APPENDIX A

Field Exploration Logs

Contract DACW-33-81-C0030

Work Order Number 1

Subsurface Investigation

Sandwich, Massachusetts

RECEIVED
MAR 19 1981
Geotech. Engrg. Br.

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site SANDWICH BULKHEAD — Page 1 of 6 Pages

Boring No. A — Desig. _____ — Diam. (Casing) 4"

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 68 Feet
Elevation Top of Rock _____ M.S.L.
Total Rock Drilled 2 Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 70 Feet
Core Recovered _____ % No. Boxes _____
Core Recovered _____ Ft. _____ Diam. _____ In.
Soil Samples 2 1/2 In. Diam. 13 No.
Soil Samples 1 1/2 In. Diam. 3 No.

Hammer Wt. 300
Hammer Drop 18
Casing Left 0
Subsurface Water Data _____ Page 6
Obs. Well NONE
Drilled By BRIGGS ENGINEERING
Mfg. Des. Drill ACKER TH
Inspected By: C.H. GROSS/N. LANNEY
Classification By: _____
Classification By: _____

Boring Started 2-17-81
Boring Completed 2-20-81

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0840					21	Drove 2'6" x 5' solid spoon from 0 to 5' and took sample.	TOPSOIL SILTY SAND coarse to fine, 10-15% gravel 30-40% fines, roots (SM)
1.0	2	J1 3 JARS	2 1/2	0	54	Recovered 3.4'. Drove 4" casing from 0 to 5'. Pulled casing out and hole stayed open	SAND, poorly graded coarse to fine sand mostly fine, 15 to 20% fine gravel, 5 to 10% non-plastic fines moist, dense (SP) FILL
				5	31		
					22		
	4				22		
0910	6	J2 3 JARS	2 1/2	5	4	Drove 2 1/2" x 5' solid spoon from 5 to 10' and took sample. Recovered 1.4'. Drove 4" casing from 0 to 10.0' and washed out hole with 3" roller bit.	SAND, poorly graded, coarse to fine sand, mostly fine, 15-20% fine gravel, 5-10% non-plastic fines, moist, brown, lenses of dark brown organic material (SP) FILL
				10	3		
					2		
	8				1		
					1		

GENERAL REMARKS:

Boring No. A

NED FORM 58 (Test)

Site: SANDWICH BULKHEAD REHABILITATION

Boring No. "A"

	DEPTH (Ft.)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0950	10	J3 (2 JARS)	2½"	10–15	4, 4, 7, 7, 16	Drove 2½" I.D. by 5' solid spoon from 10.0 to 15.0' and took sample. Recovered 1.2'. Drove 4" casing from 10.0 to 15.0' and washed out hole with 3" roller bit.	SAND, poorly graded coarse to fine sand, mostly fine micaceous sand, 10-15% coarse to fine gravel to 1.5" max., 5-10% non-plastic fines, saturated, gray-brown loose, oily odor. (SP-SM)
1030	15.0	J4 (2 JARS)	2½"	15–20	7, 8, 10, 11, 12	Drove 2½" I.D. by 5' solid spoon from 15.0' to 20.0' and took sample. Recovered 2.4'. Drove 4" casing from 15.0' to 20.0' and washed out hole with 3" roller bit.	SILTY SAND, uniform, mostly fine micaceous sand, 30-40% non-plastic fines, wet, gray, loose-medium dense, slightly organic odor (SM)
1115	20	J5 (2 JARS)	2½"	20–25	8, 5, 7, 10, 11	Drove 2½" I.D. by 5' solid spoon from 15.0 to 20.0' and took sample. Recovered 1.1'. Drove 4" casing from 20' to 25' and washed out hole with 3" roller bit	SILTY SAND, uniform, fine sand, 30-40% non-plastic fines, wet, gray, loose (SM)

Site: SANDWICH BULKHEAD REHABILITATION

Boring No. "A"

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	26	J6 2 JARS	2½"	25	4	Drove 2½" I.D. x 5' solid spoon sampler from 25.0' to 30.0' and took sample. Recovered 1.4'. Drove 4" casing from 25' to 30' and washed out hole with 3" roller bit.	SILTY SAND, uniform fine sand, 35 to 45% non-plastic fines, wet gray, loose (SM)
					5		
				30	9		
	28				11		
					11		
1230	30						
		J7 2 JARS	2½"	30	6	Drove 2½" I.D. by 5' solid spoon sampler from 30.0 to 35.0' and took sample. Recovered 1.0' Drove 4" casing from 30 to 35' and washed out hole with 3" roller bit	SANDY SILT, non-plastic to slightly plastic, 10 to 20% fine sand, gray with brown mottling, wet, soft (ML)
					7		
	32			35	9		
					10		
	34				10		
1425							
	36	J8 2 JARS	2½	35	9	Drove 2½" I.D. by 5' solid spoon sampler from 35 to 40.0 Rec 2.5' Drove 4" casing to 40' and washed out hole with 3" roller bit	CLAYEY SILT, slightly plastic, 1-3% fine sand, stiff to very stiff, saturated, gray (ML) Su(PP) = 2 to 2.5 TSF
					15		
				40	22		
	38				32		
					37		
	40						

Site: SANDWICH BULKHEAD REHABILITATION

Boring No. A

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1515	40						
	42	J9 2jars	2½	40 45	20 25 26 25 22	Drove 2½" I.D. x 5' solid spoon from 40.0 to 45.0' and took sample. Recovered 1.8' Drove 4" casing from 40.0 to 45.0 and washed out hole with 3" roller bit.	CLAYEY SILT, slightly plastic, 1-3% fine sand, very stiff, gray, saturated (ML) Su(PP) = 2 to 2.5 TSF
2-18-81 0830	44 / 45.0						
	46	J10 1jar	2½	45 48	15 13 15	Drove 2½" x 5' solid spoon from 45.0 to 50.0' and took sample Recovered 3.0'. Drove 4" casing from 45.0 to 50.0'	CLAYEY SILT, slightly plastic, stiff, brown, saturated (ML) Su(PP) = 1.0 TSF
	48	J11 1jar	2½	48 50	65 61	and washed out hole with 3" roller bit.	CLAYEY SAND, widely graded, coarse to fine sand, 15-20% subangular gravel to 1.5" max, 25-35% sl. plastic fines, brown, dense (SC)
0930	50	J12 2jars	2½	50 54	80 92 138 180	Drove 2½" I.D. by 5' solid spoon from 50' to 54'. Refusal at 54'. Chipped shoe on spoon. Drove 2½" casing from 50 to 54.0'	SILTY GRAVEL, widely graded, angular to subangular gravel to 2" max. 25 to 35% coarse to fine sand 10-15% non-plastic fines, brown, dense, saturated (GP-GM) GLACIAL OUTWASH
	54	J13				Cored cobbles from 54 to 56.0. Recovered 6.0"	

Site: SANDWICH BULKHEAD REHABILITATION	Boring No. A	Page 5 of 6

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1530							
	56	J14 1 jar	1½	56 / 60	40 / 70 / 150	Drove 1½" x5' solid spoon from 56 to 59, and took sample. Refusal at 59'. Rec. 12" Drove 2½" casing from 56 to 60.0' Used quarry bit to break through cobble at 59'	SILTY SAND widely graded, mostly fine sand, 15 to 25% subangular gravel to 1" max., 15-25% non-plastic fines, brown, dense, saturated (SM)
2-20-81 0900	60	J15 2 JARS	1½	60 / 62.3	66 / 141 / 120	Drove 1½" x5' solid spoon from 60 to 62.33 and hit refusal. Recovered 2'. Drove casing from 60 to 65' and washed out hole with roller bit	SAND, uniform, fine sand, 5-10% non-plastic fines brown, v. dense, saturated (SP-SM)
1030	66	J16 2 JARS	1½	65 / 70	41 / 100 / 193 / 200 / 204	Drove 1½" x5' solid spoon from 65' to 70' and took sample Recovered 30"	SAND, same as above
	70					END OF BORING AT 70.0'	

FORM 58A (Test)

