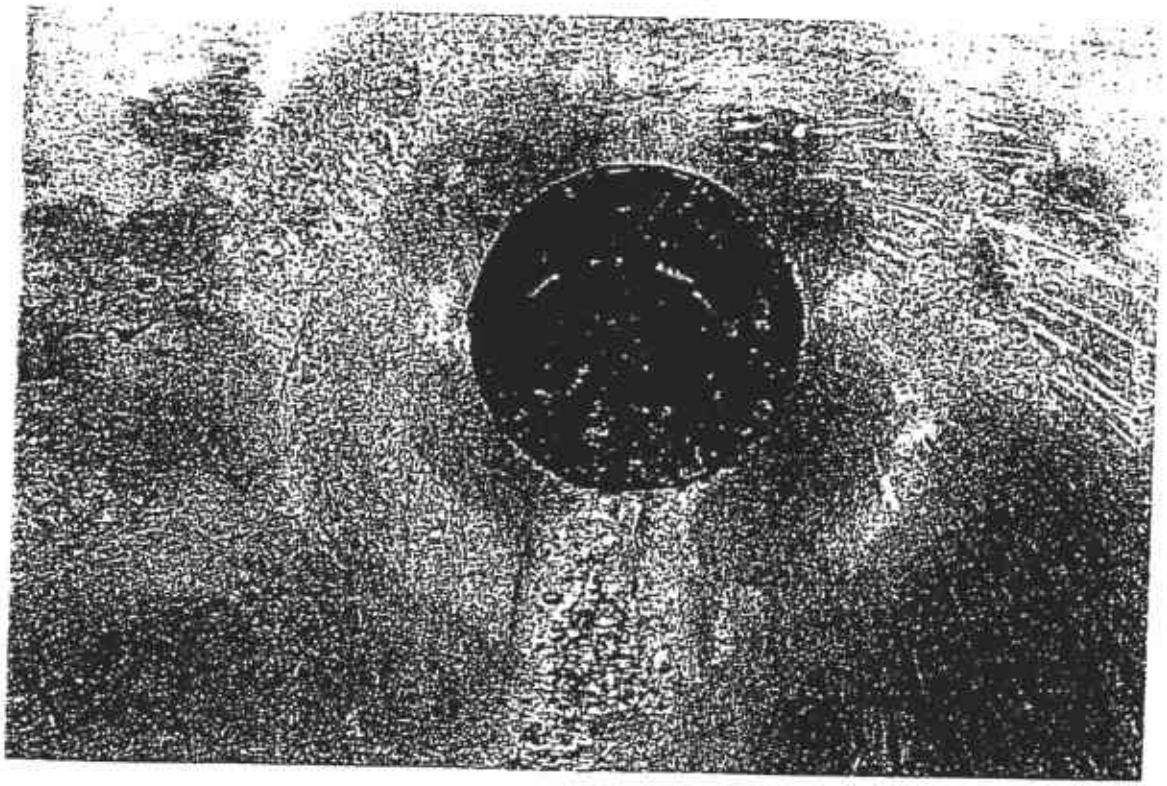


PHOTO 6: A view of cored location #2A @ Sta. 0+85 west.

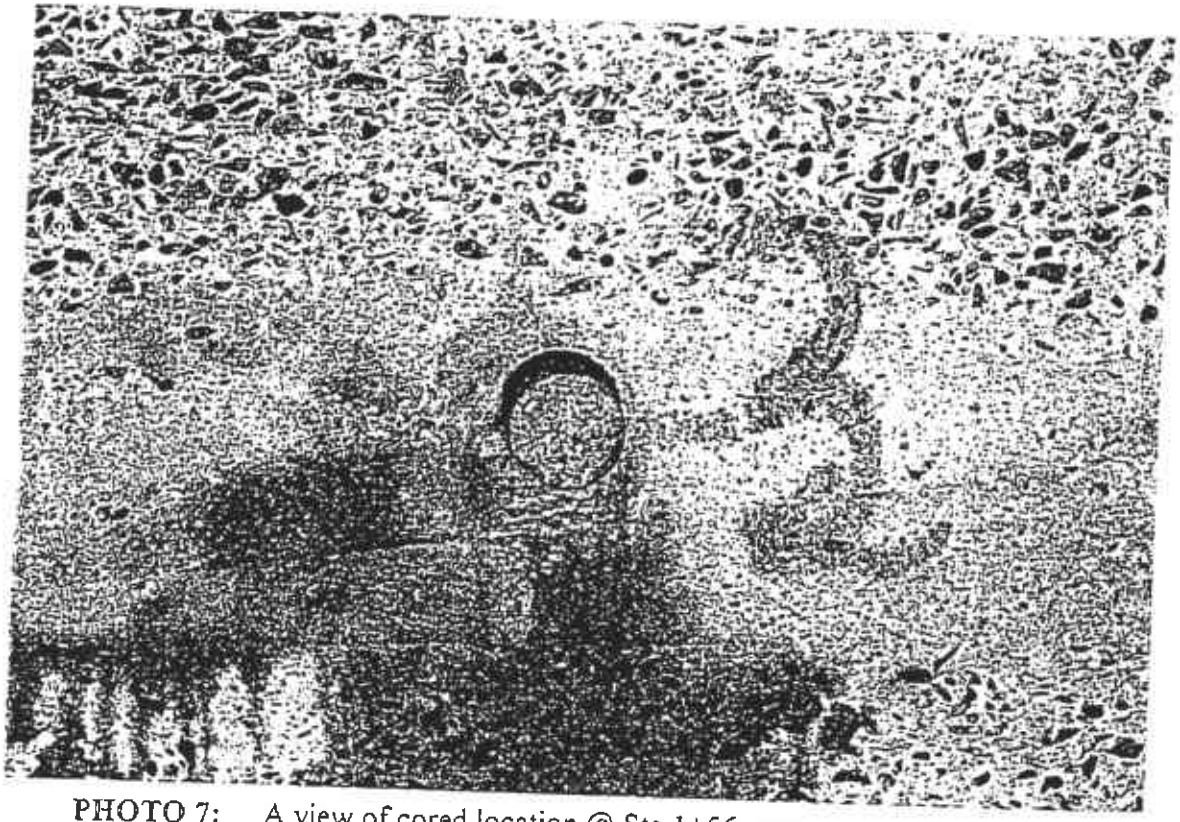


PHOTO 7: A view of cored location @ Sta 1+56 west.

