Cape Ann Tool, LLC response to questions/comments from May 15, 2013 Hearing of Rockport Conservation Commission (NOI File No. 062-0672):

Attachments RE: Clean Sediment

The following is a summary of the reports and studies (two by the Army Corps, one by URS) indicating that dredging activities in Pigeon Cove may proceed.

In 1981, the Army Corps tested three locations in Pigeon Cove (sites A, B, C shown on the Army Corps Figure 1-3 in the attached pdf). The test results in Pigeon Cove were superior to those in Rockport Harbor. Site B indicated an elevated level of PCB, but the report's author determined "The proposed oceanic discharge of dredged material from Pigeon Cove . . . is ecologically acceptable."

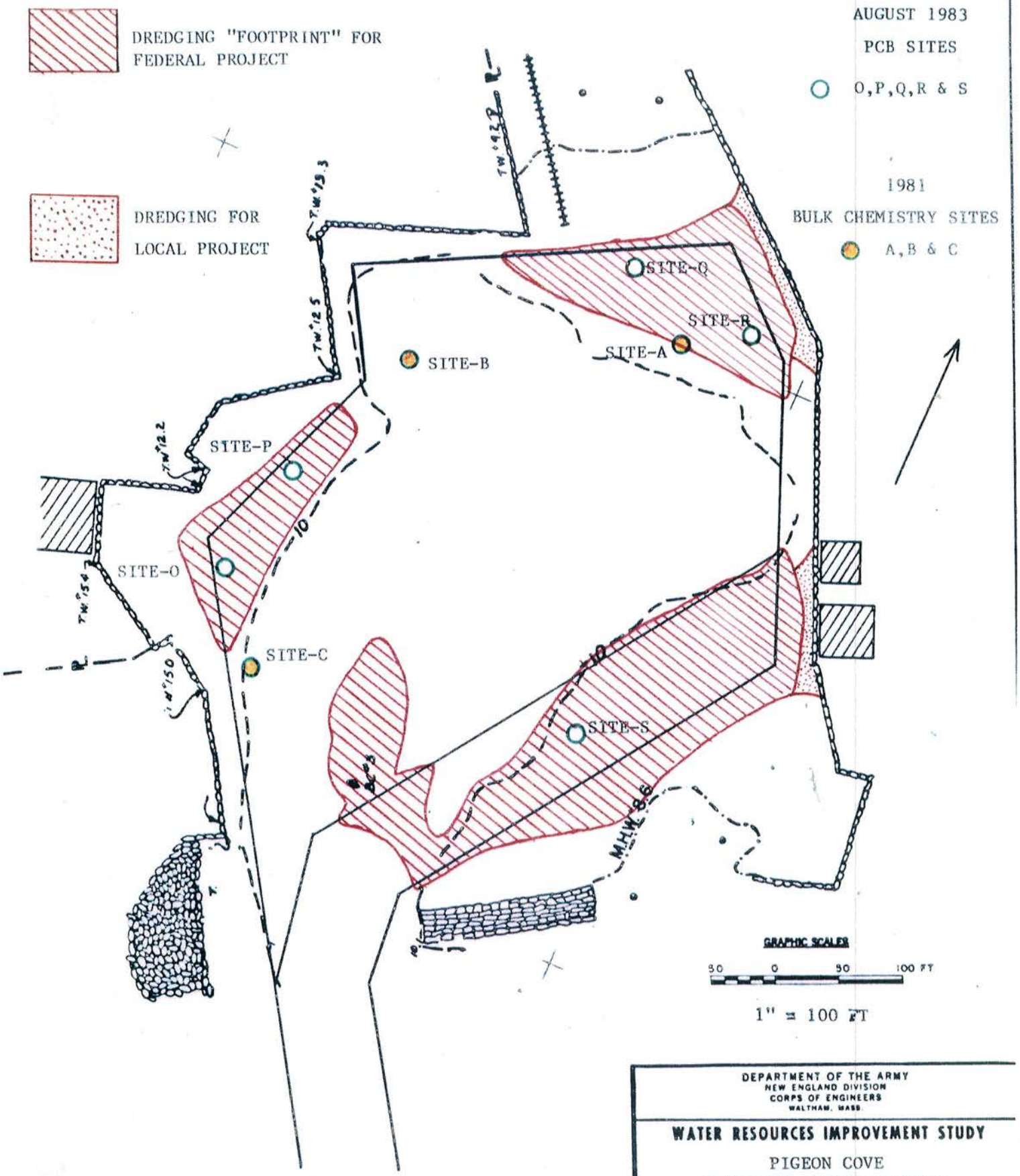
To address potential concerns about the sample taken at Site B, the Army Corps took five more samples (Sites O, P, Q, R & S on Figure 1-3). Water Quality data from all five samples (Table 1-8) was far below EPA criteria and PCB concentrations were <u>less than the mean</u> for the Gulf of Maine tidal system on 4 samples and within one standard deviation for the fifth sample. Colonel Sciple of the Army Corps of Engineers issued a Finding of No Significant Impact in 1983 concluding "There does not appear to be any remaining major environmental problem, conflict or disagreement . . . I have determined that . . . the proposed action would not have a significant impact on the human environment."

Thereafter the Army Corps completed the dredging activities.

In 1996, URS tested five samples as shown on the plan in the attached pdf. PCB's were not detected in any of the samples. Not only were the soil samples acceptable for disposal at sea, URS determined the soil was acceptable to use for landfilling.

There have been 13 test locations in Pigeon Cove, and only one had an elevated level. It is entirely possible that the positive test could have been a false positive. The last ten samples taken in Pigeon Cove either had no elevated levels or no detection at all. There should be no concern whatsoever with our proposed piling work.

The last pdf shows the probes and surveys conducted by the Army Corps of Engineers on the four harbors in Rockport. This data indicates that Pigeon Cove has the deepest harbor and the Army Corps' machine probes were able to go deeper in Pigeon Cove than any other harbor. Given this extensive soils characterization already performed by the Army Corps, we are unlikely to have any problems driving piles into the Pigeon Cove harbor soils. In the event we did experience an obstruction, we would simply relocate the problem piling to the next closest acceptable location.



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

WATER RESOURCES IMPROVEMENT STUDY

PIGEON COVE
ROCKPORT, MASSACHUSETTS

ADDITIONAL PCB AND PHYSICAL TEST SAMPLE SITES

FIGURE 1-3

APPENDIX 1

SECTION C

BIOASSAY AND BIOACCUMULATION TESTING REPORT ROCKPORT HARBOR AND PIGEON COVE ROCKPORT, MASSACHUSETTS

PREPARED FOR:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

Prepared By:
Energy Resources Company Inc.
Environmental Sciences

ENERGY RESOURCES COMPANY, INC.
PREPARED FOR: DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
DECEMBER, 1981

6. CONCLUSIONS (SUMMARY)

The proposed oceanic discharge of dredged material from Pigeon Cove and Rockport Harbor, Massachusetts, to the disposal site located approximately 15 nmi east of Nahant, Massachusetts, is ecologically acceptable as judged by the toxicity-related criteria employed in this assessment. Survival of copepods (*Acartia tonsa*), mysid shrimp (*Mysidopsis bahia*), and Atlantic silversides (*Menidia menidia*) exposed for 96 hr to 100% liquid and suspended particulate phases of dredged material from five sampling sites was not significantly lower than survival of control organisms. In addition, total (combined) survival of grass shrimp (*Palaemonetes pugio*), hard clams (*Mercenaria mercenaria*), and sandworms (*Nereis virens*) exposed for 10 days to the solid phase of the five samples of dredged material and reference (disposal-site) sediment was not significantly different.

