



Date: 7/19/2011

## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815384
Location:	CAD Cell 3 New Bedford Harbor		Y: 2696002
Elevation at mudline:	-5.6	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -85.6	Boring #: A-CAD3-2011-B1
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 1 of 3
Driller:	N. Studdard	Log By: GCD	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2		24" 6"	WOR, WOR, WOR, WOR	Dark grey, fine to coarse SAND, little organic silt, trace shell hash.	-7.6
4		24" 18"	WOH, WOH, WOH, 1	Dark grey, fine to coarse SAND, some silt.	-9.6
6		24" 19"	No Blow Count Info Available	(Top 12") Dark brown grey, fine to coarse SAND, little silt, organic odor. (Bottom 7") Dark brown grey, fine to coarse SAND, little silt.	-11.6
8		24" 12"	24, 42, 30, 31	Light grey, fine to medium SAND.	-13.6
10		24" 13"	45, 56, 51, 48	Grey, fine to medium SAND, slight organic odor.	-15.6
12		24" 12"	8,10,14,15	Grey, fine to coarse SAND.	-17.6
14		24" 2"	2,5,2,1	Grey, fine to medium SAND, trace fine gravel. (see comments)	-19.6
16		24" 12"	15,14,15,31	(Top 6") Grey, fine to coarse SAND, trace fine gravel. (Bottom 6") Inorganic silt, trace very fine.	-21.6
18		24" 11"	16,10,8,12	Grey inorganic SILT, trace fine sand.	-23.6
20		24" 8"	13,15,16,15	Brown/grey medium to coarse SAND, little fine to coarse gravel, trace silt.	-25.6
22		24" 4"	24,19,15,23	Grey, fine to coarse SAND, little to some fine gravel, trace silt. (see comments)	-27.6
24		24" 8"	15,17,14,25	Grey, fine to coarse SAND, trace silt, trace fine gravel.	-29.6

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



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Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 2 of 3
Driller:	N. Studdard	Log By: RB	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
26		24" 5"	13,24,19,28	(Top 2") Grey, fine to coarse SAND, little fine gravel, trace silt. (Bottom 3") Tan, Inorganic SILT.	-31.6
28		24" 6"	13,13,14,13	Tan, inorganic SILT.	-33.6
30		24" 12"	19,14,10,10	Tan, inorganic SILT.	-35.6
32		24" 12"	5,3,3,2	(Top 6") Tan/grey inorganic SILT. (Bottom 6") Grey inorganic SILT.	-37.6
34		24" 10"	1,4,4,1	Light grey, inorganic SILT.	-39.6
36		24" 10"	WOH, WOH, WOH, 1	Light grey, inorganic SILT, trace fine sand.	-41.6
38		24" 12"	WOH, WOH, 3,5	Inorganic SILT, some sand, some gravel.	-43.6
40		24" 19"	4,10,11	Grey, inorganic SILT.	-45.6
42		24" 18"	2,8,11,8	Grey, inorganic SILT.	-47.6
44		24" 18"	5,6,7,7	Grey, inorganic SILT.	-49.6
46		24" 14"	6,6,10,6	Grey, inorganic SILT.	-51.6
48		24" 16"	11,8,8,9	Grey, inorganic SILT.	-53.6
50		24" 18"	12,8,8,9	Grey, inorganic SILT.	-55.6

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

- Notes:
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Location:	CAD Cell 3 New Bedford Harbor		Y: 2696002
Elevation at mudline:	-5.6	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -85.6	Boring #: A-CAD3-2011-B1
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 3 of 3
Driller:	N. Studdard	Log By: RB	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
57		24" 16"	5,15,13,12	Grey, inorganic SILT. (Flush water from casing from milky silt)	-62.6
64		24" 0"	25,18,21,25	(Top 6") Tan/grey fine SAND, some inorganic silt. (Middle 7") Grey fine to medium SAND, trace inorganic silt. (Bottom 7") Grey fine to coarse SAND, trace silt, trace fine gravel.  (See comments)	-69.6
73		7" 0"	38, 100/1"	(1" refusal) Fine to Coarse SAND, Some Gravel 1/2"-1", till.	-78.6
75		24" 8"	18,51,22,25	Grey, fine to coarse SAND, some 1/4" to 1/2" gravel, trace grey silt.	-80.6
80			NO BLOW COUNT DATA AVAILABLE	Advanced with roller bit from -80.6 MLLW to -85.6 MLLW through cobbles and nested boulders. End of boring at -85.6 MLLW.	-85.6
				END OF BORING	

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

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Date: 7/20/2011

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.013	X: 815103
Location: CAD Cell 3 New Bedford Harbor		Y: 2696418
Elevation at mudline: -6	Datum: MLLW	
Casing Type: Steel	Boring Depth: -66.55	Boring No: A-CAD3-2011-B2
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 1 of 3
Driller: N. Studdard	Log By: RB	

Depth below mudline (ft)	RCD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2		24" <1"	WOR-> 24"	Black organic SILT, trace fine sand, trace shell hash trace gravel.	-8
4		24' 14'	WOR-> 24"	(Top 7") Black organic SILT, strong organic odor, some shell hash. (Bottom 7") Dark grey, fine to medium SAND, some silt, some shell hash, trace coarse sand, trace gravel, organic odor.	-10
6		24" 13"	WOR-> 24"	Black/dark grey, fine to medium SAND, some silt, organic odor.	-12
8		24" 0"	WOH-18", 4	Grey/brown fine to coarse SAND, and SILT. (See comments)	-14
10		24" 15"	10,17,31,23	Brown, fine to medium SAND, some silt. (Washed casing in between intervals, wash water is tan-milky brown)	-16
12		24" 13"	28,25,42,36	Very fine SAND, some inorganic silt.	-18
14		24" 24"	23,20,16,20	Grey, very fine SAND, some inorganic silt.	-20
16		24" 24"	12,14,17,22	Tan/grey very fine SAND.	-22
18		24" 16"	15,10,11,13	Tan/grey very fine SAND.	-24
20		24" 9"	6,10,14,14	Brown/grey fine to very fine SAND.	-26
22		24" 22"	8,10,15,17	Brown/grey fine to very fine SAND.	-28

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

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Date: 7/20/2011

## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815103
Location:	CAD Cell 3 New Bedford Harbor		Y: 2696418
Elevation at mudline:	-6	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -66.55	Boring No: A-CAD3-2011-B2
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 2 of 3
Driller:	N. Studdard	Log By: RB	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
24		24" 14"	9,8,9,8	Tan/grey, fine to very fine SAND.	-30
26		24" 12"	3,7,10,9	Tan/grey, fine to very fine SAND.	-32
28		24" 14"	4,3,4,8	Tan/grey, fine to very fine SAND.	-34
30		24" No Data	WOR, 6,9,10	Tan/grey, fine to very fine SAND.	-36
32		24" 18"	3,5,6,7	Tan/grey, fine to very fine SAND.	-38
34		24" 18"	1,5,7,10	Tan/brown/grey, fine to very fine SAND.	-40
36		24" 16"	4,5,7,8	Grey, fine to very fine SAND.	-42
38		24" 20"	5,7,8,10	Tan/grey, fine to very fine SAND.	-44
40		24" 17"	4,6,8,7	Tan/grey, fine to very fine SAND.	-46
42		24" 18"	8,10,15,14	Grey, inorganic SILT.	-48
44		24" 15"	11,15,15,18	Grey, fine to coarse SAND, little silt, trace gravel.	-50
46		24" 4"	20,12,12,19	Grey, fine to coarse SAND, trace silt, trace gravel.	-52

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

- Notes:
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Location:	CAD Cell 3 New Bedford Harbor		Y: 2696418
Elevation at mudline:	-6	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -66.55	Boring No: A-CAD3-2011-B2
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 3 of 3
Driller:	N. Studdard	Log By: RB	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
46		24" 7"	14,21,18,16	Grey, fine to coarse SAND, trace silt, trace gravel. (see comments)	-52
48		24" 6"	19,14,15,14	Coarse GRAVEL, and fine to coarse SAND, trace silt. (see comments)	-54
50		24" 0"	11,10,10,11	(Top 2") Washed fine gravel from flushing to sample interval. (Bottom 10") Grey, fine to coarse SAND, some fine gravel, trace coarse gravel, Till. (see comments)	-56
55				(See comment)	-61
57		24" 9"	22,16,31,25	Grey, fine to Coarse GRAVEL, trace Silt, Till.	-63
60.55				END OF BORING	-66.55

**Comments:** Samples with poor recovery were recollected with 3" split spoon sampler. After 50ft below mudline, switched to one split spoon per five feet.

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Date: 7/27/2011  
Time: 8:00 AM

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.005	X: 814971
Location: South Terminal Expansion		Y: 2696487
Elevation at mudline: -8.05	Datum: MLLW	
Casing Type: Steel	Boring Depth: -74.05	Boring No: A-CAD3-2011-B3
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 1 of 3
Driller: Todd Pentacost	Log By: GCD	

Depth below mudline (ft)	RQD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2		24" 11"	WOR	Black, organic SILT, little shell hash, organic odor.	-10.05
4		24" 16"	WOR	Black, organic SILT, little shell hash, organic odor.	-12.05
6		24" 12"	WOR	Black, organic SILT, little shell hash, organic odor.	-14.05
8		24" 17"	6,1,1,2	Grey, organic SILT, little shell hash.	-16.05
10		24" 20"	WOR,1,1,1	Grey, organic SILT, little shell hash, organic odor.	-18.05
12		24" 20"	12,2,3	Grey, organic SILT, little shell hash, trace sand, organic odor.	-20.05
14		24" 24"	5,25,23,27	Grey/brown, organic SILT, little Sand.	-22.05
16		24" 20"	30,10,9,20	Dark grey/brown, SILT, little medium sand, organic odor.	-24.05
18		24" 9"	20,22,26,25	Grey, fine to medium SAND, some silt, trace medium gravel.	-26.05
20		24" 3"	17,11,10,9	Medium to coarse SAND, trace coarse gravel.	-28.05
22		22" 22"	23,10,26, 100	Fine to coarse SAND, trace silt.	-30.05
24		NO DATA NO DATA	12,57,65,62	Light brown, fine to medium SAND, little coarse gravel.	-32.05
26		24" 24"	6,4,28,30	Light brown, medium to coarse SAND.	-34.05

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

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## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.005	X: 814971
Location:	South Terminal Expansion		Y: 2696487
Elevation at mudline:	-8.05	Datum:	MLLW
Casing Type:	Steel	Boring Depth:	-74.05
Casing Diameter:	4"	Drill Rig:	CME 45
Drill Co:	NH Boring	Method:	Drill and Wash
Driller:	Todd Pentacost	Log By:	GCD
			Sheet: 2 of 3

Depth below mudline (ft)	RQD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
28		24" 24"	5,17,17,66	Brown, fine to medium SAND, trace silt.	-36.05
30		24" 24"	7,7,20,87	Light brown, fine to medium SAND, trace medium gravel.	-38.05
32		24" 15"	2,2,5,16	Light brown, fine to medium SAND, trace medium gravel.	-40.05
34		24" 10"	5,5,8,10	Light brown, fine to coarse SAND.	-42.05
36		24" 10"	4,5,6,11	Light brown, medium to coarse SAND, trace medium to coarse gravel, trace silt.	-44.05
38		9" 9"	14,121/3"	Light brown, fine to medium SAND, little medium to coarse gravel.	-46.05
40		24" 12"	8,8,17,26	Light brown, fine to medium SAND, trace fine gravel.	-48.05
42		24" 10"	4,5,8,11	Light brown, fine SAND, trace silt, trace fine gravel.	-50.05
44		24" 24"	4,6,17,21	Light grey/brown, Fine to coarse SAND, trace fine gravel.	-52.05
46		24" 13"	13,8,8,11	Grey, SILT/clay and coarse sand, trace fine gravel.	-54.05
48		24" 16"	4,3,8,17	Light grey, fine to coarse SAND, trace fine gravel.	-56.05
50		23" 0	17,9,25,68	Light Grey, Fine to medium SAND.	-58.05
52		24" 22"	9,13,10	Grey/light brown, medium to coarse SAND, some medium to coarse gravel.	-60.05

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Elevation at mudline:	-8.05	Datum:	MLLW
Casing Type:	Steel	Boring Depth:	-74.05
Casing Diameter:	4"	Drill Rig:	CME 45
Drill Co:	NH Boring	Method:	Drill and Wash
Driller:	Todd Pentacost	Log By:	GCD
			Sheet: 3 of 3

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
54		24" 18"	7,4,6,19	Light brown, medium to coarse SAND, some medium coarse gravel.	-62.05
56		24" 24"	13,52,41, 44	Medium to coarse SAND, some medium to coarse gravel.	-64.05
58		24" 19"	42,30,31, 72	Light brown, coarse SAND, little fine gravel.	-66.05
58.2		2" 0	129/2"	Rock, Gravel in Spoon Nose. Fuel Line Break on rig. Advanced roller bit to -66.25 MLLW.	-66.25
61		0" 0"	120/0"	Obstruction encountered at -68.05 MLLW. Advanced roller bit to -69.05 MLLW.	-69.05
66	65%	5.0' 4.58'	12, 25, 6, 10, 8	Rock Core #1: -69.05 MLLW to -74.05 MLLW - Moderately to intensely fractured light gray to pink gneissic GRANITE with subtle foliation.	-74.05

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Date: 8/1/2011

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.005	X: 815787
Location: South Terminal Expansion		Y: 2696697
Elevation at mudline: -9.75	Datum: MLLW	
Casing Type: Steel	Boring Depth: -65.75	Boring No: A-CAD3-2011-B4
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 1 of 2
Driller: Todd Pentacost	Log By: ML	

Depth below mudline (ft)	RQD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2		24" 12"	1,1,1,2	Dark grey/black organic SILT, and shell hash, trace sand (see comments).	-11.75
4		24" 21"	4,6,66,2	(Top 10") Dark grey/black organic SILT and shell hash. (Bottom 11") Light brown fine to coarse SAND, some silt.	-13.75
6		24" 29"	22,21,16,26	Tan, SILT, trace very fine sand.	-15.75
8		24" 24"	15,7,22,10	Tan, SILT, trace very fine sand.	-17.75
10		24" 16"	10,9,10,13	Tan, SILT, trace very fine sand.	-19.75
12		24" 8"	WOR,10, 13,12	Light brown SILT, trace fine to coarse sand.	-21.75
14		24" 14"	1,4,5,4	Brown, medium to coarse SAND, some silt, trace very fine sand.	-23.75
16		24" 12"	3,5,6,7	Light brown, SILT, some fine to medium sand.	-25.75
18		24" 12"	1,5,9,10	Light brown, SILT, some fine to medium sand.	-27.75
20		24" 10"	5,2,2,3	Light brown, SILT, little medium gravel.	-29.75
22		24" 12"	5,7,7,11	Light brown, fine to medium SAND, some fine gravel, little silt.	-31.75
24		24" 10"	5,6,9,6	Light brown, SILT, trace medium gravel.	-33.75
26		24" 20"	6,7,10,11	Light brown, SILT, trace fine sand, trace fine gravel.	-35.75

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## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.005	X: 815787
Location:	South Terminal Expansion		Y: 2696697
Elevation at mudline:	-9.75	Datum:	MLLW
Casing Type:	Steel	Boring Depth:	-65.75
Casing Diameter:	4"	Drill Rig:	CME 45
Drill Co:	NH Boring	Method:	Drill and Wash
Driller:	Todd Pentacost	Log By:	ML
			Boring No: A-CAD3-2011-B4
			Sheet: 2 of 2

Depth below mudline (ft)	RQD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
28		24" 16"	6,11,14,13	Tan, SILT, and fine to medium SAND.	-37.75
30		24" 20"	1,7,9,8	Brown, SILT, little fine to medium sand, little medium to coarse gravel.	-39.75
32		24" 19"	4,9,11,14	Tan, SILT, and very fine SAND.	-41.75
34		24" 20"	9,10,9,11	(Top 10") Light brown, very fine SAND, some silt. (Bottom 10") Light brown SILT, trace very fine sand.	-43.75
36		24" 10"	6,9,13	Light Brown, SILT.	-45.75
38		24" 0	6,11,23,31	Light brown, SAND, trace silt.(see comments)	-47.75
40		24" 18"	5,5,13,40	Light brown, fine SAND, trace silt. (see comments)	-49.75
42		23" 23"	6,12,69,95	Light brown, fine SAND, little silt.	-51.75
44		24" 20"	9,8,10,13	Light brown/orange, fine SAND, trace of silt.	-53.75
46		24" 12"	8,8,16,25	Light brown/grey, SILT, trace very fine sand.	-55.75
48		24" 0	7,15,43	No Recovery	-57.75
50		19" 10"	14, 31, 66, 86	Light brown, fine SAND.	-59.75
52		24" 20"	5, 8, 14, 24	Ligh grey, fine to medium SAND and silt.	-61.75
54		24" 0"	10, 9, 3, 6	No recovery.	-63.75
56		24" 22"	10, 11, 15, 19	Grey, SILT, medium to coarse sand.	-65.75
END OF BORING					

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

**Notes:**

- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
- 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/5/2011

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.013	X: 815574
Location: CAD Cell 3 New Bedford Harbor		Y: 2696726
Elevation at mudline: -5.4	Datum: MLLW	
Casing Type: Steel	Boring Depth: -82.65	Boring No: A-CAD3-2011-B5
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 1 of 3
Driller: N. Studdard	Log By: ML	

Depth below mudline (ft)	RCD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2		24" 6"	WOR, WOR, WOR, WOR	Black/Grey organic SILT, trace shell hash.	-7.4
4		24' 14'	9, 5, 14, 30	(Top 2") Dark grey SILT, trace shell hash. (Bottom 7") Dark grey fine to Coarse SAND, trace silt.	-9.4
6		24" 7"	19, 17, 20, 22	(Top 2") SHELL HASH. (Bottom 5") of Light Brown fine to medium SAND, trace silt.	-11.4
8		24" 14"	11, 25, 24, 27	(Top 12") Light brown fine to medium SAND, trace silt. (Bottom 2") Brown fine to medium SAND, trace silt.	-13.4
10		24" 14"	5, 41, 82, 52	Light brown, fine to medium SAND, trace gravel, trace shell hash.	-15.4
12		24" 18"	18, 11, 13, 12	Light brown, medium to coarse SAND, some brown grey silt.	-17.4
14		24" 14"	20, 16, 15, 16	Light brown, fine to coarse SAND, some brown silt.	-19.4
16		24" 14"	WOR, WOR, 10, 8	Light grey, very fine SAND, trace fine gravel.	-21.4
18		24" 12"	11, 9, 12, 12	Light grey, SILT, some fine to medium sand.	-23.4
20		24" 10"	7, 4, 7, 9	Light grey, very fine SAND, trace gravel.	-25.4
22		24" 13"	2, 17, 5, 6	Light grey, very fine SAND.	-27.4
24		24" 20"	WOR, 7, 4, 5	Light grey, SILT, some very fine sand.	-29.4

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/5/2011

## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815574
Location:	CAD Cell 3 New Bedford Harbor		Y: 2696726
Elevation at mudline:	-5.4	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -82.65	Boring No: A-CAD3-2011-B5
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 2 of 3
Driller:	N. Studdard	Log By: ML	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
26		24" 10"	5, 4, 9, 7	Light grey, very fine SAND.	-31.4
28		24" 16"	11, 7, 8, 8	Light grey, SILT, trace very fine sand.	-33.4
30		24" 11"	8, 6, 8, 9	Light grey, fine SAND.	-35.4
32		24" 18"	9, 8, 8, 7	Light grey, SILT, some very fine sand.	-37.4
34		24" 14"	3, 6, 6, 10	Light grey, SILT, some very fine sand.	-39.4
36		24" 18"	9, 6, 10, 11	Grey, fine to very fine SAND.	-41.4
38		24" 14"	14, 10, 12, 16	Light grey, SILT, some very fine sand.	-43.4
40		24" 19"	7, 12, 4, 4	Light grey, SILT, some very fine sand.	-45.4
42		24" 11"	WOR, WOR, 4, 6	Light grey, SILT, some very fine sand.	-47.4
44		24" 11"	10, 12, 9, 17	Light grey, SILT, trace fine to coarse sand.	-49.4
46		24" 7"	24, 38, 39, 37	Light grey, medium to coarse sand, some medium to coarse gravel, some silt, TILL.	-51.4
48		24" 7"	41, 41, 53, 26	Light grey, medium to coarse sand, some medium to coarse gravel, some silt, TILL.	-53.4

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/8/2011

## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815574
Location:	CAD Cell 3 New Bedford Harbor		Y: 2696726
Elevation at mudline:	-5.4	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -82.65	Boring No: A-CAD3-2011-B5
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 3 of 3
Driller:	N. Studdard	Log By: ML	

Depth below mudline (ft)	ROD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
50		24" 6"	37, 15, 15, 40	Light grey, medium to coarse sand, some medium to coarse gravel, some silt, TILL	-55.4
52		24" 12"	21, 25, 34, 56	(Top 6") Grey, fine to coarse SAND. (Bottom 6") Grey/tan/pink fine to coarse SAND.	-57.4
54		21" 15"	27, 19, 43, 120/3"	Grey/tan, fine to coarse SAND, trace gravel.	-59.4
56					
58				Obstruction encountered at -59.5 MLLW. Advanced roller bit from -59.5 MLLW to -65.1 MLLW.	
60					
62		24" 5"	42, 29, 31, 30	Grey/tan weathered rock fragments.	-67.4
64		24" 8"	33, 23, 23, 31	White rock fragments w/ trace fine sand.	-69.4
65				Obstruction encountered at -69.4 MLLW. Advanced roller bit from -69.4 MLLW to -70.4 MLLW.	-70.4
67		24" 8"	19, 15, 21, 43	Grey, silty fine to coarse SAND, some gravel	-72.4
69		24" 0"	19, 30, 31, 33	No recovery.	-74.4
71		24" 10"	16, 25, 33, 47	Grey/tan, very fine to coarse SAND, some gravel	-76.4
72.25				Obstruction encountered at -77.1 MLLW. Advanced roller bit to -77.65 MLLW.	-77.65
77.25	62	5.0 5.0		Rock Core #1: -77.65 MLLW to -82.65 MLLW - Intensely to moderately fractured, light gray to pink gneissic GRANITE with slight foliation.	-82.65
				END OF BORING	

Comments: Samples with poor recovery were recollected with 3" split spoon sampler.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 7/22/2011

## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815004
Location	CAD Cell 3 New Bedford Harbor		Y: 2696757
Elevation at mudline:	-5.4'	Datum: MLLW	
Casing Type:	Steel	Boring Depth: -69.75	Boring No: A-CAD3-2011-B6
Casing Diameter:	4"	Drill Rig: CME 45	
Drill Co:	NH Boring	Method: Drill and Wash	Sheet: 1 of 3
Driller:	N. Studdard	Log By: GCD	

Depth below mudline (ft)	RQD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
2		24" 7"	WOH, WOH, WOH, 2	(Top 2") Black organic SILT, little shell hash. (Bottom 5") Dark grey fine SAND, organic silt, little shell hash.	-7.4
4		24" 14"	4,2,5,7	(Top 7") Dark Grey, fine SAND, some organic silt, little shell hash. (Bottom 7") Grey fine SAND, some to little organic silt, little shell hash.	-9.4
6		24" 12"	10,18,23,30	Grey, fine SAND, little organic silt, trace fine gravel.	-11.4
8		24" 17"	17,16,34,29	Grey, very fine SAND, trace silt.	-13.4
10		24" 11"	2,6,10,12	Tan, fine SAND, little inorganic silt.	-15.4
12		24" 7"	13,17,13,17	(Top 3") Tan, fine SAND, little medium to coarse sand, little fine gravel. (Bottom 4") Tan SILT.	-17.4
14		24" 11"	9,9,7,10	(Top 4") Tan, fine to medium SAND, little fine gravel, trace silt. (Middle 3") Tan SILT, little fine gravel. (Bottom 3") Tan, fine to medium SAND, little fine gravel, trace silt	-19.4
16		24" 5"	3,2,4,10	Tan, fine SAND, trace coarse sand, trace gravel.	-21.4
18		24" 4"	4,5,8,12	Tan, fine SAND, little to some medium to coarse sand.	-23.4
20		24" 24"	8,6,27,81	(Top 12") Tan, fine SAND, trace silt. (Bottom 12") Tan, SILT, trace fine to very fine sand.	-25.4
22		24" 15"	4,4,10,6	(Top 5") Tan, fine SAND, trace silt. (Bottom 10") Tan, SILT, some gravel, trace fine sand.	-27.4
24		24" 15"	9,8,6,8	Tan, very fine SAND, and SILT, little fine to coarse sand.	-29.4
26		24" 14"	4,3,4,6	(Top 5") Grey/tan, fine to medium SAND, inorganic silt. (Bottom 9") Tan, SILT, and very fine SAND.	-31.4

Comments: Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 7/22/2011

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.013	X: 815004
Location: CAD Cell 3 New Bedford Harbor		Y: 2696757
Elevation at mudline: -5.4'	Datum: MLLW	
Casing Type: Steel	Boring Depth: -69.75	Boring No: A-CAD3-2011-B6
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 2 of 3
Driller: N. Studdard	Log By: GCD	

Depth below mudline (ft)	RQD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
28		24" 17"	7, 6, 8, 8	Grey, SILT, some fine to coarse sand.	-33.4
30		24" 12"	4,8,26,28	Grey, very fine SAND and silt, brown/tan medium to fine sand in nose of spoon.	-35.4
32		N/A N/A	N/A	Advanced roller bit through interval.	-37.4
34		24" 14"	5,23,25,25	(Top 10") Grey, very fine SAND and SILT. (Bottom 4") Orange/brown, fine to coarse SAND, little silt.	-39.4
36		24" 20"	7,12,13,61	Grey/tan, fine to medium SAND, some silt.	-41.4
38		24" 13"	8,6,10,14	Grey/tan fine SAND, some silt, little fine to coarse gravel, trace fine sand.	-43.4
40		24" 0"	11,12,16,19	No Recovery. Grey Silt in nose of Spoon, Coarse Sand in Cuttings. Possible Till	-45.4
42		24" 0"	30,16,10,11	No Recovery	-47.4
44		24" 0"	9,14,15,14	No Recovery	-49.4
46		24" 0	35,12,9,13	Grey/tan, coarse SAND, some coarse gravel, little to some fine to medium sand.	-51.4
48		24" 2"	14,13,9,15	Grey,tan fine to coarse SAND, some fine gravel, little coarse gravel, trace silt. (see comments)	-53.4
50		24" 4"	21,11,9,13	Grey/tan, fine to coarse SAND, little fine to coarse gravel, trace silt. (see comments)	-55.4
55		24" 0	10,10,12,21	Grey/tan, fine to coarse SAND, some fine to coarse gravel. (see comments)	-60.4

**Comments:** Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

- Notes:**
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.







Date: 8/9/2011

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.013	X: 815731
Location: CAD Cell 3 New Bedford Harbor		Y: 2696868
Elevation at mudline: -5.8'	Datum: MLLW	
Casing Type: Steel	Boring Depth: -81.2' MLLW	Boring No: A-CAD3-2011-B7
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 1 of 2
Driller: N. Studdard	Log By: GCD	

Depth below mudline (ft)	RQD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
2		24" 22"	WOR-24"	Black/dark grey, organic SILT, some fine to medium sand, little shell hash, strong organic odor.	-7.8
4		24" 20"	WOR-24"	Black/dark grey, organic SILT, little organic plant matter, little fine to medium sand, strong organic odor.	-9.8
6		24" 14"	WOR-12", WOH, 1	Black/dark grey, organic SILT, trace to little fine to medium sand, trace shell hash, trace organic plant matter, strong odor.	-11.8
8		24" 18"	2, 1, 1, 4	Dark grey, organic SILT with timber at bottom 4" of recovery, little fine sand, strong organic odor.	-13.8
10		24" 14"	WOR, WOR, 6, 15	(Top 10") Grey, very fine to medium SAND, trace silt, strong organic odor. (Bottom 4") Compressed brown, organic plant matter (peat).	-15.8
12		24" 16"	3, 11, 11, 11	(Top 1") Brown organic plant matter, PEAT. (Bottom 15") Grey, very fine to coarse SAND, strong organic odor.	-17.8
14		24" 12"	5, 7, 7, 6	Grey/brown, very fine to coarse SAND, trace silt, strong organic odor.	-19.8
16		24" 12"	11, 6, 11, 39	(Top 6") Grey/tan, fine to coarse SAND, trace silt, organic odor. (Bottom 6") Grey, SILT, organic odor.	-21.8
18		24" 0"	14, 25, 22, 25	Grey, very fine to medium SAND, little sand, organic odor. (see comments)	-23.8
20		24" 12"	4, 6, 13, 18	Grey, fine to coarse SAND, organic odor.	-25.8
22		24" 10"	9, 22, 25, 33	Grey, very fine to fine SAND, slight organic odor.	-27.8
24		24" 24"	17, 19, 29, 40	Grey, medium SAND, little Coarse sand, trace fine sand, slight organic odor.	-29.8
26		24" 5"	17, 17, 21, 26	Coarse SAND, little fine to medium sand.	-31.8
28		24" 8"	5, 11, 35, 40	Coarse SAND, little fine to medium sand.	-33.8

Comments: Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/10/2011

### BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815731
Location:	CAD Cell 3 New Bedford Harbor		Y: 2696868
Elevation at mudline:	-5.8'	Datum:	MLLW
Casing Type:	Steel	Boring Depth:	-81.2' MLLW
Casing Diameter:	4"	Drill Rig:	CME 45
Drill Co:	NH Boring	Method:	Drill and Wash
Driller:	N. Studdard	Log By:	GCD
			Boring No: A-CAD3-2011-B7
			Sheet 2 of 2

Depth below mudline (ft)	RQD	Penetration/ Recovery	Blows per 6' / Drill Min. per Foot	Description		Elevation (MLLW)
				(Color, Texture, Structure)		
				Trace < 10%. Little 10% to 20%. Some 20% to 35%, And 35% to 50%		
30		24" 24"	12, 18, 15, 18	(Top 20") Grey, very fine to fine SAND.	(Bottom 4")	-35.8
32		24" 9"	10, 15, 12, 12	Grey, SILT, trace fine to medium sand, trace fine Gravel.		-37.8
34		24" 0		No recovery.		-39.8
36		24" 0"	6, 8, 11, 13	Grey, fine to coarse SAND. (see comments)		-41.8
38		24" 12"	7, 10, 22, 18	Grey, fine to coarse SAND.		-43.8
40		24" 0"	8, 20, 29, 26	Grey, medium to coarse SAND, trace fine sand. (see comments)		-45.8
42		24" 10"	10, 10, 22, 25	Grey, fine to coarse SAND, trace Gravel.		-47.8
44		24" 12"	8, 11, 19, 18	Grey, fine to coarse SAND.		-49.8
46		24" 1"	7, 17, 23, 27	Grey, fine to coarse SAND, trace silt. (see comments)		-51.8
48		24" 12"	10, 13, 18, 27	Grey, fine to coarse SAND.		-53.8
50		24" 12"	11, 14, 20, 18	Grey, fine to coarse SAND, trace silt.		-55.8
52		24" 16"	10, 19, 31, 35	Grey, very fine to fine SAND.		-57.8
54		24" 20"	8, 15, 28, 50	Grey, fine to coarse SAND, trace silt.		-59.8
56		24" 16"	19, 24, 31, 40	Grey, fine to coarse SAND, trace silt.		-61.8
58		24" 4"	15, 31, 28, 26	Grey, fine to coarse SAND, some gravel, trace silt, grey.		-63.8
70.4				Obstruction encountered at -65.5 MLLW. Advanced roller bit through cobbles and nested boulders to -73.3 MLLW. Cleaned hole and began core run at -76.2 MLLW.		-76.2
75.4	58%	5.0 4.7	6, 12, 9,10, 13	Rock Core #1: -76.2 MLLW to -81.2 MLLW - Moderately fractured, light gray, granitic GNEISS.		-81.2
END OF BORING						

Comments: Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

Notes: 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.  
 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/15/2011

## BORING LOG

Project: Phase IV Dredging	Project No: 6690.013	X: 815532
Location: CAD Cell 3 New Bedford Harbor		Y: 2696934
Elevation at mudline: -4.2	Datum: MLLW	
Casing Type: Steel	Boring Depth: -80.3	Boring No: A-CAD3-2011-B8
Casing Diameter: 4"	Drill Rig: CME 45	
Drill Co: NH Boring	Method: Drill and Wash	Sheet: 1 of 3
Driller: N. Studdard	Log By: GCD	

Depth below mudline (ft)	RQD	Penetration/Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
2		24" 18"	WOR, WOR, WOR, WOR	Black/dark grey/orange SILT, some medium to fine sand, some shell hash.	-6.2
4		24" 8"	6, 6, 11, 17	Light brown fine SAND and SILT.	-8.2
6		24" 10"	9, 11, 21, 29	(Top 7") Light brown, medium to coarse SAND. (Bottom 3") Brown, medium to coarse SAND, some shell hash, trace medium gravel.	-10.2
8		24" 10"	7, 8, 20, 29	Light brown, medium to coarse SAND.	-12.2
10		24" 10"	16, 25, 30, 33	Light brown, medium to coarse SAND, some medium gravel.	-14.2
12		24" 12"	7, 10, 13, 19	Light brown, medium to coarse SAND, some gravel, trace silt.	-16.2
14		24" 11"	12, 12, 19, 21	(Top 7") Light Brown, medium to coarse SAND. (Bottom 3") Light brown/grey, SILT, trace fine sand.	-18.2
16		24" 10"	8, 14, 34, 46	Light Brown, medium to coarse SAND, trace coarse gravel.	-20.2
18		24" 2"	9, 9, 9, 10	Light brown, medium to coarse SAND, some silt. (see comments)	-22.2
20		24" 0	12, 7, 8, 9	Grey, brown SILT, some very fine sand.	-24.2
22		24" 5"	6, 6, 8, 10	Grey, fine SAND, little to some silt.	-26.2
24		24" 20"	4, 4, 8, 6,	Grey, fine to very fine SAND, little to some silt.	-28.2
26		24" 19"	4, 4, 5, 7,	Grey, very fine SAND, grades to grey SILT, little fine sand.	-30.2

Comments: Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/15/2011

## BORING LOG

Project:	Phase IV Dredging	Project No: 6690.013	X: 815532
Location:	CAD Cell 3 New Bedford Harbor		Y: 2696934
Elevation at mudline:	-4.2	Datum:	MLLW
Casing Type:	Steel	Boring Depth:	-80.3
Casing Diameter:	4"	Drill Rig:	CME 45
Drill Co:	NH Boring	Method:	Drill and Wash
Driller:	N. Studdard	Log By:	GCD
			Boring No: A-CAD3-2011-B8
			Sheet: 2 of 3

Depth below mudline (ft)	RQD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%					
28		24" 18"	4, 5, 4, 5,	Grey, SILT, some very fine to fine sand.	-32.2
30		24" 18"	3, 6, 7, 8	Grey, very fine SAND, little silt.	-34.2
32		24" 19"	2, 2, 4, 8	Grey, very fine SAND, little to trace silt.	-36.2
34		24" 17"	3, 2, 4, 5	Grey, very fine SAND, grades to silt.	-38.2
36		24" 16"	4, 4, 5, 6	Grey, SILT, some very fine sand.	-40.2
38		24" 16"	6, 7, 6, 8	Grey, very fine SAND, little to some silt.	-42.2
40		24" 16"	3, 4, 9, 9	Grey to blue-grey, very fine SAND, grading to silt, little very fine sand.	-44.2
42		24" 13"	13, 13, 25, 15	(Top 4") Grey, very fine SAND, little to some silt (Bottom 9") Grey, fine to coarse SAND, some silt, little fine grey till.	-46.2
44		24" N/A	15, 16, 14, 12	Grey, fine to coarse SAND, and fine to coarse GRAVEL, trace to little silt.	-48.2
46		24" 6"	25, 19, 22, 40	Grey, fine to coarse SAND, and fine to coarse GRAVEL, trace silt.	-50.2
48		24" 2"	160/4"	Drill wash and 1 piece coarse Gravel, SILT in nose, probable TILL.	-52.2
50		24" n/a	100/0"	Advanced with roller bit through cobble/gravel.	-54.2
52		24" 1"	32, 13, 11, 14	Grey, fine to coarse gravel, some fine to coarse sand, some silt, TILL.	-56.2

Comments: Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



Date: 8/15/2011

### BORING LOG

Project:	Phase IV Dredging	Project No:	6690.013	X:	815532
Location	CAD Cell 3 New Bedford Harbor			Y:	2696934
Elevation at mudline:	-4.2	Datum:	MLLW		
Casing Type:	Steel	Boring Depth:	-80.3	Boring No:	A-CAD3-2011-B8
Casing Diameter:	4"	Drill Rig:	CME 45	Sheet: 3 of 3	
Drill Co:	NH Boring	Method:	Drill and Wash		
Driller:	N. Studdard	Log By:	GCD		

Depth below mudline (ft)	RQD	Penetration/ Recovery	Blows per 6" / Drill Min. per Foot	Description (Color, Texture, Structure)	Elevation (MLLW)
				Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%	
54		24" 8"	31, 10, 22, 33	Grey, fine to coarse SAND, and fine to coarse GRAVEL, some silt, TILL.	-58.2
58.5		24" n/a	100/2"	Obstruction encountered. Drove casing and advanced with roller bit to 62.7 MLLW.	-62.7
60.5		24" 4"	40, 20, 9, 17	Grey, fine to coarse SAND, and fine to coarse GRAVEL, some silt.	-64.7
62.5		24" 3"	22, 47, 52, 33	Grey, fine to coarse SAND, and GRAVEL, some silt.	-66.7
64.5		24" 4"	15, 16, 25, 18	Grey, fine to coarse SAND, and GRAVEL, some silt.	-68.7
70				Obstructionn encountered. Advanced with roller bit to -74.2 MLLW.	-74.2
70.5		5" 2"	100/5"	Grey, fine to coarse SAND, and GRAVEL, some silt.	-74.7
71.1				Obstruction encountered at -74.7 MLLW. Advanced roller bit through cobbles and nested boulders. Cleaned hole and began core run at -75.3 MLLW.	-75.3
76.1	89%	5 4.58	N/A	Rock Core #1: -75.3 MLLW to -80.3 MLLW - Slightly to moderately fractured light gray GRANITE	-80.3

Comments: Samples with poor recovery were re collected with a 3" split spoon sampler. Change in sampling intervals after reaching 50' to one sample per five feet.

- Notes:
- 1). Numbers in "Depth below mudline (ft)" column represent the depth below mudline of the bottom of the respective split-spoon, core run, or drill tool advancement.
  - 2). Numbers in "Elevation (MLLW)" column represent the elevation of the bottom of the respective split-spoon, core run, or drill tool advancement.