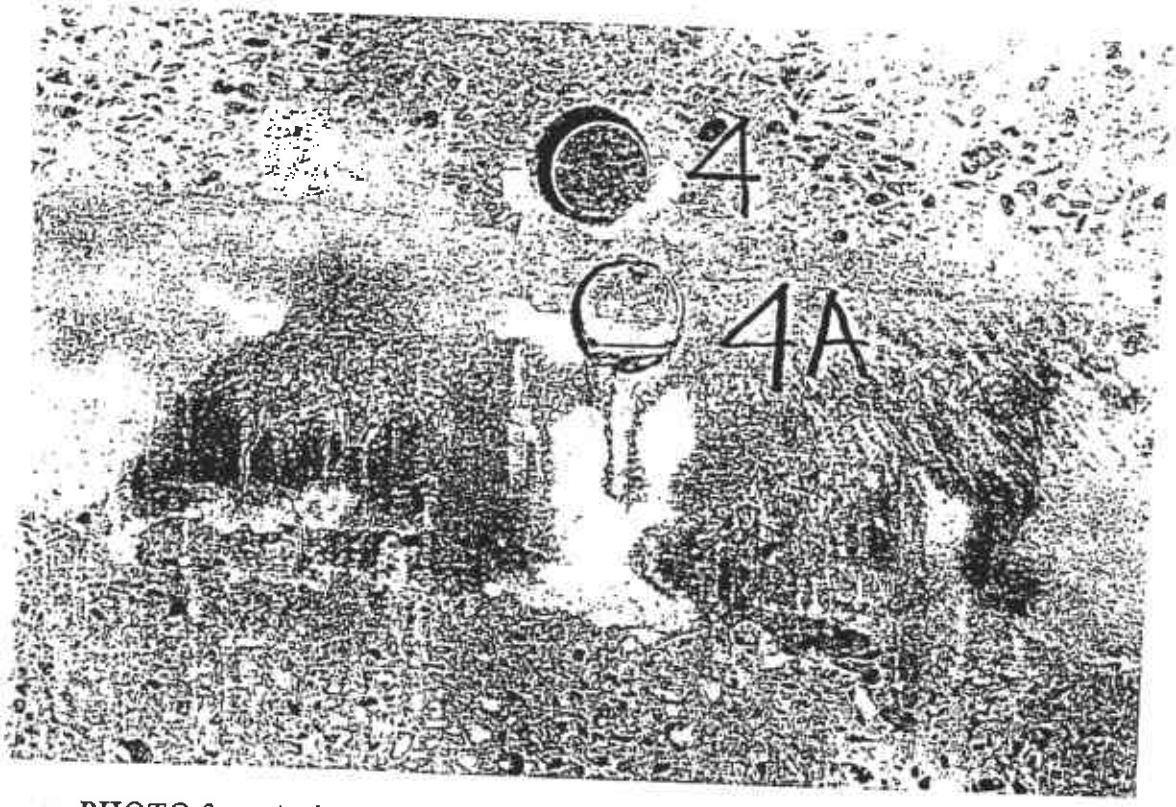


PHOTO 8: A view of cored location @ Sta. 2+05 west.

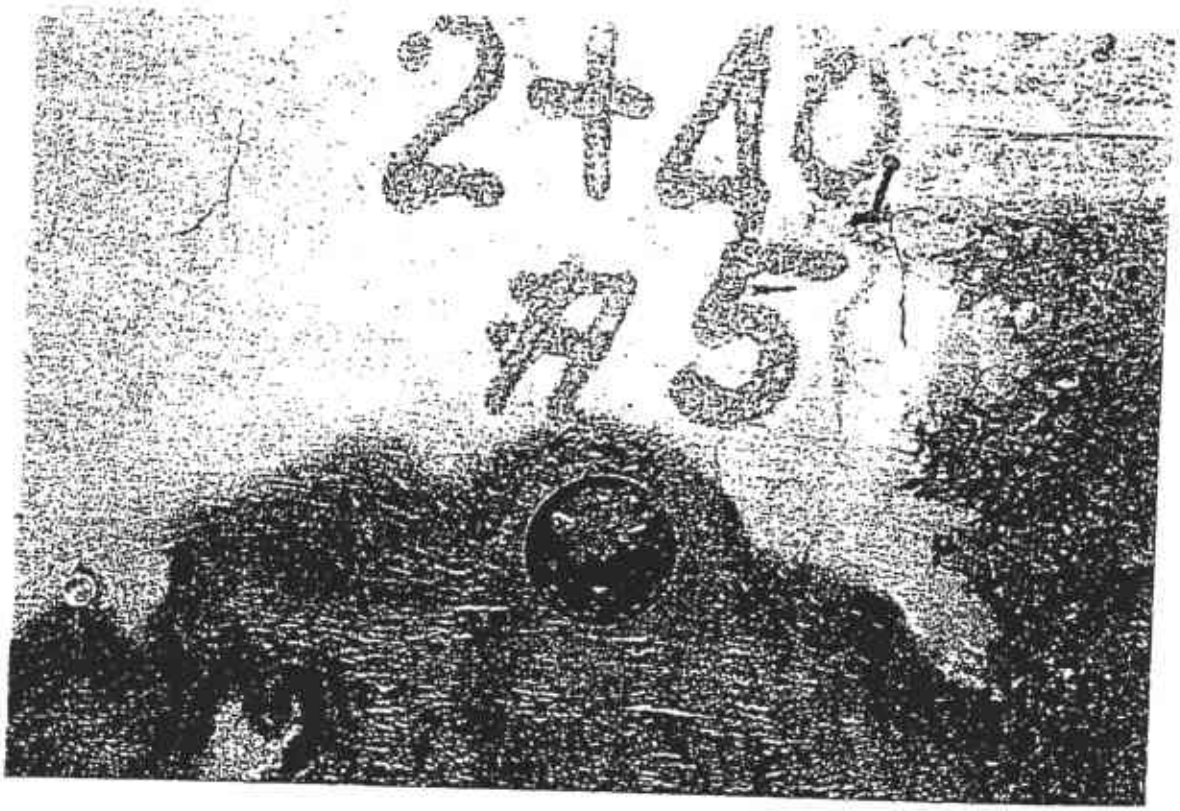


PHOTO 9: A view of cored location @ Sta. 2+40 east.

