DACW-33-91-D-0011 Delivery Order 0005
Acushnet River Superfund Site
New Bedford, MA

FILE COPY

Atlantic Testing Laboratories
LIMITED

ATLANTIC TESTING LABORATORIES, LIMITED
Sustaining Member—N.Y.S. Society of Professional Engineers

Box 29
Canton, N.Y. 13617
(315) 386-4578

Box 356
Cicero, N.Y. 13039
(315) 699-5281

January 30, 1986

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

Attn: Mr. Richard D. Reardon

Re: Acushnet River Superfund Site
New Bedford, MA
ATL Report No. CD005-11-85
Contract DACW-33-85-D-0011
Delivery Order No. 0005

Gentlemen:

In accordance with Delivery Order No. 0005, dated 26 September 1985, attached is one copy of our final Seismic Investigation Report for the Upper Acushnet River Estuary Superfund Site in New Bedford, MA.

By copy of this letter, we are also transmitting two copies of this report to the Chief of the Geotechnical Engineering Branch.

If you have any questions or comments, please do not hesitate to call.

Respectfully submitted,

Spencer T. Thew, P.E./L.S.
President

SFT/smf

encs.

cc: Chief, Geotechnical Engineering Branch (2)

RECEIVED
FEB - 3

SECTION 1

SEISMIC INVESTIGATION
ACUSHNET RIVER SUPERFUND PROJECT
NEW BEDFORD, MA

CONTRACT DACW-33-85-D-0011
CONTRACTING OFFICER:
Edward D. Hammond, LTC, CE
28 June 1985

DELIVERY ORDER NO. 0005
26 September 1985

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

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

November 26, 1985

ATL Report No. CD005-1-11-85

SECTION 2

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SECTION 3

SCOPE OF INVESTIGATION

a. DELIVERY ORDER NO. 0005

CHECK BOX APPLIES

[X] ORDER FOR SUPPLIES OR SERVICES

[ ] REQUEST FOR QUOTATIONS NO

RETURN COPY 1 OF THIS QUOTE BY

(THIS IS NOT AN ORDER. See DD Form 1155)

CONTRACT NO	2 DELIVERY ORDER NO	3 DATE OF ORDER	4 REQUISITION PURCH REQUEST NO	5 CERTIFIED FOR NATIONAL DEFENSE UNDER DMS REG 1
DACW33-85-D-0011	0005	85 SEPT 26	GEB 85-85	00

ISSUED BY Dept. of the Army CODE
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, MA 02254-9149
Buyer/Symbol: Douglas/NEDSD-P Phone: AC 617-647-8415

7 ADMINISTERED BY (If other than 6) CODE

8 DELIVERY FOB: [X] DEST [ ] OTHER (See Schedule if other)

9 CONTRACTOR/QUOTER CODE FACILITY CODE

NAME AND ADDRESS
Atlantic Testing Laboratories, Ltd.
P. O. Box 29
Canton, N.Y. 13617

10 DELIVER TO FOB POINT BY
In accordance with paragraph 7 of the Scope of Work

11 CHECK IF BUSINESS: [X] SMALL [ ] SMALL DISADVANTAGED [ ] WOMEN OWNED

12 DISCOUNT TERMS
NET

13 MAIL INVOICES TO Finance & Accounting Officer at issuing office

14 Service for: CODE
New England Division, Corps of Engineers
Engineering Division
At issuing office

15 PAYMENT WILL BE MADE BY CODE
Finance & Accounting Officer
at issuing office

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16 DELIVERY ORDER: DELIVERY [X] This delivery order is subject to instructions contained on this side of form only and is issued pursuant to the authority in accordance with and subject to terms and conditions of above numbered contract.

PURCHASE [ ] Reference your furnish the following on terms specified herein, including, for U.S. purchases General Provisions of Purchase Order on DD Form 1155r (EXCEPT CLAUSE NO. 12 APPLIES ONLY IF THIS BOX [ ] IS CHECKED, AND NO. 14 IF THIS BOX [ ] IS CHECKED), special provisions and delivery as indicated. This purchase is negotiated under authority of 10 USC 2304(a)(3) or as specified in the schedule if within the U.S., its possessions or Puerto Rico, otherwise under 2304(a)(6)

[ ] If checked, Additional General Provisions apply. Supplier shall sign "Acceptance" on DD Form 1155r and return CODE

17 ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
96X3122
B 233821000000

~~SB(1) & (4)~~
AE/PS Coord
ED - Blair
SO
~~SID/c'h~~

18 Contract Line	19 SCHEDULE OF SUPPLIES/SERVICES	20 QUANTITY ORDERED/ACCEPTED *	21 UNIT	22 UNIT PRICE	23 AMOUNT
	Furnish necessary equipment and personnel to perform Seismic Survey Exploration at Upper Acushnet River Estuary Superfund Site in accordance with attached instructions.	APPROX.			ESTIMATED
3.1	Mobilization and Demobilization	1	Job	$180.00	$180.00
3.2	Mileage from/to Waltham, MA	100	MI	.35	35.00
3.4	Survey Crew and Equipment	3	Day	440.00	1,320.00
3.5	Overnight Per Diem for Survey Crew	3	Day	90.00	270.00

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

24 UNITED STATES OF AMERICA
EDWARD D. HAMMOND, LTC, CE
BY Deputy Division Engineer CONTRACTING/ORDERING OFFICER

25 TOTAL $15,385.00

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 REPRESENTATIVE

27 SHIP NO
[ ] PARTIAL [ ] FINAL

28 D.O. VOUCHER NO

30 INITIALS

31 PAYMENT
[ ] COMPLETE [ ] PARTIAL [ ] FINAL

32 PAID BY

33 AMOUNT VERIFIED CORRECT FOR

34 CHECK NUMBER

35 BILL OF LADING NO

TOTAL CONTAINERS

PARTIAL FINAL

12 DATE RECEIVED

CONTINUATION SHEET

REF. NO. OF DOC. BEING CONT'D
Delivery Order No. 0005
DACW33-85-D-0011

NAME OF OFFEROR OR CONTRACTOR
Atlantic Testing Laboratories, Ltd.

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
3.6	Data Reduction & Plotting	1	Job	100% of 3.4	1320.00
3.7	Standby Time	8	HR	55.00	440.00
27.1	Mobilization & Demobilization (Reflection) with Floating Plant	1	Job	2400.00	2400.00
27.2	Mileage from/to Waltham, MA	100	MI	1.20	120.00
27.4	Seismic Crew & Equipment	3	Day	1650.00	4950.00
27.5	Overnight Per Diem for Seismic Crew	3	Day	140.00	420.00
27.6	Data Reduction & Report	1	Job	60% of 27.4	2970.00
27.7	Standby Time	8	HR	120.00	960.00

ATTACHMENT NO. 1
GEB REQUISITION NO. 85-85 DACW 33-85-D-0011
SURVEY DELIVERY ORDER NO. 0005
SURVEY AND EXPLORATION INSTRUCTIONS

PROJECT: General Investigation for Acushnet River Superfund Project.

SITE: Upper Acushnet River Estuary Superfund Site, New Bedford, MA.

PURPOSE: Seismic surveys on water are required to determine depths to rock in the estuary and engineering characteristics and distributions of bottom sediments.

1. SCOPE OF INVESTIGATION.

a. Seismic survey lines shall be performed for a total of about 22,000 feet as shown on Attachment 2. The lines shall be located according to the established Corps of Engineers survey control points shown on Attachment 3. Mean Low Water (MLW) will be the datum used on all seismic lines and throughout the geotechnical report.

b. The locations of lines shown are approximate. The lines actually accomplished shall be as close as possible to the lines shown but may deviate in the field as governed by the minimum depth of water needed to operate the equipment.

c. Bottom sediments shall not be disturbed.

d. The senior investigator shall provide telephone reports to Mr. Blair, Corps of Engineers, at 617-647-8396 each work day to report on the progress of the work.

2. SITE CONDITIONS.

The proposed exploration program is located in Upper Acushnet River Estuary located on Attachment 2. Known water depths limited and are shown on Attachment 3. Extremely shallow depths are expected close to the shorelines.

3. RIGHTS OF ENTRY.

The Contractor is responsible for securing any rights of entry, approvals, permits, etc. necessary for the performance of the work.

4. COORDINATION.

Mr. James Blair, Corps of Engineers, 617-647-8396, shall be contacted five days prior to start of work and each work day to report on how work is progressing and approximate depth to bedrock is being encountered.

5. EXPLORATION NUMBERS.

The seismic lines accomplished shall be numbered sequentially in order of their completion. The numbers shall be shown on the plan of completed explorations.

6. GOVERNMENT REVIEW.

The Government will review the draft submittal as well as the completed work. Subsequent to such review, the Contractor shall accomplish any corrections which may be directed as the result of the Government review.

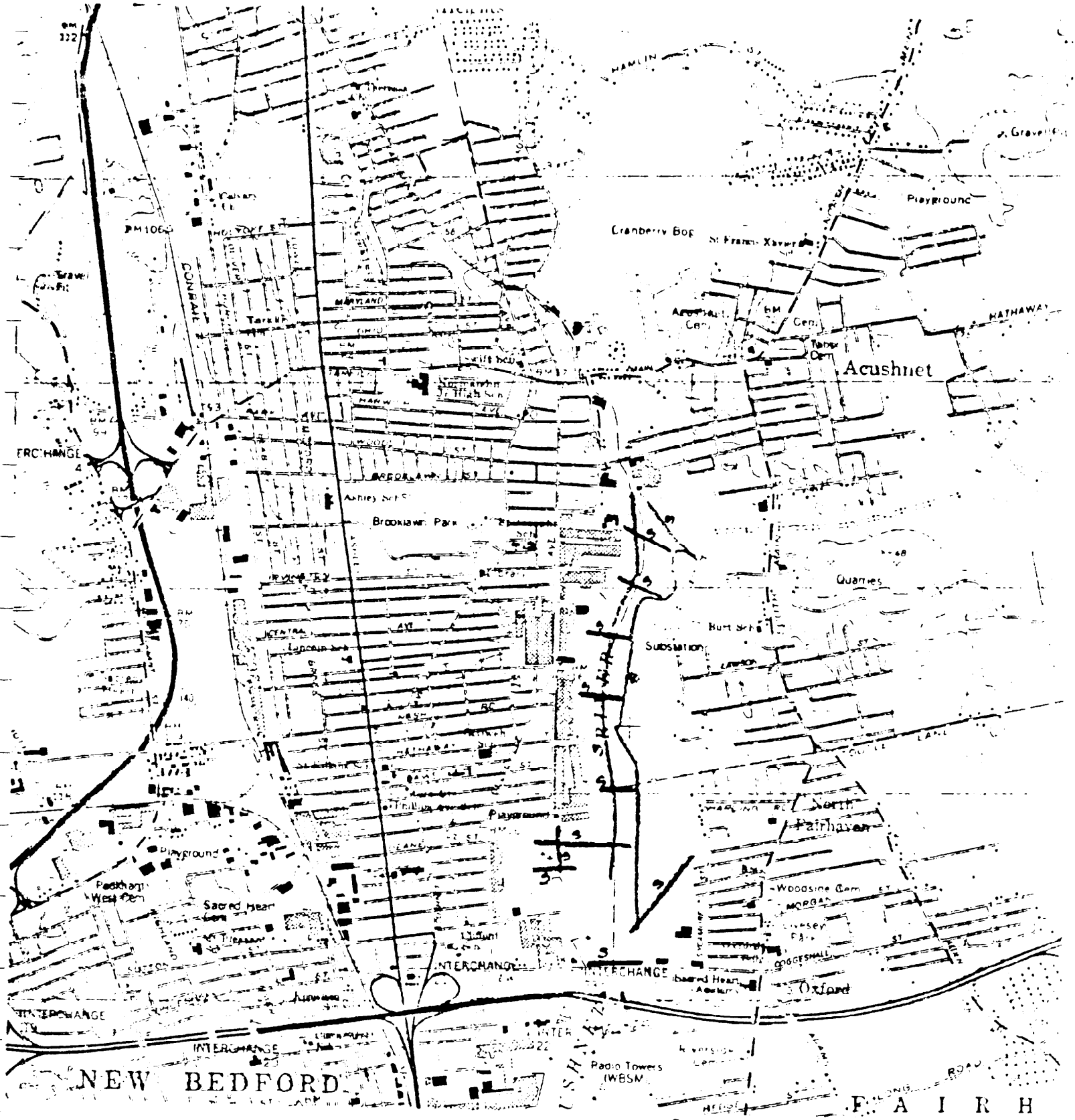
7. COMPLETION SCHEDULE.

Services under this delivery order shall start within seven calendar days after receipt of delivery order. Duration of field work is estimated to be three work days. The geotechnical report shall be submitted in draft format for review by the Government, postmarked no later than seven calendar days after completion of the field work. Government review will take approximately ten calendar days from receipt of draft report. The final geotechncial report shall be submitted postmarked no later than seven calendar days after receipt of draft report including the action taken on possible Government comments.

8. QUALITY CONTROL.

You will be held responsible for the quality of the text and plates submitted and for all damages caused the Government as a result of your negligence in the performance of any services furnished under the contract.

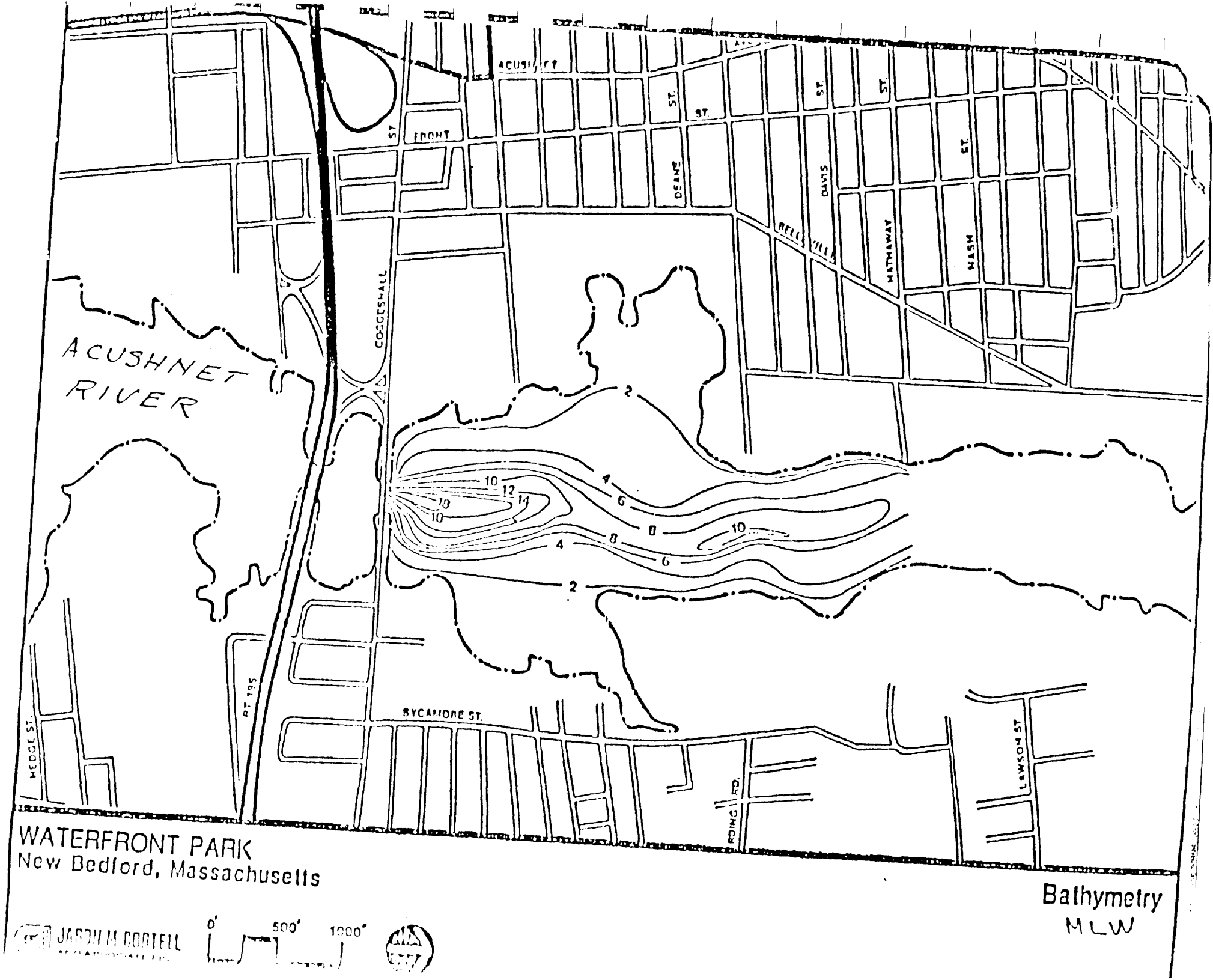
Although submissions required by your contract are technically reviewed by the Government, it is emphasized that your work must be prosecuted using proper internal controls and review procedures. The letter of transmittal for each submission which you make shall include a certification that the submission has been subjected to your own review and coordination procedures to insure (a) completeness for each discipline commensurate with the level effort required for that submission, (b) elimination of conflicts, errors and omissions, and (c) the overall professional and technical accuracy of the submission. Documents which are significantly deficient in any of these areas will be returned to you for correction and/or upgrading prior to our completing our review. Contract submission dates will not be extended if a resubmission of draft material is required for this reason.