Boring No. A

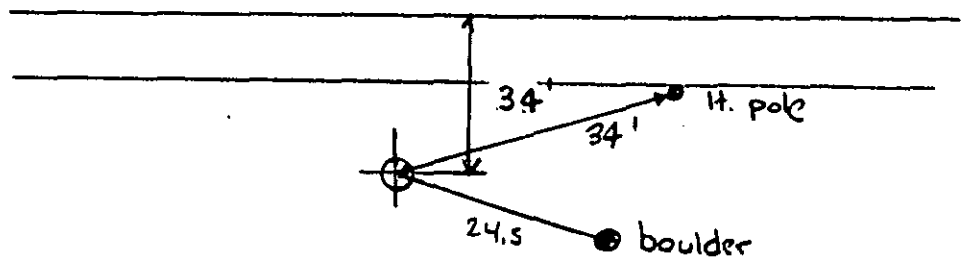
Site: SANDWICH BULKHEAD
Boring No: A

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	DEPTH TO TIDE REMARKS MEASURED FROM [illegible]
2-17-81	0910	—	10	8		3.7
	1230	30	35	6.1		7.1
	1615	45	45	6.5		14.2
2-18-81	0830	45	50	11.0		6.1
	1645	59	59	13		14
2-20-81	0830	58	59	26.0		10
	1230	56	70	7.25		2.75

Note: ~~Depths are in feet below original ground~~

BORING LOCATION SKETCH



NED FORM 59 (Test) MAR 71

Boring No. A

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site SANDWICH BULKHEAD Page 1 of 6 Pages

Boring No. B Desig. " Diam. (Casing) 4"

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 69 Feet
Elevation Top of Rock _____ M.S.L.
Total Rock Drilled 0 Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 69 Feet
Core Recovered _____ % No. Boxes _____
Core Recovered _____ Ft: _____ Diam. _____ In.
Soil Samples 2 1/2 In. Diam. 10 No.
Soil Samples 1 1/2 In. Diam. 1 No.

Hammer Wt. 300 Boring Started 20 FEB 81
Hammer Drop 18" Boring Completed 27 FEB 81
Casing Left 0
Subsurface Water Data _____ Page 6
Obs. Well NONE
Drilled By BRIGGS ENGINEERING
Mfg: Des. Drill ACKER TH
Inspected By: N. LANNEY
Classification By: _____
Classification By: _____

	DEPTH (ft)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
2-20-81	2.0	J1 Jar	2 1/2	0 / 2	13 / 13	Drove 2 1/2" I.D. x 5' solid spoon from 0 to 5' and took sample. Recovered 30".	GRAVELLY SAND, coarse to fine sand, subangular to subrounded gravel to 1" max, 10-15% fines, black, dense few roots (SP-SM) FILL
	4	J2 1 JAR	2 1/2	2 / 5	9 / 6 / 9	Drove 4" casing to 5'. Pulled casing + hole stayed open.	SAND, poorly graded, coarse to fine sand, mostly fine, 3-5% subrounded to subangular gravel to 1.25" max, 5-10% fines, brown, moist (SP-SM) FILL
1445	6.0	J3 1 JAR	2 1/2	5 / 6	14	Drove 2 1/2" I.D. by 5' solid spoon from	SAND, same as above except gravel to 3" max
	8 / 10	J4 3 JARS	2 1/2	6 / 10	4 / 4 / 4 / 4	5.0' to 10.0' and took sample. Recovered 24" Drove 4" casing from 0' to 10' and washed out hole with 3" roller bit.	SILTY CLAY slightly plastic, soft, gray, peat lenses, decaying organic material (CL-OL) Su(PP): 0.25 TSF Strong sulfur odor

GENERAL REMARKS:

Site: SANDWICH MA
BULKHEAD REHABILITATION

Boring No. B

DEPTH (Ft.)	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
12	J4	2½	10	2	Drove 2½" I.D. by 5' solid spoon from 10 to 15' and took sample Recovered 12"	SILTY CLAY, slightly plastic, ~5% fine gravel, soft, gray lense and pockets of decaying plant material (CL). Occasional lenses of coarse gray sand
				2		
			14	3	Drove 4" casing from 10 to 15' and washed out hole with 3" roller bit	
				3		
14				14		
16	J5 1JAR	2½	15 16	18	Drove 2½" I.D by 5' solid spoon from 15' to 20' and took sample. Recovered 30"	SAND, widely graded, coarse to fine sand, 10-15% non-plastic fines, sat. gray, dense (SP-SM)
7-23-81 0815						
	J6 3JARS	2½	16 20	9	Drove 4" casing from 15' to 20' and washed out hole with 3" roller bit	SILTY CLAY, slightly plastic, soft, dk gray, saturated, lenses + pockets of organic matter - peat (CL-OL)
18				8		
				9		
				10		S_u(PP) = 0.5 TSF
20 0930						
	J7 2JARS	2½	20 23	2	Drove 2½" I.D. by 5' solid spoon from 20 to 25' and took sample. Recovered 18"	SILTY CLAY, slightly plastic, very soft, dk gray, saturated, v. thin lenses of organics (CL)
				2		
				3	Drove 4" casing from 20 to 25' and washed out casing with 3" roller bit	
23	J8 1JAR	2½	23 25	72 80		Broken piece of gravel

Site: SANDWICH MA BULKHEAD REHABILITATION	Boring No. "B"	Page 3 of 6

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0945	J9 1jar	2½	25 / 27	60 / 53	Drove 2½" x5' solid spoon from 30' to 35' and took sample. Recovered 24".	SILTY SAND, widely graded mostly coarse, 15 to 20% subangular to subrounded gravel, 15 to 20% non-plastic fines, v. dense red-brown sat (SM)
27	J10 1JAR	2½	27 / 30	48 / 48 / 75	Drove 4" casing from 30' to 35' and washed out casing with roller bit	SILTY SAND, widely graded coarse to fine sand, 5-10% subangular gravel to 1" max. 15-20% non-plastic fines, v. dense brown, saturated (SM)
1115	J11 1jar	1½	30 / 346	28 / 26 / 46 / 44 / 90	Drove 1½" x5' solid spoon from 30' to 34.6' and took sample. Refusal @ 34.6'. Rec'd 6". Tip of spoon chipped. Drove 4" casing from 30' to 35' and washed out 3" casing with roller bit	SILTY SAND, widely graded, coarse to fine sand, 5-10% subangular to rounded gravel to 1" max., 15-20% non-plastic fines, v. dense brown saturated (SM)
1430		2½		112 / 30 for 0.1'	Roller bit to 36.0'	
		1½		23 / 21 / 26 / 35	Drove 1½" x5' solid spoon from 36 to 40.0' and took sample 0" recovery. Cannot go back down for another try since sand runs up hole	

Depth scale: 26, 27, 28, 30, 32, 34, 36, 38, 40

58A(Test)

Boring No. B

Site: SANDWICH MA BULKHEAD REHABILITATION	Boring No. B	Page 4 of 6

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1530	40	J12 1 jar	1½	40	20	Drove 1½" I.D. by 5' solid spoon from 40 to 45' and took sample. Recovered 3". Drove 4" casing from 40' to 45' and washed out casing with 3" roller bit.	SILTY SAND, widely graded, coarse to fine sand, 15-20% subangular to subrounded gravel to 1.5" max, 15-20% non-plastic fines, v. dense, saturated brown (SM)
	42			45	27		
					50		
	44				50		
					100		
45	46	J13 2 jars	2½	45	80	Drove 2½" x 5' solid spoon from 45' to 50' and took sample. Recovered 24". Drove 2½" casing from 45 to 50' and washed out casing with roller bit.	SILTY SAND, widely graded, coarse to fine sand, 5-10% subangular to subrounded gravel to 2½" max. 10-15% non-plastic fines, v. dense brown saturated (SP-SM)
					62		
	48			50	50		
					57		
					60		
2-27-81 0830	50	J14 2 jars	1½	50	83	Drove 1½" x 5' solid spoon from 50 to 55' and took sample Recovered 24" Drove 2½" casing from 50 to 55 and washed out with roller bit	SILTY SAND, widely graded, coarse to fine sand mostly medium and fine 10-15% subangular to subrounded gravel (some fractured pieces) 15-20% non-plastic fines, dense, brown fine (SM)
					54		
	52			55	90		
					95		
	54				77		
55							