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Boston, MA 02210  
Phone: 617.728.0070

**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B01-CAD-072007**

SHEET 1 of 4

FILE NO. 6615.003

CHKD. BY KH

Boring Co.  
Driller  
Logged By

Geologic, Inc.  
Tim Turner  
GAD, KH, KD

Boring Location Northing 2696504  
Mudline El. -5.0  
Date Start 7/30/2007

Easting 815424  
Datum MLLW  
Date End 8/2/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: Rotary wash with mud  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS	
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value				
1			24/7	0 - 2		WOR	WOR	Very soft dark grey organic silt, some fine sand, little shells	ORG SILT	
2								Very loose grey silty fine sand, little shells (set casing at 0.5 ft, wash to 2 ft. Casing dropping.)	MARINE SAND	
3			24/11	2 - 4		3,2,3,7	5	Loose brown fine to coarse sand, trace silt (pushed casing to 2 ft, washed to 4 ft, casing dropped 2 ft.)	GLACIO FLUVIAL	
4										
5			24/13	4 - 6		4,6,10,12	16	Medium dense brown fine to coarse sand, trace silt and fine gravel (washed to 6 ft, hole collapsing. Set casing at 6 ft, wash to 6 ft, sand blowing casing- sampled inside casing at 5.5 ft.)		
6			24/15	5.5 - 7.5		9,14,15,14	29	Medium dense brown fine sand, trace silt		
7								mixed polymer slurry (advanced casing to 8 ft, washed to 8 ft.)		
8										
9			24/16	8 - 10		9,14,15,17	29	Medium dense brown silty fine sand		
10								(washed to 10 ft)		
11			24/14	10 - 12		15,18,18,16	36	Brown silt, trace fine to medium sand		
12								(advanced casing to 10 ft, washed to 12 ft)		
13			24/14	12 - 14		14,12,8,11	20	Brown silt, trace fine sand		
14								(advanced casing to 12 ft, washed to 14 ft)		
15			24/15	14 - 16		17,17,15,11	32	Brown silt, trace fine sand		
16								(washed to 16 ft)		
17			24/19	16 - 18		8,7,6,7	13	Brown silt, trace fine sand		
18								(advanced casing to 16 ft, washed to 18 ft)		
19			24/20	18 - 20		7,5,5,6	10	Brown silt, trace fine sand		
20										

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- ROD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



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Phone: 617.728.0070

**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B01-CAD-072007**

SHEET 2 of 4  
FILE NO. 6615.003  
CHKD. BY KH

Boring Co. Geologic, Inc. Boring Location Northing 2696504 Easting 815424  
Driller Tim Turner Mudline El. -5.0 Datum MLLW  
Logged By GAD, KH, KD Date Start 7/30/2007 Date End 8/2/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: Rotary wash with mud  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21			24/17	20 - 22	10,6,6,6	12	Brown silt, trace fine to medium sand  (advanced casing to 18 ft, washed to 22 ft)		
22									
23			24/19	22 - 24	8,6,4,3	10	Brown silt, trace fine sand		
24									
25			24/18	24 - 26	6,3,3,4	6	Brown silt, trace fine sand  (advanced casing to 22 ft, washed to 26 ft)		
26									
27			24/18	26 - 28	6,5,9,9	14	Brown silt and fine sand  (advanced casing to 24 ft, washed to 28 ft)		
28									
29			24/17	28 - 30	11,7,7,8	14	Brown silt, trace fine sand		
30									
31			24/16	30 - 32	6,5,5,6	10	Brown silt, little fine sand  (advanced casing to 28 ft, washed to 32 ft)		
32									
33			24/15	32 - 34	8,8,9,9	17	Brown fine sand and silt		
34									
35			24/17	34 - 36	8,5,4,3	9	Grey silt, trace fine sand		
36									
37			24/24	36 - 38	9,5,3,2	8	Grey silt, trace fine sand		
38									
39			24/16	38 - 40	2,3,3,4	6	Grey silt and fine sand		
40									

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
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- UO denotes 3-inch Osterberg undisturbed sample.
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- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- ROD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:





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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B01-CAD-072007**

SHEET 3 of 4

FILE NO. 6615.003

CHKD. BY KH

Boring Co.  
Driller  
Logged By

Geologic, Inc.  
Tim Turner  
GAD, KH, KD

Boring Location Northing 2696504  
Mudline El. -5.0  
Date Start 7/30/2007

Easting 815424  
Datum MLLW  
Date End 8/2/2007

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
**Drill Rig:** Barge Mounted ATV  
**Drilling Method:** Rotary wash with mud  
**Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.**

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41			24/19	40 - 42	WOR,1,2,4	3	Grey silt and fine sand	GLACIO FLUVIAL	
42									
43			24/19	42 - 44	3,3,3,5	6	Grey fine sand, some silt		
44									
45			24/24	44 - 46	3,2,3,2	5	Grey fine sand and silt		
46									
47			24/13	46 - 48	2,WOR,2	WOR	Grey silt some fine sand		
48									
49			24/15	48 - 50	6,4,3,8	7	Grey silt, little fine sand		
50									
51			24/17	50 - 52	12,7,8,9	15	Grey silt, little fine sand		
52									
53			24/16	52 - 54	8,2,7,3	9	Grey silt, little fine sand		
54							(advanced casing to 30 ft)		
55			24/18	54 - 56	8,7,7,6	14	Grey silt, little fine sand		
56									
57			24/20	56 - 58	9,2,1,2	3	Grey silt, little fine sand		
58									
59			24/17	58 - 60	8,8,10,9	18	Grey silt, little fine sand		
60									

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
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- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- ROD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B01-CAD-072007**

SHEET 4 of 4

FILE NO. 6615.003

CHKD. BY KH

Boring Co.  
Driller  
Logged By

Geologic, Inc.  
Tim Turner  
GAD, KH, KD

Boring Location Northing 2696504  
Mudline El. -5.0  
Date Start 7/30/2007

Easting 815424  
Datum MLLW  
Date End 8/2/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: Rotary wash with mud  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
61		24/23	60 - 62	1,10,17,17	27	Grey silt, little fine sand	GLACIO FLUVIAL		
62									
63		24/24	62 - 64	17,10,48,66	58	Grey silt, little fine sand (advanced casing to 60 ft, washed to 64 ft)			
64									
65		24/16	64 - 66	12,7,4,6	11	Brown fine to coarse sand, trace silt and fine gravel			
66									
67		24/13	66 - 68	9,12,5,9	17	Brown fine sand, trace medium to coarse sand and silt (advanced casing to 66 ft, washed to 68 ft)			
68									
69		24/5	68 - 70	8,4,5,15	9	Brown fine to coarse sand, some fine to coarse gravel, trace silt (advanced casing to 68 ft, washed to 72 ft)			
70									
71		24/5	70 - 72	21,46,45,24	91	Brown fine to coarse sand, little fine to coarse gravel and silt	GLACIAL TILL		
72									
73		24/12	72 - 74	19,28,46,95	74	Brown fine to coarse sand, little fine to coarse gravel and silt			
74						(roller bit through cobble and sand to 76 ft)			
75									
76						Attempted to sample at 76 ft. Sampler refusal - 50 blows, 0 inches.			
77						Set up to core at 76 ft. (see attached rock core log)			
78									
79									
80									

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- RQD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B02-CAD-072007**

SHEET 1 of 5  
FILE NO. 6615.003  
CHKD. BY KH

Boring Co. Geologic, Inc. Boring Location Northing 2696111 Easting 815464  
Driller Tim Turner Mudline El. -5.3 Datum MLLW  
Logged By KD Date Start 8/6/2007 Date End 8/8/2007

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
**Drill Rig:** Barge Mounted ATV  
**Drilling Method:** Rotary wash with mud  
**Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.**

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1		SS	24/0	0 - 2	WOR	WOR	No Recovery	ORGANIC SILT	
2									
3									
4									
5									
6		SS	24/12	5 - 7	2,8,9,13	17	0 - 3" Brown fine to coarse sand, little fine gravel		
7							3 - 12" Brown silt, little fine sand		
8									
9									
10									
11		SS	24/14	10 - 12	9,10,10,8	20	Brown silt, trace fine sand		
12									
13									
14									
15									
16		SS	24/10	15 - 17	6,6,7,6	13	Brown silt, trace fine sand	GLACIO FLUVIAL	
17									
18									
19									
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B02-CAD-072007**

SHEET 2 of 5

FILE NO. 6615.003

CHKD. BY KH

Boring Co.  
Driller  
Logged By

Geologic, Inc.  
Tim Turner  
KD

Boring Location Northing 2696504  
Mudline El. -5.3  
Date Start 7/30/2007

Easting 815424  
Datum MLLW  
Date End 8/2/2007

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
**Drill Rig:** Barge Mounted ATV  
**Drilling Method:** Rotary wash with mud  
**Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.**

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21		SS 24/10	20-22	3,5,8,10	13	Brown silt, trace fine sand	GLACIO FLUVIAL		
22									
23									
24									
25									
26		SS 24/11	25-27	7,8,11,11	19	Brown silt, some fine sand			
27									
28									
29									
30									
31		SS 24/9	30-32	4,2,3,3	5	Grey silt, trace fine sand			
32									
33									
34									
35									
36		SS 24/8	35-37	WOR,4,3,3	7	Grey silt, little fine sand, trace coarse sand			
37									
38									
39									
40									

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- RQD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B02-CAD-072007**

SHEET 3 of 5

FILE NO. 6615.003

CHKD. BY KH

Boring Co.  
Driller  
Logged By

Geologic, Inc.  
Tim Turner  
KD

Boring Location Northing 2696504  
Mudline El. -5.3  
Date Start 7/30/2007

Easting 815424  
Datum MLLW  
Date End 8/2/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: Rotary wash with mud  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41		SS 24/8	40-42	WOR,5,5,4	10	Grey silt, little fine sand	GLACIO FLUVIAL		
42									
43									
44									
45									
46		SS 24/12	45-47	3/3",6,7,6	13	Grey silt, little fine sand			
47									
48									
49									
50									
51		SS 24/6	50-52	7,6,11,6	17	Medium dense grey fine to coarse sand, some fine to coarse gravel, trace silt			
52									
53									
54									
55									
56		SS 24/4	55-57	15,19,8,6	27	Medium dense grey fine gravel, some coarse gravel, some medium to coarse sand, trace silt			
57									
58									
59									
60									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



374 Congress Street, Suite 508  
Boston, MA 02210  
Phone: 617.728.0070

**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B02-CAD-072007**

SHEET 4 of 5

FILE NO. 6615.003

CHKD. BY KH

Boring Co. Geologic, Inc.	Boring Location Northing 2696504	Easting 815424
Driller Tim Turner	Mudline El. -5.3	Datum MLLW
Logged By KD	Date Start 7/30/2007	Date End 8/2/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Barge Mounted ATV

Drilling Method: Rotary wash with mud

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
61		SS 24/2		60-62	5,6,7,8	13	Medium dense grey fine gravel, some coarse gravel, some medium to coarse sand, trace silt (rock in spoon drove through sample - no sample collected)	GLACIO FLUVIAL	
62									
63									
64									
65									
66		SS 24/1		65-67	17,22,17,18	39	Dense grey medium to coarse sand and fine to coarse gravel, trace fine sand and silt		
67									
68									
69									
70									
71		SS 24/14		70-72	14,14,23,30	37	0-4" Brown fine to coarse sand, little fine to coarse gravel, little silt 4-14" Mottled orange-brown fine sand and silt, trace coarse sand and fine gravel		
72									
73									
74									
75									
76		SS 24/9		75-77	13,19,17,16	36	0 - 4" Dense mottled orange-brown fine sand and silt, trace coarse sand and fine gravel 4-9" Dense fine to coarse gravel, some fine to coarse sand	WEATHERED ROCK	
77									
78									
79									
80									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B02-CAD-072007**

SHEET 5 of 5

FILE NO. 6615.003

CHKD. BY KH

Boring Co.  
Driller  
Logged By

Geologic, Inc.  
Tim Turner  
KD

Boring Location Northing 2696504  
Mudline El. -5.3  
Date Start 7/30/2007

Easting 815424  
Datum MLLW  
Date End 8/2/2007

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

**Drill Rig:** Barge Mounted ATV

**Drilling Method:** Rotary wash with mud

**Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.**

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
81		SS 7/7		80-82	66,100/1"	100/1"	Very dense orange brown fine to coarse sand, some fine to coarse gravel, trace silt	WEATHERED ROCK	
82									
83							Set up to core at 82.5 ft.		
84							(Top of rock at depth of 82.5 ft)		
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- |  |   |
|--|---|
| 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation. |
| 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B03-CAD-072007**

**SHEET 1 of 4**

**FILE NO. 6615.003**

**CHKD. BY KH**

Boring Co. Geologic, Inc. Boring Location Northing 2696733 Easting 815841  
Driller TIM TURNER Mudline El. -6.6 Datum MLLW  
Logged By KTD, WB Date Start 8/3/2007 Date End 8/6/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1		SS 24/20		0-2	WOR	WOR	Very soft black organic silt, some fine sand mild odor	ORGANIC SILT	
2									
3		SS 24/10		2 - 4	WOR	WOR			
4									
5									
6		SS 24/11		5 - 7	WOR	WOR			
7									
8									
9									
10									
11		SS 24/1		10-12	WOR	WOR			
12									
13									
14									
15									
16		SS 24/14		15-17	WOR, WOR, 2,1	2			
17							Soft black organic silt, some fine sand (brown sandy silt in tip, Peat)	PEAT	
18									
19									
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:





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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B03-CAD-072007**

SHEET 2 of 4

FILE NO. 6615.003

CHKD. BY KH

Boring Co. Geologic, Inc. Boring Location Northing 2696733 Easting 815841  
Driller TIM TURNER Mudline El. -6.6 Datum MLLW  
Logged By KTD, WB Date Start 8/3/2007 Date End 8/6/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21			24/18	20-22	WOR,WOR,2,1	2	Soft brown silt, some fine sand and organic material (Peat)	PEAT	
22									
23									
24									
25			24/15	25-27	2,3,3,4	6	Loose grey fine sand and silt shells in wash	GLACIO FLUVIAL	
26									
27									
28									
29									
30									
31			24/	30-32	1,2,2,1	4			
32									
33									
34									
35			24/23	35-37	6,5,5,6	10	Loose gray fine to medium sand, trace coarse sand, trace fine gravel, trace silt sample contains gravel at 14"		
36									
37									
38									
39									
40									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B03-CAD-072007**

**SHEET 3 of 4**

**FILE NO. 6615.003**

**CHKD. BY KH**

Boring Co. Geologic, Inc. Boring Location Northing 2696733 Easting 815841  
Driller TIM TURNER Mudline El. -6.6 Datum MLLW  
Logged By KTD, WB Date Start 8/3/2007 Date End 8/6/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS	
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value				
41		SS 24/	40-42	WOR, WOR, 2, 2	2	Loose gray fine sand, some silt	GLACIO FLUVIAL			
42										
43										
44										
45										
46		SS 24/15	45-47	WOR, 1, 3, 1	4	Loose gray fine sand, some silt			GLACIO FLUVIAL	
47										
48										
49										
50										
51		SS 24/13	50-52	5, 4, 5, 8	9	Gray silt, little fine sand	GLACIO FLUVIAL			
52										
53										
54										
55										
56		SS 24/12	55-57	5, 5, 7, 9	12	Medium dense gray fine to coarse sand, little fine to coarse gravel, trace silt			GLACIO FLUVIAL	
57										
58										
59										
60										

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B03-CAD-072007**

**SHEET 4 of 4**

**FILE NO. 6615.003**

**CHKD. BY KH**

Boring Co. Geologic, Inc. Boring Location Northing 2696733 Easting 815841  
Driller TIM TURNER Mudline El. -6.6 Datum MLLW  
Logged By KTD, WB Date Start 8/3/2007 Date End 8/6/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
61		SS	24/9	60-62	17,16,21,41	37	Dense gray-brown mottled silty fine sand, little medium to coarse sand and fine to coarse gravel (Glacial Till)  (roller bit through cobble or boulder at 62 ft)	GLACIAL TILL	
62									
63									
64									
65			9/6	65-67	4,100/3"	100/3"	Very dense orange-brown fine to medium sand, some silt, trace coarse sand and fine gravel		
66									
67									
68									
69									
70									
71							set up to core at 70ft. Top of rock at 70 ft. (see attached rock core log)		
72									
73									
74									
75									
76									
77									
78									
79									
80									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B04-CAD-072007**

**SHEET 1 of 4**

**FILE NO. 6615.003**

**CHKD. BY KH**

Boring Co. Geologic, Inc. Boring Location Northing 2690765 Easting 815163  
Driller RAY Mudline El. -4.1 Datum MLLW  
Logged By KTD, WB, GD, KVN Date Start 8/16/2007 Date End 8/20/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1		SS 24/10.5	0-2	2, 1/12", 1	1	0-3" Very loose black fine sand, little coarse sand, shells 3-10.5" Very loose dark gray fine sand, some silt, trace shells	MARINE SAND		
2									
3									
4									
5						Very loose gray fine sand, little silt			
6		SS 24/11	5-7	WOR, 7, 9, 7	16	(layer of coarse gravel at 5.2 ft) Brown silt, some fine sand	GLACIO FLUVIAL		
7									
8									
9									
10		SS 24/16	9-11	4, 2, 4, 7	6	Brown silt and fine sand			
11									
12									
13									
14									
15									
16		SS 24/24	15-17	7, 10, 9, 10	19	Medium dense brown to orange fine sand, trace silt and fine gravel			
17									
18									
19									
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B04-CAD-072007**

**SHEET 2 of 4**

**FILE NO. 6615.003**

**CHKD. BY KH**

Boring Co. Geologic, Inc. Boring Location Northing 2690765 Easting 815163  
Driller RAY Mudline El. -4.1 Datum MLLW  
Logged By KTD, WB, GD, KVN Date Start 8/16/2007 Date End 8/20/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21		SS 24/14	20-22	3,4,4,5	8	Brown silt, trace fine sand	GLACIO FLUVIAL		
22									
23									
24									
25									
26		SS 24/17	25-27	4,5,10,10	15	Brown silt, trace fine sand layer of orange-brown silt and fine sand at 26 ft			
27									
28									
29									
31		SS 24/24	30-32	1,1,2,4	3	Brown fine sand, some silt, trace medium sand			
32									
33									
34									
35									
36		SS 24/23	35-37	4,4,5,6	9	Brown silt, trace fine sand			
37									
38									
39									
40									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

BORING NO. **B03-CAD-072007**

SHEET 3 of 4

FILE NO. 6615.003

CHKD. BY KH

Boring Co. Geologic, Inc. Boring Location Northing 2690765 Easting 815163  
Driller TIM TURNER Mudline El. -4.1 Datum MLLW  
Logged By KTD, WB, GD, KVN Date Start 8/16/2007 Date End 8/20/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41		SS 24/19	40-42	1,4,5,8	9	Brown silt, trace fine sand	GLACIO FLUVIAL		
42									
43									
44									
45									
46		SS 24/17	45-47	WOR	WOR	Gray fine sand and silt			
47									
48									
49									
50									
51		SS 24/24	50-52	WOR,4,11,16	15	0 - 13": Brown silt and fine sand 13 - 24" Gray silt, trace fine sand			
52									
53									
54									
55									
56		SS 24/12	55-57	23,12,10,12	22	Gray silt, trace fine sand			
57									
58									
59									
60									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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Phone: 617.728.0070

**PROJECT**

NEW BEDFORD HARBOR DREDGE PHASE III  
POPE'S ISLAND NORTH AREA - CAD CELL 2  
NEW BEDFORD HARBOR, NEW BEDFORD, MA

**BORING NO. B04-CAD-072007**

**SHEET 4 of 4**

**FILE NO. 6615.003**

**CHKD. BY KH**

Boring Co. Geologic, Inc. Boring Location Northing 2690765 Easting 815163  
Driller TIM TURNER Mudline El. -4.1 Datum MLLW  
Logged By KTD, WB, GD, KVN Date Start 8/16/2007 Date End 8/20/2007

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted ATV  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
61							roller bit through boulder at 60 ft. sand blew in, hole collapsed. (No sample at 60 ft)	GLACIO FLUVIAL	
62									
63									
64		SS 24/8	63-65	5,6,7,11	13	Medium dense gray fine to coarse sand, little fine gravel			
65									
66						telescoped 3" casing down to 68 ft.			
67						boulder encountered from 65 to 66.5 ft.			
68									
69						cleaned out casing to 70 ft, driller thinks rock encountered, set up to core rock			
70						top of rock at 70 ft.			
71						(see rock core log, next page)			
72									
73									
74									
75									
76									
77									
78									
79									
80									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-1  
SHEET 1 of 3  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2696013.2 Easting 815159.3  
Driller Barry Wordell Mudline El. -30.6 Datum MLLW  
Logged By Joe Kraycik Date Start 9/20/2004 Date End 9/20/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1									
2								ORGANIC SILT	
3									
4									
5		S1	24/24	4-6	3-9-7-5	16	Sandy organic silt and clay (OL/OH); Black, very stiff, organic odor; Grades to well-graded sand (SW) with trace organics that is dark gray and medium dense; Fine sand: 25%, medium sand: 40%, coarse sand: 25%, organics: <10%.		
6									
7									
8								GLACIO-FLUVIAL	
9		S2	24/17	8-10	2-2-3-3	5	Poorly-graded sand with trace silt and gravel (SP); Olive gray, loose; Silt: 5%, fine sand: 40%, medium sand: 35%, coarse sand: 15% gravel: 5%.		
10									
11									
12									
13									
14									
15		S3	24/8	14-16	2-2-2-3	4	Poorly-graded sand (SP) similar to S2.		
16									
17									
18									
19									
20		S4	24/7	19-21	2-3-8-14	11	Poorly-graded sand and silt (SM); Silt: 30%, fine sand: 50%, medium sand: 10%, coarse sand: 10%.		

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- ROD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:





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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-1

SHEET 2 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2696013.2 Easting 815159.3  
Driller Barry Wordell Mudline El. -30.6 Datum MLLW  
Logged By Joe Kraycik Date Start 9/20/2004 Date End 9/20/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21							(cont) Poorly-graded sand and silt (SM); Silt: 30%, fine sand: 50%, medium sand: 10%, coarse sand: 10%.	GLACIO- FLUVIAL	
22									
23									
24									
25		S5	24/12	24-26	9-9-6-10	15	Poorly-graded sand with gravel (SP); Possible wash sample; Olive gray, medium density; Fine sand: 10%, medium sand: 15%, coarse sand: 50%, gravel: 25%.		
26									
27									
28									
29									
30		S6	23/7	29-31	10-8-24-100/5"	32	Well-graded sand and gravel (SW); Brown, dense; Fine sand: 15%, medium sand: 20%, coarse sand: 40%, gravel: 25%; Gravel is fine to medium, sub-rounded to sub-angular and composed of quartz, K-feldspar, and granite. Advance casing to 34 feet.		
31									
32									
33									
34									
35		S7	24/7	34-36	16-9-12-38	21	Well-graded sand and gravel (SW) similar to S6 with increasing gravel content and trace silt.		
36									
37									
38									
39									
40		S8	24/10	39-41	6-3-7-19	10	Well-graded gravel and sand (GW); Brownish gray, medium density; Silt: 5%, fine sand: 10%, medium sand: 10%, coarse sand: 20%, gravel: 55%.		

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- ROD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-1

SHEET 3 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2696013.2 Easting 815159.3  
Driller Barry Wordell Mudline El. -30.6 Datum MLLW  
Logged By Joe Kraycik Date Start 9/20/2004 Date End 9/20/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing Blows (ft)	Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41							(cont.) Well-graded gravel and sand (GW); Brownish gray, medium density; Silt: 5%, fine sand: 10%, medium sand: 10%, coarse sand: 20%, gravel: 55%.	GLACIO-FLUVIAL	
42									
43									
44									
45		S9	24/8	44-46	4-3-3-7	6	Well-graded gravel and sand (GW) similar to S8.		
46									
47									
48									
49									
50									
51									
52									
53									
54									
55		S10	5/5	54-54.4	100/5"		Well-graded gravel and sand (GW) similar to S8. Iron staining observed. Bottom of Exploration at 54.4 ft.		
56									
57									
58									
59									
60									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-2  
SHEET 1 of 3  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695565.3 Easting 814905.3  
Driller Barry Wordell Mudline El. -30.6 Datum MLLW  
Logged By Joe Kraycik Date Start 9/23/2004 Date End 9/24/2004

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
**Drill Rig:** Barge Mounted Diedrich D50 ATV  
**Drilling Method:** 4-inch (PW) flush joint drill casing.  
**Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.**

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1								ORGANIC SILT	
2		S1	24/12	1-3	WOR		Organic silt and clay (OL/OH); black, organic odor.		
3									
4		S2	24/10	3-5	6-3-3-1	6	Poorly-graded sand and silt with trace organics (SM); Brownish-black, loose, slight organic odor; Fine sand: 50%, medium sand: 10%, silt: 35%, organics:25%.	GLACIO-FLUVIAL	
5									
6		S3	1/1	5-5.1	100/1"		Refusal; Brownish-black, fine to medium sand with some silt. Pulled casing, set spuds, readvance casing to 6'. Windy conditions moving barge.		
7		S4	24/11	6-8	13-9-13-14	22	Well-graded gravel and sand (GW); Brown, medium dense; Fine sand: 10%, medium sand: 10%, coarse sand: 25%, gravel: 15%; Gravel is composed of quartz, K and Na feldspar, granite, olivine, and is subrounded to subangular.		
8									
9		S5	24/8	8-10	13-11-9-23	20	Well-graded gravel and sand (GW); Reddish-brown, medium dense, similar to S4.		
10									
11									
12		S6	24/9	11-13	100-21-14-14	35	Poorly-graded sand and gravel with trace silt (SP); Brownish-gray, dense: Fine sand: 10%, medium sand: 15%, coarse sand: 30%, gravel: 30%, silt: 15%.		
13									
14		S7	24/7	13-15	17-8-3-2	11	Well-graded sand and gravel with trace silt (SW); Brownish-gray, medium dense; Fine sand: 15%, medium sand: 15%, coarse sand: 30%, gravel: 35%, silt: 5%.		
15									
16									
17		S8	19/12	16-18	1-1-1-100/1		Poorly-graded sand with some gravel (SP); Olive gray, very loose; Fine sand: 40%, medium sand: 20%, coarse sand: 15%, gravel: 25%.		
18									
19							Advance (drive) casing to 18.5. Roller bit refusal at 18.5. Core rock from 18.5 to 21.5 - boulder. (see rock core log, page 3).		
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-2  
SHEET 2 of 3  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring  
Driller Barry Wordell  
Logged By Joe Kracyk  
Boring Location Northing 2695565.3 Easting 814905.3  
Mudline El. -30.6 Datum MLLW  
Date Start 9/23/2004 Date End 9/24/2004

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
**Drill Rig:** Barge Mounted Diedrich D50 ATV  
**Drilling Method:** 4-inch (PW) flush joint drill casing.  
**Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.**

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21							end of boulder encountered at 21.5 ft.		
22							Telescope 3" casing inside 4" casing; advance casing to 22 ft.		
23		S8	24/7	22-24	5-7-10-11	17	Poorly-graded sand and gravel (SP); Light brown., medium dense. Fine sand: 5%, medium sand: 15%, coarse sand: 40%, gravel: 40%; Gravel is composed of quartz, K feldspar, granite, gneiss, fine to coarse grained, and subrounded to subangular,		
24									
25		S9	24/9	24-26	10-8-30-33	38	Well-graded gravel and sand (GW); Light brown, dense; Fine sand: 5%, medium sand: 10%, coarse sand: 35%, gravel 50%; Composition of gravel is similar to S8.		
26									
27		S10	17/10	26-27.4	16-21-100/5"	-	Well-graded gravel and sand with trace silt (GW); Brownish-gray. Split spoon refusal at 27.4 ft. See page 3 for log of rock core.		
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Drege - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-2

SHEET 3 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695565.3 Easting 814905.3  
Driller Barry Wordell Mudline El. -30.6 Datum MLLW  
Logged By Joe Kraycik Date Start 9/23/2004 Date End 9/24/2004

Sample: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
18						
19		C1	18.5-19.5	5	Begin C1 at 18.5 ft.	
20			19.5-20.5	2.5	White to pink, fine to medium grained granitic gneiss recovered. Out of rock (boulder) at 21.5 ft.	
21			20.5-21.5	3	End C1 at 21.5 ft.	
22					REC=88% RQD=45%	
23					(See page 2 for drilling and sampling data from 21.5 ft to 27.4 ft.)	
24						
25						
26						
27					Begin C2 at 27.4 ft.	
28		C2	27.4-28.4	4.5	White to pink, fine to medium grained granitic gneiss; No breaks.	
29			28.4-29.4	4	No breaks	
30			29.4-30.4	3	Highly fractured with horizontal and vertical breaks; Iron staining; Sand present.	
31			30.4-31.4	2	Horizontal break present; Iron staining and sand at breaks.	
32			31.4-32.4	4.5	End C2 at 32.4 ft. REC=82% RQD=75%	
33			32.4-33.4	3	Begin C3 at 32.4 ft.	
34			33.4-34.4	2	White to pink, fine to medium grained granitic gneiss. One low-angle break	
35			34.4-35.4	3	Three low-angle breaks; Iron staining and sand in breaks.	
36			35.4-36.4	4	Highly fractured with horizontal and vertical breaks. One horizontal break	
37			36.4-37.4	4	End C3 at 37.4 ft. REC=88% RQD=45% Bottom of Exploration at 37.4 ft.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1)  
2)  
3)  
4)



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-3  
SHEET 1 of 2  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695904.6 Easting 814775  
Driller Barry Wordell Mudline El. -32.5 Datum MLLW  
Logged By Tom Stolworthy Date Start 9/2/2004 Date End 9/3/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1							No Samples Taken to depth of 11.5 ft  See log of boring 3A	GLACIO- FLUVIAL	
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12		S1	24/19	11.5-13.5	6-12-29-15	41	SM; Olive gray, fine sand and silt, little medium sand, organic odor.		
13									
14		S2	24/19	13.5-15.5	5-4-10-13	14	SM; Olive gray, fine sand and silt, organic odor.		
15									
16		S3	24/16	15.5-17.5	8-9-8-8	17	SM; Light gray, fine sand sand and silt with trace amounts of coarse sand; slight organic odor.		
17									
18		S4	24/22	17.5-19.5	1-4-33-20	37	SM; Light gray, fine sand and silt, slight organic odor.		
19									
20		S5	24/24	19.5-21.5	3-6-8-6	14	SP; Gray, coarse and medium sand with some fine sand, poorly sorted to 21 feet.		

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- RQD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



374 Congress Street, Suite 508  
Boston, MA 02210  
Phone: 617.728.0070

**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-3  
SHEET 2 of 2  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695904.6 Easting 814775  
Driller Barry Wordell Mudline El. -32.5 Datum MLLW  
Logged By Tom Stolworthy Date Start 9/2/2004 Date End 9/3/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21							(cont.) SP; Gray, coarse and medium sand with some fine sand, poorly sorted to 21 feet, slight clay stringer to 21.5 feet.	GLACIO-FLUVIAL	
22		S6	24/10	21.5-23.5	14-20-8-8	28	SP; Gray/brown, coarse sand with little fine sand and trace amounts of fine gravel, poorly sorted.		
23									
24		S7	24/19	23.5-25.5	20-16-14-22	30	SP; Gray/brown, coarse sand with little fine sand and gravel, poorly sorted.		
25									
26		S8	24/12	25.5-27.5	8-13-21-3	34	SP; Brown, coarse sand with little fine gravel and trace fine to medium sand, poorly sorted.		
27									
28		S9	24/10	27.5-29.5	14-11-6-17	17	SP; Brown, coarse sand with some fine gravel and little fine to medium sand with trace cobbles, poorly sorted.		
29									
30		S10	18/13.5	29.5-31	12-49-130	179	SP; Brown, coarse sand with some fine gravel and little fine to medium sand, poorly sorted to 31 feet.		
31							Gray, fine sand with clasts of granitic gneiss.		
32							Unable to core rock due to mechanical problems with drill rig.		
33							Bottom of exploration at 31 ft.		
34									
35									
36									
37									
38									
39									
40									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-3A

SHEET 1 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695897.9 Easting 814773.3  
 Driller Barry Wordell Mudline El. -32.5 Datum MLLW  
 Logged By Joe Kraycik Date Start 9/13/2004 Date End 9/14/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Barge Mounted Diedrich D50 ATV  
 Drilling Method: 4-Inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1			24/0	0-2	WOR	WOR	No Recovery	ORGANIC SILT	
2									
3		S1	24/24	2-4	WOR	WOR	Organic silt and clay (OL/OH); Black, soft, strong odor; Coarsens downwards, bottom 2 inches composed of gray, fine to medium sand and silt (SM) ; Silt: 30%, fine sand: 45%, medium sand: 25%.		
4									
5		S2	24/18	4-6	16-12-15-17	27	Fine to medium sand and silt with trace clay and organics (SM); Gray, medium dense, organic odor; Clay: <5%, silt: 35%, fine sand: 45%, medium sand: 10-15%, organics: <5%.	GLACIO-FLUVIAL	
6									
7		S3	24/15	6-8	6-5-4-3	9	Poorly-graded sand with some silt (SP-SM); Olive gray, loose; Silt: 5-10%, fine sand: 50%, medium sand: 30-40%, coarse sand: 5-10%.		
8									
9		S4	24/17	8-10	2-2-2-3	4	Same as above (SP-SM). Casing sank under own weight. Advanced boring to 24 ft. (See log of boring CAD-3 for stratigraphy).		
10									
11									
12									
13									
14									
15									
16									
17									
18							Note: from approximately 18 to 24 ft depth, spinning casing became difficult and it was necessary to drive the casing.		
19									
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:





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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-3A

SHEET 2 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695897.9 Easting 814773.3  
 Driller Barry Wordell Mudline El. -32.5 Datum MLLW  
 Logged By Joe Kraycik Date Start 9/13/2004 Date End 9/14/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Barge Mounted Diedrich D50 ATV  
 Drilling Method: 4-Inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21									
22									
23									
24									
25	S5	24/13	24-26	9-3-5-4	8	Well-graded sand with trace silt and gravel (SW); Olive grey, loose; Silt: <5%, fine sand: 45%, medium sand: 30%, coarse sand: 10%, gravel: <5%.	GLACIO-FLUVIAL		
26									
27	S6	24/17	26-28	7-3-3-4	6	Well-graded sand and gravel with trace silt (SW); Olive gray, loose, coarsens at 27.5 feet; Silt: <5%, fine sand: 35%, medium sand: 20%, coarse sand: 25%, gravel: 10-15%.			
28									
29	S7	24/	28-30	3-4-4-9	8	Well-graded sand and gravel with trace silt (SW); Light brown, loose; Silt: <5%, fine gravel is fine to medium grained.			
30									
31	S8	9/	30-30.75	9-100/3"	-	Well-graded sand and gravel (SW); Gray, very dense, some coarse gravel present; Silt: <5%, fine sand: 30%, medium sand: 15%, coarse sand: 20%, gravel: 30%.	GLACIAL TILL		
32						Spoon hit refusal at 30.75 feet.			
33						Begin rock core at 30.75 ft.			
34						Boring log continued on next page.			
35									
36									
37									
38									
39									
40									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-3A

SHEET 3 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695897.9 Easting 814773.3  
Driller Barry Wordell Mudline El. -32.5 Datum MLLW  
Logged By Joe Kraycik Date Start 9/13/2004 Date End 9/14/2004

Sample: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig Barge Mounted Diedrich D50 ATV  
Drilling Method 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
31		C1	30.75-31.75	7	Begin C1 at 30.75 ft. Fine to medium grained, highly weathered, gray/pink granitic gneiss; Horizontal fractures.	
32			31.75-32.75	5	Approximate 4" drop at 32.7 ft.	
33			32.75-33.75	3	Quartz pegmatite intrusions, highly weathered with gravel and cobbles; Horizontal fractures.	
34			33.75-34.75	2	Approximate 1 ft drop at 34.1 ft.	
35			34.75-35.75	3	End C1 at 35.75 ft. REC=62% RQD=44%	
36		C2	35.75-36.75	6	Begin C2 at 35.75 ft. Fine to medium grained, light gray/pink granitic gneiss; Horizontally fractured with sand in fractures.	
37			36.75-37.75	3	Low angle fracture (10-20°) with sand in fracture, weathered.	
38			37.75-38.75	5	Medium to high angle fracture with silt in fracture, weathered.	
39			38.75-39.75	6	Slightly darker with more foliation and banding.	
40			39.75-40.75	7	End C2 at 40.75 ft. REC=78% RQD=91%	
41					Bottom of exploration at 40.75 ft.	
42						
43						
44						
45						
46						
47						
48						
49						
50						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1)
- 2)
- 3)
- 4)



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Phone: 617.728.0070

**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-4  
SHEET 1 of 3  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695138.5 Easting 814853.4  
Driller Barry Wordell Mudline El. -29.5 Datum MLLW  
Logged By Joe Kraycik Date Start 9/16/2004 Date End 9/16/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing Blows (ft)	Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1							ORGANIC SILT		
2		S1	24/24	1.5-3.5	6-12-16-18	28			Sandy organic soil (OL/OH); Black, very stiff; Organic silt/clay: 65%, fine sand: 25%, medium sand: 10%.
3									At 3 ft: Poorly graded sand and silt (SP-SM); gray, medium dense; fine sand 65%, medium sand 20%, silt 10 - 15%.
4							GLACIO-FLUVIAL		
5									
6									
7		S2	24/15	6.5-8.5	5-8-6-4	14			Poorly-graded sand (SP); Olive gray, medium dense; Fine sand: 50%, medium sand: 40%, coarse sand: 10%, trace shell fragments.
8									
9									
10									
11									
12		S3	24/17	11.5-13.5	9-5-8-9	13			Poorly graded sand with silt (SP-SM); Olive gray, medium dense; Fine sand: >60%, medium sand: 20%, silt: 10-15%, clay: <5%.
13									
14									
15									
16									
17		S4	24/12	16.5-18.5	3-3-3-5	6	Well-graded sand with some gravel (SW); Olive gray, loose; Fine sand: 25%, medium sand: 45%, coarse sand: 20%, gravel: 5-10%.		
18									
19									
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-4

SHEET 2 of 3

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695138.5 Easting 814853.4  
 Driller Barry Wordell Mudline El. -31.9 Datum MLLW  
 Logged By Joe Kraycik Date Start 9/16/2004 Date End 9/16/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Barge Mounted Diedrich D50 ATV  
 Drilling Method: 4-inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing Blows (ft)	Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
21								
22		S5	24/12	21.5-23.5	9-10-19-16	29	Well-graded sand and gravel (SW); Brownish-gray, medium dense; Fine sand: 10%, medium sand: 15%, coarse sand: 40%, gravel: 35%; Fine to coarse, subrounded to subangular; Quartz, K-feldspar, olivine, granite, gneiss.	
23								
24								
25								
26								
27		S6	24/9	26.5-28.5	16-18-19-30	37	Well-graded gravel with sand (GW); Brown, dense; Fine sand: <5%, medium sand: 10%, coarse sand: 25%, gravel: 60%; Fine to coarse, coarse gravel on top; Mineral content similar to above.	
28								
29								
30								
31								
32								
33		S7		32-34	28-13-34-83	47	Gravel with silt and sand (GW); Gray, dense; Silt: 30%, fine sand: 10%, medium sand: 10%, coarse sand: 10%, gravel: 45%.	
34								
35								
36								
37								
38								
39								
40		S8	24/9	39-41	43-13-19-9	32	Well-graded gravel with silt and sand (GW); Gray, dense; Silt: 20%, fine sand: 10%, medium sand: 15%, coarse sand: 15%, gravel: 40%.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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Phone: 617.728.0070

**PROJECT**  
New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-4  
SHEET 3 of 3  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695138.5 Easting 814853.4  
Driller Barry Wordell Mudline El. -31.9 Datum MLLW  
Logged By Joe Kraycik Date Start 9/16/2004 Date End 9/16/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hammer free falling from a height of 30 inches  
Drill Rig Barge Mounted Diedrich D50 ATV  
Drilling Method 4-inch (PW) flush joint drill casing  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inch

Groundwater Readings Not Applicable for Offshore Boring:

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Type & No.	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		PEN/REC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41						(cont.) Well-graded gravel with silt and sand (GW); Gray, dense; Silt: 20%, fine sand: 10%, medium sand: 15%, coarse sand: 15%, gravel: 40%.		
42								
43								
44								
45	S9	17/	44-45.4	43-82-100/5"	-	Well-graded gravel with sand (GW) some silt and clay; Gray, very dense; Silt: 20%, fine sand: 10%, medium sand: 15%, coarse sand: 10%, gravel: 40%, clay: <5%. Split spoon refusal at 45.4 ft.		
46								
47						Bottom of exploration at 45.4 ft.		
48								
49								
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								
60								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-5

SHEET 1 of 2

FILE NO. 6542.003

CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695179.3 Easting 814434.5  
Driller Barry Wordell Mudline El. -31.3 Datum MLLW  
Logged By Joe Kraycik Date Start 9/15/2004 Date End 9/15/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-Inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1		S1	24/0	0-2			No recovery	ORGANIC SILT	
2									
3		S2	24/24	2-4	9-12-15-10	27	2 to 3.25 feet: Organic silt and clay (OL/OH); Black, organic odor; 3.25 to 4 feet: Fine sand and silt (SM); Gray; Coarsens with depth to a well-graded sand and gravel (SW); Light brown, medium dense; Some organic odor; Silt: 5-10%, fine sand: 30%, medium sand: 25%, coarse sand: 30%, gravel: 15%.	GLACIO FLUVIAL	
4									
5		S3	24/14	4-6	11-7-9-14	16	Well-graded sand and gravel with trace silt (SW); Brown, medium dense; Possible wash; Silt: 5%, fine sand: 20%, medium sand: 35%, coarse sand: 25%, gravel: 15%.		
6									
7									
8									
9									
10									
11		S4	24/9	10-12	22-28-25-8	53	Well-graded sand and gravel with silt (SW-SM); Light brown, very dense; Silt: 15%, fine sand: 15%, medium sand: 20%, coarse sand: 30%, gravel: 20%; Gravel is fine to coarse grained, rounded to sub-angular, and composed of quartz, K and Na feldspar, and granite.		
12									
13									
14									
15									
16		S5	24/14	15-17	21-24-9-12	33	Similar to S4 (SW-SM); Silt: 10%.		
17									
18									
19									
20		S6	5/3	20-20.4	100/5"	-	Well-graded gravel with sand (GW); Medium sand: 35%, coarse sand: 35%, gravel: 40%; Gravel is fine to coarse grained, rounded to subangular, and composed of quartz, K and Na feldspar, and granite. Prepare to core rock at 20.4 ft.		