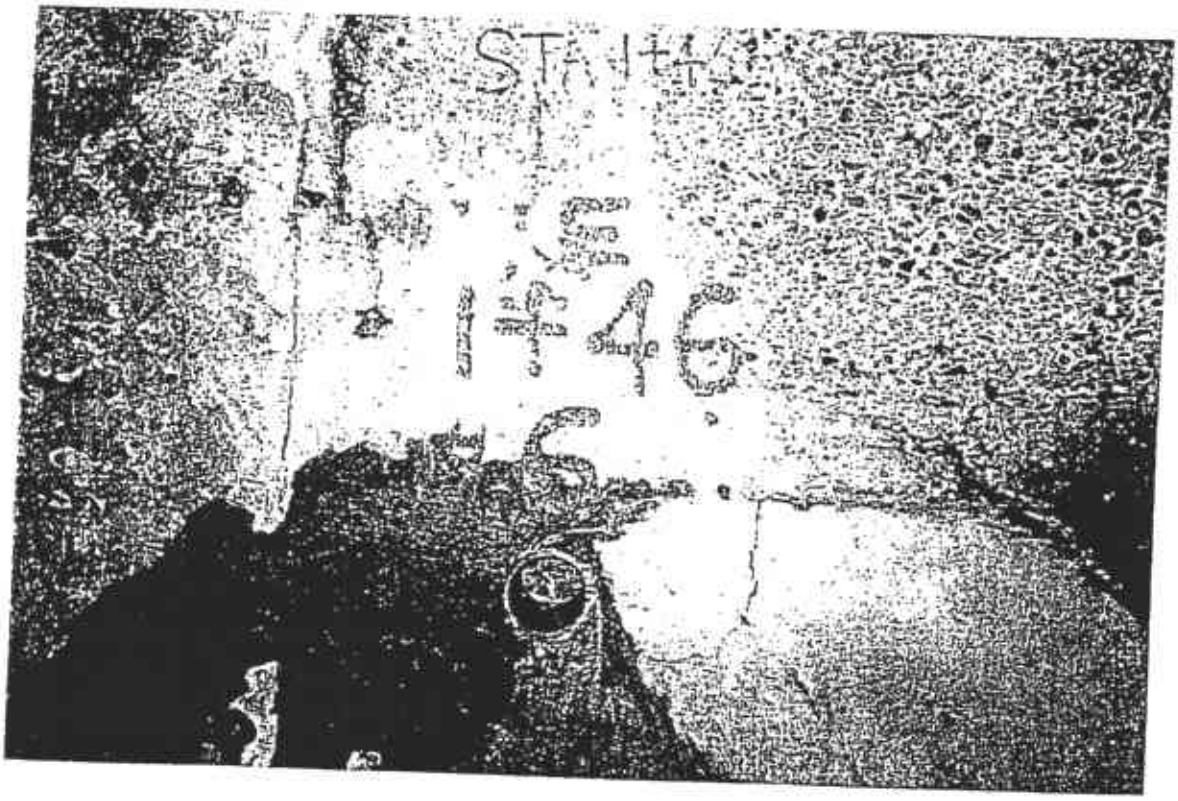


PHOTO 10: A view of cored location @ Sta. 1+46 east.

PHOTO 11: A view of cored location @ Sta. 0+31 east.

PHOTO 12: A view of core samples.

PHOTO 13: A view of compression test set-up.

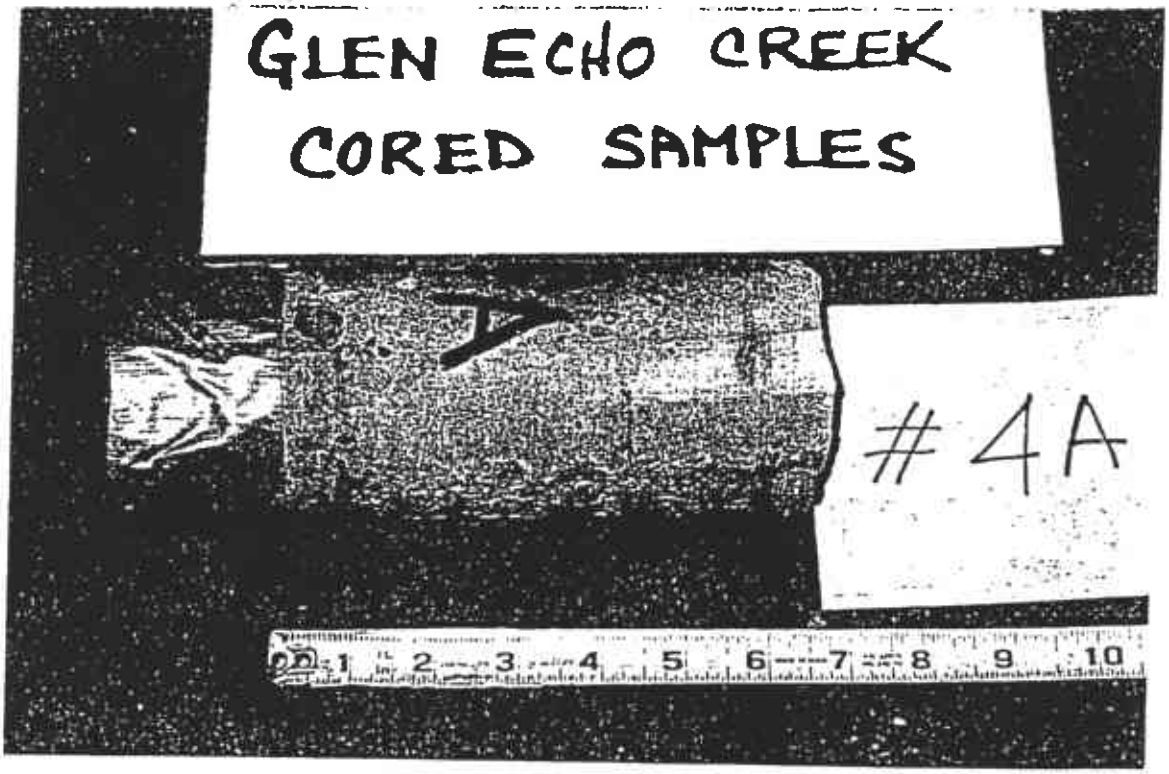


PHOTO 14: A view of core sample #4A.