Tissues of organisms that survived exposure to the solid phase of dredged material from the five sampling sites usually did not contain significantly elevated concentrations of xenobiotic constituents (cadmium, mercury, polychlorinated biphenyls, the dichloro-diphenyl-trichloroethane family, and petroleum hydrocarbons) as compared to tissues of reference organisms. Only 8% of the bioaccumulation tests (6 of 75 tests) performed during the assessment - 4 of 15 tests for petroleum hydrocarbons and 2 of 15 tests for cadmium - indicate a statistical potential for bioaccumulation.

WATER RESOURCES IMPROVEMENT STUDY

ROCKPORT HARBOR, OLD HARBOR AND PIGEON COVE

ROCKPORT, MASSACHUSETTS

ADDENDUM

to the

ENVIRONMENTAL ASSESSMENT

PREPARED BY:
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

OCTOBER 1983

VII. COORDINATION

The present proposed action has been coordinated with Federal, State and local agencies with interest in or jurisdiction over the proposed project. Federal regulatory agencies include the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service and the National Marine Fisheries Service. State regulatory agencies are the Office of Coastal Zone Management, Department of Environmental Quality Engineering, and the Department of Fisheries, Wildlife and Recreational Vehicles. These State agencies are under the Massachusetts Executive Office of Environmental Affairs. Efforts have also been coordinated with the Massachusetts Historical Commission. The Board of Selectmen and the Harbor Advisory Committee have been involved in the project on a local level.

Appendix 4 includes a discussion of meetings held with Federal, State and local officials during development of the proposed projects, as well as written communications.

Following review of the Draft Detailed Project Report several Federal and state agencies expressed concern with elevated PCB values indicated by the original chemical test results for samples taken from Pigeon Cove in 1981. In order to address these concerns a supplemental PCB sampling and testing program for Pigeon Cove sediments was conducted in August 1983. The results of these supplemental tests were presented to all concerned agencies at a meeting held on 18 August 1983. After review of the supplemental data contained in the Addendum to the Environmental Assessment the agencies concurred that the dredging and disposal of the materials to be removed from the two harbor recommended for improvement would present no significant risk to the environment.

ADDENDUM
ENVIRONMENTAL ASSESSMENT
ROCKPORT HARBOR, OLD HARBOR, AND PIGEON COVE
ROCKPORT, MASSACHUSETTS

I. Introduction

Additional PCB and physical test sample sites from Pigeon Cove were evaluated in response to comments received on the draft report. Five samples were taken, all located within the proposed dredging "footprint" for the Federal project (Figure 1-3). This addendum includes the results of this additional testing.

II. Affected Environment

A. Water Quality.

Table 1-8 presents a comparison of water quality data for the Pigeon Cove samples to the water quality criteria set forth for PCB's by the Environmental Protection Agency's 1980 Water Quality Criteria Documents.

TABLE 1-8

WATER QUALITY DATA - PIGEON COVE

AUGUST 1983

Parameter	E.P.A. Criteria(1)	Site O	Site P	Site Q	Site R	Site S
PCB's, ppb	<10.0	<0.02	0.02	0.04	0.02	0.06

(1) Environmental Protection Agency (EPA) (1980)

B. Sediments

The additional sediment analyses were done in August 1983 by the Corps of Engineers and the results are presented in Table 1-9. Sediment samples were collected from five stations in Pigeon Cove. These samples were tested only for DDT's and PCB's. Concentrations of DDT's at each of the five sample sites was less than 0.05 parts per million (ppm). Concentrations of PCB's ranged from 0.05 ppm at Site S to 0.4 ppm at Sites O and R.

As discussed in the assessment, chemical characteristics of the harbor sediments can be compared to those found in the Gulf of Maine tidal system. The statistical standard deviation compares the relative levels of contamination.

Concentrations of DDT's at Sites "O" through "S" were less than one standard deviation. Concentrations of PCB's at these sites were all less than the mean, except for Site P, which was less than one standard deviation.

Table 1-9
PIGEON COVE
ROCKPORT, MASSACHUSETTS
PHYSICAL SEDIMENT ANALYSIS
AND BULK CHEMICAL ANALYSIS
August 1983

Station	O	P	Q	R	S
Depth (ft)	0.0-1-1	0.0-1.1	0.0-1.1	0.0-1.	0.0-1.1
Soil Description	Gravelly coarse to fine sand	Silty gravelly coarse to fine sand	sandy-silt	sandy-silt	sandy-silt
Medium Grain Size	0.4500	1.8000	0.0450	0.0690	0.0500
% Fines	3.0	5.0	60.0	52.0	57.0
PPM DDT	<0.05	<0.05	<0.05	<0.05	<0.05
PPM PCB	0.4	0.8	0.6	0.4	0.05

SECTION B

FINDING OF NO SIGNIFICANT IMPACT

After careful consideration of the information in this Environmental Assessment, it is my conclusion that development of the proposed project would not require a significant commitment of physical, natural or human resources.

Points considered include the effects of dredging the channel and the inner and outer anchorages of Rockport Harbor, the effects of dredging the channel and anchorage basin of Pigeon Cove, the removal of rock from Pigeon Cove and Rockport ~~Outer Harbor and~~ the effects of disposal of the dredged material at the Foul Area disposal site. Bioassay and bioaccumulation tests show that there should be no unacceptable environmental impacts and that the Section 103 Ocean Dumping Criteria of the Clean Water Act have been satisfied for disposal of the dredged material at the Foul Area. Disposal of ledge material at the ocean disposal site in Sandy Bay, Massachusetts would create additional habitat in the area for lobsters, benthic species, finfish and other marine species.

In my evaluation, this assessment has been prepared in accordance with the National Environmental Policy Act of 1969. The determination that an Environmental Impact Statement is not required, is based on the information contained in the Environmental Assessment and the following considerations:

1. The loss of benthic communities and the generation of suspended material at the dredging and disposal sites would be minimal;

2. The proposed plan would not involve wetlands, or affect any endangered species, cultural resources or commercially important shellfish populations.

3. Ocean dumping criteria have been satisfied for disposal of the dredged material at the Foul Area, and;

4. Ocean disposal of ledge material at Sandy Bay would provide natural habitat for various marine species.

5. Coordination with appropriate Federal and state agencies insured that concerns and suggestions were made known to the Corps so that these concerns could be addressed during project planning.