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



374 Congress Street, Suite 508  
Boston, MA 02210  
Phone: 617.725.0070

**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-5  
SHEET 2 of 2  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695179.3 Easting 814434.5  
Driller Barry Wordell Mudline El. -31.3 Datum MLLW  
Logged By Joe Kraycik Date Start 9/15/2204 Date End 9/15/2004

Sample: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig Barge Mounted Diedrich D50 ATV  
Drilling Method 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
21		C1	20.4-21.4	5	Reddish, highly weathered and fractured pegmatite, 70% quartz veins, 30% granite, sand and silt present in fractures.	
22			21.4-22.4	3.5	Pink/white/black medium coarse granite, weathered, horizontal and vertical fractures.	
23			22.2-23.4	3	Similar to 21.4-22.4, horizontal breaks, vertical fracture over entire interval; grading into granitic gneiss.	
24			23.4-24.4	3	Pink/white granitic gneiss, horizontal banding, no fractures.	
25			24.4-25.4	3	Similar to 23.4-24.4, weathered horizontal break at 24.7', high angle healed fracture last 3". End of C1 at 25.4 ft. REC=93% RQD=65%	
26		C2	25.4-26.4	3	Granitic gneiss similar to 23.4-24.4, horizontal fracture (mechanical) at 26.8', fracture (weathered) at 26 ft.	
27			26.4-27.4	4	Horizontal and vertical fractures.	
28			27.4-28.4	3	Horizontal fractures, iron staining, sand in fractures, slightly weathered.	
29			28.4-29.4	3	Highly fractured, sand in fractures, iron staining.	
30			29.4-30.4	4	Horizontal and vertical fractures.	
31					End of C2 at 30.4 ft.	
32					REC= 95% RQD=80%	
33					Bottom of exploration at 30.4 ft.	
34						
35						
36						
37						
38						
39						
40						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1)
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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-6  
SHEET 1 of 2  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695343.5 Easting 814674.3  
Driller Barry Wordell Mudline El. -31.3 Datum MLLW  
Logged By Joe Kracyk Date Start 9/8/2004 Date End 9/10/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.


Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-value			
1									
2		S1 24/24	1-3	WOR-7-8	7	Black organic silt/clay (OL/OH); Organic odor; Coarsening downwards at bottom; Advance casing and roller bit to a depth of 2 feet.	ORGANIC SILT		
3		S2 24/21	2-4	6-7-10-14	17	Light brown, poorly-graded sand with some silt and trace coarse sand (SP-SM); medium dense; Trace OL/OH in top 6"; Silt: 15%, fine sand: 40%, medium sand: 35%, coarse sand: 5%, OL/OH: 5%; Some minor iron staining.	GLACIO-FLUVIAL		
4									
5		S3 24/18	4-6	9-7-5-5	12	Light brown, medium dense, well-graded sand with trace gravel and silt (SW); shell fragments, top 6" is primarily sand and silt. Silt: 5-10%, fine sand: 30%, med. sand: 30%, coarse sand: 25-30%, gravel: 5%.			
6									
7		S4 24/6	6-8	13-23-16-20	39	Reddish brown, dense, poorly-graded sand and gravel with trace silt (SP); Silt: 5%, medium sand: 20%, coarse sand: 40%, gravel: 35%; The gravel is rounded to sun-angular and composed of quartz, K and Na feldspar, granite, and gneiss; Note poor recovery.			
8									
9		S5 24/12	8-10	22-13-11-12	24	Reddish brown, medium dense well-graded gravel with sand (GW); Fine sand: 10%, medium sand: 15%, fine gravel: 25%, medium gravel: 35%, coarse gravel: 15%; Rock and mineral content same as 6-8 feet; Note poor recovery.			
10									
11		S6 24/10	10-12	16-16-11-10	27	Same as S5 (GW).			
12									
13		S7 24/10	12-14	16-13-12-16	25	Same as S5 with trace amounts of silt (<5%) (GW). Possible wash.			
14									
15		S8 24/11	14-16	12-27-19-9	46	Well-graded gravel (GW), possible wash; The bottom 4" is medium dense fine to medium sand with trace amounts of gravel; Fine sand: 50%, medium sand: 40%, gravel: 5%.			
16									
17		S9 3/3	16-16.25	100/3"	-	Well-graded sand and gravel with trace silt (SW); Fine sand: 15%, medium sand: 25%, coarse sand: 40%, gravel: 15%, silt: <5%. Refusal at 16.25 ft. Set up to core rock.			
18									
19									
20									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:



 <p>374 Congress Street, Suite 508 Boston, MA 02210 Phone: 617.728.0070</p>	<b>PROJECT</b>	BORING NO. <u>CAD-6</u>
	New Bedford Harbor Dredge - Phase II	SHEET <u>2 of 2</u>
	New Bedford, Massachusetts	FILE NO. <u>6542.003</u>
		CHKD. BY <u>K. Hartel</u>

Boring Co. _____	Boring Location <u>Northing 2695343.5</u>	Easting <u>814674.3</u>
Driller _____	Mudline El. <u>-31.3</u>	Datum <u>MLLW</u>
Logged By _____	Date Start <u>9/8/2004</u>	Date End <u>9/10/2004</u>

<p>Sample 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.</p> <p>Drill Rig (Barge Mounted Diedrich D50 ATV Drilling Method 4-inch (PW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.</p>	Groundwater Readings Not Applicable for Offshore Borings				
	Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
17		C1	16.3-17.3	9	Begin C1 at 16.3 ft.	
18			17.3-18.3	7	Granite. Possible boulder.	
19			18.3-19.3	9	Core dropped at 19.3 ft, approximate 4" void. Out of rock at approximately 20 ft.	
20					Pulled 3" casing from boring.	
21					Advanced roller bit through core run, to approximately 21 ft. Hit rock at 21 ft.	
22					Advanced roller bit through rock (possible boulder) to 24 ft.	
23					possible boulder from 21 to 24 ft.	
24						
25					driller advanced roller bit without sampling to 26 ft. Attempted split spoon sample at 26 ft. Drove spoon 100 blows for 2 inches. very coarse sand and gravel in tip.	
26					Set up to core rock. Begin C2 at 26 ft.	
27		C2	26-27	8	Fine to medium grained, slightly weathered, light gray/pink granitic gneiss; Fractures at 42" and 44", likely mechanical; High angle fracture joints at 24-27".	
28			27-28	4		
29			28-29	5		
30			29-30	4		
31			30-31	7		
32		C3	31-32	3	end of C2 at 31 ft. REC=78% RQD=89% begin C3 at 31 ft.	
33			32-33	1.5	31.42": Horizontal break, staining, weathered, 4' fracture zone; Pegmatite vein. 32.7": Pegmatite vein.	
34			33-34	2	33.75": Medium angle mechanical break, possibly along a fracture; 34'.	
35			34-35	1.5	34": Horizontal break, weathered, clay along pegmatite intrusion.	
36			35-36	2	34.4-35": Horizontal and medium angle breaks, weathered, staining; Break at 34.4: at pegmatite intrusion.	
37					End of C3 at 36 ft. REC=97% RQD=80%	
38					Bottom of exploration at 36 ft.	
39						
40						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1)
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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-8  
SHEET 1 of 2  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695624.7 Easting 814477.1  
Driller Barry Wordell Mudline El. -33.2 Datum MLLW  
Logged By Joe Kraycik Date Start 9/21/2004 Date End 9/21/2004

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Barge Mounted Diedrich D50 ATV  
Drilling Method: 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1									
2									
3									
4									
5		S1	24/24	4-6	7-9-8-5	17	4 to 5 feet: Organic silt and clay with some sand (OL/OH); Black, very stiff, organic odor; Coarsens with depth; 5 to 6 feet: Well-graded sand with some organics (SW); Grayish-black, medium density, slight organic odor; Fine sand: 35%, medium sand: 25%, coarse sand: 20%, organics: 20%.	ORGANIC SILT	
6									
7								GLACIO-FLUVIAL	
8									
9									
10		S2	24/13	9-11	15-16-15-29	31	Well-graded sand with little gravel (SW); Brown, dense; Silt: 5-10%, fine sand: 15-20%, medium sand: 30%, coarse sand: 30%, gravel 15%.		
11									
12									
13									
14									
15		S3	24/	14-16	31-20-15-27	35	Well-graded sand and gravel (SW); Brown, dense; Fine sand: 25%, medium sand: 30%, coarse sand: 15%, gravel: 40%; The gravel is subrounded to subangular and composed of quartz and granite.		
16									
17									
18							Advanced roller bit and casing to refusal at 18 ft.		
19							Set up to core rock at 18 ft.		
20							See next page for rock core log.		

**GRANULAR SOILS (N-Values)**

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

**COHESIVE SOILS (N-Values)**

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

**SYMBOL KEY**

- S denotes split-barrel sampler.
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.
- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- RQD denotes Rock Quality Designation.
- R denotes core run number.

REMARKS:



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**PROJECT**

New Bedford Harbor Dredge - Phase II  
New Bedford, Massachusetts

BORING NO. CAD-8  
SHEET 2 of 2  
FILE NO. 6542.003  
CHKD. BY K. Hartel

Boring Co. New Hampshire Boring Boring Location Northing 2695624.7 Easting 814477.1  
Driller Barry Wordell Mudline El. -33.2 Datum MLLW  
Logged By Joe Kraycik Date Start 9/21/2004 Date End 9/21/2004

Sample: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig Barge Mounted Diedrich D50 ATV  
Drilling Method 4-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
18					Begin C1 at 18 ft.	
19		C1	18-19	3	White to pink, fine to coarse grained granitic gneiss; Iron staining at top; One horizontal break; Slightly weathered.	
20			19-20	6	No breaks, uniform texture.	
21			20-21	6	One horizontal, low-angle break; Slightly weathered.	
22			21-220	4	No breaks, uniform texture.	
23			22-23	5	One horizontal break, appears mechanical.	
24					End of C1 at 23 ft. REC= 90% RQD=100%	
25					Bottom of exploration at 23 ft.	
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1)
- 2)
- 3)
- 4)

**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 1 OF 3

TO Maguire Group, Inc.  
PROJECT NAME Harbor Aquatic Disposal Cell  
REPORT SENT TO above / Feasibility Study

ADDRESS Foxborough, MA  
LOCATION New Bedford, MA  
OUR JOB NO. 02-011

HOLE NO. NBH-1  
PROJ. NO. 16421  
SURF. ELEV. -6.2' MSL

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.	DATE	
At _____ after _____ Hours	Type _____	<u>HW-NW</u>	<u>S/S</u>	<u>NV-II</u>	Start	<u>6/20/01</u>
At _____ after _____ Hours	Size I.D. _____	<u>4" 3"</u>	<u>1-3/8"</u>	_____	Complete	<u>6/27/01</u>
	Hammer Wt. _____	<u>300#</u>	<u>140#</u>	BIT _____	Boring Foreman	<u>J. Medeiros</u>
	Hammer Fall _____	<u>24"</u>	<u>30"</u>	<u>Dia.</u>	Inspector/Engr.	<u>R. SHARP/NACK</u>

**LOCATION OF BORING**

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE			
				0-6	6-12	12-18				No.	Pen"	Rec."	
5		0.0-2.0	D	Wt.	of	Rods			Dark Gray Organic SILT, trace shells	1	24	12	
		7.0-9.0	D	Wt.	of	Rods				2	24	24	
10		12.0-14.0	D	Wt.	of	Rods				3	24	24	
		17.0-19.0	D	Wt.	of	Rods				4	24	24	
15		22.0-24.0	D	Wt.	of	Rods				5	24	24	
		27.0-29.0	D	Wt.	of	Rods				6	24	18	
20		32.0-34.0	D	Wt.	of	Rods				7	24	12	
		34.0-36.0	D	3	4	4			34.0	Gray SILT and fine Sand, trace dark brown peat	8	24	12
25		38.5-40.5	D	6	10	10			38.5	Gray fine SAND and Silt	9	24	1

GROUND SURFACE TO \_\_\_\_\_ USED \_\_\_\_\_ CASING: \_\_\_\_\_ THEN \_\_\_\_\_

<p>Sample Type D=Drive C=Cored W=Washed UP=Fixed Piston UT=Shelby Tube TP=Test Pit A=Auger OE = Open End Rod * 300# hammer</p>	<p>Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%</p>	<p>Cohesionless 0-10 10-30 30-50 50+</p>	<p>140 lb. Wt x 30" fall on 2" O.D. Sampler Density Loose Med. Dense Dense Very Dense</p>	<p>Cohesive 0-4 4-8 8-15 15-30</p>	<p>Consistency Soft M./Stiff Stiff V-Stiff</p>	<p>30 + Hard</p>	<p><b>SUMMARY:</b> Earth Boring <u>87.5'</u> Rock Coring <u>15'</u> Samples <u>17</u></p>	<p>HOLE NO. <u>NBH-1</u></p>
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**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 2 OF 3

TO Maguire Group, Inc.  
PROJECT NAME Harbor Aquatic Disposal Cell  
REPORT SENT TO above / Feasibility Study

ADDRESS Foxborough, MA  
LOCATION New Bedford, MA  
OUR JOB NO. 02-011

HOLE NO. NBH-1  
PROJ. NO. 16421  
SURF. ELEV. -6.2' MSL

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen"	Rec."
						9						
45		43.5-45.5	D	5	4	5		44.0	Gray fine to medium SAND, some silt, trace fine gravel & coarse sand	10	24	12
50		49.0-51.0	D	4	5	6		49.0	Gray fine to coarse SAND and fine to medium Gravel, little silt	11	24	8
55		54.0-56.0	D	9	12	18		54.0	Dark Gray & Brown coarse to fine SAND and fine to medium Gravel, little silt (Odor Noted)	12	24	12
60		59.0-61.0	D	9	4	7		59.0	Grayish Brown medium to coarse SAND, some fine gravel, little silt	13	24	18
65		64.0-66.0	D	3	4	4				14	24	8
70		71.0-73.0	D	3	3	9				15	24	18
75		76.0-78.0	D	53	29	17		75.0	Yellow Brown & Gray silty fine to coarse SAND and Gravel	16	24	12
80		82.0-82.5	D	100					(80' to 81' - Boulder) " some weathered rock	17	6	4
85								84.0				

GROUND SURFACE TO \_\_\_\_\_ USED \_\_\_\_\_ CASING: \_\_\_\_\_ THEN \_\_\_\_\_

<p>Sample Type D=Drive C=Cored W=Washed UP=Fixed Piston UT=Shelby Tube TP=Test Pit A=Auger OE = Open End Rod * 300# hammer</p>	<p>Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%</p>	<p>Cohesionless 0-10 10-30 30-50 50+</p>	<p>140 lb. Wt x 30" fall on 2" O.D. Sampler Density Loose 0-4 Med. Dense 4-8 Dense 8-15 Very Dense 15-30</p>	<p>Cohesive 0-4 4-8 8-15 15-30</p>	<p>Consistency Soft 30 + Hard M./Stiff Stiff V-Stiff</p>	<p><b>SUMMARY:</b> Earth Boring <u>87.5'</u> Rock Coring <u>15'</u> Samples <u>17</u></p>
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HOLE NO. **NBH-1**

**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 3 OF 3

TO Maguire Group, Inc.  
PROJECT NAME Harbor Aquatic Disposal Cell  
REPORT SENT TO above / Feasibility Study

ADDRESS Foxborough, MA  
LOCATION New Bedford, MA  
OUR JOB NO. 02-011

HOLE NO. NBH-1  
PROJ. NO. 16421  
SURF. ELEV. -6.2' MSL

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen"	Rec."
90		87.5-92.5 RQD = 0%	C					Gray GRANITE	C1	60	38-60%	
95		92.5-97.5 RQD = 0%	C						C2	60	30-50%	
100		97.5-102.5 RQD = 0%	C						C3	60	40-66.7%	
							102.5	Bottom of Boring 102.5'				

GROUND SURFACE TO \_\_\_\_\_ USED \_\_\_\_\_ CASING: THEN \_\_\_\_\_

Sample Type  
D=Drive C=Cored W=Washed  
UP=Fixed Piston UT=Shelby Tube  
TP=Test Pit A=Auger  
OE = Open End Rod  
\*300# hammer

Proportions Used  
trace 0 to 10%  
little 10 to 20%  
some 20 to 35%  
and 35 to 50%

140 lb. Wt x 30" fall on 2" O.D. Sampler  
Cohesionless Density Cohesive Consistency  
0-10 Loose 0-4 Soft 30 + Hard  
10-30 Med. Dense 4-8 M./Stiff  
30-50 Dense 8-15 Stiff  
50+ Very Dense 15-30 V-Stiff

**SUMMARY:**

Earth Boring 87.5'  
Rock Coring 15'  
Samples 17

HOLE NO. NBH-1

**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 1 OF 2

TO **Maquire Group, Inc.**  
PROJECT NAME **Harbor Aquatic Disposal Cell**  
REPORT SENT TO **above / Feasibility Study**

ADDRESS **Foxborough, MA**  
LOCATION **New Bedford, MA**  
OUR JOB NO. **02-011**

HOLE NO. **NBH-2**  
PROJ. NO. **16421**  
SURF. ELEV. **-7.8' MSTL**

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	DATE	
At _____ after _____ Hours	Type	HW-NW	S/S	NV-II	Start	6/29/01	
At _____ after _____ Hours	Size I.D.	4" 3"	1-3/8"		Complete	7/2/01	
	Hammer Wt.	300#	140#	BIT	Boring Foreman	J. Medeiros	
	Hammer Fall	24"	30"	Dia.	Inspector/Engr.	R. SHARP NACK	

**LOCATION OF BORING**

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./ Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE		
				From 0-6	6-12	To 12-18				No.	Pen"	Rec."
5		0.0-2.0	D	Wt.	of	Rods		Black Organic SILT, trace shells	1	24	8	
		3.5-5.5	D	Wt.	of	Rods			2	24	20	
10		9.0-11.0	D	Wt.	of	Rods		10.0 Gray Brown fine SAND, little silt & medium sand	3	24	24	
		14.0-16.0	D	WOR	3	3		14.0 Brown fine to medium SAND, trace silt	4	24	10	
20		22.0-24.0	D	Wt.	Rods	3		22.0 Gray silty fine SAND	5	24	15	
		27.0-29.0	D	3	4	4			6	24	22	
30		32.0-34.0	D	5	9	13		32.0 Gray medium to fine SAND, trace silt, coarse sand & fine gravel	7	24	10	
		38.0-40.0	D	11	7	7		36.0 Gray fine to coarse SAND, some fine to medium gravel, little silt	8	24	6	

GROUND SURFACE TO _____	USED _____	CASING: _____	THEN _____	SUMMARY:	
Sample Type	Proportions Used	140 lb. Wt x 30" fall on 2" O.D. Sampler		Earth Boring	59'
D=Drive C=Cored W=Washed	trace 0 to 10%	Cohesionless	Density	Cohesive	Consistency
UP=Fixed Piston UT=Shelby Tube	little 10 to 20%	0-10	Loose	0-4	Soft 30 + Hard
TP=Test Pit A=Auger	some 20 to 35%	10-30	Med. Dense	4-8	M./Stiff
OE = Open End Rod	and 35 to 50%	30-50	Dense	8-15	Stiff
* 300# hammer		50+	Very Dense	15-30	V-Stiff
				Rock Coring	10'
				Samples	11
				HOLE NO.	NBH-2





**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 1 OF 2

TO **Maguire Group, Inc.**  
PROJECT NAME **Harbor Aquatic Disposal Cell**  
REPORT SENT TO **above / Feasibility Study**

ADDRESS **Foxborough, MA**  
LOCATION **New Bedford, MA**  
OUR JOB NO. **02-011**

HOLE NO. **NBH-3A**  
PROJ. NO. **10421**  
SURF. ELEV. **-7.2' MSL**

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	DATE
At _____ after _____ Hours	Type	HW-NW	S/S	NV-II	Start	7/12/01
At _____ after _____ Hours	Size I.D.	4" 3"	1-3/8"		Complete	7/13/01
	Hammer Wt.	300#	140#	BIT	Boring Foreman	J. Medeiros
	Hammer Fall	24"	30"	Dia.	Inspector/Engr.	R. SHARP NACK

LOCATION OF BORING

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen"	Rec."
5		0.0-2.0	D	Wt.	of	Rods			Black Organic SILT	1	24	6
		4.0-6.0	D	Wt.	of	Rods			" color change to Gray	2	24	24
		9.0-11.0	D	Wt.	of	Rods				3	24	24
10									11.0			
15									16.0			
20		16.5-18.5	D	8	8	20			PEAT, some organic silt			
						22						
25									21.5			
30		21.5-23.5	D	2	3	3			Brown fine to coarse SAND, some fine to medium gravel, trace silt & shells	4	24	2
						8						
35									26.0			
37.0-39.0									26.0			
31.0-33.0									21.5			
37.0-39.0									26.0			
31.0-33.0									31.0			
37.0-39.0									31.0			
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37.0-39.0									31.0			



**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 1 OF 3

TO Maguire Group, Inc.  
PROJECT NAME Aquatic Disposal Project  
REPORT SENT TO above

ADDRESS Foxborough, MA  
LOCATION New Bedford, MA  
OUR JOB NO. 03-100

HOLE NO. NBH-8  
PROJ. NO. 16421  
SURF. ELEV. -7.5'

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.	DATE
At _____ after _____ Hours	Type _____	<u>HW-NW</u>	<u>S/S</u>	<u>NV-II</u>	<u>10/15/02</u>
At _____ after _____ Hours	Size I.D. _____	<u>4" 3"</u>	<u>1-3/8"</u>	_____	<u>10/18/02</u>
	Hammer Wt. _____	<u>300#</u>	<u>140#</u>	BIT _____	<u>G. Brouillette</u>
	Hammer Fall _____	<u>24"</u>	<u>30"</u>	Dia. _____	<u>R. SHARP NACE</u>

**LOCATION OF BORING On Water**

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen"	Rec."
		0.0-2.0	D		Pushed				MUCK	1	24	24
5		5.0-7.0	UP						Dark Brown to Gray fine SAND and Silt	UP1	24	22
		7.0-9.0	D	10	21	16		7.0	Gray Brown fine to medium SAND, little silt, coarse sand & fine to medium gravel	2	24	22
10		10.0-12.0	D	4	5	5		9.0	Gray fine to coarse SAND, trace silt & fine to coarse gravel,	3	24	3
15		15.0-17.0	D	22	25	30		14.0	Gray fine to coarse SAND and Gravel, trace silt	4	24	5
20		20.0-22.0	D	16	17	16				5	24	7
25		25.0-27.0	D	9	6	6				6	24	3
30		30.0-30.3	D	75/3"					(@ 30' - Boulder)	7	3	0

GROUND SURFACE TO _____	USED _____	CASING: _____	THEN _____
Sample Type D=Drive C=Cored W=Washed UP=Fixed Piston UT=Shelby Tube TP=Test Pit A=Auger OE = Open End Rod * 300# hammer	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	Cohesionless 0-10 10-30 30-50 50+	140 lb. Wt x 30" fall on 2" O.D. Sampler Density Cohesive Consistency Loose 0-4 Soft 30 + Hard Med. Dense 4-8 M./Stiff Dense 8-15 Stiff Very Dense 15-30 V-Stiff
			SUMMARY: Earth Boring <u>86'</u> Rock Coring <u>11'</u> Samples <u>16</u>
			HOLE NO. <u>NBH-8</u>

**GUILD DRILLING CO., INC.**  
100 WATER STREET • EAST PROVIDENCE, R.I.

SHEET 2 OF 3

TO Maguire Group, Inc.  
PROJECT NAME Aquatic Disposal Project  
REPORT SENT TO above

ADDRESS Foxborough, MA  
LOCATION New Bedford, MA  
OUR JOB NO. 03-100

HOLE NO. NBH-8  
PROJ. NO. 16421  
SURF. ELEV. -7.5

Depth	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev./ Depth	SOIL OR ROCK IDENTIFICATION Remarks include color, gradation, type of soil etc. Rock-color, type, condition, hardness, drilling time, seams, etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen"	Rec."
45		41.5-43.5	D	27	35	38		Grayish Brown fine to coarse SAND, little fine gravel, trace silt	8	24	4	
						40						
50		47.5-49.5	D	11	6	7		47.5 Gray coarse to fine SAND, some fine to medium gravel, trace silt	9	24	2	
						9						
55		52.5-54.5	D	37	41	47		52.5 Gray Brown fine SAND, trace silt	49	24	24	
						47						
60		57.5-59.5	D	7	4	4		56.0 Gray fine to coarse SAND, some fine to coarse gravel, trace silt	11	24	3	
						7						
65		62.5-64.5	D	16	13	7		* little fine gravel	12	24	2	
						7						
70		67.5-69.5	D	23	20	12		67.5 Gray fine SAND, little silt	13	24	1	
						14						
75		75.5-77.5	D	19	8	9		75.5 Gray fine to coarse SAND, little fine to medium gravel, trace silt	14	24	4	
						10						
80		80.5-82.5	D	21	10	12		80.5 Grayish Brown coarse to fine SAND, trace silt & fine gravel	15	24	18	
						10						
85		85.0-85.3	D	120/3"				84.0 Gray fine to coarse SAND and Gravel, some silt & weathered rock	16	3	3	
		86.0-91.0	C	(ROD=30%)								
								85.3 Gray GRANITE	C1	60	60	

GROUND SURFACE TO		USED		CASING:		THEN		SUMMARY:	
Sample Type	Proportions Used			140 lb. Wt x 30" fall on 2" O.D. Sampler				Earth Boring	86'
D=Drive C=Cored W=Washed	trace 0 to 10%	Cohesionless	Density	Cohesive	Consistency	30 + Hard		Rock Coring	11'
UP=Fixed Piston UT=Shelby Tube	little 10 to 20%	0-10	Loose	0-4	Soft			Samples	16
TP=Test Pit A=Auger	some 20 to 35%	10-30	Med. Dense	4-8	M./Stiff				
OE = Open End Rod	and 35 to 50%	30-50	Dense	8-15	Stiff				
* 300# hammer		50+	Very Dense	15-30	V-Stiff				
								HOLE NO.	NBH-8



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-1

SHEET 1 of 5

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2698554 easting 815021  
Mudline El. -15.79 Datum NGVD  
Date Start 1/11/01 Date End 1/12/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC						Advance PW drill casing to 2 ft.		
2	WOC							ORGANIC CLAY 2.0 ft.	
3	27	S-1	24/4	2-4	6-4-1-1	5	Clayey sand (SC); medium stiff, 40% organic clay/silt, 30% fine sand, 15% medium sand, 5% coarse sand, 5% gravel, 5% shells and shell fragments, slight organic odor, dark gray. Advance PW drill casing to 8 ft. Difficult drilling. Advance 4-7/8 in. roller bit ahead of casing. Several cobbles/boulders noted. Estimated strata break at 5 ft.	MARINE SAND	
4	96								
5	138							5.0 ft.	
6	96								
7	75								GLACIAL TILL
8	109								
9		S-2	24/15	8-10	25-46-74-30	120	Silty sand with gravel (SM); very dense, 40% fine sand, 25% medium sand, 5% coarse sand, 15% gravel, 15% silt, subangular to angular gravel, brown. (Glacial Till) (2 jars) Advance 3-7/8 in. roller bit to 11.5 ft. Very difficult drilling, probable cobbles.		
10									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOLS	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) RQD biased low due to recovery of less than 100%.  
2)  
3)  
4)



Nobis Engineering  
18 Cheneil Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-1

SHEET 2 of 5

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2698554 easting 815021  
 Driller E. Thomas Mudline El. -15.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/11/01 Date End 1/12/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11							Telescope HW drill casing to 11.6 ft. Begin NX rock core at 11.5 ft. (boring log continued on next page)	GLACIAL TILL 11.0 ft.	
12								BEDROCK	
13									
14									
15									
16									
17									
18									
19									
20									

GRANULAR SOILS (NVA/DOCS)	CORES/SOILS (NVA/DOCS)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) RQD biased low due to recovery of less than 100%.  
 2)  
 3)  
 4)



Nohis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-1  
SHEET 3 of 5  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2698554 easting 815021  
Driller E. Thomas Mudline El. -15.79 Datum NGVD  
Logged By E. Thibodeau Date Start 1/11/01 Date End 1/12/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD 11 Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
12.0		R1	11.5-12.5	6 min.	Begin R1 at 11.5 ft. Fresh, hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 20 to 30 degrees). REC. = 52%; RQD = 50% (poor/fair). No water return noted during coring activities.	1
12.5					12.3 ft.: Mechanical break in rock core.	
13.0			12.5-13.5	6 min.	12.9 to 13.3 ft.: Secondary joint: high angle, rough, planar, discolored, and tight. 13.0 ft.: Mechanical break in rock core.	
13.5						
14.0			13.5-14.5	6 min.	13.7 ft.: Mechanical break in rock core. 13.8 to 14.1 ft.: Secondary joint: high angle, smooth, planar, discolored, and open.	
14.5						
15.0			14.5-15.5	5.5 min.		
15.5						
16.0		15.5-16.5	7 min.			
16.5					End of R1 at 16.5 ft. Bottom of exploration at 16.5 ft; boring terminated in bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.45.	

GRANULAR SOILS (REV 2/00)	CORESIVE SOILS (REV 2/00)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) RQD biased low due to recovery of less than 100%.  
 2)  
 3)  
 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-1

SHEET 4 of 5

FILE NO. 48138.27

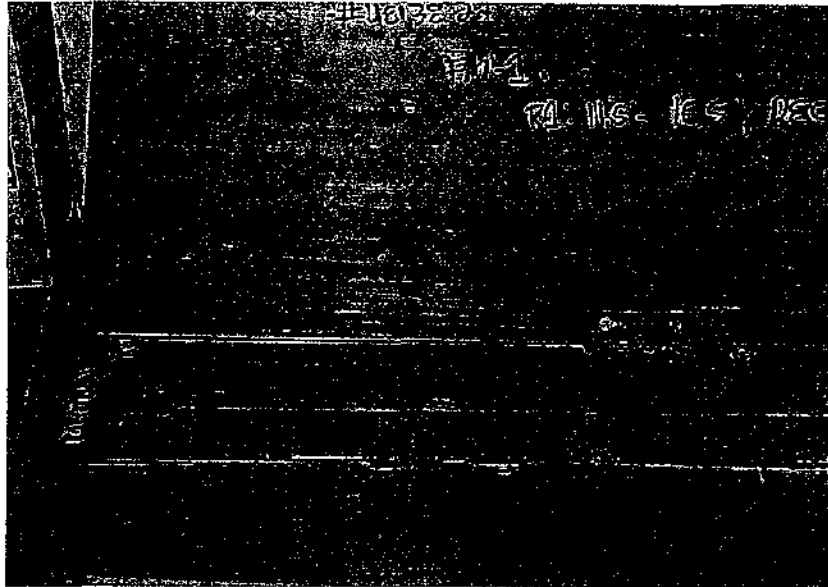
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2698554 easting 815021  
 Driller E. Thomas Mudline El. -15.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/11/01 Date End 1/12/01

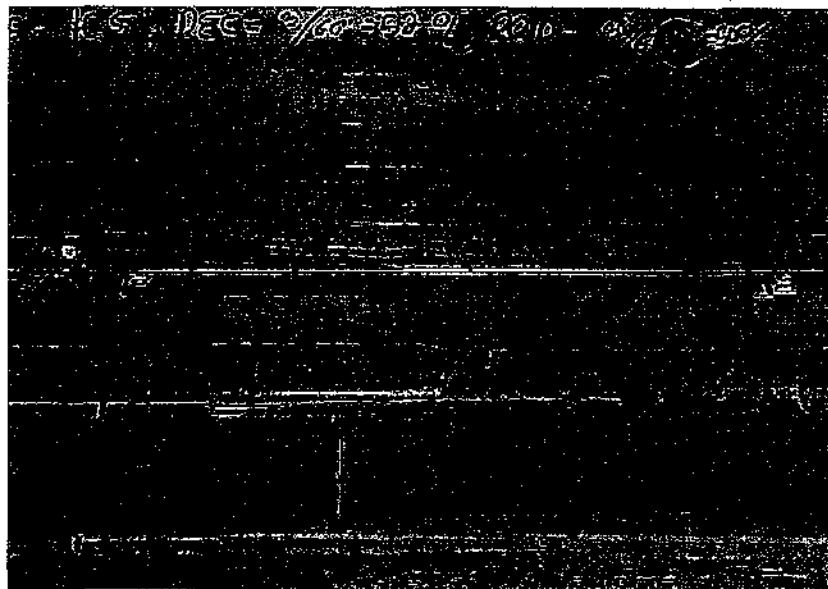
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Run R1



Core Run R1

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)





Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-1

SHEET 5 of 5

FILE NO. 48138.27

CHKD. BY J. Trottier

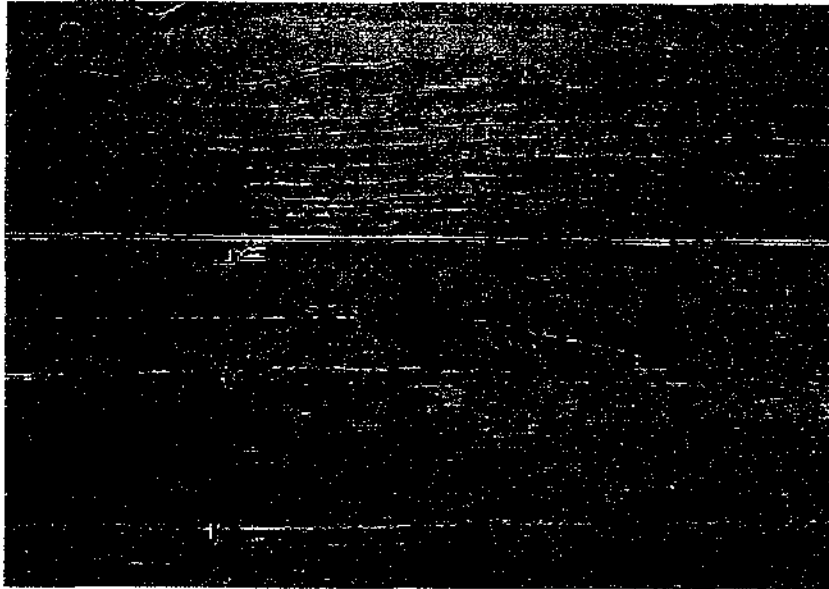
Boring Co. Warren George, Inc. Boring Location northing 2698554 easting 815021  
 Driller E. Thomas Mudline El. -15.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/11/01 Date End 1/12/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

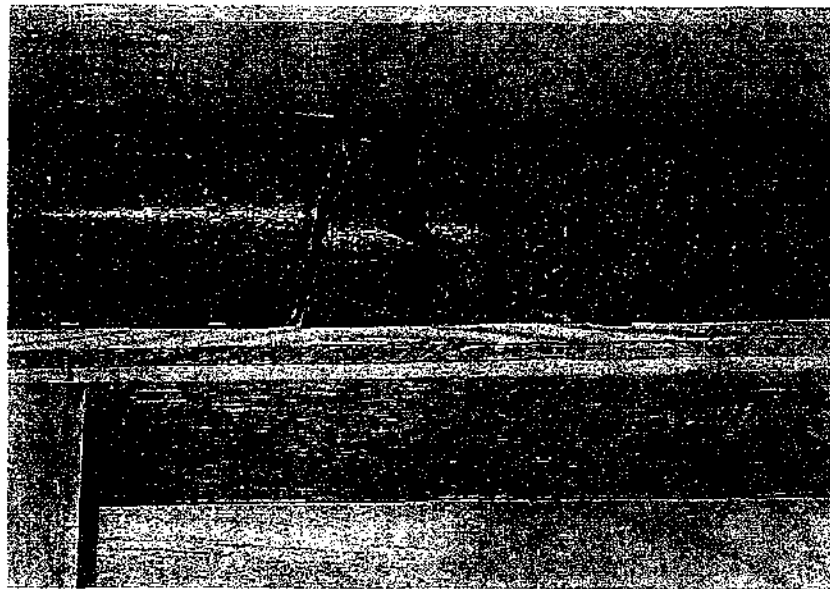
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Run R1



Secondary Joint noted in R1

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-2  
SHEET 1 of 3  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2698516 easting 815070  
Driller S. Laurenza Mudline El. -8.80 Datum NGVD  
Logged By S. Bonis Date Start 1/11/01 Date End 1/12/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC								
2	WOC	S-1	24/18	2-4	WOR	—	Clayey sand (SC); 40% organic claysilt, 60% fine sand, organic odor, black to olive gray. Interbedded medium sands noted. Advance PW drill casing to 7 ft. Advance 3-7/8 in. roller bit to 7 ft.	CLAYEY SAND	
3	WOC								
4	WOC								
5	WOC								
6	WOC								
7	10	S-2	24/0	7-9	WOR-1-3-9	4	Washed sample. Advance PW drill casing to 10 ft. Advance 3-7/8 in. roller bit to 10 ft.	7.0 ft.	
8	18								
9	18								
10	50								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.