2 Seismic Lines

UPPER ACUSHNET ESTUARY
NEW BEDFORD, MA

LOCATIONS
OF
SEISMIC LINES


ACUSHNET RIVER
FRONT ST.
COGGESHALL
DEANE ST.
DAVIS ST.
HATHAWAY ST.
NASH ST.
BELLEVILLE
RT. 195
SYCAMORE ST.
HEDGE ST.
LAWSON ST
RDING RD.
2
4
6
8
10
12
14
WATERFRONT PARK
New Bedford, Massachusetts
Bathymetry
MLW
0'
500'
1000'

Army Corps of Engineers
Waltham,Mass

New Bedford Ma
Loc Hor Control
8 Aug 1985

turned angles
17 legs

SPN ID: Acushnet

PT.NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
2	239080.762	759085.549		191Y (MGS)
3	239616.525	759018.534		Cog (85)
4	240312.867	760177.772		Rio (85)
5	240474.083	758506.195		West (85)
6	241197.408	760307.944		Verander (85)
7	242176.478	758840.874		Coffin (85)
8	243982.153	759752.886		Junk (85)
9	244426.581	758597.020		Stock (85)
10	246020.239	759236.464		Aero (85)
11	247401.558	760236.514		Parking (85)
12	247969.399	760117.972		Bit (85)
13	247671.103	759155.491		Wood (85)
14	247585.754	758134.765		Ball (85)
15	245373.754	758215.608		Hyd (85)
16	244227.272	758173.591		Mill (85)
17	241943.386	757197.494		Sun (85)
18	239103.866	757384.327		Slope (85)
19	238858.231	756426.370		191X (MGS)

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(1)

Waterway: Acushnet River

Station: Δ Cog (85)

Coordinates:	N or S	E or W

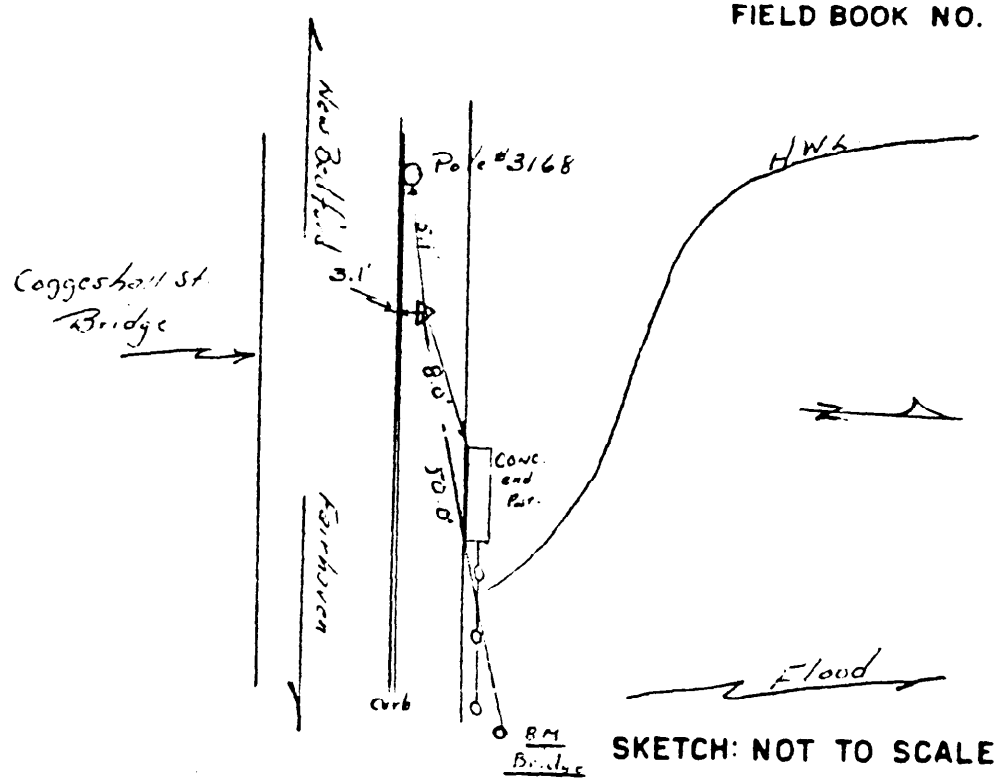
Origin DPW sta 191Y & 191Z

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO
Δ Veranda	42°-49'-39"	School Cupola Weather Vane
	150°-04'-18"	Church Spire †
	313°-44'-27"	Wind Mill

REFERENCES: BK R&H
FIELD BOOK NO. 2309



SKETCH: NOT TO SCALE

REMARKS: Δ Cog (85) is a 1/2" dH in conc sidewalk on the north side and west end of Coggeshall St Bridge

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(2)

Waterway: Acushnet River

Station: Δ east (1985)

Coordinates:	N or S	E or W

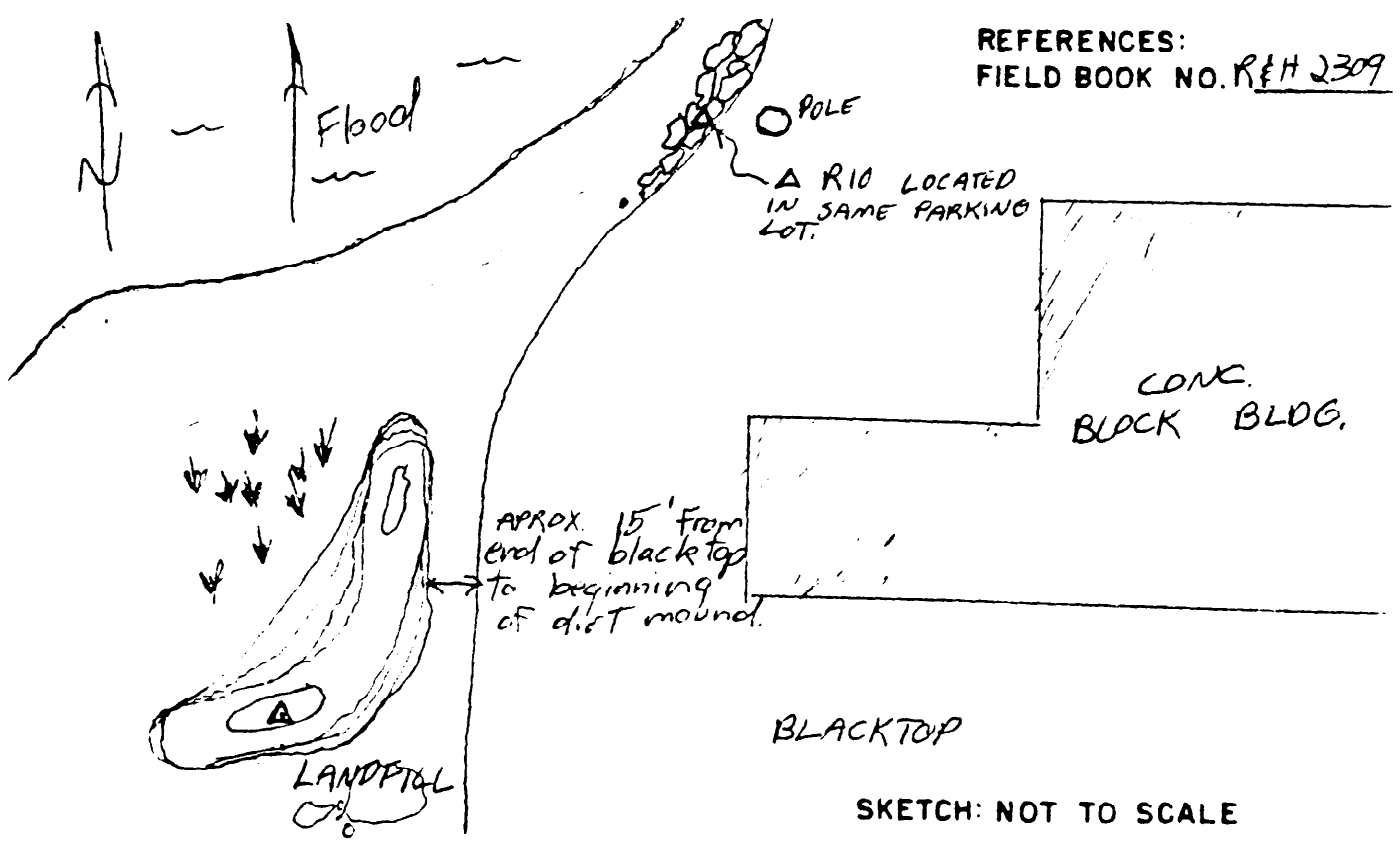
Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO
Δ West (85)	259°-06'-43"	Most Easterly Radio Tower
	359°-25'-53"	Cross on St. Anthony's Church
	49°-51'-19"	Windmill

REFERENCES:
FIELD BOOK NO. R&H 2309



SKETCH: NOT TO SCALE

REMARKS:

Δ east is a wooden stake set on top of a dirt mound. It is located in the same parking lot as Δ R10. The mound is aprox. 20' high and may only be temporary.

NED

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(3)

Waterway: Acushnet River

Station: Δ Rio (85)

Coordinates:

N or S	E or W

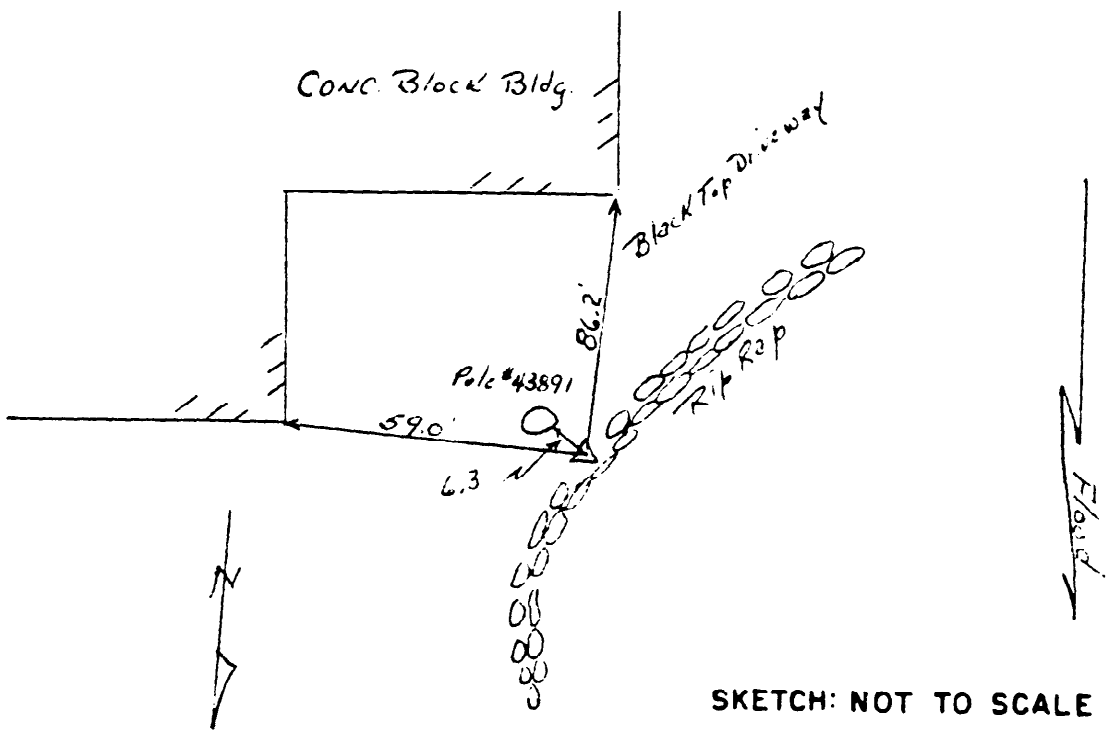
Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO Acushnet Pt
L West (85)	319°-08'-09"	Most Southerly Church Cupola
	5°-20'-30"	Cross on St. Anthony's Church
	56°-01'-45"	Windmill

REFERENCES: BK. R&H
FIELD BOOK NO. 2309



SKETCH: NOT TO SCALE

REMARKS: Δ Rio (85) is a 1/2" dH in flat stone in Top of Rip Rap at near of Rio Shopping Center, on Coggeshall St in Fairhaven.

NED

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(4)

Waterway: Acushnet River

Station: Δ West. (1985)

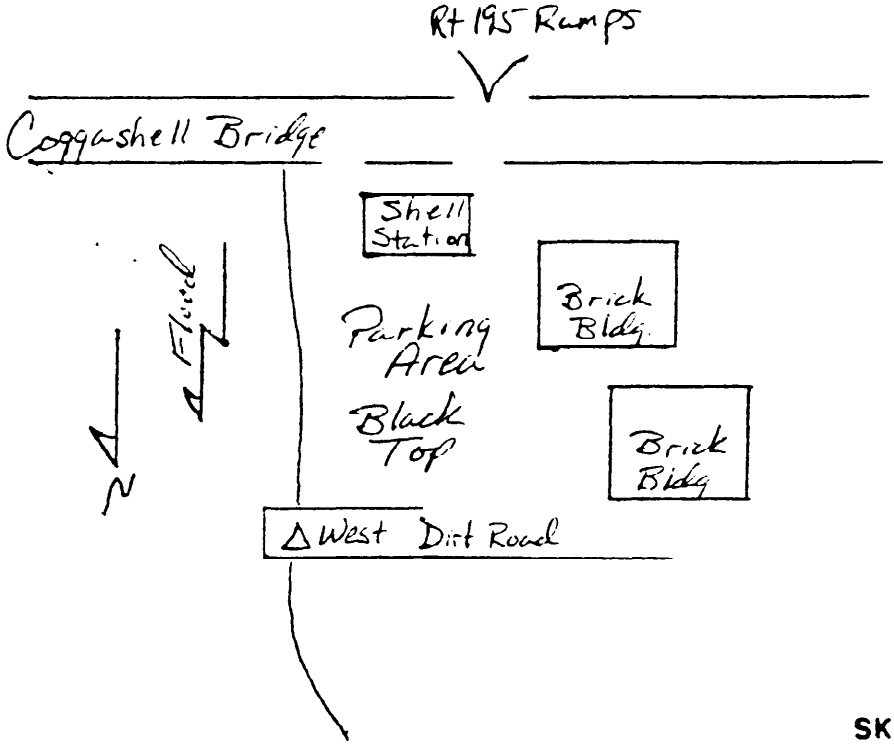
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00°00'00" on	ANGLE	TO	00°00'00" on	ANGLE	TO
Δ Veranda(85)	30°-58'-10"	Weather Vane on School Cupola			
	236°-03'-02"	Cross on Gray Stone Church Spire			
	293°-04'-25"	Windmill			

REFERENCES:
FIELD BOOK NO. R-H2309



SKETCH: NOT TO SCALE

REMARKS: Δ West is a 2⅜" d.H. in concrete cap on sewer culvert 3½' from end of the sewer culvert

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(5)

Waterway: Acushnet River

Station: △ Veranda (1985)