There does not appear to be any remaining major environmental problem, conflict or disagreement in implementing the proposed work. I have determined that implementation of the proposed action would not have a significant impact on the human environment.

21 Oct '83

DATE

CARL B. SCIPLE
Colonel, Corps of Engineers
Division Engineer

Michael Rauseo

Subject: FW: Former Cape Ann Tool Company - Harbor Sampling Results
Attachments: 20130402161021.pdf

From: Garfield, Gary [mailto:gary.garfield@urs.com]
Sent: Tuesday, April 02, 2013 4:17 PM
To: Michael Rauseo
Cc: Wade, Marilyn; LeClair, Judith
Subject: RE: Former Cape Ann Tool Company - Harbor Sampling Results

Mike,

In May 1996 we collected 5 sediment samples using a small clam shell sampler at the sample locations shown on the attached plan. The samples we analyzed for RCRA 8 Metals, and PCBs. PCBs were not detected. Arsenic, Barium, Cadmium, Chromium, Lead and Mercury were detected all at concentration below the MassDEP" *maximum allowable contaminant levels for sediment reuse at lined landfills*"..... in case landfilling was an option. In any case the concentrations were low.

Take care

Gary

0 20 40 80

APPROXIMATE SCALE (FEET)

FORMER CAPE ANN TOOL COMPANY
ROCKPORT, MASSACHUSETTS

HARBOR SEDIMENT SAMPLING LOCATIONS

DAMES & MOORE
5 INDUSTRIAL WAY
SALEM, NEW HAMPSHIRE 03079

DRAWING No. 3

SHEET No.

DESIGN

CHECKED CG

APPROVED PJK

SCALE: 1" = 40'-0"

DATE: AUGUST 1995

PROJECT No. 30731-002

ROCKPORT'S ACCESSORS

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

Laboratory Sample Number: L9603153-01
Sample Matrix: SED 1 SOIL

Date Collected: 15-MAY-96
Date Received : 16-MAY-96
Date Reported : 23-MAY-96

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 3 Glass

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Solids, Total	47.	%	0.10	3	2540B		17-May	ST
Total Metals				1	3005/3050			
Arsenic, Total [40]	17.	mg/kg	0.43	1	6010	20-May	21-May	GF
Barium, Total [-]	37.	mg/kg	4.3	1	6010	20-May	21-May	GF
Cadmium, Total [80]	ND	mg/kg	0.85	1	6010	20-May	21-May	GF
Chromium, Total [1,000]	60.	mg/kg	1.7	1	6010	20-May	21-May	GF
Lead, Total [2,000]	160	mg/kg	4.3	1	6010	20-May	21-May	GF
Mercury, Total [10]	ND	mg/kg	0.53	1	7470/7471	22-May	23-May	DM
Selenium, Total	ND	mg/kg	0.85	1	6010	20-May	21-May	GF
Silver, Total	ND	mg/kg	0.85	1	6010	20-May	21-May	GF
Polychlorinated Biphenyls [<2]				1	8080	17-May	18-May	DB
Arochlor 1221	ND	ug/kg	530					
Arochlor 1232	ND	ug/kg	530					
Arochlor 1242/PCB 1016	ND	ug/kg	530					
Arochlor 1248	ND	ug/kg	530					
Arochlor 1254	ND	ug/kg	530					
Arochlor 1260	ND	ug/kg	530					
Arochlor 1262	ND	ug/kg	530					
Arochlor 1268	ND	ug/kg	530					
SURROGATE RECOVERY								
2,4,5,6-Tetrachloro-m-xylene	76.0	%						
Decachlorobiphenyl	55.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

Laboratory Sample Number: L9603153-02
SED 2

Sample Matrix: SOIL

Condition of Sample: Satisfactory

Number & Type of Containers: 3 Glass

Date Collected: 15-MAY-96
Date Received : 16-MAY-96
Date Reported : 23-MAY-96

Field Prep: None

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Solids, Total	45.	%	0.10	3	2540B		17-May	ST
Total Metals				1	3005/3050			
Arsenic, Total	18.	mg/kg	0.44	1	6010	20-May	21-May	GF
Barium, Total	62.	mg/kg	4.4	1	6010	20-May	21-May	GF
Cadmium, Total	0.89	mg/kg	0.89	1	6010	20-May	21-May	GF
Chromium, Total	98.	mg/kg	1.8	1	6010	20-May	21-May	GF
Lead, Total	210	mg/kg	4.4	1	6010	20-May	21-May	GF
Mercury, Total	0.96	mg/kg	0.56	1	7470/7471	22-May	23-May	DM
Selenium, Total	ND	mg/kg	0.89	1	6010	20-May	21-May	GF
Silver, Total	ND	mg/kg	0.89	1	6010	20-May	21-May	GF
Polychlorinated Biphenyls				1	8080	17-May	18-May	DB
Arochlor 1221	ND	ug/kg	560					
Arochlor 1232	ND	ug/kg	560					
Arochlor 1242/PCB 1016	ND	ug/kg	560					
Arochlor 1248	ND	ug/kg	560					
Arochlor 1254	ND	ug/kg	560					
Arochlor 1260	ND	ug/kg	560					
Arochlor 1262	ND	ug/kg	560					
Arochlor 1268	ND	ug/kg	560					
SURROGATE RECOVERY								
2,4,5,6-Tetrachloro-m-xylene	77.0	%						
Decachlorobiphenyl	60.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

Laboratory Sample Number: L9603153-03
SED 3
Sample Matrix: SOIL

Date Collected: 15-MAY-96
Date Received : 16-MAY-96
Date Reported : 23-MAY-96

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 5 Glass

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Solids, Total	55.	%	0.10	3	2540B		17-May	ST
Total Metals				1	3005/3050			
Arsenic, Total	13.	mg/kg	0.36	1	6010	20-May	21-May	GF
Barium, Total	6.5	mg/kg	3.6	1	6010	20-May	21-May	GF
Cadmium, Total	ND	mg/kg	0.73	1	6010	20-May	21-May	GF
Chromium, Total	49.	mg/kg	1.5	1	6010	20-May	21-May	GF
Lead, Total	49.	mg/kg	3.6	1	6010	20-May	21-May	GF
Mercury, Total	ND	mg/kg	0.45	1	7470/7471	22-May	23-May	DM
Selenium, Total	ND	mg/kg	0.73	1	6010	20-May	21-May	GF
Silver, Total	ND	mg/kg	0.73	1	6010	20-May	21-May	GF
Polychlorinated Biphenyls				1	8080	17-May	18-May	DB
Arochlor 1221	ND	ug/kg	450					
Arochlor 1232	ND	ug/kg	450					
Arochlor 1242/PCB 1016	ND	ug/kg	450					
Arochlor 1248	ND	ug/kg	450					
Arochlor 1254	ND	ug/kg	450					
Arochlor 1260	ND	ug/kg	450					
Arochlor 1262	ND	ug/kg	450					
Arochlor 1268	ND	ug/kg	450					
SURROGATE RECOVERY								
2,4,5,6-Tetrachloro-m-xylene	88.0	%						
Decachlorobiphenyl	72.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