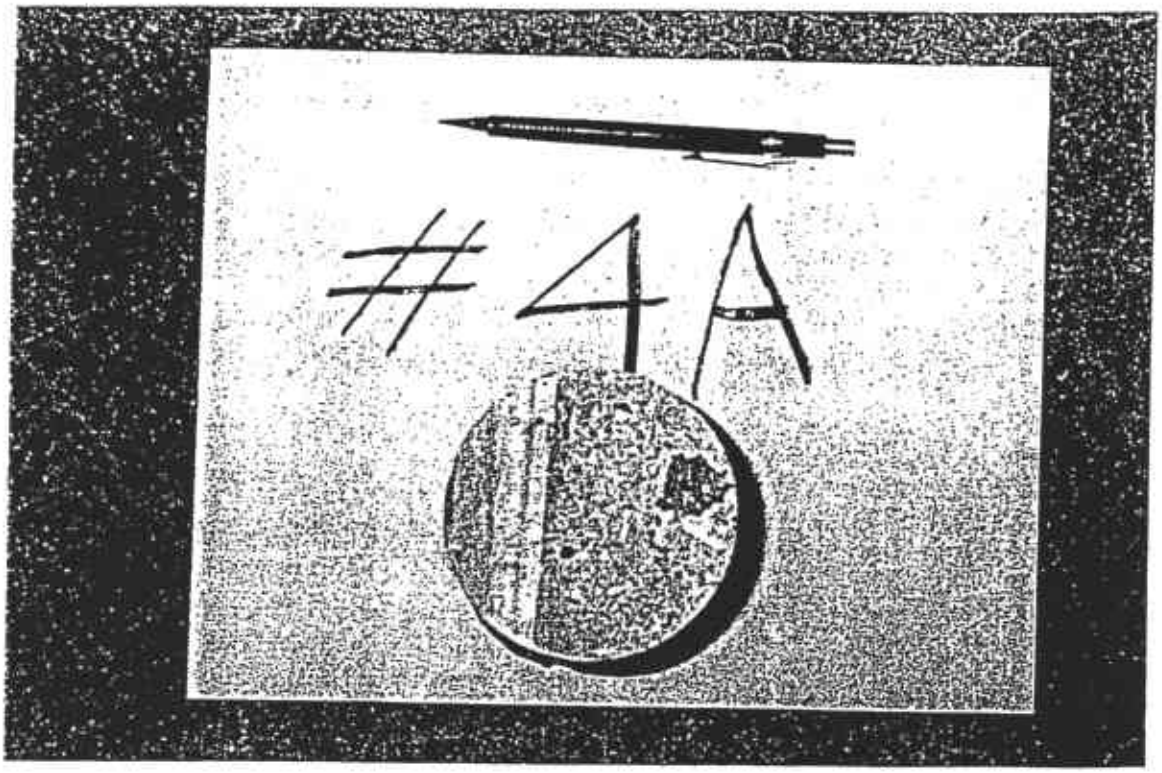


PHOTO 15: A view of core sample #4A

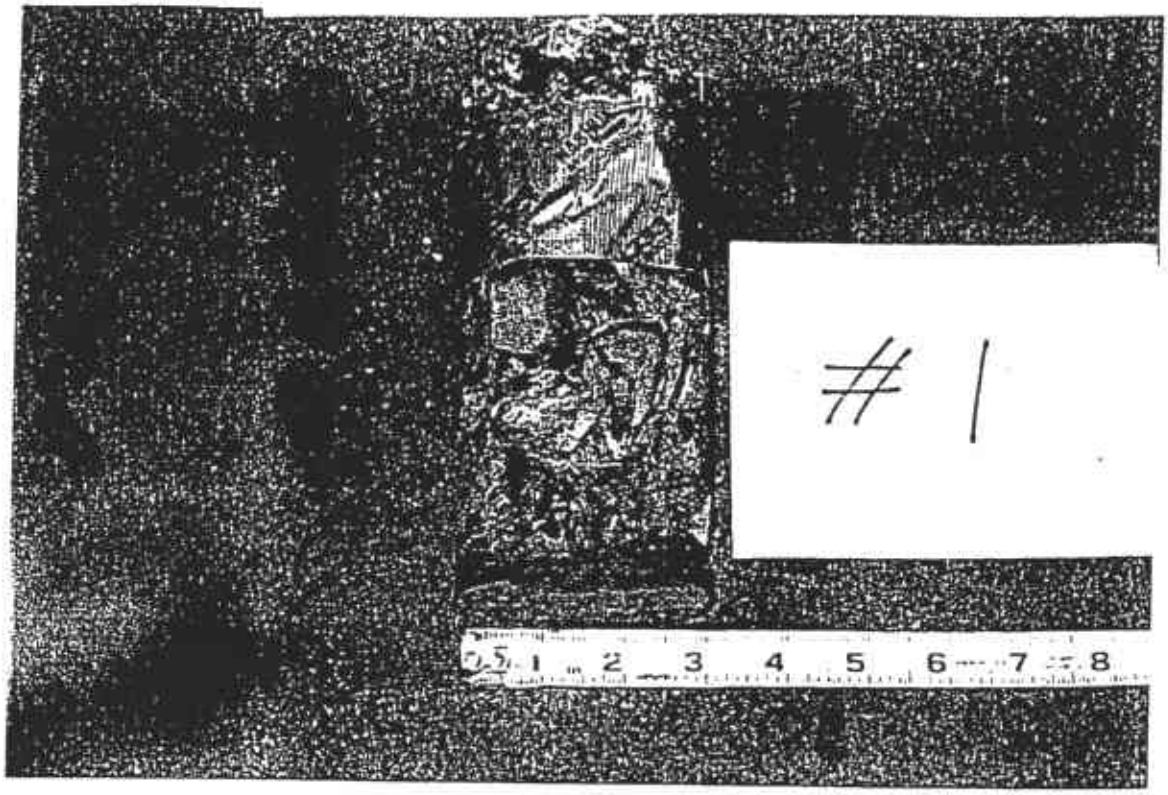


PHOTO 16: A close-up view of core sample #1.

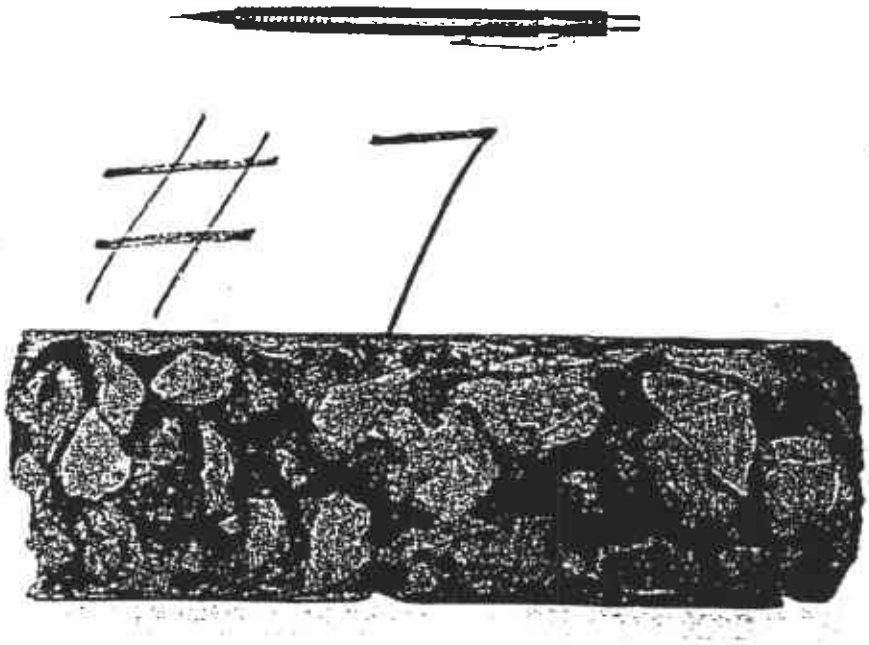


PHOTO 17: A close-up view of core sample #7.