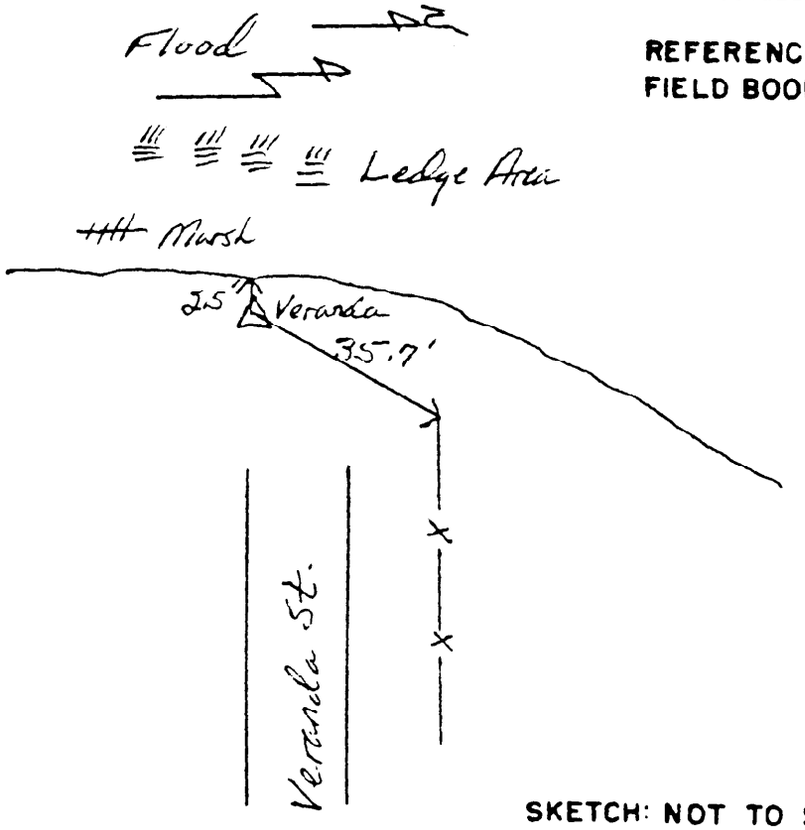
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO
△ West (85)	~~[illegible]~~	
	[redacted]	(ST. ANTHONY'S) Cross on Church Spire
	[redacted]	Wind Mill

00° 00' 00" on	ANGLE	TO
△ West (85)	20°-01'-05"	Cross on St Anthony's Church
	72°-01'-03"	Windmill
	245°-08'-54"	Weather vane on School Cupola



REFERENCES:
FIELD BOOK NO. R314 2309

SKETCH: NOT TO SCALE

REMARKS: △ Veranda is a 1" galvanized pipe 2"± above the ground on line w/ South line of Veranda St and 2.5' from top of bank

NED [illegible] 520

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(6)

Waterway: ACUSHNET RIVER

Station: Δ COFFIN (1985)

	N or S	E or W
Coordinates:		

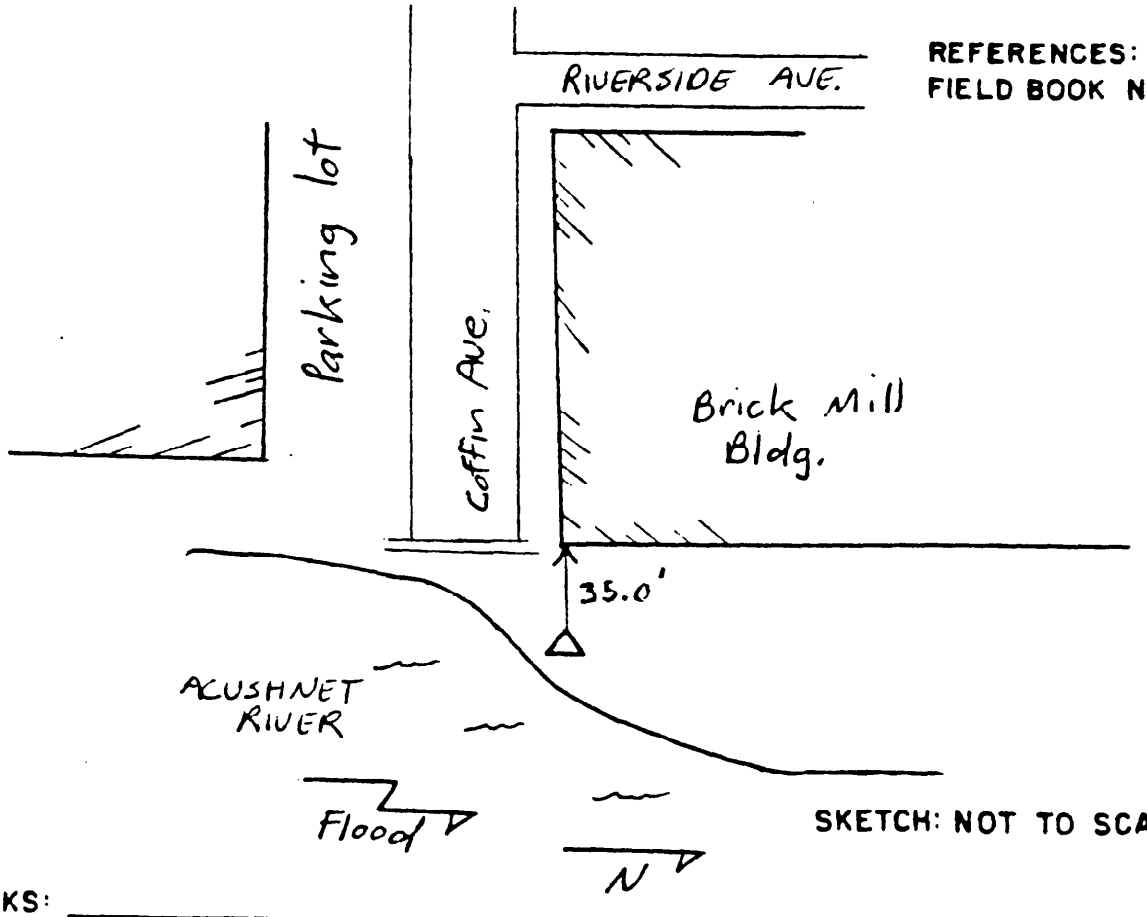
Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO
Δ Kennedy (85)	4°-48'-09"	Weather vane on School Cupola
	123°-18'-25"	St. Anthony of Padua Church Spire
	322°-18'-17"	Windmill

REFERENCES:
FIELD BOOK NO. R&H 2309



SKETCH: NOT TO SCALE

REMARKS:

Δ Coffin is an Aluminum DISK STAMPED U.S. ARMY CE SURVEY MARK. LOCATED 35' EAST & on line w/ S. FACE OF BLDG. FLUSH w/ gr IN GRASS AREA BETWEEN BLDG. & TOP OF BANK

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(7)

Waterway: Acushnet River

Station: △ Junk (1985)

	N or S	E or W
Coordinates:		

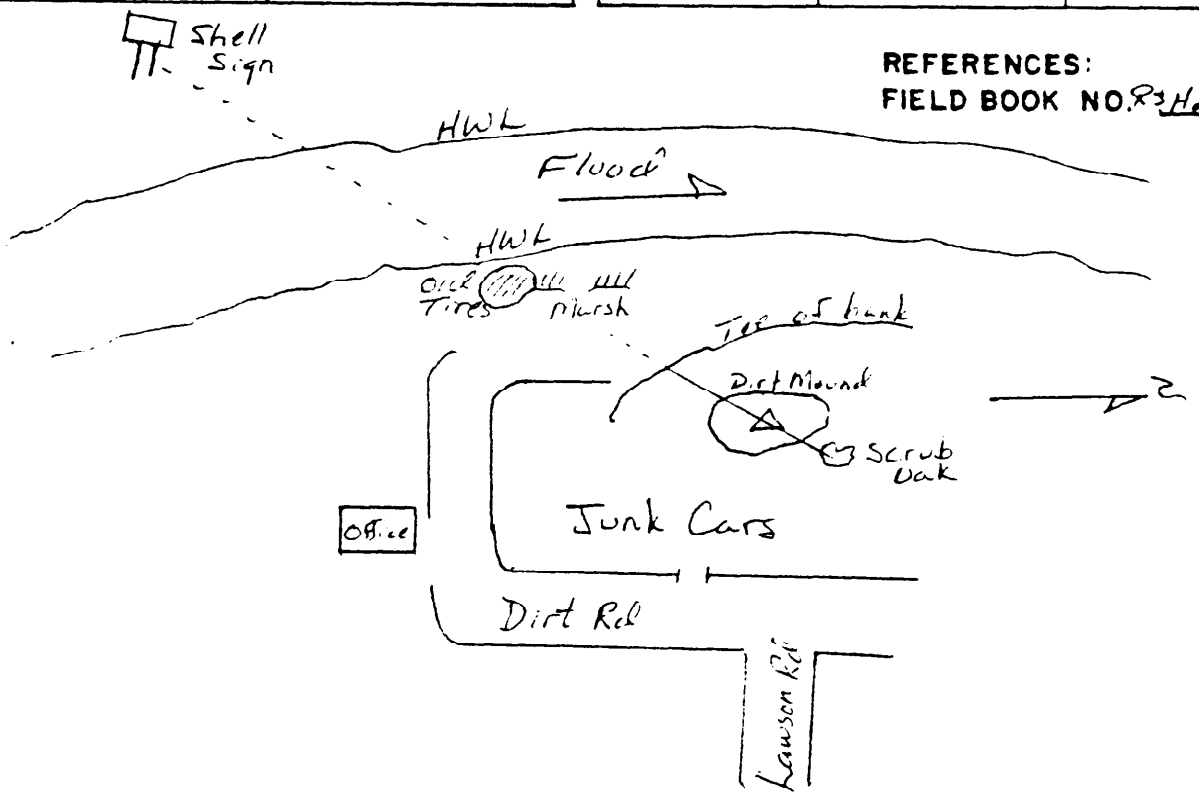
Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO
△ West (85)	30°-51'-26"	Cross on St. of Anthony's Church
	40°-00'-42"	Windmill
	344°-56'-20"	Most Westerly Radio Tower

REFERENCES:
FIELD BOOK NO. 83 H2309



SKETCH: NOT TO SCALE

REMARKS: △ Junk is an aluminum disk stamped U.S. Army C.E. Survey Disk Flush with the ground up on a small knoll. It is in Riverside Auto Salvage at the end of Lawson St.

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(8)

Waterway: Acushnet River

Station: △ Stack (1985)

Coordinates:	N or S	E or W

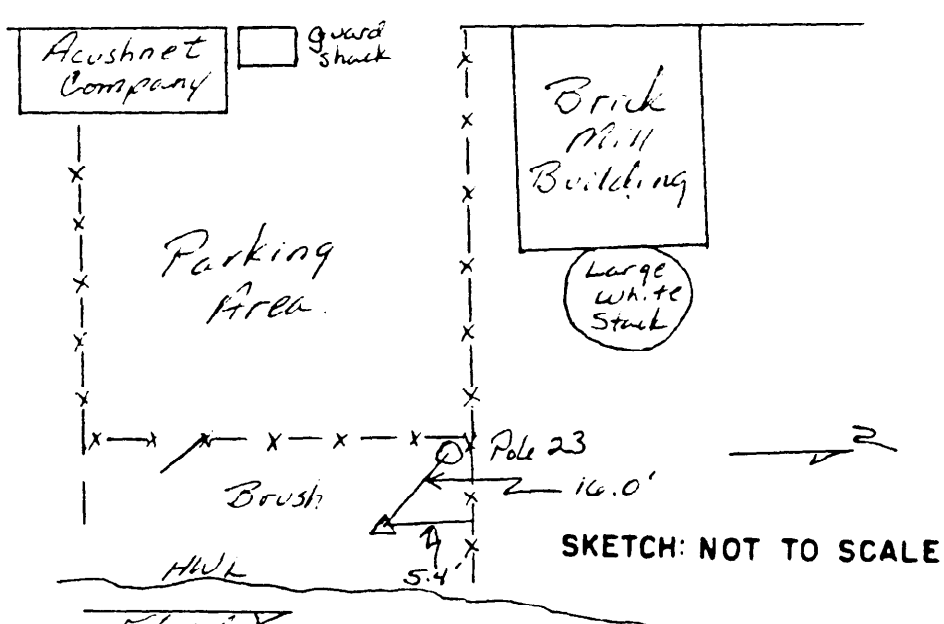
Origin _____

REFERENCE ANGLES

00°00'00" on	ANGLE	TO

00°00'00" on	ANGLE	TO
△ Veranda (80')	353°-52'-05"	Weather Vane on School Cupola
	16°-26'-09"	Most Easterly Radio Tower
	29°-30'-55"	Wind Mill

REFERENCES:
FIELD BOOK NO. R3 H2309



SKETCH: NOT TO SCALE

REMARKS: △ Stack is an aluminum disk stamped U.S. Corps C.S. Survey Marker which is flush with the ground between the fence and top of bank
Note: Step @ guard shack for visitors pass

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(9)

Waterway: Acushnet River

Station: △ Aero (1985)

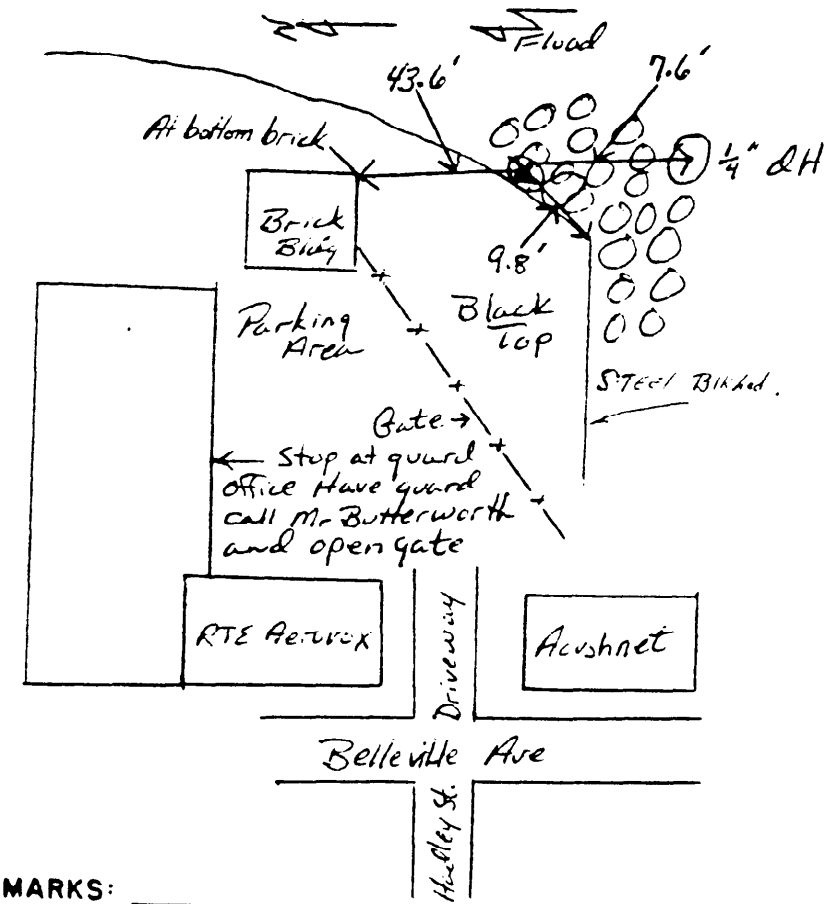
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO
△ Parking (85)	47°-00'-56"	Tallest Antenna on Com. Bldg.
	175°-21'-48"	Cross on St. Anthony's Church
	157°-53'-07"	Wind Mill



REFERENCES:
FIELD BOOK NO. RH 2309

SKETCH: NOT TO SCALE

REMARKS: △ Aero (85') is a 2 3/8" d.H. in stone rip rap around steel bulkhead on property of Aerovox

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(10)

Waterway: Acushnet River

Station: △ Parking (1985)

Coordinates:

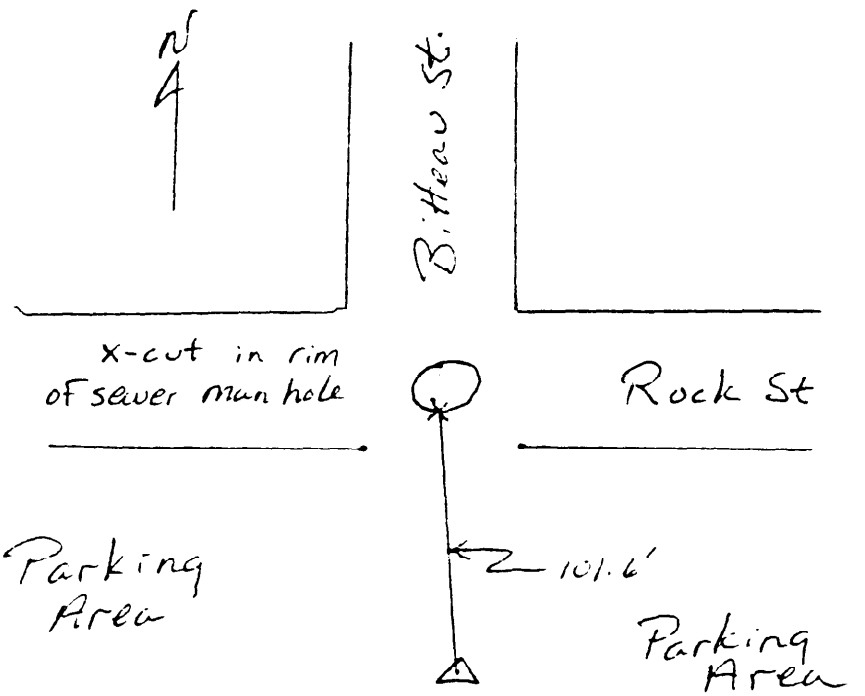
N or S	E or W

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO	00° 00' 00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO. R1H2309



SKETCH: NOT TO SCALE

REMARKS: △ Parking is a Pk. nail in the blacktop parking area on the South side of Rock St and B. Hean St.