Laboratory Sample Number: L9603153-04
SED 4
Sample Matrix: SOIL

Date Collected: 15-MAY-96
Date Received : 16-MAY-96
Date Reported : 23-MAY-96

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 4 Glass

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Solids, Total	79.	%	0.10	3	2540B		17-May	ST
Total Metals				1	3005/3050			
Arsenic, Total	8.0	mg/kg	0.25	1	6010	20-May	21-May	GF
Barium, Total	12.	mg/kg	2.5	1	6010	20-May	21-May	GF
Cadmium, Total	ND	mg/kg	0.51	1	6010	20-May	21-May	GF
Chromium, Total	16.	mg/kg	1.0	1	6010	20-May	21-May	GF
Lead, Total	62.	mg/kg	2.5	1	6010	20-May	21-May	GF
Mercury, Total	0.34	mg/kg	0.32	1	7470/7471	22-May	23-May	DM
Selenium, Total	ND	mg/kg	0.51	1	6010	20-May	21-May	GF
Silver, Total	ND	mg/kg	0.51	1	6010	20-May	21-May	GF
Polychlorinated Biphenyls				1	8080	17-May	18-May	DB
Arochlor 1221	ND	ug/kg	320					
Arochlor 1232	ND	ug/kg	320					
Arochlor 1242/PCB 1016	ND	ug/kg	320					
Arochlor 1248	ND	ug/kg	320					
Arochlor 1254	ND	ug/kg	320					
Arochlor 1260	ND	ug/kg	320					
Arochlor 1262	ND	ug/kg	320					
Arochlor 1268	ND	ug/kg	320					
SURROGATE RECOVERY								
2,4,5,6-Tetrachloro-m-xylene	86.0	%						
Decachlorobiphenyl	70.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA 086 NH 198958-A CT PH-0574 NY 11148 NC 320 SC 88006 RI A65