58A(Test)

Boring No. B

Site: SANDWICH MA
BULKHEAD REHABILITATION

Boring No. "B"

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0910 56	J15 2JARS	1½	55 60	26 48 103 143 125	Drove 1½" I.D. by 5' solid spoon from 55 to 60' and took sample. Recovered 36" Drove 2½" casing from 55 to 60' and washed out hole. Very difficult to drive casing	SAND uniform, mostly fine sand, 5-10% non-plastic fines, v. dense, brown, saturated (SP-SM)
1000 60	J16 2JARS	1½"	60 62.7	60 150 220	Drove 1½" I.D. by 5' solid spoon sampler from 60 to 62.7' and took sample. Recovered 24"	SAND same as above
64					Drove 2½" casing from 60 to 65' and washed out casing. V. difficult to drive casing	
66 68	J17	1½"	65 69	46 100 155 240	Drove 1½" x 5' solid spoon from 65 to 69' and took sample	SAND, same of above
					END OF BORING @	69'

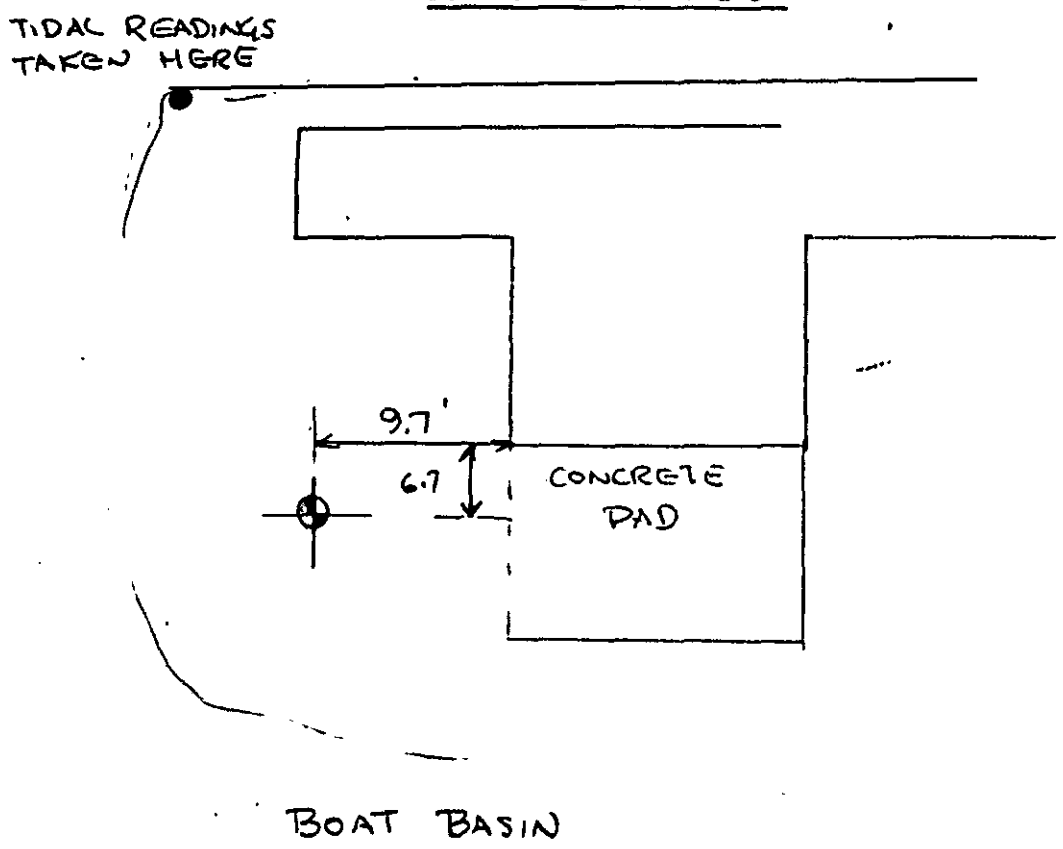
Site: SANDWICH
Boring No: B

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	TIDAL DEPTH ~~REMARKS~~ BELOW WALKWAY
2-20-81	1450	0	10	3.5		
2-23-81	0800	15	15	4.5		13'
	1700	45	50	7.0		7.5
2-24-81	0800	45	50	7.0		12.0
2-27-81	0730	45	50	4.0		7.0
	1430	0	69	5.5		8.5

Note: ~~Depths are in feet below original ground~~.

BORING LOCATION SKETCH



NED FORM 59 (Test) MAR 72

Boring No. B

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site SANDWICH BULKHEAD Page 1 of 4 Pages

Boring No. C Desig. 4 Diam. (Casing) _____

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 40 Feet
Elevation Top of Rock _____ M.S.L.
Total Rock Drilled 0 Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 40 Feet
Core Recovered _____ % No. Boxes _____
Core Recovered _____ Ft : _____ Diam. _____ In.
Soil Samples 2 1/2 In. Diam. 6 No.
Soil Samples 2 1/2 In. Diam. 1/3 No.

Hammer Wt. 300 Boring Started 2-12-81
Hammer Drop 18
Casing Left 0 Boring Completed 2-12-81
Subsurface Water Data _____ Page _____
Obs. Well _____
Drilled By BRIGGS ENGINEERING
Mfg. Des. Drill ACKER TH
Inspected By: N. LANNEY
Classification By: _____
Classification By: _____

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
920	0.4				22	Drove 2 1/2" x 5'	Fill
	0.8					solid spoon from	Pavement
	2	J1	2 1/2	0	11	0' to 5' and took	SILTY SAND, widely graded coarse to fine sand, 10-20% fine gravel, 10-20% non-plastic fines loose, brown (SP-SM) FILL
				5	7	sample. No recovery due to piece of	
	4				5	asphalt in spoon. Went	
					5	back down and recovered 15%.	
0940	5						
	6	J2	2 1/2	5'	6	Drove 2 1/2" I.D x 5'	SILTY SAND, widely graded, medium and fine sand, 10% gravel, 30-40% slightly plastic fines, dk. gray, loose, wet. (SM). Lenses of brown organic material. Strong organic odor.
		J2R			4	solid spoon from 5.0	
				10'	6	to 10.0' and took sample. Recovered 25%. Drove 4" casing	
	8				6	from 0 to 10.0'	
					8	and washed out hole with 3" roller bit.	

GENERAL REMARKS:

NED FORM 58 (Test)

Boring No. C

Site: SANDWICH MA
BULKHEAD REHABILITATION

Boring No. "C"

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
10				7	Drove 2½" I.D. x5' solid spoon from 10 to 15' and took sample. No recovery	
12.0				4		
14	J3 1jar	2½	12	12	Redrove spoon and recovered 10%. Drove 4" casing from 10 to 15' and washed out casing with 3" roller bit.	SAND, widely graded mostly coarse sand, and fine gravel, 10-20% non-plastic fines, dk. gray, wet (SP-SM)
			15	13		
15.0				13		
16	J4 1jar	2½	15	15	Drove 2½" x5' solid spoon from 15' to 20' and took sample. Recovered 10%. Drove 4" casing from 15' to 20' and washed out hole with 3" roller bit	SANDY SILT, slightly plastic, 20-30% fine sand, dense, saturated (ML)
			20	14		
18				19		
				20		
20.0				20		
	J5 1jar	1½	20	7	Drove 1½" I.D. x5' solid spoon from 20' to 25' and took sample. No recovery	SILTY SAND, uniform, mostly medium sand, 10-15% non-plastic fines, lt. gray, loose saturated (SP-SM)
22.0			22	9		
	J6 1jar	1½	22	2	~~Redrove 2½" solid~~ spoon and recovered 5%. Drove 4" casing from ~~20' to 25' and washed~~ out hole with 3" roller bit	SILT, slightly plastic, soft, saturated gray (ML)
24.0			24	6		
				32		

Site: SANDWICH MA
BULKHEAD REHABILITATION

Boring No. "C"