NED Form 520

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(11)

Waterway: Acushnet River

Station: Δ BIT

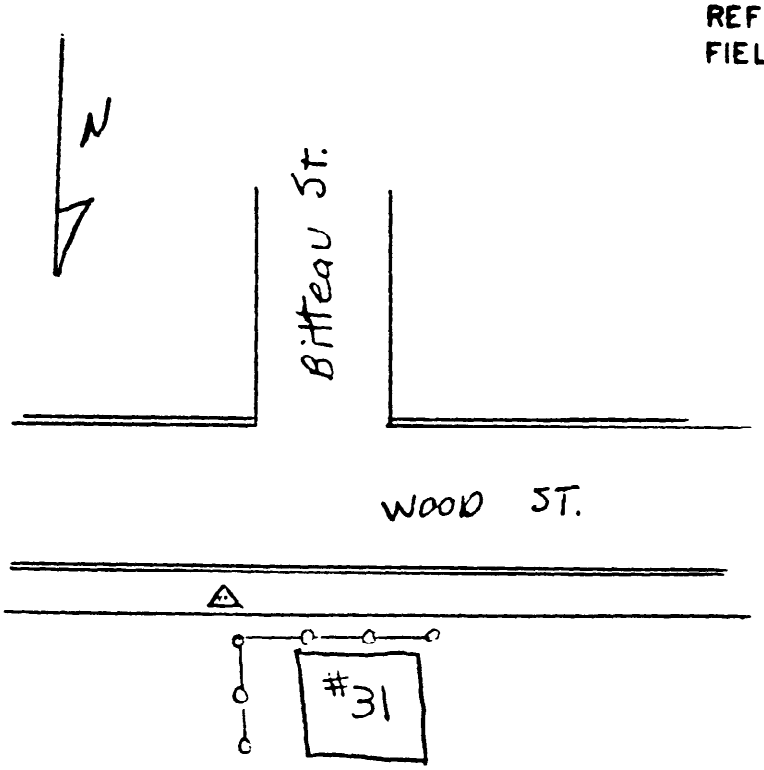
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO	00° 00' 00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO. R&H 2309



SKETCH: NOT TO SCALE

REMARKS:
Δ BIT IS A P.K. NAIL IN SIDEWALK ON THE N. SIDE OF WOOD ST. AT INTERSECTION OF 2nd BITTEAU ST.

NED Form 530

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(12)

Waterway: Acushnet River

Station: △ Wood (1955)

	N or S	E or W
Coordinates:		

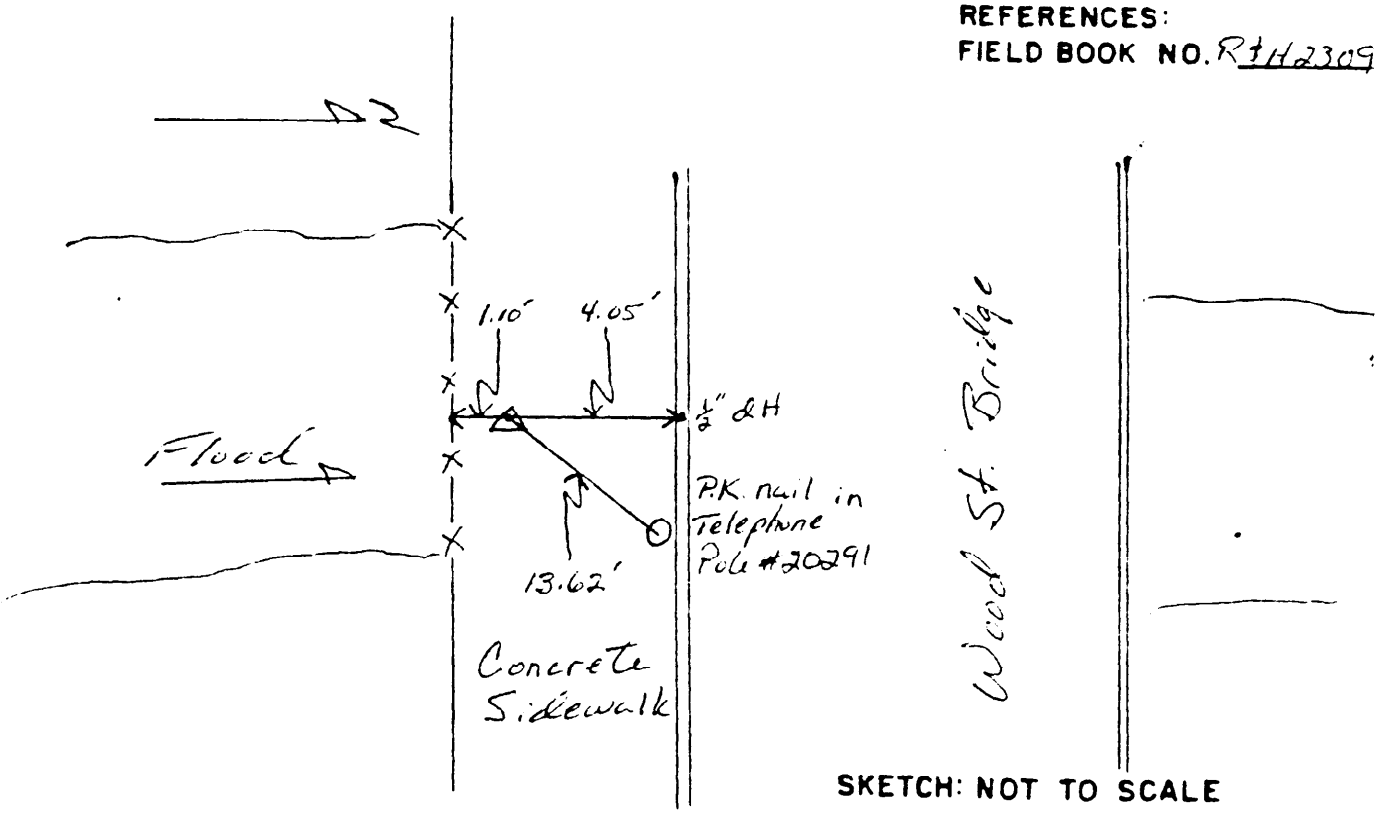
Origin _____

REFERENCE ANGLES

00°00'00" on	ANGLE	TO

00°00'00" on	ANGLE	TO
△ Bit (1955)	131°06'57"	Red Brick Church Spire
	89°09'37"	Most Westerly Sub Sta. Tower
	100°14'18"	Most Easterly Radio Tower

REFERENCES:
FIELD BOOK NO. R+H 2309



SKETCH: NOT TO SCALE

REMARKS: △ Wood is a P.K. nail in the sidewalk on the South side of the Wood St. Bridge.

NED

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(13)

Waterway: Acushnet River

Station: △ Belle (1985)

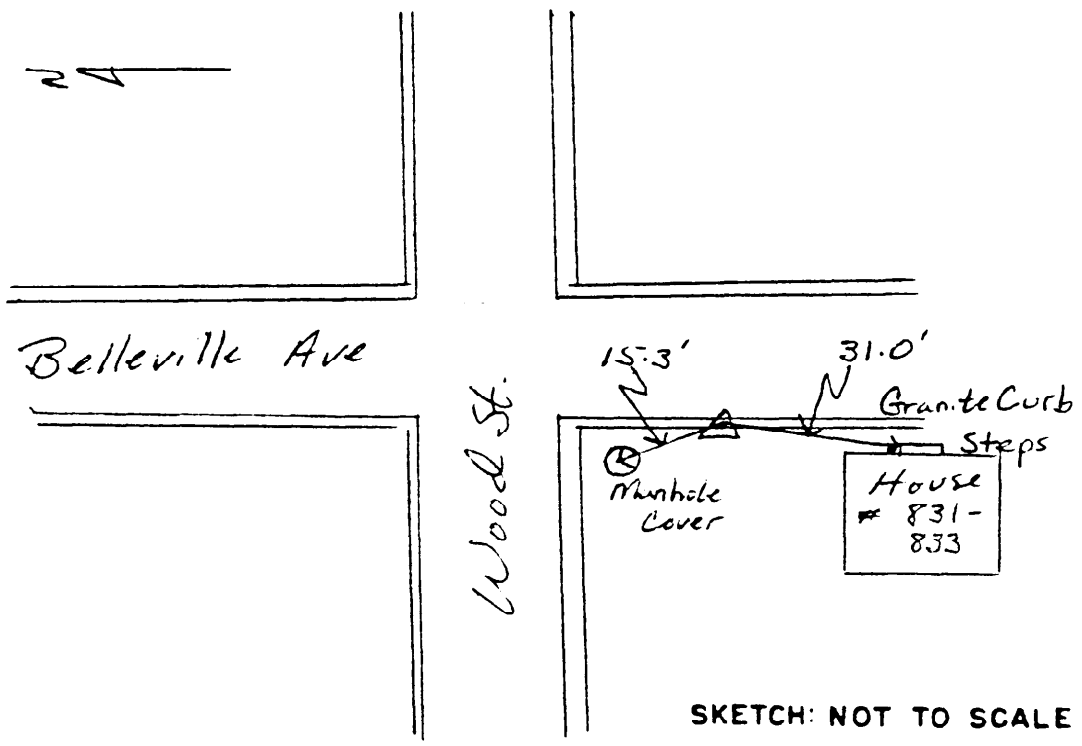
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00°00'00" on	ANGLE	TO	00°00'00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO. R-H2309



SKETCH: NOT TO SCALE

REMARKS: △ Belle is a ½" d.H. in a granite curb along the sidewalk on Belleville St. It is approximately 20' South of the intersection of Wood St. It is on the S.W. corner

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(14)

Waterway: Acushnet River

Station: Δ Hyd. (1985)

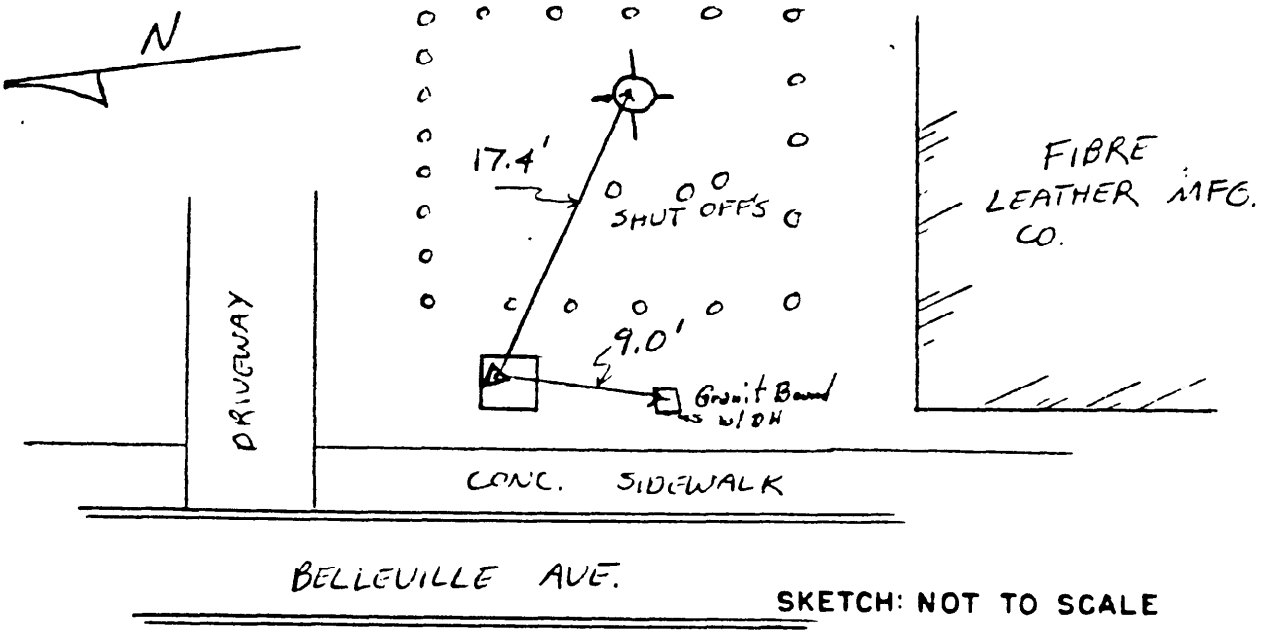
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO	00° 00' 00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO. REH 2309



SKETCH: NOT TO SCALE

REMARKS:

Δ Hyd. IS A 1/2" D.H. IN 20" x 20" CONC FOOTING ON EAST SIDE OF BELLEVILLE AVE. AT N. END OF FIBRE LEATHER MFG CO.

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(13)

Waterway: Acushnet River

Station: △ Mill (1985)

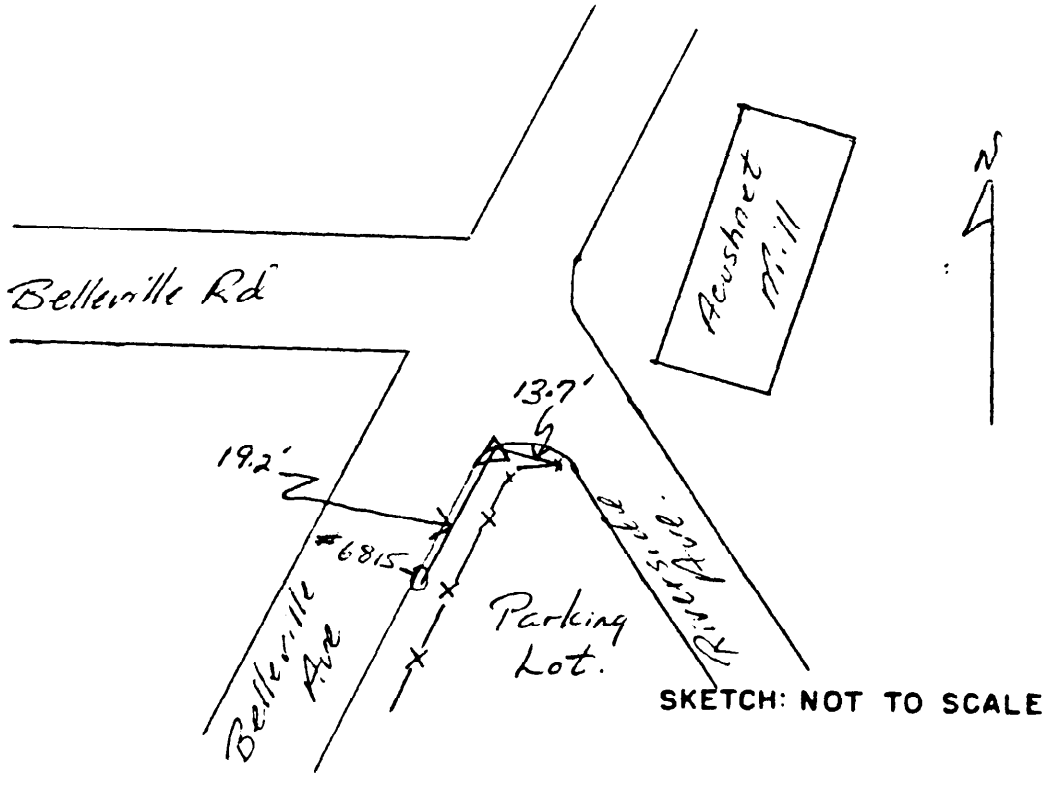
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO	00° 00' 00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO. R.H ~~2309~~ 2309



SKETCH: NOT TO SCALE

REMARKS: △ Mill is a ½" d.H. in granit curb at intersection of Belleville Ave and Riverside Ave.

