FILE COPY

ATLANTIC TESTING LABORATORIES, *Limited*

121 Riverfront Drive
Manchester, NH 03102
Phone: (603) 669-4828
Fax: (603) 669-1842

26 Taft Avenue
White River Junction, VT 05001
Phone: (802) 295-2234

P.O. Box 29
Canton-Potsdam Road
Canton, NY 13617
Phone: (315) 386-4578
Fax: (315) 386-1012

November 24, 1993

U.S. Army Corps of Engineers
New England Division
Geotechnical Engineering Division
424 Trapelo Road
Waltham, MA 02254-9149

Attn: Mr. Mark Vance
Geotechnical Engineer

Re: Final Report - Hopkinton Dam Exploration Program
Hopkinton Dam
Hopkinton, New Hampshire
Contract No. DACW33-93-D-0004
Delivery Order No. 0005
ATL Report No. CD0042-1-11-93

Ladies/Gentlemen:

In accordance with Delivery Order No. 0005 dated September 10, 1993, enclosed you will find one copy of the report for the subsurface investigation performed at Hopkinton Dam, New Hampshire.

Please review and make appropriate comments. The draft invoice is enclosed. We would appreciate your cooperation in processing this invoice. Hopefully we can receive payment before year end.

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

Respectfully submitted,

Spence

Spencer F. Thew, P.E.
President

SFT/WH/dc

Encs.

RECEIVED
[redacted] 20 1994
GEOTECHNICAL ENGINEERING BRANCH

SECTION 1

REPORT - HOPKINTON DAM EXPLORATION PROGRAM

HOPKINTON DAM

HOPKINTON, NH

Contract No. DACW33-93-D-0004

Contracting/Ordering Officer:

Charles W. Coe

Delivery Order No. 0005

PREPARED FOR: U.S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, MA 02254-9149

PREPARED BY: Atlantic Testing Laboratories, Limited
P.O. Box 29
Canton, NY 13617

ATL REPORT NO. CD0042-1-11-93

NOVEMBER 24, 1993

SECTION 2

TABLE OF CONTENTS

SECTION 2

TABLE OF CONTENTS

SECTION 1 Title Page

SECTION 2 Table of Contents

SECTION 3 Scope of Investigation

a. Delivery Order
b. Project Site
c. Purpose
d. Scope of Work

SECTION 4 Quality Control

a. General Certification Statement
b. General Statement
c. Records Taken
d. Equipment Used
e. Procedures

SECTION 5 Summary of Activities and Telephone Logs

a. Summary of Activities - Table I
b. List of Telephone Logs - Table II

SECTION 6 Chain of Custody Log

SECTION 7 Safety Reports

SECTION 8 Field Inspector's Logs and Maps

a. Daily Log of Field Explorations
b. Boring Logs
c. Figure 1 - General Project Location Map
d. Proposed Boring Locations - Plate No. 1
e. Piezometer Location Plan
f. Proposed Piezometer Locations - Plate No. 2, Plate No. 3

SECTION 9 Other Records Taken

a. Survey Notes
b. Water Table Data
c. Piezometer Information
d. Field Permeability Test Results
e. Piezometer Diagram Profiles
f. Rock Coring Data
g. Field Log of Test Boring (NED-121)

SECTION 3

SCOPE OF INVESTIGATION

a. Delivery Order No. 0005

Survey Field Copy (WOLD)

ORDER FOR SUPPLIES OF SERVICES

(Contractor must submit four copies of invoice)

Form Approved (OMB No. 0704-0187) Expires Aug 31, 1992

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project(0704-0187), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send your completed form to the procurement official identified in item 6.

1. CONTRACT/PURCH ORDER NO.: DACW33-93-D-0004
2. DELIVERY ORDER NO.: 0005
3. DATE OF ORDER: 09/09/93
4. REQUISITION/PURCH REQUEST NO.: 961316-3229-0010
5. PRIORITY:

6. ISSUED BY — CODE 961316
Dept. of the Army
N. E. Division, Corps of Engrs
424 Trapelo Road
Waltham, MA 02254-9149
Dorothy Moebius S01 (617)-647-8419

7. ADMINISTERED BY — CODE EMPTY

8. DELIVERY FOB
[ ] DEST
[X] OTHER
(See Schedule)

9. CONTRACTOR Vendor Id: 00001586 CODE 0GKT9 FACILITY CODE

NAME AND ADDRESS
ATLANTIC TESTING LAB, LIMITED
P. O. BOX 29
CANTON, NY 13617-

10. DELIVER TO FOB POINT BY 09/30/93

11. MARK IF BUS. IS
[X] SMALL
[ ] SMALL DIS-ADVANTAGED
[ ] WOMEN-OWNED

12. DISCOUNT TERMS
0 % 0 Net 0

13. MAIL INVOICES TO
See Block 15

14. SHIP TO — CODE 961404
U.S.A. Engr. Div., New England
Hopkinton Lake
Route 127, Box 86, RR #2
Contoocook, NH 03229-9213 DACW33D0004/0005

15. PAYMENT WILL BE MADE BY — CODE FAO
Finance & Accounting Officer
U.S.A. Engr. Div., New England
424 Trapelo Road
Waltham, MA 02254-9149

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16. DELIVERY [X] This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.

PURCHASE [ ] Reference your furnish the following on terms specified herein.

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR | SIGNATURE | TYPED NAME AND TITLE | DATE SIGNED

[ ] If this box is marked, supplier must sign Acceptance and return the following number of copies:

17. ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
96X3123 CC113072 1A00000 (MC)

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/SERVICE	20. QUANTITY ORDERED/ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	FURNISH NECESSARY SUPPLIES AND SERVICES TO DETERMINE SUBSURFACE MATERIAL TYPES AND DISTRIBUTIONS AS WELL AS INSTALLATION OF PIEZOMETERS FOR DETERMINATION OF FOUNDATION PHREATIC SURFACES IN ACCORDANCE WITH THE ATTACHED SCOPE OF WORK AND DRAWINGS.				

If quantity accepted by the Government is same as quantity ordered, indicate by x. If different, enter actual quantity accepted below quantity ordered and encircle.

24. UNITED STATES OF AMERICA
Charles W. Coe 9/10/93
BY: CHARLES W. COE m01
CONTRACTING/~~ORDERING~~ OFFICER

25. TOTAL: 71980.50

29. DIFFERENCES

26. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

DATE | SIGNATURE OF AUTHORIZED GOVERNMENT REP.

27. SHIP. NO.
[ ] PARTIAL
[ ] FINAL

28. D.O. VOUCHER NO.

30. INITIALS

32. PAID BY

33. AMT VERIFIED CORRECT FOR

31. PAYMENT
[ ] COMPLETE
[ ] PARTIAL
[ ] FINAL

34. CHECK NUMBER

36. I certify this account is correct and proper for payment

DATE | SIGNATURE AND TITLE OF CERTIFYING OFFICER

35. BILL OF LADING NO.

37. REC'D AT | 38. RECEIVED BY | 39. DATE REC'D | 40. TOTAL CONT. | 41. S/R ACCOUNT NUMBER | 42. S/R VOUCHER NO.

ATLANTIC TESTING LAB, LIMITED

ITEM NO.	SCHEDULE OF SUPPLIES/SERVICE	QUANTITY	UNIT	UNIT-PRICE	AMOUNT
0003	GEOTECHNICAL INSPECTOR	200	HR	48.000000	9600.0
0004	GEOTECHNICAL INSPECTOR - STANDBY TIME	20	HR	48.000000	960.0
0005	PER DIEM - OVERNIGHT STAY	20	DA	55.000000	1100.0
0006	MILEAGE FROM WALTHAM, MA AND RETURN	165	MI	0.500000	82.5
000705	50% OF $9,600.00 (LINE ITEM NO. 3), DELIVERY ORDER NO. 0005 GEOTECHNICAL SERVICES AND REPORT	1	JB	4800.000000	4800.0
0008	SURVEYING MOBILIZATION AND DEMOBILIZATION	1	JB	450.000000	450.0
0010	MILEAGE FROM/TO CONTRACTOR'S EQUIPMENT STORAGE SITE(S). SITE(S) LOCATED IN MANCHESTER, NEW HAMPSHIRE	160	MI	0.500000	80.0
0011	SURVEY CREW AND EQUIPMENT	3	DA	880.000000	2640.0
0012	OVERNIGHT PER DIEM FOR SURVEY CREW	2	DA	160.000000	320.0
001305	DATA REDUCTION AND PLOTTING (PRICE EXPRESSED AS A PERCENTAGE OF LINE ITEM NO. 0011.) 75% OF $2,640.00, DELIVERY ORDER NO. 0005	1	JB	1980.000000	1980.0
0015	SAMPLE DELIVERY MOB & DEMOB - 2 RIGS	1	JB	110.000000	110.0
0016	MOBILIZATION AND DEMOBILIZATION ONE	2	JB	1320.000000	2640.0

ATLANTIC TESTING LAB, LIMITED

ITEM NO.	SCHEDULE OF SUPPLIES/SERVICE	QUANTITY	UNIT	UNIT-PRICE	AMOUNT
0016 (continued)	DRILL RIG, CREW AND AUXILIARY EQUIPMENT MOBILIZATION AND DEMOBILIZATION				
0018	MILEAGE FROM/TO CONTRACTOR'S MAIN EQUIPMENT STORAGE SITE. SITE LOCATED IN MANCHESTER, NEW HAMPSHIRE	160	MI	1.650000	264.0
0020	STANDBY TIME/ON SITE MOVES	20	HR	110.000000	2200.0
0043	DRIVE SAMPLE BORING WITHOUT CASING: CONTINUOUS SAMPLING 0-30 FT. DEPTH	180	LF	16.000000	2880.0
0044	31-50 FT. DEPTH	120	LF	20.000000	2400.0
0045	51-100 FT. DEPTH	300	LF	24.000000	7200.0
0046	OVER 100 FT. DEPTH	213	LF	34.000000	7242.0
0063	HX SIZE - 4"	100	LF	18.000000	1800.0
0064	5" ~~6~~-INCH SIZE	110	LF	25.000000	2750.0
0082	NWX SIZE AND/OR NWM	60	LF	77.000000	4620.0
0087	PIEZOMETER CASAGRANDE TYPE/OR EQUAL, 0-50 FT. DEPTH	400	LF	16.000000	6400.0
0088	CASAGRANDE TYPE/OR EQUAL, OVER 50 FT. DEPTH	294	LF	18.000000	5292.0
0094	CAST IRON VALVE BOX	6	EA	165.000000	990.0
0117	LUMBER FOR WORK PLATFORM OR SHORING	1800	BF	1.000000	1800.0

ATLANTIC TESTING LAB, LIMITED

ITEM NO.	SCHEDULE OF SUPPLIES/SERVICE	QUANTITY	UNIT	UNIT-PRICE	AMOUNT
0117 (continued)					
0121	CRANE AND OPERATOR	12	HR	115.000000	1380.00

CD0042

INSPECTION AND EXPLORATION SCOPE OF WORK

August 1993

PROJECT: Hopkinton Dam Exploration Program

SITE: Hopkinton Dam, Hopkinton, New Hampshire

PURPOSE: To determine subsurface material types and distributions, and installation of piezometers for determination of foundation phreatic surfaces.

1. SCOPE OF INVESTIGATIONS

a. Six borings shall be completed at the locations listed below. Field locations will be surveyed and staked, by the Contractor, prior to start of work. Plan, sections, and profile of the areas to be drilled are shown on attached Plates 1 through 3. Existing survey data for Hopkinton Dam is shown on Plate 4. The Contractor shall provide an experienced geotechnical inspector to log the explorations and prepare a report.

A, B+C Will Be done 1st

BORING NO.	DAM CL STATION	DAM CL OFFSET	EST. DEPTH OVERBURDEN	EST. DEPTH ROCK CORING	PIEZOMETER NO.
FD93-A	5+25	110'*	137' 3	10'	PZ-12
FD93-B	5+25	60'*	157' 1	10'	PZ-13A & 13B
FD93-C	5+25	75'**	156' 2	10'	PZ-14A & 14B
FD93-D	5+25	150'**	121'	10	PZ-15
FD93-E	4+00	150'**	121'	10'	PZ-16
FD93-F	3+00	150'**	121'	10'	PZ-17

* indicates upstream of center line
** indicates downstream of center line

If money left D, E, F will be done

b. Eight piezometers, two double piezometers, shall be installed at the locations listed above. Piezometer tip elevations and seal locations are shown on Plates 2 and 3. All elevations and installation details are subject to change as the work progresses. Close coordination with the Geotechnical Engineering Division, New England Division (NED) office is required during drilling operations to determine final piezometer elevations and details.

c. Eight falling head permeability tests shall be performed. One test shall be conducted in each piezometer.

d. Borings shall be advanced using six inch casing as shown on Plates 2 and 3. Soil sampling shall be continuous starting from 10 feet below ground surface. Sampling shall be in accordance with SPT procedures, except a 300 pound hammer (18 inch drop) and a 2-1/2 inch ID by 3-foot sample spoon shall be used. A minimum NX size rock core barrel shall be used in bedrock coring.

e. Refusal of the sampling spoon is defined as 60 blows per

inch or bouncing refusal. Boulders encountered shall be cored or roller bited in order to continue to the specified depth.

f. Poly-Sal or Revert drilling mud and clear water shall be used to keep the hole open below the bottom of the 6-inch casing to keep the hole open during drilling. The drilling mud shall be washed out of the hole with clear water prior to piezometer installations.

g. Odex drilling methods are NOT allowed on this dam.

h. Hopkinton Dam holds a conservation pool near El. 381 ± ft NGVD during normal operations. Water from the upstream pool and downstream forebay pool may be used during boring operations.

i. The Contractor shall supply all sample jars and labels. Representative samples of each material shall be saved and labelled.

j. Piezometers shall be installed as directed by NED personnel. The top of the PVC riser for the lower piezometer shall be set at a slightly lower elevation than the top of the PVC riser for the upper piezometer. Each riser pipe shall be tagged with a brass tag which will be supplied by NED. Final locations of piezometer tips shall be approved by NED prior to setting the piezometer. The top of all risers shall be surveyed by the contractor after installation.

k. All piezometers shall be protected with a 10-foot piece of 4 inch pipe grouted in the hole. A cast iron valve box shall be provided for each of the four holes. Protective pipe and cast iron valve box for piezometers on the upstream and downstream berms shall be flush with the berm. Protective pipe and cast iron valve box for piezometers on the slopes shall stick up 2 feet. The number of the piezometer(s) shall be painted and stamped with a die on the outside of the protective pipe.

l. A sand filter shall be placed around each piezometer between each of the seal elevations or as directed in the field.

m. Falling head permeability tests shall be performed on each of the piezometers after installation and the results recorded.

n. The site shall be restored to original condition before demobilization. The condition of the site shall be approved by the Hopkinton Dam project manager.

2. SITE CONDITIONS

One boring is located on the upstream berm, one is located on the upstream slope, one on the downstream slope, and three along the downstream berm. Access is available for each location as shown on Plate 1. All borings are located on property owned by the Corps of Engineers.

Laura Frazier

-8068

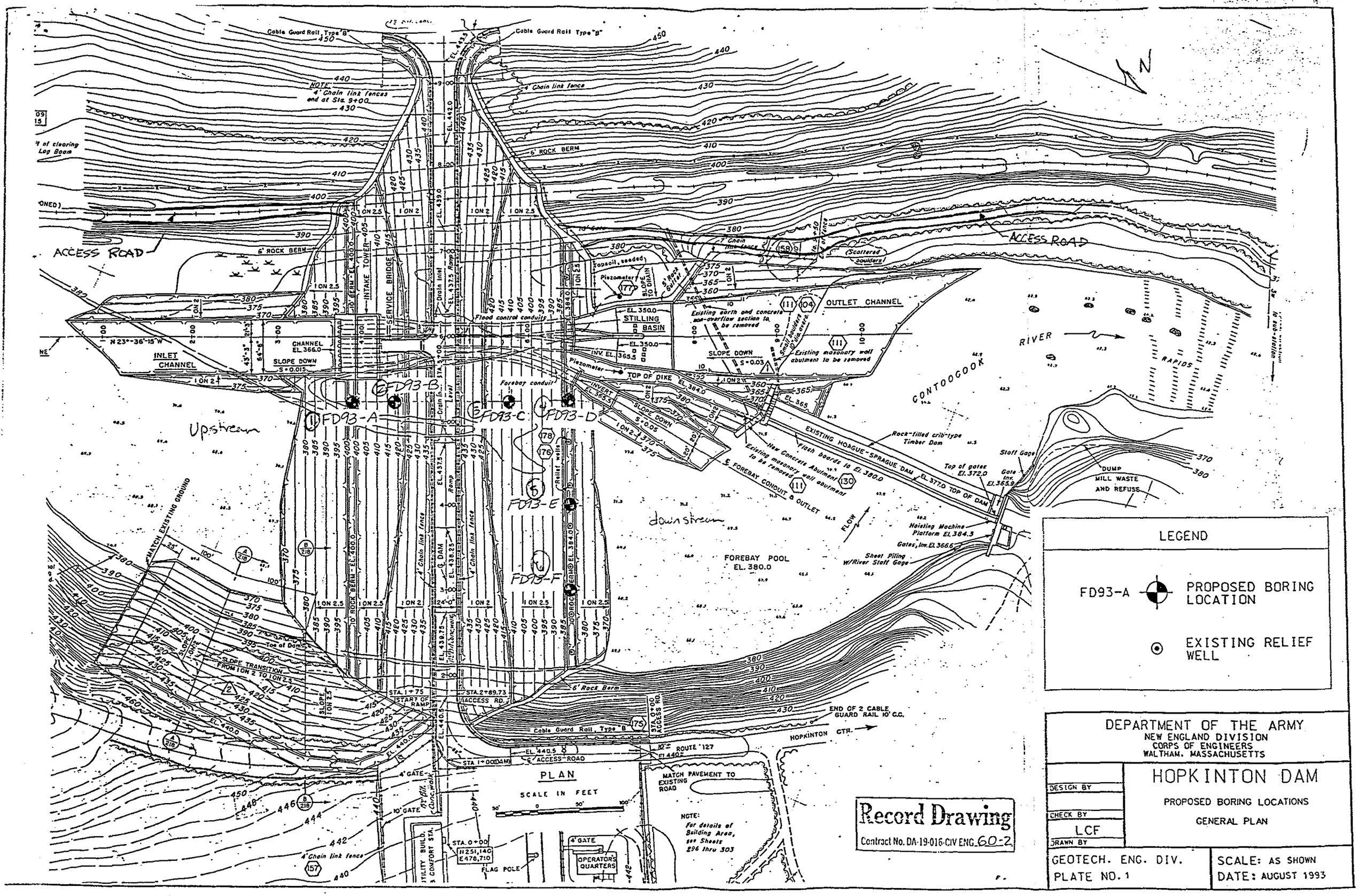
3. COORDINATION

The Contractor shall coordinate all work with the following NED personnel: Mr. Mark Vance at (617) 647-8179, Geotechnical Engineering Division, Waltham, MA, and Mr. David Shepardson at (603) 746-3601, Project Manager, Hopkinton Dam. Mr. Mark Vance shall be notified one week prior to the start of work.

All field work must be done prior to 30 September 1993.

4. EXPLORATION DESIGNATION

Borings shall be numbered FD93-1 through FD93-6 in the order of their completion. The hole labelled FD93-A on the upstream berm shall be done last.


N
ACCESS ROAD
ACCESS ROAD
INLET CHANNEL
N 23°-36'-15" W
CHANNEL EL 366.0
SLOPE DOWN S = 0.015
INTAKE TOWER
SERVICE BRIDGE
6' ROCK BERM
Cable Guard Rail, Type "B"
4' Chain link fence
NOTE: 4' Chain link fences end at Sta. 9+00
Flood control conduits
STILLING BASIN
EL. 350.0
INV. EL. 365.5
Piezometer
TOP OF DIKE EL. 384.0
Forebay conduit
OUTLET CHANNEL
Topsoil, seeded
SLOPE DRAIN
5' Rock Gutter
Existing earth and concrete non-overflow section to be removed
Existing masonry wall abutment to be removed
SLOPE DOWN S = 0.03
SLOPE DOWN S = 0.05
EXISTING HOAGUE-SPRAGUE DAM EL. 377.0 TOP OF DAM
Rock-filled crib-type Timber Dam
Flash boards to El. 380.0
New Concrete Abutment
Existing masonry wall abutment to be removed
FOREBAY CONDUIT & OUTLET
Staff Gage
Top of gates El. 372.0
Gate Inv. El. 365.9
DUMP MILL WASTE AND REFUSE
Hoisting Machine Platform El. 384.3
Gates, Inv. El. 366.6
Sheet Piling W/River Staff Gage
FLOW
FOREBAY POOL EL. 380.0
CONTOOCOOK RIVER
RAPIDS
Upstream
downstream
FD93-A
FD93-B
FD93-C
FD93-D
FD93-E
FD93-F
MATCH EXISTING GROUND
10' ROCK BERM EL. 400.0
SLOPE TRANSITION FROM 1 ON 2 TO 1 ON 2.5
Toe of Dam
STA. 1+75 START OF RAMP
STA. 2+89.73 ACCESS RD.
STA. 0+00 ACCESS RD.
END OF 2 CABLE GUARD RAIL 10' C.C.
HOPKINTON CTR.
ROUTE 127
EL. 440.5
ACCESS ROAD
STA. 1+00 (AM)
4' GATE
10' GATE
MATCH PAVEMENT TO EXISTING ROAD
UTILITY BUILD. & COMFORT STA.
STA. 0+00 N 251,140 E 478,710
FLAG POLE
OPERATOR'S QUARTERS
NOTE: For details of Building Area, see Sheets 296 thru 303
PLAN
SCALE IN FEET
LEGEND
FD93-A PROPOSED BORING LOCATION
EXISTING RELIEF WELL
Record Drawing
Contract No. DA-19-016-CIV ENG 60-2
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS
HOPKINTON DAM
PROPOSED BORING LOCATIONS
GENERAL PLAN
DESIGN BY
CHECK BY
LCF
DRAWN BY
GEOTECH. ENG. DIV.
PLATE NO. 1
SCALE: AS SHOWN
DATE: AUGUST 1993

b. Project Site

The project site is located on Hopkinton Dam in Hopkinton, New Hampshire.

c. Purpose

The purpose of the investigation was to determine subsurface material types and distributions, and to install piezometers for determining foundation phreatic surfaces.

d. Scope of Work

Inspection and exploration instructions were provided by the Army Corps of Engineers (NED), in Delivery Order No. 0005 and are included in Section 3a. of this report. General inspection and exploration instructions were provided by the Army Corps of Engineers (NED) through the contracted Specifications for Services, and Equipment Necessary for Conducting Geotechnical Exploratory Work Various Locations in New England.

Drilling and sampling were performed by Atlantic Testing Laboratories, Limited's (ATL) personnel using ATL equipment. The test borings were sampled using a 2-1/2" I.D. split spoon sampler advanced with a 300-lb. safety hammer and a drop height of 18". The borings were advanced using PW and HW casing by spinning and washing. The casing was cleaned with the appropriate size roller bit.

The proposed scope of work required three test borings, two advanced from wooden platforms constructed on either side of Hopkinton Dam on the rip-rap slopes. The borings were performed from October 4 through November 11, 1993.

ATL's surveyors provided locations and elevations for the test borings.

SECTION 4

QUALITY CONTROL

a. General Certification Statement

I hereby certify that the records, equipment, and procedures mentioned herein were used to perform the subsurface exploration. I also certify that the work was performed in a professional manner and meets the requirements set forth in the Delivery Order. This report has been subject to my review and is both complete and technically accurate.

CERTIFIED, November 23, 1993

Spencer F. Thew, P.E./L.S.

b. General Statement

The equipment and procedures used to perform the subsurface investigation are summarized below.

c. Records Taken

The "General Project Map", "Site Location Plan", and "Boring Location Plan" are included in Section 8.

Pertinent drilling procedures, sampling operations, and soil classification data were noted on the following forms provided by the Corps of Engineers:

NED 198	Daily Log of Field Explorations
NED 58 and 58a	Field Log of Test Boring
NED 121	Field Log of Test Boring
NED 59	Subsurface Water Observations
	Piezometer Installation Report
	Field Permeability Test Results
NED 130	Field Log of Test Boring in Rock

A series of logs for each of the borings and probes are included in Section 8.

A summary of daily activities and a telephone log are Table I and Table II of Section 5, respectively. A chain of custody log is in Section 6. Safety meeting, reports, and NED Form 251 are in Section 7.

d. Equipment Used

Drilling equipment, survey equipment and supplies were provided by Atlantic Testing Laboratories, Limited (ATL). The subcontract equipment was owned and operated by Able Crane Co. of Merrimack, New Hampshire. A list of pertinent equipment follows:

1. Survey Equipment:

   - 1 Wild T1000 Electronic Theomat with single and triple reflectors
   - 1 Wild GRE-4 Data Collector/Field Computer
   - Wild Heerbrugg, NAKI automatic level
   - 25-foot, extendable, fiberglass, stadia rod
   - Two-way radios
   - 1 Suburban Truck

2. Drilling Equipment:

   - CME-55 truck-mounted drill rig
   - PW and HW size casing with spin shoes
   - Drill rod, NW-threaded in 2 ft, 5 ft and 10 ft lengths used for sampling and advancing a roller bit
   - 300-lb. safety hammer for driving split spoon samples
   - 2 ft x 2-1/2" I.D. split spoon samplers
   - 5 H.P. Honda sump pump with connecting hose and water holding tank
   - NX and P size core barrels with diamond bits.

3. Subcontract Equipment:

   - Grove TM890 Crane/Operator

e. Procedures

1. General Statement

   A test boring investigation including the installation of piezometers was performed on the rip-rap slopes of Hopkinton Dam, Hopkinton, New Hampshire during the period October 4, 1993 through November 11, 1993.

e. Procedures (con't.)

2. Surveying Procedures

Atlantic Testing Laboratories, Limited's surveyors were on-site to locate the test borings and subsequently returned to the site to determine the boring locations and elevations as drilled.

a. Horizontal and Vertical Control:

Stake out: Dam centerline stations and offsets for each of six proposed piezometer locations were provided by the Corps of Engineers. The coordinates and elevations for Hopkinton Dam control monuments were also provided. The station/offset positions of the piezometers were converted to coordinate positions, and stakeout angles and distances computed from Monument 5 to each piezometer. The locations of the proposed monuments were then marked with wooden stakes and/or paint. Final positions (horizontal and vertical) of the three piezometers were determined from Monument 5 using the electronic theodolite and distomat.

3. Boring Location Procedures

Proposed test boring locations were determined from angle/distance measurements from known Corps of Engineers survey monuments located along the top of Hopkinton Dam, on the sidewalk on either side of State Highway Route 127. Flagged wooden stakes were driven in the rock rip-rap. Actual test boring locations, and well and piezometer elevations were later determined by the same method when the project was completed.

4. Sampling and Drilling Procedures

Three borings were performed at Hopkinton Dam. However, the Delivery Order had referenced six borings to be performed as shown on Attachment 2, Section 3a. The reduction in the number of borings was requested by a USACE representative. Piezometers were installed in each of three borings. The field exploration included drilling, soil sampling, and rock coring followed by piezometer installation and testing.

Soil sampling techniques involved retrieving material using the Standard Penetration Test. A 2-1/2" I.D. x 2 ft long split spoon sampler was advanced using a 300-lb. safety hammer. Samples were classified in the field in accordance with ASTM D-2488. Representative samples were taken from each soil sampling run and placed in 32-oz. jars with hermetically-sealed lids. Sample jars were labeled using a form similar to ENG Form 1742.

Bedrock was cored using NX size core barrel and diamond bit. The rock core retrieved was placed in 5 ft long core boxes as specified in the contract.

A Chain-of-Custody Log was maintained to document custody of samples between ATL and the USACE.

e. Procedures (con't.)

5. Well Installation Procedures

After the boring had been advanced to designed depth and the bedrock cored, bentonite pellets were placed in the bottom of the hole to the specified depth. Random fill was then placed in the bore hole to the depth of the lower piezometer seal. The seal consisted of bentonite pellets filled to the specified depth. The 18" long porous plastic piezometer and 3/4" PVC riser pipe were connected and lowered to the determined depth as directed by the USACE. Filter sand (No. 20 silica sand) was added to the specified depth, followed by the upper bentonite seal (3/8" peltonite pellets). The remainder of the open hole was filled with either random fill or all purpose sand. A 4" diameter by 10 ft length of steel casing was left in place around the 3/4" riser pipe for protection at test boring Locations FD93-1 and FD93-2 on the rock rip-rap slopes. A 4" diameter by 5 ft length of steel casing was used at test boring Location FD93-3, and grouted to surface elevation as specified. The piezometer riser pipe protectors have 30" of stickup on the rock slopes and a 4" stickup at Location FD93-3. The piezometers were secured with a screw-on locking pipe cap on the protective casing.

6. Well Testing Procedures

A Falling Head Permeability Test, as described in the Contract, was performed on each well after installation. This required pouring water down the riser pipe until it completely fills, then measuring the water level drop against time. The depth was measured using an electronic water level indicator at 30 seconds, and 1, 3, 5, 10, 20 and 30-minute increments. A horizontal permeability factor was determined.