Laboratory Sample Number: L9603153-05
SED 5
Sample Matrix: SOIL

Date Collected: 15-MAY-96
Date Received : 16-MAY-96
Date Reported : 23-MAY-96

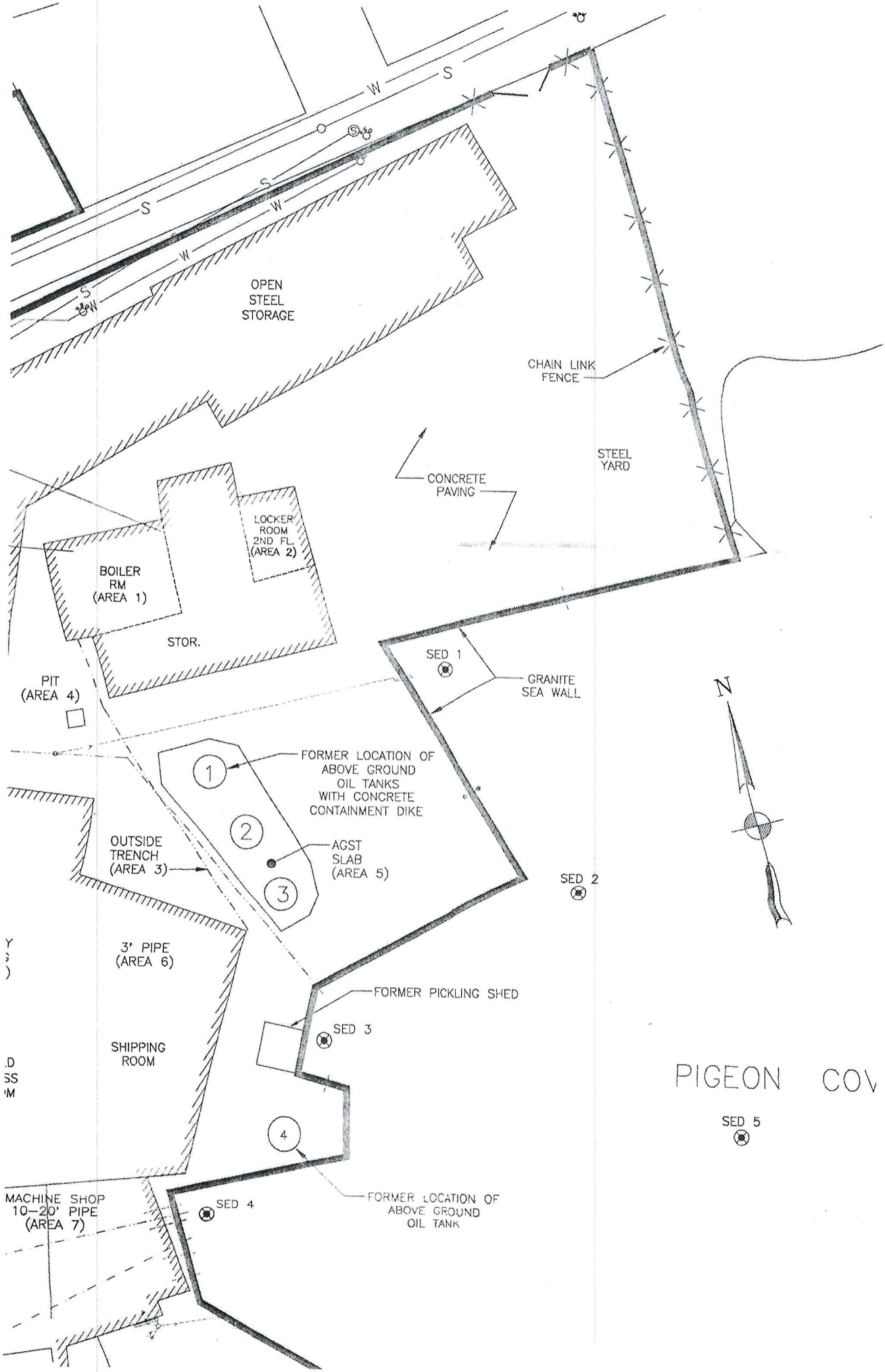
Condition of Sample: Satisfactory

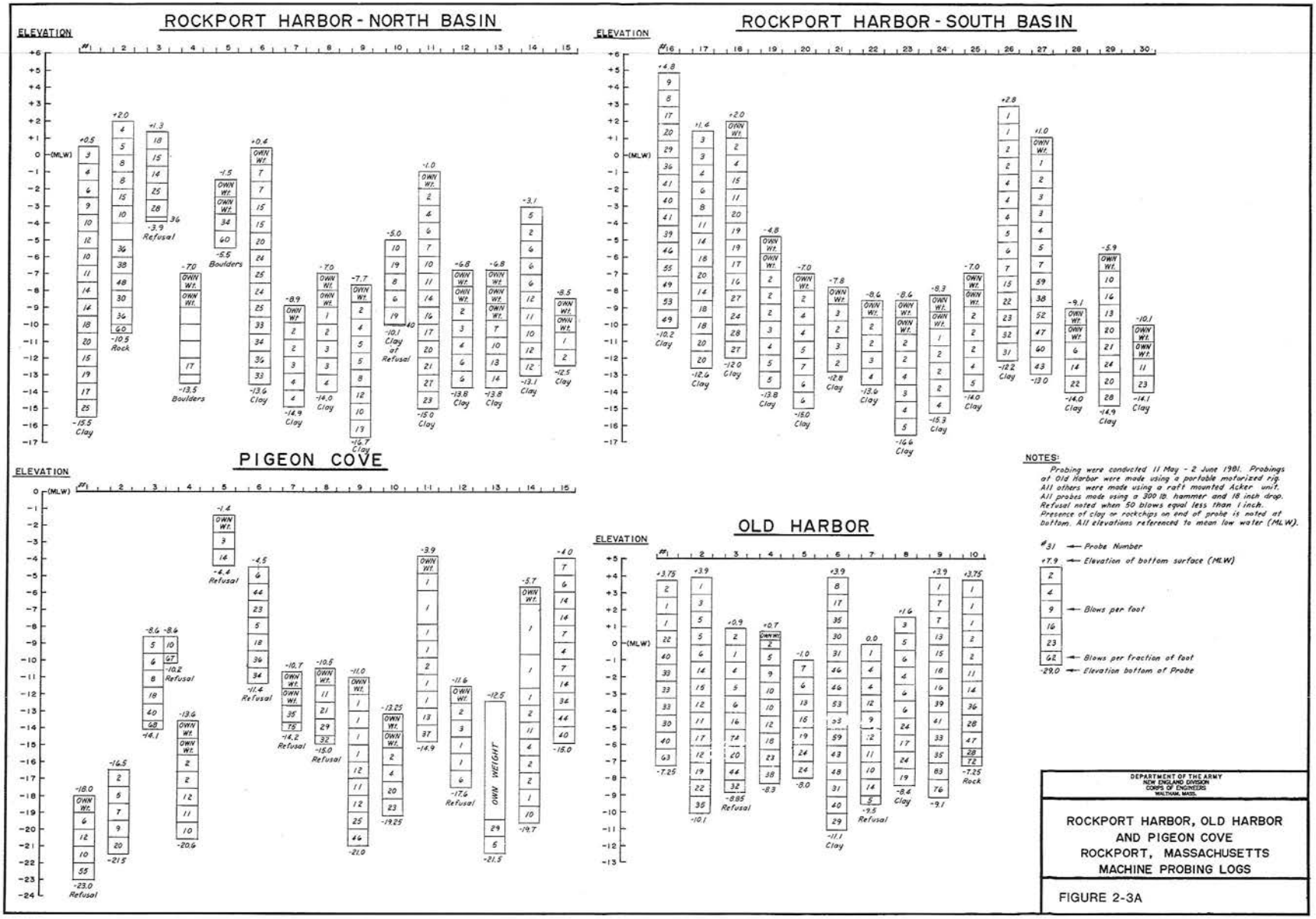
Field Prep: None

Number & Type of Containers: 4 Glass

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Solids, Total	62.	%	0.10	3	2540B		17-May	ST
Total Metals				1	3005/3050			
Arsenic, Total	8.9	mg/kg	0.32	1	6010	20-May	21-May	GF
Barium, Total	23.	mg/kg	3.2	1	6010	20-May	21-May	GF
Cadmium, Total	ND	mg/kg	0.65	1	6010	20-May	21-May	GF
Chromium, Total	30.	mg/kg	1.3	1	6010	20-May	21-May	GF
Lead, Total	83.	mg/kg	3.2	1	6010	20-May	21-May	GF
Mercury, Total	ND	mg/kg	0.40	1	7470/7471	22-May	23-May	DM
Selenium, Total	ND	mg/kg	0.65	1	6010	20-May	21-May	GF
Silver, Total	ND	mg/kg	0.65	1	6010	20-May	21-May	GF
Polychlorinated Biphenyls				1	8080	17-May	18-May	DB
Arochlor 1221	ND	ug/kg	400					
Arochlor 1232	ND	ug/kg	400					
Arochlor 1242/PCB 1016	ND	ug/kg	400					
Arochlor 1248	ND	ug/kg	400					
Arochlor 1254	ND	ug/kg	400					
Arochlor 1260	ND	ug/kg	400					
Arochlor 1262	ND	ug/kg	400					
Arochlor 1268	ND	ug/kg	400					
SURROGATE RECOVERY								
2,4,5,6-Tetrachloro-m-xylene	97.0	%						
Decachlorobiphenyl	65.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I


OPEN
STEEL
STORAGE
CHAIN LINK
FENCE
STEEL
YARD
CONCRETE
PAVING
LOCKER
ROOM
2ND FL.
(AREA 2)
BOILER
RM
(AREA 1)
STOR.
SED 1
GRANITE
SEA WALL
PIT
(AREA 4)
N
FORMER LOCATION OF
ABOVE GROUND
OIL TANKS
WITH CONCRETE
CONTAINMENT DIKE
1
2
3
AGST
SLAB
(AREA 5)
OUTSIDE
TRENCH
(AREA 3)
SED 2
3' PIPE
(AREA 6)
FORMER PICKLING SHED
SED 3
SHIPPING
ROOM
PIGEON COV
SED 5
4
MACHINE SHOP
10-20' PIPE
(AREA 7)
SED 4
FORMER LOCATION OF
ABOVE GROUND
OIL TANK



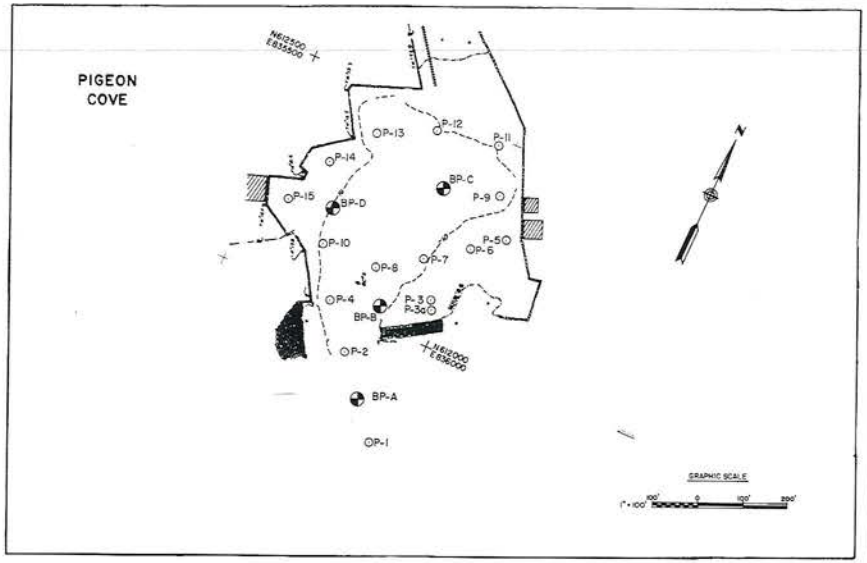
NOTES:

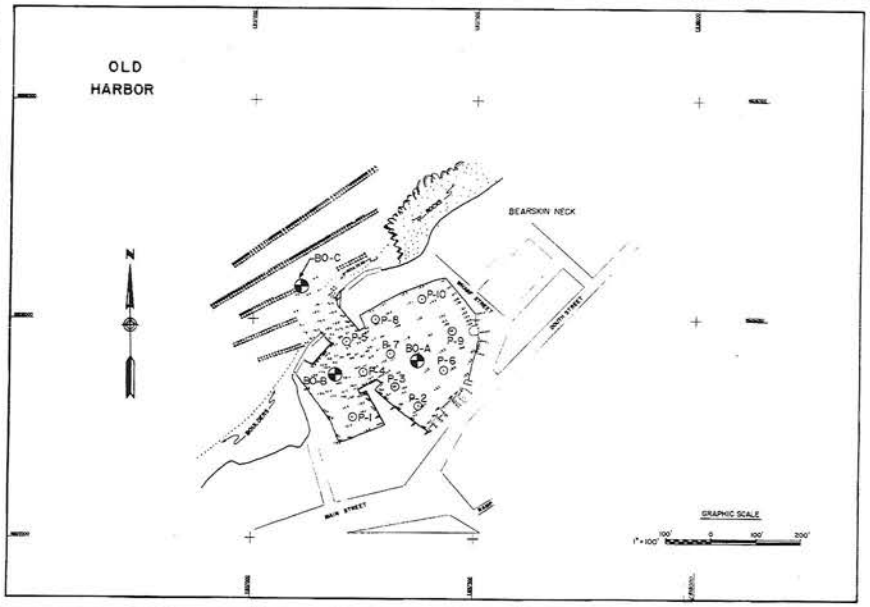
Probing were conducted 11 May - 2 June 1981. Probings at Old Harbor were made using a portable motorized rig. All others were made using a raft mounted Acker unit. All probes made using a 300 lb. hammer and 18 inch drop. Refusal noted when 50 blows equal less than 1 inch. Presence of clay or rockchips on end of probe is noted at bottom. All elevations referenced to mean low water (MLW).

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

ROCKPORT HARBOR, OLD HARBOR AND PIGEON COVE
ROCKPORT, MASSACHUSETTS
MACHINE PROBING LOGS

FIGURE 2-3A





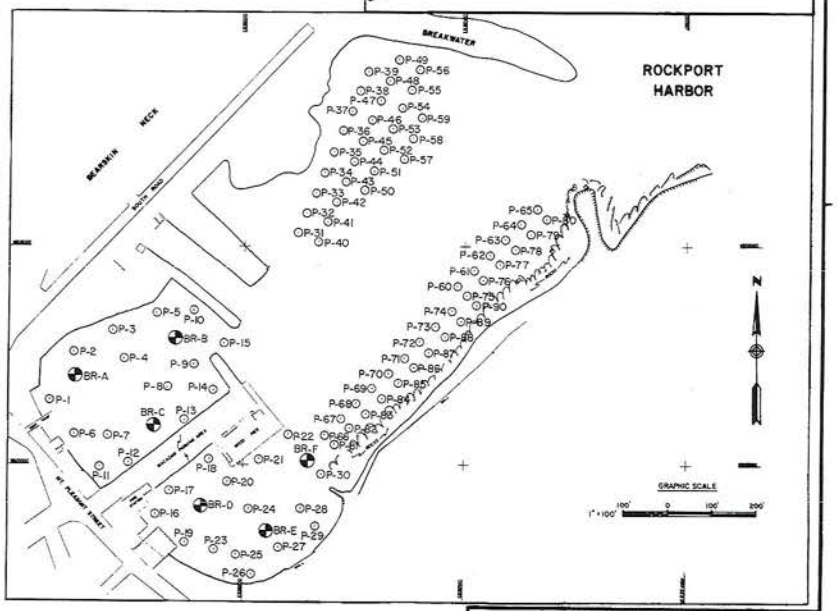
BORING NOTES:

NORMAL LENGTH OF CONTINUOUS DRIVE OF SAMPLING SPOON IS 5 OFEET PENETRATION RESISTANCE OF SAMPLING SPOON INCREASES WITH LENGTH OF DRIVE, AND THEREFORE BLOW COUNTS, GENERALLY INCREASE CORRESPONDINGLY EXCEPT WHERE DISTINCT CHANGE IN MATERIAL OCCUR WITHIN THE LENGTH OF DRIVE. IN GRAVELS, SANDS AND GRAVELS AND SOME GLACIAL TILLS, THE PRESENCE OF COARSE GRAVEL, COBBLE OR BOULDER SIZES CAUSES THE BLOW COUNT TO BECOME ERRATIC, AND THEREFOR MAY NOT BE INDICATIVE OF THE DEGREE OF COMPACTION.

WHILE THE EXPLORATIONS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE OVERBURDEN AND ROCKS OF THIS REGION ARE ANTICIPATED.

LOCATIONS OF BORINGS SHOWN THUS: BR-F

FOR GRAPHIC LOGS OF BORINGS SEE FIGURE 2-2.