REMARKS:

- 1)
- 2)
- 3)
- 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FM-2

SHEET 3 of 3

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2698516 easting 815070  
 Driller S. Laurenza Mudline El. -8.80 Datum NGVD  
 Logged By S. Bonis Date Start 1/11/01 Date End 1/12/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (FW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21							Top of bedrock at 21.0 ft. Bottom of exploration at 21.0 ft. Boring terminated on probable bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.40.	GLACIAL TILL 21.0 ft.	
22								PROBABLE BEDROCK	
23									
24									
25									
26									
27									
28									
29									
30									

GRANULAR SOILS (N-Values)	POREUSE SOILS (N-Values)	SYMBOLS (E)	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UC denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1)  
2)  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-1

SHEET 1 of 4

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By S. Bonis

Boring Location northing 2697662  
Mudline El. -7.81  
Date Start 1/11/01

easting 815001  
Datum NGVD  
Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SPT N-Value	SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES					
1	WOC									
2	WOC									
3	WOC	S-1	24/2	2-4	WOR/24"		Organic soil with sand (OH); 80% organic clay/silt, 20% fine sand, organic odor, shells, black. Slight sheen noted on sample. Advance PW drill casing to 7 ft. Advance 3-7/8 in. roller bit to 7 ft.			
4	WOC									
5	WOC									
6	WOC									
7	WOC									
8	WOC	S-2	24/10	7-9	WOR/24"		Sandy organic soil (OH); 60% organic clay/silt, 40% fine sand, organic odor, shells, gray. Advance PW drill casing to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.			
9	WOC									
10	WOC									

ORGANIC CLAY

GRANULAR SOILS IN YEARS	COHESIVE SOILS IN YEARS	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) \* 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-1

SHEET 2 of 4

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697662 easting 815001  
 Driller S. Laurenza Mudline El. -7.81 Datum NGVD  
 Logged By S. Bonis Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
11	WOC								
12	WOC	S-3	24/24	12-14	WOR/24"	---	Sandy organic soil (OH); 80% organic clay/silt, 40% fine sand, organic odor, shells, gray. Advance PW drill casing to 17 ft. Advance 3-7/8 in. roller bit to 17 ft.		
13	WOC								
14	4								
15	4								
16	3								
17	6	S-4	24/10	17-19	WOR/24"	---	Similar to S-3. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.		
18	8								
19	8								
							Estimated strata change at 19 ft.	19.0 ft.	
20	27							GLACIO FLUVIAL	

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes cora run number. |
|---|--|--|--|

REMARKS:  
 1) \* 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 2)  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-1

SHEET 3 of 4

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2697662</u>	easting <u>815001</u>
Driller <u>S. Laurenza</u>	Mudline El. <u>-7.81</u>	Datum <u>NGVD</u>
Logged By <u>S. Bonis</u>	Date Start <u>1/11/01</u>	Date End <u>1/11/01</u>

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SPT N-Value	SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES				
21	25								
22	27								
		S-5	24/4	22-24	20-21-24-25	45	Poorly graded sand with gravel (SP); dense, 65% fine sand, 15% medium sand, 15% gravel, 5% silt, subangular gravel, gray. Cobble noted in tip of spoon.		
23	40						Advance PW drill casing to 27 ft. Advance 3-7/8 in. roller bit to 27 ft.		
24	56								
25	82								
26	37								
		S-6	24/9	26-28	8-9-10-7	19*	Poorly graded gravel with silt and sand (GP-GM); medium dense, 20% fine sand, 20% medium sand, 50% subangular gravel, 10% silt, gray.	GLACIO FLUVIAL	1
27	36								
28							Boring continued as 2-15/16 in. roller bit probe at 28 ft.		
29									
30									

<b>GRANULAR SOILS</b> 0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	<b>COHESIVE SOILS</b> 0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	<b>SYMBOL KEY</b> 1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
--	---	---	--

REMARKS:

- 1) \* 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-1

SHEET 4 of 4

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697662 easting 815001  
 Driller S. Laurenza Mudline El. -7.81 Datum NGVD  
 Logged By S. Bonis Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Boring continued as 2-15/16 in. roller bit probe at 28 ft.	GLACIO FLUVIAL	
31									
32								32.0 ft.	
		S-7	0/0	32-32	25/0*		Attempt to advance split-barrel sampler. Bottom of exploration at 32.0 ft. Boring terminated on probable bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.40.	PROBABLE BEDROCK	
33									
34									
35									
36									
37									
38									
39									
40									

**SYMBOLS**

- |   |  |   |  |
|---|--|---|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. UO denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|---|--|

REMARKS:  
 1) \* 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 2)  
 3)  
 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-2

SHEET 1 of 5

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697683 easting 815274  
Mudline El. -7.11 Datum NGVD  
Date Start 1/10/01 Date End 1/10/01

Sampler: No sampling performed.

Drill Rig: Acker AD II Truck Rig  
Drilling Method: NW rod probe.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & %	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOR						Boring performed as NW rod probe with 2-inch O.D. split-barrel sampler, from mudline to refusal. Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches.	ORGANIC CLAY	
2	WOR								
3	WOR								
4	WOR								
5	WOR								
6	WOR								
7	WOR								
8	WOR								
9	WOR								
10	4***						Estimated strata change at 9 ft. based upon NW rod probe no longer falling under the weight of the rod.	9.0 ft.	GLACIO FLUVIAL
Blows shown in casing blows column beyond 9 ft. are probe blows.									

SYMBOLS	SYMBOLS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoluminescence Detector
8. PPM denotes parts per million.
9. PP denotes Pocket Penetrometer.
10. FVST denotes field vane shear test.
11. RQD denotes Rock Quality Designation.
12. R denotes core run number.

REMARKS:

- 1) \*\*\* Blows shown in casing blows column beyond 9 ft. are probe blows.
- 2)
- 3)
- 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-2

SHEET 3 of 5

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697683 easting 815274  
Mudline El. -7.11 Datum NGVD  
Date Start 1/10/01 Date End 1/10/01

Sampler: No sampling performed.

Drill Rig: Acker AD II Truck Rig  
Drilling Method: NW rod probe.

Groundwater Readings Not Applicable for Offshore Borings.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Boring performed as NW rod probe with 2-inch O.D. split-barrel sampler, from mudline to refusal. Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches. Blows shown in casing blows column beyond 9 ft. are probe blows.	GLACIO FLUVIAL	
21	21***								
22	31***								
23	31***								
24	32***								
25	33***								
26	40***								
27	50***								
28	54***								
29	49***								
30	54***								

GRANULAR SOILS (SPT)	SOIL TYPE	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) \*\*\* Blows shown in casing blows column beyond 9 ft. are probe blows.  
2)  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-2

SHEET 4 of 5

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697683 easting 815274  
 Driller E. Thomas Mudline El. -7.11 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/10/01 Date End 1/10/01

Sampler: No sampling performed.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: NW rod probe.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (U)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	USP/IN (feet)	BLOWS PER 8 INCHES	SPT N-Value			
31	52***						Boring performed as NW rod probe with 2-inch O.D. split-barrel sampler, from mudline to refusal. Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches. Blows shown in casing blows column beyond 9 ft. are probe blows.	GLACIO FLUVIAL	
32	36***								
33	40***								
34	51***								
35	51***								
36									
37	56***								
38	55***								
39	70***								
40	56***								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Phototization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) \*\*\* Blows shown in casing blows column beyond 9 ft. are probe blows.  
 2)  
 3)  
 4)



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**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. BP-D-2  
SHEET 5 of 5  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697683 easting 815274  
Driller E. Thomas Mudline El. -7.11 Datum NGVD  
Logged By E. Thibodeau Date Start 1/10/01 Date End 1/10/01

Sampler: No sampling performed. Groundwater Readings Not Applicable for Offshore Borings  
Date Time Depth Elev. Stabilization Time  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: NW rod probe.

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS		
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value					
							Boring performed as NW rod probe with 2-inch O.D. split-barrel sampler, from mudline to refusal. Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches. Blows shown in casing blows column beyond 9 ft. are probe blows.	GLACIO FLUVIAL			
41	49***										
42	42***										
43	51***										
44	53***										
45	61***										
46	72***										
	51***/3" 25***/0"										
47						Bottom of exploration at 46.3 ft.; probe refusal on probable bedrock.				46.3 ft.	PROBABLE BEDROCK
48											
49											
50											

<b>GRANULAR SOILS (GV)</b> 0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	<b>COHESIVE SOILS (CV)</b> 0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	<b>SYMBOL KEY</b> 1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*\*\* Blows shown in casing blows column beyond 9 ft. are probe blows.  
2)  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-3

SHEET 1 of 6

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697360 easting 815190  
Mudline El. -7.17 Datum NGVD  
Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.		
1	WOC								
2	WOC								
		S-1	24/2	2-4	WOR/24"		Organic soil (OH); 90% organic clay/silt, 10% fine sand, strong organic odor, black to dark gray. Slight sheen noted on sample.	ORGANIC CLAY	
3	WOC						Advance PW drill casing to 7 ft. Advance 3-7/8 in. roller bit to 7 ft.		
4	WOC								
5	WOC								
6	WOC							6.0 ft.	
7	HYD PUSH							MARINE SAND	
		S-2	24/10	7-9	2-2-2-3	4	Poorly graded sand with silt (SP-SM); very loose, 60% fine sand, 25% medium sand, 5% coarse sand, 10% silt, moderate organic odor, black to gray.		
8	24						Advance PW drill casing to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.		
9	38								
10	44								

GRAND PARSONS SYMBOLS	COLETS SYMBOLS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.
- 2) \*\*\* Blows shown in casing blows column beyond 29 ft. are probe blows.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-3

SHEET 2 of 6

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697360 easting 815190  
Mudline El. -7.17 Datum NGVD  
Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2498)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH Feet	BLOWS PER 6 INCHES	SPT N-Value			
11	44								
12	68								
13	29	S-3	24/10	12-14	3-4-7-7	11	Poorly graded sand (SP); medium dense, 45% fine sand, 40% medium sand, 5% coarse sand, 5% gravel, 5% silt, rounded to subrounded gravel, gray-brown. Advance PW drill casing to 17 ft. Advance 3-7/8 in. roller bit to 17 ft.		
14	44								
15	76							MARINE SAND	
16	95								
17	110								
18	57	S-4	24/10	17-19	4-4-4-7	8	Poorly graded sand (SP); loose, 35% fine sand, 60% medium sand, 5% silt, gray-brown to brown. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.		
19	68								
20	109								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sample. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. PVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.
- 2) \*\*\* Blows shown in casing blows column beyond 29 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. BP-D-3  
SHEET 3 of 6  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697360 easting 815190  
Driller E. Thomas Mudline El. -7.17 Datum NGVD  
Logged By E. Thibodeau Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Slopes (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	107								
22	101	S-5	24/10	22-24	6-6-5-6	11	Sandy silt (ML); stiff, 30% fine sand, 70% silt, olive brown. Advance HW drill casing to 27 ft. Advance 3-7/8 in. roller bit to 27 ft.	MARINE SAND	
23	90								
24	96								
25	97								
26	83								
27	119	S-6	24/13	27-29	2-2-2-4	4	Poorly graded sand (SP); loose, 55% fine sand, 40% medium sand, 5% silt, brown.		
28	NR								
29	NR						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		1
30	3***								

GRANULAR SOILS - SPT Values	COHESIVE SOILS - SPT Values	SYMBOLS	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.  
2) \*\*\* Blows shown in casing blows column beyond 29 ft. are probe blows.  
3)  
4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-3

SHEET 4 of 6

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697360 easting 815190  
Mudline El. -7.17 Datum NGVD  
Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

O E P T H	Casing Blows (U)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31	4***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
32	4***								
33	5***								
34	6***								
35	10***								
36	11***								
37	14***								
38	14***								
39	18***								
40	15***								

<b>SYMBOLS</b> 0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	<b>SYMBOLS</b> 0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	<b>SYMBOLS</b> 1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	<b>SYMBOLS</b> 7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
 1) Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.  
 2) \*\*\* Blows shown in casing blows column beyond 29 ft. are probe blows.  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-3

SHEET 5 of 6

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2697360</u>	easting <u>815190</u>
Driller <u>E. Thomas</u>	Mudline El. <u>-7.17</u>	Datum <u>NGVD</u>
Logged By <u>E. Thibodeau</u>	Date Start <u>1/11/01</u>	Date End <u>1/11/01</u>

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	15***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
42	14***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
43	15***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
44	14***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
45	13***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
46	13***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
47	12***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
48	22***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
49	26***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
50	26***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		

GRANULAR SOILS (ASTM D1586)	COHESIVE SOILS (ASTM D1586)	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.
- 2) \*\*\* Blows shown in casing blows column beyond 29 ft. are probe blows.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-3

SHEET 6 of 6

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697360 easting 815190  
Mudline El. -7.17 Datum NGVD  
Date Start 1/11/01 Date End 1/11/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Ackor AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (N)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
51	27***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 29 ft. are probe blows.		
52	43***								
53	35***								
54	37***								
55	50***								
	25***/10*						Bottom of exploration at 55.5 ft.; probe refusal on probable bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.39.	55.0 ft.	
56								PROBABLE BEDROCK	
57									
58									
59									
60									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**  
1) Probe driven with a 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.  
2) \*\*\* Blows shown in casing blows column beyond 29 ft. are probe blows.  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-4

SHEET 1 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697053 easting 815006  
Mudline El. -6.60' Datum NGVD  
Date Start 1/2/01 Date End 1/2/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.	ORGANIC CLAY	
1	WOC								
2	WOC								
		S-1	24/3	2-4	WOR/24*		Organic soil with sand (OH); 75% organic claysilt, 20% fine sand, 5% shells and shell fragments, strong organic odor, black to dark gray. Slight sheen noted on sample.		
							Advance PW drill casing to 7 ft. Advance 3-7/8 in. roller bit to 7 ft.		
3	WOC							5.0 ft.	
4	WOC								
5	WOC						Estimated strata change at 5 ft.		
6	HYD PUSH							MARINE SAND	
7	HYD PUSH								
		S-2	24/18	7-8	2-2-3-2	5	Silty sand (SM); loose, 10% medium sand, 75% fine sand, 15% silt, gray. Some iron staining noted in bottom 4 in. of sample.		
8	19						Advance PW drill casing to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.		
9	14								
10	28								

GRANULAR SOILS (NEW 2004)	COHESIVE SOILS (NEW 2004)	SYMBOLS	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches. casing blows beyond 29 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 29 ft. are probe blows.  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-4

SHEET 2 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697053 easting 815006  
Mudline El. -6.60 Datum NGVD  
Date Start 1/2/01 Date End 1/2/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	43								
12	55	S-3	24/16	12-14	2-2-2-3	4	Poorly graded sand with silt (SP-SM): loose, 80% fine sand, 10% medium sand, 10% silt, subangular. Some iron staining noted. Advance PW drill casing to 17 ft. Advance 3-7/8 in. roller bit to 17 ft.		
13	34								
14	27								
15	39							MARINE SAND	
16	42								
17	50	S-4	24/13	17-19	2-1-2-1	3	Sandy silt (ML): soft, 65% silt, 35% fine sand, gray. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.		
18	54								
19	28								
20	28								

GRAINULAR SOILS (ASTM D2488)	COHESIVE SOILS (ASTM D2488)	SYMBOLS	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 29 ft. are probe blows.
- 3)
- 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. BP-D-4  
SHEET 3 of 7  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697053 easting 815006  
Driller E. Thomas Mudline El. -6.60 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/2/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	21								
22	20	S-5	24/24	22-24	6-6-5-7	11	S-5A: Lean clay with sand (CL); stiff, 75% clays/silt, 25% fine sand, olive-gray. (12 in.) S-5B: Poorly graded sand (SP); medium dense, 55% fine sand, 40% medium sand, 5% silt, brown. Some iron staining noted. (12 in.)		
23	31						Advance FW drill casing to 27 ft. Advance 3-7/8 in. roller bit to 27 ft.		
24	28								
25	29							MARINE SAND	
26	33								
27	26	S-6	24/13	27-29	4-4-5-7	9	Sandy silt (ML); stiff, 70% silt, 30% fine sand, gray. Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler.		
28	NR								
29	NR								
30	14***								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 29 ft. are probe blows.  
3)  
4)



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**PROJECT**

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New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-4

SHEET 4 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697053 easting 815006  
Mudline El. -6.60 Datum NGVD  
Date Start 1/2/01 Date End 1/2/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (B)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler.		
31	15***								
32	17***								
33	19***								
34	18***								
35									
36	19***								
37	25***								
38	22***								
39	24***								
40	28***								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

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**PROJECT**

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New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-4

SHEET 5 of 7

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697053 easting 815006  
Mudline El. -6.60 Datum NGVD  
Date Start 1/2/01 Date End 1/2/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

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Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler.		
41	29***							
42	30***							
43	26***							
44	30***							
45	25***							
46	23***							
47	24***							
48	23***							
49	24***							
50	24***							

GRANULAR SOILS (N-Value)	COHESIVE SOILS (N-Value)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.
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SHEET 6 of 7

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Driller E. Thomas  
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Boring Location northing 2697053 easting 815006  
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Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT n-Value			
							Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler.		
51	30***								
52	30***								
53	37***								
54	34***								
55	36***								
56	37***								
57	31***								
58	34***								
59	33***								
60	33***								

<b>SOIL PENETRATION</b> 0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	<b>SOIL CLASSIFICATION</b> 0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	<b>SYMBOLS</b> 1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoinitiation Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 29 ft. are probe blows.
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BORING NO. BP-D-4

SHEET 7 of 7

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Driller E. Thomas  
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Boring Location northing 2697053 easting 815006  
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Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SPT Bl-Value	SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES				
61	27***						Boring continued as NW rod probe at 29 ft. with 2-inch O.D. split-barrel sampler.		
62	26***								
63	29***						Bottom of exploration at 63.5 ft.; probe refusal on probable bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.41.	63.5 ft.	PROBABLE BEDROCK
64	26***/6" 50***/10"								
65									
66									
67									
68									
69									
70									

GRANULAR SOILS (SPT Bl-Value)	COHESIVE SOILS (SPT Bl-Value)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-5

SHEET 1 of 6

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696823 easting 815010  
 Driller E. Thomas Mudline El. -5.85 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/29/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.		
1	WOC								
2	HYD PUSH								
		S-1	24/10	2-4	WOR/12'-3-3	---	Clayey sand (SC); 30% organic claysilt, 40% fine sand, 25% medium sand, 5% shells and shell fragments, strong organic odor, black to dark gray.	CLAYEY SAND	
3	HYD PUSH						Advance PW drill casing to 4 ft. Advance 3-7/8 in. roller bit to 4 ft.		
4	HYD PUSH							4.0 ft.	
		S-2	24/6	4-6	3-2-2-4	4	Poorly graded sand (SP); loose, 30% medium sand, 65% fine sand, 5% silt, gray-brown.		
5	12						Advance PW drill casing to 9 ft. Advance 3-7/8 in. roller bit to 9 ft.	MARINE SAND	
6	16								
7	23								
8	41								
9	48								
		S-3	24/6	9-11	3-2-3-3	5	Poorly graded sand (SP); loose, 30% medium sand, 65% fine sand, 5% silt, gray-brown.		
10	33						Advance PW drill casing to 14 ft. Advance 3-7/8 in. roller bit to 14 ft.		

**GRANULAR SOILS**

**COHESIVE SOILS**

**SYMBOLS**

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel sampler.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
 8. PPM denotes parts per million.  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RCD denotes Rock Quality Designation.  
 12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-5

SHEET 2 of 6

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696823 easting 815010  
 Driller E. Thomas Mudline El. -5.85 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/29/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Ackler AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT (blows)			
11	29								
12	36								
13	56								
14	105	S-4	24/12	14-16	3-3-4-3	7	S-4A: Poorly graded sand with gravel (SP); loose, 45% medium sand, 40% fine sand, 5% coarse sand, 5% gravel, 5% silt, subrounded to subangular sand and gravel, brown. (6 in.)	MARINE SAND	
15	41						S-4B: Silt with sand (ML); loose, 75% silt, 25% fine sand, brown. (6 in.) Advance PW drill casing to 19 ft. Advance 3-7/8 in. roller bit to 19 ft.		
16	48								
17	56								
18	61								
19	95	S-5	24/8	19-21	2-3-2-4	5	Poorly graded sand (SP); loose, 30% medium sand, 55% fine sand, 5% coarse sand, 5% gravel, 5% silt, subrounded to subangular sand and gravel, brown.		
20	90						Advance PW drill casing to 24 ft. Advance 3-7/8 in. roller bit to 24 ft.		

GRAVEL	COHESIVE SOILS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

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New Bedford, Massachusetts

BORING NO. BP-D-5

SHEET 3 of 6

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696823 easting 815010  
Mudline El. -5.85 Datum NGVD  
Date Start 12/29/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler, driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	99								
22	110								
23	121								
24	98	S-6	24/14	24-26	2-2-4-2	6	Sandy silt (ML); medium stiff, 60% silt, 5% medium sand, 35% fine sand, brown. Advance PW drill casing to 30 ft. Advance 3-7/8 in. roller bit to 30 ft.		
25	58								
26	129								
27	117								
28	112								
29	121								
30	120								

GRANULAR SOILS (SPT)	COHESIVE SOILS (SPT)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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BORING NO. BP-D-5

SHEET 4 of 6

FILE NO. 48138.27

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 Driller E. Thomas Mudline El. -5.85 Datum NGVD  
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Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-7	24/10	30-32	2-1-2-1	3	Slit with sand (ML); loose, 15% fine sand, 85% sil. gray-brown.		
31	NR								
32	NR								
							Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows.		1
33	5***								
34	3***								
35	8***								
36	10***								
37	12***								
38	18***								
39	19***								
40	21***								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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SHEET 5 of 6

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Driller E. Thomas  
Logged By E. Thibodeau

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Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

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Drilling Method: 5-inch (PW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	21***						Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows.		
42	27***								
43	23***								
44	18***								
45	16***								
46	18***								
47	14***								
48	16***								
49	12***								
50	12***								

GRANULAR SOILS (ASTM)	COHESIVE SOILS (ASTM)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-5

SHEET 6 of 6

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696823 easting 815010  
Mudline El. -5.85 Datum NGVD  
Date Start 12/29/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blow (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
51	14***						Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows.		
52	21***								
53	28***								
54	33***								
55	37***								
56	35***								
57	33***								
58	48***								
59	55***								
60	20***/6" 50***/10"							59.5 ft. PROBABLE BEDROCK	

Bottom of exploration at 59.5 ft.; probe refusal on probable bedrock.  
Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.50.

GRANULAR SOILS (SPT N-Value)	COHESIVE SOILS (N-Value)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 6 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.  
3)  
4)





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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. BP-D-6  
SHEET 1 of 7  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696505 easting 814990  
Driller E. Thomas Mudline El. -8.55 Datum NGVD  
Logged By E. Thibodeau Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD 11 Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PENREG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.	ORGANIC CLAY	
1	WOC								
2	WOC	S-1	24/18	2-4	WOR/24*	---	Organic soil (OH); 55% organic clay/silt, 5% fine sand, strong organic odor, black to dark gray. Trace of shell fragments noted.		
3	WOC						Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft.		
4	WOC								
5	WOC	S-2	24/6	5-7	WOR/24*	---	Similar to S-1; except dark gray.		
6	WOC						Advance PW drill casing to 10 ft. Advance 3-7/8 in roller bit to 10 ft.		
7	WOC								
8	WOC								
9	WOC								
10	WOC								

STANDARD PENETRATION TEST (SPT) (N-Value)	COHESIVE SOILS (CPT) (N-Value)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-6

SHEET 2 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696505 easting 814990  
Mudline El. -8.55 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SPT N-Value	SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES				
11	WOC	S-3	24/15	10-12	WOR/24*	—	Organic soil with sand (OH); 85% organic claysilt, 15% fine sand, strong organic odor, dark gray. Traces of shell fragments noted in sample. Advance PW drill casing to 15 ft. Advance 3-7/8 in. roller bit to 15 ft.	ORGANIC CLAY	
12	WOC								
13	WOC								
14	WOC								
15	WOC								
16	29	S-4	24/18	15-17	WOR/6'-5-4.4	9	S-4A: Mixture of organic soil (OH) and peat (Pt). Shell fragments noted. (6 in.) S-4B: Poorly graded sand (SP); loose, 35% medium sand, 60% fine sand, 5% silt, moderate organic odor, gray. (12 in.) Advance PW drill casing to 20 ft. Advance 3-7/8 in. roller bit to 20 ft.	MARINE SAND	15.0 ft.
17	36								
18	34								
19	39								
20	36								

GRAND BLOW	ADHESIVE SOIL	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-6

SHEET 3 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696505 easting 814990  
Mudline El. -8.55 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows @ 6'	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-5	24/1	20-22	3-3-3-4	6	Poor recovery. Advance PW drill casing to 25 ft. Advance 3-7/8 in. roller bit to 25 ft.	MARINE SAND	
21	23								
22	24								
23	26								
24	30								
25	33								
		S-6	24/9	25-27	3-3-2-3	5	Poorly graded sand (SP); loose, 40% medium sand, 40% fine sand, 10% coarse sand, 5% gravel, 5% silt, subrounded to subangular sand and gravel, brown. Advance PW drill casing to 30 ft. Advance 3-7/8 in. roller bit to 30 ft.	25.0 ft. GLACIO FLUVIAL	
26	33								
27	25								
28	28								
29	29								
30	62								

GRANULAR SOILS (Non-cohesive)	COHESIVE SOILS (Non-cohesive)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**  
 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.  
 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-6

SHEET 4 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696505 easting 814990  
Mudline El. -8.55 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Env.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-Value			
31	NR	S-7	24/8	30-32	4-3-3-4	6	Poorly graded sand with gravel (SP); loose, 40% medium sand, 30% fine sand, 10% coarse sand, 15% gravel, 5% silt, subrounded to subangular sand and gravel, brown.	GLACIO FLUVIAL	
32	NR								
33	14***						Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows.		1
34	13***								
35	12***								
36	12***								
37	13***								
38	16***								
39	21***								
40	19***								

<b>GRAVITY UNITS</b> 0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	<b>CONVERTED UNITS</b> 0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	<b>SYMBOLS</b> 1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	<b>ABBREVIATIONS</b> 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.  
 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-6

SHEET 5 of 7

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696505 easting 814990  
Mudline El. -8.55 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows.		
41	21***								
42	20***								
43	19***								
44	22***								
45	21***								
46	23***								
47	28***								
48	26***								
49	26***								
50	28***								

GRANULAR SOILS PENETRATION	COHESIVE SOILS PENETRATION	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**  
1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-6

SHEET 6 of 7

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696505 easting 814990  
Mudline El. -8.55 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type (ft)	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-VALUE			
							Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows.		
51	27***								
52	23***								
53	25***								
54	28***								
55	26***								
56	25***								
57	27***								
58	24***								
59	24***								
60	27***								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-6

SHEET 7 of 7

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696505 easting 814990  
 Driller E. Thomas Mudline El. -8.55 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Ackor AD II Truck Rig  
 Drilling Method: 5-inch (FW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
	22***75" 50***70"						Boring continued as NW rod probe at 32 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 32 ft. are probe blows. Bottom of exploration at 60.4 ft.; probe refusal on probable bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.34.	60.4 ft.	
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Probe driven with 300 lb. center hole hammer free falling from a height of 24 inches, casing blows beyond 32 ft. are probe blows.  
 2) \*\*\*Blows shown in casing blows column beyond 32 ft. are probe blows.  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7

SHEET 1 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696314 easting 814992  
Mudline El. -8.46 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PENREG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.	ORGANIC CLAY	
1	WOC								
2	WOC								
		S-1	24/6	2-4	WOR/24"	---	Organic soil (OH); 90% organic clay/silt, 5% fine sand, 5% shells and shell fragments, strong organic odor, dark gray. Advance PW drill casing to 7 ft. Advance 3-7/8 in. roller bit to 7 ft.		
3	WOC								
4	WOC								
5	WOC								
6	WOC								
7	WOC								
		S-2	24/18	7-9	WOR/24"	---	Similar to S-1. Advance PW drill casing to 11 ft. Advance 3-7/8 in roller bit to 11 ft.		
8	WOC								
9	WOC								
10	HYD PUSH								

GRANULAR SOILS (ASTM D 1586)	COHESIVE SOILS (ASTM D 1586)	SOILS (ASTM D 1586)
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.
- 3)
- 4)





Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7

SHEET 2 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696314 easting 814992  
 Driller E. Thomas Mudline El. -8.46 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-value			
11	HYD PUSH						Organic soil with sand (OH); 75% organic clay/silt, 20% fine sand, 5% shells and shell fragments, strong organic odor, dark gray. Traces of peat noted in tip of sampler.	ORGANIC CLAY	
		S-3	24/10	11-13	WOR/24"				
12	HYD PUSH						Estimated strata change at 13 ft. Advance PW drill casing to 17 ft. Advance 3-7/8 in. roller bit to 17 ft.	13.0 ft.	
13	HYD PUSH								
14	HYD PUSH								
15	HYD PUSH						Estimated strata change at 15 ft.	15.0 ft.	
16	40								
17	58						Poorly graded sand with silt (SP-SM); medium dense, 45% medium sand, 30% fine sand, 10% coarse sand, 5% gravel, 10% silt, slight organic odor, subrounded sand and gravel, gray. Traces of shells and shell fragments noted.	MARINE SAND	
		S-4	24/13	17-19	6-10-10-10	20			
18	22						Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.		
19	34								
20	48								

- |   |   |  |  |
|---|---|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Soft<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|---|--|--|

REMARKS:  
 1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.  
 2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.  
 3)  
 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7

SHEET 3 of 7

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696314 easting 814992  
Mudline El. -8.46 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	44	S-5	24/3	20-22	6-2-2-2	4	Poorly graded sand (SP); very loose, 30% medium sand, 65% fine sand, 5% silt, brown. Some iron staining noted. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.	MARINE SAND	1
22	58								
23	36	S-6	24/18	22-24	5-5-8-9	11	Poorly graded sand (SP); medium dense, 40% medium sand, 55% fine sand, 5% silt, gray. Advance PW drill casing to 26 ft. Advance 3-7/8 in. roller bit to 26 ft.		
24	57								
25	112								
26	123								
27	12***	S-7	24/8	26-28	5-4-4-5	8	Poorly graded sand (SP); loose, 30% medium sand, 65% fine sand, 5% silt, gray. Boring continued as NW rod probe at 26 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 26 ft. are probe blows.		
28	10***								
29	17***								
30	29***								

GRAND BLOWSONS (NVA)	CORESOFT SOILS (NVA)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photolocalization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.  
3)  
4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7

SHEET 4 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696314 easting 814992  
 Driller E. Thomas Mudline El. -8.46 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-Value			
31	28***						Boring continued as NW rod probe at 26 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 26 ft. are probe blows.		
32	28***								
33	25***								
34	25***								
35	23***								
36	25***								
37	25***								
38	24***								
39	24***								
40	26***								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7  
SHEET 5 of 7  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696314 easting 814992  
Driller E. Thomas Mudline El. -8.46 Datum NGVD  
Logged By E. Thibodeau Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Driving Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Boring continued as NW rod probe at 26 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 26 ft. are probe blows.		
41	32***								
42	28***								
43	27***								
44	31***								
45	25***								
46	27***								
47	29***								
48	29***								
49	26***								
50	29***								

GRANULAR SOILS (G.O.S.)	COHESIVE SOILS (C.O.S.)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.  
3)  
4)



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18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7

SHEET 6 of 7

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696314 easting 814992  
Mudline El. -8.46 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PVI) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Type	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (#)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT Bl-Value			
51	31***						Boring continued as NW rod probe at 26 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 26 ft. are probe blows.		
52	40***								
53	38***								
54	37***								
55	30***								
56	35***								
57	39***								
58	43***								
59	36***								
60	35***								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.
- 2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. BP-D-7

SHEET 7 of 7

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696314 easting 814992  
Mudline El. -8.46 Datum NGVD  
Date Start 12/28/00 Date End 12/28/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (U)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
						Boring continued as NW rod probe at 26 ft. with 2-inch O.D. split-barrel sampler. Blows shown in casing blows column beyond 26 ft. are probe blows.		
61	45***							
62	49***							
	13***/4"					Bottom of exploration at 62.3 ft.; probe refusal on probable bedrock.	62.3 ft.	
	50***/0"					Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.41.		
63							PROBABLE BEDROCK	
64								
65								
66								
67								
68								
69								
70								

GRANULAR SOILS (N-Value)	COHESIVE SOILS (N-Value)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Probe driven with 300 lb. Center hole hammer free falling from a height of 24 inches, casing blows beyond 26 ft. are probe blows.  
2) \*\*\*Blows shown in casing blows column beyond 26 ft. are probe blows.  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 1

SHEET 1 of 8

FILE NO. 48138.07

GHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited

Boring Location northing 2697818.1 easting 814178.0

Driller A. Carter

Mudline El. -8.1 Datum NGVD

Logged By E. Thibodeau

Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount.

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
	Casing Blow (ft)	Type & No.	PEN/REC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. roller bit from 0 to 1 ft.		
2	Hyd. Push	S-1	24/18	1-3	WOR/24"	0	Organic soil (OH); very soft, 90% organic clay/silt, 5% medium sand, 5% fine sand, strong organic odor, noticeable sheen, black.	OH	
3	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. roller bit from 1 to 3 ft.		
4	Hyd. Push	S-2	24/3	3.5-5.5	WOR/24"	0	Pull casing back to 2 ft. and perform borehole permeability test at 2 ft. Casing advanced to 3.5 ft. during test due to the effects of falling tide.	SM (Possible wick media)	1
5	Hyd. Push						Advance 3-7/8 in. roller bit from 3 to 3.5 ft. (remove wick media) S-2: Silty sand (SM); very loose, 62% medium sand, 20% fine sand, 3% coarse sand, 2% gravel, 13% silt/clay, brown to black. (possible wick media)		
6	Hyd. Push	S-3	24/10	5.5-7.5	WOR/24"	0	Advance HW drill casing to 5.5 ft. (hydraulic push) Advance 3-7/8 in. roller bit from 3.5 to 5.5 ft.	OH	
7	Hyd. Push						S-3A: Sandy organic soil (OH); very soft, 50% organic clay /silt, 30% medium sand, 20% fine sand, strong organic odor, black. (8 in.)		
8	WOH	S-4	24/2	7.5-9.5	WOR/24"	0	S-3B: Organic soil with sand (OH); very soft, 80% organic clay/silt, 20% fine sand, strong organic odor, noticeable sheen, black. (2 in.)	OH	
9	WOH						Advance HW drill casing to 7.5 ft; difficult push at 7 ft. (hydraulic push) Advance 3-7/8 in. roller bit from 5.5 to 7.5 ft.		
10		S-5	24/14	9.5-11.5	1/18"-3	0	S-4: Sandy organic soil (OH); very soft, 90% organic clay/silt, 10% fine sand, strong organic odor, noticeable sheen, black. (poor recovery)	OH	
11							Advance HW drill casing to 9.5 ft. Advance 3-7/8 in. roller bit from 7.5 to 9.5 ft. Perform borehole permeability test at 9.5 ft.		
12		S-6	24/8	11.5-13.5	2-8-7-8	15	S-5A: Organic soil with sand (OH); very soft, 75% organic clay/silt, 25% fine sand, strong organic odor, noticeable sheen, black. (3 in.)	SM SP-SM	
13							S-5B: Silty sand (SM); very loose, 40% medium sand, 15% fine sand, 5% coarse sand, 30% silt, strong organic odor, gray to black. (10 in.)		
14		S-7	24/8	13.5-15.5	21-9-8-6	17	S-5C: cinder fragments; probable sediments. (1 in.)	SP-SM	
15							Advance HW drill casing to 11.5 ft. Advance 3-7/8 in. roller bit from 9.5 to 11.5 ft. S-6A: cinder fragments; probable sediments. (5 in.)		
16		S-8	24/1	15.5-17.5	5-5-7-8	12	S-6B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 25% medium sand, 15% coarse sand, 10% fine sand, 40% gravel, 10% silt, slight organic odor, gray.		
17							Advance HW drill casing to 13.5 ft. Advance 3-7/8 in. roller bit from 11.5 to 13.5 ft. S-7: Poorly graded sand with silt (SP-SM); medium dense, 30% medium sand, 25% coarse sand, 25% fine sand, 10% gravel, 10% silt, brown.		
18		S-9	24/7	17.5-19.5	17-6-5-5	11	Advance HW drill casing to 15.5 ft. Advance 3-7/8 in. roller bit from 13.5 to 15.5 ft. Perform borehole permeability test at 15.5 ft.	SP-SM	
19							S-8: Poor recovery; piece of gravel lodged in tip of sampler.		
20							Advance HW drill casing to 17.5 ft. Advance 3-7/8 in. roller bit from 15.5 to 17.5 ft. S-9: Poorly graded sand with silt and gravel (SP-SM); medium dense, 30% medium		1

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
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-



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 1

SHEET 2 of 8

FILE NO. 46138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location northing 2697618.1 easting 814178.0

Mudline El. -8.1 Datum NGVD

Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Ackler AD2 truck mount.