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
26.0	17 1jar	2½"	25 26	48	Drove 2½" ID x 5' solid spoon from	SILTY SAND, uniform, fine 30-40% non-plastic, dense lt. brown, sat. (SM)
	18 2jars	2½"	26 30	58 100 100	25 to 29.0 and took sample. Recovered 25%. Drove 4" casing from 25 to 30' and washed out casing with 3" roller bit	SILTY SAND widely graded, coarse to fine sand, 10-20% subangular fine gravel 10-20% non-plastic fines brown, dense, saturated (SM)
				REF.		
30.0	19	2"	30 35	12 45 56 57 55	Drove 2" ID x 5' solid spoon from 30 to 35' and took sample Recovered 10%. Drove 4" casing from 30 to 35' and washed out casing with 3" roller bit. Shoe of spoon chipped	SAND, poorly graded, coarse to fine, mostly fine, 10-15% subrounded gravel, 10-15% non-plastic fines, brown, dense, saturated (SP-SM)
32 34						
36 38	10 2jars	1½"	35 40	42 50 47 41 56	Drove 1½" x 5' solid spoon from 35' to 40' and took sample Recovered 30%.	SAND, poorly graded coarse to fine mostly fine sand, 10-15% non-plastic fines, brown, dense, saturated (SP-SM)
					END OF BORING AT	40'

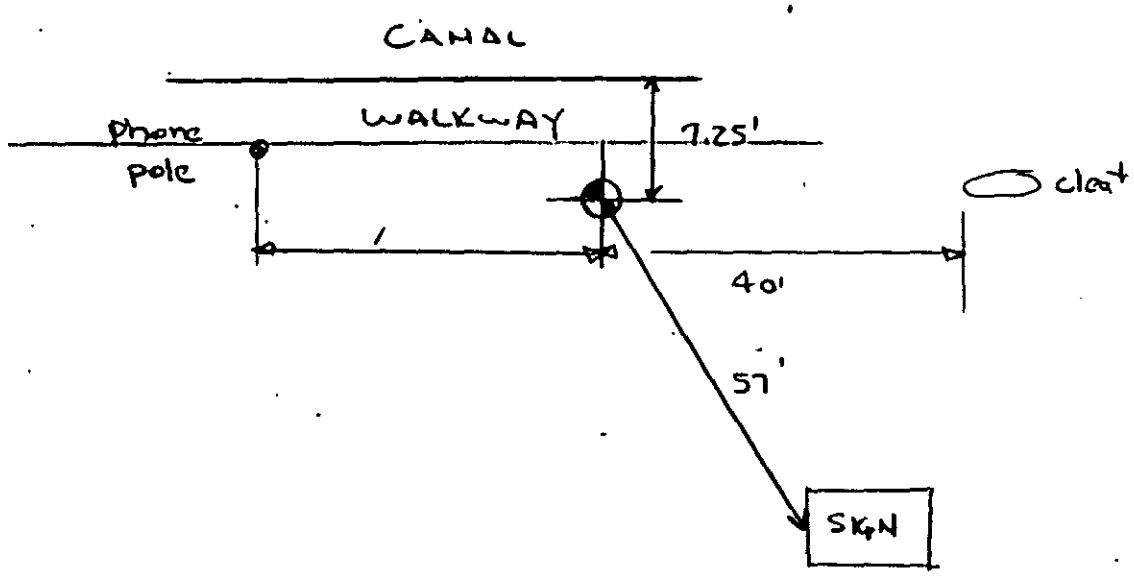
Site: SANDWICH
Boring No: C

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	~~REMARKS~~ DEPTH TO TIDE MEASURED FROM WALKWAY
2-11-81	1100	10'	15'	5.25		3.0
2-11-81	1505	30	35	9.0		8.0
2-11-81	1600	35	40	5.0		6.0'

~~Note: Depths are in feet below original ground~~

BORING LOCATION SKETCH



NED FORM 59 (Test) MAR 71

Boring No. C

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site SANDWICH BULKHEAD Page 1 of 6 Pages
Boring No. D Desig. " Diam. (Casing) 3"
Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 69 Feet
Elevation Top of Rock _____ M.S.L.
Total Rock Drilled 0 Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 69 Feet
Core Recovered _____ % No. Boxes _____
Core Recovered _____ Ft: _____ Diam. _____ In.
Soil Samples 2 1/2 In. Diam. 2 No.
Soil Samples 2 1/2 In. Diam. 16 4 No.

Hammer Wt. 300 Boring Started 27 FEB 81
Hammer Drop 18" Boring Completed 3 MAR 81
Casing Left 0
Subsurface Water Data _____ Page 6
Obs. Well _____
Drilled By BRIGGS ENGINEERING
Mfg. Des. Drill ACKER MODEL TH
Inspected By: N. LANNEY
Classification By: _____
Classification By: _____

DEPTH	1" = 2	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
27 FEB 81 1500	2	J1 2JARS	2 1/2	0 3	8 7 7	Drove 2 1/2" x 5' Solid spoon from 0 to 5' and took sample. Recovered 18". Drove 3" casing to 5', Pulled out	SANDY SILT, slightly plastic, 10-20% fine sand, firm, moist light gray (ML) FILL Layer of yellow silt
3.0	4	J2 1JAR	2 1/2	3 5	13 12	casing Hole stayed open.	SILTY SAND, medium and fine sand, 20-30% sl. plastic fines, 5% organics, firm moist, gray (SM)
1530 5.0	6 8	J3 2JARS	2"	5 9	4 4 5 5	Drove 2" x 5' solid spoon from 5 to 10' and took sample Recovered 18'. Drove 3" casing from 0 to 10' and washed out casing with 2 8/8" roller bit	SILTY SAND, mostly fine sand, 30-40% slightly plastic fines, 3-5% organics and roots, gray, moist, loose (SM-ML)
9.0	10	J4 1JAR	2"	9 10	5		Interbedded PEAT and SILT, nonplastic soft, gray (ML)

GENERAL REMARKS:

NED FORM 58 (Test)

Boring No. D

Site: SANDWICH MA BULKHEAD REHABILITATION	Boring No. D	Page 2 of 6

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1600	J5 3JARS	2"	10	1	Drove 2" x5' solid spoon from 10' to 15' and took sample. Recovered 30"	SILTY CLAY slightly plastic, pockets and lenses of organic + plant material, dk gray, firm, sat. (CL) Su(PP) = 0.75 TSF
12			13	2		
				5	Drove 3" casing to 15' and washed out with side discharge chopping bit.	
13	J6 1JAR	2"	13	15		SAND uniform mostly fine sand 3-5% non-plastic fines, dense, gray, sat. (SP)
14			15	22		
1620	J7 1JAR	2"	15	12	Drove 2" x5' solid spoon from 15 to 20' and took sample. Recovered 30"	SAND same as J-6 (SP)
16			17	9		
17	J8 1JAR	2"	17	3	Drove 3" casing to 20' and washed out hole with side discharge chopping bit	SANDY SILT slightly plastic, 30-40% fine sand, loose, brown + gray, saturated (ML)
18			19	5		
19				13		
1640	J9 2JARS	2"	20	21	Drove 2" x5' solid spoon from 20 to 25' and took sample. Recovered 33"	SILTY GRAVELLY SAND coarse to fine sand, 35 to 45% coarse to fine, angular to subrounded gravel to 2" max, 10-15% non-plastic fines, brown, v. dense, saturated (SM-GM)
22			25	47		
				102	Drove 2" casing to 25' and washed out casing with 2 3/8" roller bit. Difficult to drove casing from 22 to 23' due to cobble	
24				36		
				44		