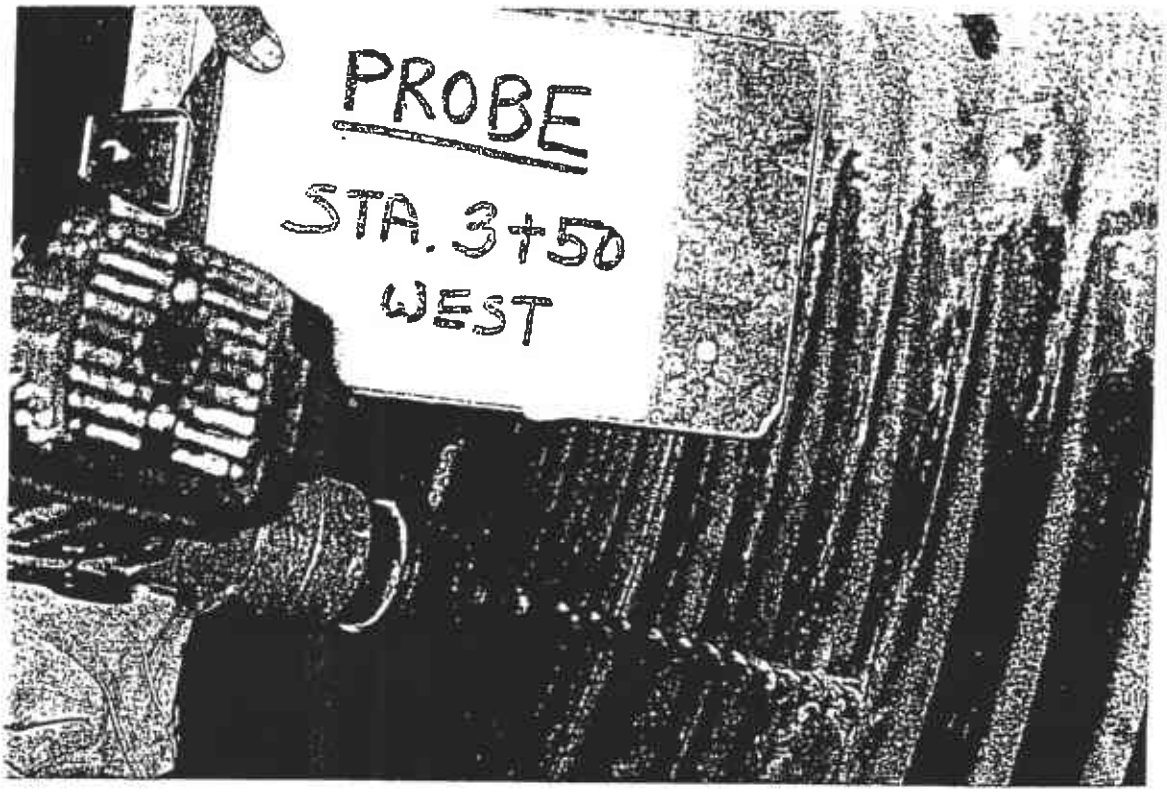
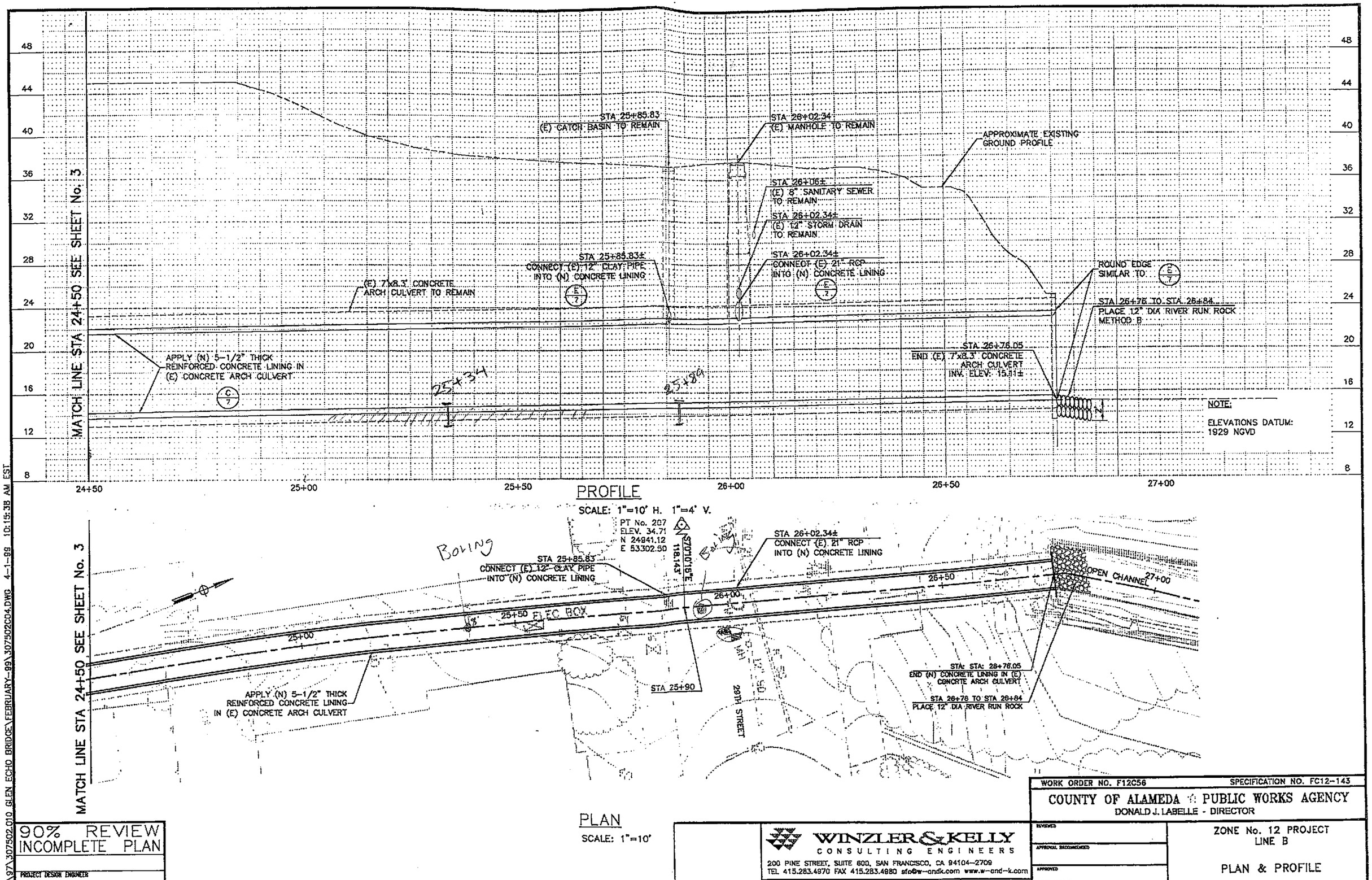


PHOTO 18: A view of typical probing operation @ Sta. 3+50 west.



PROFILE

SCALE: 1"=10' H. 1"=4' V.