SECTION 5

SUMMARY OF ACTIVITIES

AND

CONVERSATION LOGS

a. Summary of Activities

TABLE I

DATE	ACTIVITY
Sunday, September 19, 1993	**2:00 pm - 7:30 pm, ATL Surveyors on site.** - Mobilized survey crew to site, checked monumentation, and began stakeout.
Monday, September 20, 1993	**7:00 am - 3:30 pm, ATL Surveyors on site.** - Staked out all boring locations and returned.
Wednesday, September 29, 1993	- ATL mobilized four person crew, drill rig (CME-55), and 1,800 board feet of lumber for platform construction to project site.
Thursday, September 30, 1993	**6:30 am - 7:00 pm, ATL driller, 2 helpers, superintendent on site.** - Mobilized crane and operator. - Drill crew prepared drill rig for crane lift to Boring Number FD93-B. Drill crew began moving drilling supplies and tools to Location FD93-B on the slope. - Employed traffic control (road signs, cones, and flagmen) per New Hampshire Department of Transportation (NHDOT) and State Police. - Unloaded rig stand and lumber. Superintendent and 1 helper began construction of drilling platform at Location FD93-1. - 7:00 pm, Depart site for the day.
Friday, October 1, 1993	**6:30 am - 2:00 pm, ATL driller, helper, superintendent on site.** - Drill crew continued assembling rig and moving drill tools and supplies to Location FD93-B. - Superintendent and helper continued constructing drill platform at FD93-B. - 2:00 pm, Depart site for the day.
Monday, October 4, 1993	**10:30 am - 6:30 pm, ATL driller, helper, superintendent on site.** - Mobilized 90-T crane and operator. - Employed traffic control (road signs, cones, and flagging) per NHDOT and State Police. - Drill crew placed drill rig and equipment on drill platform at Location FD93-B. - Superintendent began building platform at Location FD93-C. - 6:30 pm, Depart site for the day.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Tuesday, October 5, 1993	**6:30 am - 7:00 pm, ATL driller, helper, geotechnical inspector, superintendent on site.** - Mark Wilbur (ATL geotechnical inspector) conducted safety meeting. - Drillers started drilling Location FD93-1 (FD93-B). - Remove 2' of rip-rap at boring location. - Hooked up water pumps. - Begin drilling at 2' depth. - M. Wilbur (ATL) met with David Shepardson, Project Manager. - Requested keys for the storage shed, obtained emergency communication telephone numbers, and informed him a safety meeting was held. - ATL was informed by D. Shepardson to construct safety railings around the platform. - Terminated drilling at -26'; PW casing at -20'; water at -5.5' (induced). - Superintendent continued building platform at Location FD93-C. It was necessary to purchase an additional 1,248 board feet of timber for the platform. - 7:00 pm, Depart site for the day.
Wednesday, October 6, 1993	**6:30 am - 7 pm, ATL driller, helper, geotechnical inspector, superintendent on site** - Paul Davis (ATL superintendent) began platform construction at Location FD93-C. - Drillers spun PW casing from -20 to -25'. Roller bit with wash water to -26'. - Began split spoon sampling at -26'. - Installed safety ropes around the platform per D. Shepardson's request. - Peter Russell of the Hopkinton Fire Department stopped on-site and requested a minimum of two days notice for total road closure. Contact Person: Lt. Pianka, Telephone 603/746-3181. - Stopped drilling at -54'; PW casing at -50', water at -8.5' (induced). - 7:00 pm, Depart site for the day.
Thursday, October 7, 1993	**7:00 am - 7 pm, ATL driller, helper, geotechnical inspector, superintendent on-site** - Paul Davis (ATL superintendent) continued platform construction at Location FD93-C. - Tom Eldridge replaced Mark Wilbur as ATL's geotechnical inspector. - Drillers advanced Test Boring FD93-1; starting from -54'. - M. Vance and L. Frazier of CE-NED, on-site to observe drilling operations.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Thursday, October 7, 1993 (con't.)	- Wally Shedd of ATL's Manchester, NH office visited site. Wally attended meeting in regards to road closure procedures and of the possibilities of utilizing the crane to move the drill rig to the other side of dam after midnight (approximately 2:00 am). - Geotechnical inspector and drillers met with M. Vance and L. Frazier of CE-NED concerning the problems of the bore hole remaining open below the PW stabilizing casing. M. Vance indicated the PW casing could be further advanced, if stabilizing the bore hole with drilling mud proved ineffective. - The test boring was advanced from -54' to -66'; continuous sampling every 2' with a 2-1/2" I.D. split spoon sampler. - The boring was advanced with a 3-7/8" roller bit using wash water. - PW casing was advanced to -65' by the end of the day. Water at -6.7' (induced). - 7:00 pm, Depart site for the day.
Friday, October 8, 1993	**7:00 am - 1:00 pm, ATL driller, helper, geotechnical inspector, superintendent on site** - Water level in test boring -12.3'. - Began drilling starting at -66'. Roller bit/wash bore hole; continuous sample with 2-1/2" I.D. split spoon sampler. - Rob Pryce (ATL driller) called T. Wiggins (ATL) to discuss the need to use HW casing to keep bore hole open. T. Wiggins agreed. - PW Casing advanced to -75'. - A sand layer was encountered at Location FD93-1 at approximately -70 to 72', and a sample was obtained. Otherwise, generally sandy glacial till material encountered. - Drill to -79.2 ft. Continuous sample to -79.2'. Water level in the boring -10.7' (induced). - 1:00 pm, Depart site for the day.
Monday, October 11, 1993	**12:00 pm - 7:00 pm, ATL driller, helper, geotechnical inspector on site** - Safety meeting was held by Geotechnical Inspector, T. Eldridge.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Monday, October 11, 1993 (con't.)	- Advance HW casing from 0' -79.5' (spin and wash); install 3-7/8" roller bit and advance to 80'. Continuous sample beginning at -79.2' and was continued to -88' with 3" I.D. split spoon sampler. Advance HW casing to 84'. - 7:00 pm, Depart site for the day.
Tuesday, October 12, 1993	**7:00 am - 6:30 pm, ATL driller, helper, geotechnical inspector on site.** - Began drilling; continuous sampling at -88' using 3" I.D. split spoon sampler. - Boulder refusal at -92'; penetrate 9" cobble with 3-7/8" roller bit. - Continue drilling and sampling. Strata changes at -92' and -100'; especially at -100', where fine to medium sands grade to fine to coarse sands and gravel, with cobbles and most likely boulders. - Continuous sampling in sand/gravel zone; high blow counts and frequent refusals. - Continuous sampling to -108.8'. Advanced HW casing to -110' at end of day. Water reading at -2.5' (induced). - 6:30 pm, Depart site for the day.
Wednesday, October 13, 1993	**7:00 am - 6:30 pm, ATL driller, helper, geotechnical inspector on site.** - Roller bit and wash casing to -110'. Continued drilling with continuous sampling. - Many cobbles and/or boulders; used 3-7/8" roller bit to penetrate. - Advanced HW casing to -120'. Strata change at -121' from sand/gravel to dense glacial till material. Relatively slow drilling; roller bit through cobbles and dense gravel; high blow counts and refusals in SPT tests. Continued sampling to -128.4'. - Water level at -30.1'. - 6:30 pm, Depart site for the day.
Thursday October 14, 1993	**7:00 am - 6:30 pm, ATL driller, helper, geotechnical inspector on-site.** - Water level reading at -47.5'. Drilling began at -128.4' with continuous sampling using 3" I.D. split spoon sampler. - Spun and washed HW casing from -120' to -130'.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Thursday, October 14, 1993 (con't.)	- Strata change in glacial till at approximately -135.5'. Till contains greater amounts of fine sand and silt and a little clay. - Suspected bedrock encountered at -144'. - Continued use of roller bit to -146' and sampled. Rock fragments recovery after blow count refusal with 300 lb. hammer. Roller bit to -148'. - Spun and washed HW casing from -130' to -144.5'; seated in to bedrock. - Core rock 5' run from -148.0' to -153.0'; 70% recovery of weathered bedrock. - 6:30 pm, Depart site for the day.
Friday, October 15, 1993	**7:00 am - 1:00 pm, ATL driller, helper, geotechnical inspector on-site.** - T. Eldridge called M. Vance (CE-NED); he was on his way to project site. - Began second 5' run of bedrock core; 60% recovery. - T. Eldridge obtained 1/2 to 3/4 yd. of bank run, washed sand from Henniker Sand and Gravel for use as random fill material in test boring. Returned to project site. - M. Vance on site to review soil samples and drilling logs; later determined adjusted piezometer tip and bentonite seal elevations; forward to geotechnical inspector. - Drill crew backfilled bedrock core with bentonite pellets to -44.5' elevation; withdrew 5' of HW casing. - Moved random sand fill to rig platform. - Drill crew spent 3 hours preparing for move to next drill location and moving drill supplies. - 1:00 pm, Depart site for the day.
Monday, October 18, 1993	**10:30 am - 7:30 pm, ATL driller, helper, geotechnical inspector on site** - T. Eldridge went to Merrimack Farm & Country Store (Blue Seal) in Henniker, NH to purchase 24 bags of all purpose sand for test boring backfill. Returned to site and stored equipment in garage. - Ray Wellman of ATL arrived on site with 12, 100 lb. bags of #20 silica sand for use as filter sand. They were stored in the equipment garage. - Drill crew moved sand and piezometer supplies to drill rig platform.

a. **Summary of Activities (con't.)**

TABLE I (con't.)

DATE	ACTIVITY
Monday, (con't.) October 18, 1993	- Drillers begin pulling HW casing and back-filled with all purpose sand and existing bank run sand from Henniker Sand & Gravel. - Lower zone of random fill backfilled from -144.5' to -125.0'. - Lower seal for Piezometer 13-A backfilled 6' (-125.0' to -119.0') with bentonite pellets. - Constructed and installed lower Piezometer (13-A). Piezometer tip at -117' depth on bedding of filter sand. Backfilled filter sand to -103'. - End backfill placement for the day. - Test floodlights for dam night lighting. - 7:30 pm, Depart site for the day.
Tuesday, October 19, 1993	**7:00 am - 12:00 am, ATL driller, helper, geotechnical inspector on-site.** - Finished backfilling filter sand for lower piezometer. - Began backfill placement for upper bentonite seal. - T. Eldridge made phone calls to equipment rentals to secure more dam floodlights. - HW casing starting to clog with bentonite seal, bridging at about -68'. - Began flushing with water in attempts to clear. - Continued backfilling hole after obstruction cleared. Sand, random fill placement to -56'. Placed lower bentonite seal for upper piezometer from -56' to -50'. - Pull remaining HW casing. - Filter sand backfilled around upper piezometer after installation. - Upper seal of upper piezometer completed (-42' to -38'). Random fill placed above -38' to -8'. - Casing pulled. Pulled all remaining PW casing. - 4" Steel protective casing placed in bore hole. 10' Length with 2'+ stickup. - At 10:00 pm, drill crew started preparing for move with crane. - T. Eldridge moved lighting materials, power cords, necessary equipment to dam gatehouse for use in night work on the dam. - Rigged up dam lighting for night work.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Wednesday, October 20, 1993	**12:00 am - 7:00 am, ATL driller, helper, geotechnical inspector on site** - Clear rig platform. Fold up drill rig, organize drill rods and pipe casing, and consolidate gear. - Hopkinton Police arrived/Tim Gunn, State Highway Department arrived. - Crane on-site and set outriggers, set up lighting, and barricades. - Moved drill rig over dam crest to platform on north side at Location FD93-2, center on platform. - Moved drill rods, pipe casing, etc. to other side. - Rig down lighting, remove barricades, etc. **11:30 am - 6:00 pm, ATL driller and helper on site** - Drill crew finished moving miscellaneous supplies from south of the dam to north. - Drilled holes and bolted drill rig to platform. - 6:00 pm, Depart site for the day.
Thursday, October 21, 1993	**7:30 am - 7:00 pm, ATL driller, helper, geotechnical inspector on site** - Standby time due to heavy steady rain and hazardous rock rip-rap conditions. - Began drilling through rip rap using PX (4 x 5-1/2) diamond bit. - Penetrated boulders in 5 places with PX diamond bit. Broke up rock and removed (+6'). Then install PW casing. - Spin/wash PW casing with diamond cutting shoe to -10'. - Roller bit and wash to -11' (gravelly, cobbly @ -10'). - Sample from -11' to -13' with 3" split spoon sampler at 5' intervals. - Roller bit and wash to -15'. Gravelly and relatively difficult drilling. - 7:00 pm, Depart site for the day.
Friday, October 22, 1993	**7:00 am - 1:00 pm, ATL driller, helper, geotechnical inspector on site.** - Began drilling and advanced PW casing from -10' to -15'. - Began sampling with 3" split spoon sampler in 5' intervals from -15' to -35'. - Began continuous sampling from -35' to -39' (strata change at -37' and again at -38. Advanced PW casing to -39'. - 1:00 pm, Depart site for the day.

a. **Summary of Activities (con't.)**

TABLE I (con't.)

DATE	ACTIVITY
Monday, October 25, 1993	**10:30 am - 6:30 pm, ATL driller, helper, geotechnical inspector on site.** - T. Eldridge to Merrimack Farm (Blue Seal) to obtain 24, 60-lb. bags of all purpose sand; stored them in equipment storage garage; CE-NED building on site. - Begin backfilling around protective well casing at Location FD93-1, after the 9' length of pipe was placed in the ground. - Filled inside the 4" dia. pipe, around the piezometer risers with all purpose sand. Outside of well protector with bank run sand. - Install locking well cap. - T. Eldridge, conducted safety meeting. - Continued drilling at Location FD93-2 starting at -39'. Continuous sample through permeable sand zone. - Continuous sample to -51' using a 3" split spoon sampler. - Sampled S-13 from -49' to -51' beginning of grey, virgin glacial till material. - Advanced PW casing to -55'. - Sampling at 5' intervals from -51' to -62'. - 6:30 pm, Depart site for the day.
Tuesday, October 26, 1993	**7:00 am - 6:30 pm, ATL driller, helper, geotechnical inspector on-site.** - Water level reading at -34.5'. - Assemble and advance HW casing from 0' to -60'. - Replace worn roller bit with new, type LH1 3-7/8" dia. - Sampled at 5 ft intervals from -62' to -90'; continuous sample from there through gravel zone to -96.8'. - Strata change at -85.5' (glacial till material changing to fine sand with thin beds of silt/clay material, trace gravel). - Strata change at -95.5' (previous strata grading in to cmf sands and gravel). - Terminated sampling at -96.8'. - Terminated HW casing at -95'. - Water level reading at -24.5' (induced). - 6:00 pm, Depart site for the day.

a. **Summary of Activities (con't.)**

TABLE I (con't.)

DATE	ACTIVITY
Wednesday, October 27, 1993	**7:00 am - 6:30 pm, ATL driller, helper, geotechnical inspector on site** - Water level reading at -35.5'. - Continuous sampling starting at -96.8' through -115'. - Strata change at -108' (cmf sands and gravel change to grey, fine sand and silt, little gravel). - Change to glacial till at -115'. - Begin sampling at 5' interval starting at -115'. - Terminated sampling at -125.7' (slow drilling); boulders and cobbles at -121.5' to -124.0'. - Advance HW casing to -120.0'. - Water level reading at - 25.8' (induced). - 6:30 pm, Depart site for the day.
Thursday, October 28, 1993	**7:00 am - 7:00 pm, ATL driller, helper, geotechnical inspector on site** - Water level reading at -37.5'. - Continued drilling from -125.7' to -144'. Sample at 5' intervals. - Dense, glacial till material encountered, with cobbles and boulders. - Advanced test boring FD93-2 to bedrock at -142'. - Advanced roller bit 2' into bedrock. Advanced HW casing from -120' to -144'. - Begin coring granite bedrock using NX core barrel and diamond bit/advanced, two 5' runs/core samples obtained from -144' to -154'. - Boring terminated at -154'. - Water level reading at -24.5' (induced). - Moved peltonite pellets and all purpose sand to rig floor/organize. - Seal cored bedrock cavity with "pellets", began addition of random fill (all purpose sand/began pulling HW casing). - 7:00 pm, Depart site for the day.
Friday, October 29, 1993	**7:00 am - 1:00 pm, ATL driller, helper, geotechnical inspector on site** - Backfill test boring FD93-2 with random fill (all purpose sand) from -141'. - Pull HW casing slowly when adding fill. - M. Vance (CE-NED) arrived on site at 10:00 am and determined piezometer elevations, seals, etc. Reviewed site conditions. Directed ATL to proceed to Location FD93-D for next boring.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Friday, October 29, 1993 (con't.)	- M. Vance directed ATL to install improved well protectors and locking caps on the existing piezometers located along the berm and toe of rip-rap slope, downstream side of the dam. This would be in addition to work already contracted and would be a modification to the contract. R. Pryce (ATL driller) and S. Thew (ATL) to follow up. - Location FD93-2 bore hole backfilled with random sand to -127'. Pulled casing to -125'. - Mobilize random fill (all purpose sand), peltonite pellets, and filter sand to rig platform. - Drill crew began moving drill supplies and tools to Location FD93-D. - 1:00 pm, Depart site for the day.
Monday, November 1, 1993	**11:30 am - 5:30 pm, ATL driller, helper, geotechnical inspector on site.** - Backfilled borehole with random fill (all purpose sand) from -127' to -121'. Peltonite "pellets" (bentonite sealer) was then placed to -115'. - Installed lower piezometer (P-14A) at -113'. - Backfilled with filter sand from -115' to -96'; placed bentonite for upper seal from -96' to -90'. Backfilled with random fill (all purpose sand) from -90' to -65'. - Pulled HW casing to -65'. - 5:30 pm, Depart site for the day.
Tuesday, November 2, 1993	**6:30 am - 5:00 pm, ATL driller, helper, geotechnical inspector on site** - Continued backfilling with random fill from -65' to -55'. - Removed and disassembled HW casing. - Placed lower seal from -55' to -49'. - Installed Piezometer P-14B and backfilled zone with filter sand (-49' to -39'). - Placed upper seal (peltonite pellets) to -33'. Backfilled boring with random fill to -10'. - Installed 4" steel protective well casing, 10' length; and backfilled inside and out with all purpose sand. - Completed test boring and piezometer installation. - Performed field permeability tests through both piezometers and recorded results (falling head tests).

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Tuesday, November 2, 1993 (con't.)	- At 2:00 pm, drill crew started removing tools and supplies from drill rig platform in preparation for mobilization to next boring. - Drill crew mobilized equipment, lights, etc. to dam gatehouse in preparation for move with the crane. - 5:00 pm, Depart site for the day.
Wednesday, November 3, 1993	**12:30 am - 6:30 am, ATL driller, helper, geotechnical inspector on site** - Assemble lights, power, barricades, etc. - Crane operator on site; sets outriggers out and prepares boom. - Drill rig moved off platform and placed on truck located on Route 127 (top of earth dam)/bolted to the truck. - Drill rods, HW and PW casing removed from rip-rap slope work area. - Crane lifts steel drill rig support structure on to back of truck, centers and secures; end is red flagged. - Gather lights, equipment, etc. Consolidate and store. Road re-opens. - **10:30 am - 6:00 pm, ATL driller, helper on site** - **12:00 pm - 6:00 pm, Geotechnical inspector on site** - Moved equipment and rental supplies from dam gatehouse to equipment storage garage, CE-NED building. - Drill rig and equipment mobilized to FD93-3 location on berm road downstream side of dam. - At 3:00 pm, began drilling and penetrated rip-rap; advanced PW size casing to -10'. - T. Eldridge (geotechnical inspector) returned lighting and rental equipment. - 6:00 pm, Depart site for the day.
Thursday, November 4, 1993	**6:00 am - 5:30 pm, ATL driller, helper, geotechnical inspector on site** - Begin sampling by using 2-1/2" I.D. split spoon sampler at 5' intervals. - Replaced spin shoe on HW casing. Advanced PW casing to -20 ft; and HW casing to -65'. - Advance test boring, including HW casing. Sampled at 5' intervals through glacial till, and stratified sands and silts. - Last sample at -65' to -65.8'. - 5:30 pm, Depart site for the day.

a. **Summary of Activities (con't.)**

TABLE I (con't.)

DATE	ACTIVITY
Friday, November 5, 1993	**6:00 am - 1:00 pm, ATL driller, helper, geotechnical inspector on site** - Water table at -3.2'. Roller bit and wash; then advance HW casing to -70'. Hole didn't stay open for sampling; back in with roller bit. - Sampled S-13 from -70.0' to 70.8'. - Samples at 5' intervals to -85'. - HW casing advanced to -85' (top of sand/gravel zone). - 1:00 pm, Depart site for the day.
Monday, November 8, 1993	**11:00 am - 5:00 pm, ATL driller, helper, geotechnical inspector on site** - Safety meeting conducted by T. Eldridge (ATL, geotechnical inspector). - Began drilling at -85'. - Sampled S-16 from -85' to -85.4' (dense, sandy, glacial till material). - Continuous sampling from -85.4' to -101.3' (strata changes at -94' and -98.3'). - Sampling encountered dense silty/clay, little gravel, till material. - Boring at -101.3' at end of day. - 5:00 pm, Depart site for the day.
Tuesday, November 9, 1993	**6:30 am - 6:00 pm, ATL driller, helper, geotechnical inspector on site** - Roller bit and wash boring from -101.3' to -105'. - Sampled at 5 ft intervals beginning at -105'. - Phone call to CE-NED Office in Waltham to express need for M. Vance to make site visit. - Advanced HW casing to -125'. - M. Vance (CE-NED) on site to determine piezometer depth and zone of interest. - 5' Interval sampling from -115' to -124' (bedrock). - Began rock coring bedrock from -125' to -135' (10' of core obtained). - Water level reading at -18' (induced). - 6:00 pm, Depart site for the day.

a. Summary of Activities (con't.)

TABLE I (con't.)

DATE	ACTIVITY
Wednesday November 10, 1993	**6:30 am - 5:30 pm, ATL driller, helper, geotechnical inspector, surveyor on site** - Water level reading at -15.9'. - Backfilled rock core cavity with peltonite pellets (bentonite sealer) from -135' to -124'. - Pulled HW casing and fill boring with random fill (No. 4 silica sand) from -124' to -91'. - Backfilled lower seal with peltonite pellets from -91' to -85'. - Set Piezometer P-15; tip elevation is 301' NGVD or -83' depth. - Backfilled zone with No. 20 silica sand, as well filter sand (-85' to -50'). - Upper seal for piezometer placed from -50' to -44'. Some bridging of the casing from the bentonite sealer occurred at approximately -37'; it was flushed clear using water. - S. Chatelle (ATL surveyor) on site to survey test boring and well casing locations, elevations, and piezometer elevations. - Random backfill was placed above -44'. No. 4 silica sand was used as fill. - 5:30 pm, Depart site for the day.
Thursday, November 11, 1993	**6:30 am - 5:30 pm, ATL driller, helper, geotechnical inspector on site** - Installed 4" diameter steel well protector. - Installed well protectors for 6 existing piezometers along downstream berm road. - Falling Head Permeability Test performed on P-15 at Test Boring FD93-3. - Straighten and grout in existing piezometers located along berm road. - Falling Head Permeability Tests were performed on P-13A and P-13B at Test Boring FD93-1. - Cleaned up site. - End of Project. - 5:30 pm, Depart site.
Friday, November 12, 1993	- T. Eldridge (geotechnical inspector) delivered samples.

b. **List of Telephone Logs**

TABLE II

DATE	CONVERSATION
Thursday, 1:30 pm September 9, 1993	**T. Wiggins (ATL) to L. Fraser (CE-NED)** - T. Wiggins indicated boring stakeout would be the week of September 20, 1993. - Platform construction and drilling the week of September 27, 1993. - ATL will confirm with M. Vance the week of September 20, 1993.
Monday, 4:35 pm September 20, 1993	**S. Chatelle (ATL surveyor) to T. Wiggins (ATL)** - Reported boring stakeout was complete. - Slope at FD-93-B is 2.17:1, slope at FD-93-A is 3.08:1, horizontal to vertical ratio.
Wednesday, 11:50 am September 22, 1993	**T. Wiggins (ATL) to P. Mitchell (NHDOT office)** - Requested details on permit to use State Route 127 to unload and load with a crane. - Application filed from Manchester, NH office.
Thursday, 8:45 am September 23, 1993	**M. Wilbur (ATL) to T. Wiggins (ATL)** - Requested schedule of operations.
Thursday, 1:01 pm September 23, 1993	**T. Wiggins (ATL) to M. Vance (CE-NED)** - To report that boring stakeout was complete. - To report that ATL staff and equipment will arrive next Wednesday (9/29/93) or Thursday (9/30/93) to begin platform construction. - Confirmed that requireed piezometer tips were to be 18" long. - To report that platforms will be larger than anticipated to accommodate CME-55 drill rig. The larger rig was deployed to enhance the rate of drilling.
Monday, 9:50 am September 27, 1993	**T. Wiggins (ATL) to T. Gunn (NHDOT)** - To report that ATL will be unloading equipment on Thursday (9/30/93) morning at 8:00 am. ATL will start moving drill equpiment and supplies to drill location and work on drill platform.
Friday, 8:45 am October 1, 1993	**M. Vance (CE-NED) to S. Thew (ATL)** - On September 31, 1993, the CE-NED Project Manager for Hopkinton Dam found defeciencies in the crane inspection report. The deficiencies were discussed with Ray Cilley, ATL's subcontractor (American Steel Erectors, Inc.). Ray Cilley indicated the deficiencies will be corrected. - To indicate that ATL was not required to submit an Accident Prevention Plan. - To remind ATL to hold a safety meeting on Monday morning before beginning work. - S. Thew indicated he would call American Steel Erectors, Inc. to review the need for a current inspection report.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Friday, 3:15 pm October 1, 1993	**S. Thew (ATL) to Betty (American Steel Erectors Greenfield, NH (603/547-6311) regarding crane safety** - S. Thew asked Betty to make sure R, Cilley has all necessary crane safety paperwork for 90T crane prior to arriving on site Monday, October 4, 1993. - Betty stated the crane probably would not be there, since it was just assigned to a three week project. - S. Thew stated they had committed to ATL for Monday. - Betty said she would check again with R. Cilley
Monday, 11:20 am October 4, 1993	**M. Wilbur (ATL) to M. Vance (CE-NED)** - To introduce himself as ATL's Geotechnical Engineer for the project. - To inform M. Vance that ATL needed 600 additional board feet for the drilling platform to accommodate the CME-55 rig. - M. Vance approved of the purchase. - To inform M. Vance that ATL would begin drilling FD-93-B late this afternoon or tomorrow morning.
Tuesday, 3:05 pm October 5, 1993	**M. Wilbur (ATL) to T. Wiggins (ATL)** - To inform T. Wiggins of today's drilling progress at FD-93-B at 12', and P. Davis constructing 2nd platform. - Attempted to call M. Vance at 12:20, 2:20, 4:45 with project progress. M. Vance was out of the office at each attempt.
Wednesday, 3:35 pm October 6, 1993	**M. Wilbur (ATL) to M. Vance (CE-NED)** - To inform him that ATL drilled to 26' yesterday. Casing left at 20'. - Progress as of this time today to 46' of split spoon sampling. - Informed M. Vance that soil classifications were fairly consistent and revealed sandy silt material to 46'. - Second platform was being constructed and should be completed at weeks end. - M. Vance stated he would be on-site tomorrow.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Thursday, 3:30 pm October 7, 1993	**ATL drillers to T. Wiggins (ATL)** - Regarding concerns of bore hole remaining open below casing during the drilling process. It was decided to telescope the bore hole if necessary with HW casing. - To inform T. Wiggins of progress to date and of the near completion of the second platform on the north side of the dam.
Friday, 10:30 am October 8, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - To verify that ATL will need 4" casing to support the bore hole to designated depth, and that ATL will have it on-site Monday. - M. Vance expressed desire to use a medium grade filter sand for the piezometers and T. Eldridge agreed.
Friday, 10:35 am October 8, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform him of progress to date, that we can pick up Size 16 filter sand locally, and that we need HW casing to effectively keep bore hole open. - T. Wiggins said it will be with the drillers Monday.
Monday, 4:30 pm October 11, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform him of drillers arrival, advancement of HW casing and test boring; samples obtained and subsurface conditions. - T. Wiggins gave T. Eldridge numbers to call to obtain 4" pipe to be used as protective casing for the piezometers after they have been installed.
Tuesday, 8:25 am October 12, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - To inform him of drilling progress to date. Mark was unavailable at this time.
Tuesday, 2:15 pm October 12, 1993	**T. Eldridge (ATL) to L. Frazier (CE-NED)** - To inform her of progress to date and the rate at which drilling is taking place using the continuous sampling method at increasingly greater depths.
Tuesday, 3:30 pm October 12, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - To inform him of progress to date, the rate at which drilling progress is being made, and our expected finish time for Location FD93-1. - M. Vance stated someone from CE-NED will probably be on site Friday to review soil samples and observe drilling operations.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Tuesday, 3:40 pm October 12, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform him of conversation with M. Vance (CE-NED), ATL's progress to date, etc. - Informed T. Wiggins that M. Vance requested ATL to continue drilling FD93-1 using continuous sampling method though progress is relatively slow. He said some adjustments as to method may occur on the other borings.
Wednesday, 3:30 pm October 13, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Reported progress to date. - Informed T. Wiggins that ATL experienced a strata change at about -121'. The relatively dense sand/gravel zone changed back in to a dense, well graded glacial till material; still with significant gravel content. Many cobbles were experienced in the drilling progress evident by advancing the roller bit. - Informed T. Wiggins that ATL should be on bedrock on Friday.
Thursday, 8:15 am October 14, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Reported progress to date and that T. Eldridge could obtain random fill or sand locally, for use as backfill in the bore hole between the bentonite seals and piezometers.
Thursday, 8:30 am October 14, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - Reported progress to date and of the sand ATL hopes to use in backfilling the boring. - To report materials would be on site Friday. - M. Vance stated a person from CE-NED will be on site either Friday or Monday (October 18, 1993) to provide piezometer elevations after reviewing soil samples.
Thursday, 12:30 pm October 14, 1993	**T. Eldridge (ATL) to Irene (ATL Manchester, NH)** - Requested Irene to relay message to employee who brings filter sand to site to stop at Capitol Fire Protection Company and pick up the steel protective pipe casing which is ready. Irene acknowledged message.
Friday, 8:00 am October 15, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - M. Vance was not available at this time, since he was enroute to the project site. - M. Vance arrived on site at 9:30 am.
Friday, 4:15 pm October 15, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Reported progress to date and asked about available lighting for the dam area during next weeks' move of the drill rig to the other side of the dam.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Friday, 4:15 pm October 15, 1993 (con't.)	- T. Wiggins stated that the drillers will be returning with flood lights on Monday, and that ATL will be all set for the move on Wednesday at 2:00 am.
Monday, 8:45 pm October 18, 1993	**T. Eldridge (ATL) to Wally Shedd (ATL, NH)** - Expressed concern for proper dam night light and the recommendation that additional lights and power cables are needed. - W. Shedd stated he will make phone calls tomorrow to rent lighting materials.
Tuesday, 11:30 am October 19, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform him of bentonite pellets bridging in the HW casing; therefore not reaching designated seal depth. - T. Wiggins asked to speak to Rob Pryce (ATL driller) regarding possible methods to use to unclog the obstruction. - S. Thew (ATL) instructed R. Pryce to place a 6" layer of sand on the pellets and then flush water through the tube. The sand will keep the tube from clogging with the bentonite.
Tuesday, 2:00 pm October 19, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Spoke to S. Thew (ATL) to inform him of progress to date and that the obstruction in the HW casing was cleared by flushing it with water and sand fill.
Tuesday, 2:30 pm October 19, 1993	**T. Eldridge (ATL) to W. Shedd (ATL)** - W. Shedd informed T. Eldridge that additional night lighting was being delivered to the dam site. All systems are go for the drill rig move late tonight, across the dam.
Tuesday, 2:45 pm October 19, 1993	**T. Eldridge (ATL) to Mark Vance (CE-NED)** - To inform of progress to date and of ATL's intention of moving on to the next test boring, after midnight. A crane will be used to move the drill rig and tools. M. Vance acknowledged.
Tuesday, 6:45 pm October 19, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform of progress to date. T. Wiggins stated that all things were set for the move (the state highway and police departments have been notified) at 2:00 am.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Wednesday, 9:00 am October 20, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform of night move of drill rig and supplies across the dam, and its placement on the wooden platform. The move went relatively smooth and the lighting was effective.
Thursday, 10:00 am October 21, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - To inform of progress to date, including successful move of drill rig to north platform. Asked him about cutting 1' off protective casing on first boring, Location FD93-1, and reinserting into ground, backfilling with sand and gravel, then rip-rap. M. Vance confirmed.
Thursday, 10:15 am October 21, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform him of weather conditions and the fact that ATL was on standby at that time as a result. T. Wiggins stressed safety first, and use best judgement; do not proceed under hazardous conditions.
Friday, 8:30 am October 22, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - T. Wiggins unavailable, spoke with Dixie (ATL), left message as to progress to date, that ATL was through rock rip-rap and advanced boring through the earth dam fill zone, sampling every 5'.
Monday, 9:15 am October 25, 1993	**S. Thew (ATL) to T. Eldridge (ATL)** - Inquired about progress to date and the fact that the existing platform over FD93-1 test boring needs to be broken down and wants to consider most effective means.
Tuesday, 9:00 am October 26, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - To inform of progress to date and discuss the need for locking steel caps for the protective well casings. M. Vance agreed, and one was installed at FD93-1.
Tuesday, 9:15 am October 26, 1993	**T. Eldridge (ATL) to W. Shedd (ATL-Manchester)** - W. Shedd was unavailable, left message with Irene (Receptionist) that additional silica sand is required for the filter zones for piezometer installations; also report status to date.
Tuesday, 1:00 pm October 26, 1993	**T. Eldridge (ATL) to S. Thew (ATL)** - To inform of progress to date.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Thursday, 10:15 am October 28, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - To inform of progress to date and that ATL should reach bedrock depth today. M. Vance stated he would arrive on site tommorrow morning, Friday.
Thursday, 10:30 am October 28, 1993	**T. Eldridge (ATL) to W. Shedd (ATL-Manchester)** - Requested additional bags of silica sand for use as bore hole filter sand. W. Shedd stated it would be delivered to the site in the afternoon. Informed W. Shedd that the crew will give him an accurate date of completion of Test Boring 2, so that necessary arrangements can be made with the State Police, and NHDOT for the next drill rig move using the 90T crane.
Thursday, 10:40 am October 28, 1993	**T. Eldridge (ATL) to S. Thew (ATL)** - To inform of progress to date, and that ATL will advance Test Boring FD93-2 to bedrock some time this afternoon.
Monday, 10:00 am November 1, 1993	**T. Eldridge (ATL) to W. Shedd (ATL-Manchester)** - W. Shedd informed T. Eldridge that all things are set and ready for the drill rig to be moved off the platform after midnight, Tuesday.
Tuesday, 8:15 am November 2, 1993	**T. Eldridge (ATL) to W. Shedd (ATL-Manchester)** - Requested flood lights and accessories to be delivered to project site today. W. Shedd acknowledged and said that they would be delivered today.
Tuesday, 8:30 am November 2, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - M. Vance unavailable, left message that T. Eldridge of Hopkinton Dam project called.
Tuesday, 8:35 am November 2, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform of progress to date and intentions of moving on to Test Boring FD93-3 located below, on the downstream side of the dam, designated as FD93-D on the plan. T. Eldridge explained that Test Boring FD93-A may be drilled by ATL. T. Wiggins is aware of the fact that six existing piezometers located along the berm road north of the dam need improved well protectors and that they are to be installed by ATL.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Wednesday, 1:00 pm November 3, 1993	**T. Eldridge (ATL) to W. Shedd (ATL)** - Reported that the move of the drill rig off the platform with the crane was successful. T. Eldridge stated that he would return flood light rental equipment.
Wednesday, 3:00 pm November 3, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - M. Vance out of the office for the week, spoke with L. Frazier (CE-NED). T. Eldridge gave L. Frazier a report of the work progress to date and what ATL intended to accomplish in the week ahead. L. Frazier acknowledged and said that M. Vance would be back in the office on Monday, November 8, 1993.
Thursday, 2:10 pm November 4, 1993	**T. Eldridge (ATL) to L. Frazier (CE-NED)** - Reported status of ATL's work on Test Boring FD93-3. Also, inquired if this test boring would be the last, or if ATL is to expect a fourth. As far as she knew at this time, FD93-3 boring would be the last.
Thursday, 2:20 pm November 4, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - To inform of progress to date. ATL is advancing Test Boring FD93-3. Inquired if T. Wiggins knew anything in regards to drilling another Test Boring FD93-4. T. Wiggins stated he was in contact with CE-NED, but that nothing was definite as yet.
Friday, 9:30 am November 5, 1993	**T. Eldridge (ATL) to L. Frazier (CE-NED)** - L. Frazier unavailable at this time.
Tuesday, 9:45 am November 9, 1993	**M. Vance (CE-NED) to T. Wiggins (ATL)** - T. Wiggins asked M. Vance if he was up to date with site activity. T. Wiggins said ATL had drilled and sampled to 101 ft at close of work yesterday. Expected to hit and core bedrock today. The ATL crew and geotechnical inspector need direction for piezometer installation. M. Vance said he had been out of the office last week and yesterday. We discussed the replacement of 4" pipe protectors. M. Vance has requested additional funds for a fourth boring. M. Vance thinks ATL will have used up his $71,000 budget by the end of this week, and estimated $12,000 additional for a fourth hole. M. Vance to call T. Wiggins later today as to whether a fourth hole will be done.

b. List of Telephone Logs (con't.)