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT Bl Value			
21	10	S-10	24/10	20-22	4-3-4-4	7	sand, 29% fine sand, 10% coarse sand, 25% gravel, 6% silt, brown. Advance HW drill casing to 20 ft.	SP	t
22	17						Advance 3-7/8 in. roller bit from 17.5 to 20 ft.		
23	16						S-10: Poorly graded sand with gravel (SP); loose, 40% medium sand, 25% fine sand, 10% coarse sand, 20% gravel, 5% silt, brown. Advance HW drill casing to 25 ft.		
24	15						Advance 3-7/8 in. roller bit from 20 to 25 ft.		
25	30								
26	13	S-11	24/11	25-27	5-6-10-5	16	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 30% fine sand, 10% coarse sand, 25% gravel, 5% brown. Advance HW drill casing to 30 ft.	SP	
27	27						Advance 3-7/8 in. roller bit from 25 to 30 ft.		
28	39								
29	40								
30	66								
31	57	S-12	24/6	30-32	17-14-9-8	23	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 20% fine sand, 20% coarse sand, 25% gravel, 5% silt, brown. Advance HW drill casing to 35 ft.	SP	
32	47						Advance 3-7/8 in. roller bit from 30 to 35 ft.		
33	52								
34	57								
35	72								
36	71	S-13	24/3	35-37	16-17-10-8	27	Poorly graded sand with gravel (SP); medium dense, 20% coarse sand, 15% medium sand, 15% fine sand, 45% gravel, 5% silt, brown. Advance HW drill casing to 37 ft. Advance 3-7/8 in. roller bit from 35 to 37 ft.	SP	
37	62						Attempt borehole permeability test at 37 ft. Unable to keep bottom of borehole stabilized; approximately 10 in. of run-in sands. Four attempts to remove material were made. Permeability test not performed.		
38	60	S-14	24/0	37-39	12-7-8-7	15	Add bentonite to drilling fluid.		
39	66						S-14: No recovery.		
40	73						Advance HW drill casing to 40 ft. Advance 3-7/8 in. roller bit from 37 to 40 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
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Nobis Engineering  
 PO Box 2890  
 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford Harbor Superfund Site

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New Bedford, Massachusetts

BORING NO. FD-1

SHEET 3 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697618.1 easting 814178.0

Driller A. Carter Mudline El. -8.1 Datum NGVD

Logged By E. Thibodeau Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount.

Drilling Method: 4.4-inch I.D. (H-W) flush-joint casing, wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Blows (#)	Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES			
41	150/ 6"	S-15	5/4	40-40.4	100/5"	—	Poorly graded sand with silt and gravel (SP-SM); 25% coarse sand, 25% medium sand, 20% fine sand, 20% gravel, 10% silt, brown. Advance HW drill casing to 40.5 ft. Advance 3-7/8 in. roller bit from 40 to 40.5 ft. Top of bedrock at 40.5 ft. Telescope and advance NW inner drill casing to 41 ft. for coring. (spin) Begin NV rock core at 41.0 ft. (boring log continued on next page)	SP-SM  BEDROCK	

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:

1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 1

SHEET 4 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697618.1 easting 814178.0  
 Driller A. Carter Mudline El. -8.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
41.5		R1	41.0 - 42.0	7 mins.	Begin R1 at 41.0 ft.	
42.0					Fresh to slightly weathered, medium, gray, fine grained GNEISS. Low angle foliation (25 degrees). REC = 85%; RQD = 50% (poor/fair)	
42.5					41.0 to 41.3 ft: fractured zone, some discoloration present.	
43.0					41.3 ft: Primary joint: low angle, close to moderately spaced, rough, undulating, discolored, and partly open.	
43.5					42.2 ft: Secondary joint: horizontal, very close to moderately spaced, rough, planar, discolored, and open.	
44.0			42.4 ft: Secondary joint: horizontal, very close to moderately spaced, rough, planar, discolored, and open.			
44.5			42.4 to 42.6 ft: Primary joint: moderately dipping, close to moderately spaced, rough, planar, slightly discolored, and partly open.			
45.0			42.9 to 43.1 ft: Primary joint: moderately dipping, close to moderately spaced, smooth, planar, discolored, and open.			
45.5			43.1 to 43.3 ft: healed primary joint with some discoloration.			
46.0			43.8 ft: Secondary joint: horizontal, very close to moderately spaced, rough, planar, slightly discolored, and partly open.			
			43.8 to 44.4 ft: fractured zone, some discoloration noted.			
			44.4 to 45.2 ft: core barrel dropped; core run terminated.			
			Obtain split-barrel sample of void material; 5 blows, 2.5 in. of recovery.			
			S-16A: Sandy silt (ML); moist to wet, 60% silt, 10% clay, 30% fine sand, gray. Some discoloration/iron staining noted. (top)			
			S-16B: Silty sand with gravel (SM); wet, 25% fine sand, 10% coarse sand, 10% medium sand, 15% gravel, 40% silt, reddish-brown. (bottom)			
		R2	45.2 - 46.2	5.5 mins.	End R1 at 45.2 ft. Begin R2 at 45.2 ft.	
					Fresh to slightly weathered, medium, gray, fine grained GNEISS. Low angle foliation (30 degrees). REC = 95%; RQD = 63% (fair)	
					No water return noted during coring activities.	
					45.4 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored, and open.	
					45.6 to 45.9 ft: Secondary joint: high angle, extremely close to widely spaced, rough, planar, discolored, and open.	

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photolization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 9 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test	12. R denotes core run number.

**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
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Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 1  
SHEET 5 of 8  
FILE NO. 48138.07  
CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697618.1 easting 814178.0  
Driller A. Carter Mudline El. -8.1 Datum NGVD  
Logged By E. Thibodeau Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
46.5		R2 (cont.)	46.2 - 47.2	3 mins.	45.9 to 46.8 ft: Secondary joint: high angle to vertical, extremely close to widely spaced, rough, undulating, discolored, and partly open. 45.8 ft: mechanical break in rock core.		
47.0					46.8 to 46.9 ft: Primary joint: low angle, very close to moderately spaced, smooth, planar, discolored, and open. Traces of filling material noted along joint.		
47.5			47.2 - 48.2	4 mins.	46.9 ft: healed primary joint. Some discoloration noted. 47.0 ft: mechanical break in rock core. Minor discoloration noted; possible healed joint. 47.6 ft: healed primary joint. 47.7 ft: mechanical break in rock core. Minor discoloration noted; possible healed joint.		
48.0					48.2 ft: Primary joint: low angle, very close to moderately spaced, rough, undulating, discolored, and partly open.		
48.5			48.2 - 49.2	4.5 mins.	48.3 ft: quartz inclusion, pink in color. Approximately 1 in. thick. 48.4 to 48.5 ft: Secondary joint: high angle, extremely close to widely spaced, rough, undulating, slightly discolored, and partly open. 48.9 ft: healed joint.		
49.0					49.0 to 49.1 ft: series of healed joints. Slight discoloration noted.		
49.5			49.2 - 50.2	4 mins.	49.1 to 49.3 ft: Secondary joint: high angle, extremely close to widely spaced, smooth, planar, slightly discolored, and partly open. Possible healed joint. 49.3 to 49.8 ft: Secondary joint: high angle, extremely close to widely spaced, rough, undulating, discolored, and open. 49.3 to 49.8 ft: series of healed joints. Some discoloration noted along joints. 49.8 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored and open.		
50.0					Perform single packer water pressure test from 42.2 to 50.2 ft. End R2 at 50.2 ft. Begin R3 at 50.2 ft.		
50.5			R3	50.2 - 51.2	4 mins.	Fresh to slightly weathered, medium to moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 100%; RQD = 52% (fair)	
51.0						50.2 ft: Primary joint: low angle, very close to moderately spaced, smooth, planar, discolored and open. 50.2 ft to 50.9 ft: Secondary joint: high angle to vertical, extremely close to widely spaced, rough.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 1

SHEET 6 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697618.1 easting 814178.0  
 Driller A. Carter Mudline El. -8.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
51.5		R3 (cont.)	51.2 - 52.2	4 mins.	undulating, discolored, and open. 50.3 ft: mechanical break in rock core. 50.8 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored, and open. 50.9 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored, and open. 51.0 ft: healed joint. 51.1 ft: mechanical break in rock core. 51.3 and 51.4 ft: Primary joints: low angle, very close to moderately spaced, smooth, planar, discolored, and partly open.		
52.0					51.5 and 51.7 ft: mechanical breaks in rock core. 52.0 and 52.1 ft: Primary joints: low angle, very close to moderately spaced, smooth, planar, discolored, and partly open.		
52.5			52.2 - 53.2	3.5 mins.	52.4 and 52.5 ft: Primary joints: low angle, very close to moderately spaced, smooth to rough, planar, discolored, and open. 52.5 to 53.0 ft: series of joints. Some discoloration and slight weathering noted.		
53.0					53.0 to 53.6 ft: change in rock core. Possible secondary mineralization. Fresh, very soft to soft, dark gray, and aphanitic. Several mechanical breaks noted.		
53.5				53.2 - 54.2	4 mins.	53.4 to 53.6 ft: Secondary joints: high angle, extremely close to widely spaced, smooth, planar, discolored, slightly decomposed, and open. Traces of slickensides noted along joint surface. 53.6 to 53.7 ft: Primary joint: low angle to moderately dipping, very close to moderately spaced, slickensides, planar, discolored, and tight.	
54.0						53.9 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored, and open. 54.0 to 54.1 ft: Primary joint: moderately dipping, very close to moderately spaced, smooth, planar, discolored, and partly open.	
54.5				54.2 - 55.2	3.5 mins.	54.5 to 54.6 ft: series of healed joints. 54.6 ft: mechanical break in rock core. Possible healed joint. 55.0 to 55.1 ft: Secondary joint: high angle, extremely close to widely spaced, smooth, planar, discolored and partly open.	
55.0						55.1 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored, and open. End R3 at 55.2 ft. Begin R4 at 55.2 ft.	
55.5			R4	55.2 - 56.2	3.5 mins.	Fresh to slightly weathered, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 100%; RQD = 62% (fair) 55.3 to 55.4 ft: series of healed joints.	
56.0						55.8 to 56.6 ft: Secondary joint: vertical, extremely close to widely spaced, smooth, undulating, slightly discolored, and tight. Possible healed joint.	

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel sampler.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
 8. PPM denotes parts per million.  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RQD denotes Rock Quality Designation.  
 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
- 2)
- 3)
- 4)



Nobis Engineering  
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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 1

SHEET 7 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697618.1 easting 814178.0  
 Driller: A. Carter Mudline El. -8.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
 area falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
56.5		R4 (cont.)	56.2 - 57.2	3.5 mins.	56.0 and 56.2 ft: mechanical breaks in rock core.  56.6 to 56.8 ft: Secondary joint: moderately dipping, extremely close to widely spaced, smooth, planar, discolored, and open. 56.7 to 56.8 ft: mechanical break in rock core. Possible healed joint. 57.1 to 57.8 ft: series of healed joints. Some discoloration noted.		
57.0							
57.5			57.2 - 58.2	2.6 mins.	57.5 ft: Primary joint: low angle, very close to moderately spaced, rough, undulating, discolored, and partly open. 57.9 to 58.9 ft: series of healed joints. Some discoloration noted.		
58.0					58.1 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, and discolored.		
58.5			58.2 - 59.2	4 mins.	Possible healed joint. 58.0 to 58.7 ft: Secondary joint: high angle to vertical, extremely close to widely spaced, rough, undulating, discolored, and partly open. Possible healed joint. 58.3 ft: mechanical break in rock core. Possible healed joint.		
59.0					58.8 ft: Primary joint: low angle to moderately dipping, very close to moderately spaced, rough, undulating, discolored, and partly open.		
59.5			59.2 - 60.2	4 mins.	58.8 to 58.9 ft: Secondary joint: moderately dipping, extremely close to widely spaced, rough, undulating, discolored, and open. 58.9 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, slightly discolored, and open. Possible healed joint.		
60.0					59.0 to 60.2 ft: change in rock core. Possible inclusion or secondary mineralization. Fresh to slightly weathered, soft, dark gray, and aphanitic. Several mechanical breaks noted.		
60.5			R5	60.2 - 61.2	12 mins.		End R4 at 60.2 ft. Begin R5 at 60.2 ft. Fresh, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 30 degrees. REC = 100%; RQD = 53% (fair)
61.0							60.2 to 61.6 ft: change in rock core. Possible inclusion or secondary mineralization. (continued from R4) Fresh, very soft to soft, dark gray, and aphanitic. Highly fractured near bottom of zone.

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolonization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
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PO Box 2690  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 1

SHEET 6 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697618.1 easting 814178.0  
 Driller A. Carter Mudline El. -8.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/22/99 Date End 9/27/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HM) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
61.5		R5 (cont)	61.2 - 62.2	8.5 mins.	61.4 to 62.2 ft: series of healed joints. Slight discoloration noted. 61.7 ft: mechanical break in rock core. Possible healed joint; slight discoloration noted.	
62.0					61.9 ft: mechanical break in rock core. Possible healed joint; slight discoloration noted. 62.1 ft: mechanical break in rock core. Possible healed joint; slight discoloration noted.	
62.5			62.2 - 63.2	4 mins.	62.5 and 62.8 ft: Primary joints: low angle, very close to moderately spaced, smooth, undulating, discolored, and partly open. 62.8 ft: mechanical break in rock core. Possible healed joint; slight discoloration noted.	
63.0					63.0 ft: Primary joint: low angle, very close to moderately spaced, smooth, planar, slightly discolored, and partly open.	
63.5			63.2 - 64.2	3.5 mins.	63.1 ft: mechanical break in rock core. Possible healed joint; slight discoloration noted. 63.3 to 64.2 ft: series of healed joints. Slight discoloration noted.	
64.0					63.8 ft: mechanical break in rock core. Possible healed joint.	
64.5			64.2 - 65.2	4 mins.	64.3 ft: Primary joint: low angle, very close to moderately spaced, rough, planar, discolored, and partly open. 64.4 ft: Primary joint: horizontal, very close to moderately spaced, smooth, planar, discolored, and partly open. 64.6 to 64.8 ft: Secondary joint: high angle, extremely close to widely spaced, smooth, planar, slightly discolored, and partly open.	
65.0					64.8 to 65.2 ft: series of mechanical breaks in rock core. Some grinding of the core noted. End R5 at 65.2 ft.	
					Bottom of exploration at 65.2 ft.; boring terminated in bedrock.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
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Nobis Engineering  
 P.O. Box 2390  
 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-2

SHEET 1 of 2

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2687607.5 easting 814288.8  
 Driller A. Carter Mudline El. -10.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/13/99 Date End 8/16/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer

free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount.

Drilling Method: 4-inch I.D. (FV) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	UO-1	24/22	3-5			Sandy organic silt (OH); 59% organic silt, 33% fine sand, 6% medium sand, 2% coarse sand, slightly glossy sheen appearance, strong organic odor, black. Advance HW drill casing to 6 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 6 ft.	OH	1
5	Hyd. Push								
6	Hyd. Push								
7	Hyd. Push	UO-2	24/15	6-8			Top: Organic clay with sand (OH); 74% organic clay, 23% fine sand, 3% medium sand, slight glossy sheen appearance, strong organic odor, black. Bottom: Silty sand (SM); 10% medium sand, 75% fine sand, 15% silt, gray. Advance HW drill casing to 9 ft. (hydraulic push) Advance 3-7/8 in. button bit from 6 to 9 ft.	OH	1
8	Hyd. Push							SM	
9	Hyd. Push								
10	5	S-1	24/10	9-11	6-6-6-6	12	Silty sand (SM); medium dense, 5% coarse sand, 6% medium sand, 70% fine sand, 20% silt, strong organic odor, gray to black. Advance HW drill casing to 15 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 9 to 15 ft.	SM	
11	8								
12	10								
13	12								
14	11								
15	11								
16	29	S-2	24/18	15-17	WCH/6"-7-7-6	14	S-2A: Sandy lean clay (CL); 50% clay, 20% silt, 30% fine sand, brown. (12 in.) S-2B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 30% medium sand, 20% fine sand, 15% coarse sand, 20% gravel, 15% silt, oxidized, reddish brown. (6 in.) Advance HW drill casing to 19 ft. Casing refusal at 19 ft. Advance 3-7/8 in. button bit from 15 to 19.5 ft.	CL SP-SM	
17	35								
18	27								
19	82						Top of bedrock at 19 ft.		2
20	0"	R1	19.8-20.8		4 mins.		Telescope and advance NW inner drill casing to 19.8 ft for coring. (spin) Begin NX rock core at 19.8 ft.	BEDROCK	

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel sampler.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
 8. PPM denotes parts per million.  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RQD denotes Rock Quality Designation.  
 12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.
- Loss of drilling fluid noted during advancement of button bit.
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PO Box 1898  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-2  
SHEET 2 of 2  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697607.5 easting 814288.8  
Driller A. Carier Mudline El. -10.9 Datum NGVD  
Logged By E. Thibodeau Date Start 8/13/99 Date End 8/16/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Ackor AD2 truck mount.  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
21		R1	20.8-21.8		4 mins.		BEDROCK	R1: 19.8 to 24.8 ft. Fresh, moderately hard, gray, aphanitic GNEISS with low angle to moderately dipping, very close to close, rough, stepped, discolored, tight to moderately wide joints.
22		cont.	21.8-22.8		4 mins.			
23			22.8-23.8		5 mins.			REC = 88%, RQD = 75% (good) Loss of water return noted at 22.8 ft.
24			23.8-24.8		4 mins.			
25		R2	24.8-25.8		5 mins.			Perform constant head permeability test from 19.8 to 24.8 ft. (R1) R2: 24.8 to 29.8 ft. From 24.8 to 27.5 ft: Highly fractured discolored material; poor recovery.
26			25.8-26.8		0 mins.			From 27.5 to 29.8 ft: Fresh, medium hard, gray, GNEISS with high angle to vertical, smooth to rough, planar, discolored joints.
27			26.8-27.8		1 min.			REC = 67%, RQD = 10% (very poor) No water return noted during coring activities.
28			27.8-28.8		6 mins.			Core barrel dropped a total of approximately 22 inches from 25.8 feet to 27.8 feet. Attempt constant head permeability test at completion of R2; unable to maintain a constant water level in casing. Water level did not rise in casing.
29			28.8-29.8		9 mins.			
30								
31							Bottom of exploration at 28.8 ft.; boring terminated in bedrock.	
32								
33								
34								
35								
36								
37								
38								
39								
40								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2) Loss of drilling fluid noted during advancement of button bit.  
3)  
4)





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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-3

SHEET 1 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697572.5 easting 814475.8  
Driller A. Carter Mudline El. -20.32 Datum NGVD  
Logged By E. Paddleford Date Start 9/27/99 Date End 9/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount.

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH ft	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	4	S-1	24/15	1-3	WOR/9"-1-3	0	S-1A: Organic soil (OH); 75% organic clay, 20% organic silt, 5% fine sand, dark gray to black. (3 in.) S-1B: Peat (PI) (9 in.) S-1C: Poorly graded sand (SP); 50% medium sand, 45% fine sand, 5% silt, gray. (3 in.) All three samples had a strong organic odor.	OH Pt SP	
3	8						Advance HW drill casing to 5 ft. Advance 3-7/8 in. button bit from 1 to 6 ft.		
4	18								
5	42								
6	14	S-2	24/16	5-7	9-7-9-8	16	Sandy silt (ML); very stiff, 50% silt, 50% fine sand, gray. Advance HW drill casing to 10 ft. Advance 3-7/8 in. button bit from 5 to 10 ft.	ML	
7	25								
8	26								
9	16								
10	19								
11	24	S-3	24/18	10-12	3-5-11-13	16	Sandy silt (ML); very stiff, 54% silt, 45% fine sand, 1% medium sand, dark gray. Advance HW drill casing to 15 ft. Advance 3-7/8 in. button bit from 10 to 15 ft.	ML	1
12	22								
13	24								
14	23								
15	22								
16	20	S-4	24/16	15-17	4-6-5-7	16	S-4A: Silt (ML); very stiff, 95% silt, 5% fine sand, gray. (8 in.) S-4B: Poorly graded sand with silt (SP-SM); medium dense, 45% medium sand, 40% fine sand, 5% coarse sand, 10% silt, gray. (8 in.) Advance HW drill casing to 20 ft. Advance 3-7/8 in. button bit from 15 to 20 ft. Mix drilling mud.	ML SP-SM	
17	31								
18	30								
19	26								
20	28								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-3

SHEET 2 of 6

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Paddleford

Boring Location

Mudline El.

Date Start

northing 2697572.5 easting 814475.9

-20.32

9/27/99

Datum

Date End

NGVD

9/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Aker AD2 truck mount.  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Elev (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCH	SPT N-Value			
21	12	S-5	24/0	20-22	4-6-7-7	13	No recovery. Change in drilling effort noted; probable gravel and sand. Advance HW drill casing to 22 ft. Advance 3-7/8 in. button bit from 20 to 22 ft.		
22	26								
23	26	S-6	24/4	22-24	13-25-10-12	35	Poorly graded sand with gravel (SP); dense, 50% coarse sand, 20% medium sand, 10% fine sand, 15% gravel, 5% silt, brown. Rock fragments in tip of sampler. Advance HW drill casing to 25.9 ft. Advance 3-7/8 in. button bit from 22 to 22.9 ft. Some water loss noted during advancement of roller bit. Casing refusal at 25.9 ft. 100 blows recorded for last 2 in.	SP	
24	28								
25	72								
	205/								
28	11"	S-7	1/1	25.9 - 25.9	100/1"	—	Poorly graded sand (SP); 55% medium sand, 30% coarse sand, 10% fine sand, 5% gravel, brown. (1 in.) Bedrock disc noted in tip of sampler; quartz. Top of bedrock at 25.9 ft. Telescope and advance NW inner drill casing to 26 ft for rock coring. (spin) Was only able to advance NW inner drill casing 1.5 in into bedrock; competent rock. Begin NV rock core at 25.9 ft. (boring log continued on next page)	SP	
								BEDROCK	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-3

SHEET 3 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Boring Location northing 2697572.5

easting 814475.8

Driller A. Carter

Mudline El. -20.32

Datum NGVD

Logged By E. Paddleford

Date Start 9/27/99

Date End 9/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

Unless noted, all casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
		R1	25.9-26.9	4 mins.	Begin R1 at 25.9 ft. Top 9 in: Fresh, hard, gray with pink and green, aphanitic with fine grained minerals also present. Some pitting noted on surface. REC = 84%; ROD = 80% Void spaces occur from 26.7 to 27 ft. where a small amount (3) cobbles were cored then another void from 27.2 to 27.7 ft. Void/softer material from 26.7 to 27 ft. and 27.2 to 27.7 ft. Minimal water return noted during coring activities.	
26.5	5' 0" 26.7 26.7 void					
27.0	27' rubble					
27.5			26.9-27.9	4 mins.	Attempted to note changes in water return color and catch in sieve; nothing found.	
28.0	27.7				Lower 3.3 ft: Fresh, medium hard, gray, aphanitic GNEISS with low angle, moderately spaced, rough, planar, fresh, tight, jointing. Foliation roughly horizontal with jointing not following foliation plane.	
28.5	Joint		27.9-28.9	4 mins.		
29.0						
29.5			28.9-29.9	4.5 mins.		
30.0	mechanical break					
30.5			29.9-30.9	5 mins.		
31.0	29.9 R1 80				Perform falling head permeability test for 6 mins. Filled NW inner drill casing. Some overflow noticed in the HW outer drill casing. Water level in HW outer drill casing returns to harbor level. Take readings from NW drill casing. Advance NW inner drill casing to 26.4 ft. (6 in.) End R1 at 30.9 ft.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolocalization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
- 2)
- 3)
- 4)



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PO Box 7890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-3

SHEET 4 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697572.5 easting 814475.8  
 Driller A. Carter Mudline El. -20.32 Datum NGVD  
 Logged By E. Paddleford Date Start 9/27/99 Date End 9/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (4-1/2") flush-joint casing; wash and drive.  
 Unless noted, all casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
31.5		R2	30.9-31.9	5 mins.	Begin R2 at 30.9 ft. Fresh, moderately hard, light gray, aphanitic GNEISS with low angle, moderately spaced, rough, undulating, fresh, partly open joints. REC = 93%; RQD = 93% Minimal water return noted during coring activities; approximately 1/4 to 1/2 of normal.	
32.0			31.9-32.9	6.5 mins.		
32.5			32.9-33.9	7 mins.	32.9 ft: further reduction in water return noted.	
33.0			33.9-34.9	8 mins.	33.9 ft: almost total water return observed.	
33.5			34.9-35.4	4 mins.	35 ft: no water return observed. Core barrel full at 35.4 ft. Probably filled with material from advancing NW inner drill casing. Material was preserved in sample jars.	
34.0			35.4-36.4	4 mins.	End R2 at 35.4 ft. Begin R3 at 35.4 ft. Fresh, moderately hard, gray, aphanitic GNEISS with low angle, widely spaced, rough, undulating, discolored, moderately wide joints. REC = 100%; RQD = 96%	
34.5						
35.0						
35.5						
36.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
 2)  
 3)  
 4)



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-3

SHEET 5 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697572.5 easting 814475.8  
 Driller A. Carter Mudline El. -20.32 Datum NGVD  
 Logged By E. Paddleford Date Start 9/27/99 Date End 9/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (FHV) flush-joint casing; wash and drive.

Unless noted, all casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
36.5		R3 (cont.)	36.4-37.4	4 mins.	No water return noted for the first two feet of coring.	
37.0						
37.5			37.4-38.4	5 mins.	37.4 ft: almost total water return observed.	
38.0						
38.5			38.4-39.0	2 mins.	Core barrel full/clogged at 38.9 ft. Attempt to remove core barrel; core barrel caught in hole. Difficult to remove. Core barrel full with broken rock fragments. Jar rock fragments. (wash) Cored a total of 3.6 ft; the rest of core barrel was filled with rock fragments.	
39.0		R4	39.0-40.0	3.5 mins.	Advance NW inner drill casing another 1.5 ft to 27.9 ft. to seal off void area. Clean out rock core hole with 2-7/8 in. roller bit. Having trouble getting core barrel back down core hole. Spin roller bit a few times to at least 16 ft. Begin R4 at 39.0 ft. Fresh, moderately hard, gray, aphanitic GNEISS with low angle, widely spaced, rough, undulating, discolored, moderately wide joints. REC = 100%, RQD = 100%	
39.5					No water return noted during coring activities.	
40.0			40.0-41.0	4 mins.		
40.5						
41.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
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Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-3  
SHEET 6 of 6  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697572.5 easting 814475.8  
Driller A. Carter Mudline El. -20.32 Datum NGVD  
Logged By E. Paddleford Date Start 9/27/99 Date End 9/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
Unless noted, all casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
41.5		R4 (cont.)	41.0-42.0	5.5 mins.		
42.0			42.0-43.0	5 mins.		
42.5			43.0-44.0	6 mins.		
43.0						
43.5						
44.0						Filled NW inner drill casing with water at completion of coring to perform permeability test. Some water noted overtopping the HW drill casing. Advance NW inner drill casing 12 in. to 28.9 ft. to achieve a better seal. Still water noted overtopping HW drill casing. End R4 at 44.0 ft.
						Bottom of exploration at 44.0 ft; boring terminated in bedrock.

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVS1 denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-4  
SHEET 1 of 6  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697615.7 easting 814602.1  
Driller A. Carter Mudline El. -15.4 Datum NGVD  
Logged By E. Paddleford Date Start 9/20/99 Date End 9/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount.  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing	Type	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.	OH	
2	Hyd. Push	S-1	24/6	1-3	WOR/24"	0	Organic soil (OH); very soft, 75% organic clay, 10% organic silt, 10% fine sand, 5% shell fragments, strong organic odor, dark gray.		
3	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 3 ft.	SP	
4	Hyd. Push	S-2	24/4	3-5	WOR/24"	0	Poorly graded sand (SP); very loose, 50% medium sand, 20% fine sand, 30% shell fragments, gray.		
5	Hyd. Push						Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.	OH	
6	Hyd. Push	S-3	24/16	5-7	WOR/18"-3	0	S-3A: Organic soil (OH); very soft, 75% organic clay, 10% organic silt, 10% fine sand, 5% shell fragments. (12 in.) S-3B: Mixture of Peat (Pt) and sand in tip of sampler. (4 in.)		
7	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 7 ft.	Pt SP-SM	
8	15	S-4	24/15	7-9	2-6-9-11	15	S-4: Poorly graded sand with silt (SP-SM); medium dense, 40% medium sand, 35% fine sand, 10% coarse sand, 10% silt, 5% gravel, gray-brown.		
9	24						Advance HW drill casing to 11 ft. Advance 3-7/8 in. button bit from 7 to 11 ft.	SM	
10	24						Mix drilling mud.		
11	22							SM	
12	16	S-5	24/10	11-13	13-61-22-20	83	Silty sand (SM); very dense, 60% fine sand, 20% medium sand, 20% silt, gray.		
13	19						Advance HW drill casing to 16 ft. Advance 3-7/8 in. button bit from 11 to 16 ft.	SM SP	
14	18						Mix drilling mud.		
15	19							SM	
16	24								
17	27	S-6	24/20	16-18	2-8-9-10	17	S-6A: Silty sand (SM); medium dense, 65% fine sand, 15% medium sand, 20% silt, gray. (14 in.) S-6B: Poorly graded sand (SP); medium dense, 15% coarse sand, 50% medium sand, 30% fine sand, 5% silt, brown. (6 in.)		
18	23						Advance HW drill casing to 21 ft. Advance 3-7/8 in. button bit from 16 to 21 ft.	SP	
19	28								
20	23								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Changed rig geologist from E. Paddleford to E. Thibodeau at 36 ft.
- 2)
- 3)
- 4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-4

SHEET 4 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location northing 2897615.7 easting 814602.1

Mudline El. -15.4 Datum NGVD

Date Start 9/20/99 Date End 9/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (H-W) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
41.5		R2	41.0 - 42.0	10 mins.	Begin R2 at 41.0 ft. Fresh, moderately hard, gray, fine grained GNEISS. Low angle, foliation (30 degrees). REC = 100%; RQD = 87% (excellent) 41.1 ft. Primary joint: low angle, wide to very widely spaced, rough, undulating, fresh, and open. Loss of water noted during coring activities.	
42.0			42.0 - 43.0	8 mins.		
42.6						
43.0			43.0 - 44.0	7 mins.		
43.6						
44.0			44.0 - 45.0	6.5 mins.		
44.6						
45.0						
45.5			45.0 - 46.0	8 mins.	45.2 to 45.3 ft. mechanical breaks in core.	
46.0					Approximately 225 gallons of water loss noted during coring activities. End R2 at 46.0 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Changed rig geologist from E. Paddleford to E. Thibodeau at 36 ft.  
2)  
3)  
4)





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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-4  
SHEET 5 of 6  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697615.7 easting 814602.1  
Driller A. Carter Mudline El. -15.4 Datum NGVD  
Logged By E. Thibodeau Date Start 9/20/99 Date End 9/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
46.5		R3	46.0 - 47.0	10 mins.	Begin R3 at 46.0 ft. Fresh, moderately hard, gray, medium to fine grained GNEISS. Low angle foliation (30 degrees). REC = 98%; RQD = 98% (excellent) Loss of water noted during coring activities. 46.2 to 46.9 ft. Secondary joint: high angle, very widely spaced, smooth, planar, slightly discolored, and open. Possible mechanical break.	
47.0					46.9 ft. mechanical break in core.	
47.5			47.0 - 48.0	10 mins.	46.3 to 47.3 ft. Healed joint: vertical, very widely spaced, smooth, planar, and discolored. Missing core from 46.9 to 47.3 ft.	
48.0						
48.5			48.0 - 49.0	11 mins.		
49.0						
49.5		49.0 - 50.0	11 mins.			
50.0						
50.5		50.0 - 51.0	11.5 mins.		50.3 to 50.5 ft. pink zone; possible quartz inclusion. 50.7 ft. mechanical break in core. 50.7 to 51.0 ft. black/pink mica and quartz inclusion. (continued in R4) Approximately 400 gallons of water loss noted during coring activities.	
51.0					End R3 at 51.0 ft.	

- |   |  |   |  |
|---|--|---|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|---|--|

REMARKS:  
1) Changed rig geologist from E. Paddleford to E. Thibodeau at 36 ft.  
2)  
3)  
4)



Nobis Engineering  
PO Box 1890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO.

FD-4

SHEET

6 of 8

FILE NO.

48138.07

CHKD. BY

J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2697615.7 easting 814602.1  
Mudline El. -15.4 Datum NGVD  
Date Start 9/20/99 Date End 9/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (MW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.5		R4	51.0 - 52.0	5 mins.	Begin R4 at 51.0 ft. Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation (20 degrees). REC = 100%; RQD = 100% (excellent) Loss of water noted during coring activities. 51.0 to 51.4 ft. black/pink mica and quartz inclusion. (continued from R3)	
52.0			52.0 - 53.0	3.5 mins.		
52.5						
53.0			53.0 - 54.0	4.5 mins.		
53.5						
54.0					53.8 ft. mechanical break in core.	
54.5			54.0 - 55.0	4 mins.		
55.0						
55.5			55.0 - 56.0	5 mins.	55.5 ft. mechanical break in core.	
56.0					Filled NW inner casing with water at completion of coring activities; water level dropped at a constant rate. Approximately 5 ft. of head was noted. End R4 at 56.0 ft. Bottom of exploration at 56.0 ft; boring terminated in bedrock.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Changed rig geologist from E. Paddleford to E. Thibodeau at 38 ft.  
2)  
3)  
4)



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-5

SHEET 1 of 2

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697871.3 easting 814761.0  
 Driller A. Carter Mudline El. -22.5 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/17/99 Date End 8/18/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer  
 free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	UC-1	24/24	3-5			Organic clay (OH); 94% organic clay, 4% fine sand, 2% medium sand, black. Advance HW drill casing to 6 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 6 ft.	OH	1
5	Hyd. Push								
6	Hyd. Push								
7	Hyd. Push	UC-2	24/21	6-8			Top : Sandy organic clay (OL); 54% organic clay, 35% fine sand, 8% medium sand, 1% coarse sand, 2% gravel, black. Bottom : Poorly graded sand with silt (SP-SM); 50% medium sand, 35% fine sand, 15% silt, gray to brown. Bottom of tube damaged from sand and gravel.	OL	1
8	Hyd. Push							SP-SM	
9	Hyd. Push						Advance HW drill casing to 9 ft. (hydraulic push) Advance 3-7/8 in. button bit from 6 to 9 ft.		
10	14	S-1	24/13	9-11	9-8-8-11	16	Poorly graded sand (SP); medium dense, 50% medium sand, 35% fine sand, 5% coarse sand, 5% gravel, 5% silt, brown to red. Advance HW drill casing to 15 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 9 to 15 ft.	SP	
11	16								
12	17								
13	23								
14	18								
15	25								
16	15	S-2	24/13	15-17	11-7-8-11	15	Poorly graded sand with silt and gravel (SP-SM); medium dense, 56% fine sand, 17% medium sand, 2% coarse sand, 15% gravel, 10% silt, brown. Advance HW drill casing to 20 ft. Advance 3-7/8 in. button bit from 15 to 20 ft.	SP-SM	1
17	21								
18	55								
19	56								
20	46								

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|--|

REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
 3)  
 4)



Nobis Engineering  
PO Box 7890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-5  
SHEET 2 of 2  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697671.3 easting 814761.0  
Driller A. Carier Mudline El. -22.5 Datum NGVD  
Logged By E. Thibodeau Date Start 8/17/99 Date End 8/18/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HM) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
21	31	S-3	24/12	20-22	9-4-5-4	9	Poorly graded sand with silt and gravel (SP-SM); loose, 37% medium sand, 27% fine sand, 14% coarse sand, 16% gravel, 6% silt, brown.	SP-SM	2
22	30						Advance HW drill casing to 25 ft.		
23	25						Advance 3-7/8 in. button bit from 20 to 25 ft.		
24	30								
25	32								
26	27	S-4	24/12	25-27	11-8-5-30	13	Silty sand with gravel (SM); medium dense, 24% medium sand, 21% fine sand, 8% coarse sand, 30% gravel, 17% silt, brown.	SM	2
27	44						Advance HW drill casing to 27 ft.		
28	0*						Advance 3-7/8 in. button bit from 25 to 27 ft.		
29		R1	28.0-29.0		8.5 mins.		Top of bedrock at 27 ft.	BEDROCK	
30			29.0-30.0		5.5 mins.		Advance 3-7/8 in. button bit from 27 to 28 ft.		
31			30.0-31.0		30 sec.		Begin NX rock core at 28 ft.		
32			31.0-32.0		8.5 mins.		R1: 28.0 to 33.0 ft.		
33			32.0-33.0		4.5 mins.		Fresh, moderately hard, gray, aphanitic GNEISS with horizontal to high angle, close to moderately spaced, rough, planar, fresh to discolored, open joints.		
34		R2	33.0-34.0		8 mins.		REC = 72%; RQD = 55% (fair)		
35			34.0-35.0		7 mins.		Core barrel dropped from 30 to 30.9 ft; probable cavity or void.		
36			35.0-36.0		13.5 mins.		Loss of water return at 31 ft.		
37		R3	36.0-37.0		5.5 mins.		Core barrel dropped from 32 to 32.6 ft; probable cavity or void.		
38			37.0-38.0		7 mins.		R2: 33.0 to 36.0 ft.		
39							Fresh, moderately hard, gray, aphanitic GNEISS with horizontal to low angle, close to moderately spaced, smooth, planar, fresh to discolored, partly open joints.		
40							REC = 100%; RQD = 78% (good)		
							Core barrel dropped from 33.4 to 33.6 ft.		
							Reddish discoloration noted on core from 34.9 to 35.1 ft.		
							No water return noted during coring activities for R2.		
							R3: 36.0 to 38.0 ft.		
							Fresh, moderately hard, gray, aphanitic GNEISS. No joints noted.		
							REC = 100%; RQD = 100% (excellent)		
							Approximately 12 in. of cave in material noted at beginning of core run.		
							No water return noted during coring activities for R3.		
							Bottom exploration at 38.0 ft; boring terminated in bedrock.		