PLAN

SCALE: 1"=10'

90% REVIEW
INCOMPLETE PLAN

PROJECT DESIGN ENGINEER

REVIEWED BY: DATE

WORK ORDER NO. F12C56 SPECIFICATION NO. FC12-143

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
DONALD J. LABELLE - DIRECTOR

REVIEWED

APPROVAL RECOMMENDED

APPROVED
RALPH JOHNSON
DATE SCALE

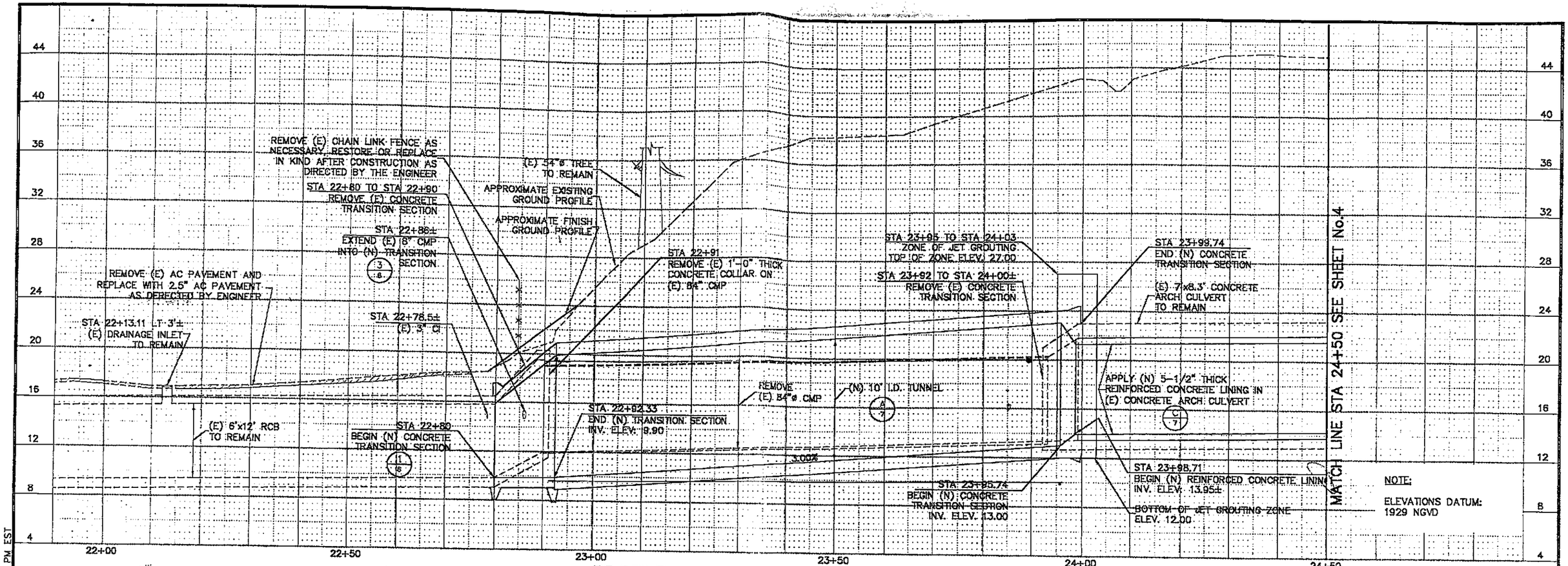
ZONE No. 12 PROJECT
LINE B

PLAN & PROFILE

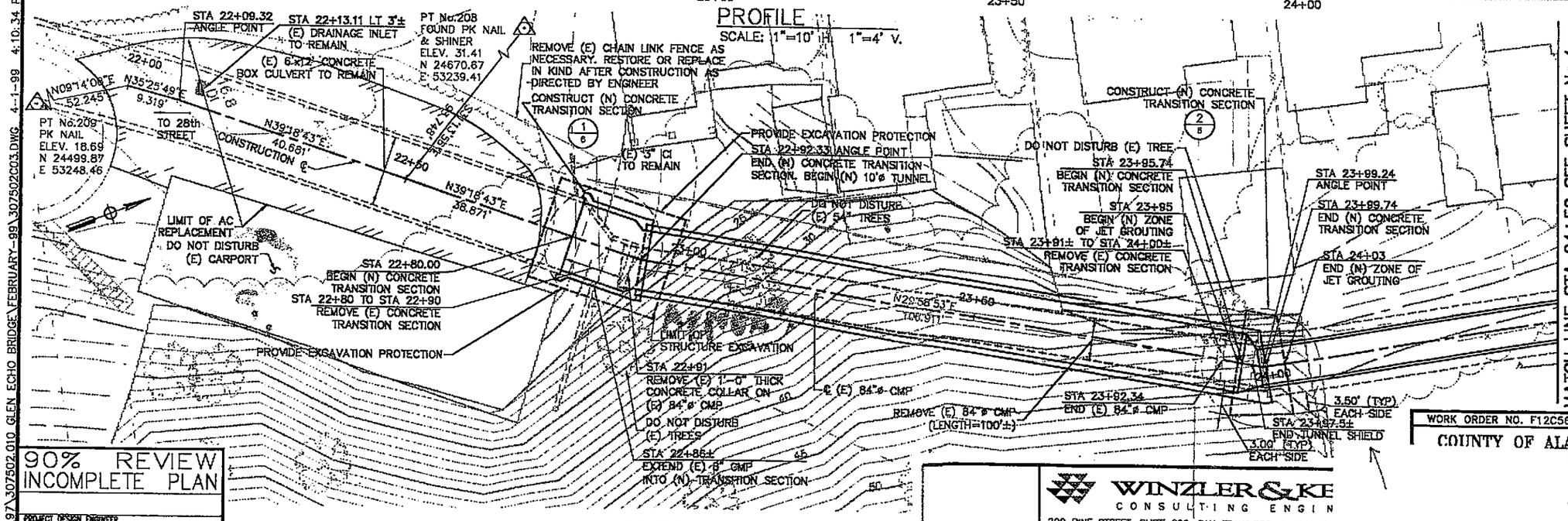
FILE NO. SHEET NO. OF

WINZLER & KELLY
CONSULTING ENGINEERS
200 PINE STREET, SUITE 600, SAN FRANCISCO, CA 94104-2709
TEL 415.283.4970 FAX 415.283.4980 sfo@w-andk.com www.w-and-k.com

W&K JOB NO. DESIGNED DRAWN CHECKED



PROFILE
SCALE: 1"=10' H. 1"=4' V.



PLAN

BENCHMARK: STATION 31/D-OAKLAND

TOP OF A BRONZE CITY OF OAKLAND DISC STAMPED "SEC 31 STA D", IN THE TOP OF A CONCRETE POST ABOUT ONE (1) FOOT BELOW THE SURFACE OF THE SIDEWALK, AT THE NORTHEAST CORNER OF THE INTERSECTION OF BROADWAY AND 29TH STREET, 11.4 FEET NORTH OF THE PROLONGATION OF THE NORTH CURB OF THE STREET, AND 4.7 FEET EAST OF THE EAST CURB OF BROADWAY.

ELEVATION = 40.085 (DATUM: 1929 NGVD 1959 ADJUSTMENT)

BENCHMARK: STATION 53/A-OAKLAND

TOP OF A BRONZE CITY OF OAKLAND DISC WITH DRILLED HOLE, IN THE TOP OF A CONCRETE POST, ABOUT ONE (1) FOOT BELOW THE SURFACE OF THE SIDEWALK,600 FEET, MORE OR LESS, EASTERLY OF THE CENTERLINE BROADWAY, AND 6 FEET NORTHERLY OF THE NORTH CURB OF 29TH STREET.