Site: SANDWICH MA
BULKHEAD REHABILITATION

Boring No. D

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
3-2-81 0830	26	J10 2JARS	2"	25 30	36 84 78 200 205	Drove 2" ID x 5' solid spoon from 25 to 30' and took Sample. Recovered 36" Drove 3" casing to 30' and washed out casing with 2 3/8" roller bit	SILTY SAND, coarse to fine sand, 10-15% subangular to subrounded fine to coarse gravel, broken pieces of cobble, 10-15% non-plastic fines, dense brown, saturated (SP-SM) gravel content increased with depth
0935	28 / 30.0	J11 1JAR	2"	30 32	66 126	Drove 2" I.D by 5' solid spoon from 30 to 35' and took sample. Recovered 24"	SAND uniform mostly fine sand 5-10% non-plastic fines v. dense brown, saturated (SP-SM)
	32.0	J12 1JAR	2"	32 35	142 178 194	Drove 3" casing to 35' and washed out hole with 2 3/8" roller bit.	SANDY GRAVEL, poorly graded, subangular to subrounded gravel to 2" max., 30-40% coarse to fine sand, 5-10% non-plastic fines, dense brown saturated (GP-GM)
1045		J13 1JAR	2"	35 36	66	Drove 2" ID by 5' solid spoon from 35 to 40' and took sample. Recovered 36". Drove 3" casing to 40' and washed out hole with 2 3/8" roller bit. Easy to drive casing	SANDY GRAVEL, same as J13
	36	J14 1JAR	2"	36 38	76 100		SAND, poorly graded, coarse to fine, mostly fine sand, 5-10% non-plastic fines dense brown, saturated (SP-SM)
	38	J15 1JAR	2"	38 40	133 200		SANDY GRAVEL, coarse to fine, subangular to subrounded gravel 30 to 40% coarse to fine sand 5-10% non-plastic fines, dense brown, saturated (GP-GM)

Site: SANDWICH MA BULKHEAD REHABILITATION

Boring No. D

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1200						
42	J16 3JARS	2"	40	74	Drove 2" I.D by 5' solid spoon from 40 to 45' and took sample. Recovered 36"	GRAVELLY SAND poorly graded coarse to fine sand, mostly fine, 15 to 20% subrounded gravel, mostly fine gravel, 5-10% non-plastic fines, dense, brown, saturated (SP-SM)
				102		
			45	100	Drove 3" casing from 40 to 45' and washed out casing with 2 3/8" roller bit	
				84		
44				116		
1400						
46	J17 2JARS	2"	45	83	Drove 2" I.D. by 5' solid spoon from 45 to 50' and took sample. Recovered 30"	GRAVELLY SAND, same as above except for pieces of broken cobble.
				126		
			50	123	Drove 3" casing to 50' and washed out casing with 2 3/8" roller bit.	
48				113		
				79		
1445 50						
	J18 2JARS	2"	50	53	Drove 2" ID by 5' solid spoon from 50 to 52.6' and hit refusal. Took sample and recovered 24".	GRAVELLY SAND poorly graded, coarse to fine sand mostly coarse, subangular to subrounded fine gravel little coarse gravel, 5-10% non-plastic fines dense saturated, brown (SP-SM)
52			52.6	147		
				180		
54					Drove 3" casing to 55' and washed out hole with 2 3/8" roller bit.	

Site: SANDWICH MA

BULKHEAD REHABILITATION

Boring No. D

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER PT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1630	56		2"		160 / 200	Drove 2" x 5' solid spoon from 55 to 56.4 and hit refusal. No recovery. Drove 3" casing to 57' and washed out hole with roller bit.	
59	58	J19 UAR	1½	57 / 59.5	114 / 150 / 200	Drove 1½" by 5' solid spoon from 57 to 59.5 and took sample. Refusal at 59.5'. Recovered 18". Drove 3" casing from 57 to 60' and washed out hole with 2⅞" roller bit. Difficult to drive casing.	SILTY SAND, coarse to fine sand, mostly fine, 5-10%, fine subangular to subrounded gravel, 10-15% non-plastic fines, v. dense, brown, saturated (SP-SM)
3 MARCH 0945 60	62	J20 2JARS	1½	60 / 62.4	80 / 155 / 200	Drove 1½" x 5' solid spoon from 60 to 62.4' and hit refusal. Took sample and recovered 24".	SAND, poorly graded, coarse to fine sand, mostly fine sand, 5-10% non-plastic fines, v dense, brown, saturated (SP-SM)
1115	64					Drove 3" casing to 65'. Very difficult to drive casing. Must washed out casing every 2', then drive 2' more.	
68	66	J21	1½"	65 / 68	63 / 78 / 135	Drove 1½" by 5' solid spoon from 65 to 69' and took sample Recovered 24"	SAND, same as J20
69		J22	1½"	68 / 69	290		SAND uniform, fine, 5-10% non-plastic fines,
	70				END	OF BORING AT 69'	v. dense sat. brown (SP-SM)

Site: SANDWICH MA

Boring No: D

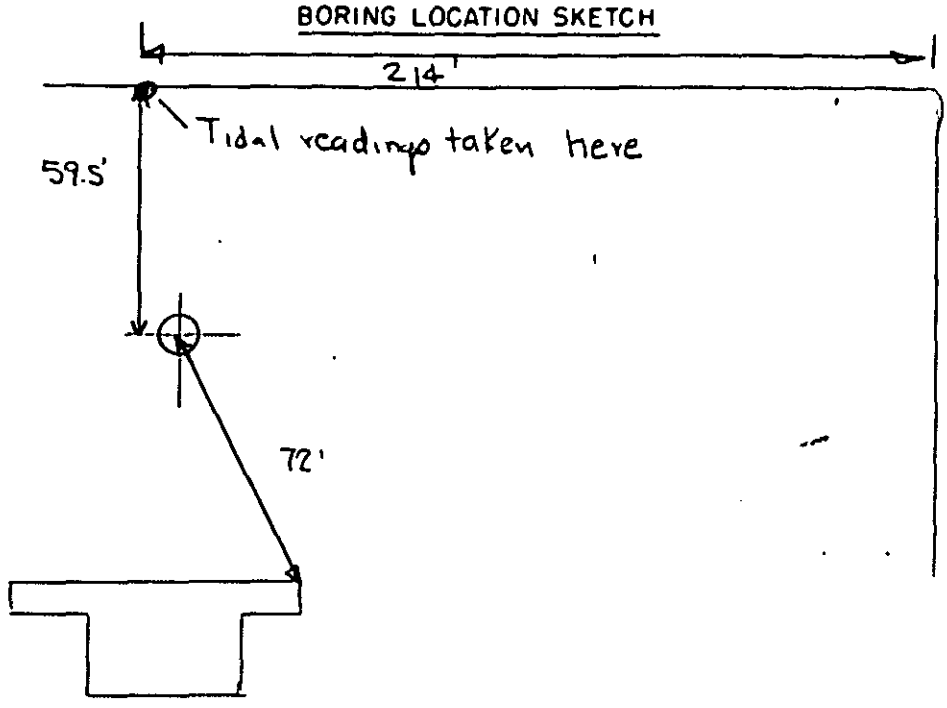
SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	TIDAL READINGS REMARKS
27MARCH81	1543	10	10	3.5		6.5
2MARCH81	0745	25	25	4.75		3.75
3MARCH81	1130	60	69	7		7.5

Note: ~~Depths are in feet below original ground~~

Ground surface at Boring "D" 1-2' above top of walkway

BORING LOCATION SKETCH



D FORM 59 (Test)

Boring No. D

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site SANDWICH, MA, BULKHEAD REHABILITATION Page 1 of 6 Pages

Boring No. "E" Desig. _____ Diam. (Casing) 3"

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 70.0 Feet
Elevation Top of Rock — M.S.L.
Total Rock Drilled 0 Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 70.0 Feet
Core Recovered _____ % No. Boxes _____
Core Recovered _____ Ft: _____ Diam. _____ In.
Soil Samples 2 1/2" In. Diam. 3 No.
Soil Samples 2" / 1 1/2" In. Diam. 18 / 6 No.