NED

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(16)

Waterway: Acushnet River

Station: Δ Sun (1985)

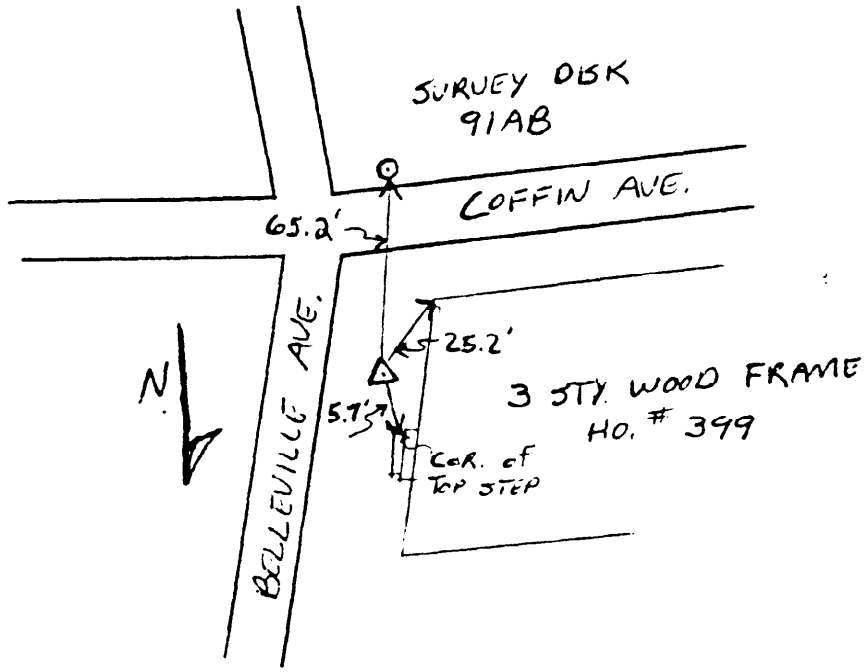
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO	00° 00' 00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO. R&H 2309



SKETCH: NOT TO SCALE

REMARKS:

Δ SUN IS A 1/2" D.H. IN CONCRETE SIDEWALK. ON WEST SIDE OF Belleville Ave. & N. OF COFFIN Ave.

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(17)

Waterway: Housatonic River

Station: Δ Slope (1985)

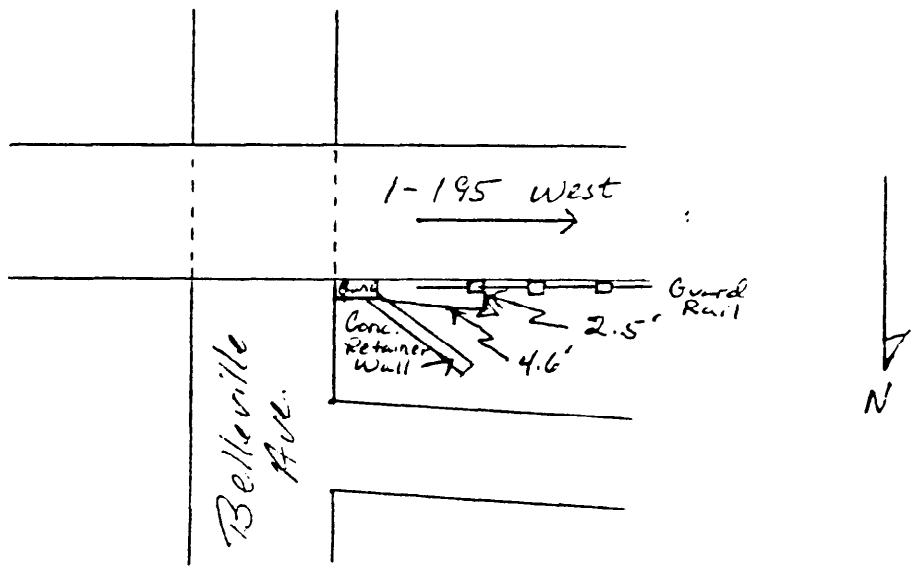
	N or S	E or W
Coordinates:		

Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO	00° 00' 00" on	ANGLE	TO

REFERENCES:
FIELD BOOK NO R3H2309



SKETCH: NOT TO SCALE

REMARKS: Δ Slope is an oak stake flush with the ground on the North side of I-195 at the North West corner of the overpass of Belleville Ave

U.S.A. Engineer Division
Corps of Engineers
New England

SURVEY STATION DATA

(18)

Waterway: Housatonic River

Station: Δ West 2 (85)

	N or S	E or W
Coordinates:		

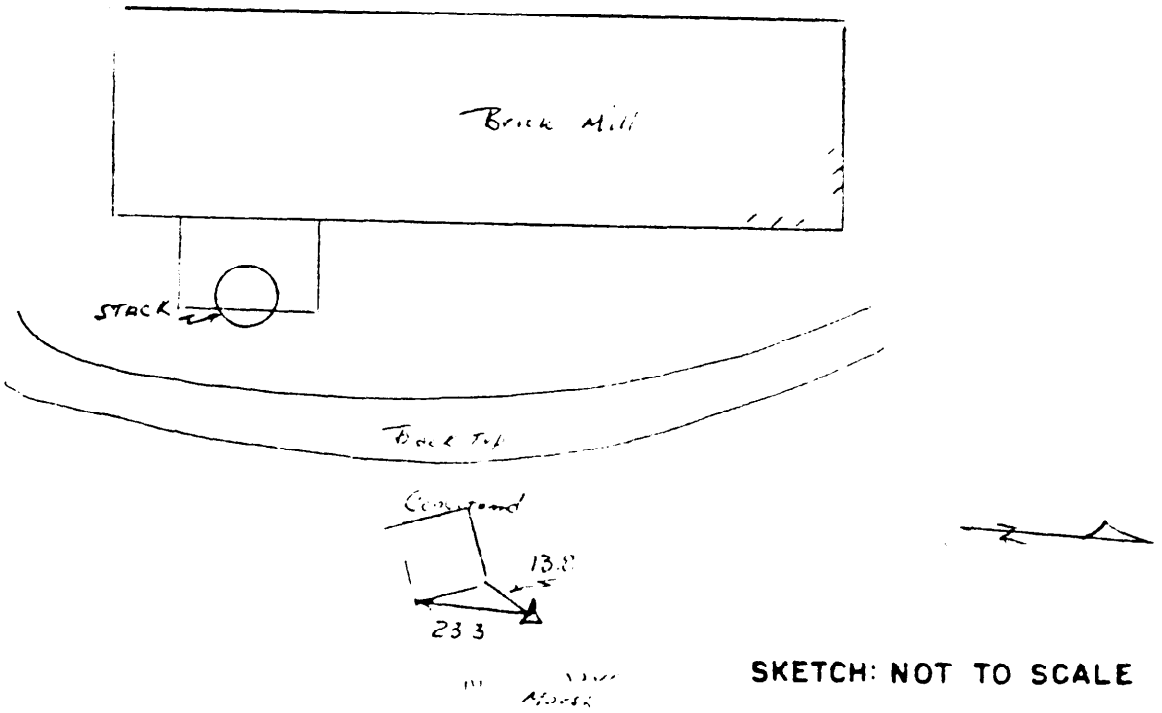
Origin _____

REFERENCE ANGLES

00° 00' 00" on	ANGLE	TO

00° 00' 00" on	ANGLE	TO
Δ Veranda (85)	18°-06'-47"	Weather Vane on School Cupola
	87°-48'-42"	West Westerly Radio Tower
	297°-47'-58"	Wind mill

REFERENCES: R.H.
FIELD BOOK NO. 2309



SKETCH: NOT TO SCALE

REMARKS: Δ West 2 (85) is a 1½" Sq. alum. pipe flush w/ground in high grass between Co. & Mr. Bro.

NED Form 520

b. Project Site

The site is the Upper Acushnet River Estuary Superfund Site in New Bedford, MA. A general project location plan is included in Section 10.

c. Purpose

The authorized seismic surveys on water were required to determine depths to rock in the estuary and the engineering characteristics and distributions of bottom sediments.

d. Scope of Investigation

Survey and exploration instructions, which were provided by the Army Corps of Engineers, New England Division, are included in Section 3a. The subsurface investigation program included about 17,000 feet of seismic survey lines.

Work under this delivery order consisted of locating nineteen seismic lines with horizontal and vertical control. Mean Low Water (MLW) was the datum used on all seismic lines.

SECTION 4

QUALITY CONTROL

a. General Certification Statement

I hereby certify that the referenced records, equipment and procedures were used to perform the subsurface exploration described herein. 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 30 January 1986

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

b. Records Taken

The records taken were seismograms which consist of a photographic record of the seismic signals detected by an array of hydrophones. These records are available for perusal at Weston Geophysical Corporation, Post Office Box 550, Westboro, MA 01581, (617)366-9191.

c. Equipment Used

The equipment used in the seismic survey was a Bolt air gun with a 40 $inch^3$ chamber, a 12-trace marine refraction system with hydrophone spacings of 40 feet, and a recording system consisting of a geophysical amplifier and filter system manufactured by Weston Geophysical with a recording oscillograph. Further information regarding the equipment may be found in Section 3 and Appendix A of Weston Geophysical's report, which is found in its entirety in Appendix 1 of this report.

d. Procedures

The field procedures for data acquisition may be found in Appendix A of Weston Geophysical's report, which is found in Appendix 1 of this report.

SECTION 5

SUMMARY OF ACTIVITIES

AND

TELEPHONE LOG

TABLE 1

SUMMARY OF ACTIVITIES

Date	Activity
10/14	Monday: mobilize to site, meet with Weston Geophysical to coordinate work, locate survey control, hold safety meeting.
10/15	Tuesday: shoot seismic lines 1(1A) for a total of 5000 feet.
10/16	Wednesday: shoot seismic lines 2(2A), 3(3A) and B(B1) for a total of 7900 feet.
10/17	Thursday: shoot seismic lines A(A1), C(C1), D, E(E1), F(F1), G(G1) for a total of 4010 feet.

TABLE 2

TELEPHONE LOG

Date	Conversation
10/16	Wednesday: surveyor requested information regarding vertical control

SECTION 6

LOCATING EQUIPMENT AND PROCEDURES

a. Equipment

Survey equipment consisted of a Lietz-TM20C Theodolite and a Wild-T1 Theodolite.

b. Procedures

For horizontal location, the method of intersection was used to establish the location of the seismic points. Control was previously established by the Corps. For vertical location elevations were determined by noting the elevation of water level at the time of measurement. Mean low water was the datum used.

Expected accuracy is $\pm 2'$ in the horizontal direction and $\pm 0.1'$ in the vertical direction.

C. Survey Field Notes

ACUSHNET RIVER SEISMIC SURVEY

LINE 1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	239,860.05	759,093.17	2.00
2	239,958.93	759,118.65	2.00
3	240,100.09	759,117.39	1.90
4	240,233.67	759,102.51	1.90
5	240,324.81	759,105.95	1.80
6	240,499.10	759,105.27	1.70
7	240,595.22	759,171.05	1.60
8	240,624.71	759,139.95	1.50
9	240,675.56	759,007.84	1.40
10	241,191.40	759,118.65	1.40
11	241,285.64	759,123.30	1.30
12	241,448.84	759,104.13	1.30
13	241,576.36	759,171.27	1.20
14	241,621.21	759,174.59	1.10
15	241,815.77	759,152.22	1.10
16	242,153.02	759,227.63	1.00
17	242,276.89	759,199.48	0.90
18	242,502.26	759,140.09	0.90
19	242,615.33	759,122.66	0.80
20	242,677.13	759,082.14	0.60
21	243,013.99	759,019.52	0.40
22	243,332.64	759,049.98	0.20
23	243,501.07	759,054.23	0.10
24	243,847.19	759,969.35	0.00
25	243,953.42	759,955.73	-0.10
26	244,173.95	759,025.26	-0.20
27	244,317.96	759,024.20	-0.30
28	244,587.39	759,030.43	-0.30
29	244,746.95	759,057.53	-0.30
30	244,835.46	759,090.31	-0.30
31	244,937.88	759,133.56	-0.30
32	245,055.34	759,151.36	-0.30
33	245,158.81	759,227.93	-0.30
34	245,543.66	759,346.25	-0.30
35	245,666.20	759,366.59	-0.30
36	245,902.88	759,452.01	-0.30

ACUSHNET RIVER SEISMIC SURVEY

LINE 1A

MARK	NORTHING	EASTING	ELEV. (MLW)
1	244,879.67	759,069.93	-0.30
2	244,720.39	759,049.25	-0.30
3	244,490.44	759,015.67	-0.30
4	244,272.31	758,998.45	-0.30
5	243,810.55	758,936.97	-0.30
6	243,570.73	758,935.93	-0.30
7	243,237.12	759,028.71	-0.30
8	243,062.10	759,126.14	-0.30
9	242,725.20	759,260.54	-0.30
10	242,519.40	759,222.05	-0.30
11	242,121.00	759,223.93	-0.30
12	241,952.98	759,204.38	-0.30
13	241,857.80	759,249.36	-0.30
14	241,669.98	759,258.39	-0.30
15	241,105.65	759,221.78	-0.30
16	240,897.64	759,177.97	-0.30
17	240,487.53	759,229.14	-0.30
18	240,282.56	759,213.18	-0.30
19	240,062.38	759,200.64	-0.30
20	239,805.96	759,145.28	-0.30

ACUSHNET RIVER SEISMIC SURVEY

LINE 2

MARK	NORTHING	EASTING	ELEV. (MLW)
1	240,085.60	759,516.94	3.90
2	240,220.83	759,515.82	4.00
3	240,441.70	759,583.76	4.00
4	240,582.49	759,584.38	4.10
5	240,852.30	759,620.38	4.10
6	240,742.02	759,615.81	4.20
7	240,893.23	759,572.88	4.20
8	241,009.24	759,531.32	4.30
9	241,164.62	759,497.38	4.30
10	241,269.74	759,481.57	4.30
11	241,438.50	759,505.12	4.40
12	241,585.69	759,453.95	4.40
13	241,785.88	759,481.66	4.50
14	241,929.95	759,455.77	4.50
15	242,113.34	759,457.53	4.50
16	242,235.94	759,437.16	4.50
17	242,383.98	759,470.33	4.50
18	242,514.75	759,450.40	4.50
19	242,672.46	759,449.84	4.60
20	242,834.37	759,397.71	4.60
21	343,241.70	759,294.13	4.60
22	243,405.90	759,203.11	4.60
23	243,580.20	759,182.60	4.50
24	243,748.79	759,183.36	4.50
25	243,827.36	759,190.94	4.50
26	243,974.44	759,205.60	4.50
27	244,272.12	759,175.75	4.40
28	244,454.07	759,260.20	4.40
29	244,716.99	759,290.49	4.30
30	244,879.11	759,287.56	4.30
31	245,077.71	759,334.26	4.20
32	245,301.13	759,380.77	4.20
33	245,511.06	759,503.23	4.20
34	245,696.82	759,531.21	4.10
35	245,919.98	759,590.45	4.10
36	246,072.13	759,587.80	4.10

ACUSHNET RIVER SEISMIC SURVEY

LINE 2A

MARK	NORTHING	EASTING	ELEV. (MLW)
1	245,649.60	759,596.51	4.10
2	245,498.69	759,508.74	4.10
3	245,137.74	759,336.72	4.00
4	244,875.15	759,345.51	4.00
5	244,737.85	759,383.41	3.90
6	244,539.73	759,353.52	3.90
7	244,340.69	759,283.69	3.80
8	244,202.74	759,273.24	3.80
9	243,972.97	759,247.27	3.70
10	243,829.38	759,221.45	3.70
11	243,522.29	759,239.62	3.60
12	243,400.74	759,256.40	3.60
13	243,106.53	759,287.45	3.50
14	242,941.32	759,351.29	3.50
15	242,621.19	759,473.33	2.80
16	242,597.09	759,517.54	2.80
17	242,198.85	759,414.17	2.70
18	242,024.99	759,389.73	2.70
19	241,693.05	759,460.27	2.60
20	241,526.69	759,452.61	2.60
21	241,252.15	759,475.29	2.50
22	241,062.32	759,504.15	2.50
23	240,847.30	759,486.52	2.40
24	240,662.65	759,502.63	2.30
25	240,401.29	759,476.47	2.20
26	240,203.52	759,441.87	2.10
27	239,987.27	759,366.55	2.00
28	235,856.29	759,351.14	2.00