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated February 2, 2000.  
3)  
4)



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-6

SHEET 1 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697527.4 easting 814695.2  
 Driller A. Carter Mudline El. -21.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/22/99 Date End 10/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4 inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT Bl-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	Hyd. Push	UO-1	24/24	1-3			Organic clay with sand (OH); 75% organic clay, 13% fine sand, 3% medium sand, 2% coarse sand, 7% gravel, strong organic odor, slight sheen, black to gray.	OH	1
3	Hyd. Push						Advance HW drill casing to 4 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 4 ft.		
4	Hyd. Push								2
5	Hyd. Push	UO-2	24/24	4-5			Clayey sand with gravel (SC); 23% fine sand, 13% medium sand, 3% coarse sand, 15% gravel, 46% organic clay, strong organic odor, slight sheen, black to dark gray. Shells and shell fragments noted in sample.	SC	1
6	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 4 to 7 ft.		
7	Hyd. Push								3
8	Spin	UO-3	24/24	7-9			Silty sand (SM); 62% fine sand, 1% medium sand, 37% non-plastic silt, strong organic odor, dark gray.	SM	1
9	Spin						Advance HW drill casing to 10 ft. Advance 3-7/8 in. button bit from 7 to 10 ft.		
10	Spin								
11	Spin	S-1	24/15	10-12	13-15-11-10	26	<i>Sandy silt (ML)</i> Silty sand (SM); medium dense, 49% fine sand, 1% medium sand, 50% silt, gray.	<del>SM</del>	4
12	Spin						Advance HW drill casing to 15 ft. Approximately 10 in. of material in bottom of casing prior to sampling; advance 3-7/8 in. button bit to remove material.		
13	Spin								
14	Spin								
15	Spin								
16	Spin	S-2	24/6	15-17	6-4-3-7	7	Poorly graded sand with silt (SP-SM); loose, 40% coarse sand, 20% medium sand, 20% fine sand, 10% gravel, 10% silt, brown. Approximately 1 in. fine sand/silt lense noted in sample.	SP-SM	
17	Spin						Advance HW drill casing to 17 ft.		
18	Spin	S-3	24/13	17-19	7-5-8-4	14	S-3A: Clayey sand (SC); medium dense, 55% fine sand, 45% clay, reddish brown to brown. (5 in.)	SC	
19	Spin						S-3B: Silty sand (SM); medium dense, 45% fine sand, 10% medium sand, 5% coarse sand, 30% silt, 10% clay, reddish brown. (8 in.)	SM	
20	Spin						Advance HW drill casing to 20 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoradiation Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Strata break changed from 8.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
 3) Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.  
 4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
 5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Noh's Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 6

SHEET 2 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697527.4 easting 814695.2  
 Driller A. Carter Mudline El. -21.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/22/99 Date End 10/28/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.		Groundwater Readings Not Applicable for Offshore Borings			
Drill Rig: Acker AD2 truck mount		Date	Time	Depth	Elev.
Drilling Method: 4 inch I.D. (HW) flush-joint casing; spin and wash.					Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin	S-4	24/9	20-22	14-6-5-6	11	Poorly graded sand with gravel (SP); medium dense, 33% medium sand, 21% fine sand, 13% coarse sand, 30% gravel, 3% silt, brown. Advance HW drill casing to 25 ft.	SP	5
22	Spin								
23	Spin								
24	Spin								
25	Spin								
26	Spin	S-5	24/7	25-27	13-6-6-10	12	Poorly graded sand with silt and gravel (SP-SM); medium dense, 40% medium sand, 25% fine sand, 10% coarse sand, 15% gravel, 10% silt, brown. Advance HW drill casing to 30 ft.	SP-SM	
27	Spin								
28	Spin						Change in drilling resistance at 28 ft; probable cobble.		
29	Spin								
30	Spin						Approximately 6 in. of material in bottom of casing prior to taking sample; advance 3-7/8 in. button bit to remove material.		
31	Spin	S-6	24/7	30-32	11-6-3-6	9	Silty sand with gravel (SM); loose, 40% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, 20% silt, brown. Advance HW drill casing to 32 ft.	SM	
32	Spin								
		S-7	4/4	32- 32.3	15/4" - 50/0"	—	Silty sand with gravel (SM); 41% fine sand, 16% medium sand, 3% coarse sand, 17% gravel, 23% silt, brown. Spoon refusal at 32.3 ft. Top of bedrock at 32.3 ft. Advance HW drill casing from 32 to 32.5 ft. for rock coring. (spin) Begin HV rock core at 32.3 ft. (boring log continued on next page)	SM  BEDROCK	1

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UD denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Strata break changed from 8.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
 3) Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.  
 4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
 5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



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Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 6

SHEET 3 of 6

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697527.4 easting 814695.2  
Driller A. Carter Mudline El. -21.1 Datum NGVD  
Logged By E. Thibodeau Date Start 10/22/99 Date End 10/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4 inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
32.5		R1	32.3 - 33.3	10 mins.	Check casing seal; water level dropped slowly. Begin R1 at 32.3 ft. (3rd gear) Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 25 degrees. REC = 100%; RQD = 97% (excellent) 32.3 to 32.6 ft: discoloration/weathering noted.	
33.0						
33.5			33.3 - 34.3	6 mins.		
34.0					33.8 ft: Primary joint: low angle, very widely spaced, smooth, planar, discolored, and open. 34.0 to 34.4 ft: mechanical break in rock core.	
34.5			34.3 - 35.3	6 mins.		
35.0						
35.5			35.3 - 36.3	6 mins.	35.5 ft: mechanical break in rock core.	
36.0						
36.5			36.3 - 37.3	6 mins.		
37.0					Perform constant head permeability test from 32.8 to 37.3 ft. End R1 at 37.3 ft.	

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	17. PID denotes Photoionization Detector.
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UD denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Strata break changed from 8.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.
- Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 6

SHEET 4 of 6

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697527.4 easting 814695.2  
 Driller A. Carter Mudline El. -21.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/22/99 Date End 10/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4 inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings: Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
37.5		R2	37.3 - 38.3	10 mins.	Begin R2 at 37.3 ft. (3rd gear). Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 100%; RQD = 100% (excellent). Water return color: milky white.  39.3 ft: mechanical break in rock core.       41.8 ft: mechanical break in rock core.  End R2 at 42.3 ft.	
38.0						
38.5			38.3 - 39.3	6 mins.		
39.0						
39.5			39.3 - 40.3	5 mins.		
40.0						
40.5			40.3 - 41.3	6.5 mins.		
41.0						
41.5			41.3 - 42.3	5.5 mins.		
42.0						

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector.  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Strata break changed from 8.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.
- Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.





Nobis Engineering  
PO Box 2896  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 6  
SHEET 5 of 6  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697527.4 easting 814695.2  
Driller A. Carter Mudline El. -21.1 Datum NGVD  
Logged By E. Thibodeau Date Start 10/22/99 Date End 10/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4 Inch I.D. (H-W) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
42.5		R3	42.3 - 43.3	8 mins.	Begin R1 at 42.3 ft. (3rd gear) Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 15-20 degrees. REC = 98%; RQD = 98% (excellent)	
43.0						
43.5			43.3 - 44.3	8.5 mins.		
44.0					43.8 to 44.1 ft: Quartz or feldspar inclusion; pink in color. 43.9 ft: mechanical break in rock core.	
44.5			44.3 - 45.3	7.5 mins.		
45.0					45.2 ft: mechanical break in rock core.	
45.5			45.3 - 46.3	7.5 mins.		
46.0					46.2 ft: mechanical break in rock core.	
46.5			46.3 - 47.3	7.5 mins.		
47.0					End R3 at 47.3 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1, S denotes split-barrel sampler. 2, U denotes 3-inch O.D. undisturbed sample. 3, UD denotes 3-inch Osterberg undisturbed sample. 4, PEN denotes penetration length of sampler. 5, REC denotes recovered length of sample. 6, SPT denotes Standard Penetration Test.	7, PID denotes Photoionization Detector 8, PPM denotes parts per million. 9, PP denotes Pocket Penetrometer. 10, FVST denotes field vane shear test. 11, RQD denotes Rock Quality Designation. 12, R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Strata break changed from 8.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
3) Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.  
4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Nobis Engineering  
PO Box 1890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 6

SHEET 6 of 6

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697527.4 easting 814695.2  
 Driller A. Carter Mugline El. -21.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/22/89 Date End 10/26/89

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
tree falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4 inch I.D. (HFW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
47.5		R4	47.3 - 48.3	13.5 mins.	Begin R4 at 47.3 ft. (3rd gear) Fresh, moderately hard to hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 98%; RQD = 88% (excellent) Water return color: milky white.	
48.0						
48.5			48.3 - 49.3	11 mins.		
49.0						
49.5			49.3 - 50.3	10.5 mins.	49.2 ft: mechanical break in rock core.  49.8 to 50.1 ft: Secondary joint: moderately dipping, very widely spaced, smooth, planar, discolored, and partly open.	
50.0						
50.5			50.3 - 51.3	23 mins.	50.3 ft: mechanical break in rock core.	
51.0					Switch to coring in 4th gear at 51.3 ft.	
51.5			51.3 - 52.3	18.5 mins.	51.3 ft: mechanical break in rock core.	
52.0					End of R4 at 52.3 ft. Bottom of exploration at 52.3 ft.; boring terminated in bedrock.	

0 to 4 - Very Loose

5 to 10 - Loose

11 to 30 - Medium Dense

31 to 50 - Dense

Over 50 - Very Dense

0 to 2 - Very Soft

3 to 4 - Soft

5 to 8 - Medium Stiff

9 to 15 - Stiff

16 to 30 - Very Stiff

Over 30 - Hard

1. S denotes split-barrel sampler.

2. U denotes 3-inch O.D. undisturbed sample.

3. UN denotes 3-inch Osterberg undisturbed sample.

4. PEN denotes penetration length of sampler.

5. REC denotes recovered length of sample.

6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector

8. PPM denotes parts per million.

9. PP denotes Pocket Penetrometer.

10. FVST denotes field vane shear test.

11. RQD denotes Rock Quality Designation

12. R denotes core run number.

**REMARKS:**

- 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- 2) Strata break changed from 8.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.
- 3) Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.
- 4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- 5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-7

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697361.2 easting 814759.4  
 Driller A. Carter Mudline El. -20.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 11/1/99 Date End 11/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	Hyd. Push	UO-1	24/24	1-3			Organic clay with sand (OH); 81% organic clay, 14% fine sand, 4% medium sand, 1% coarse sand, strong organic odor, black to dark gray. Traces of shells noted.	OH	1
3	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 3 ft.		
4	Hyd. Push	UO-2	24/24	3-5			Organic clay (OH); 91% organic clay, 6% fine sand, 3% medium sand, strong organic odor, black.	OH	1
5	Hyd. Push						Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.		2
6	Hyd. Push	UO-3	24/24	5-7			Pull casing back to 4 ft. and perform borehole permeability test at 4 ft. UO-3: Clayey sand (SC); 38% fine sand, 12% medium sand, 2% coarse sand, 1% gravel, 49% organic clay, strong organic odor, dark gray.	SC	1
7	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 7 ft.		
8	Hyd. Push	UO-4	24/20	7-9			UO-4: Clayey sand (SC); 31% fine sand, 21% medium sand, 6% coarse sand, 10% gravel, 32% organic clay, strong organic odor, dark gray. Bottom 4 in. of sample missing; presumed to be clayey sand/silty sand interface.	SC	1
9	Hyd. Push						Advance HW drill casing to 9 ft. (hydraulic push) Advance 3-7/8 in. button bit from 7 to 9 ft.		
10	Hyd. Push	S-1	24/13	9-11	4-4-5-4	9	S-1: Silty sand (SM); loose, 60% fine sand, 40% silt, gray	SM	
11	Hyd. Push						Advance HW drill casing to 11 ft. (hydraulic push) Advance 3-7/8 in. button bit from 9 to 11 ft.		
12	9	S-2	24/7	11-13	10-8-8-5	16	Perform borehole permeability test at 11 ft. S-2: Sandy silt (ML); very stiff, 62% silt, 32% fine sand, 5% medium sand, 1% coarse sand, gray.	ML	3
13	10						S-2: Sandy silt (ML); very stiff, 62% silt, 32% fine sand, 5% medium sand, 1% coarse sand, gray.		
14	8	S-3	24/6	13-15	2-2-4-4	6	Advance HW drill casing to 13 ft. Advance 3-7/8 in. button bit from 11 to 13 ft. Perform borehole permeability test at 13 ft.	CL	
15	17						S-3: Lean clay with sand (CL); medium stiff, 82% clay/silt, 14% fine sand, 2% medium sand, 1% coarse sand, 1% gravel, olive brown. Some iron staining noted in sample.		3
16	16	S-4	24/0	15-17	7-5-6-6	11	Advance HW drill casing to 15 ft. Advance 3-7/8 in. button bit from 13 to 15 ft. No recovery. Piece of fractured rock lodged in tip of sampler. Appears to be a coarse grained granite; possible cobble.		
17	18						Advance HW drill casing to 17 ft.		
18	23	S-5	24/0	17-19	7-6-7-8	13	Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 15 to 17 ft. No recovery. Attempt to resample material with 2 in. split-barrel. 6 in. of recovery achieved. Poorly graded sand with gravel (SP); medium dense, 40% fine sand, 20% medium sand, 10% coarse sand, 25% gravel, 5% silt, brown.	SP	
19	20						Advance HW drill casing to 20 ft.		
20	20						Advance 3-7/8 in. button bit from 17 to 20 ft. (No bentonite drilling mud)		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PND denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
-



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03307

PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-7  
SHEET 2 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2897361.2 easting 814759.4  
Driller A. Carter Mudline El. -20.3 Datum NGVD  
Logged By E. Thibodeau Date Start 11/1/99 Date End 11/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	23	S-6	24/8	20-22	4-5-7-8	12	Perform borehole permeability test at 20 ft. S-6: Poorly graded sand with gravel (SP); medium dense, 25% medium sand, 15% coarse sand, 14% fine sand, 41% gravel, 4% silt, reddish brown.	SP	3
22	31						Advance HW drill casing to 25 ft. Add bentonite to drilling fluid.		
23	39						Advance 3-7/8 in. button bit from 20 to 25 ft.		
24	38								
25	31								
26	19	S-7	24/9	25-27	6-3-4-5	7	Well (SW) Poorly graded sand with gravel (SP); loose, 30% medium sand, 22% coarse sand, 9% fine sand, 36% gravel, 3% silt, brown.	SP	3
27	23						Advance HW drill casing to 27 ft. Advance 3-7/8 in. button bit from 25 to 27 ft.		
28	15	S-8	24/10	27-29	8-4-4-4	8	Silty sand with gravel (SM); loose, 10% coarse sand, 10% fine sand, 5% medium sand, 45% gravel, 20% silt, gray.	SM	
29	21						Advance HW drill casing to 30 ft. Advance 3-7/8 in. button bit from 27 to 30 ft. (No bentonite drilling mud)		
30	18						Perform borehole permeability test at 30 ft.		
31	18	S-9	24/10	30-32	3-5-4-4	9	Poorly graded sand with gravel (SP); loose, 43% fine sand, 34% medium sand, 5% coarse sand, 15% gravel, 3% silt, gray-brown.	SP	3
32	23						Advance HW drill casing to 32 ft. Advance 3-7/8 in. button bit from 30 to 32 ft.		
33	27	S-10	24/6	32-34	4-4-2-3	8	Poorly graded sand with silt (SP-SM); loose, 70% fine sand, 10% medium sand, 5% coarse sand, 5% gravel, 10% silt, gray-brown.	SP-SM	
34	31						Advance HW drill casing to 34 ft. Advance 3-7/8 in. button bit from 32 to 34 ft.		
35	18	S-11	24/2	34-36	21-8-7-8	15	Poor recovery. Mostly rock fragments and button bit cuttings; possible cobbles.		
36	37						Advance HW drill casing to 36 ft. Advance 3-7/8 in. button bit from 34 to 36 ft.		
37	48	S-12	24/3	36-38	14-13-13-9	26	Poor recovery. Mostly rock fragments and button bit cuttings; possible cobbles.		
38	85						Advance HW drill casing to 38 ft. Advance 3-7/8 in. button bit from 36 to 38 ft. (No bentonite drilling mud)		
39	99	S-13	23/6	38-39.9	23-27-16- 18/4"-50/1"	43	Perform borehole permeability test at 38 ft. S-13A: rock fragments and button bit cuttings. (top) S-13B: Poorly graded gravel with silt and sand (GP-GM); dense, 53% gravel, 18% medium sand, 17% fine sand, 7% coarse sand, 5% silt, gray. (6 in.) Bedrock fragments noted in tip of sampler. Minor feldspar/quartz inclusion noted in one of the fragments.	GP-GM	3
40	112							BEDROCK	

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. ROD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|--|

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTensing Express, dated December 23, 1999.
- Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTensing Express, dated February 2, 2000.
-



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 7

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697361.2 easting 814759.4  
 Driller A. Carter Mudline El. -20.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 11/1/99 Date End 11/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2487)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41							Advance HW drill casing to 40 ft.		
42							Approximately one foot of material in bottom of casing; advance 3-7/8 in. button bit to remove material.		
43							Top of bedrock at 40 feet.		
44							Telescope NW drill casing to 40 ft. for coring.		
45							Boring terminated at 40 ft. due to a severe overnight wind event causing the loss of the HW and NW drill casings.		
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|--|

REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTasing Express, dated December 23, 1999.  
 2) Strata break changed from 8.5 ft. (shown on the field log) to 7 ft. based on the laboratory test data.  
 3) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTasing Express, dated February 2, 2000.  
 4)



Nobis Engineering  
PO Box 2899  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-8

SHEET 1 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2697223.2 easting 814705.6  
Mudline El. -23.5 Datum NGVD  
Date Start 8/9/99 Date End 8/11/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush-joint inner casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Boring

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing Blows (ft)	Type & No.	PENREC (inches)	DEPTH (ft-RD)	BLOWS PER 6 INCHES	SPT R-Value			
1	Hyd. Push						Advance PW outer drill casing to 4 ft. (hydraulic push)		
2	Hyd. Push						Advance 4-7/8 in. roller bit from 0 to 4 ft.		
3	Hyd. Push								
4	Hyd. Push								
5	Hyd. Push	UO-1	24/0	4-6			No recovery. No soil trimmings on inside or outside of tube. Probable very soft sediments.		
6	Hyd. Push						Advance PW outer drill casing to 6 ft. (hydraulic push)		
7	Hyd. Push	UO-2	24/23	6-8			Advance 4-7/8 in. roller bit from 4 to 6 ft.	SC	1
8	Hyd. Push						Clayey sand (SC): 28% fine sand, 17% medium sand, 6% coarse sand, 13% gravel, 36% organic clay, organic odor, drak gray to black. Traces of shells and shell fragments noted in sample.		
9	Hyd. Push						Advance PW outer drill casing to 9 ft. (hydraulic push)		
10	16	S-1	24/18	9-11	3-3-3-4	6	Very difficult push at 8.5 ft.		
11	9						Advance 4-7/8 in. roller bit from 6 to 9 ft.		
12	8	S-2	24/12	11-13	8-8-7-6	15	Silty sand (SM); loose, 60% fine sand, 20% medium sand, 20% silt, strong organic odor, gray.	SM	
13	13						Telescope HW inner drill casing to 11 ft.		
14	13						Advance 3-7/8 in. button bit from 9 to 11 ft.		
15	10						Similar to S-1, except medium dense.	SM	
16	0	S-3	24/12	15-17	6-3-3-2	5	Advance HW inner drill casing to 15 ft.		
17	9						Advance 3-7/8 in. button bit from 11 to 15 ft.		
18	9	S-4	24/8	17-19	5-1-WOH/12"	1	Sandy silt (ML); medium stiff, 66% silt/clay, 32% fine sand, 1% medium sand, 1% coarse sand, slight organic odor, gray.	ML	1
19	17						Advance HW inner drill casing to 17 ft. Casing advanced by self-weight from 15 to 16.5 ft.		
20	22						Advance 3-7/8 in. button bit from 15 to 17 ft.		
							S-4A: Silty sand (SM); 50% fine sand, 30% medium sand, 5% coarse sand, 15% silt, gray. (6 in.)	SM	
							S-4B: Lean clay with sand (CL); very soft, 50% clay, 30% silt, 20% fine sand, brown to gray. (2 in.)	CL	
							Advance HW inner drill casing to 20 ft. Casing advanced by self-weight from 17 to 17.5 ft.		
							Advance 3-7/8 in. button bit from 17 to 20 ft.		

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-8  
SHEET 2 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697223.2 easting 814705.6  
Driller A. Carter Mudline El. -23.5 Datum NGVD  
Logged By E. Thibodeau Date Start 8/9/99 Date End 8/11/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush-joint inner casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Boring

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (PI)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	15	S-5	24/2	20-22	8-5-6-8	11	Poorly graded sand with silt (SP-SM); medium dense, 35% coarse sand, 30% medium sand, 20% fine sand, 5% gravel, 10% silt, brown. Advance HW inner drill casing to 25 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 20 to 25 ft.	SP-SM	
22	26								
23	21								
24	27								
25	30								
26	20	S-6	24/6	25-27	6-5-5-2	10	Poorly graded sand with silt and gravel (SP-SM); loose, 22% medium sand, 21% fine sand, 17% coarse sand, 34% gravel, 6% silt, brown. Advance HW inner drill casing to 30 ft. Add more bentonite to drilling fluid. Advance 3-7/8 in. button bit from 25 to 30 ft.	SP-SM	1
27	26								
28	32								
29	37								
30	39								
31	31	S-7	24/2	30-32	5-4-4-5	8	Poorly graded sand with gravel (SP); loose, 30% medium sand, 20% coarse sand, 5% fine sand, 40% gravel, 5% silt, brown. (possible washed sample) Advance HW inner drill casing to 32 ft. Advance 3-7/8 in. button bit from 30 to 32 ft.	SP	
32	29								
33	40	S-8	24/2	32-34	8-10-12-12	22	Poorly graded sand with gravel (SP); medium dense, 50% coarse sand, 20% medium sand, 5% fine sand, 20% gravel, 5% silt, brown. (possible washed sample) Advance HW inner drill casing to 33.6 ft. Advance 3-7/8 in. button bit from 32 to 33.6 ft. Top of bedrock at 33.6 ft. Advance 3-7/8 in. button bit from 33.6 to 34.6 ft. Telescope and advance NW drill casing to 35.1 ft. for coring. (spin) Begin NX rock core at 34.6 ft. (boring log continued on next page)	SP	
34	70								
	7							BEDROCK	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-1/2 inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 26, 1999.  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-8  
SHEET 3 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697223.2 easting 814705.6  
Driller A. Carter Mudline El. -23.5 Datum NGVD  
Logged By E. Thibodeau Date Start 8/9/99 Date End 8/11/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush-joint inner casing.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Boring				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
35.0	[Visual representation: solid line]	R1	34.6 - 35.6	8.5 mins.	Begin R1 at 34.6 ft. Fresh, moderately hard, gray, fine grained GNEISS. Moderately dipping foliation; approximately 45 degrees. REC = 68%; RQD = 54% (fair) 34.7 to 34.9 ft: Primary joint: moderately dipping, moderate to widely spaced, smooth, planar, fresh to slightly discolored, and partly open. 35.2 ft: mechanical break in rock core.	
35.5			35.6 - 36.6	11.5 mins.		
36.0	[Visual representation: dashed line]		36.6 - 37.6	11.5 mins.	36.6 and 36.8 ft: Secondary joints: low angle, very closely spaced, smooth, planar, fresh to slightly discolored, and partly open. 36.8 to 37.1 ft: Primary joint: high angle, moderate to widely spaced, rough, planar, fresh, and tight. Possible mechanical break; goes against foliation. 36.6 to 36.8 ft: mechanical break in rock core.	
36.5			37.6 - 38.6	3 mins.		
37.0	[Visual representation: solid line]		38.6 - 39.6	6 mins.	38.6 ft: appears to be a change in foliation from moderately dipping to high angle. Possible cobble or boulder. 38.7 ft: mechanical break in rock core.  39.1 to 39.6 ft: core barrel dropped. Possible void in bedrock; no void material recovered.	
37.5						
38.0	[Visual representation: hatched pattern]					
38.5						
39.0	[Visual representation: hatched pattern]					
39.5						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolonization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2)  
3)  
4)





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PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-8

SHEET 4 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2897223.2 easting 814705.6  
Driller A. Carter Mudline El. -23.5 Datum NGVD  
Logged By E. Thibodeau Date Start 8/9/99 Date End 8/11/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush joint inner casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Boring

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
		R1 (cont.)	39.6 - 40.6	3 mins.	39.9, 40.2, and 40.3 ft: appear to be mechanical breaks in the rock core. Slight discoloration noted.	
40.0						
40.5					40.3 to 41.1 ft: Quartz vein; dark gray. Appears to be a mechanical break in rock core along quartz/GNEISS interface.	
			40.6 - 41.6	3 mins.	40.7 ft: mechanical break in rock core.	
41.0					41.1 to 41.6 ft: core barrel dropped. Possible void in quartz vein or possible quartz/GNEISS interface.	
41.5						
			41.6 - 42.6	3.5 mins.	41.6 to 42.6 ft: Quartz vein; dark gray. Some discoloration noted on quartz; possible natural fractures. Did not achieve full recovery of rock core for this interval. Core very fractured; probable mixture of mechanical breaks and natural fractures.	
42.0						
42.5						
			42.6 - 43.6	5.5 mins.	42.6 to 43.3 ft: Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. 42.6 to 42.7 ft: discoloration/weathering noted on rock core.	
43.0					43.3 to 43.8 ft: Quartz vein; dark gray. Some discoloration noted.	
43.5						
			43.6 - 44.6	4.5 mins.	43.8 to 44.6 ft: rock core not recovered.	
44.0					Perform single packer water pressure test at 44.6 ft. End R1 at 44.6 ft.	
44.5					Bottom of exploration at 44.6 ft; boring terminated in bedrock.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.
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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

**BORING NO.** FD-9  
**SHEET** 1 of 4  
**FILE NO.** 48138.07  
**CHKD. BY** J. Trotter

**Boring Co.** Atlantic Testing Laboratories, Limited      **Boring Location** northing 2897055.5      easting 814763.5  
**Driller** A. Carter      **Mudline El.** -18.7      **Datum** NGVD  
**Logged By** E. Paddleford      **Date Start** 9/28/99      **Date End** 10/5/99

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
**Drill Rig:** Acker AD2 truck mount  
**Drilling Method:** 4-inch I.D. (HW) flush-joint casing; wash and drive.  
**All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.**

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 5 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft. Wash water clear upon return.		
2	Hyd. Push	S-1	24/0	1-3	WOR/24"	0	No recovery. Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 3 ft. Wash water black to gray upon return.		
3	Hyd. Push								
4	Hyd. Push	S-2	24/8	3-5	WOR/24"	0	Organic soil (OH); very soft, 80% organic clay, 10% organic silt, 5% fine sand, 5% shell fragments, dark gray. Large shell noted in sample.	OH	
5	Hyd. Push						Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.		
6	Hyd. Push	S-3	24/20	5-7	WOR/24"	0	Organic soil (OH); very soft, 80% organic clay, 10% organic silt, 10% fine sand, dark gray.	OH	
7	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 7 ft.		
8	Hyd. Push	S-4	24/0	7-9	WOR/24"	0	No recovery. Advance HW drill casing to 9 ft. (hydraulic push) Advance 3-7/8 in. button bit from 7 to 9 ft.		
9	Hyd. Push								
10	Hyd. Push	S-5	24/12	9-11	4-4-4-6	8	Poorly graded sand (SP); loose, 76% fine sand, 9% medium sand, 4% coarse sand, 7% gravel, 4% silt, gray. Shell fragments noted in sample.	SP	1
11	Hyd. Push						Advance HW drill casing to 11 ft. (hydraulic push) Advance 3-7/8 in button bit from 9 to 11 ft.		
12	9	S-6	24/10	11-13	5-9-10-12	19	Poorly graded sand (SP); medium dense, 60% fine sand, 30% medium sand, 5% silt, 5% shell fragments, gray.	SP	
13	13						Advance HW drill casing to 16 ft. Mix bentonite drilling mud. Advance 3-7/8 in. button bit from 11 to 16 ft.		
14	13								
15	12								
16	10								
17	9	S-7	24/10	16-18	3-4-3-2	7	Silty sand (SM); loose, 66% fine sand, 3% medium sand, 29% silt, gray.	SM	1
18	10						Advance HW drill casing to 18 ft. Advance 3-7/8 in. button bit from 16 to 18 ft.		
19	7	S-8	24/16	18-20	2-3-1-2	4	Silt with sand (ML); soft, 80% silt, 20% fine sand, gray.	ML	
20	8						Advance HW drill casing to 23 ft. Advance 3-7/8 in. button bit from 18 to 23 ft.		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 20 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
3)  
4)



Nobis Engineering  
PO Box 1890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-9

SHEET 2 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Boring Location

northing 2697056.5 easting 814763.5

Driller A. Carter

Mudline El.

-18.7

Datum

NGVD

Logged By E. Paddleford

Date Start

9/28/99

Date End

10/5/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

**Groundwater Readings Not Applicable for Offshore Borings**

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	11								
22	15								
23	17								
24	23	S-9	24/21	23-25	6-3-2-3	5	Similar to S-8, except medium stiff. Advance HW drill casing to 28 ft. Advance 3-7/8 in. button bit from 23 to 28 ft.	ML	
25	27								
26	28								
27	27								
28	28								
29	43	S-10	24/20	26-30	6-3-3-3	6	Silt with sand (ML); medium stiff, 80% silt, 20% fine sand, gray. Advance HW drill casing to 33 ft. Advance 3-7/8 in. button bit from 28 to 33 ft.	ML	
30	41						Seemed to be cobbly when washing out casing.		
31	43								
32	44								
33	50								
34	19	S-11	24/12	33-35	48-26-6-8	32	Poorly graded sand with silt (SP-SM); dense, 40% medium sand, 30% fine sand, 15% coarse sand, 10% silt, 5% gravel, brown. Probable cobble from 33 to 33.5 ft.; hard driving spoon. Advance HW drill casing to 38 ft. Advance 3-7/8 in. button bit from 33 to 38 ft.	SP-SM	
35	35								
36	48								
37	89								
38	126								
39	150	S-12	24/10	38-40	7-10-23-16	36	Poorly graded sand (SP); dense, 75% fine sand, 20% medium sand, 5% coarse sand, brown, iron stained layers. Advance HW drill casing to 43 ft. Advance 3-7/8 in. button bit from 38 to 43 ft.	SP	
40	113								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 28, 1999.
- 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
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- 4)



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Concord, New Hampshire 03302

**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

**BORING NO.** FD-9  
**SHEET** 3 of 4  
**FILE NO.** 48138.07  
**CHKD. BY** J. Trotter

**Boring Co.** Atlantic Testing Laboratories, Limited      **Boring Location** northing 2697056.5      easting 814763.5  
**Driller** A. Carter      **Mudline El.** -18.7      **Datum** NGVD  
**Logged By** E. Paddleford      **Date Start** 9/28/99      **Date End** 10/5/99

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
**Drill Rig:** Acker AD2 truck mount  
**Drilling Method:** 4-inch I.D. (HW) flush-joint casing; wash and drive.  
**All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.**

**Groundwater Readings Not Applicable for Offshore Borings**

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (N)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PEWREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	155								
42	125								
43	152								
44	200	S-13	24/0	43-45	11-10-19-17	28	No recovery.		
45	160						Advance HW drill casing to 45 ft. Hard driving but still seems to be cobbly/sand material. Advance 3-7/8 in. button bit from 43 to 45 ft. Drilling mud thickness equals 70 pcf. as per mud scale.		
46	206	S-14	24/8	45-47	11-10-4-5	14	Poorly graded sand with silt (SP) silty sand with gravel (SM); medium dense, 46% fine sand, 75% medium sand, 3% coarse sand, 3% gravel, 26% silt/clay, gray. 20 25 11	SP SM	2
47	168						Due to high casing blow count, will advance 3-7/8 in. roller bit ahead of drill casing to establish pilot hole.		
48	124						Advance 3-7/8 in. button bit from 45 to 50 ft. Losing drilling mud to borehole. Difficult roller bitting; possible cobbles.		
49	83						Advance HW drill casing to 50 ft. Difficult to advance casing.		
50	146			50.7-			Due to the falling tide cycle and the time it took to advance the drill casing; casing depth actually 50.7 ft. Mix additional bentonite drilling mud.		
51		S-15	9/8	51.5	26-100/4"		Advance 3-7/8 in. button bit to clean out casing; 8 in. of fill in at bottom of casing. Poorly graded sand with silt (SP-SM); 35% medium sand, 25% coarse sand, 20% fine sand, 10% gravel, 10% silt, gray.	SP-SM	
52		R1		51.5-52.5	4.5 mins.		Top of bedrock at 51.5 ft. Telescope and advance NW drill casing to 52.0 ft. for coring. (spin)		
53				52.5-53.5	4.5 mins.		Begin NV rock core at 51.5 ft. R1: 51.5 to 56.5 ft.	BEDROCK	
54				53.5-54.5	4.5 mins.		Fresh, moderately hard, gray, aphanitic GNEISS with horizontal to low angle, closely spaced, rough, undulating, fresh, tight joints. Jointing is along foliation. However foliation is not distinct.		
55				54.5-55.5	5.5 mins.		REC = 100%; RQD = 100%		
56				55.5-56.5	7 mins.				
57		R2		56.5-57.5	6 mins.		R2: 56.5 to 61.5 ft.		
58				57.5-58.5	4.5 mins.		Fresh, moderately hard, gray, aphanitic GNEISS with primary horizontal to low angle, closely spaced, rough, undulating, fresh, tight joints. Secondary jointing is high angle.		
59				58.5-59.5	7 mins.		widely spaced, rough, stepped, discolored, and partly open. Discoloration due to secondary mineralization/filling material noted in the joint.		
60				59.5-60.5	11 mins.		REC = 100%; RQD = 100%		

- |   |  |  |   |
|---|--|--|---|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photolionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|---|

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-9

SHEET 4 of 4

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697056.5 easting 814763.5  
 Driller A. Carter Mudline El. -18.7 Datum NGVD  
 Logged By E. Paddleford Date Start 9/28/99 Date End 10/5/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
61			60.5-61.5		13 mins.		BEDROCK		
62	R3		81.5-82.5		12 mins.	R3: 61.5 to 65.5 ft.			
63			82.5-83.5		12 mins.	Fresh, moderately hard, gray, aphanitic GNEISS. No jointing. However, surface of core shows signs of weakness that are high angle.			
64			83.5-84.5		11 mins.	REC = 100%; RQD = 100%			
65			84.5-85.5		15 mins.				
66	R4		85.5-86.5		24.25 mins.	R4: 65.5 to 70.5 ft.			
67			86.5-87.5		18 mins.	Fresh, moderately hard, gray, aphanitic GNEISS with primary low angle, closely spaced, rough, stepped, fresh to slightly discolored, partly open joints. Secondary high angle, moderately spaced, rough, planar, fresh, partly open joints. Quartz and feldspar mineralization noted in last foot of core (layer of weakness). Surface jointing in bottom 2 ft. Solution cavities.			
68			87.5-88.5		11.75 mins.	REC = 99%; RQD = 70%			
69			88.5-89.5		9.5 mins.				
70			89.5-90.5		13.25 mins.				
71						Bottom of exploration at 70.5 ft.; boring terminated in bedrock.			
72									
73									
74									
75									
76									
77									
78									
79									
80									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-10

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696917.0 easting 814709.0  
 Driller A. Carter Mudline El. -23.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (H.V) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	S-1	24/24	3-5	WOR/24"	0	Organic soil (OH); very soft, 60% organic clay, 30% organic silt, 10% fine sand, strong organic odor, black. Traces of peat noted in sample. Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.	OH	
5	Hyd. Push								
6	Hyd. Push	S-2	24/12	5-7	WOR/24"	0	S-2A: Similar to S-1. (11 in.) S-2B: Peat (Pt); very soft, fibrous, strong organic odor, dark brown. (1 in.) Advance HW drill casing to 8 ft. (hydraulic push) Very difficult push at 8 ft. Drive casing to 10 ft. Advance 3-7/8 in button bit from 5 to 10 ft.	OH	
7	Hyd. Push								
8	Hyd. Push							Pt	
9	23								
10	18								
11	11	S-3	24/5	10-12	8-8-6-8	14	Silty sand (SM); medium dense, 55% fine sand, 20% medium sand, 5% coarse sand, 20% silt, gray. Advance HW drill casing to 15 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 10 to 15 ft.	SM	
12	12								
13	16								
14	11								
15	19								
16	22	S-4	24/2	15-17	14-17-12-10	29	Fractured rock; probable cobbles. Advance HW drill casing to 17 ft. Advance 3-7/8 in button bit from 15 to 17 ft.		
17	52								
18	16	S-5	24/4	17-19	8-7-9-6	16	Silty sand with gravel (SM); medium dense, 30% medium sand, 15% coarse sand, 15% fine sand, 20% gravel, 20% silt, brown. Advance HW drill casing to 20 ft. Advance 3-7/8 in button bit from 17 to 20 ft.	SM	
19	30								
20	28								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-10

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696917.0 easting 814709.0  
 Driller A. Carter Mudline El. -23.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (H44) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	22	S-6	24/0	20-22	5-6-6-6	12	No recovery. Advance HW drill casing to 22 ft. Advance 3-7/8 in. button bit from 20 to 22 ft.		
22	35								
23	36	S-7	24/5	22-24	9-10-4-3	14	Poorly graded sand with gravel (SP); medium dense, 90% coarse sand, 20% medium sand, 20% fine sand, 25% gravel, 5% silt, gray. Advance HW drill casing to 25 ft. Advance 3-7/8 in. button bit from 22 to 25 ft.	SP	
24	33								
25	33								
26	20	S-6	24/0	25-27	4-8-7-10	12	No recovery. Advance HW drill casing to 27 ft. Advance 3-7/8 in. button bit from 25 to 27 ft.		
27	48								
28	2"	S-8	4/1	27-27.3	100/4"	---	Poor recovery. Button bit cuttings and piece of fractured bedrock. Advance HW drill casing to 27.2 ft. Advance 3-7/8 in. button bit from 27 to 27.2 ft. Top of bedrock at 27.2 ft.		
29		R1		28.2-28.2	1.5 mins.		Advance 3-7/8 in. button bit from 27.2 to 28.2 ft. Telescope and advance NW drill casing to 29.7 ft for coring. (spin) NW drill casing dropped and readily advanced to 28.7 ft. Begin NX rock core at 28.2 ft.	BEDROCK	
30				29.2-30.2	1.5 mins.				
31				30.2-31.2	5 mins.		R1: 28.2 to 33.2 ft. Fresh, medium hard, gray, aphanitic GNEISS with moderately dipping, close to widely spaced, rough, planar, discolored, open joints. REC = 77%; RQD = 53% (fair)		
32				31.2-32.2	6 mins.				
33				32.2-33.2	6 mins.		Core barrel dropped from 28.5 to 29.7 feet.		
34		R2		33.2-34.2	2.5 mins.		Water return noted in HW drill casing; NW drill casing seal compromised. Minimal water loss noted during coring activities; water return via HW drill casing. R2: 33.2 to 43.2 ft.		
35				34.2-35.2	30 secs.		NW drill casing advanced approximately 3 in. upon core barrel insertion. Core barrel lodged in NW drill casing. Remove core barrel and advance NW drill casing from		
36				35.2-36.2	11.5 mins.		30 to 30.5 ft. (spin) Fresh, moderately hard, gray, aphanitic GNEISS with close to moderately spaced, rough, undulating, slightly discolored, open joints. High angle, close, smooth, planar, discolored, partially healed and sand filled joint set noted from 42.5 to 43.2 ft. REC = 82%; RQD = 73% (fair)		
37				36.2-37.2	5.5 mins.				
38				37.2-38.2	6 mins.		Core barrel dropped from 33.2 to 35 ft.		
39				38.2-39.2	7.5 mins.		Minimal water loss noted during coring activities; water return via NW drill casing.		
40				39.2-40.2	8 mins.				