TABLE II

DATE	CONVERSATION
Monday, 3:00 pm November 8, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - M. Vance was unavailable, left message that T. Eldridge will call again Tuesday morning.
Monday, 3:30 pm November 8, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Reported the progress to date. T. Eldridge indicated he had called M. Vance (CE-NED). M. Vance was unavailable. - Stated that ATL should core bedrock tomorrow and be ready for backfill operations, and the installation of Piezometer P-15. ATL will need adjusted depth elevations for the piezometer and seals.
Tuesday, 8:15 am November 9, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - M. Vance was unavailable at this time, S. Dunbar (CE-NED) took message.
Tuesday, 10:30 am November 9, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - Informed M. Vance that ATL expected to reach bedrock today and are ready to core the rock. - Asked M. Vance if he could be on site today to review boring data and to give ATL adjusted elevations for the installation of the piezometer and well development. M. Vance stated he would be on site this afternoon.
Tuesday, 2:30 pm November 9, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Reported progress to date and that ATL had reached bedrock at -124', and that M. Vance of CE-NED was on site from 1:00 pm to 2:30 pm. - T. Wiggins stated that he had spoken to M. Vance earlier this morning.
Wednesday, 1:15 pm November 10, 1993	**T. Eldridge (ATL) to M. Vance (CE-NED)** - M. Vance unavailable, out of the office today.
Thursday, 3:30 pm November 11, 1993	**T. Eldridge (ATL) to T. Wiggins (ATL)** - Piezometer casings have been grouted in and permeability tests have been performed. - Reported that work is completed and that clean up is occurring.

SECTION 6

CHAIN OF CUSTODY LOG

00430

CHAIN OF CUSTODY RECORD

ATLANTIC TESTING LABORATORIES, Limited

SCIENCE AND ENGINEERING
P.O. BOX 29
CANTON, NEW YORK 13617
315-386-4578, FAX 315-386-1012

ENVIRONMENTAL LABORATORY
48 LAGRASSE STREET
WADDINGTON, NEW YORK 13694
315-388-4452, FAX 315-388-5510

PROJECT NUMBER: CD0042

PAGE 1 OF 1

PROJECT CONTACT: MARK VANCE

QA/QC CODE: ☐ DEC/ASP ☐ NYSDOH ☐ CLP ☐ SW-846 ☐ OTHER

PROJECT NAME: HOPKINTON DAM EXPLORATION PROGRAM DACW 33-93-D-0004

PROJECT LOCATION: HOPKINTON, NH

PARAMETERS

REPORT DISTRIBUTION
DATES REQUIRED:
SEND REPORT TO:
FAX RESULTS TO: AT

CUSTODY SEAL 'X' EQUALS INTACT

DATE	TIME	SAMPLE LOCATION	SAMPLE TYPE *	NO. OF CONT.	LABORATORY IDENTIFICATION NUMBER	FIELD NOTES
10/29	P.M.	FD93-1 5+25 60' OFFSET-U		68		
11/2	P.M.	FD93-2 5+25 75' OFFSET-D		37		
11/11	P.M.	FD93-3 5+25 150' OFFSET-D		29		
			SOILS			
11/11	P.M.	FD93-1, 2 & 3 ROCK CORE BOXES		2		

SAMPLERS NAME: Tom ELDRIDGE
SAMPLERS SIG: Tom Eldridge
DATE: 11/11/93
TIME: P.M.

RECEIVED FOR LABORATORY NAME:
SIG:
DATE:
TIME:
SHIPMENT REC'D INTACT(YES/NO)?

SAMPLES RELINQUISHED BY:

NAME: Tom ELDRIDGE DATE: 11/12/93
SIG: Tom Eldridge TIME: 800 AM

NAME: DATE:
SIG: TIME:

NAME: DATE:
SIG: TIME:

SAMPLES RECEIVED BY:

NAME: Richard Berger DATE: 11/12/93
SIG: Richard Berger TIME: 800 AM

NAME: DATE:
SIG: TIME:

NAME: DATE:
SIG: TIME:

* SAMPLE TYPE CODE KEY
B = QA/QC
C = COMPOSITE
G = GRAB
H = HEXANE SURFACE WIPES
ND = NOT DETERMINED BY SAMPLER
O = OIL
S = SOLID OR SLUDGE
W = WATER

DISTRIBUTION: WHITE WITH SAMPLES GREEN TO SCIENCE AND ENGINEERING FILES, GOLD TO CLIENT

LABORATORY STORAGE LOCATION:

LABORATORY REMARKS

THINK QUALITY

SECTION 7

SAFETY REPORTS

WEEKLY SAFETY MEETING

NEDSO

Date held 10-5-93 (TUESDAY)

THRU: Area Engineer, _____ Area

Time 11:00 AM

TO: Safety Office, NED

1. Weekly safety meeting was held this date for the following personnel:

Contract No. _____ Contractor _____

Conducted By M. WILBUR

Personnel present (Contr) ROBBIE PRICE, DARIUS WINTERS, PAUL DAVIS
(Sub) _____
(Govt) _____

Subjects discussed (Note, delete, or add):

Individual Protective Equipment - HARDHATS, safety GLASSES

Prevention of Falls - Keep AWAY of PLATFORM EDGES, Keep PLATFORM CLEAN

Safe Lifting Techniques - LIFT W/ LEGS

Emergency Communications - FIRE 746-3355 POLICE 746-4141 DAVE SHEPARDSON 464-4667 N.E.D. C of E.

Fire Prevention - ✓ OK

Sanitation, First Aid - ✓ OK

Tripping Hazards - trash, hose, nails in lumber - ¾ rock - RIP/RAP, WATER HOSES

Staging, Ladders, Concrete Forms -

Hand Tools, Portable Power Tools, Woodworking Machinery - OK

Equipment Maintenance (Zero defects) - OK

~~Hoisting Equipment~~ -

Ropes, Hooks, Chains and Slings - OK

~~Electrical Grounding, Temporary Wiring~~ -

~~Lockouts for safe clearance procedures - electrical, pressure, moving part~~

~~Welding~~ -

~~Excavations~~ -

Loose Rock and Steep Slopes - TAKE SMALL STEP & MAKE SURE of SECURE FOOTING while WALKING UP & DOWN SLOPES

~~Explosives~~ -

~~Water Safety~~ -

~~Other~~ -

Prepared by Mark Wilber Title Geotechnical Engineer

2. Forwarded.

Signature _____
Resident Engineer

CF: MANHOURS
Contractor 188.5
Sub Contractor 8
Period Covered 10/4 To 10/8

FIG No. 11

WEEKLY SAFETY MEETING

NEDSO

Date held OCTOBER 11, 1993

THRU: Area Engineer, _____ Area

Time 1200 PM

TO: Safety Office, NED

1. Weekly safety meeting was held this date for the following personnel:

Contract No. DACW 33-93-D-0004 Contractor ATLANTIC TESTING LABS

Conducted By T. ELDRIDGE Personnel present (Contr) T. ELDRIDGE ROB PRICE DARIUS WINTERS

(Sub) _____

Subjects discussed (Note, delete, or add): (Govt) _____

Individual Protective Equipment - HARD HATS ON ALL TIMES, EYE PROTECTION ETC.

Prevention of Falls - WATCH ROCK RIP RAP SLOPES - ALL TIMES

Safe Lifting Techniques - WITH LEGS, NOT BACK

Emergency Communications - POLICE DEPT. 746-4141 HOPKINTON
FIRE DEPT. 746-3355 HOPKINTON
STATE POLICE 1-800-852-3411

Fire Prevention - ✓ OK

Sanitation, First Aid - GAUZE, BAND AIDS ETC.

Tripping Hazards - trash, hose, nails in lumber - ORGANIZE PLATFORM

Staging, Ladders, Concrete Forms - ✓

Hand Tools, Portable Power Tools, Woodworking Machinery - ✓ OK

Equipment Maintenance (Zero defects) - ✓ OK

Hoisting Equipment - OK

Ropes, Hooks, Chains and Slings - OK ORGANIZED ON PLATFORM

Electrical Grounding, Temporary Wiring -

Lockouts for safe clearance procedures - electrical, pressure, moving part OK

Welding - ✓

Excavations - ✓

Loose Rock and Steep Slopes - ! CAREFUL WALKING & MOVING GEAR

Explosives - ✓

Water Safety - ✓

Other -

Prepared by Tom ELDRIDGE Title GEOTECHNICAL INSPECTOR

2. Forwarded.

Signature Tom Eldridge

Resident Engineer

CP: MANHOURS

Contractor 142.5

SubContractor -

Period Covered 10/11 To 10/15

C-62

FIG No. 11

WEEKLY SAFETY MEETING

NEDSO

Date held OCT 18, 1993

THRU: Area Engineer, _____ Area

Time 1145 AM

TO: Safety Office, NED

1. Weekly safety meeting was held this date for the following personnel:

Contract No. DACW33-93-D-0004 Contractor ATLANTIC TESTING LABS

Conducted By T. ELDRIDGE Personnel present (Contr) T. ELDRIDGE, R. PRKE, D. WINTERS

(Sub) _____

(Govt) _____

Subjects discussed (Note, delete, or add):

Individual Protective Equipment - HARD HELMETS

Prevention of Falls - ROCK RIP ALWAYS HAZARDOUS (WET & DRY) - TAKE CARE

Safe Lifting Techniques - LEGS NOT BACK

Emergency Communications - HOPKINTON POLICE - 746-4141
HOPKINTON FIRE - 746-3355
STATE POLICE - 1-800-852-3411

Fire Prevention -

Sanitation, First Aid - GAUZE, BANDAIDS, ETC. ON SITE

Tripping Hazards - trash, hose, nails in lumber - ORGANIZE RIG

Staging, Ladders, Concrete Forms - N/A

Hand Tools, Portable Power Tools, Woodworking Machinery - CARE

Equipment Maintenance (Zero defects) - OK

Hoisting Equipment - OK

Ropes, Hooks, Chains and Slings - OK

Electrical Grounding, Temporary Wiring - N/A

Lockouts for safe clearance procedures - electrical, pressure, moving part OK

Welding - OK

Excavations - N/A

Loose Rock and Steep Slopes - !! CAREFUL MOVING EQMT - ALL TIMES !!

Explosives - N/A

Water Safety - N/A

Other -

Prepared by Tom ELDRIDGE Title ATL GEOTECHNICAL INSPECTOR

2. Forwarded.

Signature _____
Resident Engineer

CF: MANHOURS
Contractor 164.5
SubContractor 8
Period Covered 10/18 TO 10/22

C-62

FIG No. 11

WEEKLY SAFETY MEETING

NEDSO

Date held 10/25/93

THRU: Area Engineer, _____ Area

Time 12:15 PM

TO: Safety Office, NED

1. Weekly safety meeting was held this date for the following personnel:

Contract No. DACW 33-93-D-0004 Contractor ATLANTIC TESTING LABS

Conducted By T ELDRIDGE Personnel present (Contr) T ELDRIDGE, R. PRICE, D. WINTERS

(Sub) _____

(Govt) _____

Subjects discussed (Note, delete, or add):

Individual Protective Equipment - HARD HATS, EAR

Prevention of Falls - ORGANIZE RIG / WATCH ROCK RIPRAP

Safe Lifting Techniques - LEGS NOT BACK

Emergency Communications - HOPKINTON POLICE - HOPKINTON FIRE - STATE POLICE -

Fire Prevention -

Sanitation, First Aid - BANDAIDS, GAUZE ETC...

Tripping Hazards - trash, hose, nails in lumber - ORGANIZE

Staging, Ladders, Concrete Forms - N/A

Hand Tools, Portable Power Tools, Woodworking Machinery - CAREFUL

Equipment Maintenance (Zero defects) - OK

Hoisting Equipment - OK

Ropes, Hooks, Chains and Slings - OK

Electrical Grounding, Temporary Wiring - N/A

Lockouts for safe clearance procedures - electrical, pressure, moving part OK

Welding - N/A

Excavations - N/A

Loose Rock and Steep Slopes - ROCK RIP RAP SLOPES, SLOW DOWN WALKING CARRYING EQMT ETC..

Explosives - N/A

Water Safety - N/A

Other -

Prepared by TOM ELDRIDGE Title ATL GEOTECHNICAL INSPECTOR

2. Forwarded.

Signature _____

Resident Engineer

CF: MANHOURS

Contractor 147.5

SubContractor -

Period Covered 10/25 to 10/29

FIG No. 11

WEEKLY SAFETY MEETING

NEDSO

Date held Nov 1, 1993

THRU: Area Engineer, _____ Area

Time 1200 NOON

TO: Safety Office, NED

1. Weekly safety meeting was held this date for the following personnel:

Contract No. DACW 33-93-D-0004 Contractor ATLANTIC TESTING LABS

Conducted By TOM ELDRIDGE Personnel present (Contr) T. ELDRIDGE R. PRYCE D. WINTERS

(Sub) _____

Subjects discussed (Note, delete, or add): (Govt) _____

Individual Protective Equipment - HARD HATS, EYE PROTECTION

Prevention of Falls - WATCH ROCK RIP RAP SLOPES, ORGANIZE RIG AREA

Safe Lifting Techniques - LEGS, NOT BACK

Emergency Communications - POLICE DEPT. 746-4141 HOPKINTON
FIRE DEPT. 746-3355 HOPKINTON
STATE POLICE 1-800-852-3411

Fire Prevention -

Sanitation, First Aid - GAUZE, BANDAIDS, ETC.

Tripping Hazards - trash, hose, nails in lumber - ORGANIZATION

Staging, Ladders, Concrete Forms - ✓

Hand Tools, Portable Power Tools, Woodworking Machinery - ✓

Equipment Maintenance (Zero defects) - OK

Hoisting Equipment - OK

Ropes, Hooks, Chains and Slings - OK

Electrical Grounding, Temporary Wiring -

Lockouts for safe clearance procedures - electrical, pressure, moving part OK

Welding - ✓

Excavations - ✓

Loose Rock and Steep Slopes - WATCH ROCK SLOPES!

Explosives - ✓

Water Safety - ✓

Other -

Prepared by TOM ELDRIDGE Title GEOTECHNICAL INSPECTOR

2. Forwarded.

Signature Tom Eldridge
Resident Engineer

CF: MANHOURS
Contractor 148.5
Sub Contractor 8
Period Covered 11/1 to 11/5

FIG No. 11

WEEKLY SAFETY MEETING

NEDSO

Date held NOV 8, 1993

THRU: Area Engineer, _____ Area

Time 1130 AM

TO: Safety Office, NED

1. Weekly safety meeting was held this date for the following personnel:

Contract No. DACW33-93-D-0004 Contractor ATLANTIC TESTING LABS

Conducted By TOM ELDRIDGE Personnel present (Contr) T ELDRIDGE R PRICE D WINTERS

(Sub) _____

(Govt) _____

Subjects discussed (Note, delete, or add):

Individual Protective Equipment - HARD HATS, EAR, EYE

Prevention of Falls - ORGANIZE WORK AREA

Safe Lifting Techniques - LEGS NOT BACK

Emergency Communications - POLICE - 746-4141 HOPKINTON
FIRE - 746-3355 HOPKINTON
STATE POLICE - 1-800-852-3411

Fire Prevention - OK

Sanitation, First Aid - BAND AIDS, GAUZE, WRAP ETC.

Tripping Hazards - trash, hose, nails in lumber - ORGANIZE

Staging, Ladders, Concrete Forms -

Hand Tools, Portable Power Tools, Woodworking Machinery -

Equipment Maintenance (Zero defects) - OK

Hoisting Equipment - OK

Ropes, Hooks, Chains and Slings - OK

Electrical Grounding, Temporary Wiring -

Lockouts for safe clearance procedures - electrical, pressure, moving part OK

Welding -

Excavations -

Loose Rock and Steep Slopes - CAREFUL -

Explosives -

Water Safety -

Other -

Prepared by TOM ELDRIDGE Title GEOTECHNICAL INSPECTOR

2. Forwarded.

Signature Tom Eldridge
Resident Engineer

CF: MANHOURS
Contractor 116.5
Sub Contractor -
Period Covered 11/8 To 11/11

FIG No. 11

SECTION 8

FIELD INSPECTOR'S LOGS AND MAPS

a. Daily Log of Field Explorations

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 1A DATE 9-30-93

DAILY LOG OF FIELD EXPLORATIONS

PROJECT Hopkinton Dam Exploration Program

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED

PHONE TIME TEMPERATURE: MAX. MIN.

WEATHER

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL	HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
Paul Davis (Superintendent)	12.5
R. Pryce (Driller)	12.5
D. Winters (Helper)	12.5
M. Hawkins (Helper)	12.5

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
Crane & Operator	8	—
CME-55 Drill Rig	12.5	

P. Davis
CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

9-30-93

NARRATIVE OF DAYS OPERATIONS

Mobilized American Steel Erectors Crane and operator Unloaded rig stand and lumber on slope. Superintendent and helper began Construction of platform at Location FD 93-B. Employed traffic control cones and flagmen per NHDOT and State Police.

Drill Crew prepared ~~drilling pad~~ drilling rig for the crane lift to set it on Location. Started carrying drill equipment and supplies to boring location on the slope.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
P. Davis			12.5							*12.5	12.5
R. Pryce			12.5								12.5
D. Winters			12.5								12.5
M. Hawkins			12.5							*12.5	12.5

* Building drilling platform at Location F.D. 93-B.

WORK FOR TOMORROW

Continue constructing drilling platforms. Move tools and equipment to platform.

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 1AA DATE 10-1-93 FRI

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED

PHONE TIME TEMPERATURE: MAX. MIN.

WEATHER

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
P. DAVIS (SUPERINTENDENT)	7.5
R. PRYCE (DRILLER)	7.5
D. WINTERS (HELPER)	7.5

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME-55 DRILL RIG	7.5	

P. DAVIS
CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

10-1-93

NARRATIVE OF DAYS OPERATIONS

CONTINUED CONSTRUCTION OF DRILLING PLATFORMS. ORDERED 1248 BOARD FEET OF ADDITIONAL LUMBER FOR COMPLETE 2nd DRILLING PLATFORM.

ASSEMBLED DRILL GEAR AND RIG TO READY FOR CRANE SET ON 10/4/93.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
P. DAVIS			7.5								7.5
R. PRYCE			7.5								7.5
D. WINTERS			7.5								7.5

WORK FOR TOMORROW

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 1-AAA DATE 10-4-93 (MON)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED

PHONE TIME TEMPERATURE: MAX. MIN.

WEATHER

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
PAUL DAVIS (SUPERINTENDANT)	8
ROB PRYCE (DRILLER)	8
DARIUS WINTERS (DRILLER HELPER)	8

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	8	
90-T CRANE	8	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

10-4-97
MON

NARRATIVE OF DAYS OPERATIONS

MOBILIZED 90-T CRANE AND OPERATOR. SET UP ROAD SIGNS, FLAGMEN, CONES PER NH DOT AND STATE POLICE. SET DRILL STAND ON PLATFORM. SET RIG ON DRILL STAND WITH CRANE. MOVED REMAINING DRILL TOOLS AND EQUIPMENT TO PLATFORM. PREPARE TO BEGIN DRILLING FD93-1
DRILL SUPERINTENDANT BEGAN TO BUILD DRILL PLATFORM @ FD93-C

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
PAUL DAVIS										8	8
ROB PRYCE			8								8
DARIUS WINTERS			8								8

* BUILDING PLATFORM AT FD93-C

WORK FOR TOMORROW

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 1B DATE OCT 5, 1993 (TUE)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED

PHONE TIME TEMPERATURE: MAX. 55 MIN. 42

WEATHER PARTLY SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	0.0	26.0	26.0	0-10' OVERBURDEN 10-26' SILT, SOME CMF SAND

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
MARK WILBUR (GEO INSPECTOR)	12
ROB PRYCE (DRILLER)	12 1/2
DARIUS WINTERS (HELPER)	12 1/2
PAUL DAVIS (SUPERINTENDANT)	12 1/2

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME DRILL RIG 55	12 1/2	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

BOLTED UP CME-55 DRILL RIG TO THE PLATFORM AT BORING LOCATION FD93-1. DRILLED FROM 0-26' WITH ROLLER BIT FOR THE INITIAL 10' OVERBURDEN & CONTINUOUS SPLIT SPOON SAMPLE FROM 10-26 FT. WITH A 2½" I.D. SPLIT SPOON SAMPLER. INSTALLED 20 FT. OF PW (5") CASING.

CONSTRUCTION OF PLATFORM @ BORING LOCATION FD-93-C CONTINUES

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
MARK WILBUR									12		12
ROB PRICE			12½								12½
DARIUS WINTERS			12½								12½
PAUL DAVIS										12½	12½

* BUILDING PLATFORM

WORK FOR TOMORROW

CONTINUE DRILLING FD 93-1 BEGINNING at 26' DEPTH
CONTINUE CONSTRUCTING PLATFORM @ FD93-C

FIELD PURCHASES

ITEM	AMOUNT
PURCHASED 1248 B.F. LUMBER	

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 2 DATE Oct 6, 1993 (WED)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT Hopkinton Dam Exploration Program

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED

PHONE TIME TEMPERATURE: MAX. 57 MIN. 38

WEATHER Sunny

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	Hopkinton Dam	26.0	54.0	28.0	26.0 TO 36.0' Brown silt and cmf sand, trace mf gravel
					36.0' TO 48.0' Gray silt and cmf sand, little mf gravel
					48.0' TO 54.0' Gray silt, some cmf sand, little mf gravel, little clay

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
MARK WILBUR (Geo Inspector)	12
BOB PAYNE (Driller)	12½
DARIUS WINTERS (Driller Helper)	12½
PAUL DAVIS (Superintendent)	12½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME-55 Drill Rig	12½	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

10-6-93
WED

NARRATIVE OF DAYS OPERATIONS

Drilled from 26' to 54' continuous sampling
with 2½" diameter split spoon sampler.
5" diameter PW casing advance to 50' depth

Continued with platform construction at
Boring location FD93-C

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
MARK WILBUR									12		12
ROB PRYCE				12½							12½
DARIUS WINTERS				12½							12½
PAUL DAVIS										* 12½	12½

* Building platform

WORK FOR TOMORROW

Continue drilling Boring FD93-1 Begin @ -54.0' depth
Continue construction of platform at Boring FD93-C

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 3 DATE OCTOBER 7, 1993 (THU)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS —

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 75 MIN. 45

WEATHER SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	54.0	66.0	12.0'	GLACIAL TILL GRAY SILT, SOME CME SAND, little GRAVEL trace to little CLAY

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11½
ROB PRICE (DRILLER)	12
DARIUS WINTERS (DRILLER HELPER)	12
PAUL DAVIS (Superintendent)	12

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	12	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

10/7

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-1 WAS ADVANCED FROM -54 FEET TO -66 FEET TODAY. THE BORING WAS CONTINUOUS SAMPLED USING A 2½" I.D. SPLIT SPOON SAMPLER. THE BORE HOLE WAS CLEANED USING A 3⅞" ROLLER BIT AND WASH WATER. DRILLING MUD WAS USED TO FLUSH CAVINGS, ETC - FROM -60 TO -62 FEET. THE 5" PW STEEL CASING WAS FURTHER ADVANCED FROM -50 FEET AT THE START OF THE DAY TO -65 FEET BY DAYS END, IN ORDER TO STABILIZE THE BOREHOLE AND LESSEN INFILTRATION OF SANDS AND WASH -

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11½		11½
ROB PRICE				12							12
DARIUS WINTERS				12							12
PAUL DAVIS										12	12*

* BUILD PLATFORM

WORK FOR TOMORROW

TO CONTINUE DRILLING FD93-1 FROM -66 FEET ON DOWN AND CONTINUOUS SAMPLE AT 2 FOOT INTERVALS

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 4 DATE OCTOBER 8, 1993 (FRI)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS ~

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 75 MIN. 55

WEATHER SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	-66.0	-79.2	13.2'	-66.0 TO -71.9 GRAY SANDY GLACIAL TILL -71.9' TO -74.0 GRAY CLEAN CMF SAND LAYER
					-71.9' TO -79.2' GRAY SANDY GLACIAL TILL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	6
ROB PRICE (DRILLER)	6
DARIUS WINTERS (DRILLER HELPER)	6

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	6	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD93-1 (DESIGNATED FD93-B) WAS FURTHER ADVANCED TODAY TO -79.2 FT. DEPTH. GRAY, SANDY GLACIAL TILL WAS COMMON EXCEPTING A 2 FOOT SEAM OF COARSE TO FINE SAND at approximately -72' TO -74' DEPTH. 5" PW CASING WAS ADVANCED TO -75 FEET. THE BOREHOLE WAS KEPT OPEN USING A 3 7/8" ROLLER BIT AND WASHED CLEAN

Continuous Sampling to -79.2 Feet

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM EWRIDGE									6		6
ROB PRICE				6							6
DARIUS WINTERS				6							6

WORK FOR TOMORROW

NONE - WEEKEND

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 5 DATE OCTOBER 11, 1993 (MON)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS –

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 50 MIN. 30

WEATHER SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD 93-1	HOPKINTON DAM	79.2	88.0	8.8	GRAY mF SAND, 1mile mC GRAVEL, Trace SILT trace CLAY (SANDY TILL TO mF SAND)

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	7
ROB PRICE (DRILLER)	7
DARIUS WINTERS (DRILLERS HELPER)	7

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	7	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

OCT 11, MON

4" HW CASING WAS ADVANCED THROUGH THE EXISTING 5" PW CASING TODAY TO A TOTAL DEPTH OF 84 FEET. THE PURPOSE WAS TO STABILIZE THE BOREHOLE AND CONTAIN THE SANDY TILL AND SAND LAYERS THROUGH WHICH IT PENETRATED.

FD 93-1 TEST BORING WAS FURTHER ADVANCED TO -88.0 FEET AND CONTINUOUS SAMPLED TO THAT DEPTH WITH THE 2½" I.D. SPLIT SPOON SAMPLER (-79.2' to -88.0')

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									7		7
ROB PRICE				7							7
DARIUS WINTERS				7							7

WORK FOR TOMORROW

TO ADVANCE TEST BORING FD 93-1 FURTHER TOWARD THE DESIGNATED DEPTH @ BEDROCK ELEVATION

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 6 DATE OCTOBER 12, 1993 (TUE)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS —

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 45 MIN. 35

WEATHER CLOUDY A.M TO STEADY RAIN PM

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	88.0	108.8	20.8	89.5 - 92.0 GRAY F SAND & SILT, little CLAY
					92.0 - 100.0 GRAY mF SAND & STRATIFIED SILT/CLAY
					100.0 - 110.0 GRAY cmF SAND & GRAVEL (COBBLES)

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11.5
ROB PRICE (DRILLER)	11.5
DARIUS WINTERS (DRILLER HELPER)	11.5

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11.5	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

OCT 12 (TUE)

TEST BORING FD93-1 WAS ADVANCED TO -108.8 FT. TODAY AND CONTINUOUS SAMPLED USING A 2½" I.D. SPLIT SPOON SAMPLER AT A TWO FOOT INTERVAL. 4" HW CASING WAS ADVANCED TO -110 FEET BY THE END OF THE DAY. A STRATA CHANGE WAS ENCOUNTERED AT ROUGHLY -100 FT., SUBSURFACE SOIL CONDITIONS BECOMING MOSTLY GRAVELLY SAND. A GRAY CMF SAND & GRAVEL MATERIAL WAS ENCOUNTERED WITH TRACES OF SILT AND A FEW ROCK FRAGMENTS, EVIDENT OF COBBLES AND BOULDERS

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11.5		11.5
ROB PRICE				11.5							11.5
DARIUS WINTERS				11.5							11.5

WORK FOR TOMORROW

TO CONTINUE DRILLING FD93-1 TEST BORING TOWARD ITS DESIGNATED DEPTH @ BEDROCK ELEVATION

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 7 DATE OCTOBER 13, 1993 (WED)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 50 MIN. 45

WEATHER PT. CLOUDY WINDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	108.8	128.4	19.6	TO → 121.0' GRAY CMF SAND & GRAVEL - COBBLES 121.0 - 128.4 - GRAY CMF SAND SOME GRAVEL (COBBLES), LITTLE SILT (GLACIAL TILL)

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11½
ROB PRICE (DRILLER)	11½
DARIUS WINTERS (DRILLER HELPER)	11½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11½	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

OCT 13 (WED)

TEST BORING FD 93-1 WAS ADVANCED FROM -108.8 FT. TO -128.4 FT. DEPTH TODAY. THE BORING WAS SAMPLED CONTINUOUS TO THAT DEPTH WITH THE 2½" I.D. SPLIT SPOON SAMPLER. THE 4" DIA HW CASING WAS FURTHER ADVANCED, 10 FEET TO -120 FT. DEPTH, TO KEEP THE BOREHOLE OPEN.

A STRATA CHANGE OCCURRED AT ROUGHLY -121 FT. DEPTH, THE SAND/GRAVEL ZONE GIVING WAY TO DENSE GLACIAL TILL. DRILLING WAS RELATIVELY DIFFICULT DUE TO THE PRESENCE OF MANY TIGHTLY PACKED COBBLES AND TILL MATERIALS

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11½		11½
ROB PRICE				11½							11½
DARIUS WINTERS				11½							11½

WORK FOR TOMORROW

TO CONTINUE DRILLING AND SAMPLING TEST BORING FD 93-1, ADVANCING TOWARD BEDROCK AND THE DESIGNATED DEPTH

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 8 DATE OCTOBER 14, 1993 (THU)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 50 MIN. 20

WEATHER CLEAR IN MORNING, PT CLOUDY TO cloudy P.M.