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

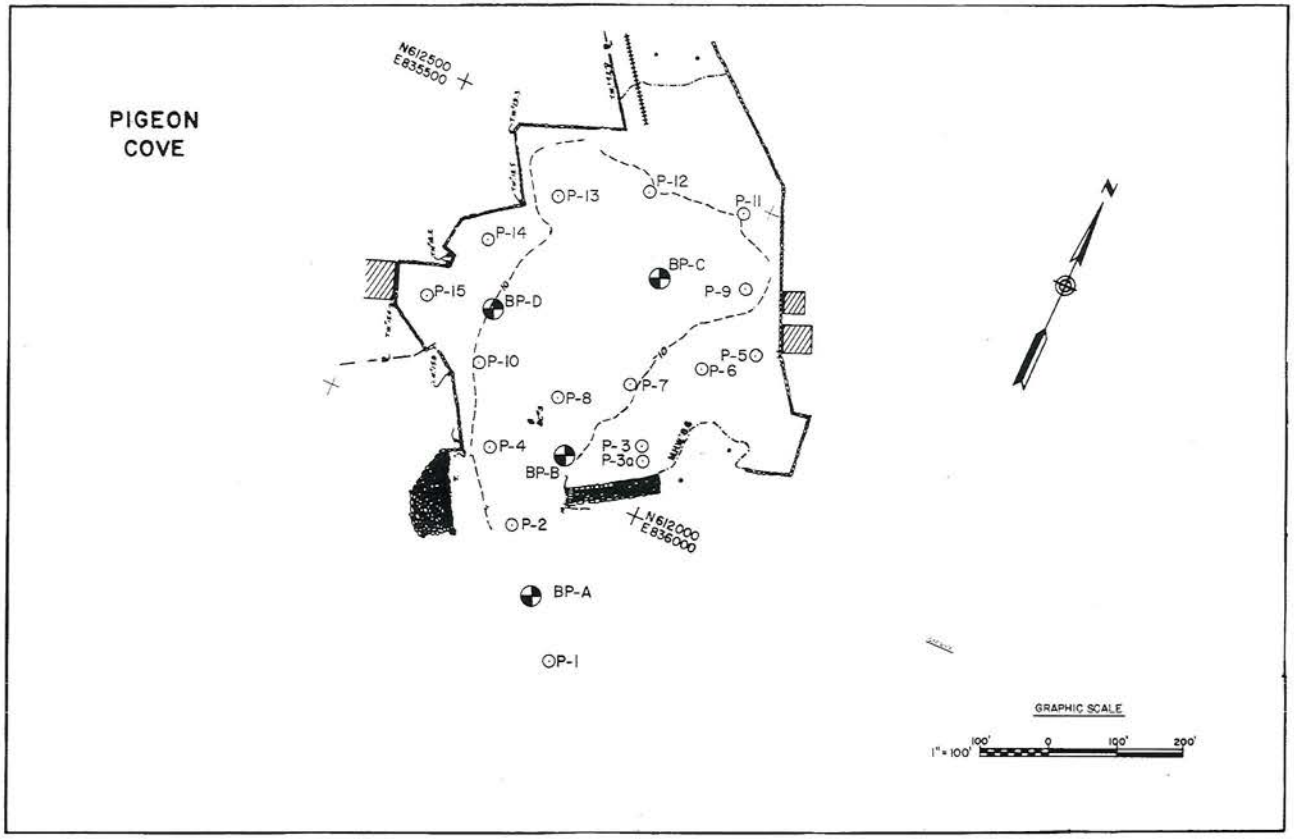
ROCKPORT HARBOR, OLD HARBOR AND PIGEON COVE
ROCKPORT, MASSACHUSETTS
LOCATION OF BORINGS AND PROBINGS

SCALE

FIGURE 2-4

BORING AND PROBE PLAN ENLARGED

CORPS OF ENGINEERS



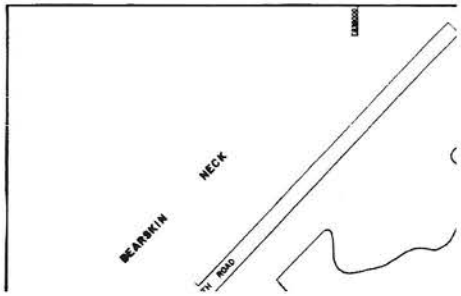
BORING NOTES:

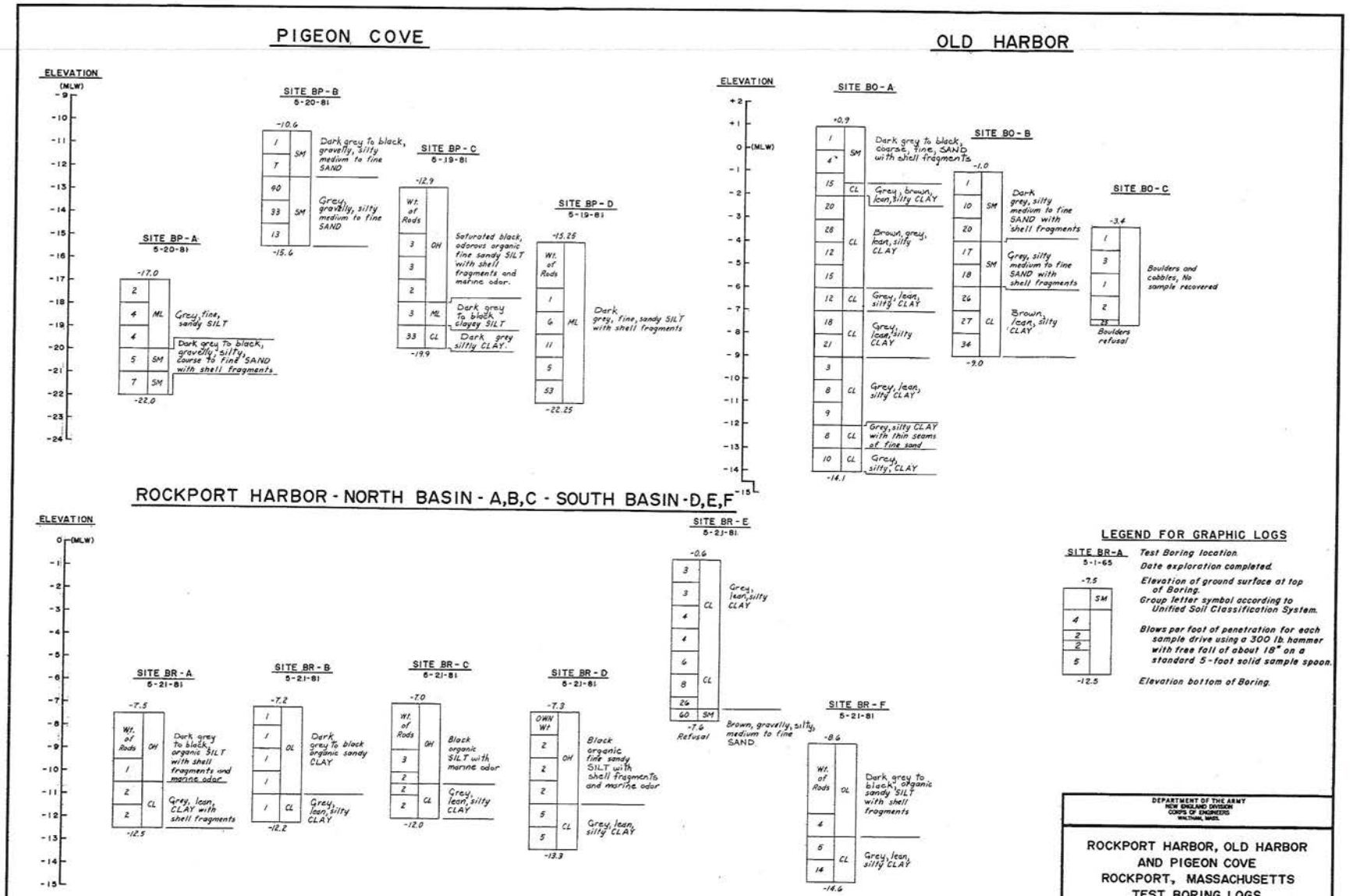
NORMAL LENGTH OF CONTINUOUS DRIVE OF SAMPLING SPOON IS 5.0 FEET. PENETRATION RESISTAN SAMPLING SPOON INCREASES WITH LENGTH OF DRIVE, THEREFORE BLOW COUNTS, GENERALLY INCREASE CORRESPONDINGLY EXCEPT WHERE DISTINCT CHANGE MATERIAL OCCUR WITHIN THE LENGTH OF DRIVE. IN GR SANDS AND GRAVELS AND SOME GLACIAL TILLS, THE PRESENCE OF COARSE GRAVEL, COBBLE OR BOULDER CAUSES THE BLOW COUNT TO BECOME ERRATIC, AND THEREFOR MAY NOT BE INDICATIVE OF THE DEGREE COMPACTION.