- |   |  |   |  |
|---|--|---|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|---|--|

REMARKS:  
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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-10

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696917.0 easting 814709.0  
 Driller A. Carter Mudline El. -23.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41		R2	40.2-41.2		7.5 mins.		BEDROCK		
42		cont.	41.2-42.2		9 mins.				
43			42.2-43.2		9 mins.				
44						Bottom of exploration at 43.2 ft.; boring terminated in bedrock.			
45						Note: Pumped approximately 70 gallons of grout to grout completed hole to top of HW drill casing.			
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

- |   |  |  |   |
|---|--|--|---|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UD denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photolionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|---|

REMARKS:  
1)  
2)  
3)  
4)





Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-11

SHEET 1 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2696789.5 easting 814755.4  
Mudline El. -13.1 Datum NGVD  
Date Start 10/5/99 Date End 10/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount.  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	Hyd. Push	S-1	24/16	1-3	2-1-4-2	5	Well-graded sand with silt (SW-SM); loose, 38% fine sand, 30% medium sand, 10% coarse sand, 13% gravel, 9% silt, slight organic odor, gray. Traces of shells and shell fragments noted in sample.	SW-SM	1
3	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 3 ft.	SM	
4	Hyd. Push	S-2	24/12	3-5	3-4-2-3	6	S-2: Silty sand with gravel (SM); loose, 30% fine sand, 20% coarse sand, 10% medium sand, 20% gravel, 20% silt, 5% shells and shell fragments, gray.		
5	Hyd. Push						Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.	CL	
6	Spin	S-3	24/8	5-7	3-2-2-3	4	Perform borehole permeability test at 5 ft. S-3: Lean clay with sand (CL); soft, 73% clay, 22% fine sand, 4% medium sand, 1% coarse sand, gray. Traces of iron staining noted in bottom of sample.		1
7	Spin						Advance HW drill casing to 10 ft.		
8	Spin								
9	Spin								
10	Spin								
11	Spin	S-4	24/7	10-12	14-10-9-11	19	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 30% fine sand, 10% coarse sand, 25% gravel, 5% silt, brown.	SP	
12	Spin						Advance HW drill casing to 15 ft.		
13	Spin								
14	Spin								
15	Spin								
16	Spin	S-5	24/0	15-17	15-11-9-13	20	No recovery. Piece of gravel lodged in tip of sampler. Advance HW drill casing to 17 ft.		
17	Spin								
18	Spin	S-6	24/7	17-19	18-16-12-15	23	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 20% fine sand, 15% coarse sand, 30% gravel, 5% silt, brown.	SP	2
19	Spin						Advance HW drill casing to 20 ft.		
20	Spin								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UC denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated December 23, 1999.
- Fractured rock noted in top of sample. May have been pushing cobble with sampler; therefore, N-value may be biased high.
- Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.
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Nobis Engineering  
PO Box 1590  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 11

SHEET 2 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696789.5 easting 814755.4  
 Driller A. Carter Mudline El. -13.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/5/99 Date End 10/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount.  
 Drilling Method: 4-inch I.D. (H-W) flush-joint casing, spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Shows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin	S-7	24/10	20-22	32-23-19-13	42	S-7A: Fractured pieces of gravel/rock. (1 in.) S-7B: Silty sand with gravel (SM); dense, 20% medium sand, 20% fine sand, 10% coarse sand, 30% gravel, 20% silt, reddish-brown. (8 in.) Advance HW drill casing to 25 ft.	SM	2
22	Spin								
23	Spin								
24	Spin								
25	Spin								
26	Spin	S-8	24/8	25-27	30-30-20-24	50	S-8A: Fractured pieces of gravel/rock. (1 in.) S-8B: Poorly graded sand with silt and gravel (SP-SM); dense, 27% medium sand, 21% fine sand, 14% coarse sand, 29% gravel, 8% silt, brown. (7 in.) Advance HW drill casing to 30 ft. Very difficult drilling from approximately 29 to 30 ft. Possible cobble/boulder or weathered bedrock. Sound borehole, approximately 12 in. of material in bottom of casing. Advance 3-7/8 in button bit from 29 to 30 ft. Button bit cuttings preserved in two sample jars.	SP-SM	2
27	Spin								1
28	Spin								
29	Spin								3
30	Spin								
		S-9	6/3	30-30.5	10-75/0*	—	Silty sand with gravel (SM); 30% fine sand, 15% medium sand, 5% coarse sand, 15% gravel, 35% silt, brown. Advance HW drill casing to 30.5 ft. Top of bedrock at 30.5 ft. Attempt to advance HW drill casing to 31.0 ft. for coring. Very hard formation, only able to advance to 30.7 ft. Begin HV rock core at 30.5 ft. (boring log continued on next page)	SM	
								BEDROCK	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Fractured rock noted in top of sample. May have been pushing cobble with sampler; therefore, N-value may be biased high.  
 3) Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.  
 4)



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**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

**BORING NO.** FD - 11  
**SHEET** 3 of 7  
**FILE NO.** 48138.07  
**CHKD. BY** J. Trotter

**Boring Co.** Atlantic Testing Laboratories, Limited      **Boring Location** northing 2696789.5      easting 814755.4  
**Driller** A. Carter      **Mudline EL.** -13.1      **Datum** NGVD  
**Logged By** E. Thibodeau      **Date Start** 10/5/99      **Date End** 10/7/99

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer, free falling from a height of 30 inches.  
**Drill Rig:** Aker AD2 truck mount  
**Drilling Method:** 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
31.0		R1	30.5 - 31.5	3.5 mins.	Begin R1 at 30.5 ft. (4th gear) Fresh to slightly weathered, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 95%; RQD = 82% (good) 30.9 ft: Primary joint: horizontal, very close to very widely spaced, rough, planar, slightly discolored, and open.	
31.5						
32.0			31.5 - 32.5	3 mins.	31.8 ft: Primary joint: horizontal, very close to very widely spaced, rough, planar, discolored, and open. 31.8 to 32.0 ft: Fractured zone. Discoloration noted. 32.0 ft: Primary joint: low angle, very close to very widely spaced, rough, planar, slightly discolored, and open.	
32.5						
33.0			32.5 - 33.5	6 mins.	32.5 ft: shift drill rig to lower gear; approximately 200 rpm. (3rd gear) 32.9 ft: mechanical break in rock core.	
33.5						
34.0			33.5 - 34.5	6 mins.	33.5 ft: shift drill rig to higher gear. (4th gear) 34.0 ft: shift drill rig to lower gear. (3rd gear) 34.2 ft: mechanical break in rock core.	
34.5						
35.0			34.5 - 35.5	4 mins.	34.7 ft: minimal water return noted. 34.7 ft: mechanical break in rock core.	
35.5						
					35.4 ft: Primary joint: low angle, very close to very widely spaced, rough, undulating, discolored, and open. End R1 at 35.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Fractured rock noted in top of sample. May have been pushing cobble with sampler, therefore, N-valve may be biased high.  
3) Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.  
4)



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-11  
SHEET 4 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trolier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696789.5 easting 814755.4  
Driller A. Carter Mudline El. -13.1 Datum NGVD  
Logged By E. Thibodeau Date Start 10/5/99 Date End 10/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) push-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
36.0		R2	35.5 - 38.5	3.5 mins.	Begin R2 at 35.5 ft. Fresh to slightly weathered, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 100%; RQD = 96% (excellent) 38.1 ft. mechanical break in rock core.	
36.5						
37.0			38.5 - 37.5	5 mins.		
37.5					37.3 ft. loss of water return. 37.5 ft. mechanical break in rock core.	
38.0		R3	37.5 - 37.8	1 min.	Core barrel blocked at 37.8 ft.; core run terminated. End R2 at 37.8 ft.	
38.5			37.8 - 38.8	5 mins.	Attempt R3; core barrel lodged in core hole. Retrieve core barrel and advance HW drill casing from 30.7 to 32.7 ft. Advance 3-7/8 in. button bit to remove casing shoe cuttings. Cuttings preserved in three sample jars. Begin R3 at 37.8 ft. Fresh to slightly weathered, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 100%; RQD = 100% (excellent)	2
39.0			38.8 - 39.8	4 mins.	38.2 ft. shift drill rig to lower gear. (3rd gear) 39.0 ft. mechanical break in rock core.	
39.5						
40.0			39.8 - 40.8	4.5 mins.		
40.5						

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Fractured rock noted in top of sample. May have been pushing cobble with sampler; therefore, N-valve may be biased high.
- Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.
-



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 11

SHEET 5 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696789.5 easting 814755.4  
 Driller A. Carter Mudline El. -13.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/5/99 Date End 10/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AQ2 truck mount.  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
41.0		R3 (cont.)	40.8 - 41.8	4.5 mins.		
41.5						
42.0			41.8 - 42.8	4.5 mins.	41.9 ft: mechanical break in rock core. 42.1 ft: mechanical break in rock core.	
42.5						
43.0		R4	42.8 - 43.8	4 mins.	Perform constant head permeability test from 30.7 to 42.8 ft. End R3 at 42.8 ft. Begin R4 at 42.8 ft. (3rd gear) Fresh to slightly weathered, medium hard, gray, fine grained GNEISS. Approximately horizontal foliation. REC = 100%; RQD = 98% (excellent)	
43.5					43.3 to 44.3 ft: quartz inclusion zone. Pink in color; coarse grained.	
44.0			43.8 - 44.8	3.5 mins.	44.1 ft: mechanical break in rock core.	
44.5						
45.0			44.8 - 45.8	4 mins.	44.9 ft: mechanical break in rock core. 45.1 ft: Primary joint: low angle, very close to very widely spaced, rough, planar, slightly discolored, and partly open. 45.2 ft: Primary joint: low angle, very close to very widely spaced, rough, planar, discolored, and open.	
45.5						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. FPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Fractured rock noted in top of sample. May have been pushing cobble with sampler; therefore, N-valve may be biased high.  
 3) Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.  
 4)



Nobis Engineering  
PO Box 2850  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 11

SHEET 6 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696789.5 easting 814755.4  
 Driller A. Carter Mudline El. -13.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/5/99 Date End 10/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
 free falling from a height of 30 inches.

Drill Rig: Acter AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
46.0		R4 (cont.)	45.8 - 46.8	4 mins.		
46.5						
47.0			46.6 - 47.5	4 mins.		
47.5					Core barrel full at 47.5 ft.; core run terminated. End R4 at 47.5 ft.	
48.0		R5	47.5 - 48.5	5 mins.	Begin R5 at 47.5 ft. (3rd gear) Fresh to slightly weathered, medium hard, gray, fine grained GNEISS. Horizontal foliation. REC=100%; RQD = 100% (excellent)	
48.5						
49.0			48.5 - 49.5	5.5 mins.		
49.5					49.3 to 49.6 ft: Secondary joint: moderately dipping, extremely widely spaced, smooth, planar, slightly discolored, and partly open. Traces of slickensides noted along joint.	
50.0			49.5 - 50.5	4.5 mins.	49.4 ft: mechanical break in rock core.	
50.5					50.5 ft: mechanical break in rock core.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 6 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Fractured rock noted in top of sample. May have been pushing cobble with sampler; therefore, N-value may be biased high.  
 3) Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.  
 4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

**BORING NO.** FD-11  
**SHEET** 7 of 7  
**FILE NO.** 48138.07  
**CHKD. BY** J. Trottier

**Boring Co.** Atlantic Testing Laboratories, Limited      **Boring Location** northing 2896789.5      easting 814755.4  
**Driller** A. Carter      **Mudline El.** -13.1      **Datum** NGVD  
**Logged By** E. Thibodeau      **Date Start** 10/5/99      **Date End** 10/7/99

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
**Drill Rig:** Acker AD2 truck mount  
**Drilling Method:** 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.0	[Visual representation diagram showing a vertical line with a horizontal tick mark at 52.1 ft]	R5 (cont.)	50.5 - 51.5	4 mins.	52.1 ft. mechanical break in rock core.	
51.5			51.5 - 52.5	4.5 mins.		
52.0					End R5 at 52.5 ft.	
52.5					Bottom of exploration at 52.5 ft.; boring terminated in bedrock.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Fractured rock noted in top of sample. May have been pushing cobble with sampler; therefore, N-valve may be biased high.  
3) Button bit cuttings sample obtained utilizing an 8-in. diameter #100 U.S. sieve.  
4)



Northwest Drilling Technologies  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-12

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carler

Logged By E. Thibodeau

Boring Location

northing 2696647.2 easting 814700.0

Mudline El.

-20.2

Datum

NGVD

Date Start

8/23/99

Date End

8/25/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (H/W) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H M	Casing Stave (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 2 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 2 ft.		
2	Hyd. Push								
3	Hyd. Push	UO-1	24/23	2-4			Top: Poorly graded sand with silt (SP-SM); 50% medium sand, 30% fine sand, 10% silt, moderate odor, gray.	SP-SM	
4	Hyd. Push						Bottom: Clayey sand (SC); 45% fine sand, 30% medium sand, 15% organic clay, 10% organic silt, slight organic odor, gray.	SC	
5	Hyd. Push						Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 2 to 5 ft.		
6	Hyd. Push	S-1	24/4	5-7	1/24"	0	Poorly graded sand with silt (SP-SM); very loose, 50% medium sand, 40% fine sand, 10% silt, slight odor, gray.	SP-SM	
7	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 7 ft.		
8	9	S-2	24/14	7-9	2-3-4-9	7	Silty sand (SM); loose, 50% medium sand, 20% fine sand, 5% coarse sand, 20% silt, 5% clay, moderate odor, dark gray to gray. Two approximate 1 in. thick layers of wood noted in sample.	SM	
9	12						Advance HW drill casing to 10 ft. Add bentonate to drilling fluid.		
10	23						Advance 3-7/8 in. button bit from 7 to 10 ft.		
11	9	S-3	24/16	10-12	4-5-2-1	7	Poorly graded sand (SP); loose, 60% medium sand, 35% fine sand, 5% silt, strong organic odor, dark gray to gray. Advance HW drill casing to 15 ft.	SP	
12	8						Advance 3-7/8 in. button bit from 10 to 15 ft.		
13	8								
14	13								
15	17								
16	14	S-4	24/18	15-17	1-1-1-6	2	S-4A: Sandy silt (ML); very soft, 65% silt, 33% fine sand, 2% medium sand, gray. (12 in.) S-4B: Poorly graded sand (SP); 75% medium sand, 20% fine sand, 5% silt, brown. (5 in.) Advance HW drill casing to 17 ft.	ML SP	1
17	9						Advance 3-7/8 in. button bit from 15 to 17 ft.		
18	14	S-5	24/18	17-19	2-3-3-2	6	Poorly graded sand (SP); loose, 65% medium sand, 30% fine sand, 5% silt, brown. Some iron staining noted in sample. Approximate 2 in. thick clay/silt seam noted in bottom of sample.	SP	
19	11						Advance HW drill casing to 20 ft.		
20	13						Advance 3-7/8 in. button bit from 17 to 20 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.
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Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-12

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged B E. Thibodeau

Boring Location northing 2696647.2 easting 814700.0  
Mudline El. -20.2 Datum NGVD  
Date Start 8/23/99 Date End 8/25/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	12	S-6	24/16	20-22	3-2-2-1	4	Poorly graded sand (SP); very loose, 75% medium sand, 20% fine sand, 5% silt, brown. Approximate 2 in. thick clay seam noted in bottom of sample.	SP	
22	13						Advance HW drill casing to 22 ft.		
23	14	S-7	24/20	22-24	WOR/12-	3	Sandy lean clay (CL); soft, 54% clay/silt, 42% fine sand, 4% medium sand, brown.	CL	1
24	14						Advance HW drill casing to 25 ft.		
25	17						Advance 3-7/8 in. button bit from 20 to 22 ft.		
26	19	S-8	24/18	25-27	2-3-6-8	9	S-8A: Silty sand (SM); loose, 50% fine sand, 20% medium sand, 25% silt, 5% clay, brown. (6 in.)	SM	
27	18						S-8B: Poorly graded sand (SP); loose, 65% medium sand, 30% fine sand, 5% silt, brown. (12 in.)	SP	
28	19						Advance HW drill casing to 30 ft.		
29	22						Advance 3-7/8 in. button bit from 22 to 25 ft.		
30	27								
31	21	S-9	24/18	30-32	6-7-11-12	18	Poorly graded sand with gravel (SP); medium dense, 40% medium sand, 30% fine sand, 10% coarse sand, 15% gravel, 5% silt, brown.	SP	
32	32						Advance HW drill casing to 35 ft.		
33	33						Advance 3-7/8 in. button bit from 30 to 35 ft.		
34	43						Flush casing with potable water to remove drilling mud.		
35	67						Perform borehole permeability test at 35 ft.		
36	41	S-10	24/16	35-37	10-10-6-7	16	Poorly graded sand with gravel (SP); medium dense, 40% medium sand, 17% fine sand, 15% coarse sand, 25% gravel, 3% silt, reddish brown.	SP	1
37	38						Advance HW drill casing to 40 ft.		
38	48						Advance 3-7/8 in. button bit from 35 to 40 ft.		
39	50								
40	45								

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-12

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location

northing 2696647.2 easting 814700.0

Mudline El.

-20.2

Datum

NGVD

Date Start

8/23/99

Date End

8/25/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140-lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Shows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	31	S-11	24/2	40-42	8-4-3-4	7	Fractured rock lodged in tip of sampler; probable cobble. Advance HW drill casing to 42 ft. Advance 3-7/8 in. button bit from 40 to 42 ft.		
42	34								
43	42	S-12	24/18	42-44	11-8-11-12	19	Well-graded sand with silt and gravel (SW-SM); medium dense, 40% medium sand, 29% coarse sand, 8% fine sand, 17% gravel, 6% silt, brown. Advance HW drill casing to 46.5 ft. Advance 3-7/8 in. button bit from 42 to 46.5 ft. Top of bedrock at 46.5 ft.	SW-SM	1
44	63						Telescope and advance NW drill casing to 47 ft. for coring. (spin) Begin NX rock core at 46.5 ft.		
45	73								
46	90								
47	6'	R1	46.5-47.5		9 mins.		R1: 46.5 - 58.5 ft. Fresh, moderately hard, gray, aphanitic GNEISS with horizontal to high angle, very close to widely spaced, smooth to rough, undulating, fresh to discolored, open joints. REC = 90%; RQD = 65% (fair) Highly fractured zone noted from 48.7 to 50.6 ft. Quartz inclusions noted from 49.1 to 49.6 ft., 50.7 to 51.0 ft., 52.2 to 52.5 ft., 53.1 to 53.4 ft., and 54.7 to 54.9 ft. Consumed approximately 300 gallons of potable water during coring activities.	BEDROCK	
48			47.5-48.5		5.5 mins.				
49			48.5-49.5		5 mins.				
50			49.5-50.5		5 mins.				
51			50.5-51.5		8.5 mins.				
52			51.5-52.5		7.5 mins.				
53			52.5-53.5		7.5 mins.				
54			53.5-54.5		8 mins.				
55			54.5-55.5		12 mins.		Attempt constant head permeability test in bedrock; water return noted in annular space between HW and NW drill casings. Test terminated. Advance NW drill casing to 47.5 ft. (spin)		
56			55.5-56.5		15.5 mins.		Attempt constant head permeability test in bedrock; water return noted in annular space between HW and NW drill casings. Test terminated.		
57							Bottom of exploration at 56.5 ft.; boring terminated in bedrock.		
58									
59							Note: Pumped approximately 50 gallons of grout to grout completed hole to top of HW drill casing.		
60									

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.
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Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-13

SHEET 1 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2695492.9 easting 814749.9  
Driller A. Carter Mudline El. -13.2 Datum NGVD  
Logged By E. Thibodeau Date Start 10/7/99 Date End 10/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Ackor AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2487)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		1
2	Hyd. Push	S-1	24/1	1-3	WOR/24"	0	Sandy organic soil (OH); very soft, 65% organic clay/silt, 30% fine sand, 5% shell fragments, strong organic odor, dark gray.	OH	
3	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 3 ft.		
4	Hyd. Push	UO-1	24/24	3-5			Organic clay with sand (OH); 78% organic clay, 2% medium sand, 20% fine sand, strong organic odor, dark gray.	OH	2
5	Hyd. Push						Advance HW drill casing to 6 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 6 ft.		
6	Hyd. Push								
7	Hyd. Push	UO-2	24/24	6-8			Organic clay with sand (OH); 72% organic clay, 1% coarse sand, 2% medium sand, 25% fine sand, moderate organic odor, dark gray.	OH	2
8	Hyd. Push						Advance HW drill casing to 9 ft. (hydraulic push) Advance 3-7/8 in. button bit from 6 to 9 ft.		
9	Hyd. Push								
10	Hyd. Push	UO-3	24/24	9-11			Clayey sand (SC); 4% medium sand, 36% fine sand, 12% gravel, 48% organic clay, moderate organic odor, dark gray.	SC	2
11	Hyd. Push						Advance HW drill casing to 12 ft. (hydraulic push) Advance 3-7/8 in. button bit from 9 to 12 ft.		
12	Hyd. Push								
13	Hyd. Push	UO-4	24/21	12-14			Sandy organic soil (OH); 55% organic clay/silt, 40% fine sand, 5% medium sand, moderate organic odor, dark gray. Traces of peat (Pt) noted in bottom of sample.	OH	
14	Hyd. Push						Advance HW drill casing to 15 ft. (hydraulic push) Advance 3-7/8 in. button bit from 12 to 15 ft. Traces of peat/wood/vegetable matter noted in wash.		
15	Hyd. Push							Pt	
16	Spin	UO-5	24/0	15-17			No recovery. Attempt to obtain sample with split-barrel. Silty sand (SM); 35% fine sand, 30% medium sand, 5% coarse sand, 10% gravel, 20% silt, gray.	SM	3
17	Spin						Advance HW drill casing to 17 ft. Advance 3-7/8 in. button bit from 15 to 17 ft.		
18	Spin	S-3	24/12	17-19	5-1-7-6	8	S-3: Silty sand (SM); loose, 62% fine sand, 7% medium sand, 2% coarse sand, 8% gravel, 21% silt, gray.	SM	4
19	Spin						Advance HW drill casing to 20 ft.		
20	Spin								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation  
12. R denotes core run number.

REMARKS:

- Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-13

SHEET 2 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696492.9 easting 814749.9  
 Driller A. Carter Mudline El. -13.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/7/99 Date End 10/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type E-No	PEN/REC (inches)	DEPTH (ft)	BLOWS PER 8 INCHES	SPT N-Value			
21	Spin	S-4	24/24	20-22	6-2-1-1	3	S-4A: Silty sand (SM); 60% fine sand, 10% medium sand, 30% silt, gray. (12 in.) S-4B: Sandy silt (ML); very soft, 40% silt, 25% clay, 35% fine sand, gray. (12 in.) Advance HW drill casing to 25 ft.	SM  ML	
22	Spin								
23	Spin								
24	Spin								
25	Spin								
26	Spin	S-5	24/24	25-27	WOR/6"-	8	S-5A: Lean clay with sand (CL); very soft, 80% clay, 18% fine sand, 2% medium sand, brown. (14 in.) S-5B: Clayey sand (SC); loose, 45% fine sand, 10% medium sand, 5% coarse sand, 40% clay, brown. (10 in.) Advance HW drill casing to 30 ft.	CL  SC	4
27	Spin								
28	Spin								
29	Spin								
30	Spin								
31	Spin	S-6	24/9	30-32	3-4-5-6	9	Poorly graded sand (SP); loose, 75% fine sand, 20% medium sand, 5% silt, brown. Advance HW drill casing to 32 ft. Encounter difficulty in advancing casing at 32 ft. Loss of water return to drill bit sands closing around casing; difficult to spin. Mix bentonite and polymer drilling mud to help stabilize hole.	SP	
32	Spin								
33	Spin								
34	Spin								
35	Spin								
36	0	S-7	24/17	35-37	9-10-10-13	20	Poorly graded sand with silt (SP-SM); medium dense, 80% fine sand, 10% medium sand, 10% silt, brown. Some iron staining noted in sample. HW drill casing advanced to 38 ft. by self-weight. Advance HW drill casing to 40 ft.	SP-SM	
37	0								
38	Spin								
39	Spin								
40	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UC denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. PVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.  
 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 3) Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.  
 4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
 5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 23, 1999.



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**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-13  
SHEET 3 of 8  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696492.9 easting 814749.9  
Driller A. Carter Mudline El. -13.2 Datum NGVD  
Logged By E. Thibodeau Date Start 10/7/99 Date End 10/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SPT N-Value	SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES				
41	Spin	S-8	24/11	40-42	7-7-9-12	15	Poorly graded sand (SP); medium dense, 70% fine sand, 20% medium sand, 5% coarse sand, 5% silt, brown. Advance HW drill casing to 43 ft.	SP	
42	Spin						Difficult drilling at 43 ft. Sands closing in around casing; difficult to spin. Mix bentonite and polymer drilling mud to help stabilize hole.		
43	Spin						Advance HW drill casing to 45 ft. with the aid of drilling mud.		
44	Spin								
45	Spin								
46	Spin	S-9	24/19	45-47	9-10-10-12	20	Poorly graded sand with silt (SP-SM); medium dense, 60% fine sand, 35% medium sand, 5% silt, reddish-brown. Advance HW drill casing to 50 ft.	SP-SM	
47	Spin						Slight increase in drilling resistance noted at 48 ft.		
48	Spin								
49	Spin								
50	Spin								
51	Spin	S-10	24/0	50-52	8-8-6-7	14	No recovery. Two pieces of gravel/fractured rock lodged in tip of sampler. Advance HW drill casing to 52 ft.		
52	Spin								
53	Spin	S-11	24/3	52-54	11-9-4-8	13	S-11A: Fractured rock (1 in.) S-11B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 20% coarse sand, 15% medium sand, 15% fine sand, 40% gravel, 10% silt, brown. (2 in.) Advance HW drill casing to 54 ft.	SP-SM	
54	Spin								
55	Spin	S-12	24/9	54-56	12-6-7-10	13	Poorly graded sand with silt and gravel (SP-SM); medium dense, 33% fine sand, 14% medium sand, 7% coarse sand, 39% gravel, 7% silt, brown. Advance HW drill casing to 58.1 ft.	SP-SM	
56	Spin								
57	Spin								
58	Spin						Very difficult drilling at 57 ft.; probable glacial till.		
59	Spin	S-13	24/6	58.1- 59.1	22-14-50/0"		Silty sand with gravel (SM); 15% medium sand, 15% fine sand, 10% coarse sand, 40% gravel, 20% silt, brown. (GLACIAL TILL) Advance HW drill casing to 59.1 ft.	SM (GLACIAL TILL)	
60	Spin						Top of bedrock at 59.1 ft.	BEDROCK	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolocalization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.





Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-13

SHEET 5 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2696492.9 easting 814749.9  
Mudline El. -13.2 Datum NGVD  
Date Start 10/7/99 Date End 10/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HVV) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
59.5		R1	59.1 - 60.1	5.5 mins.	Begin R1 at 59.1 ft. (3rd gear) Fresh to slightly weathered, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 to 15 degrees. REC = 100%; ROD = 95% (excellent) 59.1 to 59.2 ft: slight discoloration/weathering noted. 59.1 to 61.6 ft: Healed joint: high angle to vertical, very widely spaced, rough, and undulating.		
60.0			60.1 - 61.1	5.5 mins.	60.0 ft: mechanical break in rock core.		
60.5				61.1 - 62.1	4.5 mins.	61.2 ft: mechanical break in rock core.  61.6 to 61.8 ft: Primary joint: low angle, moderate to widely spaced, rough, planar, discolored, slightly decomposed, and wide.	
61.0				62.1 - 63.1	6 mins.	62.2 ft: mechanical break in rock core.	
61.5				63.1 - 64.1	5 mins.	63.6 ft: mechanical break in rock core.	
62.0						Perform constant head permeability test from 59.4 to 64.1 ft. End R1 at 64.1 ft.	
62.5							
63.0							
63.5							
64.0							

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UD denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. ROD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:

- Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-13

SHEET 8 of 8

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696492.9 easting 814749.9  
 Driller A. Carter Mudline El. -13.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/7/99 Date End 10/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AQ2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
64.5		R2	64.1 - 65.1	5.5 mins.	Begin R2 at 64.1 ft. (3rd gear) Fresh, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 100%; RQD = 98% (excellent)	
65.0					64.9 ft: Primary joint: low angle, moderate to widely spaced, rough, planar, discolored, and tight.	
65.5			65.1 - 66.1	5 mins.		
66.0					66.4 ft: mechanical break in rock core.	
66.5			66.1 - 67.1	5 mins.	66.8 ft: mechanical break in rock core.	
67.0					66.9 ft: Primary joint: low angle, moderate to widely spaced, slickensides, planar, slightly discolored, and tight.	
67.5			67.1 - 68.1	5 mins.		
68.0					67.9 ft: Primary joint: low angle, moderate to widely spaced, smooth, planar, slightly discolored, and open.	
68.5			68.1 - 69.1	4.5 mins.		
69.0					Perform constant head permeability test from 59.4 to 69.1 ft. End R2 at 69.1 ft.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
15 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number

REMARKS:

- 1) Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.
- 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- 3) Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.
- 4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000
- 5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999





Nobis Engineering  
 PO Box 2890  
 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
 New Bedford Harbor Superfund Site  
 New Bedford, Massachusetts

BORING NO. FD-13  
 SHEET 7 of 8  
 FILE NO. 48138.07  
 CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2896492.9 easting 814749.9  
 Driller A. Carter Mudline El. -13.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/7/99 Date End 10/12/99

Sampler: 2 1/2 inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	R E M A R K S
		CORE RUN	CORE INTERVAL	CORE TIME		
69.5		R3	69.1 - 70.1	4.5 mins.	Begin R3 at 69.1 ft. (3rd gear) Fresh, medium to moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 100%; ROD = 100% (excellent)	
70.0					69.8 ft: mechanical break in rock core.	
70.5			70.1 - 71.1	4 mins.		
71.0					70.7 ft: mechanical break in rock core.	
71.5			71.1 - 72.1	4 mins.	71.0 to 71.7 ft: Quartz/feldspar inclusion. Pink/dark gray in color.	
72.0					71.0 ft: mechanical break in rock core. 71.2 ft: healed joint. 71.3 ft: mechanical break in rock core. 71.4 ft: healed joint. 71.7 ft: mechanical break in rock core.	
72.5			72.1 - 73.1	4 mins.		
73.0					72.6 ft: mechanical break in rock core.	
73.5			73.1 - 74.1	4.5 mins.		
74.0					73.5 ft: mechanical break in rock core.  73.9 ft: mechanical break in rock core. End R3 at 74.1 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS**

- 1) Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.
- 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- 3) Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.
- 4) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- 5) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Mobis Engineering  
PO Box 2990  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-13

SHEET B of 8

FILE NO. 48138.07

CHKD. BY J. Troitier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696492.9 easting 814749.9  
 Driller A. Carter Mudline El. -13.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/7/99 Date End 10/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (H-W) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
74.5		R4	74.1 - 75.1	5.5 mins.	Begin R4 at 74.1 ft (3rd gear) Fresh to weathered, medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 100%; RQD = 67% (fair) 74.7 ft: mechanical break in rock core.	
75.0						
75.5			75.1 - 76.1	5 mins.	75.2 ft: mechanical break in rock core. 75.5 to 75.7 ft: Primary joint: low angle, extremely close to moderately spaced, rough, planar, discolored, and very wide open.	
76.0					75.8 and 75.9 ft: Primary joints: low angle, extremely close to moderately spaced, rough, planar, discolored, and open.	
76.5			76.1 - 77.1	5 mins.	76.1 ft: color change noted in water return. (brownish gray) 76.1 ft: Primary joint: low angle, extremely close to moderately spaced, rough, planar, discolored, and open. 76.2 to 76.3 ft: Primary joint: low angle, extremely close to moderately spaced, rough, planar, discolored, and very wide open. 76.5 ft: mechanical break in rock core.	
77.0					76.6, 76.8, 77.1, and 77.2 ft: Primary joints: low angle, extremely close to moderately spaced, rough, planar, discolored, and wide open.	
77.5			77.1 - 78.1	3.5 mins.	77.4 to 77.8 ft: weathered zone. Rock appears to have different texture and hardness (soft). Slightly friable. 77.4, 77.5, 77.6, 77.8, 78.0, 78.1, and 78.3 ft: mechanical breaks in rock core.	
78.0						
78.5			78.1 - 79.1	4 mins.	78.4 ft: Primary joint: horizontal, extremely close to moderately spaced, rough, planar, discolored, and open. 78.9 to 79.1 ft: Primary joints: horizontal to low angle, extremely closely spaced, rough, planar, discolored, slightly friable, and open. Joints spaced approximately 1/4 to 1/2 in. apart. Perform single packer water pressure test from 69.1 to 79.1 ft. Perform single packer water pressure test from 61.1 to 79.1 ft. End R4 at 79.1 ft.	
79.0					Bottom of exploration at 79.1 ft.; boring terminated in bedrock.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- Upon sounding mudline with survey rod, bottom felt competent. Sand and/or sediments may be present.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Material previously sampled with Osterberg sampler; therefore, N-value may be biased low.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 18  
SHEET 1 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696322.5 easting 814282.0  
Driller A. Carter Mudline El. -7.85 Datum NGVD  
Logged By E. Thibodeau Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.O. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push)	OH	1
2	Hyd. Push	UO-1	24/24	1-3			Advance 3-7/8 in. button bit from 0 to 1 ft. Sandy organic clay (OH); 65% organic clay, 23% fine sand, 7% medium sand, 2% coarse sand, 3% gravel, strong organic odor, dark gray. Traces of shell fragments noted.		
3	Hyd. Push						Advance HW drill casing to 4 ft. (hydraulic push)		
4	Hyd. Push						Advance 3-7/8 in. button bit from 1 to 4 ft.	SC	2
5	Hyd. Push	UO-2	24/24	4-6			Clayey sand (SC); 33% fine sand, 14% medium sand, 4% coarse sand, 3% gravel, 46% inorganic clay, strong organic odor, dark gray. Traces of shell fragments noted.		
6	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push)	SM	1
7	Hyd. Push						Advance 3-7/8 in. button bit from 4 to 7 ft.		
8	Hyd. Push	UO-3	24/24	7-9			Top: Silty sand (SM); 55% fine sand, 10% medium sand, 30% silt, 5% shell fragments, gray. Bottom: Sandy silt (ML); 70% silt/clay, 30% fine sand, light gray.		
9	Hyd. Push						Advance HW drill casing to 9 ft. (hydraulic push)	ML	1
10	Spin	S-1	24/12	9-11	2-7-12-12	19	Advance 3-7/8 in. button bit from 7 to 9 ft. S-1: Silt with sand (ML); very stiff, 80% silt/clay, 20% fine sand, light gray. Traces of iron staining.		
11	Spin						Advance HW drill casing to 15 ft.	ML	1
12	Spin								
13	Spin								
14	Spin								
15	Spin							ML	1
16	Spin	S-2	24/18	15-17	7-7-8-6	15	Sandy silt (ML); stiff, 65% silt/clay, 35% fine sand, olive brown. Advance HW drill casing to 20 ft.		
17	Spin								
18	Spin								
19	Spin								
20	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
3) Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.  
4) Button bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 18  
SHEET 2 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696322.5 easting 814282.0  
Driller A. Carter Mudline El. -7.85 Datum NGVD  
Logged By E. Thibodeau Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blow #	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin	S-3	24/20	20-22	6-6-6-8	12	Sandy silt (ML); stiff, 55% silt/clay, 45% fine sand, olive brown. Advance HW drill casing to 25 ft.	ML	
22	Spin								
23	Spin								
24	Spin								
25	Spin								
26	Spin	S-4	24/18	25-27	6-6-8-10	14	Silt with sand (ML); stiff, 75% silt/clay, 25% fine sand, olive brown. Advance HW drill casing to 30 ft.	ML	
27	Spin								
28	Spin								
29	Spin								
30	Spin								
31	Spin	S-5	24/20	30-32	7-16-12-16	28	Sandy lean clay (CL); very stiff, 65% clay/silt, 35% fine sand, olive brown. Approximately 1 in. thick medium to fine sand seam noted in sample, reddish-brown. Traces of black also noted in sample. Advance HW drill casing to 35 ft.	CL	
32	Spin								
33	Spin								
34	Spin						Change in drilling resistance at approximately 33 ft.		
35	Spin								
36	Spin	S-6	24/6	35-37	22-13-9-10	21	Silty sand with gravel (SM); medium dense, 30% fine sand, 20% medium sand, 10% coarse sand, 20% gravel, 20% silt, brown. Advance HW drill casing to 37 ft.	SM	3
37	Spin								
38	Spin	S-7	24/10	37-39	21-13-14-20	27	Lean clay with sand (CL); very stiff, 85% clay/silt, 15% fine sand, olive brown. Approximate 1/4 in. thick medium to fine sand seam noted in bottom of sample, brown. Advance HW drill casing to 40 ft.	CL	
39	Spin								
40	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
3) Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.  
4) Bottom bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 18  
SHEET 3 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696322.5 easting 814282.0  
Driller A. Carter Mudline El. -7.85 Datum NGVD  
Logged By E. Thibodeau Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing, spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
41	Spin	S-8	24/8	40-42	19-24-27-15	51	Poorly graded sand with silt and gravel (SP-SM); very dense, 40% fine sand, 20% medium sand, 5% coarse sand, 26% gravel, 10% silt, brown. Advance HW drill casing to 45 ft.	SP-SM	3
42	Spin						Very difficult drilling at 44 ft.		
43	Spin								
44	Spin								
45	Spin								
46	Spin	S-9	24/0	45-47	59-16-12-15	28	No recovery. Advance HW drill casing to 47 ft.		4
47	Spin								
48	Spin	S-10	24/8	47-49	27-12-20-16	32	Poorly graded sand with silt and gravel (SP-SM); dense, 40% fine sand, 15% medium sand, 10% coarse sand, 25% gravel, 10% silt, brown. Advance HW drill casing to 50 ft.	SP-SM	
49	Spin								
50	Spin								
51	Spin	S-11	24/2	50-52	19-11-11-15	22	Poor recovery. Piece of fractured rock lodged in tip of sampler. Possible weathered/fractured bedrock. Advance HW drill casing to 52 ft.	POSSIBLE BEDROCK	
52	Spin								
53	Spin	S-12	24/0	52-54	16-30-30-29	60	Poor recovery. Fractured rock. Possible weathered/fractured bedrock. Advance 3-7/8 in. button bit from 52 to 54 ft. (open hole) Button bit cuttings preserved in three sample jars. Cuttings appear to be bedrock.		
54	Spin								
		S-13	2/1	54-54.2	75/2	—	Fractured bedrock. Appears to be less weathered/more competent than samples obtained in S-11 and S-12. Advance HW drill casing to 54.7 ft. for coring. (spin) Fill casing with water to check casing seal; water level dropped slowly. Begin HV rock core at 54.2 ft. (boring log continued on next page)		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
3) Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.  
4) Button bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 18