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	128.4	148.0	19.6	128.4 TO 135.5 - GRAY CMF SAND, SOME GRAVEL, LITTLE SILT 135.5 TO 144.1 - GRAY SILT & F SAND, LITTLE CLAY, LITTLE GRAVEL
"	"	148.0	153.0	5.0	WEATHERED ROCK

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11½
ROB PRICE (DRILLER)	11½
DARIUS WINTERS (DRILLER HELPER)	11½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11½	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

OCT 14 (THU)

TEST BORING FD 93-1 WAS ADVANCED TO -153 FT. DEPTH TODAY.
THE BORING WAS SAMPLED CONTINUOUS FROM -128.4 TO -148.0 FT.
WEATHERED BEDROCK WAS ENCOUNTERED AT APPROXIMATELY -144.5 FT.
THE HOLE FROM THIS DEPTH WAS FURTHER ADVANCED USING
THE 3 7/8" ROLLER BIT TO -148 FT.
HW CASING WAS ADVANCED FROM -120 FT. TO 144.5 FT. AND
SEATED IN TO THE ROCK.
THE ROCK WAS CORED USING NX SIZE CORE BARREL WITH DIAMOND
BIT. A 5 FT. RUN YIELDED 70% RECOVERY. RQD WAS < 10% -
WEATHERED ROCK

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11 1/2		11 1/2
ROB PRICE				9 1/2	2						11 1/2
DARIUS WINTERS				9 1/2	2						11 1/2

WORK FOR TOMORROW

TO CONTINUE CORING ROCK, A SECOND 5 FT. RUN, AT DEPTH BEGINNING
@ -153 FT.
TO BEGIN DEVELOPING THE BOREHOLE FOR PIEZOMETER INSTALLATION

FIELD PURCHASES

ITEM	AMOUNT
(2) 10 FT. LENGTHS of 4" DIA STEEL	
PIPE, SCHEDULE 40 - threaded	
w/ (2) CAPS TO MATCH	

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 9 DATE OCTOBER 15, 1993 (FRI)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH. 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 40

WEATHER MOSTLY CLOUDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-1	HOPKINTON DAM	153.0	158.0	5.0	WEATHERED BEDROCK

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	6
ROB PRICE (DRILLER)	6
DARIUS WINTERS (DRILLER HELPER)	6

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	6	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

OCT 15, FRI

NARRATIVE OF DAYS OPERATIONS

AN ADDITIONAL 5 FEET OF ROCK CORE WAS OBTAINED THIS MORNING WITH NX SIZE CORE BARREL AND DIAMOND BIT. THE SECOND RUN YIELDED A 60% RECOVERY WITH LITTLE OR NO RQD (WEATHERED ROCK)

MARK VANCE (USACE) WAS ON SITE THIS MORNING TO DETERMINE PIEZOMETER TIP ELEVATIONS, SEALS, ETC. ELEVATIONS WERE DETERMINED AFTER EXAMINATION OF DATA

DRILLERS BACKFILLED BEDROCK CORE CAVITY WITH BELTONITE PELLETS, PULLED HW CASING BACK 5 FEET,
RANDOM SAND FILL WAS MOBILIZED TO THE RIG PLATFORM

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE			*						3	3	6
ROB PRICE			3		3						6
DARIUS WINTERS			3		3						6

* PREPARE EQMT FOR NEXT BORING

WORK FOR TOMORROW

MONDAY - TO COMPLETE THE BORING, INCLUDING THE INSTALLATION OF PIEZOMETERS TO DESIGNATED DEPTHS, APPROPRIATE BACKFILL, AND PROTECTIVE WELL CASING

FIELD PURCHASES

ITEM	AMOUNT
RANDOM FILL - BANK RUN SAND	

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 10 DATE OCTOBER 18, 1993 (MON)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 60 MIN. 45

WEATHER PT CLOUDY - WINDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	9
ROB PRICE (DRILLER)	8
DARIUS WINTERS (DRILLER HELPER)	8

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	8	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

Oct. 13 (Mon)

#20 FILTER SAND (SILICA SAND) ARRIVED ON SITE TODAY AND WHAT WASN'T MOBILIZED TO THE RIG PLATFORM WAS STORED IN THE STORAGE GARAGE.

60 lb BAGS OF ALL PURPOSE SAND WERE PURCHASED FROM A LOCAL HARDWARE AND BROUGHT ON SITE.

THE TEST BOREHOLE WAS BACKFILLED WITH RANDOM SAND FILL TO -128 FOOT DEPTH. AS THE 4" CASING WAS SLOWLY WITHDRAWN THE SAND WAS ADDED TO THE HOLE. A 6 FT. ZONE OF BENTONITE PELLETS WERE PLACED IN THE BOREHOLE BETWEEN -125 FT. AND -119 FT. AS THE LOWER SEAL. 2 FT. OF FILTER SAND BEDDING WAS THEN PLACED IN THE HOLE, THE PIEZOMETER TIP CONSTRUCTED and installed FROM -117 FT. AND FILTER SAND PLACED AROUND IT, ACCORDINGLY - THE SAND BACKFILL reached A depth of approximately -103 FT. by the END OF THE DAY.

DAM LIGHTING WAS TESTED.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									8	+1	9
ROB PRICE										*8	8
DARIUS WINTERS										*8	8

+ ACQUIRE / STORE BACKFILL MATERIALS

* PULL CASING / INSTALL PIEZOMETER / BACKFILL

WORK FOR TOMORROW

TO FINISH THE INSTALLATION OF both PIEZOMETERS TO DESIGNATED DEPTHS WITH ACCOMPANYING BACKFILL MATERIALS AND PROTECTIVE CASING. TO READY THE DRILL RIG FOR THE MOVE ACROSS THE ROAD AND ON TO THE PLATFORM, NORTH SIDE.

FIELD PURCHASES

ITEM	AMOUNT
(12) 100 lb BAGS #20 SILICA SAND	167.40
(24) 60 lb BAGS ALL PURPOSE SAND	76.80

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 11 DATE OCTOBER 19, 1993 (TUE)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 60 MIN. 40

WEATHER SUNNY TO PT. CLOUDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
					— BACKFILL TEST BORING FD93-1 —

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	17
ROB PRICE (DRILLER)	17½
DARIUS WINTERS (DRILLER HELPER)	17½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	17½	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

OCT 19
TUE

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD93-1 WAS COMPLETED TODAY. BOTH PIEZOMETERS, DESIGNATED 13-A AND 13-B WERE INSTALLED AND BACKFILLED IN ACCORDANCE WITH WORK ORDER SPECS.

PREPARATION FOR THE MOVE OF DRILL RIG AND MATERIALS TO THE NORTH SIDE OF THE DAM CONTINUES. A CRANE TO BE USED FOR THIS PURPOSE IS TO ARRIVE AT 2:00 AM EARLY MORNING, WEDNESDAY

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE									15	2	17
ROB PRICE			2							15½	17½
DARIUS WINTERS			2							15½	17½

* INSTALL PIEZOMETERS / BACKFIL BORING

WORK FOR TOMORROW

AFTER MIDNIGHT - MOVE DRILL RIG, PIPE SUPPLIES, ETC. OVER CREST OF DAM TO OTHER SIDE USING CRANE

BOLT RIG TO PLATFORM - MOBILIZE & SET UP ASSESSORY EQMT TO NEW RIG PLATFORM

FIELD PURCHASES

ITEM	AMOUNT
(2) SETS OF 500 WATT	
QUARTZITE FLOOD LIGHTS	
(RENTAL)	

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 12 DATE OCTOBER 20, 1993 (WED)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 65 MIN. 45

WEATHER MOSTLY CLOUDY - SOME LIGHT DRIZZLE

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	7
ROB PRICE (DRILLER)	13 1/2
DARIUS WINTERS (DRILLER HELPER)	13 1/2

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	13 1/2	
CRANE / OPERATOR	8	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

OCT 20
WED

NARRATIVE OF DAYS OPERATIONS

CRANE ARRIVED ON SITE AT 2:15 AM – STATE ROAD CLOSED
MOVED DRILL RIG, DRILL RODS, PIPE CASING, AND NECESSARY SUPPLIES &
EQUIPMENT ACROSS DAM CREST & ROAD TO THE NORTH SIDE AND
WOOD PLATFORM
RIGGED UP AND DOWN NIGHT LIGHTING EQUIPMENT, BARRICADES, ETC.

MOVE ADDITIONAL MATERIALS FROM SOUTH SIDE OF DAM TO NORTH SIDE
MOBILIZE EQUIPMENT TO RIG PLATFORM
BOLT DOWN AND SECURE RIG
REMOVE RENTAL AND BORROWED EQUIPMENT FROM SITE

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE			7								7
ROB PRICE			13½								13½
DARIUS WINTERS			13½								13½

WORK FOR TOMORROW

TO BEGIN DRILLING F093-2 TEST BORING (DESIGNATED F093-C) ON THE
NORTH RIP-RAP SLOPE OF HOPKINTON DAM

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 13 DATE OCTOBER 21, 1993 (THU)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH. 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 50 MIN. 45

WEATHER STEADY RAIN IN A.M. TO LIGHT DRIZZLE, CLOUDY P.M.

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-2	HOPKINTON DAM	0	15.0'	15.0	0 TO -6.5 ROCK RIP RAP 6.5 TO -15.0 BROWN CMF SAND & SILT, LITTLE GRAVEL TRACE CLAY

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11½
ROB PRICE (DRILLER)	12
DARIUS WINTERS (DRILLER HELPER)	12

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	12	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

OCT 21
(THU)

NARRATIVE OF DAYS OPERATIONS

WORK WAS DELAYED FOR 3 HOURS IN THE MORNING DUE TO HEAVY DOWNPOURS AND HAZARDOUS ROCK RIP RAP CONDITIONS

TEST BORING FD 93-2 WAS DRILLED TO A DEPTH OF 15 FEET TODAY. 6½ FT. OF ROCK RIP RAP HAD TO BE PENETRATED FIRST. "P" SIZE CORE BARREL WITH DIAMOND CUTTING BIT WAS USED TO PENETRATE THE LARGE BOULDERS WHICH WERE BROKEN APART AFTER MANY HOLES WERE DRILLED.

5" PW CASING WAS ADVANCED 10 FT. AND THE BORING, 11 FT. USING THE 3 7/8" ROLLER BIT. A SAMPLE WAS OBTAINED AT 11 TO 13 FT. DEPTH WITH THE 2½" I.D. SPLIT SPOON SAMPLER. THE HOLE WAS FURTHER ADVANCED BY ROLLER BIT AND WASH WATER TO -15 FT. DEPTH BY THE END OF THE DAY

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE								3	8½		11½
ROB PRICE				9				3			12
DARIUS WINTERS				9				3			12

WORK FOR TOMORROW

TO CONTINUE DRILLING FD 93-2, ADVANCING WITH PW SIZE CASING, AND SAMPLING WITH 2 FT. X 2½" I.D. SPLIT SPOON SAMPLER

FIELD PURCHASES

ITEM	AMOUNT
(2) SETS DRILLER RAIN GEAR	

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 14 DATE OCTOBER 22, 1993 (FRI)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 45

WEATHER PT-CLOUDY; WINDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-2	HOPKINTON DAM	15.0	39.0	24.0	15.0 TO 37.0 EARTH DAM FILL BROWN CMF SAND & SILT LITTLE GRAVEL, TRACE CLAY
					37.0 TO 38.6 PERVIOUS SAND BROWN CMF SAND, LITTLE GRAVEL, TR SILT

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	6
ROB PRICE (DRILLER)	6
DARIUS WINTERS (DRILLER HELPER)	6

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	6	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

Oct. 22 (Fri)

TEST BORING FD93-2 WAS ADVANCED FROM -15 FT. TO -39 FT. TODAY. THE BORING WAS SAMPLED EVERY 5 FT UNTIL -35 FT. DEPTH AND THEN SAMPLED CONTINUOUS. A ZONE OF PERVIOUS SAND MATERIAL WAS ENCOUNTERED @ ROUGHLY -37 TO -38.5 FT. DEPTH. THE BOTTOM FEW INCHES RETAINED IN THE SAMPLING SPOON BECAME THE GRAY SAND-SILT GLACIAL TILL (VIRGIN) MATERIAL

THE PW SIZE CASING WAS ADVANCED TO -39 FT. by THE END OF THE DAY.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									6		6
ROB PRICE				6							6
DARIUS WINTERS				6							6

WORK FOR TOMORROW

MONDAY - TO CONTINUE DRILLING FD93-2 THROUGH GLACIAL TILL AND TO ADVANCE PW CASING ACCORDINGLY

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 15 DATE OCTOBER 25, 1993 (MON)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 65 MIN. 40

WEATHER MOSTLY SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
F093-2	HOPKINTON DAM	39.0'	62.0'	23.0'	-39' TO -49' BROWN cmf TO mf SAND, TRACE GRAVEL, tr SILT -49' TO -62' GRAY mf SAND & SILT, little GRAVEL, TRACE CLAY (GLACIAL TILL)

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	8
ROB PRICE (DRILLER)	8
DARIUS WINTERS (DRILLER HELPER)	8

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	8	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

OCT 25 (MON)

NARRATIVE OF DAYS OPERATIONS

A 9 FT. LENGTH OF 4" DIA. STEEL PROTECTIVE WELL CASING WAS INSTALLED IN FD93-1. THE PIPE WAS BACKFILLED WITH BANKRUN SAND, AND INSIDE, BETWEEN THE PIEZOMETER RISERS, WITH ALL PURPOSE SAND. THE EXISTING PLATFORM BEGAN TO BE DISASSEMBLED AT THIS LOCATION.

TEST BORING FD 93-2 WAS ADVANCED FROM -39 FT. TO -62 FT. TODAY. THE BORING WAS SAMPLED CONTINUOUS THROUGH -51 FT. DUE TO THE PERMEABLE SAND ZONE ENCOUNTERED. BELOW -49 FT. THERE WAS A STRATA CHANGE, FROM PERMEABLE SAND TO DENSE GLACIAL TILL. THE TILL STRATA WAS SAMPLED AT 5 FOOT INTERVALS TO -62 FEET BY DAYS END. PW CASING WAS ADVANCED TO -55 FT.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE									8		8
ROB PRICE				6						1½	7½
DARIUS WINTERS				6						1½	7½

* INSTALL / BACKFILL PROTECTIVE WELL CASING, FD93-1

WORK FOR TOMORROW

TO CONTINUE ADVANCING TEST BORING FD93-2 TOWARD ITS DESIGNATED DEPTH @ BEDROCK ELEVATION

FIELD PURCHASES

ITEM	AMOUNT
(24) 60-lb BAGS ALL PURPOSE SAND	76.80

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 16 DATE OCTOBER 26, 1993 (TUE)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 50 MIN. 28

WEATHER PT SUNNY - MOSTLY CLOUDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
F093-2	HOPKINTON DAM	-62'	-96.8	34.8'	-62' TO -85 GLACIAL TILL - DENSE -85 TO -96 FINE SAND, STRATIFIED SILT CLAY, TR GRVL
					-95.5 → STRATA CHANGE TO CMF SAND & GRAVEL COBBLES

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11 1/2
ROB PRICE (DRILLER)	12
DARIUS WINTERS (DRILLER HELPER)	12

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11 1/2	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

Oct. 26 (Tue)

TEST BORING FD93-2 WAS FURTHER ADVANCED TODAY FROM -62 FT. TO -96.8 FT. DEPTH. THE BORING WAS SAMPLED AT 5 FOOT INTERVALS TO -92 FT. THEN CONTINUOUS SAMPLED THEREAFTER. A STRATA CHANGE OCCURRED AT -85.5 FT. WHERE THE DENSE GRAY GLACIAL TILL MATERIAL GRADED TO A FINE SAND WITH BEDS OF SILT AND CLAY. AT -95.5 FEET THE SUBSURFACE AGAIN CHANGED GRADING IN TO cmf SANDS & GRAVEL MATERIAL.

4" DIA HW CASING WAS ADVANCED TO -95 FEET BY THE END OF THE DAY

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11½		11½
ROB PRICE				11½						½	12
DARIUS WINTERS				11½						½	12

WORK FOR TOMORROW

TO CONTINUE DRILLING FD93-2 TEST BORING TOWARD ITS DESIGNATED DEPTH @ BEDROCK ELEVATION. THE GRAVEL, cmf SAND ZONE IS TO BE SAMPLED CONTINUOUS.

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 17 DATE OCTOBER 27, 1993 (WED)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 50 MIN. 40

WEATHER CLOUDY - STEADY LIGHT RAIN

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-2	HOPKINTON DAM	96.8	125.7	28.9	96.8-108 GRAY cmf SAND, SOME GRAVEL, tr SILT 108-115 GRAY F SAND, SOME SILT, tr-little GRAVEL
					115 → GRAY GLACIAL TILL

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11½
ROB PRICE (DRILLER)	11½
DARIUS WINTERS (DRILLER HELPER)	11½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CMESS DRILL RIG	11½	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

Oct. 27

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-2 WAS FURTHER ADVANCED TODAY, FROM -96.8' TO -125.7'. THE 4" HW CASING WAS ADVANCED TO A DEPTH OF -120 FEET. A STRATA CHANGE WAS NOTED AT -108 FT. WHERE THE cmf SAND AND GRAVEL MATERIAL RETURNED TO A FINE SAND, LITTLE SILT, LITTLE TO TRACE GRAVEL MATERIAL. DENSE GLACIAL MATERIAL RETURNED AT ROUGHLY -115 FT. DEPTH. IT BECAME VERY DENSE AND COBBLY BETWEEN -120 TO -124 FT.

PLATFORM @ FD 93-1 BORING TORN DOWN FOR USE AS PLATFORM FOR TEST BORING FD 93-3.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11 1/2		11 1/2
ROB PRICE				11 1/2							11 1/2
DARIUS WINTERS				11 1/2							11 1/2

WORK FOR TOMORROW

TO CONTINUE DRILLING TEST BORING FD 93-2 TOWARD ITS DESIGNATED DEPTH @ BEDROCK ELEVATION, SAMPLING AT 5 FOOT INTERVAL, AND CORING BEDROCK

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 18 DATE OCTOBER 28, 1993 (THU)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, N.H. 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 40

WEATHER PT SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-2	HOPKINTON DAM	-125.7	-154'	28.3'	-125.7 TO -142.0 DENSE SANDY GLACIAL TILL -142.0 TO -154.0 GRANITE BEDROCK

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11 1/2
ROB PRICE (DRILLER)	12
DARIUS WINTERS (DRILLER HELPER)	12

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	12	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

Oct. 28

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD93-2 WAS ADVANCED TO -154' DEPTH TODAY AND TERMINATED. BEDROCK WAS ENCOUNTERED at -142 FT AND THE FIRST 2 FEET WAS PENETRATED WITH THE 3 7/8" ROLLER BIT. THE GRANITE BEDROCK WAS THEN CORED WITH NX CORE BARREL AND DIAMOND BIT 10 FEET, 2-5 FT. RUNS. 100% RECOVERY AND CORE SAMPLES WERE OBTAINED

HW CASING WAS ADVANCED TO -142 FEET AND SEATED IN TO THE ROCK

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11 1/2		11 1/2
ROB PRICE				9	3						12
DARIUS WINTERS				9	3						12

WORK FOR TOMORROW

TO DEVELOP THE BOREHOLE, INCLUDING THE INSTALLATION OF PIEZOMETERS AND APPROPRIATE BACKFILL

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 19 DATE OCTOBER 29, 1993 (FRI)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 60 MIN. 40

WEATHER MOSTLY CLOUDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-2	HOPKINTON DAM				— BACKFILL TEST BORING —

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	6
ROB PRICE (DRILLER)	6
DARIUS WINTERS (DRILLER HELPER)	6

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	6	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD93-2 WAS BACKFILLED FROM -154 FT. TO -142 FT. DEPTH USING THE "PELTONITE PELLETS" TO FILL THE CORED ROCK CAVITY. IT WAS FURTHER BACKFILLED WITH RANDOM FILL (ALL PURPOSE SAND) TO -127 FT. DEPTH. THE HW SIZE CASING WAS PULLED UP TO -125 FT.

FILTER SAND AND PELTONITE SEALANT PELLETS, ALL PURPOSE SAND, ETC. WAS MOBILIZED TO THE RIG PLATFORM

MARK VANCE, USACE, WAS ON SITE TO DETERMINE PIEZOMETER ELEVATIONS, SEALS, ETC.. AND TO REVIEW SITE CONDITIONS

PLATFORM AT LOCATION FD93-1 WAS DISASSEMBLED, LUMBER ORGANIZED. STARTED MOVING DRILL TOOLS AND SUPPLIES TO LOCATION FD93-D, TEST BORING FD93-3.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE			3						3		6
ROB PRICE			3							3	6
DARIN SWINTERS			3							3	6

MOVING - TOOLS SUPPLIES ETC. TO NEW DRILL SITE
DISASSEMBLE PLATFORM

MISC - BACKFILL TEST BORING FD93-2

WORK FOR TOMORROW

TO DEVELOP BOREHOLE FD93-2 FOR THE INSTALLATION OF PIEZOMETERS, AND REQUIRED BACKFILL MATERIALS

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 20 DATE NOVEMBER 1, 1993 (MON)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 45 MIN. 35

WEATHER STEADY LIGHT RAIN / DRIZZLE

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
TD93-2	HOPKINTON DAM				- BACKFILLING TEST BORING -

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	6
ROB PRICE (DRILLER)	6
DARIUS WINTERS (DRILLER HELPER)	6

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	6	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-2 WAS DEVELOPED TO -65 FT. TODAY. RANDOM FILL WAS PLACED IN THE BOREHOLE TO -121 FT. BETWEEN -121 FT AND -115 FT A BENTONITE SEALER WAS PLACED. THE LOWER PIEZOMETER (P-14A) WAS THEN INSTALLED, THE 18 IN. TIP PLACED ON A TWO FOOT BED OF FILTER SAND at -113 FT. THE ZONE WAS FILLED WITH FILTER SAND TO -96 FT. WHERE THE UPPER BENTONITE SEALER BEGAN. THE HOLE WAS SEALED 6 FT. TO -90 FT. THEN FILLED WITH RANDOM FILL (ALL PURPOSE SAND) TO -65 FT. BY THE END OF THE DAY.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE									6		6
ROB PRICE										6	6
DARIUS WINTERS										6	6

* BACKFILLING BOREHOLE / INSTALL PIEZOMETER

WORK FOR TOMORROW

TO COMPLETE THE DEVELOPMENT OF TEST BORING FD 93-2, INCLUDING THE INSTALLATION OF PIEZOMETERS, PROTECTIVE WELL CASING, AND PLACEMENT OF REQUIRED BACKFILL MATERIAL

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 21 DATE NOVEMBER 2, 1993 (TUE)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 45 MIN. 30

WEATHER MOSTLY SUNNY - WINDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
					-BACKFILL TEST BORING FD93-2-

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	10 1/2
ROB PRICE (DRILLER)	10 1/2
DARIUS WINTERS (DRILLER HELPER)	10 1/2

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	10 1/2	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD93-2 WAS COMPLETED TODAY. THE PIEZOMETERS WERE INSTALLED, THE BOREHOLE BACKFILLED, AND THE PROTECTIVE CASING SET SOLIDLY IN PLACE PER SPECIFICATION. A FALLING HEAD PERMEABILITY TEST WAS PERFORMED ON EACH PIEZOMETER (P-14A & P-14B) AND THE RESULTS RECORDED.

AT 2 P.M. DRILL CREW STARTED MOVING EQUIPMENT -

EQUIPMENT AND SUPPLIES WERE REMOVED FROM THE RIG PLATFORM AND PREPARATION WAS MADE FOR THE RIG TO BE MOVED AFTER MIDNIGHT

DAM LIGHTING AND ACCESSORY EQUIPMENT WAS CONSOLIDATED AND MADE READY

THE CRANE AND OPERATOR ARRIVED ON SITE @ 445 PM

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE			1						9 1/2		10 1/2
DARIUS WINTERS			3							7 1/2	10 1/2
ROB PRICE			3							7 1/2	10 1/2

* BACKFILL BORING/DEVELOP AND PERFORM FIELD PERMEABILITY TESTING

WORK FOR TOMORROW

TO MOVE THE DRILL RIG OFF THE PLATFORM, AFTER MIDNIGHT, AND TO PREPARE EQUIPMENT AND SUPPLIES AT TEST BORING FD93-D LOCATION WHICH WILL BE HENCEFORTH REFERRED TO AS FD93-3

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 22 DATE NOVEMBER 3, 1993 (WED)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 25

WEATHER MOSTLY CLOUDY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-3	HOPKINTON DAM	0	10'	10'	ROCK RIP RAP 0-8' 8-10' mf PERVIOUS SANDS

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	12
ROB PRICE (DRILLER)	13½
DARIUS WINTERS (DRILLER HELPER)	13½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	3	
CRANE	8	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

NARRATIVE OF DAYS OPERATIONS

THE DRILL RIG WAS MOVED OFF THE PLATFORM AND ON TO THE TRUCK USING THE CRANE. IT WAS MOUNTED ON THE TRUCK AND BOLTED DOWN. PW AND HW CASING WAS MOVED OFF THE RIP-RAP SLOPE AS WERE DRILLING RODS AND OTHER WORK MATERIAL. LIGHTING, BARRICADES, CONES, ETC. WERE RIGGED UP AND RIGGED DOWN.

ADJUSTMENTS WERE MADE ON TRUCK MOUNTED RIG
LIGHTING MATERIALS, ETC. WERE MOVED FROM THE DAM GATE HOUSE TO EQUIPMENT STORAGE
TRUCK MOUNT DRILL RIG WAS SET OVER TEST BORING FD 93-3. PENETRATED RIP-RAP AND ADVANCED BORING 10 FEET. ROLLER BIT ADVANCED BORING, PW CASING ADVANCED
RENTAL MATERIAL WAS RETURNED

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE			9						3		12
ROB PRICE			10½		3						13½
DARIUS WINTERS			10½		3						13½
CRANE OPERATOR											8

WORK FOR TOMORROW

TO DRILL THROUGH ROCK RIP RAP AND TO ADVANCE TEST BORING FD 93-3 TOWARD ITS DESIGNATED DEPTH AT BEDROCK ELEVATION

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 23 DATE NOVEMBER 4, 1993 (THU)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 60 MIN. 40

WEATHER MOSTLY SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-3	HOPKINTON DAM	-10'	-65.8	55.8'	-8 TO -18' PERVIOUS MF SAND ZONE -18 TO -65' GLACIAL TILL AND STRATIFIED SANDS

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11
ROB PRICE (DRILLER)	11½
DARIUS WINTERS (DRILLER HELPER)	11½

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11½	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

11/4 THU

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-3 WAS ADVANCED FROM -10 FT. TO -70 FT. TODAY. THE BORING WAS SAMPLED at 5 FOOT INTERVALS USING THE 2½" I.D. SPLIT SPOON SAMPLER. PW CASING WAS ADVANCED 20 FEET, HW CASING ADVANCED 65 FT. THE LAST SAMPLE WAS OBTAINED at -65 FOOT DEPTH.

THE SUBSURFACE MATERIAL GENERALLY CONSISTED of MEDIUM DENSE GLACIAL TILL MATERIAL TO STRATIFIED BEDS OF FINE SAND, SILT AND CLAY

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11		11
ROB PRICE				11½							11½
DARIUS WINTERS				11½							11½

WORK FOR TOMORROW

TO CONTINUE ADVANCING TEST BORING FD 93-3 TOWARD ITS DESIGNATED DEPTH AT BEDROCK ELEVATION

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 24 DATE NOVEMBER 5, 1993 (FRI)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 45

WEATHER MOSTLY CLOUDY TO STEADY LIGHT RAIN

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-3	HOPKINTON DAM	65.8	85'	19.2'	GLACIAL TILL, STRATIFIED SANDS, SILT & CLAY

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	7
ROB PRICE (DRILLER)	7
DARIUS WINTERS (DRILLER HELPER)	7

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	7	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

11/5 FRI

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-3 WAS ADVANCED FROM -65.8 FT. TO -85 FT.
IT WAS SAMPLED AT 5 FOOT INTERVALS.
HW CASING WAS ADVANCED TO -85 FEET

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									7		7
ROB PRICE				7							7
DARIUS WINTERS				7							7

WORK FOR TOMORROW

MONDAY - TO ADVANCE TEST BORING FD 93-3 THROUGH SAND/GRAVEL ZONE (CONTINUOUS SAMPLE) TOWARD TERMINATION AT BEDROCK ELEVATION

FIELD PURCHASES

ITEM	AMOUNT

ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 25 DATE NOVEMBER 8, 1993 (MON)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 45 MIN. 20

WEATHER SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD-93-3	HOPKINTON DAM	-85	-101.3	16.3'	-85 TO -94 DENSE GRAY SANDY TILL GRADE TO -94 TO -98.5 cmFSAND, little GRAVEL, Tr SILT
					-98.5 → -101.3 V-DENSE GRAY SILT, SOME CLAY little GRAVEL, Tr SAND

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	6
ROB PRICE (DRILLER)	6
DARINS WINTERS (DRILLER HELPER)	6

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	6	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

11/8 MON

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-3 WAS ADVANCED FROM -85 FT. TO -101.3 FT. DEPTH TODAY. THE BORING WAS SAMPLED CONTINUOUS BETWEEN THOSE DEPTHS. A STRATA CHANGE WAS EXPERIENCED AT APPROXIMATELY -94 FEET AND AGAIN AT -98.3 FEET. AN ABRUPT CHANGE OCCURRED AT THE LOWER DEPTH; SAND/GRAVEL MATERIAL BECOMING A DENSE, DARK GRAY, SILT/CLAY & LITTLE GRAVEL TILL MATERIAL. THE BOREHOLE REMAINED OPEN TODAY SO THE HW CASING REMAINED at -85 FT. DEPTH.

THE WOODEN PLATFORM AT FD 93-2 LOCATION WAS DISASSEMBLED AND REMOVED FROM THE ROCK RIP RAP SLOPE. IT WAS STOCK-PILED BELOW, NEAR THE BERM ROAD

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									6		6
ROB PRICE				6							6
DARIUS WINTERS				6							6

WORK FOR TOMORROW

TO ADVANCE TEST BORING FD 93-3 TO BEDROCK DEPTH, SAMPLE at 5 FOOT INTERVALS, AND CORE THE BEDROCK 10 FEET.

TO DETERMINE FINAL PIEZOMETER TIP ELEVATION, SEALS, ETC...

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 26 DATE NOVEMBER 9, 1993 (TUE)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST MANCHESTER, NH 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 20

WEATHER MOSTLY SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-3	HOPKINTON DAM	101.3	135	33.7	-104.3 TO -124 GRAY BROWN TILL -124 TO -135 WEATHERED GRANITE BEDROCK

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	11
ROB PRICE (DRILLER)	11 1/2
DARIUS WINTERS (DRILLER HELPER)	11 1/2

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11 1/2	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

11/9 TUE

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD 93-3 WAS ADVANCED TO -135 FT. DEPTH TODAY AND TERMINATED. BEDROCK WAS ENCOUNTERED AT -124 FT. AND 10 FEET WAS CORED, FROM -125 TO -135 FEET.

FINAL DEPTHS (ELEVATIONS) FOR THE INSTALLATION AND PROPER BACKFILL FOR THE PIEZOMETER, INCLUDING BENTONITIC SEALS WERE DETERMINED.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC.	TOTAL
TOM ELDRIDGE									11		11
ROB PRICE				9	2 1/2						11 1/2
DARIUS WINTERS				9	2 1/2						11 1/2

WORK FOR TOMORROW

TO BACKFILL TEST BORING FD 93-3 AND INSTALL PIEZOMETER & RISER PIPE AT DESIGNATED DEPTHS

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 27 DATE NOVEMBER 10, 1993 (WED)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH. 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 20

WEATHER SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-3	HOPKINTON DAM				- BACKFILL FD93-3 BOREHOLE -

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	10
ROB PRICE (DRILLER)	11
DARIUS WINTERS (DRILLER HELPER)	11

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	11	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

11/10 WED

NARRATIVE OF DAYS OPERATIONS

TEST BORING FD93-3 WAS BACKFILLED WITH REQUIRED MATERIALS TO -30 FT. DEPTH TODAY AND PIEZOMETER P-15 INSTALLED.

THE ZONE OF INTEREST WAS BETWEEN -85 AND -50 FT. DEPTH. THE PIEZOMETER TIP WAS SET AT -83 FT. A BENTONITIC SEALER ISOLATED THE ZONE.

THE INSTALLED WELL CASING AND PIEZOMETERS WERE SURVEYED FOR LOCATION AND ELEVATIONS BY ATLANTIC TESTING LABS SURVEYORS.

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE									10		10
ROB PRICE										11	11
DARIUS WINTERS										11	11

* BACKFILL TEST BORING & INSTALL PIEZOMETER

WORK FOR TOMORROW

TO COMPLETE THE DEVELOPMENT OF FD93-3 TEST BORING, PERFORM FIELD PERMEABILITY TESTING ON FD93-3 AND FD93-1, AND TO INSTALL WELL PROTECTORS FOR 6 EXISTING PIEZOMETER LOCATIONS ALONG THE BERM ROAD, DOWNSTREAM SIDE OF THE DAM

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT

NEW ENGLAND DIVISION
CORPS OF ENGINEERS, U.S. ARMY
WALTHAM, MASSACHUSETTS

FOUNDATIONS & MATERIALS BRANCH

LOG NO. 28 DATE NOVEMBER 11, 1993 (THU)

DAILY LOG OF FIELD EXPLORATIONS

PROJECT HOPKINTON DAM EXPLORATION PROGRAM

TEMPORARY ADDRESS

LOCATION WHERE CAN BE REACHED 45 MONROE ST. MANCHESTER, NH. 03104

PHONE (603) 627-9143 TIME EVENINGS TEMPERATURE: MAX. 55 MIN. 30

WEATHER PT SUNNY

DRILLING TODAY

HOLE	AREA	FOOTAGE FROM	FOOTAGE TO	FOOTAGE TODAY	MATERIAL
FD93-3	HOPKINTON DAM				- BACKFILL FD93-3 BOREHOLE

TEST PITS OR AUGER BORINGS TODAY

HOLE	AREA	DEPTH	MATERIAL

HOLE	AREA	DEPTH	MATERIAL

PERSONNEL

NAME	HOURS
TOM ELDRIDGE (GEO INSPECTOR)	10 1/2
ROB PRICE (DRILLER)	11
DARIUS WINTERS (DRILLER HELPER)	11

PLANT USED

ITEM	HOURS	BREAKDOWN HOURS
CME 55 DRILL RIG	10	

CHIEF OF FIELD PARTY

NED FORM DEC 63 198 REPLACES EDITION OF MAY 62 WHICH MAY BE USED UNTIL EXHAUSTED

(OVER)

11/11 THU

NARRATIVE OF DAYS OPERATIONS

FALLING HEAD FIELD PERMEABILITY TESTS WERE PERFORMED ON PIEZOMETER P-15, TEST BORING FD93-3, AND PIEZOMETERS P13-A & P13-B, TEST BORING FD93-1, AND THE RESULTS RECORDED.