ELEVATION = 38.22 (DATUM: 1929 NGVD)

90% REVIEW
INCOMPLETE PLAN

PROJECT DESIGN ENGINEER

REVIEWED BY: DATE

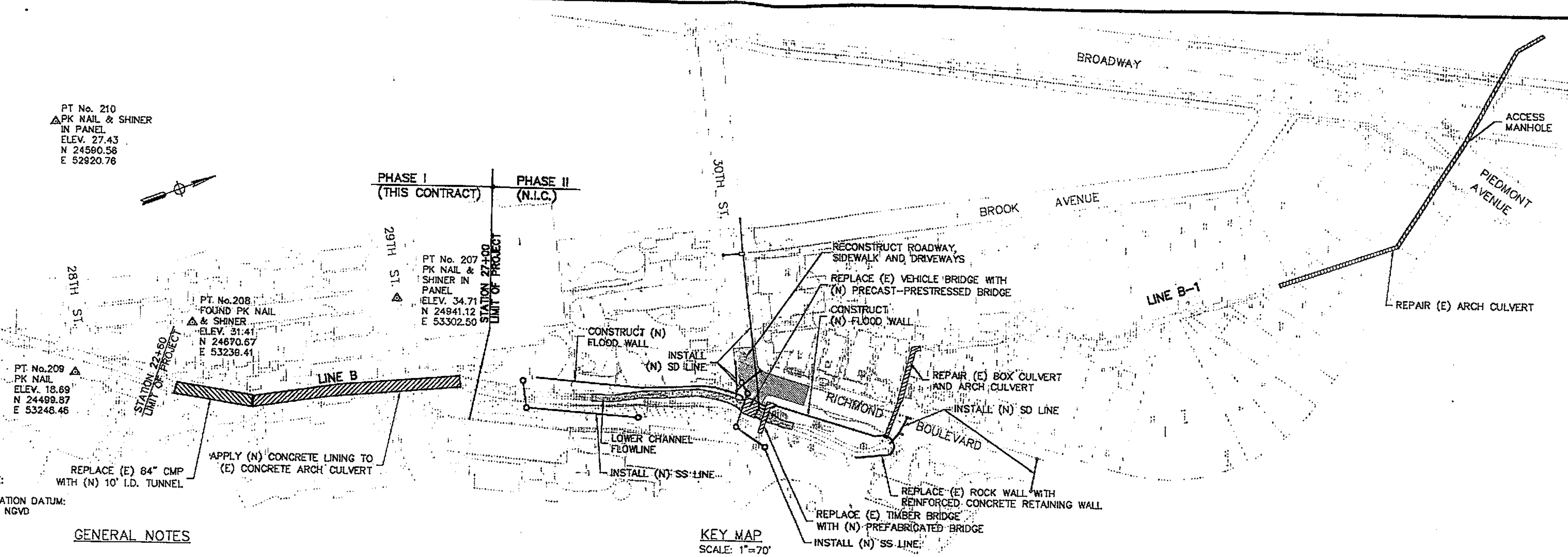
WINZLER & KELLY
CONSULTING ENGINEERS
200 PINE STREET, SUITE 600, SAN FRANCISCO, CA 94104-
TEL 415.283.4970 FAX 415.283.4980 sfo@w-andk.com ww

WORK ORDER NO. F12C56 SPECIFICATION NO. FC12-143

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY
D.J. LABELLE - DIRECTOR

ZONE No. 12 PROJECT
LINE B

PLAN AND PROFILE



NOTE:
ELEVATION DATUM:
1929 NGVD

KEY MAP
SCALE: 1"=70'