ACUSHNET RIVER SEISMIC SURVEY

LINE 3

MARK	NORTHING	EASTING	ELEV. (MLW)
1	240,893.13	758,574.04	1.50
2	241,023.77	758,575.25	1.50
3	241,247.95	758,573.40	1.50
4	241,321.99	758,560.97	1.40
5	241,530.32	758,572.74	1.40
6	241,603.06	758,575.36	1.30
7	241,557.78	758,642.81	1.30

ACUSHNET RIVER SEISMIC SURVEY

LINE 3A

MARK	NORTHING	EASTING	ELEV. (MLW)
1	241,425.10	758,587.83	1.00
2	241,343.74	758,581.20	0.90
3	241,230.00	758,528.00	0.90
4	241,113.79	758,490.12	0.80
5	240,970.87	758,548.40	0.80

ACUSHNET RIVER SEISMIC SURVEY

LINE A

MARK	NORTHING	EASTING	ELEV. (MLW)
1	239,713.18	759,323.28	3.10
2	239,692.91	759,253.90	3.20
3	238,691.35	758,804.10	3.20
4	238,695.14	758,824.52	3.20
5	238,734.92	758,770.72	3.28

ACUSHNET RIVER SEISMIC SURVEY

LINE A1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	239,656.30	759,069.37	3.40
2	239,690.31	759,414.89	3.40
3	239,695.02	759,512.86	3.40
4	239,715.45	759,559.10	3.40

ACUSHNET RIVER SEISMIC SURVEY

LINE B

MARK	NORTHING	EASTING	ELEV. (MLW)
2	241,077.47	759,050.98	0.30
3	241,071.00	759,936.70	0.30
4	241,046.82	758,781.44	0.30
5	241,079.54	758,700.93	0.30
6	241,113.16	758,543.65	0.30

ACUSHNET RIVER SEISMIC SURVEY

LINE B1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	241,005.93	758,841.57	3.60
2	241,035.14	758,867.46	3.70
3	241,070.40	759,076.66	3.70
4	241,106.21	759,295.39	3.80
5	241,143.84	759,393.00	3.80
6	241,109.25	759,505.88	3.90
7	241,062.64	759,659.42	3.80

ACUSHNET RIVER SEISMIC SURVEY

LINE C

MARK	NORTHING	EASTING	ELEV. (MLW)
1	241,319.24	759,287.03	0.70
2	241,308.35	759,154.07	0.70
3	241,289.42	759,032.88	0.60
4	241,228.68	758,861.12	0.60
5	241,249.13	758,757.37	0.50
6	241,323.41	758,626.84	0.50

ACUSHNET RIVER SEISMIC SURVEY

LINE C1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	241,484.48	758,787.80	4.00
2	241,506.45	758,810.64	4.00
3	241,501.40	759,065.00	4.00
4	241,488.32	759,247.53	4.10
5	241,479.25	759,360.14	4.10
6	241,455.31	759,459.95	4.10
7	241,428.72	759,548.57	4.10

ACUSHNET RIVER SEISMIC SURVEY

LINE D

MARK	NORTHING	EASTING	ELEV. (MLW)
1	240,945.36	759,769.62	4.20
2	240,944.00	759,838.40	4.20
3	241,054.38	759,906.97	4.20
4	241,159.01	759,974.45	4.20

ACUSHNET RIVER SEISMIC SURVEY

LINE E

MARK	NORTHING	EASTING	ELEV. (MLW)
1	242,673.96	759,339.24	4.30
2	242,648.48	759,158.26	4.30
3	242,654.51	759,091.27	4.30
4	242,633.98	759,000.57	4.30
5	242,608.07	758,868.92	4.30

ACUSHNET RIVER SEISMIC SURVEY

LINE E1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	242,653.82	759,159.55	4.30
2	242,678.54	759,229.13	4.30
3	242,695.42	759,350.59	4.30
4	242,694.78	759,444.38	4.30
5	242,694.36	759,523.30	4.30

ACUSHNET RIVER SEISMIC SURVEY

LINE F

MARK	NORTHING	EASTING	ELEV. (MLW)
1	243,754.15	758,954.35	5.50
2	243,750.80	758,859.58	5.50
3	243,765.46	758,835.16	5.50
4	243,758.23	758,753.03	5.50
5	243,754.46	758,686.45	5.50

ACUSHNET RIVER SEISMIC SURVEY

LINE F1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	243,749.91	759,034.55	5.50
2	243,755.70	759,105.13	5.50
3	243,753.60	759,173.02	5.50
4	243,765.68	759,244.94	5.50
5	243,790.97	759,327.31	5.50

ACUSHNET RIVER SEISMIC SURVEY

LINE 6

MARK	NORTHING	EASTING	ELEV. (MLW)
1	244,762.72	759,035.57	4.30
2	244,735.62	758,966.62	4.30
3	244,722.04	758,880.90	4.30
4	244,717.48	758,802.47	4.30
5	244,702.69	758,739.20	4.30
6	244,716.70	758,660.60	4.30

ACUSHNET RIVER SEISMIC SURVEY

LINE G1

MARK	NORTHING	EASTING	ELEV. (MLW)
1	244,760.65	758,027.56	4.20
2	244,765.69	759,099.21	4.20
3	244,782.48	759,171.97	4.20
4	244,798.83	759,244.29	4.20
5	244,825.78	759,316.00	4.20
6	244,875.80	759,411.06	4.20

1

LINE 1 → NORTH

T @ WEST

B.S. VERANDA

MARK #	
1.	69° 11' 40"
2.	60° 15' 20"
3.	52° 55' 50"
4.	40° 59' 40"
5.	33° 43' 40"
6.	18° 14' 40"
7.	9° 44' 20"
8.	350° 57' 40"
9.	339° 16' 20"
10.	331° 05' 00"
11.	328° 03' 40"
12.	325° 57' 20"
13.	322° 22' 00"
14.	317° 58' 20"
15.	315° 48' 30"
16.	315° 06' 20"
17.	312° 58' 00"
18.	309° 24' 50"
19.	308° 10' 20"
20.	305° 41' 40"
21.	303° 41' 40"
22.	

2

T.P. STAKE

Line # 1 → N

B.S. windmill

MARK #	
22.	335° 34' 50"
23.	332° 06' 40"
24.	325° 19' 30"
25.	318° 46' 20"
26.	278° 35' 20"
27.	262° 45' 55"
28.	[illegible] 40"
29.	234° 09' 00"
30.	228° 44' 40"
31.	224° 46' 50"
32.	221° 47' 20"
33.	219° 09' 00"
34.	212° 14' 40"
35.	210° 14' 00"
36.	208° 23' 40"

3 TC @ STACK → B.S. windmill

LINE 1A → South

MARK #	
1	225° 48' 40"
2	235° 23' 20"
3	259° 43' 40"
4	289° 25' 20"
5	329° 22' 00"
6	334° 15' 00"
7	338° 24' 40"
8	337° 12' 20"
9	337° 03' 00"
10	340° 15' 20"
11	343° 11' 10"
12	344° 36' 20"
13	
14	

4 TC @ WEST → B.S. JERUSALEM

LINE 1A → South

MARK #	
13	314° 51' 50"
14	323° 32' 30"
15	333° 54' 25"
16	347° 55' 40"
17	19° 29' 10"
18	36° 4' 25"
19	52° 29' 20"
20	49° 11' 00"

5 LINE 2 → NORTH

π @ WEST *
B.S. windmill

MARK 1	109°25'00"
2.	102°12'20"
3.	89°32'00"
4.	82°59'00"
5.	78°34'00"
6.	74°01'20"
7.	66°02'40"
8.	59°53'20"
9.	52°38'00"
10.	47°45'20"
11.	43°44'20"
12.	38°02'00"
13.	34°38'20"
14.	31°13'00"
15.	28°21'20"
16.	26°08'40"
17.	25°18'00"
18.	23°15'40"
19.	21°43'40"
20.	19°15'00"
21.	14°34'40"
22.	12°06'20"
23.	11°06'40"
24.	10°29'20"

6 LINE 2 → NORTH π @ STACK
B.S. windmill

MARK 25	313°39'20"
26.	305°00'40"
27.	283°20'40"
28.	266°03'20"
29.	245°40'40"
30.	235°10'00"
31.	226°57'00"
32.	220°16'00"
33.	218°17'00"
34.	214°44'00"
35.	212°02'00"
36.	209°27'10"
37.	
38.	
39.	
40.	
41.	
42.	

7

LINE 2A → South π @ stock
B.S. windmill

MARK #	
1.	217° 39' 20"
2.	218° 43' 00"
3.	224° 29' 20"
4.	232° 07' 40"
5.	247° 03' 10"
6.	259° 53' 40"
7.	275° 31' 50"
8.	286° 43' 00"
9.	303° 18' 00"
10.	312° 07' 40"
11.	323° 00' 10"
12.	325° 40' 00"
13.	330° 47' 20"
14.	331° 28' 40"
15.	
16.	
17.	
18.	
19.	

8

LINE 2A → South π @ WEST *
B.S. windmill

MARK #	
15.	20° 56' 40"
16.	23° 56' 20"
17.	26° 02' 00"
18.	27° 44' 03"
19.	35° 58' 20"
20.	40° 56' 20"
21.	48° 46' 50"
22.	56° 55' 20"
23.	64° 29' 20"
24.	76° 42' 40"
25.	92° 00' 40"
26.	104° 14' 00"
27.	118° 09' 00"
28.	125° 05' 00"

9

LINE # 3 → NORTH

#6

TO VERANDA

B.S. windmill

MARK #	
1.	299° 54' 10"
2.	304° 08' 00"
3.	311° 31' 30"
4.	314° 15' 40"
5.	320° 43' 00"
6.	323° 02' 00"
7.	325° 18' 40"
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	

10

LINE 3A → SOUTH

TO VERANDA

B.S. windmill

MARK #1.	311° 31' 40"
2.	314° 4[illegible]' 00"
3.	31[illegible]° 54' 20"
4.	307° 13' 20"
5.	302° 31' 45"
6.	
7.	
8.	
9.	
10.	

11

MARK #	LINE ℄ WEST	#6 TO VERAVKIA B.S. windmill
1.	316° 39' 40"	
2.	315° 21' 00"	
3.	313° 59' 00"	
4.	311° 05' 40"	
5.	311° 46' 00"	
6.	314° 09' 00"	
7.		
8.		
9.		

12

MARK #	LINE B → WEST	#6 TO VERAVICA B.S. windmill
1		
2	304° 24' 20"	
3	304° 35' 20"	
4	304° 13' 20"	
5	305° 39' 40"	
6	307° 07' 20"	
7		
8		

#3 LINE A ~~[illegible]~~ → WEST (6) I @ VERANDA

B.S. windmill

MARK #	
1.	253°25'00"
2.	254°53'20"
3.	262°50'40"
4	264°29'40"
5.	266°17'00"
6.	
7.	
8.	
9.	
10.	

14 LINE A, → EAST I @ VERANDA

B.S. windmill

MARK #	
1.	258°38'40"
2.	250°30'20"
3.	247°44'40"
4	245°27'00"
5	

15 (6)

LINE B → EAST

X @ VERANDA

BS. wind mill

MARK #	
1.	302° 25′ 00″
2.	303° 07′ 20″
3.	303° 58′ 00″
4.	309° 15′ 20″
5.	306° 30′ 20″
6.	303° 35′ 00″
7.	297° 17′ 20″

16 (6)

LINE C → EAST

X @ VERANDA

BS. wind mill

MARK #	
1.	320° 33′ 00″
2.	322° 24′ 20″
3.	323° 36′ 00″
4.	325° 12′ 00″
5.	326° 25′ 00″
6.	326° 46′ 20″
7.	326° 45′ 20″

17	Line D	N.E. →	⊼ @ VERANDA B.S. windmill
MARK #			
1.	284°41'00"		
2.	281°26'00"		
3.	290°08'00"		
4.	304°59'20"		
5.			
6.			
7.			
8.			
9.			
10.			

18	"E" Line	~~WEST~~	⊼ @ VERANDA B.S. windmill
MARK #			
1.	6°35'20"		
2.	2°24'00"		
3.	359°59'40"		
4.	357°43'40"		
5.	354°17'10"		
6.			
7.			
8.			
9.			
10.			

A	"E," Line → EAST	↑ @ VERANDA B.S. windmill
MARK #		
1.	1°36'00"	
2.	3°47'20"	
3.	7°16'30"	
4.	9°53'00"	
5.	12°11'40"	

20	"F" Line → WEST	(8) ↑ @ Junk B.S. windmill
MARK #		
1.	14°29'20"	
2.	15°18'20"	
3.	17°08'20"	
4.	17°40'40"	
5.	18°22'20"	

21

LINE F, EAST → ⊼ @ Junk
B.S. windmill

MARK #	
1.	12° 30' 30"
2.	11° 09' 20"
3.	8° 53' 10"
4.	7° 20' 30"
5.	6° 14' 00"
6.	
7.	
8.	

22

LINE "G" → WEST ⊼ @ Junk
B.S. windmill

MARK #	
1.	77° 51' 30"
2.	74° 12' 40"
3.	70° 44' 20"
4.	68° 09' 10"
5.	65° 45' 00"
6.	64° 20' 40"
7.	
8.	
9.	
10.	

	"G1" LINE	EAST →		
MARK #	∠		⊼ @ sink	
			B.S. windmill	
1.	77°27'00"			
2.	80°43'50"			
3.	34°27'00"			
4.	88°30'40"			
5.	93°05'20"			
6.	99°29'30"			
7.				
8.				
9.				
10.				

1

TC Aero [110]

Line #1 → N TBM = 0.23'

B.S. - windmill

		Elev.	Rod	
#1	347°32'36"	2.0	1.8'	12:00 noon
2	347°19'54"	2.0		
3	347°21'54"	1.9		
4	346°44'42"	1.9		
5	346°55'12"	1.8		
6	346°43'54"	1.7		
7	346°54'06"	1.6		
8	347°16'30"	1.5		
9	347°53'54"	1.4'	1.2'	12:30
10	349°36'30"	1.4		
11	347°34'48"	1.33		
12	346°52'00"	1.26		
13	347°03'06"	1.2		
14	347°03'18"	1.13		
15	347°23'12"	1.07		
16	346°20'30"	1.0		
17	346°46'36"	.93		
18	347°46'48"	.86		
19	348°07'30"	0.8'	0.6	1:00
20	349°01'18"	0.6		
21	350°20'18"	0.4		

2

22	350°10'48"	0.2	1:30	0
23	350°20'54"	0.1		
24	353°12'06"	0.0		
25	354°05'48"	-0.1		
26	352°44'12"	-0.2		
27	353°19'06"	-0.3		
28	354°23'36"	-0.3		
29	353°46'06"	-0.3	2:00	-.5±
30	353°14'36"	-0.3		
31	351°38'30"	-0.3		
32	348°53'12"	-0.3		
33	346°46'42"	-0.3		
34	333°13'30"	-0.3		
35	326°01'48"	-0.3	2:30	-.5±
36	284°46'42"	-0.3		

Line

3

line 1A → S

TC Aero - o - windmill

#1	353°31'54"	-0.3	3.00	±0.5
2	354°24'24"	-0.3		
3	354°25'24"			
4	353°57'54"			
5	353°52'42"			
6	353°30'00"			
7	350°27'34"			
8	348°20'48"			
9	345°47'30"			
10	346°26'48"			
11	346°23'42"			
12	346°39'46"			
13*	346°02'00"		3:30	-0.5±
14	345°56'54"			
15	346°23'06"			
16	346°51'54"			
17	346°17'12"			
18	346°26'36"			
19	346°28'42"		4:00	-0.5±
20	347°03'06"	-0.3		

4

Line 2 → North

TC Aero - o - windmill

1	343°30'18"	3.9	~~9:30~~ a.m 9:15	3.7
2	343°27'18"	4.0		
3	342°38'54"	4.0		
4	342°33'48"	4.1		
5	342°07'12"	4.1		
6	342°06'00"	4.2		
7	342°27'24"	4.2		
8	342°50'36"	4.3	9:35	4.1
9	343°08'06"	4.3		
10	343°29'48"	4.3		
11	342°51'18"	4.4		
12	343°23'48"	4.4		
13	342°53'48"	4.5		
14	343°08'30"	4.5	9:50	4.3
15	342°58'12"	4.5		
16	343°10'30"	4.5		
17	342°26'12"	4.5		
18	342°43'06"	4.6		
19	342°33'50"	4.6		
20	343°18'48"	4.6	10:10	4.4
21	345°01'18"	4.6		