THE 6 EXISTING PIEZOMETERS LOCATED ALONG THE BERM ROAD, NORTH SIDE OF THE DAM WERE REPAIRED AND GROUTED IN, WITH NEW WELL PROTECTORS, INSTALLED.

CLEANED UP SITE AND ORGANIZED EQUIPMENT & MATERIALS

MAN-HOUR WORK BREAKDOWN

NAME	MOB.	DEMOB.	MOVING	DRILL OVB.	DRILL BEDROCK	PREV. MAINT.	EQUIP. FAILURE	LOST TIME (WEATHER)	INSP. & SUPER.	MISC. *	TOTAL
TOM ELDRIDGE									10½		10½
ROB PRICE										11	11
DARIUS WINTERS										11	11

* 8 HRS TO THE MAINTENANCE & REPAIR OF THE 6 EXISTING PIEZOMETERS

WORK FOR TOMORROW

WORK COMPLETED

FIELD PURCHASES

ITEM	AMOUNT	ITEM	AMOUNT
5-80 lb BAGS QUICKCRETE MORTAR	19.45		

b. Boring Logs

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site HOPKINTON DAM Page 1 of 10 Pages

Boring No. FD93-1 Desig. FD93-B Diam. (Casing) 5" PW & 4" HW

Co-ordinates: N 250877.22 E 478249.90

Elevation Top of Boring 416 NGVD ~~M.S.L.~~ Hammer Wt. 300 Boring Started 10/5/93

Total Overburden Drilled 144.5 Feet Hammer Drop 18" Boring Completed 10/19/93

Elevation Top of Rock 271.5 NGVD ~~M.S.L.~~ Casing Left

Total Rock Drilled 13.5 Feet Subsurface Water Data Page

Elevation Bottom of Boring 258 NGVD ~~M.S.L.~~ Obs. Well

Total Depth of Boring 158 Feet Drilled By ROB PRYCE, DARIUS WINTERS

Core Recovered 65 % No. Boxes 1 Mfg. Des. Drill CME-55

Core Recovered 6 Ft : 6" Diam. 2-1 In. Inspected By: MARK WILBUR T ELDRIDGE

Soil Samples 2 1/2 In. Diam. 68 No. Classification By: MARK WILBUR T ELDRIDGE

Soil Samples In. Diam. No. Classification By:

	DEPTH (Ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
							ROCK RIP-RAP
406	10			16.0 TO	15	300 lb HAMMER 18" DROP NW ROD 2 1/2 ID SPLIT SPOON	10 Ft 4" RECOVERY TAN CRF SAND, SOME SILT (MOIST, NON-P)
	11	S-1		12.0	12 10 13		
	12			12.0 TO	20		12'
	13	S-2		14.0	29 24	SIMILIAR PROCEDURE ROLLER BIT & WASH TO 14'	10" RECOVERY BROWN SILT, SOME CRF SAND LITTLE CLAY, TRACE OF GRAVEL (MOIST, VERY SLIGHTLY PLASTIC)
	14			14.0 TO	26 11		
	15	S-3		16.0	34 22	300 lb HAMMER, 18" DROP NW ROD 2 1/2" ID. SPLIT SPOON, SPUN/WASH PW CASING TO 15'	10" RECOVERY SIMILIAR SOILS
	16			16.0 TO	28 34		
	17	S-4		18.0	35 41	SIMILIAR PROCEDURE	16" RECOVERY SIMILIAR SOILS
398	18				46		

GENERAL REMARKS: 10' OVERBURDEN, NO SAMPLING REQUIRED. REMOVED 2' OF RIP-RAP BY HAND SPUN PW (5") CASING TO -10' DEPTH. ROLLER BIT & WASH TO -10' DEPTH

ED FORM 1 MAR 58 (Test) Boring No. FD93-1 FIG NO 2B

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
398 18				10		4" Recovery
				21		Similiar Soils w/ cobbles
19	S-5			100/3"	REFUSAL @ 19.3' (possible cobble)	
					INSTALL Roller Bit	
					Spin casing to 20'	
20			20.0	23	20'	
			TO	27		12" Recovery
21	S-6				300 lb Hammer, 18" Drop	Brown Silt and
			22.0	37	NW Rod, 2½" I.D. split	cmf sand trace
				38	spoon	mf gravel (moist, nd)
22			22.0	37		
				23	Similiar procedure	4" Recovery
23	S-7					Similiar Soils w/ rock fragments
			TO.	64	Roller Bit & wash 20-24'	
			24.0	57		
24						
			24.0	19		
				24	300 lb Hammer, 18" Drop	
25	S-8		TO	30	NW Rod, 2½" I.D. split spoon	15" Recovery
					(End of work day 7:00 PM)	Similiar Soils
			26.0	43		
26					Spun/wash pw casing to 25'	
			26.0	47		
			TO	49		
27	S-9			36	300 lb Hammer, 18" Drop	
			28.0	31	NW Rod, 2½" I.D. split spoon	
28						12" Recovery
			28.0	35		Similiar Soils
			TO	37		
29	S-10			45	Similiar procedure	6" Recovery
			30.0			Similiar Soils
				33	Spun/wash pw casing	
30					to 30', 3rd gear, relatively	
			30.0	23	easy drilling, install roller	
			TO	27	Bit & wash 26 to 30'	
31	S-11					8" Recovery
			32.0	12	300 lb Hammer, 18" Drop	Similiar Soils
				14	NW Rod, 2½" I.D. split spoon	
32						
			32.0	23		
				16		15" Recovery
33	S-12		TO	24	Similiar procedure	Similiar Soils
			34.0	20	Spun/wash pw casing	
382 34					30 to 34', 3rd gear relatively	
				32	easy drilling, install roller	
				32	Bit & wash to 34'	

NED Form 58A (Test)

Boring No. ED93-1

FIG NO

DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
382 34						
			34.0 TO 36.0	33 26 46 65	300 lb HAMMER, 18" DROP NW ROD 2½" SPLIT SPOON SAMPLER	6" RECOVERY SIMILIAR SOILS
35	S-13					
36			36.0 TO 38.0	47 52 42 28	SIMILIAR PROCEDURE	36' 11" RECOVERY Grey SILT, AND cnf SAND, little cnf GRAVEL (MOIST, N-P) (GLACIAL TILL)
37	S-14					
38			38.0 TO 40.0	39 45 100 100/5"		
39	S-15					10" RECOVERY SIMILIAR SOILS
40			40.0 TO 40.9		300 lb HAMMER, 18" DROP NX ROD 2½", SPLIT SPOON SAMPLER. REFUSAL @ 40.9' INSTALL ROLLER BIT AND ADVANCE THROUGH 5" COBBLE	
41	S-16					8" RECOVERY SIMILIAR SOILS VERY COMPACT
42			42.0 TO 44.0	29 37 63 59	SIMILIAR PROCEDURE	
43	S-17					9" RECOVERY SIMILIAR SOILS
44			44.0 TO 46.0	35 35 37 48		
45	S-18					7" RECOVERY SIMILIAR SOILS
46			46.0 TO 48.0	21 23 51 34	300# HAMMER, 18" DROP NX ROD, 2½" ID SPLIT SPOON SAMPLER	
47	S-19					9" RECOVERY SIMILIAR SOILS
48			48.0 TO 50.0	35 22 44 49		48'
49	S-20					9" RECOVERY Grey SILT, Some cnf SAND, little mf GRAVEL, little CLAY (MOIST, SLIGHTLY PLASTIC) (GLACIAL TILL)
366 50					SIMILIAR PROCEDURE SPUN/WASH PW(5") CASING TO 45', INSTALL ROLLER BIT AND ADVANCE TO 50' 3RD GEAR, RELATIVELY EASY DRILLING	

NED Form 58A (Test)

Boring No. FD93-1

FIG NO :

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVT	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
366	50				22	300 lb HAMMER, 18" DROP	
				50.0	22	NX ROD, 2½ I.D. SPLIT SPOON	
	51	S-21		TO	13	SAMPLER	10" RECOVERY SIMILAR SOILS
				52.0	24		
	52				26		
				52.0	39	SIMILIAR PROCEDURE	
				TO			
	53	S-22			87	SPIN/WASH PW (5") CASING TO 50' (STOPPAGE of WORK DAY)	16" RECOVERY SIMILIAR SOILS
				54.0	76	ROLLER BIT & WASH TO -54'	
	54						
		S-23		54.0	29	300 lb. HAMMER 18 IN. DROP	18" RECOVERY
				TO	92	NX ROD 2½" I.D. SPLIT SPOON	GRAY SILT, SOME cmf SAND, little cmf GRAVEL, trace Clay (MOIST, NSP) GLACIAL TILL
	55			56.0	65	3⅞" ROLLER BIT & WASH TO -56 FT.	
					164		
	56						
		S-24		56.0	33	300 lb. HAMMER 18 IN DROP	14" RECOVERY
				TO	250	NX ROD 2½" I.D. SPLIT SPOON	SIMILAR SOILS
	57			58.0	120	SPIN & WASH 5" PW CASING 5 FT. TO -55 FT.	
					177	ROLLER BIT & WASH TO -58 FT.	
	58						
		S-25		58.0	60	300 lb. HAMMER 18 IN DROP	12" RECOVERY
				TO	60	NX ROD 2½" I.D. SPLIT SPOON	SIMILAR SOILS
	59			60.0	110	ROLLER BIT & WASH TO -60 FT.	
					148		
	60						
		S-26		60.0	95	300 lb HAMMER 18 IN DROP	3" RECOVERY
				TO	150/3	NW ROD 2½" I.D. SPLIT SPOON	SIMILAR SOILS W ROCK FRAGMENTS
	61			60.8		ROLLER BIT & WASH TO -62 FT.	GRAVEL OR COBBLE LAYER? EXCESSIVE WASH IN SPOON
						WASH WITH DRILLING MUD TO CLEAR CAVINGS & WASH	
	62						
		S-27		62.0	73	ADVANCE 5" PW CASING TO -62 FT. / ROLLER BIT & WASH	18" RECOVERY GRAY SILT, little cmf SAND, little CLAY, ROCK fragments (MOIST, SP)
				TO	71	300 lb HAMMER 18 IN. DROP	
	63			64.0	73	NW ROD 2½" I.D. SPLIT SPOON	
					78		
	64						
		S-28		64.0	46	300 lb HAMMER 18 IN. DROP	18" RECOVERY
				TO	46	NW ROD 2½" I.D. SPLIT SPOON	SIMILAR SOILS GRADE TO GRAY CLAY, some SILT, little gravel (MOIST, P)
	65			65.8	70	SPIN & WASH 5" PW CASING TO -65 FT.	
					120/3		
350	66						

NED Form 58A (Test)

Boring No. PD93-1

FIG NO

	DEPTH 1"	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
OCT 8 350' EL.	66	S-29		66.0 To 68.0	20 26 42 53	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	22" RECOVERY GRAY cmf SAND, little SILT, trace CLAY, trace GRAVEL (moist, USP) "SANDY TILL"
	67						
	68	S-30		68.0 To 69.8	88 70 137 160/3	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON SPIN & WASH 5" PW CASING TO -70 FT.	16" RECOVERY SIMILAR SOILS
	69						
	70	S-31A		70.0 To 72.0	19 25 39 43	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	22" RECOVERY SIMILAR SOILS 71.9'
	71						
	72	S-31B					1" LAYER GRAY mf SAND (moist, NP)
		S-32		72.0 To 74.0	34 38 57 52	300 lb. HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON ADVANCE 5" PW CASING TO ~75 FT.	22" RECOVERY GRAY cmf SAND, trace GRAVEL trace SILT grade TO mf SAND CLEAN (WET, NP) 74'
	73						
	74	S-33		74.0 To 76.0	26 37 52 50	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT/WASH TO ~76 FT.	17" RECOVERY GRAY cmf SAND, little GRAVEL trace-little SILT (moist, NP)
	75						
	76	S-34		76.0 To 78.0	47 75 100 150	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO ~78 FT	22" RECOVERY SIMILAR SOIL
	77						
	78	S-35		78.0 To 79.2	44 57 100/2 BOUNCING REFUSAL	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON INSERT 4" HW CASING IN TO BORE HOLE AND SPIN/WASH TO ~79.5 FT. ROLLER BIT W 3⅞" BIT TO ~80 FT. 3RD GEAR 3/4 THROTTLE	10" RECOVERY SIMILAR SOIL "SANDY TILL"
336.8	79						
OCT 11 336' EL.	80	S-36		80.0 To 81.3	73 65 160/4	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT/WASH TO ~82 FT.	16" RECOVERY GRAY mf SAND, little GRAVEL, trace SILT, trace CLAY (DRY-moist, NP)
	81						
	82						

NED Form 58A (Test)

Boring No. FD 93-1

FIG NO

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE REC'VT	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
334'	82	S-37		82.0 to 84.0	46 60 66 72	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; SPIN/WASH HW CASING TO -84 FT. 3RD GEAR 3/4 throttle moderately DIFFICULT DRILLING	18" RECOVERY SIMILAR SOILS
	83						
	84	S-38		84.0 To 86.0	56 85 133 138	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; ROLLER BIT TO -86 FT. AND WASH	20" RECOVERY GRAY F SAND, Trace-little C GRAVEL, Trace SILT, Trace CLAY (moist, NP)
	85						
	86	S-39		86.0 To 88.0	58 82 95 95	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; SPIN/WASH HW CASING TO -88 FT.	22" RECOVERY SIMILAR SOILS GRADE TO GRAY CLEAN mF SAND, Trace SILT (MOIST, NP)
	87						
OCT 12	88	S-40		88.0 To 90.0	31 35 40 38	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; SPIN/WASH CASING TO 90 FT.	14" RECOVERY GRAY mF SAND, little mc GRAVEL Trace SILT grade TO GRAY F SAND, SILT, Trace CLAY (moist, SP)
	89						
	90	S-41		90.0 To 92.0	18 26 38 132	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; ROLLER BIT/WASH TO 92 ft	24" RECOVERY GRAY FINE SAND & SILT, little CLAY, Trace GRAVEL (moist, SP)
	91						
	92	S-42			60/0	300 lb HAMMER 18 IN DROP NW ROD; ROLLER BIT THROUGH 9" BOULDER	NO RECOVERY COBBLES/BOULDER?
	93						
	94	S-43		94.0 To 95.1	25 50 100/1	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; SPIN, WASH CASING TO -95'; ROLLER BIT & WASH TO -96'	12" RECOVERY GRAY mF SAND, little SILT, Trace CLAY (WET, NP) SILT/CLAY LAYERS STRATIFIED
	95						
	96			96.0 To 97.4	33 68 200/5	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON; ROLLER BIT TO -98 ft.	16" RECOVERY GRAY FINE SAND, Trace SILT, Trace CLAY (SILT/CLAY STRATIFI (WET, NP)
	97						
318'	98						

NED Form 58A (Test)

Boring No. FO 93-1

FIG NO.

ELEV	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
318	98	S-45		98.0 TO 99.0	76 / 164 / 60/0	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ADVANCE CASING TO -100 FT.	12" RECOVERY GRAY mf SAND, TRACE SILT, TRACE GRAVEL (WET, NP) @100' mf SAND graded to cmf SAND and GRAVEL
316	100	S-46		100 TO 100.2	100/2 Bouldering REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -102'	2" RECOVERY GRANITE ROCK FRAGMENTS
	102	S-47		102.0 TO 102.2	171 / 150/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH BOREHOLE TO -104 FT.	2" RECOVERY GRAY cmf SAND & GRAVEL, TRACE SILT (WET, NP)
	104	S-48		104.0 TO 104.4	200/5	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT / WASH BORING TO -104 FT.	4" RECOVERY SIMILAR SOILS
	106	S-49		106.0 TO 106.7	151 / 100/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT / WASH BORING TO -108 FT.	8" RECOVERY GRAY cmf SAND & GRAVEL trace SILT (WET, NP)
	108	S-50		108.0 TO 108.8	70 / 100/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON SPIN/WASH 4" HW CASING TO -110 FT ROLLER BIT WASH CASING TO -110 FT.	6" RECOVERY SIMILAR SOILS
OCT 13	110	S-51		110.0 TO 110.2	200/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH BOREHOLE TO -112' 3rd GEAR ½ 3/4 throttle RELATIVELY DIFFICULT DRILLING	2" RECOVERY SIMILAR SOIL COBBLES (-110' to -111')
	112	S-52		112.0 TO 113.1	145 / 60/1	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -114 FT.	6" RECOVERY SIMILAR SOIL
302	114						

NED Form 58A (Test)

Boring No. TO 93-1

FIG NO

DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
302 114	S-53		114.0 TO 114.3	120/3 Bouncing REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ADVANCE 4" CASING, SPIN/WASH TO -115 FT. ROLLER BIT TO -116 FT.	2" RECOVERY GRAY cmf SAND & GRAVEL tr SILT tr CLAY (WET, NP)
115						
116	S-54		116.0 TO 116.4	150/5	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT, WASH BOREHOLE TO -118 FT. DIFFICULT DRILLING & BOUNCING OF RIG CONTINUE ROLLER BIT & WASH through Cobble & GRAVEL TO -120 FT. SPIN & WASH HW CASING TO -120 FT. DIFFICULT - 3RD GEAR 3/4 THROTTLE	5" RECOVERY SIMILAR SOIL COBBLES (116.5 - 119) COBBLES & BOULDERS NO RECOVERY UNABLE TO SAMPLE
117						
118						
119						
120	S-55		120.0 TO 120.8	125 / 125/3	300 lb HAMMER 18 IN DROP NW ROD 2½" SPLIT SPOON ROLLER BIT TO -122 FT. 2ND GEAR ½-¾ throttle	9" RECOVERY GRAY cmf SAND & GRAVEL trace SILT (WET, NP) (COBBLES)
121						
122	S-56		122.0 TO 123.0	101 / 246	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT BOREHOLE & WASH TO -124 FT.	8" RECOVERY GRAY cmf SAND, SOME GRAVEL little SILT (WET, NP) "TILL"
123						
124	S-57		124.0 TO 124.3	150/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -126 FT. SHAKING/ROCKING	2" RECOVERY SIMILAR SOIL w GRAVEL & COBBLES cobbles
125						
126	S-58		126.0 TO 126.5	170 / REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH BOREHOLE RELATIVELY DIFFICULT TO ~128 FT.	4" RECOVERY GRAY cmf SAND, SOME cmf GRAVEL, little SILT (WET, NP) cobbles
127						
128	S-59		128.0 TO 128.4	150/5	300 lb. HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON SPIN/WASHED HW CASING TO 130 FT. ROLLER BIT TO SAME	3" RECOVERY SIMILAR SOILS
129						
286 130						

NED Form 58A (Test)

Boring No. FD 93-1

FIG NO.

OCT 14 286

DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
130	S-60		130.0 TO 130.8	110 / 110/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -132'	5" RECOVERY GRAY cmf SAND, SOME GRAVEL, little SILT (MOIST, NP) "GRAY SANDY TILL"
131						
132	S-61		132.0 TO 132.4	157 / 6	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH BOREHOLE TO -134' 2ND GEAR ¾ throttle MODERATE DRILLING	5" RECOVERY SIMILAR SOILS
133						
134	S-62		134.0 TO 134.8	102 / 150/3	300 lb. HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH BOREHOLE TO -136' 135.5'	6" RECOVERY SIMILAR SOILS (COBBLES, ETC @ 130'-135')
135						
136	S-63		136.0 TO 137.6	34 / 59 / 112 / 60/1	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -138'	18" RECOVERY GRAY mf SAND & SILT, little CLAY, trace GRAVEL (MOIST, SP)
137						
138	S-64		138.0 TO 139.6	54 / 60 / 130 / 60/1	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -140 FT.	19" RECOVERY GRAY SILT & f SAND, SOME CLAY, little GRAVEL (MOIST, SP) ROCK fragments - ROTTEN ROCK
139						
140	S-65		140.0 TO 140.8	64 / 150/3	300 lb HAMMER 18 in DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -142.0'	9" RECOVERY SIMILAR SOILS
141						
142	S-66	142.0	142.0 TO 143.2	76 / 97 / 150/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -146 FT. ↓ -144.5' through COBBLES?	12" RECOVERY SIMILAR SOILS UNABLE TO SAMPLE DUE TO COBBLES OR ROTTEN ROCK
143						
144						
145						
146						

270

NED Form 58A (Test)

Boring No. FD93-1

FIG NO.

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
270	146	S-67		146.0 P 146.1	90/1	300 lb HAMMER 18 IN DROP NW ROD 2½" SPLIT SPOON	1" RECOVERY ROCK OR COBBLE (BOULDER) FRAGMENTS
	147					ADVANCE HW CASING (HOLE NOT STAYING OPEN & ROLLER BIT BINDING UP) TO -144.5' DEPTH	
	148					INCREASE THROTTLE SPEED @ -143.5' DEPTH	BEDROCK
	149				42" REC	CORE ROCK WITH NX SIZE CORE BARREL DIAMOND BIT	
					70%	1ST 5 FT RUN DRILL TIME: 11 min 30 sec	WEATHERED BEDROCK
	150				R-1	CORE ROCK BETWEEN -148 FT TO -153'	
	151				RQD <10%		
	152						
263	153						
					R-2	2ND 5 FT. RUN	
	154				36" REC	NX SIZE CORE BARREL W DIAMOND BIT	WEATHERED BEDROCK
	155				60%	DRILL TIME: 10 min 30 sec. CORED ROCK BETWEEN -153 FT. TO -158 FT.	
	156				RQD 0		
	157						
258	158					TERMINATE BORING @ -158.0 FT.	

NED Form 58A (Test)

Boring No. F093-1

FIG NO

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site HOPKINTON DAM Page 1 of 9 Pages

Boring No. FD93-2 Desig. FD93-~~B~~ C Diam. (Casing) 5"PW, 4"HW

Co-ordinates: N 250997.22 E 478198.97

Elevation Top of Boring 416 NGVD ~~M.S.L.~~
Total Overburden Drilled 142 Feet
Elevation Top of Rock 274 NGVD ~~M.S.L.~~
Total Rock Drilled 12 Feet
Elevation Bottom of Boring 262 NGVD ~~M.S.L.~~
Total Depth of Boring 154 Feet
Core Recovered 100 % No. Boxes 1
Core Recovered 10 Ft : — Diam. 2.1 In.
Soil Samples 2½ In. Diam. 37 No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. 300 lb Boring Started 10/21/93
Hammer Drop 18 IN. Boring Completed 11/2/93
Casing Left ____
Subsurface Water Data ____ Page ____
Obs. Well ____
Drilled By ROB PRICE, DARIUS WINTERS
Mfg. Des. Drill CME 55 TRUCK MOUNT
Inspected By: T ELDRIDGE
Classification By: T ELDRIDGE
Classification By: ____

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
408 OCT 21 — 10					ROLLER BIT (3⅞" DIA) & WASH TO -11 FT. REL. DIFFICULT DRILLING	
11	S-1		11.0 TO 13.0	18 24 19 27	300 lb. HAMMER 18 IN. DROP 2½" I.D. SPLIT SPOON NW ROD	12" RECOVERY BROWN cmf SAND & SILT, little GRAVEL, trace CLAY (moist, VERY SLIGHTLY PLASTIC)
12					ROLLER BIT & WASH TO -15 FT.	
13						
14					SPIN & WASH 5" CASING TO -15 FT.	
OCT 22 — 15	S-2		15.0 TO 17.0	15 35 27 34	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	18" RECOVERY SIMILAR SOILS
16					SPIN & WASH 5" CASING TO -20 FT.	
17						
18						EARTH DAM FILL
19						
393 — 20						

GENERAL REMARKS:
BOREHOLE STARTED USING P-SIZE CORE BARREL INSIDE 4 IN. CASING, DRILLING THROUGH ROCK RIP-RAP. 5 IN. PW SIZE CASING W DIAMOND CUTTING SHOE WAS SPUN AND WASHED 10 FT.

ED FORM MAR 1 58 (Test)

Boring No. ~~FD93-2~~

FIG NO 2B

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
393	20	S-3		20.0 TO 22.0	33 30 23 25	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ADVANCE CASING, SPIN/WASH TO -25 FT.	16" RECOVERY SIMILAR SOILS
	21						
	22						
	23						
	24						
	25	S-4		25.0 TO 27.0	41 30 46 37	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ADVANCE CASING, SPIN/WASH TO -30 FT. 3RD GEAR ½-¾ throttle MODERATE DRILLING ROLLER BIT & WASH CLEAN TO -30 FT DIFFICULT, SLOW DRILLING	16" RECOVERY SIMILAR SOILS SOME COBBLES
	26						
	27						
	28						
	29						
383	30	S-5		30.0 TO 32.0	20 23 25 33	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH BOREHOLE TO -35 FT.	12" RECOVERY SIMILAR SOILS @ VARYING AMOUNTS OF SAND OR SILT BROWN CMF SAND, SOME SILT, little GRAVEL, TRACE SILT (MOIST, NP)
	31						
	32						
	33						
	34						
378	35	S-6		35.0 TO 37.0	32 27 43 35	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	18" RECOVERY SIMILAR SOILS
	36						
376	37						

NED Form 58A (Test)

Boring No. F093-2

FIG NO

	DEPTH ft.	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
376	37	S-7A		37.0 TO 38.0	34 19 13	300 lb HAMMER 18 IN DROP NW ROD 2½" SPLIT SPOON	20" RECOVERY BROWN cmf SAND, little GRAVEL, trace SILT (WET, NP)
	38					SPUN & WASH CASING TO 38.5' -39 FT-	
		S-7B			22		4" GRAY cmf SAND & SILT, little GRAVEL, tr CLAY (MOIST, VSI)
OCT 25 374	39	S-8		39.0 TO 41.0	57 68 62 71	300 lb HAMMER 18 IN DROP 39' NW ROD 2½" I.D. SPLIT SPOON	24" RECOVERY BROWN cmf SAND, tr GRAVEL, trace SILT (MOIST, NP)
	40					ROLLER BIT & WASH TO -41 FT.	
	41	S-9		41.0 TO 43.0	29 43 52 60	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	18" RECOVERY BROWN - GRAY cmf SAND, trace GRAVEL, trace SILT (MOIST, NP)
	42					ROLLER BIT & WASH TO -43 FT.	
	43	S-10		43.0 TO 45.0	22 36 63 98	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	18" RECOVERY BROWN mf SAND, TRACE SILT (WET, NP)
	44					ROLLER BIT & WASH TO -45' SPIN & WASH PW CASING TO -45' 3RD-4TH GEAR ½-¾ THROTTLE	
	45	S-11		45.0 TO 47.0	38 47 55 72	300 lb HAMMER REL EASY 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON SAMPLER	22" RECOVERY SIMILAR SOILS
	46						
	47	S-12		47.0 TO 49.0	25 41 74 202	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	22" RECOVERY SIMILAR SOILS
	48					ROLLER BIT & WASH TO -49'	
364	49	S-13		49.0 TO 51.0	43 61 42 47	300 lb HAMMER 18 IN DROP 49' NW ROD 2½" I.D. SPLIT SPOON SPUN & WASHED PW CASING TO -50'	16" RECOVERY GRAY cmf SAND & SILT, little GRAVEL (MOIST, NP)
	50						
	51						COBBLES -
	52					ROLLER BIT & WASH CLEAN TO -55 FT.	
	53						
359	54						

NED Form 58A (Test)

Boring No. FD93-2

FIG NO :

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
359	54					ROLLER BIT & WASH TO ~55 FT.	
	55	S-14		55.0 TO 56.3	36 80 100/3 (6%)	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON SPIN/WASH PW CASING TO ~55' MODERATE DRILLING	12" RECOVERY GRAY mf SAND, SOME SILT, little GRAVEL, trace CLAY (moist, VSP-NP) (GRAY SANDY TILL)
	56						
	57					ROLLER BIT & WASH TO ~60 FT. DIFFICULT @ TIMES	COBBLES/GRAVEL ENCOUNTERED
	58						
	59						
	60	S-15		60.0 TO 61.6	52 88 99 60/1	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	16" RECOVERY SIMILAR SOILS
	61						
OCT 26	62					ASSEMBLE & ADVANCE 4" HW CASING TO ~65 FT.	
	63						
	64					ROLLER BIT & WASH TO ~65 FT.	
	65	S-16		65.0 TO 67.0	95 84 135 142	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ADVANCE HW CASING TO ~70 FT CLEAN, WASH W/ ROLLER BIT	6" RECOVERY & SILT GRAY mf SAND, some GRAVEL, TRACE CLAY (moist, VSP) (GRAVEL & COBBLES)
	66						
	67						
	68						
	69						
	70	S-17		70.0 TO 71.8	41 30	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	20" RECOVERY ↓
342	71						

NED Form 58A (Test)

Boring No. FD93-2

FIG NO.

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
342	71	S-17		70.0 TO 71.8	88 100/3 (60%)	ROLLER BIT & WASH TO -75 FT. W/ NEW 3 7/8" BIT INSTALLED	20" REC GRAY cmf SAND, little GRAVEL, little SILT, TRACE CLAY "SANDY TILL" (WET, NP)
	72						
	73						SOME COBBLES ENCOUNTERED
	74						
	75	S-18		75.0 TO 76.2	79 136 120/2	300 lb HAMMER 18-IN. DROP NW ROD 2 1/2" I.D. SPLIT SPOON	14" RECOVERY
	76						SIMILAR SOILS -
	77					ADVANCE CASING TO -80 FT. ROLLER BIT & WASH TO -80 FT. RELATIVELY DIFFICULT DRILLING	DENSE, GRAY SANDY GLACIAL TILL MATERIAL COBBLES / BOULDERS
	78						
	79						
	80	S-19		80.0 TO 80.3	150/3 (BOUNC REF)	300 lb HAMMER 18 IN DROP NW ROD 2 1/2" I.D. SPLIT SPOON	TRACE RECOVERY - ROCK FRAGMENTS
	81					ADVANCE ROLLER BIT & WASH TO -85 FT. DIFFICULT DRILLING	
	82						
	83						BOULDERS?
	84						
	85	S-20		85.0 TO 87.0	14 14 23 43	300 lb HAMMER 18 IN DROP NW ROD 2 1/2" I.D. SPLIT SPOON 86'	18" RECOVERY
327	86					SPIN/WASH HW CASING TO -85 FT.	GRAY FSAND & SILT, SOME CLAY, Trace GRAVEL (moist, P)
	87					ROLLER BIT & WASH TO -90 FT.	
325	88						

NED Form 58A (Test)

Boring No. FD93-2

FIG NO :

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
325	88						
	89					ROLLER BIT & WASH TO -90 FT. RELATIVELY EASY DRILLING	
	90	S-21		90.0 TO	40 78	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	8" RECOVERY LIGHT GRAY FINE SAND TRACE SILT, TRACE CLAY (MOIST, NP) to WET
	91			91.2	80/2 BOUNCING REFUSAL	SPIN & WASH HW CASING TO -90 FT. ROLLER BIT CLEAN TO -92 FT.	
	92	S-22		92.0 TO	33 90	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	16" RECOVERY SIMILAR SOILS
	93			93.3	120/4 BOUNCE REF	ADVANCE CASING TO -95 FT.	
	94					ADVANCE WITH ROLLER BIT & WASH TO -96 FT.	
	95					DRILLER NOTICE CHANGE 95.5'	
317	96	S-23		96.0 TO 96.8	58 120/3 BOUNCE REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	8" RECOVERY, SOME GRAY CMF SAND & GRAVEL TRACE SILT, TRACE CLAY (WET, NP)
OCT 27	97					ROLLER BIT / WASH TO -98 FT.	
	98	S-24		98.0 TO 98.6	158 70/1	300 lb HAMMER 18 IN DROP NW ROD 2½" SPLIT SPOON	6" RECOVERY SIMILAR SOILS -
	99						
	100	S-25		100.0 TO 100.3	150/4	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	4" RECOVERY GRAY cmf SAND, SOME mf GRAVEL, TRACE SILT (WET, NP)
	101					SPIN/WASH HW CASING CLEAN @ ROLLER BIT & WASH	
	102	S-26		102.0 TO 102.3	150/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	3" RECOVERY SIMILAR SOILS
	103						
	104	S-27		104.0 TO 104.3	120/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	3" RECOVERY SIMILAR SOILS
308	105						

NED Form 58A (Test)

Boring No. FO 93-2

FIG NO.