Hammer Wt. 300 lb Boring Started 3-3-81
Hammer Drop 18"
Boring Completed 3-5-81
Casing Left 0
Subsurface Water Data See Page 6
Obs. Well None
Drilled By BRIGGS ENGR. & TESTING
Mfg. Des. Drill ACKER MODEL TH
Inspected By: N. LANNEY
Classification By: _____
Classification By: _____

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
3-3-81 1400		J-1 1 JAR	2 1/2"	0.0 TO 2.0'	11 / 12	DROVE 2 1/2" I.D. x 5' SOLID SPOON SAMPLER FROM 0.0 TO 5.0' AND TOOK SAMPLE. RECOVERED 18.0"	Silty Sand widely graded coarse to fine sand, 15 to 25% subangular gravel 10 to 20% nonplastic fines (SW-SM)
2.0	2	J-2 1 JAR	2 1/2"	2.0 TO 3.0	8	DROVE 3.0" CASING TO 5.0'. PULLED CASING OUT AND HOLE REMAINED OPEN	Silty Sand medium to fine sand, 20 to 30% silt, gray (SM)
3.0	4	J-3 2 JARS	2 1/2"	3.0 TO 5.0'	9 / 10		SAND poorly graded medium sand, gray (SP)
5.0	6 / 8	J-4 3 JARS	2.0"	5.0 TO 10.0'	2 / 2 / 2 / 3 / 3	DROVE 2.0" ID SOLID SPOON SAMPLER FROM 5.0 TO 10.0' RECOVERED 3.0' DROVE 3.0" CASING TO 10.0'. WASHED OUT BORING HOLE WITH SIDE DISCHARGING CHOPPING BIT	Interbedded sand, clayey silt, and fiberous material J-1/3 Silty Sand medium to fine sand, 30 to 40% silt, gray, brown organic fibrous material, very strong odor, consistency soft (SM) J-2/3 Silty Sand medium to fine sand, 15 to 25% silt, gray, moist, soft (SM) J-3/3 Clayey Silt gray 5 to 10% fine sand 10% fibrous organic material and wood chips, soft (ML)

GENERAL REMARKS: CATCHER IN FOR ALL SAMPLING. OBSTRUCTION ENCOUNTERED AT 17.5' HOLE MOVED, SEE FIGURE PAGE 6.

Site: SANDWICH, BULKHEAD REHABILITATION

Boring No. E

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1430	12, 14, 15.0	J-5 1 JAR	2.0"	10.0 TO 15.0'	3, 3, 3, 3, 6	DRIVE 2.0" ID x 5.0' SOLID SPOON SAMPLER FROM 10.0 TO 15.0'. RECOVERED 12.0". DRIVE 3.0" CASING 10.0 TO 15.0'. WASHED OUT BORING WITH SIDE DISCHARGING CHOPPING BIT	PEAT brown Fiberous material, 10 TO 15% silt, gray, Saturated, very strong organic odor, soft, (Pt)
1450	16, 18, 20.0	J-6 3 JARS	2.0"	15.0 TO 20.0'	2, 1, 90 Refusal	DRIVE 2.0" x 5' SOLID SPOON SAMPLER 15.0 TO 17.6'. REFUSAL AT 17.6'. RECOVERED 2.6'. DRIVE 3.0" CASING TO 17.5'. WASHED OUT BORING WITH SIDE DISCHARGE CHOPPING BIT. ROCK OBSTRUCTING BORING. DRILLED ROCK USING ROLLER BIT FOR 1.0'. UNABLE TO BREAK ROCK. MOVED BORING LOCATION (SEE PG 7.6)	Layers of clayey silt and peat. J-1/3 & J-2/3 Clayey Silt Saturated, soft, 10% Fiberous organic material, 5% Fine Sand, Slightly plastic, (ML). J-3/3 Peat brown Fiberous Peat, 15 to 25% gray silt, Saturated, soft (Pt)
3-9-81 0815	20.0, 21.0	J-7 3 JARS	2.0"	20.0 21.0'	13		CLAY, high plasticity, Stiff, gray 3 to 8% Silt, 2 to 7% med to fine Subangular Gravel (CH)
	22, 24, 24.0, 25.0	J-8 1 JAR	2.0"	21.0 TO 29.0'	31, 40, 46	DRIVE 2.0" x 5.0' SOLID SPOON SAMPLER FROM 20.0 TO 25.0' AND TOOK SAMPLE. RECOVERED 2.5'	SAND coarse to fine Sand, 8 to 12% Silt, 3 to 8% Fine angular Gravel, gray, (SW)
		J-9 1 JAR	2.0	29.0 25.0'	60		Silty Sand, coarse to fine Sand, 10 to 15% Silt, 5 to 10% Fine Subangular Gravel, gray (SW-SM)

Boring No. E

Site: SANDWICH, BULKHEAD REHABILITATION

Boring No. F

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVT	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
3-4-81							
	26.0 / 26	J-10 1 JAR	2.0"	25.0 26.0'	31	DROVE 3.0" CASING FROM 20.0 TO 25.0' WASHED OUT HOLE WITH ROLLER BIT	Silty Sand, medium to fine Sand, 10 to 20% Silt, gray, saturated (SP-SM)
0930	28 / 28.4	J-11 1 JAR	2.0"	26.0 TO 28.4'	44 / 54	DROVE 2.0" x 5' SOLID SPOON SAMPLER AND TOOK SAMPLE. RECOVERED 3.5'	Silty Sand, coarse to fine, pred. Fine Sand, 10 to 15% Silt, gray 2 to 5% rounded Gravel, saturated, (SP-SM)
	30.0 / 30	J-12 1 JAR	2.0"	28.4 TO 30.0'	59 / 59	DROVE 3.0" CASING FROM 25.0 TO 30.0' WASHED OUT BORING WITH ROLLER BIT	Silty Sand, medium to fine Sand, 5 to 10% Silt, gray, saturated, (SP-SM)
1030	32 / 33.0	J-13 3 JARS	2.0"	30.0 TO 33.0'	63 / 96 / 85	DROVE 2.0" x 5' SOLID SPOON SAMPLER FROM 30.0 TO 35.0' AND TOOK SAMPLE. RECOVERED 2.25'	Interbedded 2.0" layers of Silt with 6.0 to 8.0" layers of Sand (J-13 1 of 3) Silt nonplastic gray saturated (ML) (J-13 2 of 3) Silty Sand, med. Sand 15 to 20% Silt, 3 to 8% Fine Gravel, gray (SP-SM) (J-13 3 of 3) Silty Sand, coarse to fine Sand, 10 to 15% Silt, Sat. (SM)
	34 / 35.0	J-14 1 JAR	2.0"	33.0 TO 35.0'	60 / 62	DROVE 3.0" CASING FROM 30.0 TO 35.0'. WASHED BORING HOLE USING ROLLER BIT	Gravelly Sand, coarse to fine Sand, predominately coarse, 12 to 17% rounded and Subangular Gravel, 10 to 15% Silt, brown, saturated, (SP)
1115	36	J-15	2.0"	35.0 TO 35.8	46	DROVE 2.0" x 5' SOLID SPOON SAMPLER FROM 35.0 TO 40.0' AND TOOK SAMPLE.	Silty Sand, medium to fine Sand, predominately med, 10 to 15% Silt, 2 to 5% fine rounded & Subangular Gravel (SP-SM)
	38	J-16 1 JAR	2.0"	35.8 TO 40.0'	62 / 57 / 74 / 64	RECOVERED 1.0' DROVE 3.0" CASING FROM 35.0 TO 40.0'. WASHED BORING HOLE USING ROLLER BIT	Silty Sand, medium to fine Sand, predominately medium, 15 to 20% Silt, 3 to 8% fine rounded and Subangular Gravel, brown (SP-SM)
	40						

FORM 58A (Test)