5

					Elev.
# 22	346°56'30"				4.6
23	347°24'18"				4.5
24	347°33'00"	10:20	4.3		4.5
25	347°~~25~~ 24'00"	10:50	4.3		4.5
26	347°04'30"				4.5
27	348°12'00"				4.4
28	345°03'00"				4.4
29	343°50'12"	11.00	4.1		4.3
30	343°38'30"				4.3
31	340°17'12"				4.2
32	334°51'48"	11:07	4.0		4.2
33	318°33'36"				4.2
34	303°52'00"				4.1
35	272°01'30"	11:16	3.9		4.1
36	247°48'36"				4.1

6

Line 2A
π @ Aero - ⊙ - windmill

1	302°02'06"	11:27	~~4.9~~ 3.9	4.1
2	318°49'00"			4.1
3	339°47'36"	11:35	~~4.8~~ 3.8	4.0
4	340°13'36"			4.0
5	339°14'00"	11:39	3.7	3.9
6	341°41'24"			3.9
7	344°36'00"	11:43	3.6	3.8
8	345°03'06"			3.8
9	345°54'30"	11:47	3.5	3.7
10	346°36'12"			3.7
11	346°08'18"	11:52	3.4	3.6
12	345°46'24"			3.6
13	345°12'30"	11:57	3.3	3.5
14	344°09'30"			3.5
15	341°58'36"	12:21	2.6	2.8
16	341°31'00"			2.8
17	343°32'54"	12:27	2.5	2.7
18	344°03'42"			2.7
19	343°15'00"	12:31	2.4	2.6
20	342°56'54"			2.6
21	343°20'36"	12:38	2.3	2.5

7

#22	343°07'12"				2.5
23	343°26'36"	12:43	2.2		2.4
24	343°22'00"				2.3
25	343°45'54"	12:48	2.0		2.2
26	344°11'18"				2.1
27	344°59'06"	12:52	1.8		2.0
28	345°08'42"				2.0
29	345°25'12"				2.0
30					

8

Line 3 *

H.I. = R10 + 4.8 = 9.03+4.8 = 13.8

TC @ R10-0- windmill

TBM				Elev.
1	318°21'12"	1:46	1.2	1.5
2	322°23'06"			1.5
3	328°41'54"			1.5
4	330°41'12"			1.4
5	335°38'36"			1.4
6	337°18'06"			1.3
7	339°41'12"	1:56	1.0	1.3

H.I. = R10 + 4.8

TBM = Rod = 13.55 Elev = 0.28

line 3A TC R10-0-Windmill

1	333°32'06"	2:14P.M	0.7	1.0
2	331°18'42"			0.9
3	327°32'48"			0.9
4	323°51'00"			0.8
5	320°25'42"	2:22	0.5	0.8
6				
7				

9

			TBM= 0.3	
	line C			
	T@ R10 -o- windmill			
	H.I. = R10 + 4.8			
1	346°57'00"	2:31	0.4	0.7
2	342°39'46"			0.7
3	338°55'30"			0.6
4	333°17'00"			0.6
5	331°51'12"			0.5
6	331°36'00"	2:42	0.2	0.5
~~7~~				
	line B			
1	?	2:52	0.0	0.3
2	332°37'18"			0.3
3	329°53'00"			0.3
4	326°11'24"			0.3
5	325°53'54"			0.3
6	324°33'18"	3:04		0.3
7				

10

		(7)		
	Line A			
	T@ Coffin -o- windmill			
	H.I. = Coffin + 5.04'		= 8.57+5.04 = 13.61	
TBM		12.38		1.23
	line A → west			
1	182°53'48	9:20 a.m.	1.9	3.1
2	184°31'54"			3.2
3	192°31'12"	9:24	2.0	3.2
4	194°21'10"			3.2
5	195°37'24"	9:26	2.0	3.2
~~6~~	End of line			
	line A1 → East			
1	188°47'~~88~~ 48	9:34	2.2	3.4
2	180°58'36"			3.4
3	178°49'30"			3.4
4	176°52'30"	9:37	2.2	3.4
~~5~~	End of line			

11 (1)

π @ Coffin - O - windmill
H.I. = Coffin + 5.04 = 13.6
TBM = 1.2

	line B1 → East			Elev.
1	193°56'36"	9:45	2.4	3.6
2	187°37'36"			3.7
3	181°56'36"			3.7
4	169°19'24"	9:55	2.6	3.8
5	165°50'42"			3.8
6	162°03'00"			3.9
7	157°54'18"	9:59	2.7	3.9
	End-of-line			~~3.9~~
				~~3.9~~
	line C1 → East			~~4.0~~
1	198°21'48"	10:09	2.8	4.0
2	188°00'54"			4.0
3	175°36'18"			4.1
4	163°23'42"	10:14	2.9	4.1
5	157°18'00"			4.1
6	153°20'00"			4.1
7	150°38'06"	10:16	2.9	4.1

12

π @ Coffin - O - windmill
H.I. = Coffin + 5.04 = 13.6
TBM = 1.2

	line D			
1	156°56'48"	10:22	3.0	4.2
2	153°49'36"			↓
3	150°23'24"			↓
4	145°36'24"	10:25	3.0	4.2
	line E → west			
1	59°01'42"	10:41	3.1	4.3
2	50°57'18"			↓
3	41°37'24"			↓
4	34°10'06"			↓
5	17°41'48"	10:45	3.1	4.3
	line E1 → East			↓
1	97°42'18"	10:57	3.1	4.3
2	51°41'48"			↓
3	58°27'36"			↓
4	63°19'18"			↓
5	66°47'00"	10:56	3.1	4.3

13

⊼ @ Coffin-o-windmill

H.I. = Coffin + 5.04 = 13.6

TBM = 1.2

line F → west

1	18°05'30"	11:~~13~~ 15	4.3	5.5
2	16°00'12"			↓
3	13°46'18"			
4	11°09'36"			
5	8°23'18"	11:18	4.3	5.5

End-of-line

line F1 → East

1	20°59'42"	11:25	4.3	5.5
2	23°28'36"			↓
3	25°53'54"			
4	28°14'36"			
5	30°44'42"	11:27	4.3	5.5

14

⊼ @ Coffin-o-windmill

H.I. = Coffin + 5.04 = 13.6

TBM = 1.2

line G → west

1	18°17'30"	11:36	3.1	4.3
2	16°47'42"			↓
3	14°52'42"			
4	13°06'42"			
5	11°36'18"			
6	9°55'06"	11:39	3.1	4.3

line G1 → East

1	18°06'36	11:49	3.0	4.2
2	19°40'00"			↓
3	21°13'06"			
4	22°43'24"			
5	24°09'42"		~~3~~	
6	25°54'18"	11:52	3.0	4.2

SECTION 7

SAFETY REPORT

WEEKLY SAFETY MEETING

NEDSO

Date held 10-15-85

THRU: Area Engineer, NE Area

Time

TO: Safety Office, NED

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

Contract No. DACW-32-1-0011 Contractor ATL Weston Geophysical

Conducted By D. Drake All personnel present (Contr) 2
(Sub) 2 #1
(Govt)

Subjects discussed (Note, delete, or add):
EM 385-1-1, Section:

Accident Prevention Plan

Individual Protective Equipment -

Prevention of Falls -

Back Injury, Safe Lifting Techniques -

Fire Prevention -

Sanitation, First Aid, Waste Disposal -

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

Staging, Ladders, Concrete Forms, Safety Nets -

Hand Tools, Portable Power Tools, Woodworking Machinery -

X Equipment Inspection & Maintenance (Zero Defects) -

Hoisting Equipment -

Ropes, Hooks, Chains and Slings -

Electrical Grounding, Temporary Wiring, GFCI -

X Lockouts for safe clearance procedures - electrical, pressure, moving parts -

Welding, Cutting -

Excavations -

X Loose Rock and Steep Slopes -

Explosives -

X Water Safety -

Toxic materials - hazards, MSDS, respiratory, ventilation -

Other -

2. Forwarded.

Prepared by Dana Drake Title LS

OF: EXPOSURE: 10/14 & 17/85

Signature

Resident Engineer

HRS: 30

NED FL FI 251

SECTION 8

RESULTS OF INVESTIGATION

The investigation results may be found in Appendix 1 which contains the complete report of Weston Geophysical Corporation. Specifically, their results are presented in Figure 3 as contours of bedrock elevations below mean low water and in Figure 5 as a series of seismic profiles with the seismic velocities of the various layers detected.

SECTION 9

DISCUSSION

A discussion of the results may be found in Section 5 of Weston Geophysical's report, which is included as Appendix 1 of this report.

SECTION 10

GENERAL PROJECT LOCATION PLAN

The general project location plan is Figure 1 of Weston Geophysical's Report, in Appendix 1 of this report.

SECTION 11

SEISMIC EXPLORATION
AND
SURVEY MAP

The plan of coverage map is Figure 2 of Weston Geophysical's Report in Appendix 1 of this report.

SECTION 12

CONTOUR MAP OF BEDROCK ELEVATIONS

The contour map of bedrock elevations is Figure 3 of Weston Geophysical's Report in Appendix 1 of this report.

SECTION 13

SEISMIC PROFILES

A plan map showing the location of the drawn seismic profiles is Figure 4 of Weston Geophysical's Report, in Appendix 1.

The seismic profiles are Figure 5 of Weston Geophysical's Report, in Appendix 1 of this report.

SECTION 14

DATA AND CALCULATIONS

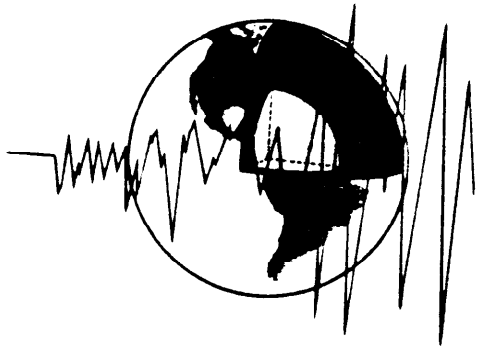
The field procedure for data acquisition and the interpretation theory which includes computations is outlined in Appendix A of Weston Geophysical's report, which is located in Appendix 1 of this report.

The seismic signals detected by an array of hydrophones were recorded on photographic paper; these data are available for perusal at Weston Geophysical Corporation, Post Office box 550, Westboro, MA 01581, (617)366-9191.

APPENDIX 1

SEISMIC REFRACTION SURVEY REPORT

WESTON GEOPHYSICAL CORPORATION



Weston Geophysical
CORPORATION

January 21, 1985
WGC - R762

ATLANTIC TESTING LABORATORIES, LTD.
Box 29
Canton, NY 13617

Gentlemen;

In accordance with the Army Corps of Engineers Contract No. DACW33-85-D-0011, Weston Geophysical has performed a marine seismic refraction survey at the Upper Acushnet River Estuary in New Bedford, Massachusetts.

This is a final report of our findings.

Very truly yours,

WESTON GEOPHYSICAL CORPORATION

Ed Rostosky

Ed Rostosky

ER:wpt-0207J1

Post Office Box 550 • Westboro, Massachusetts 01581 • (617) 366-9191 • Telex No. 920491

MARINE SEISMIC REFRACTION SURVEY

UPPER ACUSHNET RIVER ESTUARY
NEW BEDFORD, MASSACHUETTS

Prepared for
ATLANTIC TESTING LABORATORIES, LTD.

JANUARY, 1985

Weston Geophysical
CORPORATION

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1.0 INTRODUCTION & PURPOSE

A seismic refraction survey was conducted for Atlantic Testing Laboratories, Ltd. in the Acushnet River Estuary in New Bedford, Massachusetts. The survey was conducted during the period of October 15 through 17, 1985.

The purpose of this study was to determine depth to bedrock and the seismic velocity of all layers detected. All field work was coordinated through Atlantic Testing Laboratories, Ltd. of Canton, New York.

2.0 LOCATIONING & SURVEY CONTROL

The area of investigation is shown on Figure 1, a segment of the New Bedford North, Massachusetts United States Geological Topographic Quadrangle Map. The specific lines of coverage are shown on Figure 2. The plan map showing the locations of the seismic profiles is shown on Figure 4. The plan of coverage map and water elevations at time of survey [based on mean low water] were provided by Atlantic Testing Laboratories, Ltd. Radio communications between the boat and on-shore survey crews enabled the surveyors to triangulate to a fixed point on the boat at a mark [shot] location.

3.0 METHOD OF INVESTIGATION

Marine seismic refraction data were acquired with a 12-trace marine refraction system. The hydrophone spacings for this study were 40 feet apart. The energy source was a Bolt air gun with a 40-inch^3 chamber. For a more detailed description of the marine seismic refraction technique, refer to Appendix A.

4.0 PRESENTATION OF RESULTS

The results of this survey are presented on Figure 3 as contours and bedrock elevations below mean low water. Figure 5 is a series of seismic profiles with the seismic velocities of the various layers detected.

5.0 DISCUSSION OF RESULTS

Seismic refraction data were collected along nine lines of coverage. The data were collected in both directions of each line in order to obtain average velocity of any dipping layers. As indicated by the shaded areas on Figure 3, areas of organics on the river bottom were encountered. The presence of gas and/or air entrapped sediments [organics], prevents the seismic [sound] signal from traveling to or from deeper layers.

The shallowest bedrock was detected at the northern end of the project; bedrock elevations generally ranged from 15 to 30 feet below mean low water in this area. In the southern half of the project, bedrock elevations were generally 40 feet below mean low water or greater reaching a minimum elevation of -53 MLW. Bedrock velocities are generally high, 14,000 to 16,000 ft/sec. indicating a sound bedrock which would require systematic drilling and blasting for removal. The velocity of the overburden material throughout the area generally ranged from 5,000 to 5,200 ft/sec. indicating a water saturated material. At a few localities, seismic velocity up to 5,400 ft/sec. were measured; this would indicate a slightly more dense overburden material.

Based on our nearly 30 years of experience with refraction data, we would anticipate the calculated depths to be within 8% to 10% of the actual depth. However, thin layers such as dense glacial till overlying the bedrock may go undetected and result in a calculated depth slightly shallower than the actual depth. Drill

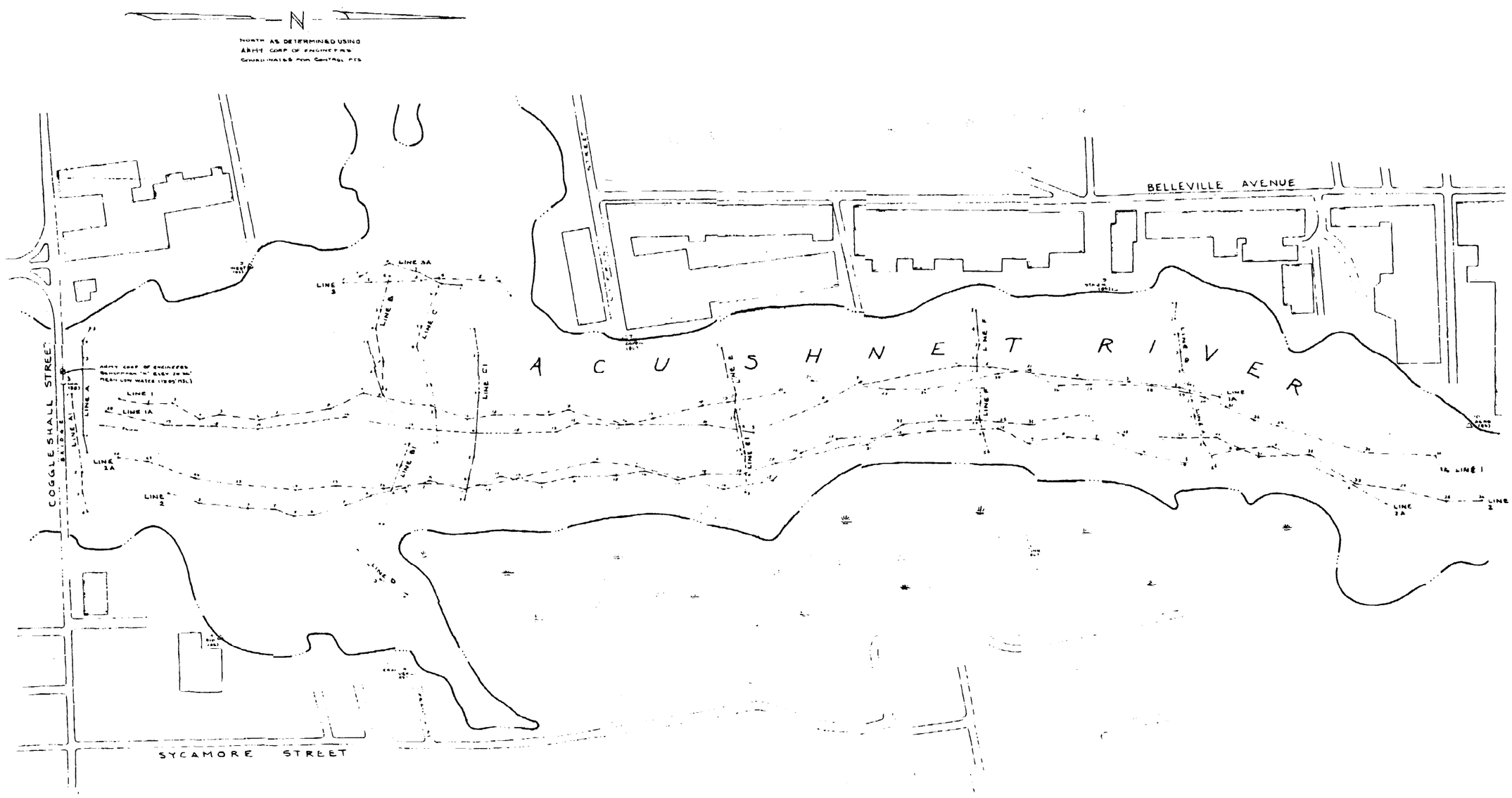
hole information to confirm material types and depths would raise the confidence level of the seismic interpretation.