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
308	105					SPIN/WASH CASING TO -105 FT.	GRAY cmF SAND, some mF GRAVEL, TRACE SILT (WET, NP)
	106	S-28		106.0 TO 106.2	150/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	1" REC — SIMILAR SOILS — NESTED COBBLES
	107					ROLLER BIT & WASH TO -108 FT.	
305	108	S-29		108.0 TO 108.8	109 / 150/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	6" RECOVERY GRAY F SAND, little SILT, little GRAVEL, TRACE CLAY (MOIST, NP)
	109					SPIN/WASH HW CASING TO -110 FT.	
	110	S-30		110.0 TO 110.9	90 / 150/5	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	8" RECOVERY GRAY mF SAND, little SILT, little GRAVEL (MOIST, NP)
	111					ROLLER BIT & WASH BOREHOLE TO -112 FT.	
	112	S-31		112.0 TO 112.8	65 / 100/3 BNC REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	7" RECOVERY GRAY FINE SAND & SILT (MOIST, NP)
	113					SPIN/WASH HW CASING TO -115 FT. 3RD GEAR - ¾ throttle	
	114						
298	115	S-32		115.0 TO 115.8	131 / 150/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	8" RECOVERY GRAY cmF SAND, little SILT, little GRAVEL (MOIST, NP)
	116						SANDY TILL
	117					ADVANCE BORING USING ROLLER BIT & WASH 2ND GEAR ½-¾ throttle	MANY COBBLES ?
	118						
	119						
	120	S-33		120.0 TO 120.2	150/2 BOUNCING REFUSAL	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	TRACE RECOVERY — SIMILAR SOILS —
	121					SPIN/WASH HW CASING TO -120 FT.	
291	122						

NED Form 58A (Test)

Boring No. FD93-2

FIG NO. 1

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
291	122						
	123					ROLLER BIT & WASH ADVANCE TO -125 FT. RELATIVELY DIFFICULT DRILLING	BOULDERS/COBBLES @ 121.5 TO 123.5' DEPTH
	124						
	125	S-34		125.0 TO 125.1	175 100/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	1" RECOVERY GRAY cmf SAND, little SILT little GRAVEL, TRACE CLAY (GLACIAL TILL) (MOIST, VSP)
OCT 28	126						
	127					ROLLER BIT & WASH ADVANCING TO -130 FT.	
	128						
	129						
	130	S-35		130.0 TO 130.2	130/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	1" RECOVERY SIMILAR SOILS MANY COBBLES @ 130-132.5'
	131						
	132					ROLLER BIT & WASH TO -135 FT.	
	133						
	134						
	135	S-36		135.0 TO 135.3	250/3 BNC REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	TRACE of GRAY, SANDY TILL
	136						
	137					SPIN & WASH CASING TO -137 FT. MODERATE TO SLOW 3RD GEAR ½-¾ throttle	SIMILAR SOIL 137'-138.5' NUMEROUS cobbles/boulders
	138						
274	139						

NED Form 58A (Test)

Boring No. FD93-2

FIG NO

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
274	139					ROLLER BIT & WASH ADVANCE TO -140 FT.	
	140	S-37		140.0 TO 141.3	60 90 125/4	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	16" RECOVERY GRAY SILT, little mF SAND, little GRAVEL, little CLAY DENSE
	141					ROLLER BIT & WASH TO -142 FT. "BEDROCK ENCOUNTERED	
	142					CONTINUE ROLLER BIT -2 FT. IN TO ROCK ADVANCE HW CASING TO -142 FT.	
	143						GRANITE BEDROCK
	144				R-1 60" REC 100% RQD 33⅓	CORE ROCK WITH NX SIZE CORE BARREL, DIAMOND BIT RUN-1 DRILL TIME: 14 MIN. CORE ROCK BETWEEN -144 FT. TO -149'	GRANITE BEDROCK A FEW SEAMS SANDSTONE bedded
	145						
	146						
	147						
	148						
	149				R-2 60" REC 100% RQD 92	RUN-2 NX SIZE CORE BARREL, with DIAMOND BIT DRILL TIME: 24 MIN. CORE ROCK BETWEEN -149' TO -154'	GRANITE BEDROCK SANDSTONE SEAMS
263	150						
	151						
	152						
	153						
259	154					TERMINATE BORING @ -154 FT.	

NED Form 58A (Test)

Boring No. FD 93-2

FIG NO.

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site HOPKINTON DAM Page 1 of 8 Pages

Boring No. FD93-3 Desig. FD93-D Diam. (Casing) 5" PW

Co-ordinates: N 251074.22 E 478166.43

Elevation Top of Boring 384 NGVD ~~MSL~~
Total Overburden Drilled 124 Feet
Elevation Top of Rock 260 ~~MSL~~
Total Rock Drilled 11 Feet
Elevation Bottom of Boring 249 ~~MSL~~
Total Depth of Boring 135 Feet
Core Recovered 100 % No. Boxes 1
Core Recovered 10 Ft : — Diam. 2.1 in.
Soil Samples 2½ in. Diam. 29 No.
Soil Samples ____ in. Diam. ____ No.

Hammer Wt. 300 lb Boring Started NOV 3, 1993
Hammer Drop 18 IN Boring Completed NOV 11, 1993
Casing Left ____
Subsurface Water Data ____ Page ____
Obs. Well ____
Drilled By ROB PRYCE, DARIUS WINTERS
Mfg. Des. Drill CME 55 TRUCKMOUNT
Inspected By: T ELDRIDGE
Classification By: T ELDRIDGE
Classification By: ____

	DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
NOV 3 384							0-8 FT ROCK RIP RAP CHANGE @ -8 FT. BEGIN SAMPLE @ -10 FT.	
374 NOV 4	10		S-1		10.0 TO 12.0	6 6 4 4	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	NO RECOVERY BROWN mf SAND (WET, NP)
	11						SPIN & WASH PW CASING TO -15 FT. EASY DRILLING	
	12							
	13							
	14							
	15		S-2		15.0 TO 17.0	4 3 3 5	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	8" RECOVERY BROWN mf SAND, trace GRAVEL (WET, NP)
	16						SPIN & WASH PW CASING TO -20 FT.	
	17						3RD-4TH GEAR ¾ throttle	
	18						DRILLING CHANGE	
	19							

GENERAL REMARKS:
ADVANCED BORING THROUGH ROCK RIP RAP
A 3⅞" ROLLER BIT WAS USED TO PENETRATE
AND BREAK THROUGH ROCK / 10 FT. OF PW SIZE
. CASING WAS ADVANCED

ED MAR 58 (Test)

Boring No. FD93-3

FIG NO 2B

	DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	19						INSTALL ROLLER BIT CLEAN WASH PW CASING TO -20 FT.	
364	20		S-3		40 80 80 130	20.0 TO 22.0	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	24" RECOVERY GRAY cmF SAND, little SILT, little GRAVEL (MOIST, NP)
	21						ROLLER BIT & WASH TO -25 FT. 2ND GEAR ½-¾ throttle	
	22							
	23							
	24							
	25		S-4		45 90/2	25.0 TO 25.1	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	8" RECOVERY SIMILAR SOILS WITH THIN BEDS OF STRATIFIED SILT/CLAY (MOIST, NP)
	26						REPLACE SAN SHOE ON 4" AW CASING	
	27						SPIN CASING TO -30 FT.	
	28						CLEAN/WASH W ROLLER BIT TO -30 FT.	
	29							
	30		S-5		30.0 TO 32.0	33 57 88 97	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	24" RECOVERY GRAY mFSAND, SOME SILT TRACE GRAVEL (MOIST, NP) THIN LAYER mFSAND (4 IN)
	31						HW SPIN/WASH CASING TO -35 FT MODERATE DRILLING	
	32							
	33							
	34							
	35		S-6		35.0 TO 37.0	21 32	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	22" RECOVERY STRATIFIED GRAY cmF SAND, mF AND F SAND, SILT/CLAY LAYERS,
348	36							

NED Form 58A (Test)

Boring No. FD 93-3

FIG NO

348

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
36	S-6		35.9 TO 37.0	34 40	ADVANCE HW CASING AND ROLLER BIT/WASH TO -40 FT.	... TO GRAY GLACIAL TILL (MOIST, NP)
37						
38						
39						
40	S-7		40.0 TO 42.0	55 63 68 61	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	22" RECOVERY GRAY cmf SAND, SOME SILT, TRACE GRAVEL (MOIST, NP) "GRAY SANDY TILL"
41						
42					ROLLER BIT & WASH TO -45 FT.	
43						- BOULDER ENCOUNTERED
44						
45	S-8		45.9 TO 47.0	52 70 65 71	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLITSPOON	20" RECOVERY SIMILAR SOILS
46						
47						- NESTED COBBLES BOULDERS
48						
49					ROLLER BIT & WASH TO -50 FT. ADVANCE 4" CASING TO -50 FT.	COBBLES
50	S-9A		50.5 TO 52.5	72 57 21 19	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLITSPOON	18" RECOVERY GRAY cmf SAND & GRAVEL TRACE SILT (WET; NP)
51						12
52	S-9B					6 GRAY SILT, SOME CLAY, SOME cmf SAND/STRATIFIED (MOIST (NP)
53						

331

NED Form 58A (Test)

Boring No. FO 93-3

FIG NO :

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
331	53						
	54					ADVANCE BORING WITH ROLLER BIT / WASH TO -55 FT.	
	55	S-10A		55.0 TO 57.0	55/19 31 49 130	300 lb HAMMER 18 IN DROP NW ROD 2 1/2" I.D. SPLITSPOON	18" RECOVERY GRAY cmF SAND, TRACE GRAVEL (WET, NP)
	56						12
	57	S-10B					6 GRAY F SAND, thin beds OF SILT / CLAY
	58					ADVANCE HW CASING TO -60 FT.	
	59					ROLLER BIT & WASH TO -60 FT.	
	60	S-11		60.0 TO 60.8	100 100/4 REF	300 lb HAMMER 18 IN DROP NW ROD 2 1/2" I.D. SPLITSPOON	10" RECOVERY GRAY mF SAND, little SILT, little GRAVEL (MOIST, NP)
	61					ROLLER BIT / WASH TO -65 FT.	GRAY, SANDY TILL
	62						
	63						
	64						
	65	S-12		65.0 TO 65.8	70 150/4	300 lb HAMMER 18 IN DROP NW ROD 2 1/2" I.D. SPLITSPOON	8" RECOVERY GRAY cmF SAND, TRACE SILT TRACE GRAVEL & GRAY F SAND, STRATIFIED
	66						
	67					SPIN / WASH HW CASING TO -65 FT.	
	68					EASY TO MOD. DIFFICULT WHERE COBBLES ARE ENCOUNTERED	
	69					1/2 3/4 THROTTLE 3RD 4TH GEAR	
314	70						

NED Form 58A (Test)

Boring No. FD93-3

FIG NO :

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVT	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
NOV 5 314	70	S-13		70.0 TO 70.8	135 100/4	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON MC SAND IN CUTTINGS FROM ROLLER BIT @ -70 FT.	10" RECOVERY GRAY cmF SAND & GRAVEL grade to mF SAND, little Silt little GRAVEL (SANDY TILL) (WET, NP)
	71						
	72					SPIN/WASH HW CASING TO -75 FT. MODERATE DRILLING CLEAN WITH ROLLER BIT	
	73						
	74						
	75	S-14		75.0 TO 75.1	80/1 BNCING REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT & WASH TO -80 FT. 1/2-3/4 throttle 2ND GEAR VARYING TO CONDITION	1" RECOVERY GRAY cmF SAND & GRAVEL ROCK FRAGMENTS (WET, NP) NESTED COBBLES (BOULDERS?)
	76						
	77						
	78						
	79						
	80	S-15		80.0 TO 81.2	60 1/4 100/2	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON ROLLER BIT THEN ADVANCE CASING TO -85 FT. WASH BORING ↓	80' 12" RECOVERY GRAY mF SAND, little SILT, little GRAVEL, STRATIFIED SILT/CLAY LAYERS (MOIST, NP)
	81						
	82						
	83						
	84						
NOV 8	85	S-16		85.0 TO 85.4	150/5 REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	85' 5" RECOVERY GRAY cmF SAND, little GRAVEL, little SILT, (MOIST, NP) - DENSE SANDY TILL -
	86						
297	87						

NED Form 58A (Test)

Boring No. FD 93-3

FIG NO :

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVT	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
291	87	S-17		87.0 TO 87.3	150/4	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	5" RECOVERY SIMILAR SOILS
	88					ROLLER BIT & WASH TO -90 FT.	
	89						
	90	S-18		90.0 TO 90.8	119 150/4	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	10" RECOVERY SIMILAR SOILS
	91					ADVANCE BORING BY ROLLER BIT/WASH TO -94 FT.	
	92						
	93						
290	94	S-19		94.0 TO 94.2	95/2 BNC REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	2" RECOVERY GRAY cmf SAND, little GRAVEL trace SILT (WET, NP)
	95					ROLLER BIT/WASH TO -96 FT.	BOULDER @ -95 TO -95.5' (COBBLES @ -94 TO -95)
	96	S-20		96.0 TO 96.4	130/5 BNC REF	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	5" RECOVERY SIMILAR SOIL
	97					ROLLER BIT/WASH TO -98 FT.	
286	98	S-21A		98.0 TO 98.8	80 90/3	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON 98.5	9" RECOVERY 3 IN. SIMILAR SOIL
285	99	S-21B					6 IN. GRAY SILT, little cmf SAND, little GRAVEL, little CLAY (MOIST, MP)
	100					ROLLER BIT/WASH TO -100.5 FT.	BOULDER @ 100-100.5 UNABLE TO SAMPLE
	101	S-22		100.5 TO 101.3	75 92/3	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	9" RECOVERY GRAY SILT, SOME CLAY, little mc GRAVEL, trace cmf SAND (MOIST, MP) V. DENSE
NOV 9	102						
	103						
280	104						

NED Form 58A (Test)

Boring No. FD93-3

FIG NO :

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
280 / ~~104~~ Nov 9						ROLLER BIT & WASH TO -105 FT.	
105		S-23		105.0 TO 109.0	26 49 111 102	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	20" RECOVERY GRAY SILT, little F SAND, STRATIFIED SILT/CLAY LAYERS (moist, mP)
106							
107						ROLLER BIT & WASH TO -110 FT.	
108						HOLE STAYS OPEN	
109							
110		S-24		110.0 TO 111.4	47 63 150/5	300 lb HAMMER 18 IN. DROP NW ROD 2½" I.D. SPLIT SPOON	1" RECOVERY GRAY-BROWN SILT, SOME CLAY little mF SAND, little GRAVEL (moist, mP)
111							
112						ROLLER BIT & WASH TO -115 FT.	
113						HOLE PLUGS / CLEAN OUT @ ROLLER BIT	
114						ADVANCE HW CASING, SPIN/WASH TO -115 FT.	
115		S-25		115.0 TO 117.0	49 65 84 135	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	24" RECOVERY GRAY-BROWN SILT, SOME CLAY, little cmF SAND, trace GRAVEL (moist, mP)
116							
117						ROLLER BIT & WASH TO -120 FT. 2ND GEAR ½-¾ throttle	
118							
119							
120		S-26		120.0 TO 120.4	15/5	300 lb HAMMER 18 IN DROP NW ROD 2½" I.D. SPLIT SPOON	3" RECOVERY GRAY cmF SAND, little GRAVEL trace SILT (moist, NP)
263 / ~~121~~							

NED Form 58A (Test)

Boring No. FD93-3

FIG NO :

	DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
263	~~121~~						ROLLER BIT/WASH TO -124 ft	
	122						SPIN/WASH HW CASING TO -125 FT - SEAT IN TO ROCK	
	123							COBBLES/ BOULDERS
260	124							BEDROCK ENCOUNTERED
259	125					R-1 60" REC 100%	CORE ROCK WITH NX SIZE CORE BARREL, DIAMOND BIT RUN-1 (5 FT) DRILLING TIME 15 MIN. - NO WATER LOSS -	WEATHERED GRANITE BEDROCK
	126							
	127					RQD 93		
	128							
	129							
	130					R-2 60" REC 100%	RUN-2 (5 FT) DRILLING TIME 10 MIN 30 SEC. - NO WATER LOSS	WEATHERED GRANITE BEDROCK
	131							
	132							
	133					RQD 60		
	134							
249	135						BORING TERMINATED @ - 135'	

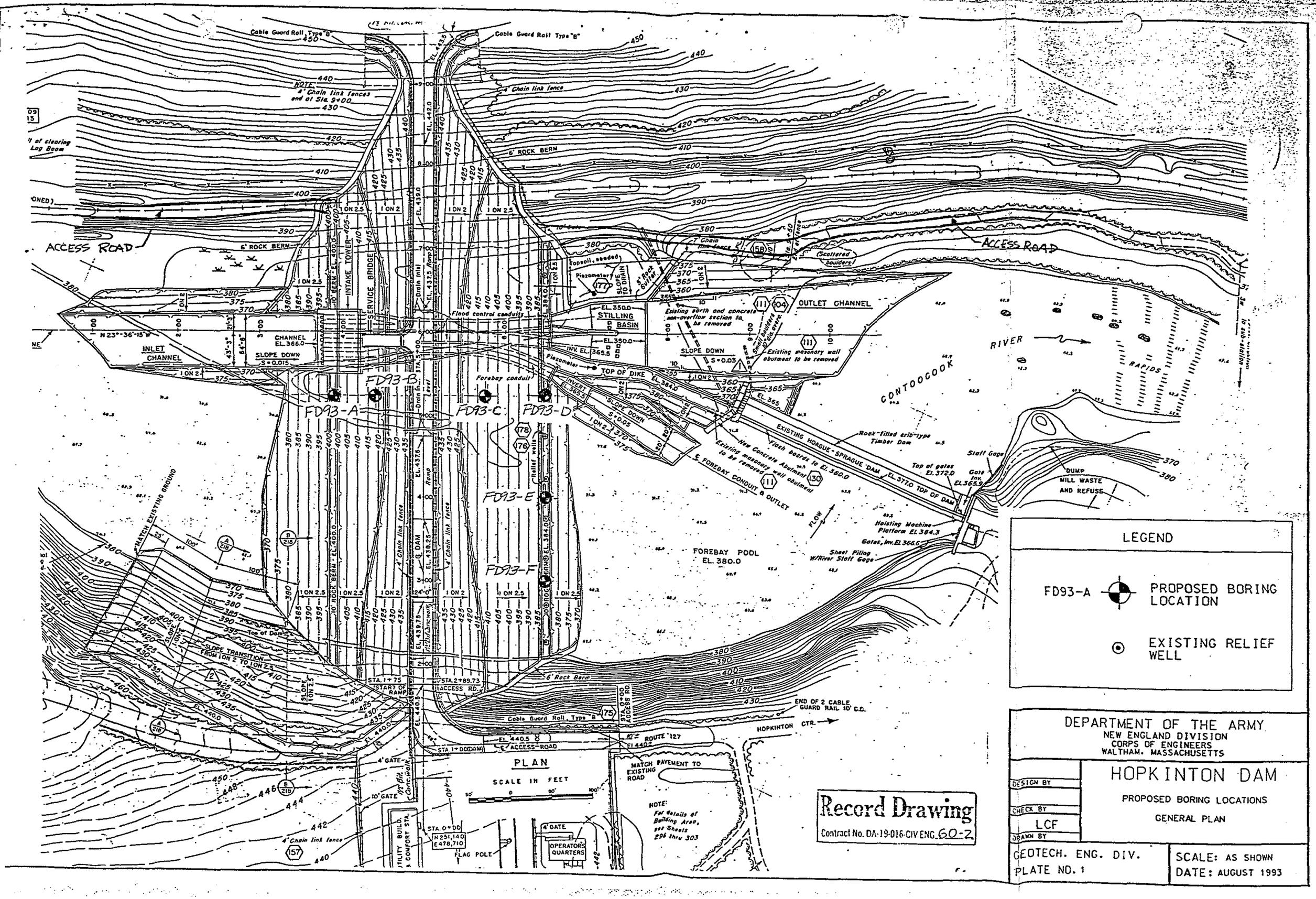
NED Form 58A (Test)

Boring No. FD 93-3

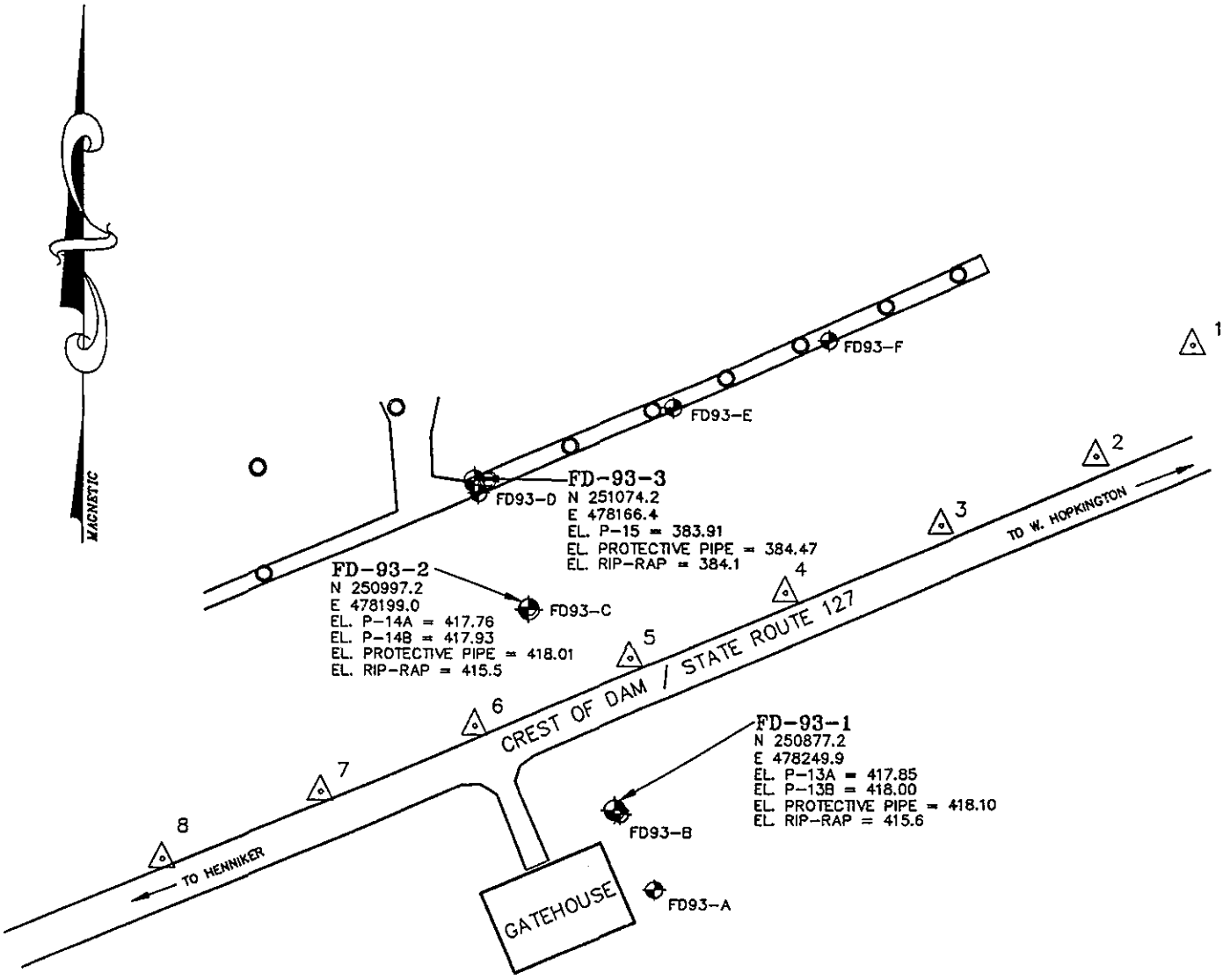
FIG NO

c. Figure 1 - General Project Location Map

d. Proposed Boring Locations - Plate No. 1


ACCESS ROAD
Cable Guard Rail Type "B"
NOTE: 4' Chain link fences end at Sta. 9+00
4' Chain link fence
6' ROCK BERM
INTAKE TOWER
SERVICE BRIDGE
INLET CHANNEL
CHANNEL EL. 366.0
SLOPE DOWN S=0.015
N 23°-36'-15" W
STILLING BASIN
EL. 350.0
INV. EL. 365.5
Piezometer
Topsoil, seeded
SLOPE TO DRAIN
Existing earth and concrete ogee-overflow section to be removed
Existing masonry wall abutment to be removed
OUTLET CHANNEL
SLOPE DOWN S=0.03
TOP OF DIKE EL. 384.0
Forebay conduit
FD93-A
FD93-B
FD93-C
FD93-D
FD93-E
FD93-F
EXISTING HOAGUE-SPRAGUE DAM
EL. 371.0 TOP OF DAM
Rock-filled crib-type Timber Dam
Flash boards to El. 380.0
New Concrete Abutment
Existing masonry wall abutment to be removed
℄ FOREBAY CONDUIT & OUTLET
Staff Gage
Top of gates El. 372.0
Gate Inv. El. 365.9
Hoisting Machine Platform El. 384.3
Gates, Inv. El. 366.6
Sheet Piling W/River Staff Gage
FOREBAY POOL EL. 380.0
FLOW
CONTOOCOOK RIVER
RAPIDS
DUMP MILL WASTE AND REFUSE
MATCH EXISTING GROUND
SLOPE TRANSITION FROM 1 ON 2 TO 1 ON 2.5
Toe of Dam
STA. 1+75 START OF RAMP
STA. 2+89.73 ACCESS RD.
STA. 0+00 ACCESS RD.
Cable Guard Rail, Type B
END OF 2 CABLE GUARD RAIL 10' C.C.
HOPKINTON CTR.
ROUTE 127
EL. 440.5
℄ ACCESS-ROAD
STA. 1+00 DAM
4' GATE
10' GATE
PLAN
SCALE IN FEET
MATCH PAVEMENT TO EXISTING ROAD
NOTE: For details of Building Area, see Sheets 296 thru 303
STA. 0+00 N 251,140 E 478,710
FLAG POLE
OPERATOR'S QUARTERS
UTILITY BUILD. & COMFORT STA.
4' Chain link fence
Record Drawing
Contract No. DA-19-016-CIV ENG. 60-2
LEGEND
FD93-A PROPOSED BORING LOCATION
EXISTING RELIEF WELL
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS
HOPKINTON DAM
PROPOSED BORING LOCATIONS
GENERAL PLAN
DESIGN BY
CHECK BY
LCF
DRAWN BY
GEOTECH. ENG. DIV.
PLATE NO. 1
SCALE: AS SHOWN
DATE: AUGUST 1993

e. Piezometer Location Plan



LEGEND

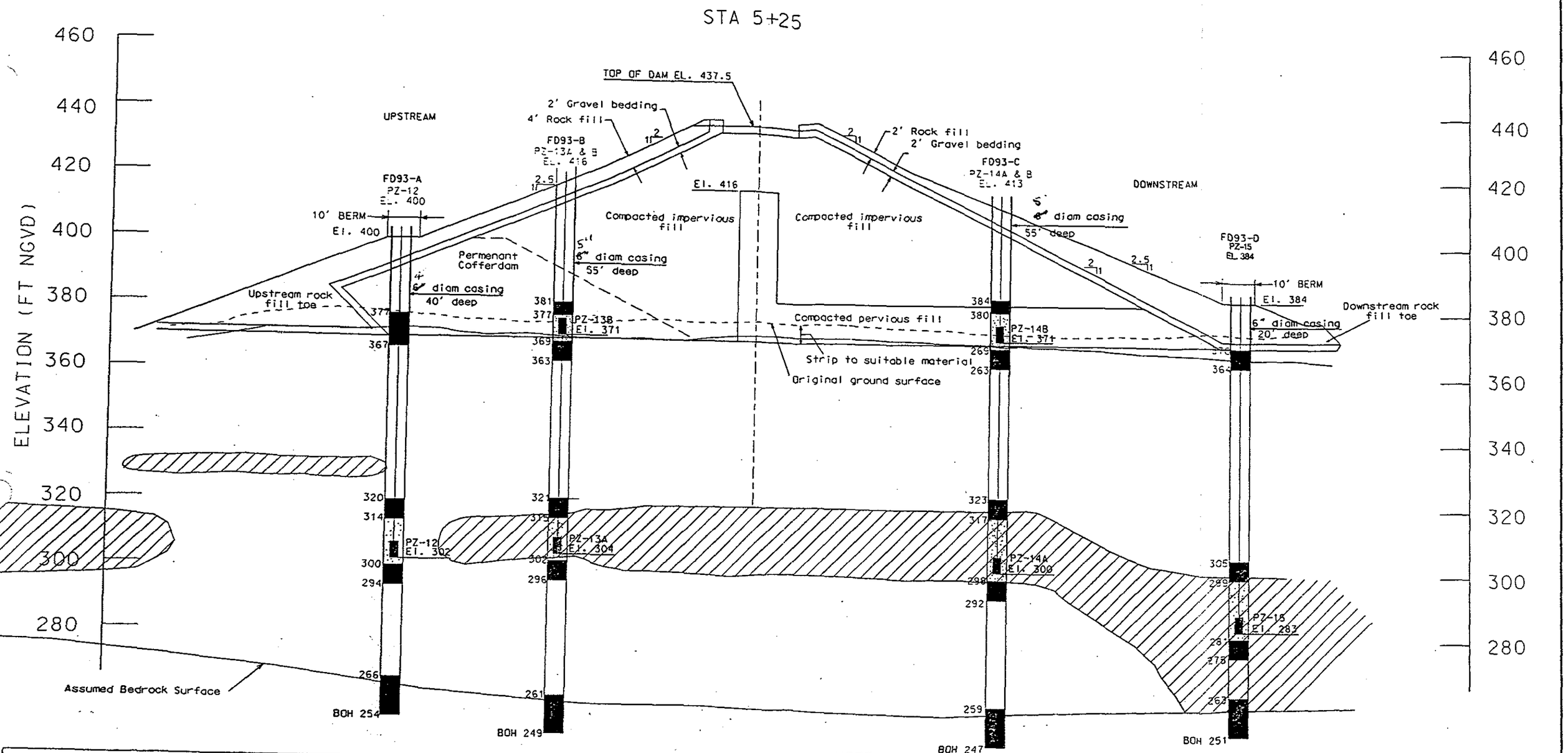
P-13A	PIEZOMETER DESIGNATION
FD-93-3	AS-DRILLED BORINGS
FD93-A	PROPOSED PIEZOMETERS
△	U.S.A.C.E. CORPS OF ENGINEERS BRASS MONUMENT
○	EXISTING PIEZOMETERS/WELLS

GRAPHIC SCALE

(IN FEET)
1 inch = 100 ft.