Boring No. _____

Site: SANDWICH, BURKHEAD REHABILITATION

Boring No. E

3-4-81

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
1200	42	J-17 1 JAR	2.0"	40.0 TO 42.0'	31 / 49 / 84 / 144	DROVE 2.0" x 5' SOLID SPOON SAMPLER FROM 40.0 TO 45.0' AND TOOK SAMPLE. REMOVAL OF SAMPLER VERY DIFFICULT. RECOVERED 3.0'. DROVE 3.0" CASING FROM 40.0 TO 45.0', WASHED OUT	Silty Sand, coarse to fine sand, predominately medium, 10 to 15% silt, 2 to 5% fine rounded and subangular gravel, brown, saturated. (SM)
41.0	44	J-18 1 JAR	2.0"	44.0 44.5'	224	BORING HOLE USING ROLLER BIT	Silt, nonplastic, stiff, brown (ML)
44.5		J-19 1 JAR	2.0"	44.5 45.0'			Silt, nonplastic, stiff, rusty brown (ML)
45.0							
1315	46	J-20 J-21	2.0	45.0 TO 46.5'	98 / 200	DROVE 2.0" x 5' SOLID SPOON SAMPLER FROM 45.0 TO 46.5'. OBSTRUCTION ENCOUNTERED 200 blows 46.0 TO 96.5	Interbedded narrow bands of silt and sand. (J-20) Silty Sand, medium to fine sand, 18 to 23% silt, mottled rusty brown and brown, saturated (SP-SM) (J-21) Silty Sand, fine sand, 25 to 30% silt, grey (SM)
	48					RECOVERED 1.0'. DROVE 3.0" CASING FROM 45.0 TO 48.0 ft. WASHED BORING HOLE OUT USING ROLLER BIT. DROVE 2.0" CASING FROM 48.0 TO 50.0 ft AND WASHED OUT BORING HOLE	
50.0	50						
1445	52	J-22 1 JAR	1.5"	50.0 TO 52.0'	145 / 125	DROVE 1.5" x 5' SOLID SPOON SAMPLER FROM 50.0 TO 52.0'. BORING STOPPED DUE TO HIGH BLOW COUNT	Silty Sand, medium to fine sand, 12 to 17% silt, 5% rounded and subangular gravel to 1.5", grayish brown (SP-SM)
	54	J-23 1 JAR	1.5"	52.0 TO 53.0	129 / 180	RECOVERED 2.0'. DROVE 3.0" CASING FROM 50.0 TO 55.0', CASING WAS DIFFICULT TO DRIVE. HOLE WASHED ONCE AT 54.0'	Silty Sand, coarse to fine sand, predomantely medium, 8 to 13% silt, brown (SM)

Site: SANDWICH, BOURNEHEAD REHABILITATION

Boring No. E

	DEPTH (r.2")	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
5 MARCH 8 0815	58	J-24 1 JAR	1.5"	55.0 TO 58.6'	58	DROVE 1.5" x 5' SOLID SPOON SAMPLER FROM 50.0 TO 59.0' AND TOOK SAMPLE	Silty Sand, medium to Fine Sand, predominately medium, 12 to 17% silt, saturated, brown (SM)
					90	SAMPLING STOPPED AT 59.0' DUE TO HIGH BLOW COUNT	
	58				133	RECOVERED 2.4'	
					204	DROVE 3.0" CASING FROM 55.0 TO 60.0'	
		J-25 1 JAR	1.5	58.6 59.0			Silty Sand, Fine Sand, 15 to 25% silt, saturated, brown, (SM)
1050	60					WASHED BORING HOLE FROM 55.0 TO 58.0', ENCOUNTERED	
		J-26 2 JARS	1.5"	60.0 TO 65.0'	37	RESISTANCE TO WASHING AT 58.0', ALSO LOW WATER FLOW, RODS PULLED AND REINSERTED, WASHED BORING TO 60.0' WITH NO FURTHER RESISTANCE	Interbedded strata of fine sand and medium to fine sand, fine sand 4 to 6 in. thick layers.
	62				103		(J-26 1/2) Silty Sand, medium to fine sand, predominately medium, 15 to 20% silt, saturated, brown (SM)
					120	DROVE 1.5" x 5.0' SOLID SPOON SAMPLER FROM 60.0 TO 65.0'	
	64				101	RECOVERED 2.5'	(J-26 2/2) Silty Sand, Fine sand, 15 to 20% silt, saturated, brown, (SM)
					166		
1150	66	J-27	1.5"		52	DROVE 3.0" CASING FROM 60.0 TO 65.0' AND WASHED BORING HOLE USING ROLLER BIT	(J-27) Silty Sand, medium to Fine Sand, 15 to 20% silt, saturated, brown, (SM)
					82	NOTE: MUCH FINER SAND AND MORE SILT IN WASH. CASING DROVE EASIER	
	68				122		(J-28) Gravelly Sand, coarse to fine sand, predominately coarse, 7 to 12% Gravel, rounded and subangular 1 1/2" by 2.0", 7 to 12%+ silt, saturated, brown, (SP-SM)
		J-28	1.5"		241	DROVE 1.5" x 5.0' SOLID SPOON SAMPLER FROM 65.0 TO 70.0' AND SAMPLED	
	70				260	RECOVERED 2.25'	
						10.0 ft BOTTOM OF BORING	

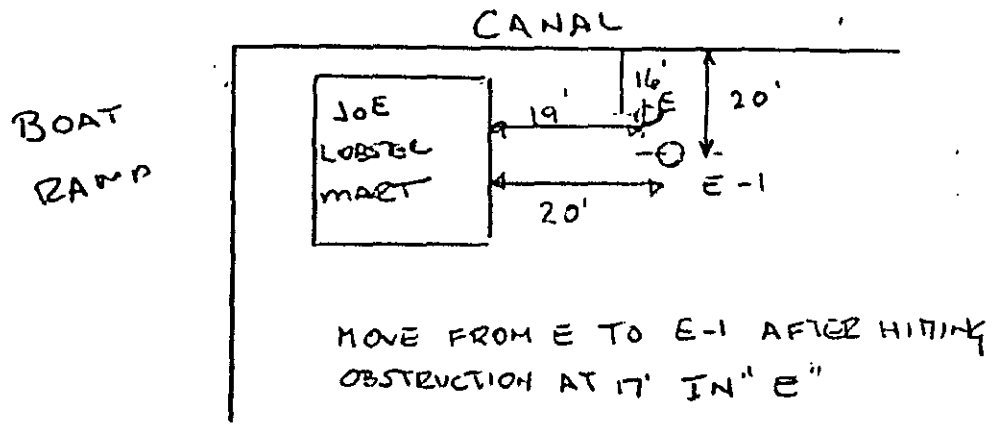
Site: SANDWICH MA
Boring No: E

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	WATER LEVEL ~~REMARKS~~ BELOW WALKWAY
4 MARCH 81	0830	15	20	7		4.0
3/4/81	12:30	90.	45	7.25		7.5
3/5/81	0730	55	55	8.6		6.3

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



WED FORM 59 (Test) MAR 71

Boring No.

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site SANDWICH MA Page 1 of 5 Pages

Boring No. SP-1 Desig. _____ Diam. (Casing) 3"

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 52' Feet
Elevation Top of Rock _____ M.S.L.
Total Rock Drilled 0 Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 52' Feet
Core Recovered _____ % No. Boxes _____
Core Recovered _____ Ft. _____ Diam. _____ In.
Soil Samples 1 3/8 In. Diam. 12 No.
Soil Samples _____ In. Diam. _____ No.

Hammer Wt. 140 Boring Started 2-13-81
Hammer Drop 30" Boring Completed 2-13-81
Casing Left 0
Subsurface Water Data _____ Page 5
Obs. Well _____
Drilled By Briggs Engineering
Mfg. Des. Drill Acker TH
Inspected By: N. Lanney
Classification By: _____
Classification By: _____

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER 6" / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	1" = 2'						
	2	J1 1 jar	1 3/8	1.0 3.0	40 44 30 21	Drove 1 3/8" x 24" split spoon from 1.0 to 3.0' and took sample. Recovered 18". Drove 3" casing from 0.0 to 5.0'. Pulled out casing and hole stayed open.	Sand poorly graded, mostly fine sand, 15-20% gravel, 10-15% non plastic fines, brown, dry, dense (SP-SM) Fill
	4						
5.0	6	J2 1 jar	1 3/8	5.0 7.0	4 4 3 2	Drove 1 3/8" x 24" split spoon from 5.0' to 7.0' and took sample. Recovered 24". Drove 3" casing to 10.0' and washed out with 2 3/8" roller bit	Sand uniform, mostly fine sand, 10-15% non-plastic fines, moist, brown, loose (SP-SM). Fill
	8						

GENERAL REMARKS:

Site: Sandwich
Bulkhead Rehabilitation

Boring No. SP-1

	DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER 6" / CORE RECV'Y	6" SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
9:30	10	J3	1 3/8	10 12	1 1 5 5	Drove 1 3/8" x 24" split spoon from 10 to 12.0' and took sample. Recovered 9.0". Drove 3" casing from 10.0 to 15.0' and washed out casing with 2 3/8" roller bit	Sand, uniform, fine sand, 5 to 10% non-plastic fines, wet, gray, loose (SP-SM)
	12						
	14						
10:10	16	J4	1 3/8	15 17	4 4 5 5	Drove 1 3/8" x 24" split spoon from 15.0 to 17.0' and took sample. Recovered 8". Drove 3" casing from 15.0' to 20.0' and washed out casing with 2 3/8" roller bit	Silty Sand, uniform, fine micaceous sand 30-40% non-plastic fines, loose, gray, saturated (SM)
	18						
	20	J5	1 3/8	20 22	1 2 2 4	Drove 1 3/8" x 24" split spoon from 20.0' to 22.0' and took sample. Recovered 24" Drove 3" casing from 20.0 to 25.0' and washed out casing with 2 3/8" roller bit	Silty Sand, uniform, fine micaceous sand 30-40% non plastic fines, loose, gray saturated (SM)
	22						
	24						
	26	J6	1 3/8	25 27	3 2 5 5	Drove 1 3/8" x 24" split spoon from 25.0' to 27.0' and took sample. Recovered 18" Drove 3" casing from 25.0 to 30.0' and washed out casing with roller bit	Silty Sand, uniform, fine micaceous sand, 35-45% non-plastic fines, loose, gray sat. (SM)

Site: Sandwick Bulkhead Rehabilitation	Boring No. SP-1	Page 3 of 5

DEPTH	1" = 2'	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER 6" / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	28						
	30						
11:30		J7A	1 3/8	30 31	3 4	Drove 1 3/8 x 24 split spoon from 30.0 to 32.0 and took sample. Recovered 14".	Silty Sand uniform fine micaceous sand 35 to 40% non-plastic fines, loose, gray, saturated (SM)
31		J7B	1 3/8	31 32	5 7	Drove 3" casing from 30.0 to 35.0' and washed out casing with 2 3/8" roller bit	Sandy Silt, non-plastic 10-20% fine micaceous sand, dk gray, firm saturated (ML)
	32						
	34						
37		J8	1 3/8	33 37	5 7 8 10	Drove 1 3/8" x 24" split spoon from 35.0' to 37.0' and took sample Recovered 18". Drove 3" casing from 35.0' to 40.0' and washed out casing with 2 3/8" roller bit.	Silt, slightly to non plastic, 10-15% fine sand, gray, stiff, saturated (ML) S_u(PP) = 0.75 TSF
	36						
	38						
40		J9	1 3/8	40 42	9 11 14 21	Drove 1 3/8" x 24" split spoon from 40.0 to 45.0' and took sample. Rec'd 18" Drove 3" casing from 40.0 to 45.0' and washed out casing with 2 3/8" roller bit	Clayey Silt, slightly plastic, stiff, saturated, gray (ML) S_u(PP) = 2.0 TSF
	42						

Site: Sandwich MA Bulkhead Rehabilitation	Boring No. SP-1	Page 4 of 5

DEPTH	1"=2	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER 6" / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	42						
	44						
45							
1420	46	J10	1 3/8	45 47	10 7 10 10	Drove 1 3/8" x 24" split spoon from 45.0 to 47.0 and took sample. Recovered 6" Drove casing from 45 to 50.0' and washed out casing with 2 3/8" roller bit. Difficult to drive casing	Clayey Silt slightly plastic, 10% sand, stiff, brown, saturated (ML). Piece of gravel in shoe
47	48						
	50	J11	1 3/8	50 52	32 54 43 35	Drove 1 3/8" x 24" split spoon from 50.0 to 52.0 and took sample.	Sand widely graded mostly coarse sand, 10-20% fine gravel, 10-15% non plastic fines, dense brown sat. (SP-SM) TILL
	52						End of Boring at 52.0'

NED FORM 58A(Test) MAR 71

Boring No. _____

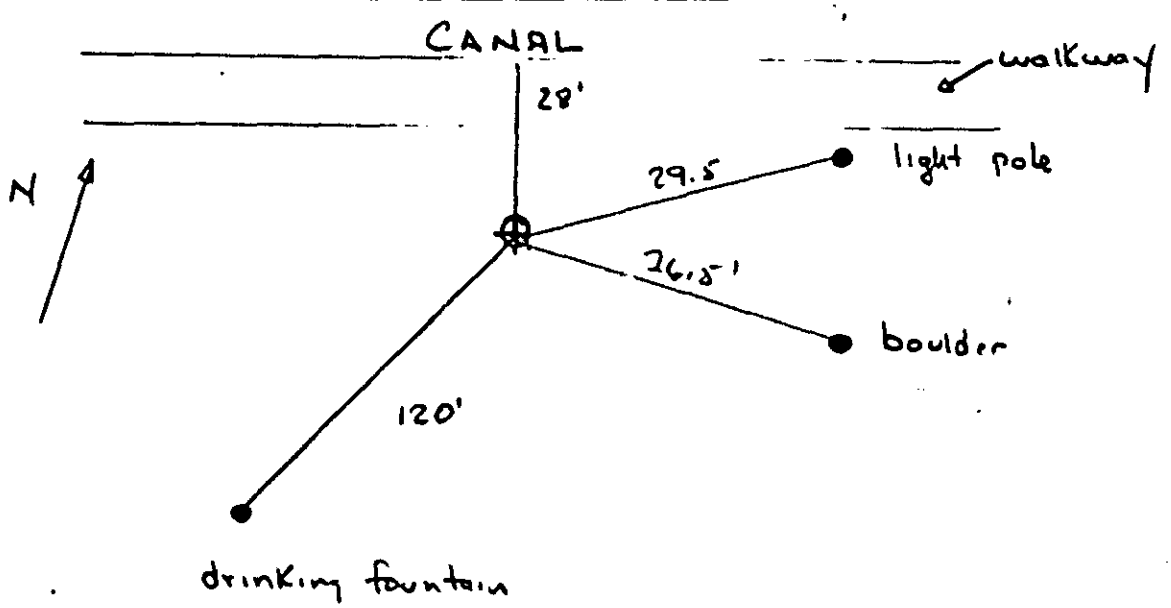
Site: Sandwich MA
Boring No: SP-1

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
2-13-81	1300	35	37	8.7		Tide 13.5' below walkway
2-13-81	1630	35	50	10.0'		TIDE 8' below walkway

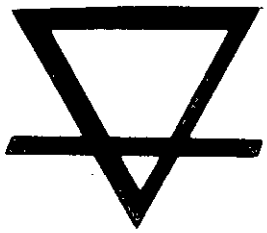
Note: Depths are in feet below original ground

BORING LOCATION SKETCH

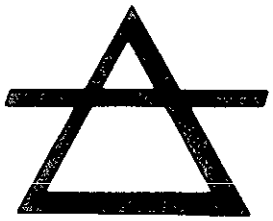


NED FORM 59 (Test) MAR 71

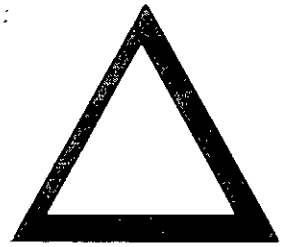
Boring No.



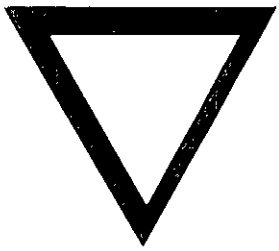
EARTH



AIR



FIRE



WATER

In ancient times
Greek and Hindu philosophers
believed that there were
four elements in the material universe
— EARTH, AIR, FIRE and WATER.
Over the years
man's knowledge has expanded
and the world of materials
is now known to be extremely complex.
The unravelling of these complexities
is the continuing goal of
Briggs Engineering & Testing Company.

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