GENERAL NOTES

1. ALL WORK IS TO BE DONE UNDER THE DIRECTION OF THE ENGINEER.
2. CALTRANS STANDARD SPECIFICATIONS AND STANDARD PLANS, JULY 1992 EDITION, ARE PART OF THESE PLANS.
3. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORK HOURS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF PROPER SHORING OF TRENCHES IN ACCORDANCE WITH OCCUPATIONAL SAFETY LAWS. THE DUTIES OF THE ENGINEER DO NOT INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY IN, ON, OR NEAR THE CONSTRUCTION SITE.
4. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY AND ALL DAMAGE TO EXISTING STRUCTURES AND/OR UTILITIES DURING CONSTRUCTION. PROPER REPAIR SHALL BE DONE TO THE SATISFACTION OF THE ENGINEER AND THE RESPECTIVE UTILITY COMPANY.
5. ALL PIPELINES AND OTHER UNDERGROUND FACILITIES MAY NOT BE SHOWN. EXISTING UNDERGROUND FACILITIES AS SHOWN ARE APPROXIMATE ONLY AND WERE OBTAINED FROM AVAILABLE UTILITY RECORDS. HOWEVER, THE COUNTY ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY OR COMPLETENESS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT ALL UTILITIES AND TO HAVE ALL FACILITIES LOCATED IN THE FIELD PRIOR TO THE START OF ANY CONSTRUCTION. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT AT 1-800-642-2444 AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION.
6. EROSION CONTROL SHALL BE PERFORMED ON ALL DISTURBED AREAS.
7. LIMITS OF NEW STRUCTURAL SECTION SHOWN ARE FOR ESTIMATING PURPOSES ONLY. EXACT LOCATION SHALL BE AS DETERMINED IN THE FIELD BY THE ENGINEER DURING EXCAVATION.
8. ALL ELEVATIONS SHOWN ARE FINISHED ELEVATIONS UNLESS STATED OTHERWISE.
9. THE CONTRACTOR SHALL NOT PERFORM WORK OUTSIDE THE RIGHT OF WAY UNLESS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
10. FOR PAVEMENT STRUCTURAL SECTION:
    A.C. = ASPHALT CONCRETE, TYPE A
    A.B. = AGGREGATE BASE, CLASS II
11. THE INFORMATION CONCERNING EXISITNG UTILITIES IS NOT GUARANTEED SEE "INFORMATION TO BIDDERS" SECTION OF SPECIFICATIONS.
12. THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM THE APPROPIATE PROPERTY OWNERS PRIOR TO REMOVING ANY EXISTING FENCES, OR ENTERING ANY PROPERTY OUTSIDE THE DISTRICT'S PERMANENT EASEMENT OR TEMPORARY CONSTRUCTION EASEMENT. ALL FENCES, SHEDS OR OTHER PERMANENT IMPROVEMENTS REMOVED OR DAMAGED BY THE CONTRACTOR WITHIN THE EASEMENT OR CONSTRUCTION EASEMENT SHALL BE RESTORED TO THEIR ORIGINAL LOCATION AND CONDITION BY CONTRACTOR USING NEW MATERIALS AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCING AND GATES WHENEVER AND WHEREVER EXISTING FENCING OR GATES ARE REMOVED FOR CONSTRUCTION PURPOSES.
13. ACCESS TO THE CONSTRUCTION SITE FROM "A" STREET THROUGH THE FENCED AND LOCKED ALAMEDA COUNTY CORPORATION YARD IS AVAILABLE BY PERMIT FROM ALAMEDA COUNTY PUBLIC WORKS AT 399 ELMHURST STREET, HAYWARD, AT NO COST TO THE CONTRACTOR. THE CONTRACTOR CAN USE THIS PROPERTY AS A TEMPORARY STAGING AREA FOR HIS EQUIPMENT AND MATERIALS. THE CONTRACTOR SHALL SECURE THE FENCE AND LOCK THE GATE AT THE END OF EACH WORKING DAY.
14. WHERE REFERENCE IS MADE TO THIS NOTE, PAYMENT FOR ALL NECESSARY LABOR, EQUIPMENT AND MATERIALS REQUIRED FOR THE COMPLETE WORK SHALL BE DEEMED INCLUDED IN THE LUMP SUM PRICE BID FOR "CLEARING AND GRUBBING" AND/OR "MISCELLANEOUS WORK". SEE SECTIONS 14.17 AND 14.26 OF THE SPECIFICATIONS.
15. THE CONTRACTOR SHALL EXERCISE STRICT DUST CONTROL TO PREVENT DAMAGE TO ADJACENT AREAS. SEE GENERAL NOTE NO. 5.
16. WHERE STATIONING OF THE STRUCTURES IS SHOWN TO THE NEAREST FOOT, THE LOCATION MAY BE ADJUSTED BY THE ENGINEER TO SUIT SITE CONDITIONS.
17. THE CONTRACTOR SHALL PROTECT ALL EXISTING TREES AND SHRUBBERIES UNLESS OTHERWISE NOTED ON THE DRAWINGS. THE CONTRACTOR SHALL NOT ENTER UPON NOR DISTURB THE NATIVE VEGETATION UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
18. REMOVE BRUSH AND VEGETATION BETWEEN THE EXISTING TOP OF BANK ON THE LEFT SIDE AND CONSTRUCTION CENTER LINE ONLY AS NECESSARY TO PLACE STRUCTURAL FILL. SEE GENERAL NOTE NO. 5.
19. THE CONTRACTOR SHALL CONSTRUCT THE TEMPORARY LOW-FLOW BYPASS, DEWATER THE WORK AREAS, AND CONTROL THE GROUNDWATER TO PERMIT THE CONSTRUCTION IN AN EFFICIENT AND EFFECTIVE MANNER. THE CONTRACTOR SHALL PROTECT THE STREAM FLOW FROM POLLUTION AS WELL AS PROTECT THE CONSTRUCTION AREA FROM WATER DAMAGE. SEE TEMPORARY WATER CONTROL, SHEET NO. 9. SEE SECTION 14.29 OF THE SPECIFICATIONS.
20. STRUCTURE EXCAVATION WILL NOT BE PERMITTED UNTIL LOW-FLOW BYPASS SYSTEM HAS BEEN INSTALLED TO THE SATISFACTION OF THE ENGINEER. SEE SECTION 14.29 OF THE SPECIFICATIONS. SEE DETAIL SHEET NO. 9.
21. SHORING AND EXCAVATION PROTECTION WILL BE REQUIRED ALONG CONSTRUCTION C.L. STATION 22+73 TO STATION 22+98. THE CONTRACTOR SHALL SUBMIT A DETAILED PLAN SHOWING THE DESIGN OF THE SHORING, BRACING, SHEETING AND SLOPING FOR THIS REQUIRED PROTECTION PRIOR TO ANY EXCAVATION. THE SHORING AND EXCAVATION PROTECTION SHALL COMPLY WITH THE PROVISIONS OF THE CONSTRUCTION SAFETY ORDERS AND THE LABOR CODE. SEE SECTIONS 14.31 AND 14.32 OF THE SPECIFICATIONS.
22. THE CONTRACTOR'S ACCESS TO THE CONSTRUCTION SITE FROM THE ALAMEDA COUNTY CORPORATION YARD IS CONSIDERED RESTRICTIVE, BUT ADEQUATE TO COMPLETE THE REQUIRED CONSTRUCTION. THE CONTRACTOR SHALL CAREFULLY PLAN AND CONSTRUCT HIS MEANS IN SUCH A WAY THAT TREES, SHRUBBERIES, AND PERMANENT IMPROVEMENTS SHALL BE PROTECTED AND SHALL NOT BE DAMAGED, UNLESS OTHERWISE DESIGNATED ON THE DRAWINGS OR AUTHORIZED IN WRITING BY THE ENGINEER.
23. THE CONTRCTOR SHALL CONNECT AND EXTEND ALL SIDE DRAINS ENCOUNTERED WITHIN THE PROJECT LIMITS. SEE SECTION 14.17 OF THE SPECIFICATIONS, AND GENERAL NOTE NO. 5.
24. THE CONTRACTOR SHALL MAINTAIN ADEQUATE ACCESS TO PRIVATE PROPERTIES, DRIVEWAYS, AND DWELLINGS AT ALL TIMES.
25. QUANTITIES AND TOPOGRAPHIC INFORMATION PROVIDED ON THE DRAWINGS ARE BASED ON FIELED DATA OBTAINED IN NOVEMBER 1994. FINAL QUANTITIES FOR BASIS OF PAYMENT WILL BE BASED ON FIELED SURVEY DATA OBTAINED AFTER CLEARING AND GRUBBING.
26. THE DISTRICT IS IN THE PROCESS OF SECURING THE RIGHT-OF-WAY SHOWN ON SHEET 9. IT IS ANTICIPATED THAT THE ACQUISITION WILL BE COMPLETED BY MAY 31, 1999. SHOULD THE DISTRICT BE UNABLE TO SECURE THE RIGHT-OF-WAY DUE TO SOME UNFORSEEN CIRCUMSTANCE, THE DISTRICT MAY ELECT TO CANCEL THIS CONTRACT. SUCH CANCELLATION SHALL NOT CONSTITUTE A BASIS FOR CLAIM BY THE CONTRACTOR FOR PAYMENT OR DAMAGES.
27. THE CONTRACTOR AGREES THAT THE COUNTY IS NOT RESPONSIBLE FOR ANY THEFT OR DAMAGE TO THE CONTRACTOR'S EQUIPMENT OR MATERIALS STORED AT THE CONSTRUCTION STAGING AREA.

90% REVIEW
INCOMPLETE PLAN

PROJECT DESIGN ENGINEER
REVIEWED BY: DATE

WINZLER & KELLY
CONSULTING ENGINEERS
200 PINE STREET, SUITE 600, SAN FRANCISCO, CA 94104-2709
TEL 415.283.4970 FAX 415.283.4980 sfo@w-andk.com www.w-and-k.com

WORK ORDER NO. F12C56 | SPECIFICATION NO. FC12-143

COUNTY OF ALAMEDA PUBLIC WORKS AGENCY
DONALD J. LABELLE - DIRECTOR

REVIEWED
APPROVAL RECOMMENDED
APPROVED

ZONE No. 12 PROJECT
LINE B

KEY MAP AND GENERAL NOTES