WHILE THE EXPLORATIONS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOC AND FOR THEIR RESPECTIVE VERTICAL REACHES, L VARIATIONS CHARACTERISTIC OF THE OVERBURDEN A ROCKS OF THIS REGION ARE ANTICIPATED.

LOCATIONS OF BORINGS SHOWN THUS: BR-F

FOR GRAPHIC LOGS OF BORINGS SEE FIGURE 2-2.



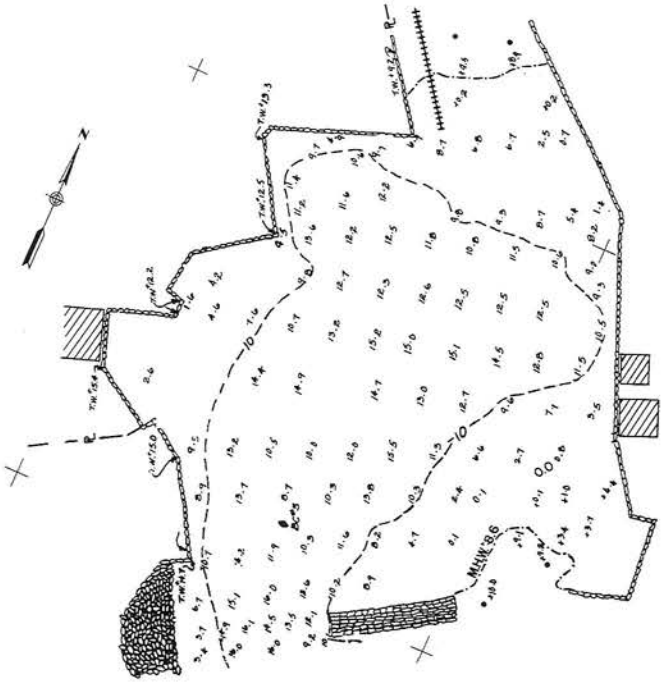


DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

ROCKPORT HARBOR, OLD HARBOR AND PIGEON COVE
ROCKPORT, MASSACHUSETTS
TEST BORING LOGS

FIGURE 2-2

CORPS OF ENGINEERS U. S. ARMY



NOTES:

SOUDINGS ARE IN FEET AND TENTHS AND ARE REFERRED TO THE PLANE OF MEAN LOW WATER.

HYDROGRAPHY FROM SURVEY PERFORMED BY TIBBETS ENGINEERING CO. OF NEW BEDFORD, MASS. ON MARCH 1981.

COORDINATES ARE ON THE LAMBERT GRID SYSTEM FOR THE COMMONWEALTH OF MASSACHUSETTS.

THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.

SAFETY PAYS

GRAPHIC SCALES

1" = 50 FT 50 0 50 100 FT

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

WATER RESOURCES IMPROVEMENT STUDY

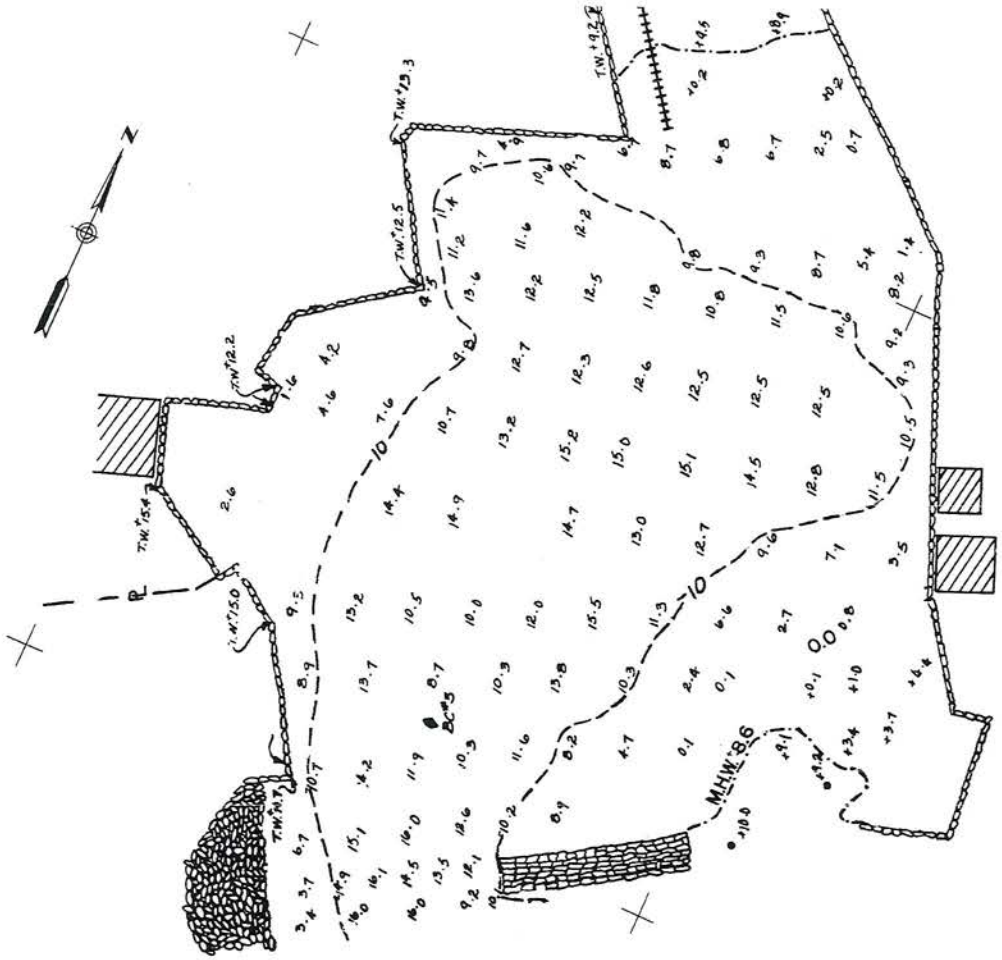
ROCKPORT, MASSACHUSETTS

HYDROGRAPHIC SURVEY

PIGEON COVE

FIGURE 2-1C

SURVEY PLAN ENLARGED



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NOTES:

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