PIEZOMETER LOCATION PLAN	DRAWN BY	SCALE	PROJECT No.	DATE
	SLC	1" = 100'	CD042	11-12-93
HOPKINGTON DAM U. S. ARMY CORPS OF ENGINEERS	ATLANTIC TESTING LABORATORIES, Ltd. CANTON, NY CICERO, NY ENDICOTT, NY BURLINGTON, VT UTICA, NY MANCHESTER, NH			

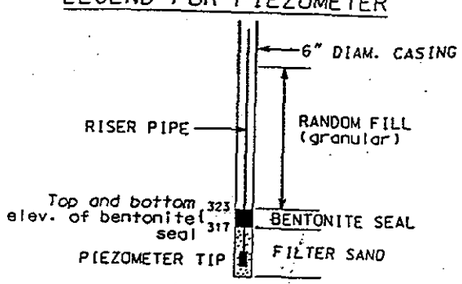
f. Proposed Piezometer Locations
Plate No. 2, Plate No. 3



LEGEND

- Poorly graded SANDS and GRAVELS
- silty, clayey SANDs and GRAVELs, Till
- Proposed piezometer location and tip elevation (ft NGVD)

LEGEND FOR PIEZOMETER



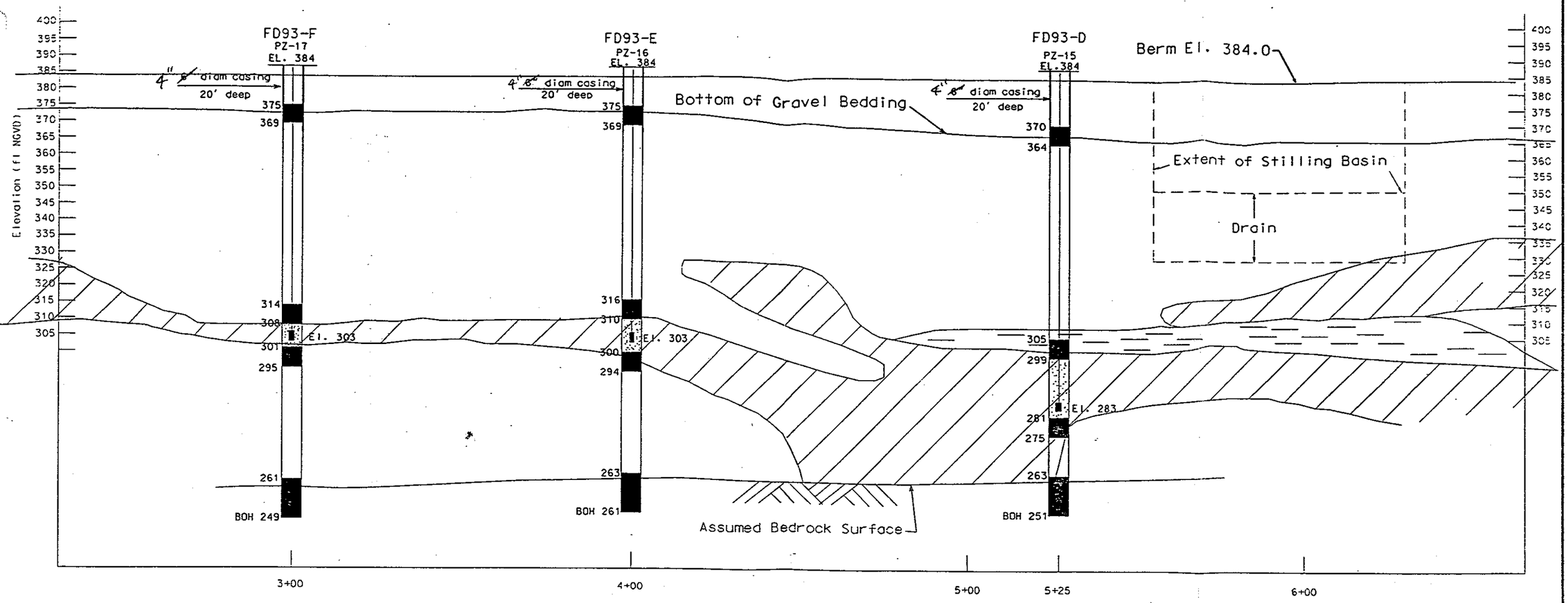
NOTE:
1. All elevations are in ft NGVD
2. Filter material shall be backfilled between seals where pz tip is located
3. Random fill shall be backfilled between bentonite seal above the top seal to within 8 feet of the top of the protective pipe

30 0 30 60

SCALE: 1" = 30'

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

LCD DESIGN BY	MERRIMACK RIVER FLOOD CONTROL
MAV CHECK BY	HOPKINTON DAM
LCD DRAWN BY	PROPOSED PIEZOMETER LOCATIONS
	STATION 5+25
GEOTECH. ENG. DIV. PLATE NO. 2	SCALE: AS SHOWN DATE: AUGUST 1993



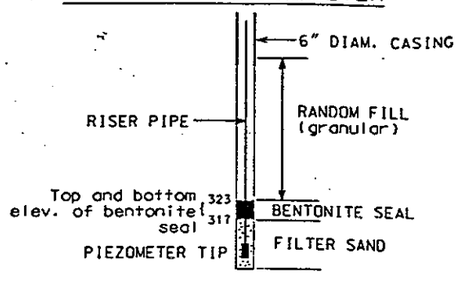
PROFILE ALONG DOWNSTREAM BERM
(STATION ALONG CL OF DAM)

LEGEND

- Poorly graded SANDs and GRAVELs
- silty, clayey SANDs and GRAVELs, TILL
- stratified fine SAND and SILT
- Proposed piezometer and elevation (ft NGVD)

El. 303

LEGEND FOR PIEZOMETER



NOTE:
1. All elevations are in ft NGVD
2. Filter material shall be backfilled between seals where pz tip is located
3. Random fill shall be backfilled between bentonite seal above the top seal to within 8 feet of the top of the protective pipe

30 0 30 60

SCALE: 1" = 30'

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

LCD (DESIGN BY)	MERRIMACK RIVER FLOOD CONTROL
MAV (CHECK BY)	HOPKINTON DAM
LCD (DRAWN BY)	PROPOSED PIEZOMETER LOCATIONS
	STATION 5+25
GEOTECH. ENG. DIV. PLATE NO. 3	SCALE: 1' = 30' DATE: JULY 1993

SECTION 9

OTHER RECORDS TAKEN

a. Survey Notes

U.S. Army Corps of Engineers
Hopkinton Dam
Piezometer Stakeout
St. Charlie
Town Copiah [illegible]
Arrival 7:30 = 10:00 7-20-93
Steve Chatelle

DIETZGEN NO. 3846

Corps of Engineers
CDOHR
Hopkinton Dam
11/10/93
S Chatelle Tow
T. Eldridge
Stephen A. Chatelle

DIETZGEN NO. 3846

P.1 9-20-93	Direct Horiz Angle	Re se Horiz Angle	Hor. Dist.	Vert. Dist	Prism
Guard Rails	182 4108		42.53	0.08	5.0 (10)
⊼ at B, PK					
BS Mon 2	0 00 00				
	(N Az)				
-A-	178 3001		113.54 ~~40.60~~	-4060	5.0
-B-	194 1124		69.34	-24.37	5.0
⊼ at PK8					
BS Mon2	61 06 52		300.98	3.45	5.47
PK-8	89 5442	89 55 05	27.87 27.85	0.12 0.13	5.0 5.0 (8)
Guardrails	183 0050		42.51	0.10	5.0 (9)
⊼ at 5	HI=4.75				
BS 2	0 00 00	180 0019			5.4
	(N Azimuth)				
-F-	31 3041		222.21	-52.58	5.0
-E-	09 2005		151.72	-51.80	5.0
-D-	317 5235		131.28	-51.92	5.0
-C-	297 0916		67.80	-23.29	5.0
⊼ at Mon 5	HI=4.75				
BS Mon 2	66 2523		295.71	3.68	5.47 ~~5.56~~

P.1 11-10-93 Object	Direct Hor. Angle	Reverse Hor. Angle	Reverse Direct Horiz Dist	Reverse Direct Vert Dist	Rod
					Rim 418.01
FD-93-2	302 5051	122 5032	76.74	-29.91 -29.90	[illegible]
FD-93-3	277 5716	97 5645	196.71 196.68	-53.91 -53.93	5.0 384.14
Mon 5	[illegible] 2930		10[illegible]	-0.31	5.0 437.77
⊼ at 6 Mon	HI=5.17			(437.91)	
BS ~~Mon 5~~ PK			104.10	0.42	5.0 (437.66)
Boring 1-93-1	292 2035		66.52	-24.74 -24.79	0 (418.10 Rim)
⊼ at PK5a	HI=5.70				(437.66)
BS Mon 6		104.19	0.04		5.0 437

b. Water Table Data

Site: HOPKINTON DAM
Boring No: FD93-1

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
10/5	700PM	20	26	5.5		INDUCED
10/6	700AM	20	26	5.5		
10/6	700PM	50	54	8.5		
10/7	730AM	50	54	8.9		
10/7	630PM	65	66	6.7		
10/8	700AM	65	66	12.5		
10/8	100PM	75	80	10.7		
10/11	1230PM	75	80	39.5		
10/11	700PM	84	88	14.1		INDUCED
10/12	700AM	84	88	29.8		
10/12	630PM	110	109	2.5		INDUCED
10/13	730AM	110	109	45.9		
10/13	630PM	120	128.5	30.7		INDUCED
10/14	730AM	120	128.5	47.5		
10/14	630PM	144.5	153.0	25.3		INDUCED

Note: Depths are in feet below original ground
10/15 700AM 144.5 153.0 45.5

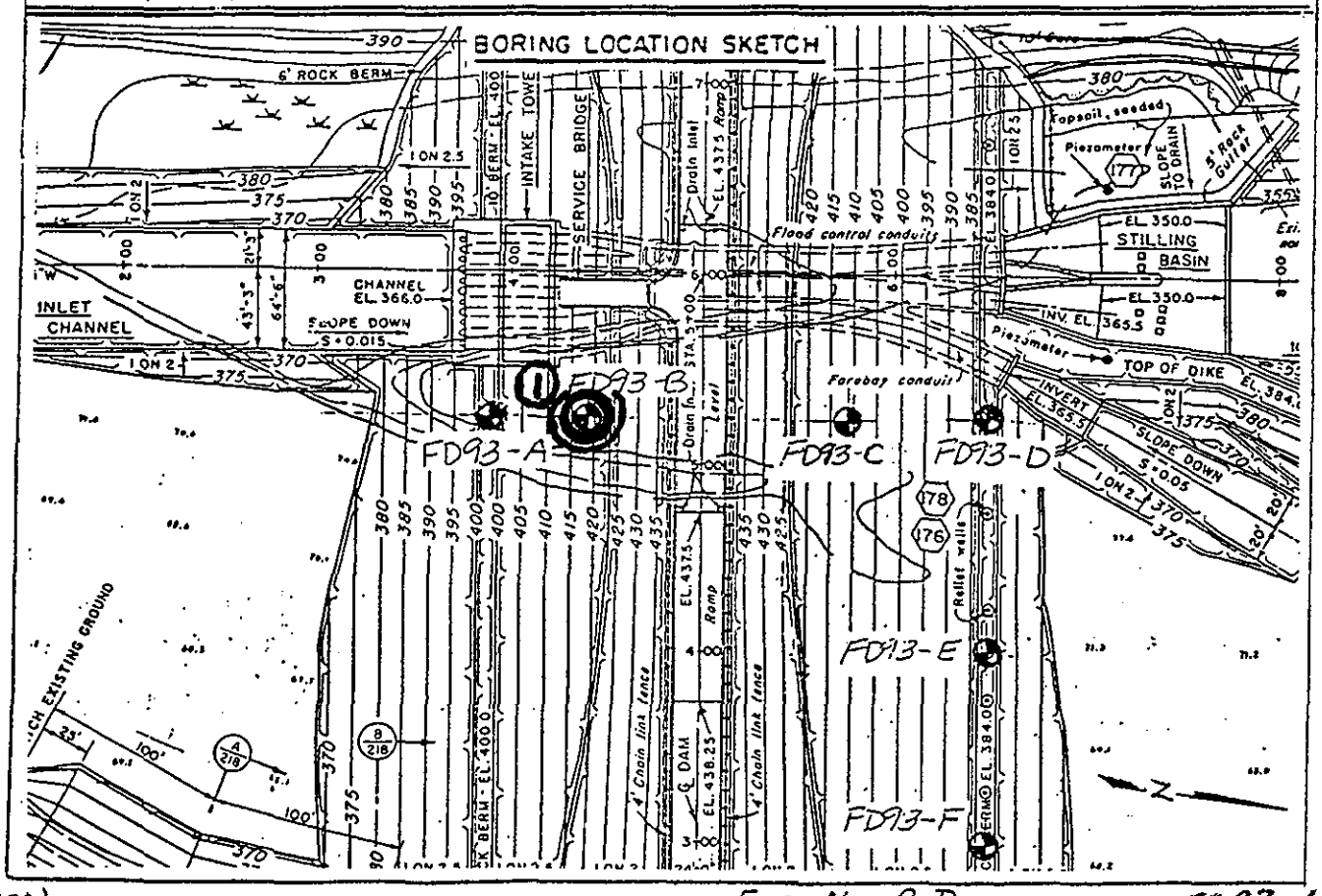


FIG. No. 2D

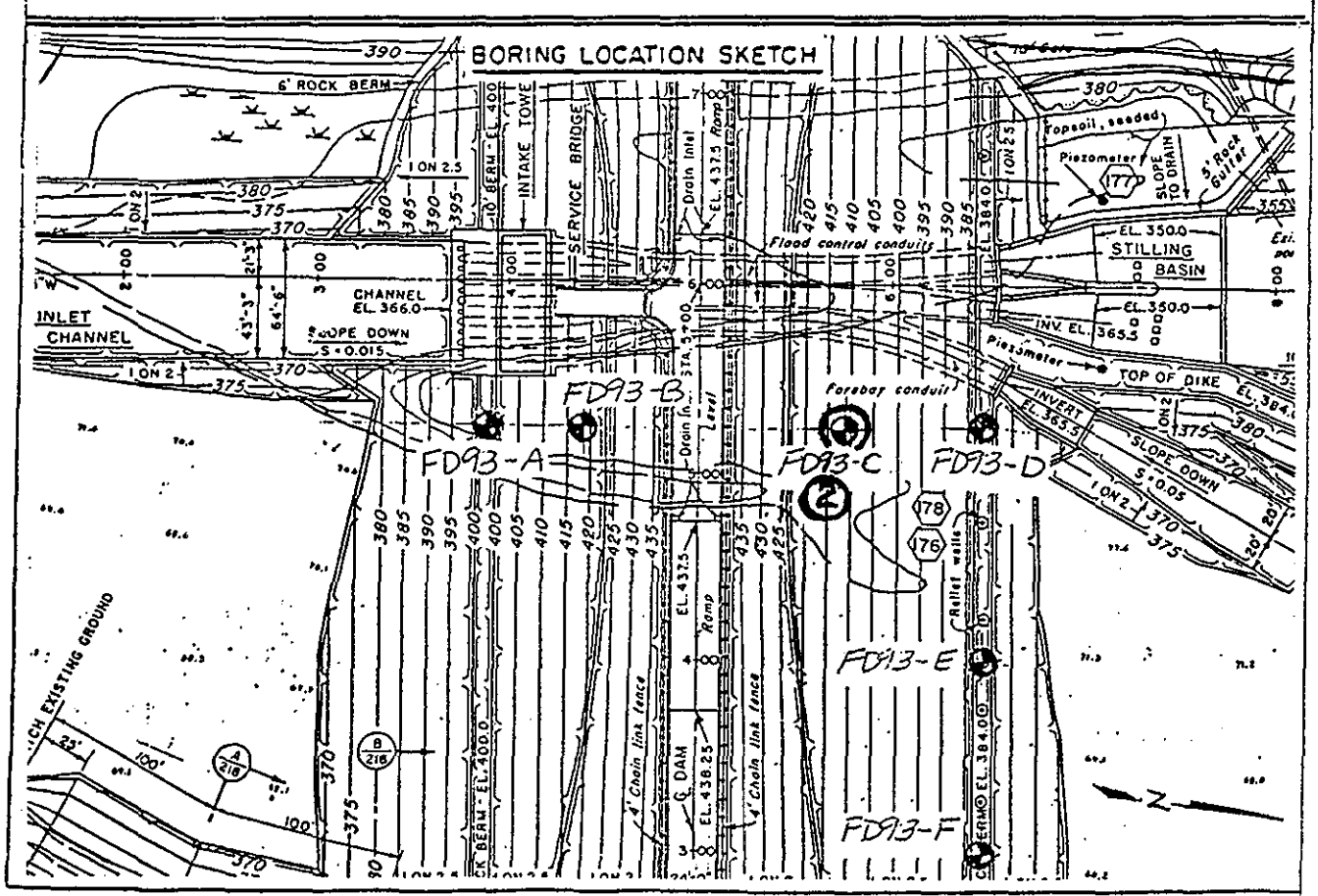
Boring No. FD93-1

Site: HOPKINTON DAM
Boring No: FD93-2

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
10/25	1230PM	39	39	34.2		
10/25	630PM	55	62	12.2		(INDUCED)
10/26	700AM	55	62	34.5		
10/26	615PM	95	97	25.5		(INDUCED)
10/27	715AM	95	97	35.5		
10/27	600PM	120	126	25.8		(INDUCED)
10/28	715AM	120	126	37.5		
10/28	600PM	142	154	24.3		(INDUCED)

Note: Depths are in feet below original ground



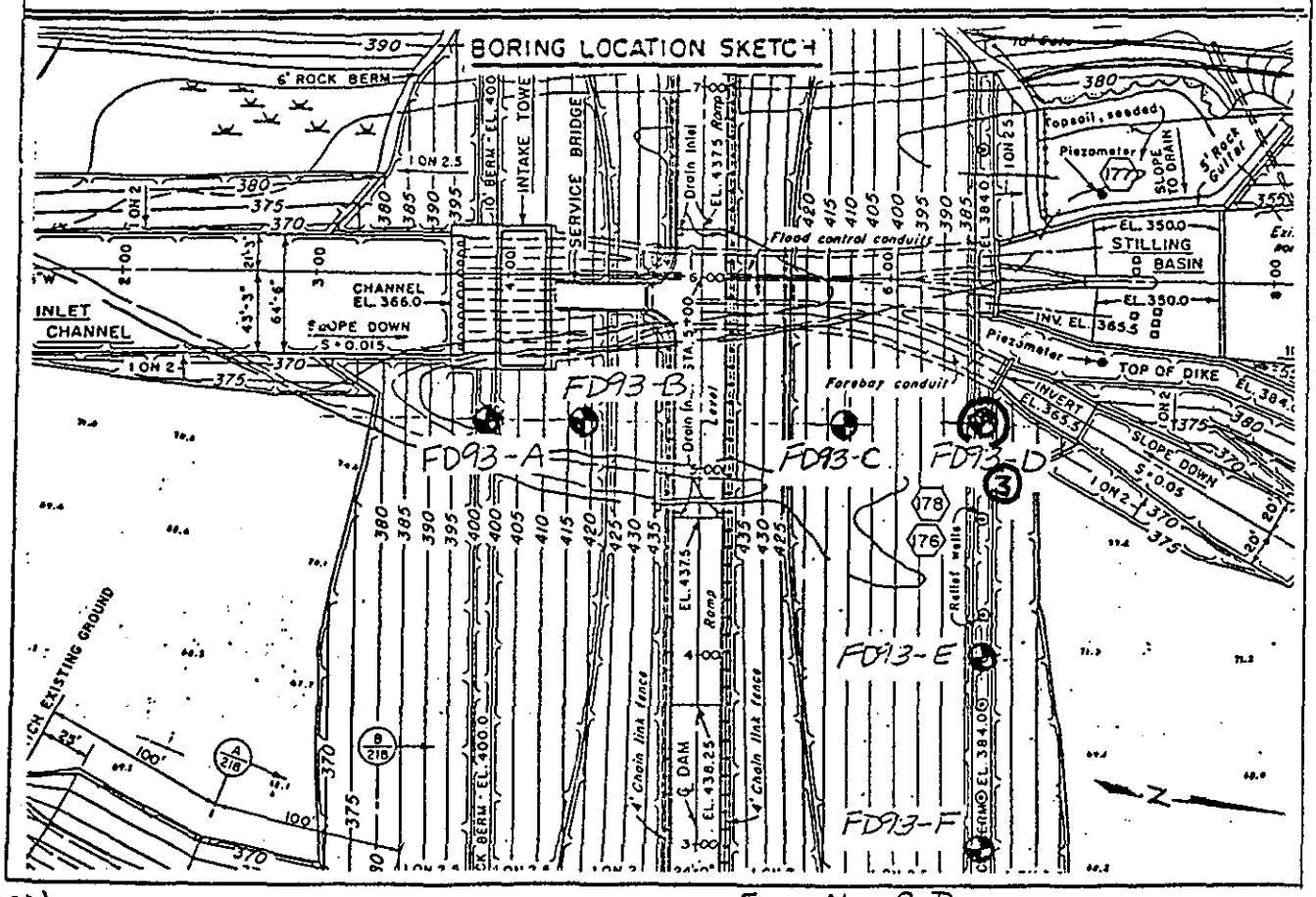
59(Test) C-52 FIG. No. 2D Boring No. FD93-2

Site: HOPKINTON DAM
Boring No: FD93-3

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
11/5	630AM	70	66	-3.2'		
11/5	1230PM	85	85	-10.5'		(INDUCED)
11/8	1200	85	85	-14.5'		
11/8	500PM	85	101	-12.3'		(INDUCED)
11/9	630AM	85	101	-6.6'		
11/9	500PM	125	135	-18.0'		(INDUCED)
11/10	630AM	125	135	-15.9'		

Note: Depths are in feet below original ground



59(Test)

C-52

FIG. No. 2D

Boring No. _____

c. Piezometer Information

PIEZOMETER INSTALLATION REPORT

PROJECT: HOPKINTON DAM | DATE. NOVEMBER 11, 1993

LOCATION (STA): 5+25 | OFFSET FROM CENTER LINE: 60' UPSTREAM | PIEZ NO.: 13-A

PIEZ TYPE: CASAGRANDE W/ 3/4" I.D PVC RISER | DEPTH OF PIEZ: 117' | RISER PIPE DIAM: 3/4" I.D.

PIEZ TIP SET IN (SOIL TYPE): SP-SM TO GP-GM | SOIL SAMPLE NO.: S-46 TO S-54 | BORING DIAM: 4 IN.

METHOD OF INSTALLATION: ROTARY WASH BORING

TYPE OF PROTECTION FOR PIEZ: 4" DIA STEEL CASING | VENT: THREADED LOCKING CAP

GROUND ELEV.: 416' (NGVD) | ELEV. TOP OF RISER: 417.9 | ELEV PIEZ TIP: 299'

FILTER: #20 SILICA SAND | FROM ELEV: 297' | TO ELEV: 315'

SEAL: PELTONITE "PELLETS" | FROM ELEV: 291' 315' | TO ELEV: 297' 321'

INSTALLED BY: ATLANTIC TESTING LABS | CONTRACT NO.: DACW33-93-D-0004 | FOREMAN: T ELDRIDGE

DATE OF INSTALLATION: OCTOBER 18, 1993 | DATE OF OBSERVATIONS: NOVEMBER 11, 1993

METHOD OF TESTING PIEZ.: FALLING HEAD

TIME 221	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET
221 39	0.5	11.80	241	20.0	45.06			
222	1.0	19.06	251	30.0	45.72			
224	3.0	32.32						
226	5.0	37.70						
231	10.0	42.72						

REMARKS:

PIEZOMETRIC HEAD @ START OF TEST -46.62 FT.

Tom Eldridge
INSPECTOR

E.G. No.

PIEZOMETER INSTALLATION REPORT

PROJECT: HOPKINTON DAM | DATE. NOVEMBER 11, 1993

LOCATION (STA): 5+25 | OFFSET FROM CENTER LINE: 60' UPSTREAM | PIEZ NO.: 13-B

PIEZ TYPE: CASAGRANDE @ 3/4" I.D. PVC RISER | DEPTH OF PIEZ: -48 FT. | RISER PIPE DIAM: 3/4" I.D.

PIEZ TIP SET IN (SOIL TYPE): SP-SM | SOIL SAMPLE NO.: S-17 TO S-20 | BORING DIAM: 5 IN.

METHOD OF INSTALLATION: ROTARY WASH BORING

TYPE OF PROTECTION FOR PIEZ: 4" DIA STEEL CASING | VENT: threaded locking CAP

GROUND ELEV.: 416' (NGVD) | ELEV. TOP OF RISER: 418.0 | ELEV PIEZ TIP: 368'

FILTER: #20 SILICA SAND | FROM ELEV: 366' | TO ELEV: 374'

SEAL: BENTONITE "PELLETS" | FROM ELEV: 360' 374' | TO ELEV: 366' 378'

INSTALLED BY: ATLANTIC TESTING LABS | CONTRACT NO.: DACW33-93-D-0004 | FOREMAN: T. ELDRIDGE

DATE OF INSTALLATION: OCTOBER 19, 1993 | DATE OF OBSERVATIONS: NOVEMBER 11, 1993

METHOD OF TESTING PIEZ.: FALLING HEAD

TIME 256	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET
256 30	0.5	1.52	316	20.0	5.34			
257	1.0	2.10	326	30.0	6.18			
259	3.0	2.78						
301	5.0	3.26						
306	10.0	4.12						

REMARKS:

PIEZOMETRIC HEAD @ START OF TEST -35.1 FT.

Tom Eldridge
(INSPECTOR)

C.C. No.

PIEZOMETER INSTALLATION REPORT

PROJECT: HOPKINTON DAM EXPLORATION PROGRAM | DATE. NOVEMBER 2, 1993

LOCATION (STA): 5+25 | OFFSET FROM CENTER LINE: 75' DOWNSTREAM | PIEZ NO.: 14-A

PIEZ TYPE: CASAGRADE @ 3/4" I.D. PVC RISER | DEPTH OF PIEZ: - 113 FT. | RISER PIPE DIAM: 3/4" I.D.

PIEZ TIP SET IN (SOIL TYPE): SP-SM | SOIL SAMPLE NO.: S-23 TO S-31 | BORING DIAM: 4"

METHOD OF INSTALLATION: ROTARY WASH BORING

TYPE OF PROTECTION FOR PIEZ: 4" STEEL CASING | VENT: THREADED LOCKING CAP

GROUND ELEV.: 416' (NGVD) | ELEV. TOP OF RISER: 417.8' | ELEV PIEZ TIP: 303'

FILTER: #20 SILICA SAND | FROM ELEV: 301' | TO ELEV: 320'

SEAL: PELTONITE PELLETS | FROM ELEV: 295' 320' | TO ELEV: 301' 326'

INSTALLED BY: ATLANTIC TESTING LABS | CONTRACT NO.: DACW33-93-D-0004 | FOREMAN: T. ELDRIDGE

DATE OF INSTALLATION: NOVEMBER 2, 1993 | DATE OF OBSERVATIONS: NOV 2, 1993

METHOD OF TESTING PIEZ.: FALLING HEAD

TIME 205	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET
2053	0.5	8.75	225	20.0	43.14			
206	1.0	13.45	235	30.0	43.66			
208	3.0	25.90						
210	5.0	32.82						
215	10.0	40.14						

REMARKS:

PIEZOMETRIC HEAD @ -49.22 FT. @ START OF TEST

TOM ELDRIDGE
INSPECTOR

E.G. No. 1

PIEZOMETER INSTALLATION REPORT

PROJECT: HOPKINTON DAM EXPLORATION PROGRAM | DATE. NOVEMBER 2, 1993

LOCATION (STA): 5+25 OFFSET FROM CENTER LINE: 75' DOWNSTREAM PIEZ NO.: 14-B

PIEZ TYPE: CASAGRANDE @ 3/4" I.D. PVC RISER DEPTH OF PIEZ: -47 FT. RISER PIPE DIAM: 3/4" I.D.

PIEZ TIP SET IN (SOIL TYPE): SP SOIL SAMPLE NO.: S-8 TO S-12 BORING DIAM: 5 IN.

METHOD OF INSTALLATION: ROTARY WASH BORING

TYPE OF PROTECTION FOR PIEZ: 4" STEEL CASING VENT: threaded locking Cap

GROUND ELEV.: 416' (NGVD) ELEV. TOP OF RISER: 417.9' ELEV PIEZ TIP: 369'

FILTER: #20 SILICA SAND FROM ELEV: 367' TO ELEV: 377'

SEAL: PELTONITE PELLETS FROM ELEV: 361' 377' TO ELEV: 367' 383'

INSTALLED BY: ATLANTIC TESTING LABS CONTRACT NO.: DACW33-93-D-0004 FOREMAN: T. ELDRIDGE

DATE OF INSTALLATION: NOVEMBER 2, 1993 DATE OF OBSERVATIONS: NOV 2, 1993

METHOD OF TESTING PIEZ.: FALLING HEAD

TIME 241	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET
2 4730	0.5	19.30	307	20.0	35.22			
248	1.0	23.75	317	30.0	35.70			
250	3.0	30.32						
252	5.0	32.35						
257	10.0	34.16						

REMARKS:

PIEZOMETRIC HEAD @ -37.44 FT. @ START OF TEST

Tom Eldridge
INSPECTOR

F.G. No.

PIEZOMETER INSTALLATION REPORT

PROJECT: HOPKINTON DAM | DATE. NOVEMBER 11, 1993

LOCATION (STA): 5+25 OFFSET FROM CENTER LINE: 150' DOWNSTREAM PIEZ NO.: PZ-15

PIEZ TYPE: CASAGRANDE @ 3/4" I.D PVC RISER DEPTH OF PIEZ: -83 FEET RISER PIPE DIAM: 3/4" I.D.