FIGURES

MARINE SEISMIC REFRACTION SURVEY
UPPER ACUSHNET RIVER ESTUARY
NEW BEDFORD, MASS.
prepared for
ATLANTIC TESTING LABORATORIES, LIMITED

AREA OF INVESTIGATION

WESTON GEOPHYSICAL CORPORATION
JANUARY 1986 FIGURE 1



LEGEND

NOTE: ALL GENERAL TOPOGRAPHIC INFORMATION SHOWN HAS BEEN PLOTTED FROM THE EPILABORATORY OF 1965 QUADRANGLE NEW BEDFORD (1:25,000)

MARINE SEISMIC REFRACTION SURVEY UPPER ACUSHNET RIVER ESTUARY NEW BEDFORD, MASS. Prepared for ATLANTIC TESTING LABORATORIES, LIMITED	PLAN OF COVERAGE WESTON GEOPHYSICAL CORPORATION JANUARY 1969 FIGURE 2

DRAWN P.L.A. CHKD L.H.D. SCALE 1" = 700' DATE NOV. 1, 1968	SEISMIC EXPLORATION AND SURVEY MAP UPPER ACUSHNET ESTUARY NEW BEDFORD MASS SPENCER F. THEW, P.E./L.S. PROFESSIONAL ENGINEER LICENSED LAND SURVEYOR
CD-005	

LEGEND

-28 SPOT BEDROCK ELEVATION (MLW)

AREA OF ORGANICS

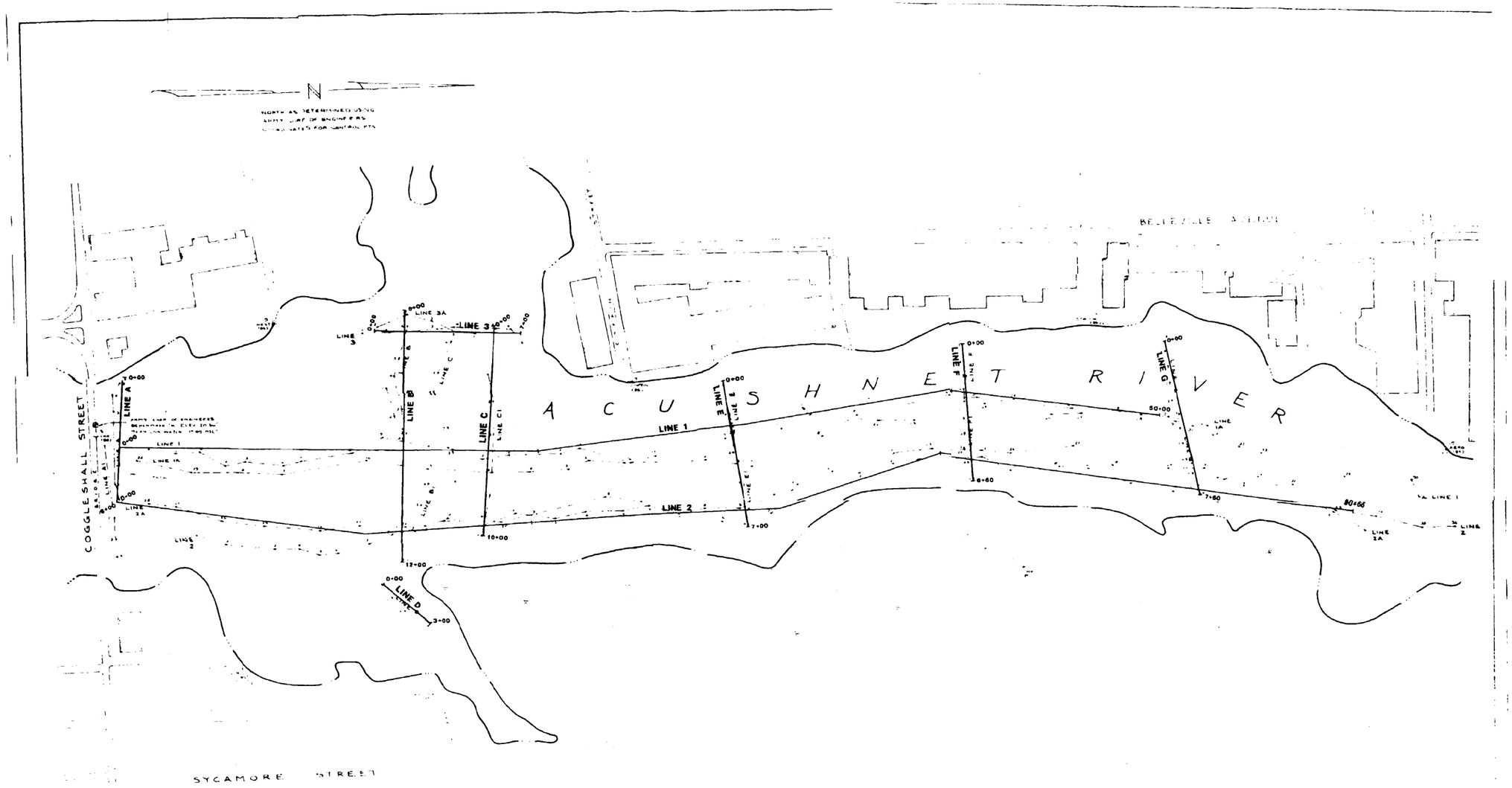
SHORELINE

NOTE: ALL GENERAL TOPOGRAPHIC INFORMATION SHOWN WAS OBTAINED FROM AN ENLARGEMENT OF USGS QUADRANGLE "NEW BEDFORD, MASS." 1965

ELEVATION DATUM IS MEAN LOW WATER.

MARINE SEISMIC REFRACTION SURVEY UPPER ACUSHNET RIVER ESTUARY NEW BEDFORD, MASS. prepared for ATLANTIC TESTING LABORATORIES, LIMITED	CONTOUR MAP BEDROCK ELEVATIONS WESTON GEOPHYSICAL CORPORATION JANUARY 1986 FIGURE 3

DRAWN SLA	SEISMIC EXPLORATION AND SURVEY MAP
CHECKED DLD	UPPER ACUSHNET ESTUARY NEW BEDFORD · MASS.
SCALE 1" = 200'	SPENCER F. THEW, P.E./L.S.
DATE NOV 1, 1985	PROFESSIONAL ENGINEER - LICENSED LAND SURVEYOR MALONE, N.Y. CANTON, N.Y. CICERO, N.Y.
PROJECT NUMBER CD-005	

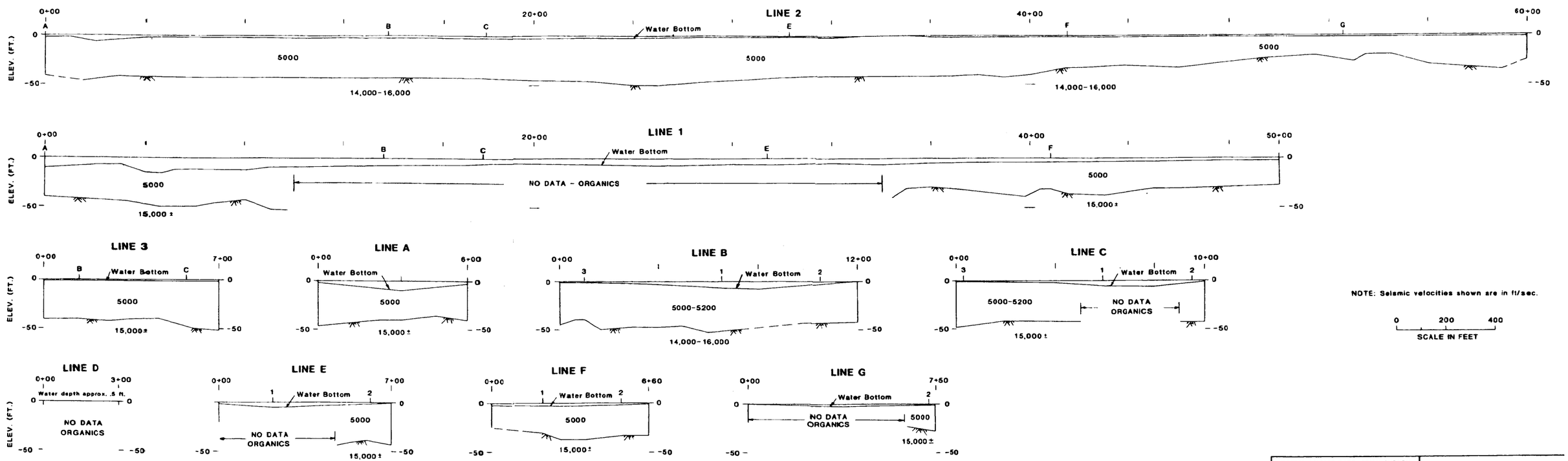


LEGEND

MARINE SEISMIC REFRACTION SURVEY UPPER ACUSHNET RIVER ESTUARY NEW BEDFORD, MASS. prepared for ATLANTIC TESTING LABORATORIES, LIMITED	PLAN MAP SEISMIC PROFILES WESTON GEOPHYSICAL CORPORATION JANUARY 1986 FIGURE 4

SEISMIC EXPLORATION
AND SURVEY MAP
UPPER ACUSHNET ESTUARY
NEW BEDFORD MASS.
SPENCER THEW PEARCE

CD-005



MARINE SEISMIC REFRACTION SURVEY UPPER ACUSHNET RIVER ESTUARY NEW BEDFORD, MASS. prepared for ATLANTIC TESTING LABORATORIES, LIMITED	SEISMIC PROFILES WESTON GEOPHYSICAL CORPORATION JANUARY 1988 FIGURE 5

APPENDIX A

MARINE SEISMIC REFRACTION SURVEY
METHOD OF INVESTIGATION

GENERAL CONSIDERATIONS

The marine seismic refraction survey method is a means of determining the depths to a refracting horizon and the thickness of major seismic discontinuities overlying the high-velocity refracting horizon. The seismic velocities measured by this technique can be used to calculate the thicknesses of subsurface materials and for generalized material identification.

Interpretations are made from travel time curves developed from the measurement of the time required for elastic waves generated by a Bolt air gun or seisgun at a point source to travel to a series of pressure sensitive devices [hydrophones] spaced at known intervals along a seismic cable. [See Figure A-1.] The recording systems consists of a geophysical amplifier and filter system manufactured by Weston Geophysical with either a WesComp™ [a digital data acquisition system developed by Weston] or a recording oscillograph. The system provides either a photographic record with an accurate record of time of the individual traces of each shot and/or the data may be stored on a disk for further playback and analysis, depending on job requirements. As the shot is detonated, a time break is displayed on the seismogram. The arrival times between the shot and each hydrophone are measured in reference to this time break.

INTERPRETATION THEORY

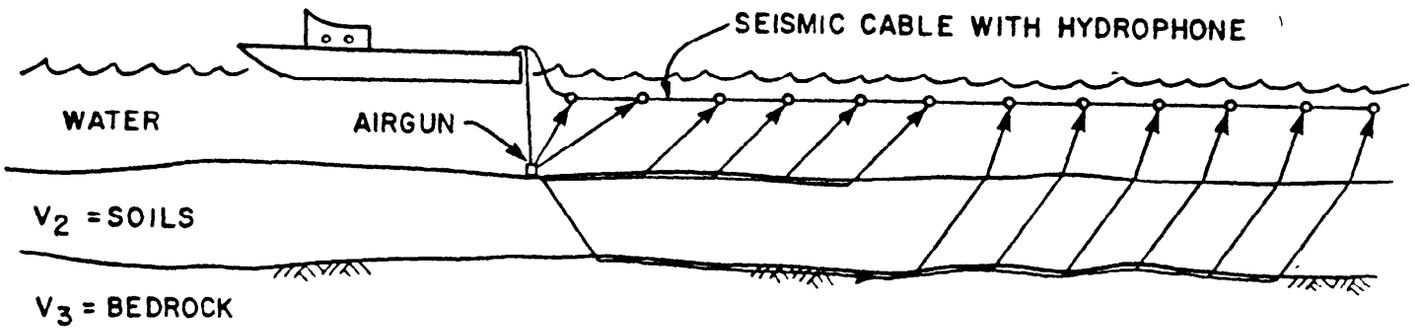
The elastic wave measured in the seismic refraction method, the "P" or compressional wave, is the first arrival of energy from the source at the detector. This energy wave travels from the energy source in a path causing adjacent solid particles to oscillate in the direction of wave propagation. Figure A-1 shows a hypothetical subsurface consisting of a lower velocity material above a higher velocity material. At greater distance, the first arrival at the detector will be a refracted wave that has taken an indirect path through the two velocity layers. The refracted wave will arrive before the direct wave at a greater distance along the spread because the time gained in travel through the higher-speed material compensates for the longer path. Depth

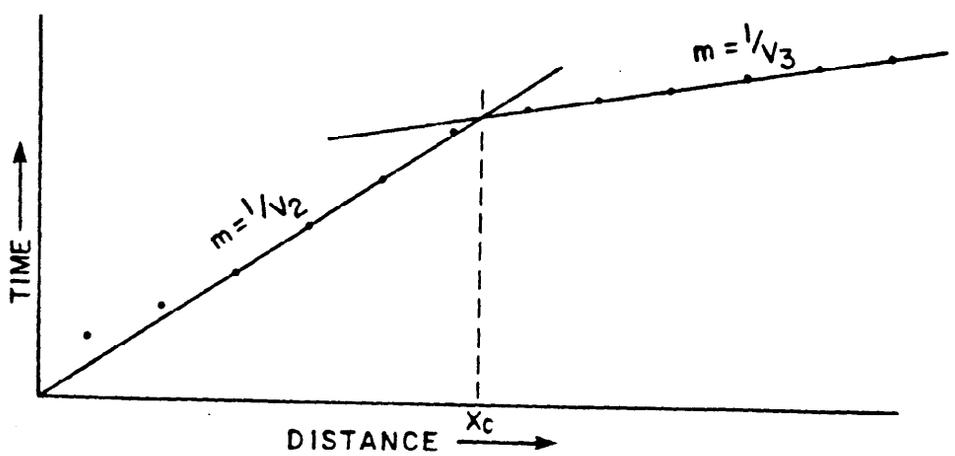
computations are based on the ratio of the layer velocities and the horizontal distance from the energy source to the point at which the refracted wave overtakes the direct wave.

Generally, the interpretation is by one or more of several methods [W.M. Telford, et al, 1976] ray-tracing, wave front methods, delay times, critical distances, etc. Either a forward or inverse problem can be performed using Weston-developed computer programs. Since successful refraction interpretation is based on experience, all interpretation of refraction data is performed or thoroughly reviewed by a senior staff geophysicist.

Reference

Telford, W.M.; Geldart, L.P.; Sheriff, R.E.; Keys, D.A., 1976, Applied Geophysics: Cambridge University Press.





DEPTH TO ROCK = $\frac{1}{2} X_c \sqrt{\frac{V_3 - V_2}{V_3 + V_2}} + K$, WHERE K IS A FUNCTION OF WATER DEPTH AND DEPTH OF SEISMIC CABLE.

SEISMIC REFRACTION METHOD

FIGURE A-1