PIEZ TIP SET IN (SOIL TYPE): SP-SM STRATIFIED SOIL SAMPLE NO.: S-9A TO S-15 BORING DIAM: 4"

METHOD OF INSTALLATION: ROTARY WASH BORING

TYPE OF PROTECTION FOR PIEZ: 4" DIA STEEL CASING VENT: threaded locking CAP

GROUND ELEV.: 384' (NGVD) ELEV. TOP OF RISER: 384.3' ELEV PIEZ TIP: 301'

FILTER: #20 SILICA SAND FROM ELEV: 299' TO ELEV: 334'

SEAL: PELTONITE "PELLETS" FROM ELEV: 293' 334' TO ELEV: 299' 340'

INSTALLED BY: ATLANTIC TESTING LABS CONTRACT NO.: DACW33-93-D-0004 FOREMAN: T ELDRIDGE

DATE OF INSTALLATION: NOVEMBER 10, 1993 DATE OF OBSERVATIONS: NOVEMBER 11, 1993

METHOD OF TESTING PIEZ.: FALLING HEAD

TIME 1019	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER FEET
1019 30	0.5	3.28	1039	20.0	—			
1020	1.0	4.69	1049	30.0	—			
1022	3.0	5.74						
1024	5.0	5.80						
1029	10.0	5.80						

REMARKS:

- PIEZOMETRIC HEAD @ START OF TEST -5.90 FT.
- THE AVERAGE OF 2 RUNS WITH SIMILAR RESULTS EACH RUN

Tom Eldridge
INSPECTOR

EG No.

d. Field Permeability Test Results

FIELD PERMEABILITY TEST RESULTS

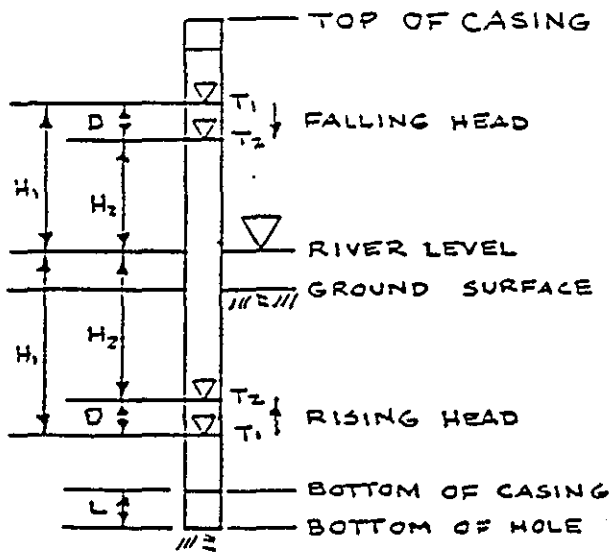
DATE: NOV 11, 1993	BORING NO: FD93-1	DEPTH: 117 FT.	INSPECTOR: T ELDRIDGE

D_o = 1.0	D_i = 0.75	L = 216 IN.	H_1 = 46.62 FT.	m = 3

FALLING HEAD				RISING HEAD			
ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_h	ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_h
0.5	11.80	34.82	2.26×10^{-5}				
1.0	19.06	27.56	2.04×10^{-5}				
3.0	32.32	14.30	1.53×10^{-5}				
5.0	37.70	8.92	1.28×10^{-5}				
10.0	42.72	3.90	9.6×10^{-6}				
20.0	45.06	1.56	6.6×10^{-6}				
30.0	45.72	0.90	5.1×10^{-6}				

NOTES: PIEZOMETER 13-A

SCHEMATIC



SYMBOLS

D_o = OUTSIDE DIAMETER OF CASING
D_i = INSIDE DIAMETER OF CASING (c
L = LENGTH OF SAMPLE (CM)
m = TRANSFORMATION RATIO
H = PIEZOMETRIC HEAD
T = TIME (SEC.)
K_h = HORIZONTAL PERMEABILITY (CM
D = CHANGE IN H

$$K_h = \frac{D_i^2 \ln\left[\frac{mL}{D_o} + \sqrt{1 + \left(\frac{mL}{D_o}\right)^2}\right]}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$K_h = \frac{D_i^2 \cdot \ln\left(\frac{2mL}{D_o}\right)}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2} \quad \text{for } \frac{mL}{D_o} > 4$$

FIG. 14

FIELD PERMEABILITY TEST RESULTS

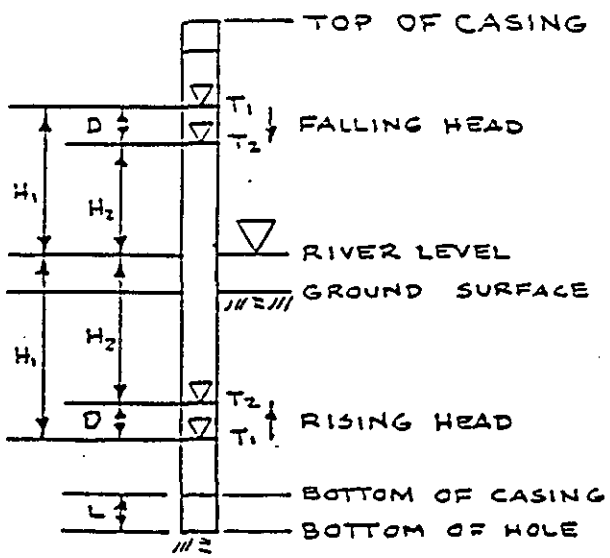
DATE: NOV 11, 1993	BORING NO: F093-1	DEPTH: 48 FT.	INSPECTOR: T ELDRIDGE

D_o = 1.0	D_i = 0.75	L = 96 IN.	H_1 = 35.1 FT.	m = 3

FALLING HEAD				RISING HEAD			
ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_H	ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_H
0.5	1.52	33.58	6.8×10^{-6}				
1.0	2.10	33.0	4.7×10^{-6}				
3.0	2.78	32.32	2.1×10^{-6}				
5.0	3.26	31.84	1.5×10^{-6}				
10.0	4.12	30.98	9×10^{-7}				
20.0	5.34	29.76	6×10^{-7}				
30.0	6.18	28.92	5×10^{-7}				

NOTES: PIEZOMETER 13-B

SCHEMATIC



SYMBOLS

D_o = OUTSIDE DIAMETER OF CASING
D_i = INSIDE DIAMETER OF CASING (C
L = LENGTH OF SAMPLE (CM)
m = TRANSFORMATION RATIO
H = PIEZOMETRIC HEAD
T = TIME (SEC.)
K_h = HORIZONTAL PERMEABILITY (CM
D = CHANGE IN H

$$K_h = \frac{D_i^2 \ln\left[\frac{mL}{D_o} + \sqrt{1 + \left(\frac{mL}{D_o}\right)^2}\right]}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$K_h = \frac{D_i^2 \cdot \ln\left(\frac{2mL}{D_o}\right)}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2} \quad \text{for } \frac{mL}{D_o} > 4$$

FIG. 14

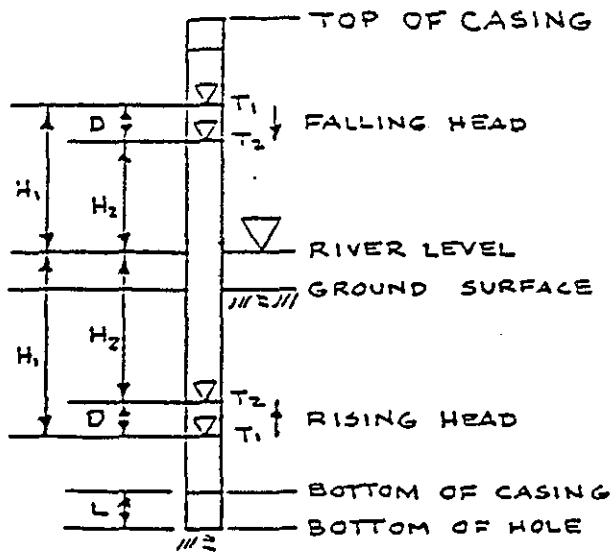
FIELD PERMEABILITY TEST RESULTS

DATE: 11/3/93	BORING NO: FD93-2	DEPTH: -115 FT.	INSPECTOR: TE
D_o = 1.0 IN.	D_i = 0.75 IN.	L = 228 IN.	H_1 = 49.22 FT.	m = 3

FALLING HEAD				RISING HEAD			
ELAPSED TIME MIN ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 FT. ($H_1 - D$)	K_H IN/SEC	ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_H
0.5	-8.75	40.47	1.45×10^{-5}				
1.0	-13.45	35.77	1.18×10^{-5}				
3.0	-25.90	23.32	9.2×10^{-6}				
5.0	-32.82	16.40	8.1×10^{-6}				
10.0	-40.14	9.08	6.2×10^{-6}				
20.0	-43.14	6.08	3.8×10^{-6}				
30.0	-43.66	5.56	2.6×10^{-6}				

NOTES: PIEZOMETER 14-A
MINUTES AND FEET WERE CONVERTED TO SECONDS AND INCHES FOR HORIZONTAL PERMEABILITY COEFFICIENT VALUE

SCHEMATIC



SYMBOLS

D_o = OUTSIDE DIAMETER OF CASING
D_i = INSIDE DIAMETER OF CASING (c
L = LENGTH OF SAMPLE (CM)
m = TRANSFORMATION RATIO
H = PIEZOMETRIC HEAD
T = TIME (SEC.)
k_h = HORIZONTAL PERMEABILITY (CM
D = CHANGE IN H

$$K_h = \frac{D_i^2 \ln\left[\frac{mL}{D_o} + \sqrt{1 + \left(\frac{mL}{D_o}\right)^2}\right]}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{D_i^2 \cdot \ln\left(\frac{2mL}{D_o}\right)}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2} \quad \text{for } \frac{mL}{D_o} > 4$$

FIG. 14

22"

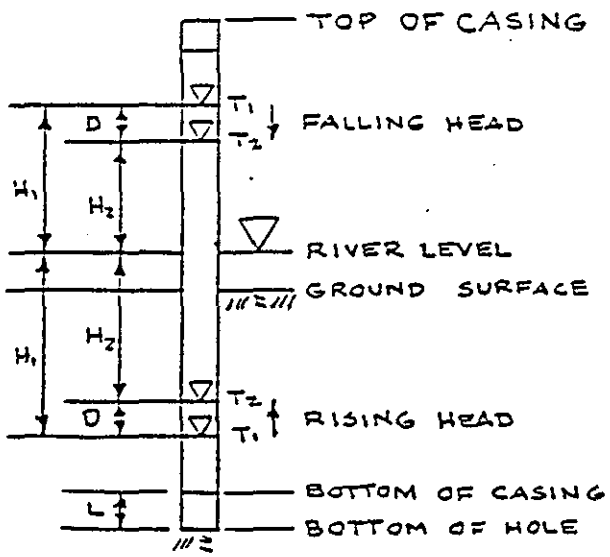
FIELD PERMEABILITY TEST RESULTS

DATE: 11/2/93	BORING NO: FD93-2	DEPTH: -49 FT.	INSPECTOR: TE
D_o = 1.0 IN.	D_i = 0.75 IN.	L = 120 IN.	H_1 = 37.44 FT.	m = 3

FALLING HEAD				RISING HEAD			
ELAPSED TIME ($t_2 - t_1$) MIN	ΔD ($H_2 - H_1$)	H_2 FT ($H_1 - D$)	K_H IN/SEC	ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_H
0.5	-19.30	18.14	9.31×10^{-5}				
1.0	-23.75	13.69	6.46×10^{-5}				
3.0	-30.32	7.12	3.55×10^{-5}				
5.0	-32.35	5.09	2.56×10^{-5}				
10.0	-34.16	3.28	1.56×10^{-5}				
20.0	-35.22	2.22	9.0×10^{-6}				
30.0	-35.70	1.74	6.5×10^{-6}				

NOTES: PIEZOMETER 14-B
MINUTES AND FEET WERE CONVERTED TO SECONDS AND INCHES FOR HORIZONTAL PERMEABILITY COEFFICIENT

SCHEMATIC



SYMBOLS

D_o = OUTSIDE DIAMETER OF CASING
D_i = INSIDE DIAMETER OF CASING (C
L = LENGTH OF SAMPLE (CM)
m = TRANSFORMATION RATIO
H = PIEZOMETRIC HEAD
T = TIME (SEC.)
k_h = HORIZONTAL PERMEABILITY (CM
D = CHANGE IN H

$$K_h = \frac{D_i^2 \ln\left[\frac{mL}{D_o} + \sqrt{1 + \left(\frac{mL}{D_o}\right)^2}\right]}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{D_i^2 \cdot \ln\left(\frac{2mL}{D_o}\right)}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2} \quad \text{for } \frac{mL}{D_o} >$$

FIG. 14

FIELD PERMEABILITY TEST RESULTS

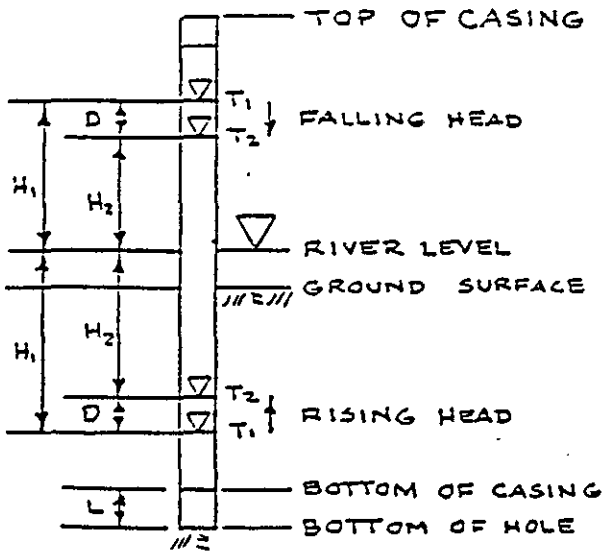
DATE: Nov 11, 1993	BORING No: 093-3	DEPTH: 83 FT.	INSPECTOR: T ELDRIDGE
D_o = 1.0	D_i = 0.75	L = 420 IN.	H_1 = 5.90 FT.	m = 3

FALLING HEAD				RISING HEAD			
ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_H	ELAPSED TIME ($t_2 - t_1$)	ΔD ($H_2 - H_1$)	H_2 ($H_1 - D$)	K_H
0.5	3.28	2.62	3.54×10^{-5}				
1.0	4.69	1.21	3.46×10^{-5}				
3.0	5.74	0.16	2.62×10^{-5}				
5.0	5.80	0.10	1.78×10^{-5}				
10.0	5.80	0.10	8.9×10^{-6}				
20.0			—				
30.0			—				

NOTES: PIEZOMETER 15

EXPERIENCED MORE DOWNHOLE PRESSURE IN THIS BORING COMPARED TO OTHERS WHEN SETTING PIEZOMETER

SCHEMATIC



SYMBOLS

D_o = OUTSIDE DIAMETER OF CASING
D_i = INSIDE DIAMETER OF CASING (
L = LENGTH OF SAMPLE (CM)
m = TRANSFORMATION RATIO
H = PIEZOMETRIC HEAD
T = TIME (SEC.)
k_h = HORIZONTAL PERMEABILITY (CM
D = CHANGE IN H

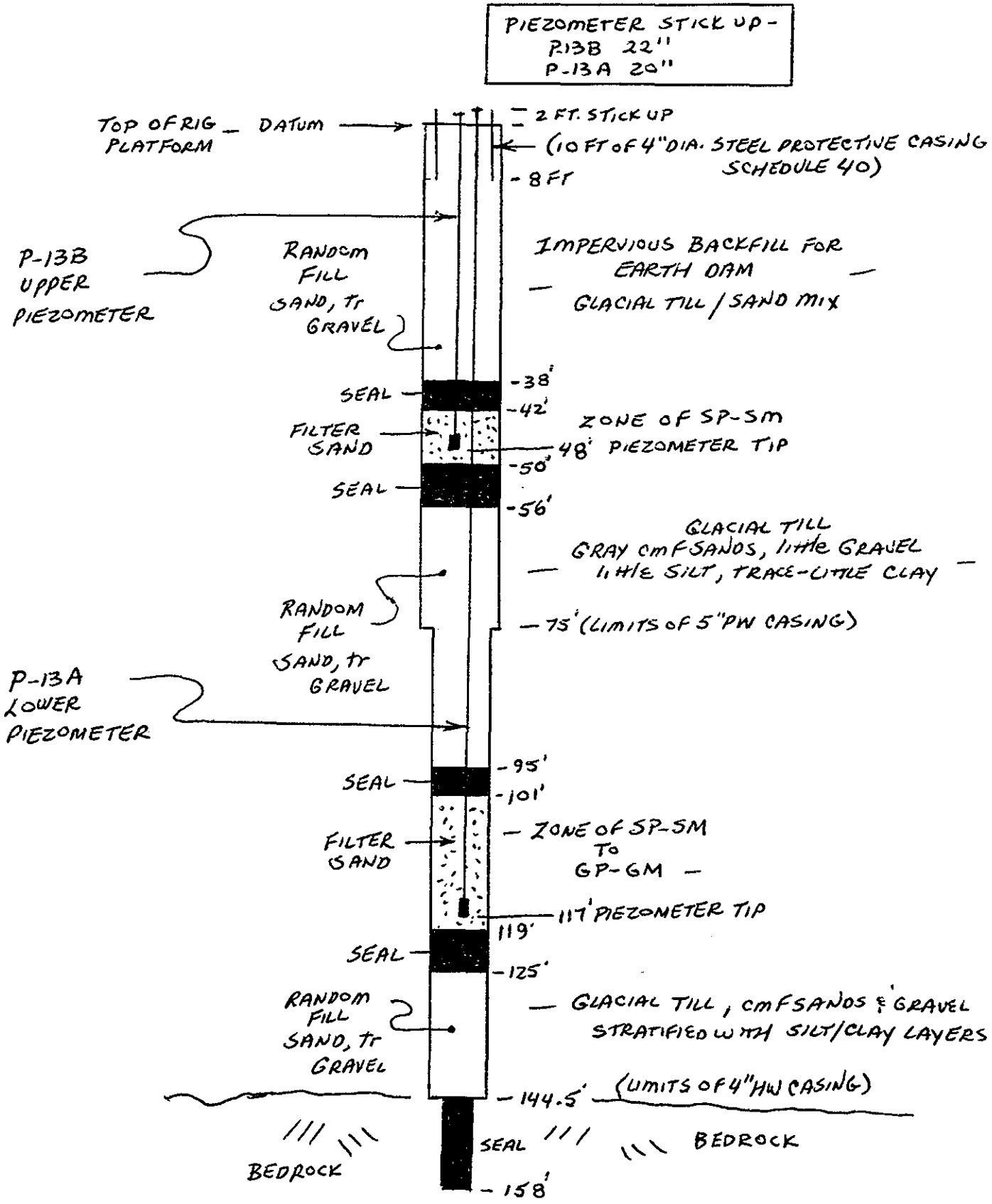
$$K_h = \frac{D_i^2 \ln\left[\frac{mL}{D_o} + \sqrt{1 + \left(\frac{mL}{D_o}\right)^2}\right]}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$K_h = \frac{D_i^2 \cdot \ln\left(\frac{2mL}{D_o}\right)}{8 \cdot L \cdot (t_2 - t_1)} \ln \frac{H_1}{H_2} \quad \text{for } \frac{mL}{D_o} > 1$$

FIG. 14

e. Piezometer Diagram Profiles

TEST BORING
FD 93-1

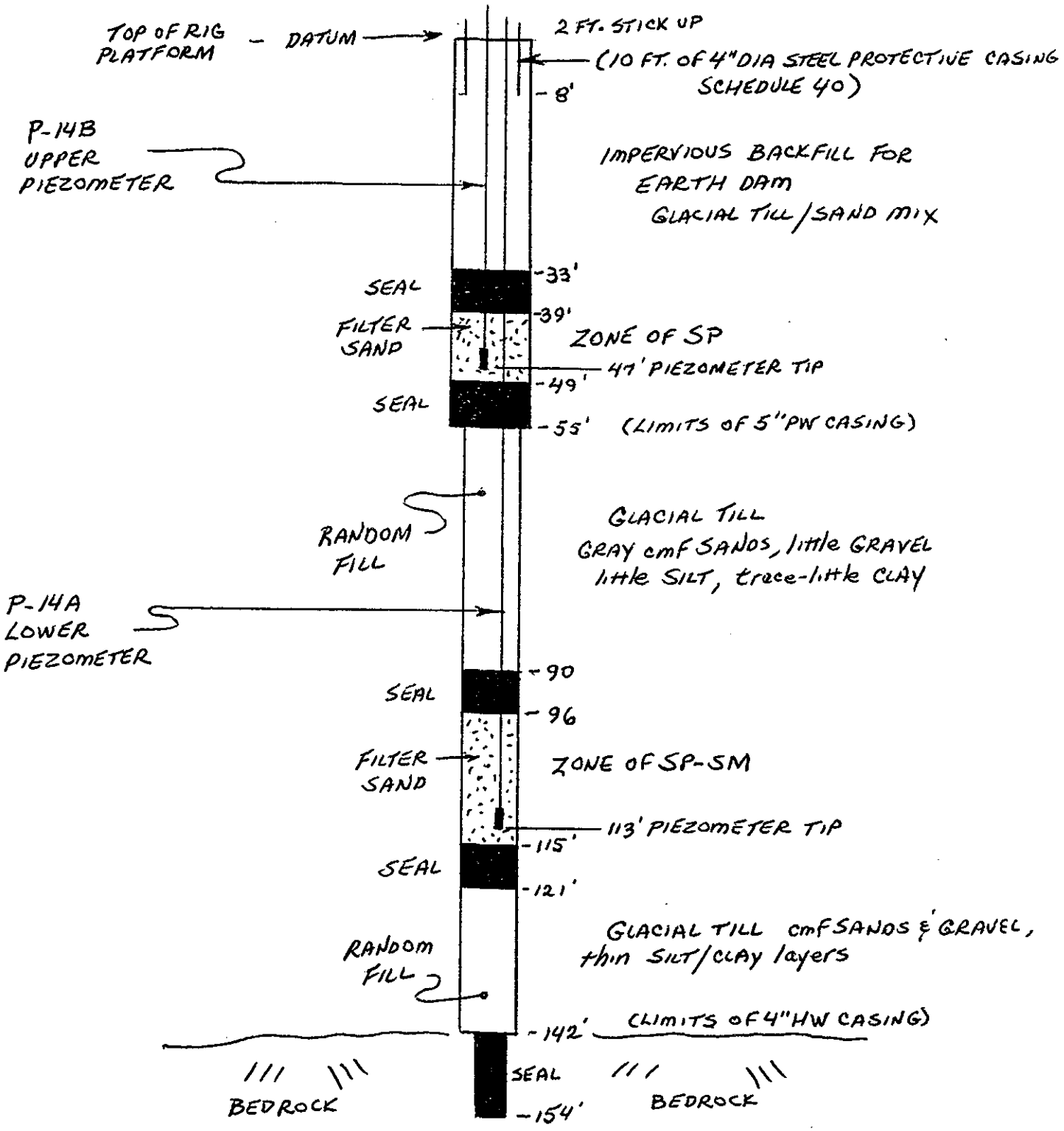


CASAGRANDE TYPE PIEZOMETERS
WITH 3/4" I.D. PVC RISERS
SCHEDULE 80

BENTONITE SEALS
#20 SILICA SAND - FILTER SAND
RANDOM FILL IS ALL PURPOSE SAND
60 lb BAGS & BANK RUN
SAND-GRAVEL

TEST BORING
FD 93-2

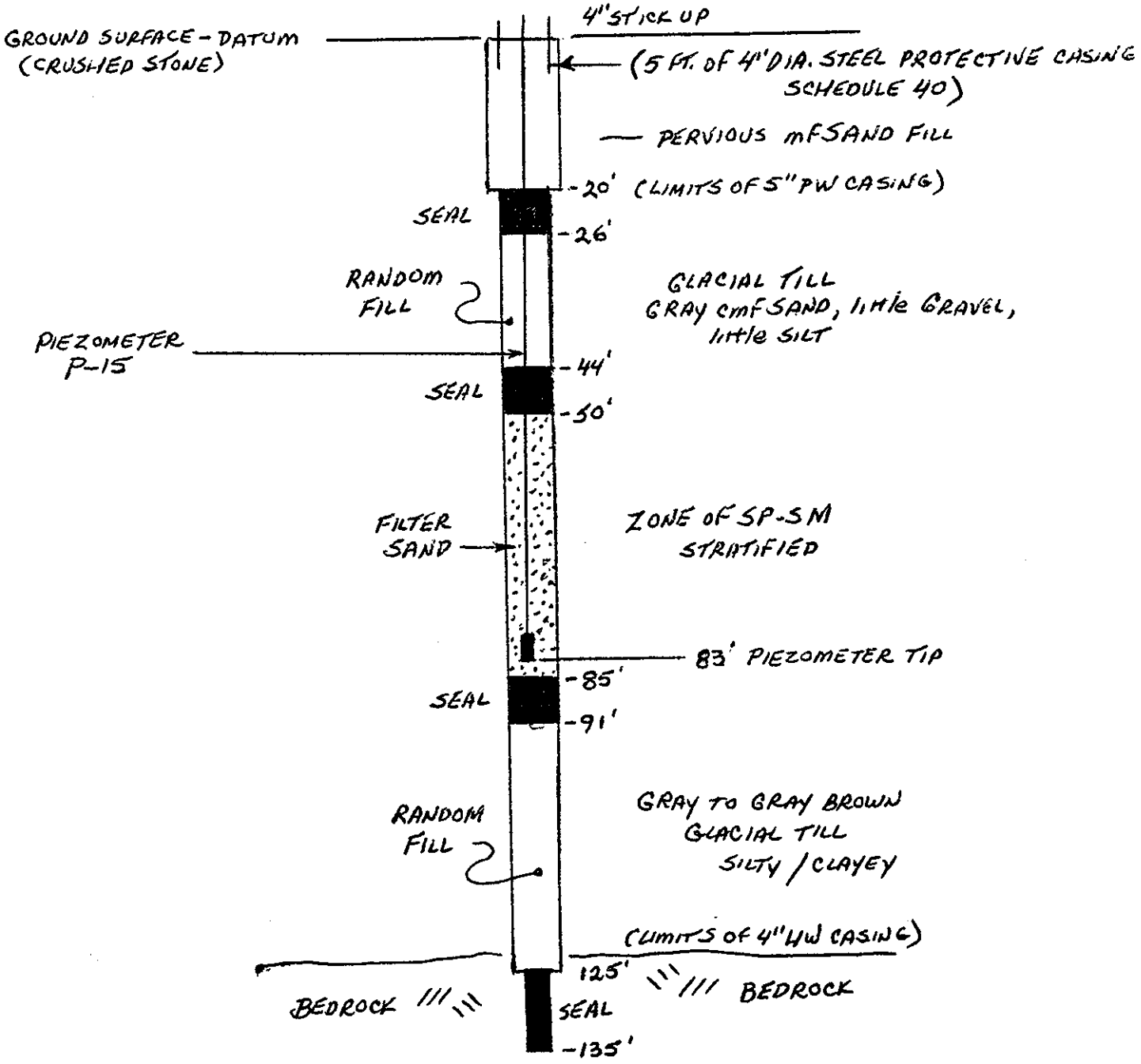
PIEZOMETER STICK UP -
P-14B - 22 IN.
P-14A - 20 IN.



CASAGRANDE TYPE PIEZOMETERS
WITH 3/4" I.D. PVC RISERS
SCHEDULE 80

BENTONITE SEALER - PELTONITE "PELLETS"
FILTER SAND - #20 SILICA SAND
RANDOM FILL - ALL PURPOSE SAND
60 lb BAGS

TEST BORING
FD 93-3



CASAGRANDE TYPE PIEZOMETER
WITH 3/4" I.D. PVC RISER
SCHEDULE 80

BENTONITE SEALER - PELTONITE "PELLETS"
FILTER SAND - #20 SILICA SAND
RANDOM FILL - #4 SILICA SAND

f. Rock Coring Data

FIELD LOG OF TEST BORING IN ROCK

SITE HOPKINTON DAM HOLE NO. FD 93-1 PAGE 1

	DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR: FEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR FOLL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
R-1	OCT 14	148.0	153.0	5 Ft	3.5 Ft.	70		NO WATER LOSS		11 min 30 SEC.	NX CORE DIAMOND	RQD = 10 WEATHERED GRANITE
R-2	OCT 15	153.0	158.0	5 Ft.	3 Ft.	60				10 min 30 SEC.	NX CORE DIAMOND	RQD = 0 WEATHERED GRANITE

TOTAL BED ROCK DRILLED 10 FEET

TOTAL BED ROCK RECOVERED 6.5 FEET

BED ROCK RECOVERY 65 PERCENT

DRILLER ROB PRICE

INSPECTOR TOM ELDRIDGE

NED FORM DEC 83 130

PREVIOUS EDITION OF THIS FORM MAY BE USED UNTIL EXHAUSTED

C-56

FIG NO.

FIELD LOG OF TEST BORING IN ROCK

SITE HOPKINTON DAM ROLL NO. FD 93-2 PAGE 2

	DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR: FEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR FOLL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
R-1	OCT 28	144.0	149.0	5 FT.	5 FT	100%		NO WATER LOSS		14 MIN.	NX CORE DIAMOND	RQD=33 WEATHERED GRANITE
R-2	OCT 28	149.0	154.0	5 FT.	5 FT.	100%				24 MIN.	NX CORE DIAMOND	RQD=92 GRANITE (SANDSTONE SEAMS)

TOTAL BED ROCK DRILLED 10 FEET

TOTAL BED ROCK RECOVERED 10 FEET

BED ROCK RECOVERY 100 PERCENT

DRILLER ROB PRICE

INSPECTOR TOM ELDRIDGE

NED FORM DEC 63 130

FIG NO.

FIELD LOG OF TEST BORING IN ROCK

SITE HOPKINTON DAM HOLE NO. FD93-3 PAGE 3

	DATE	DEPTH FT. FROM	DEPTH FT. TO	RUN FT.	RUN REC'V'Y FT.	REC'V'Y %	DRILLING BEHAVIOR: FEED	DRILLING BEHAVIOR: WATER	DRILLING BEHAVIOR: REASON FOR PULL	ACTUAL DRILLING TIME	BIT NO. SIZE AND TYPE	ADDITIONAL REMARKS
R-1	NOV 9	-125'	-130'	5 FT.	5 FT	100		NO WATER LOSS		15 min.	NX CORE DIAMOND	WEATHERED GRANITE
R-2	NOV 9	-130'	-135'	5 FT.	5 FT.	100				10 min 30 SEC	NX CORE DIAMOND	WEATHERED GRANITE

TOTAL BED ROCK DRILLED 10 FEET

TOTAL BED ROCK RECOVERED 10 FEET

BED ROCK RECOVERY 100 PERCENT

DRILLER ROB PRICE

INSPECTOR TOM ELDRIDGE

HED FORM DEC 61 130

C-56

FIG NO.

g. Field Log of Test Boring (NED-121)

CORPS OF ENGINEERS, U. S. ARMY
NEW ENGLAND DIVISION
FOUNDATION AND MATERIALS BRANCH

FIELD LOG OF TEST BORING

Site: HOPKINTON DAM EXPLORATION PROGRAM

PROJECT NO. DACW33-93-D-0004

Page 1 of ___ Pages

Hole No. FD93-1 Diam. (Casing) 4"HW, 5"PW

Boring Started: OCTOBER 5, 1993

Co-ordinates: N 250877.22 E 418249.90

Boring Completed: OCTOBER 19, 1993

Drilled by: ROB PRICE, DARIUS WINTERS (ATL)

Report Submitted: ___

Purpose of Exploration: TO DETERMINE SUBSURFACE MATERIAL TYPES AND DISTRIBUTION AS WELL AS INSTALLATION OF PIEZOMETERS FOR DETERMINATION OF FOUNDATION PHREATIC SURFACES

Elevation Toe of Hole: 416 NGVD ~~M.S.L.~~

Total Overburden Drilled: 144.5 Feet

Elevation Top of Rock: 271.5 NGVD ~~M.S.L.~~

Elevation Bottom of Hole: 258 NGVD ~~M.S.L.~~

Total Rock Drilled: 13.5 Feet

Total Depth of Hole: 158 Feet

Core Recovered: 65 %

Core Recovered: 6 Ft.: 6 IN Diam. 2.1 In.

Soil Samples: 2½ In. Diam. 68 No.

Soil Samples: ___ In. Diam. ___ No.

Casing Left in Place: 0 Feet

PIEZOMETERS PROTECTED WITH 10 FEET 4" DIA STEEL CASING (2 FT. STICK UP)

Water Table Depth: -46 FT.

Depth From	Depth To	Method of Drilling and Type of Bit Used
0	158	ROTARY-WASH

INDEX

Ground Water	Back of Page ___
Boring Location Sketch	Back of Page ___
Overburden Record	Page ___
Rock Drilling	Page ___
	Page ___
	Page ___
	Page ___

Prepared by: Tom Eldridge
Field Data — Lab. Data

Submitted by: ___

NED FORM DEC 63 121

REPLACES EDITION OF JUN 51 WHICH MAY BE USED UNTIL EXHAUSTED

FIG NO 2

CORPS OF ENGINEERS, U. S. ARMY
NEW ENGLAND DIVISION
FOUNDATION AND MATERIALS BRANCH

FIELD LOG OF TEST BORING

Site HOPKINTON DAM EXPLORATION PROGRAM PROJECT NO. DACW 33-93-D-0004

Page 1 of ___ Pages

Hole No. F093-2 Diam. (Casing) 4" HW, 5" PW

Boring Started OCTOBER 21, 1993

Co-ordinates: N 250997.22 E 478198.97

Boring Completed NOVEMBER 2, 1993

Drilled by ROB PRICE, DARIUS WINTERS (ATL)

Report Submitted ___

Purpose of Exploration TO DETERMINE SUBSURFACE MATERIAL TYPES AND DISTRIBUTION AS WELL AS INSTALLATION OF PIEZOMETERS FOR DETERMINATION OF FOUNDATION PHREATIC SURFACES

Elevation Top of Hole 416 NGVD

Total Overburden Drilled 142 Feet

Elevation Top of Rock 274 NGVD

Elevation Bottom of Hole 262 NGVD

Total Rock Drilled 12 Feet

Total Depth of Hole 154 Feet

Core Recovered 100 %

Core Recovered 10 Ft.: 0 Diam. 2-1 In.

Soil Samples 2 1/2 In. Diam. 37 No.

Soil Samples ___ In. Diam. ___ No.

Casing Left in Place 0 Feet

PIEZOMETERS PROTECTED WITH 10 FT. OF 4" DIA STEEL CASING (2 FT. STICK UP)

Water Table Depth -36 FT.

Depth From	Depth To	Method of Drilling and Type of Bit Used
0	154	ROTARY-WASH

INDEX

Ground Water ___ Back of Page ___

Boring Location Sketch ___ Back of Page ___

Overburden Record ___ Page ___

Rock Drilling ___ Page ___

___ Page ___

___ Page ___

___ Page ___

Prepared by Tom Wheelock Field Data ___ Lab. Data

Submitted by ___

NED FORM DEC 63 121 REPLACES EDITION OF JUN 51 WHICH MAY BE USED UNTIL EXHAUSTED

FIG NO 2

CORPS OF ENGINEERS, U. S. ARMY
NEW ENGLAND DIVISION
FOUNDATION AND MATERIALS BRANCH

FIELD LOG OF TEST BORING

PROJECT NO. DACW33-93-D-0004

Site HOPKINTON DAM — Page 1 of ___ Pages

Hole No. FD 93-3 Diam. (Casing) 4"HW 5"PW — Boring Started NOVEMBER 3, 1993

Co-ordinates: N 251074.22 E 478166.43 — Boring Completed NOVEMBER 11, 1993

Drilled by ATLANTIC TESTING LABS — Report Submitted ___

Purpose of Exploration TO DETERMINE SUBSURFACE MATERIAL TYPES AND DISTRIBUTIONS, AND INSTALLATION OF PIEZOMETERS FOR DETERMINATION OF FOUNDATION PHREATIC SURFACES

Elevation Top of Hole 384 NGVD
Total Overburden Drilled 124 Feet
Elevation Top of Rock 260 NGVD
Elevation Bottom of Hole 249 NGVD
Total Rock Drilled 11 Feet
Total Depth of Hole 135 Feet
Core Recovered 100 %
Core Recovered 10 Ft.: - Diam. 2-1 in.
Soil Samples 2½ in. Diam. 29 No.
Soil Samples ___ in. Diam. ___ No.

Casing Left in Place 0 Feet
PIEZOMETERS PROTECTED WITH 5 FEET 4" DIA STEEL CASING (GROUTED IN HOLE)

Water Table Depth -3.5 FT

Depth From	Depth To	Method of Drilling and Type of Bit Used
0	135	ROTARY-WASH BORING

INDEX

Ground Water	Back of Page ___
Boring Location Sketch	Back of Page ___
Overburden Record	Page ___
Rock Drilling	Page ___
	Page ___
	Page ___
	Page ___

Prepared by TOM ELDRIDGE
Field Data — Lab. Data

Submitted by ___

NED FORM DEC 63 121 — REPLACES EDITION OF JUN 51 WHICH MAY BE USED UNTIL EXHAUSTED

FIG NO 2