SHEET 4 of 7

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location northing 2696322.5 easting 814282.0

Mudline El. -7.85 Datum NGVD

Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; split and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
54.5		R1	54.2 - 55.2	4 mins.	Begin R1 at 54.2 ft (3rd gear) Water return color: milky white. Fresh to slightly weathered, moderately hard, gray, fine grained GNEISS. Appears to be high angle to vertical foliation. REC = 83%; RQD = 70% (fair)	
55.0					54.2 to 54.3 ft: fractured piece of bedrock. Slightly discolored and weathered. 54.9 to 55.7 ft: core barrel dropped. Probable void. Recovered a few pieces of fractured bedrock and what appears to be fine gravel. Probably soil filled.	
55.5			55.2 - 56.2	1.5 mins.		
56.0					55.7 ft: change in foliation from high angle/vertical to low angle; approximately 10 degrees. 55.7 ft: water return color: light brown. Water return still possible after coring through void.	
56.5			56.2 - 57.2	3.5 mins.	56.2 ft: water return color: milky white. 56.3 ft: mechanical break in rock core.	
57.0						
57.5			57.2 - 58.2	4 mins.	57.2, 57.3, 57.4, and 57.5 ft: Primary joints: low angle, extremely close to moderately spaced, rough, planar, discolored, and partly open.	
58.0					58.7 ft: Primary joint: low angle, extremely close to moderately spaced, rough, planar, discolored, and tight.	
58.5			58.2 - 59.2	5 mins.	58.9 ft: Primary joint: low angle, extremely close to moderately spaced, smooth, planar, discolored, and open. Sound corehole after completion of core run; approximately 4 ft. of material in corehole. Attempt split-barrel sample. Drive sampler from 58 to 59 ft. REC = 24 in. S-14A: Mostly core bit cuttings; piece of fractured bedrock noted. (top) S-14B: Mixture of medium to fine sand and gravel; could be void material. Advance HW drill casing from 54.7 to 56.2 ft. to seal off void.	
59.0					End R1 at 59.2 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
 3) Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.  
 4) Button bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 18  
SHEET 5 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696322.5 easting 814282.0  
Driller A. Carter Mudline El. -7.85 Datum NGVD  
Logged By E. Thibodeau Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; split and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
58.5		R2	59.2 - 60.2	5 mins.	Advance 3 7/8 in. button bit from 56 to 59.2 ft to remove cuttings. Fill casing with water to check casing seal; water level dropped slowly. Begin R2 at 59.2 ft. (3rd gear) Water return color: milky white. Fresh to weathered, hard to medium hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 to 20 degrees. REC = 98%; RQD = 87% (good)	
60.0						
60.5			60.2 - 61.2	4.5 mins.	60.4 to 60.5 ft: Primary joint: low angle, extremely close to moderately spaced, rough, stepped, discolored, and partly open. 60.5 to 60.6 ft: Primary joint: low angle, extremely close to moderately spaced, rough, planar, discolored, and tight.	
61.0						
61.5			61.2 - 62.2	3 mins.	61.7 to 62.8 ft: weathered zone; discolored. 61.7 to 61.9 ft: Primary joints: low angle to horizontal, extremely close to moderately spaced, rough, planar, discolored, slightly decomposed, and partly open. Joints spaced approximately 0.1 to 0.3 in. apart. 62.1 ft: mechanical break in rock core.	
62.0						
62.5			62.2 - 63.2	3 mins.	62.3 ft: mechanical break in rock core. 62.5 ft: Primary joint: horizontal, extremely close to moderately spaced, rough, planar, discolored, and open. 62.6 to 62.8 ft: Primary joints: horizontal, extremely close to moderately spaced, rough, planar, discolored to slightly decomposed, and open. Decomposed to disintegrated (friable) zone noted from 62.6 to 62.7 ft. Traces of mud filling noted in this zone. 63.0 ft: water return color: light brown to milky white.	
63.0						
63.5			63.2 - 64.2	4 mins.	63.5 ft: Primary joint: low angle, extremely close to moderately spaced, smooth, planar, discolored, slightly decomposed, and partly open.	
64.0					64.0 ft: mechanical break in rock core. End R2 at 64.2 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.
- Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.
- Button bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-18  
SHEET 6 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696322.5 easting 814282.0  
Driller A. Carter Mudline El. -7.85 Datum NGVD  
Logged By E. Thibodeau Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
64.5		R3	64.2 - 65.2	5 mins.	Fill casing with water to check casing seal; water level dropped more rapidly. Begin R3 at 64.2 ft. (3rd gear) Water return color: light brown to milky white. Fresh, hard, gray, fine grained GNEISS. Low angle foliation; approximately 15 degrees. REC = 100%; RQD = 97% ( excellent)  65.1 ft: mechanical break in rock core.	
65.0						
65.5			65.2 - 66.2	4 mins.	  66.1 ft: mechanical break in rock core.	
66.0						
66.5			66.2 - 67.2	4 mins.	66.5 ft: Primary joint: low angle, extremely close to widely spaced, smooth, planar, slightly discolored, and open. Minor core grinding noted on fracture surface.	
67.0						
67.5			67.2 - 68.2	4.5 mins.	67.7 ft: mechanical break in rock core.	
68.0						
68.5			68.2 - 69.2	4.5 mins.	68.3 ft: Primary joint: low angle, extremely close to widely spaced, smooth, planar, slightly discolored, and open. Some core grinding noted on fracture surface.  68.9 ft: mechanical break in rock core.	
69.0					End R3 at 69.2 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
3) Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.  
4) Button bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.





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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 18

SHEET 7 of 7

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited	Boring Location northing 2696322.5 easting 814282.0
Driller A. Carter	Mudline El. -7.85 Datum NGVD
Logged By E. Thibodeau	Date Start 10/13/99 Date End 10/15/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-Inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
69.5		R4	69.2 - 70.2	5.5 mins.	Begin R4 at 69.2 ft. (3rd gear) Water return color: milky white. Fresh, hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 98%; RQD = 98% (excellent)	
70.0					70.1 ft: mechanical break in rock core.	
70.5			70.2 - 71.2	7.5 mins.		
71.0					70.9 ft: mechanical break in rock core. 71.2 ft: mechanical break in rock core.	
71.5			71.2 - 72.2	5.5 mins.		
72.0					72.1 ft: mechanical breaks in rock core.	
72.5			72.2 - 73.2	5.5 mins.		
73.0					72.8 to 72.9 ft: Quartz/feldspar inclusion; pink in color. 73.0 ft: mechanical break in rock core.	
73.5			73.2 - 74.2	4.5 mins.		
74.0					73.9 ft: mechanical break in rock core. Perform constant head permeability test from 56.2 to 74.2 ft. End R4 at 74.2 ft. Bottom of exploration at 74.2 ft.; boring terminated in bedrock. Grouted completed borehole with approximately 57 gallons of bentonite grout. (9.2 lbs/gal.)	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Strata break changed from 7 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
 3) Fractured rock/gravel noted in top of recovered sample; therefore, N-value may be biased high.  
 4) Button bit cuttings samples obtained utilizing an 8 in. diameter #100 U.S. sieve.



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-19

SHEET 1 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller R. Pryce

Logged By R. Chase

Boring Location northing 2696353.5 easting 814172.2

Ground Surface El. 6.98 Datum NGVD

Date Start 9/8/99 Date End 9/9/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: CME 75 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)

Date	Time	Depth	Elev.	Stabilization Time
9/9	7:00 AM	4.1 ft.	2.86	12 hours

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Spin	S-1	15/9	0-2	6-50-50/3*	>50	Poorly graded sand (SP); dry, very dense, 50% fine sand, 30% medium sand, <5% coarse sand, 5% fine gravel, 5% silt, <5% brick, brown. (FILL) Advance HW drill casing to 3 ft.	SP (FILL)	
2	Spin								
3	Spin								
4	Spin	S-2	8/3	3-3.8	8-50/2*	>50	Poorly graded sand (SP); wet, very dense, 50% medium sand, 30% coarse sand, 5% fine sand, 10% fine gravel, <5% silt, brown. (FILL) Advance HW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 8.5 ft. Probable nested boulders from 3.6 to 8.5 ft.	SP (FILL)	
5	Spin								
6	Spin								Probable Nested Boulders
7	Spin								
8	Spin								
9	Spin	S-3	24/9	8.5-10.5	33-20-13-20	33	Poorly graded sand (SP); wet, dense, 80% fine sand, 5% medium sand, <5% coarse sand, <5% fine gravel, 5% silt, oily odor, black. Advance HW drill casing to 13 ft.	SP	
10	Spin								
11	Spin								
12	Spin								
13	Spin								
14	Spin	S-4	24/14	13-15	44-36-25-37	61	Similar to S-3 except very dense. Oily odor noted. Advance 3-7/8 in. roller bit to 18 ft. (open hole)	SP	
15	Spin								
16	Spin								
17	Spin								
18	Spin								
19	Spin	S-5	24/8	18-20	12-6-22-35	28	Poorly graded sand (SP); wet, medium dense, 55% fine sand, 5% medium sand, <5% coarse sand, 30% fine gravel, 5% silt, gray. Advance HW drill casing to 23 ft.	SP	
20	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Grout the completed borehole from 0 to 71 ft.  
2)  
3)  
4)



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-19  
SHEET 2 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696353.5 easting 814172.2  
Driller R. Pryce Ground Surface El. 6.98 Datum NGVD  
Logged By R. Chase Date Start 9/8/99 Date End 9/9/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drift Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
9/9	7:00 AM	4.1 ft.	2.88	12 hours

DEPTH H	Casing Blows (#)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin								
22	Spin								
23	Spin								
24	Spin	S-6	24/9	23-25	25-20-20-20	40	Silt (ML); wet, hard, 100% silt, gray. Advance HW drill casing to 28 ft.	ML	
25	Spin								
26	Spin								
27	Spin								
28	Spin								
29	Spin	S-7	24/17	28-30	20-19-27-34	46	Similar to S-6, except several lenses of fine sand noted in sample. Advance HW drill casing to 33 ft.	ML	
30	Spin								
31	Spin								
32	Spin								
33	Spin								
34	Spin	S-8	24/22	33-35	15-15-20-22	35	Similar to S-7. Advance HW drill casing to 38 ft.	ML	
35	Spin								
36	Spin								
37	Spin								
38	Spin								
39	Spin	S-9	24/12	38-40	10-19-22-20	41	Silt (ML); wet, hard, 95% silt, 5% fine gravel. Advance HW drill casing to 43 ft.	ML	
40	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Grout the completed borehole from 0 to 71 ft.  
2)  
3)  
4)



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 P.O. Box 2890  
 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
 New Bedford Harbor Superfund Site  
 New Bedford, Massachusetts

BORING NO. FD-19  
 SHEET 3 of 4  
 FILE NO. 48138.07  
 CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696353.5 easting 814172.2  
 Driller R. Pryce Ground Surface El. 6.98 Datum NGVD  
 Logged By R. Chase Date Start 9/8/99 Date End 9/9/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
 free falling from a height of 30 inches.  
 Drill Rig: GME 75 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)

Date	Time	Depth	Elev.	Stabilization Time
9/9	7:00 AM	4.1 ft.	2.88	12 hours

DEPTH H	Casing Blows (%)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	Spin								
42	Spin								
43	Spin								
44	Spin	S-10	24/4	43-45	23-19-20-21	39	Poorly graded gravel (GP); wet, dense, 95% fine gravel, 5% coarse sand, gray. Advance HW drill casing to 48 ft.	GP	
45	Spin								
46	Spin								
47	Spin								
48	Spin								
49	Spin	S-11	24/7	48-50	32-15-20-24	35	Poorly graded sand (SP); wet, dense, 50% fine sand, 30% medium sand, 10% coarse sand, <5% fine gravel, 5% silt, brown. Advance HW drill to 53 ft.	SP	
50	Spin								
51	Spin								
52	Spin								
53	Spin								
54	Spin	S-12	5/3	53-53.4	50/5*	>50	Poorly graded sand (SP); wet, dense, 55% medium sand, 40% coarse sand, 5% fine sand, brown. Advance HW drill casing to 58 ft. Possible cobble from 53.4 to 53.8 ft.	SP	
55	Spin								
56	Spin								
57	Spin								
58	Spin								
59		S-13	0/0	58-58	50/0*	>50	Refusal. Top of bedrock at 58 ft. Advance 3-7/8 in. roller bit to 60.8 ft. Advance HW drill casing from 58 to 60.7 ft.	BEDROCK	
60									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Grout the completed borehole from 0 to 71 ft.  
 2)  
 3)  
 4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-19  
SHEET 4 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller R. Pryce  
Logged By R. Chase

Boring Location northing 2696353.5 easting 814172.2  
Ground Surface El. 6.98 Datum NGVD  
Date Start 9/8/99 Date End 9/9/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
9/9	7:00 AM	4.1 ft.	2.88	12 hours

DEPTH FT	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
61						Advance 3-7/8 in. roller bit to 61 ft. Begin NX rock core at 61 ft.		
62		R1	61-62	7.75 mins.		R1: 61 to 66 ft. Fresh, medium hard, gray, aphanitic GNEISS with very low angle, very closely spaced, rough, planar, fresh, open joints. REC = 80%; RQD = 78%	BEDROCK	
63			62-63	8 mins.		90% of rock core breaks are mechanical.		
64			63-64	7.8 mins.				
65			64-65	7 mins.				
66			65-66	11.4 mins.				
67		R2	66-67	10.9 mins.		R2: 66 to 71 ft. Similar to R1 REC = 98%; RQD = 98%		
68			67-68	9.5 mins.				
69			68-69	9.1 mins.				
70			69-70	9.6 mins.				
71			70-71	11.1 mins.				
72						Bottom of exploration at 71 ft.; boring terminated in bedrock.		
73								
74								
75								
76								
77								
78								
79								
80								

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|--|

REMARKS:  
1) Grout the completed borehole from 0 to 71 ft.  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-20  
SHEET 1 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696458.0 easting 814073.9  
Driller A. Carter Mudline El. -4.08 Datum NGVD  
Logged By E. Thibodeau Date Start 9/7/99 Date End 9/8/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer (free falling from a height of 30 inches).  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (S)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	S-1	24/8	3-5	WOR/24"	0	Organic soil with sand (OH); very soft, 60% organic clay, 20% organic silt, 15% fine sand, 5% medium sand, strong organic odor, slight sheen, dark gray to black. Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.	OH	
5	Hyd. Push								
6	Hyd. Push	S-2	24/18	5-7	WOR/15"	0	S-2A: Sandy organic soil (OH); very soft, 40% organic clay, 25% organic silt, 30% fine sand, 5% shell fragments, strong organic odor, dark gray. (12 in.) S-2B: Poorly graded sand with silt (SP-SM): 50% fine sand, 40% medium sand, 10% silt, gray to brown. (6 in.)	OH	
7	Hyd. Push							SP-SM	
8	19						Advance HW drill casing to 10 ft. (hydraulic push) Very difficult push at 7 ft.; drive casing. Advance 3-7/8 in. button bit from 5 to 10 ft.		
9	16								
10	21								
11	7/6"	S-3	24/19	10-12	17-29-29-26	58	Poorly graded sand (SP); very dense, 50% medium sand, 35% fine sand, 5% coarse sand, 5% gravel, 5% silt, brown. Advance HW drill casing to 15 ft. Advance 3-7/8 in. button bit from 10 to 15 ft.	SP	1
12	18								
13	26								
14	37								
15	43								
16	14	S-4	24/12	15-17	6-6-7-7	13	Poorly graded sand (SP); medium dense, 40% medium sand, 25% fine sand, 20% coarse sand, 10% gravel, 5% silt, brown. Advance HW drill casing to 20 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 15 to 20 ft.	SP	
17	26								
18	41								
19	46								
20	49								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) HW drill casing advanced approximately 6 in. during standard penetration test; therefore, N-value may be biased high.
- 2) Slight loss of drilling fluid noted during advancement of button bit.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-20

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696458.0 easting 814073.9  
 Driller A. Carter Mudline El. -4.08 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/7/99 Date End 9/8/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 9 INCHES	SPT N-Value			
21	36	S-5	24/19	20-22	11-14-21-31	35	Poorly graded sand with gravel (SP); dense, 30% medium sand, 30% fine sand, 15% coarse sand, 20% gravel, 5% silt, brown. Advance HW drill casing to 25 ft. Advance 3-7/8 in. button bit from 20 to 25 ft.	SP	
22	37								
23	30								
24	36								
25	60								
26	81	S-6	24/8	25-27	10-14-11-13	25	Poorly graded sand with silt and gravel (SP-SM); medium dense, 30% medium sand, 15% coarse sand, 15% fine sand, 30% gravel, 10% silt, brown. Advance HW drill casing to 30 ft. Advance 3-7/8 in. button bit from 25 to 30 ft.	SP-SM	
27	120								
28	191								
29	123								
30	115								
31	78	S-7	24/10	30-32	25-17-14-14	31	Silty sand with gravel (SM); dense, 20% medium sand, 15% coarse sand, 15% fine sand, 35% gravel, 15% silt, brown. Advance HW drill casing to 35 ft. Advance 3-7/8 in. button bit from 30 to 35 ft.	SM	
32	73								
33	85								
34	113								
35	115								
36	76	S-8	24/8	35-37	39-18-10-10	28	Poorly graded sand with silt and gravel (SP-SM); medium dense, 30% coarse sand, 20% fine sand, 10% medium sand, 30% gravel, 10% silt, brown. Piece of gravel lodged in tip of sampler. Advance HW drill casing to 40 ft. Advance 3-7/8 in. button bit from 35 to 40 ft.	SP-SM	
37	70								
38	130								
39	128								
40	81								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) HW drill casing advanced approximately 6 in. during standard penetration test; therefore, N-value may be biased high.  
 2) Slight loss of drilling fluid noted during advancement of button bit.  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-20

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2696458.0 easting 814073.9  
Mudline El. -4.08 Datum NGVD  
Date Start 9/7/99 Date End 9/8/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drift Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
41	78	S-9	24/6	40-42	30-24-11-9	35	Poorly graded sand with silt (SP-SM); dense, 40% medium sand, 30% fine sand, 10% coarse sand, 10% gravel, 10% silt, brown.	SP-SM	2
42	100						Advance HW drill casing to 46 ft.		
43	196						Advance 3-7/8 in. button bit from 40 to 46 ft.		
44	89								
45	63								
46	79								
47	56	S-10	24/18	46-48	19-12-7-5	19	Poorly graded sand with gravel (SP); medium dense, 40% medium sand, 20% coarse sand, 20% fine sand, 15% gravel, 5% silt, brown. Traces of weathered bedrock noted in sample.	SP	
48	65						Advance HW drill casing to 48.8 ft.		
49	9'	218/					Top of bedrock at 48.8 ft.		
50							Advance 3-7/8 in. button bit from 46 feet to 50.8 ft.		
51								BEDROCK	
52							Bottom of exploration at 50.8 feet; boring terminated in probable bedrock.		
53							Note: Pumped approximately 59 gallons of grout to grout completed borehole to top of HW drill casing.		
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolorization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) HW drill casing advanced approximately 6 in. during standard penetration test; therefore, N-value may be biased high.
- 2) Slight loss of drilling fluid noted during advancement of button bit.
- 3)
- 4)





Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-21  
SHEET 1 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696526.5 easting 814030.9  
Driller R. Pryce Ground Surface El. 10.9 Datum NGVD  
Logged By R. Chase Date Start 8/31/99 Date End 9/1/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)					
Date	Time	Depth	Elev.	Stabilization Time	
No water levels recorded					

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-VALUE			
1	Spin	S-1	17/11	0-1.4	14-38-50/5*	>50	Poorly graded sand (SP); dry, very dense, 80% fine sand, 5% coarse sand, 5% medium sand, 5% fine gravel, 5% silt, brown. (FILL) Advance HW drill casing to 3 ft.	SP (FILL)	
2	Spin								
3	Spin								
4	Spin	S-2	5/5	3-3.4	50/5*	>50	Similar to S-1, except wet. Advance HW drill casing to 8 ft.	SP (FILL)	
5	Spin								
6	Spin								
7	Spin								
8	Spin								
9	Spin	S-3	24/6	8-10	27-20-6-5	26	Similar to S-2, except medium dense. Advance HW drill casing to 13 ft.	SP (FILL)	
10	Spin								
11	Spin								
12	Spin								
13	Spin								
14	Spin	S-4	3/3	13-13.3	50/3*	>50	Poorly graded sand (SP); wet, 40% coarse sand, 40% medium sand, <5% fine sand, 10% fine gravel, <5% silt, red-brown. Traces of brick noted in sample. (FILL) Advance HW drill casing to 18 ft. Probable boulder from 13.3 to 14.3 ft. Probable boulder from 14.3 to 15.5 ft.	SP (FILL)  Probable Boulders	
15	Spin								
16	Spin								
17	Spin								
18	Spin								
19	Spin	S-5	24/14	18-20	9-6-6-6	12	Organic soil (OL); wet, stiff, 100% organic silt, black. Advance HW drill casing to 23 ft.	OL	
20	Spin								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Grout the completed borehole from 0 to 49 ft.
- 2)
- 3)
- 4)



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-21  
SHEET 2 of 3  
FILE NO. 48138.07  
CHKD. BY J.Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696526.5 easting 814030.9  
Driller R. Pryce Ground Surface El. 10.9 Datum NGVD  
Logged By R. Chase Date Start 8/31/99 Date End 9/1/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 8 INCHES	SPT N-Value			
21	Spin								
22	Spin								
23	Spin						Inferred strata change at 23 ft.		
24	Spin	S-6	24/10	23-25	14-9-10-14	19	Silty sand (SM); wet, medium dense, 85% fine sand, 15% silt, gray. Advance HW drill casing to 28 ft.	SM	
25	Spin								
26	Spin								
27	Spin								
28	Spin								
29	Spin	S-7	24/10	28-30	8-9-11-10	20	Similar to S-6. Advance HW drill casing to 33 ft.	SM	
30	Spin								
31	Spin								
32	Spin								
33	Spin								
34	Spin	S-8	24/6	33-35	11-14-13-13	27	Poorly graded sand (SP); wet, medium dense, 95% fine sand, 5% silt, gray. Advance HW drill casing to 38 ft.	SP	
35	Spin								
36	Spin								
37	Spin								
38	Spin								
39	Spin	S-9	10/6	38-39.9	18-50/4*	>50	Well-graded sand with gravel (SW); wet, 35% coarse sand, 30% medium sand, 15% fine sand, 15% fine gravel, 5% silt. Advance HW drill casing to 43 ft.	SW	
40	Spin								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Grout the completed borehole from 0 to 49 ft.
- 2)
- 3)
- 4)



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 PO Box 2890  
 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-21

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
 Driller R. Pryce  
 Logged By R. Chase

Boring Location northing 2696526.5 easting 814030.9  
 Ground Surface El. 10.9 Datum NGVD  
 Date Start 8/31/99 Date End 9/1/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SPT N-Value	SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES				
41	Spin								
42	Spin								
43	Spin								
44	Spin	S-10	24/4	43-45	14-11-12-25	23	Poorly graded sand (SP); wet, medium dense, 50% coarse sand, 35% medium sand, 5% fine sand, <5% fine gravel, <5% silt, gray. Advance HW drill casing to 46.5 ft. Top of bedrock at 46.5 ft. Advance 3-7/8 in. roller bit to 49.0 ft. to confirm bedrock.	SP	
45	Spin								
46	Spin								
47									
48									
49									
50							Bottom of exploration at 49 ft.; boring terminated in probable bedrock.		
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel samples.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
 8. PPM denotes parts per million  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RQD denotes Rock Quality Designation.  
 12. R denotes core run number.

REMARKS:  
 1) Grout the completed borehole from 0 to 49 ft.  
 2)  
 3)  
 4)



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-22

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller R. Pryce

Logged By S. Boris

Boring Location northing 2696654.2 easting 814095.5

Ground Surface El. 11.28 Datum NGVD

Date Start 9/15/99 Date End 9/20/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: CME 75 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

**Groundwater Readings (from ground surface)**

Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

O P T R	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N <sub>60</sub> blows			
1	Spin	S-1	24/12	0-2	14-30-14-9	44	Poorly graded sand with silt and gravel (SP-SM); dry, dense, 60% fine sand, 10% coarse sand, 15% gravel, 15% silt, dark brown. Wood and concrete fragments noted in sample. (FILL)	SP-SM (FILL)	
2	Spin						Advance HW drill casing to 3 ft.		
3	Spin						Advance 3-7/8 in. roller bit. to 3 ft.		
4	Spin	S-2	24/1	3-5	9-30-9-4	39	Poorly graded gravel (GP); dense, 90% gravel, 10% coarse sand. (FILL)	GP (FILL)	
5	Spin						Advance HW drill casing to 9.5 ft.		
6	Spin						Very slow drilling; possible boulders.		
7	Spin						Advance 3-7/8 in. roller bit. to 9.5 ft.		
8	Spin						Possible boulder from 7.5 to 9.5 ft.	Probable Boulder	
9	Spin								
10	Spin	S-3	7/3	9.5-10.1	25-50/1*	>50	Poorly graded sand with silt and gravel (SP-SM); 70% sand, 20% gravel, 10% silt.	SP-SM (FILL)	
11	Spin						Fractured cobble fragments and bits of wire noted in sample. (FILL)		
12	Spin						Advance HW drill casing to 13 ft.		
13	Spin						Advance 3-7/8 in. roller bit. to 13 ft.		
14	Spin	S-4	24/4	13-15	15-4-4-11	8	Poorly graded sand with silt (SP-SM); loose, 90% fine sand, 10% silt, heavy sheen, strong petroleum/tar odor, black. (FILL)	SP-SM (FILL)	
15	Spin						Advance HW drill casing to 18 ft.		
16	Spin						Advance 3-7/8 in. roller bit. to 18 ft.		
17	Spin								
18	Spin								
19	Spin	S-5	24/7	18-20	9-6-5-7	11	Silty sand (SM); medium dense, 15% medium sand, 60% fine sand, 10% gravel, 15% silt, gray. Traces of shell fragments noted in sample. (FILL)	SM (FILL)	
20	Spin						Advance HW drill casing to 23 ft.		
							Advance 3-7/8 in. roller bit. to 23 ft.		

0 to 4 - Very Loose. 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

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Active Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-22  
SHEET 2 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696654.2 easting 814095.5  
Driller R. Pryce Ground Surface El. 11.28 Datum NGVD  
Logged By S. Bonis Date Start 9/15/99 Date End 9/20/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: CME 75 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing, spin and wash.

**Groundwater Readings (from ground surface)**

Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin						Estimated strata change at 20 ft.		
22	Spin								
23	Spin								
24	Spin	S-6	24/8	23-25	25-8-5-6	13	Organic soil (OH); moist, stiff, 90% organic clay/silt, 10% fine sand, hydrogen sulfide odor, dark gray. Plant material and shell fragments noted in sample.	OH	
25	Spin						Advance HW drill casing to 28 ft.		
26	Spin						Advance 3-7/8 in. roller bit. to 28 ft.		
27	Spin								
28	Spin								
29	Spin	S-7	24/20	28-30	7-5-7-7	12	Organic soil (OH); moist, stiff, 90% organic clay/silt, 5% coarse sand, 5% fine sand, hydrogen sulfide odor, dark gray. Shell fragments noted in sample.	OH	
30	Spin						Advance HW drill casing to 33 ft.		
31	Spin						Advance 3-7/8 in. roller bit. to 33 ft.		
32	Spin								
33	Spin								
34	Spin	S-8	24/5	33-35	22-31-21-23	52	Well-graded sand with silt and gravel (SW-SM); very dense, 50% medium sand, 15% coarse sand, 10% fine sand, 15% gravel, 10% silt.	SW-SM	
35	Spin						Advance HW drill casing to 38 ft.		
36	Spin						Advance 3-7/8 in. roller bit. to 38 ft.		
37	Spin								
38	Spin								
39	Spin	S-9	24/11	38-40	15-12-9-10	21	Similar to S-8; except medium dense.	SW-SM	
40	Spin						Advance HW drill casing to 43 ft.		
							Advance 3-7/8 in. roller bit. to 43 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number

REMARKS:  
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PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-22  
SHEET 3 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller R. Pryce  
Logged By S. Bonis  
Boring Location northing 2696654.2 easting 814095.5  
Ground Surface El. 11.28 Datum NGVD  
Date Start 9/15/99 Date End 9/20/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rtg: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	Spin								
42	Spin								
43	Spin								
44	Spin	S-10	24/20	43-45	14-11-13-11	24	Well-graded sand with silt and gravel (SW-SM); medium dense, 50% medium sand, 15% coarse sand, 10% fine sand, 15% gravel, 10% silt. Advance HW drill casing to 48 ft.	SW-SM	
45	Spin						Advance 3-7/8 in. roller bit.		
46	Spin								
47	Spin								
48	Spin								
49	Spin	S-11	24/16	48-50	35-17-18-17	35	Well-graded gravel with sand (GP); dense, 50% gravel, 30% coarse sand, 10% medium sand, 5% fine sand, 5% silt. Advance HW drill casing to 53 ft.	GP	
50	Spin						Advance 3-7/8 in. roller bit.		
51	Spin								
52	Spin								
53	Spin								
54	Spin	S-12	24/0	53-55	8-7-7-8	14	No recovery. (1st attempt) Stopped for the weekend.	SM	
			24/4	53-55	8-5-6-14	11	Monday: 2 ft. of wash noted in bottom of casing. Advance 3-7/8 in. roller bit to remove material. Re-attempt 53 to 55 ft. sample.		
55	Spin						S-12: Silty sand (SM); medium dense, 50% medium sand, 30% fine sand, 20% silt. (2nd attempt)		
56	Spin						Advance HW drill casing to 55.5 ft. (probable bedrock)		
57							Advance HW drill casing to 56.5 ft. Advance 3-7/8 in. roller bit to 57 ft. to confirm bedrock.	BEDROCK	
58							Bottom of exploration at 57 ft.; boring terminated in probable bedrock.		
59									
60									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-23

SHEET 1 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696825.4 easting 814041.8  
 Driller R. Pryca Ground Surface El. 9.82 Datum NGVD  
 Logged By R. Chase Date Start 9/2/99 Date End 9/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)

Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

Core Type H	Casey Blows (#)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Spin							ASPHALT	
2	Spin	S-1	24/7	1-3	8-6-5-9	11	Silty sand (SM); wet, medium dense, 75% fine sand, 5% coarse sand, 5% medium sand, 15% silt, brown. (FILL)	SM (FILL)	
3	Spin								
4	Spin	S-2	24/12	3-5	15-8-7-8	15	Similar to S-1. Advance HW drill casing to 6 ft. Advance 3-7/8 in. roller bit from 6 to 7.5 ft. Advance HW drill casing to 8 ft.	SM (FILL)	
5	Spin								
6	Spin								
7	Spin						Probable boulder from 6 to 7.5 ft.	Probable Boulder	
8	Spin								
9	Spin	S-3	24/4	8-10	8-4-6-9	10	Poorly graded sand with gravel (SP); wet, loose, 50% fine sand, 10% medium sand, 5% coarse sand, 30% fine gravel, 5% silt, gray. (FILL)	SP (FILL)	
10	Spin								
11	Spin								
12	Spin								
13	Spin						Probable boulder from 12.5 to 13.5 ft.	Probable Boulder	
14	Spin	S-4	24/16	13.5- 15.5	6-4-6-7	10	Silty sand (SM); wet, loose, 50% fine sand, 50% silt, asphalt like odor, oily sheen, black. PID = 36 ppm when sampler was opened. (FILL)	SM (FILL)	
15	Spin								
16	Spin								
17	Spin								
18	Spin								
19	Spin	S-5	24/5	18-20	42-19-15-20	34	Poorly graded gravel with sand (GP); wet, dense, 70% fine gravel, 10% coarse sand, 10% medium sand, 5% fine sand, 5% silt, gray. Traces of wood and brick noted in sample. (FILL)	GP (FILL)	
20	Spin						Advance HW drill casing to 23 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 6 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-23

SHEET 2 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696825.4 easting 814041.8  
 Driller R. Pryce Ground Surface El. 9.82 Datum NGVD  
 Logged By R. Chase Date Start 9/2/99 Date End 9/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin								
22	Spin								
23	Spin								
24	Spin	S-6	24/5	23-25	15-7-9-9	16	Organic soil (OL); wet, very stiff, 99% organic silt, 1% brick, gray. Brick fragments noted in top 1 in. of sample. Advance HW drill casing to 28 ft.	OL	
25	Spin								
26	Spin								
27	Spin								
28	Spin								
29	Spin	S-7	24/16	28-30	6-5-8-18	13	Organic soil (OL); wet, stiff, 100% organic clay/silt. Advance HW drill casing to 33 ft.	OL	
30	Spin								
31	Spin								
32	Spin								
33	Spin								
34	Spin	S-8	24/6	33-35	30-15-15-18	30	Poorly graded sand (SP); wet, medium dense, 50% fine sand, 10% medium sand, 5% sand, 30% fine gravel, 5% silt, gray. Advance HW drill casing to 38 ft.	SP	
35	Spin								
36	Spin								
37	Spin								
38	Spin								
39	Spin	S-9	24/12	36-40	8-12-13-17	25	Silty sand (SM); wet, medium dense, 85% fine sand, 15% silt, gray. Advance HW drill casing to 43 ft.	SM	
40	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-23

SHEET 3 of 4

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited  
Driller R. Pryce  
Logged By R. Chase

Boring Location northing 2696825.4 easting 814041.8  
Ground Surface El. 9.82 Datum NGVD  
Date Start 9/2/99 Date End 9/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT Bl-Value			
41	Spin								
42	Spin								
43	Spin								
44	Spin	S-10	24/15	43-45	23-14-14-19	28	Silty sand (SM); wet, medium dense, 85% fine sand, 15% silt, gray. Advance HW drill casing to 48 ft.	SM	
45	Spin								
46	Spin								
47	Spin								
48	Spin								
49	Spin	S-11	2/0	48-	50/2"	>50	No recovery. Advance HW drill casing to 53 ft. Advance 3-7/8 in. roller bit to 58 ft.		
50	Spin								
51	Spin								
52	Spin								
53	Spin						Probable nested boulders from 52.5 to 55.8 ft.	Probable Nested Boulders	
54	Spin								
56	Spin								
57	Spin	S-12	20/10	56-	16-48-60-50/2"	108	Poorly graded sand (SP); wet, very dense, 75% fine sand, 10% medium sand, <5% coarse sand, 5% fine gravel, <5% silt. Advance HW drill casing to 57.9 ft.	SP	
58	Spin						Top of bedrock at 57.9 ft. Advance 3-7/8 in. roller bit to 60 ft. (boring log continued on next page)		
59								BEDROCK	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-23  
SHEET 4 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696825.4 easting 814041.8  
Driller R. Pryce Ground Surface El. 9.82 Datum NGVD  
Logged By R. Chase Date Start 9/2/99 Date End 9/7/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing Type & No.	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT (N-Value)			
60						Begin NX rock core at 60 ft.		
61	R1	60-61		9.5 mins.		R1: 60 to 65 ft. Fresh, medium hard, gray, aphanitic GNEISS with low angle, very closely spaced, rough, planar, fresh, open joints.	BEDROCK	
62		61-62		7.5 mins.		REC = 100%; ROD = 65%		
63		62-63		8.5 mins.		Approximately 80% of rock core breaks are mechanical.		
64		63-64		8.5 mins.				
65		64-65		8.5 mins.				
66	R2	65-66		7 mins.		R2: 65 to 70 ft. Similar to R1.		
67		66-67		7.5 mins.		REC = 100%; ROD = 91%		
68		67-68		7 mins.				
69		68-69		6 mins.				
70		69-70		8.5 mins.				
71						Bottom of exploration at 70 ft.; boring terminated in bedrock.		
72								
73								
74								
75								
76								
77								
78								
79								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number
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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-24  
SHEET 1 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697050.8 easting 814049.7  
Driller A. Carter Mudline El. -2.3 Datum NGVD  
Logged By E. Thibodeau Date Start 9/14/99 Date End 9/14/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. roller bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	5	S-1	24/3	3-5	6-1-2/12"	0	Poorly graded sand with silt (SP-SM); very loose, 50% medium sand, 30% fine sand, 10% coarse sand, 10% silt, strong petroleum based odor, black. (Probable sediments) Advance HW drill casing to 5 ft.	SP-SM:	
5	2						Advance 3-7/8 in. roller bit from 3 to 5 ft.		
6	4	S-2	24/0	5-7	WOH/24"	0	Distinct sheen noted in drilling water return. S-2: No recovery. Advance HW drill casing to 7 ft.		
7	3						Advance 3-7/8 in. roller bit from 5 to 7 ft.		
8	5	S-3	24/12	7-9	WOR/24"	0	Organic soil with sand (OH); very soft, 80% organic clay/silt, 15% fine sand, 5% shells, strong organic odor, dark gray. Advance HW drill casing to 11 ft.	OH	
9	3						Advance 3-7/8 in. roller bit from 7 to 11 ft.		
10	3								
11	4								
12	7	S-4	24/16	11-13	WOH/12"- WOH/12"	0	Organic soil with sand (OH); very soft, 80% organic clay/silt, 15% fine sand, 5% medium sand, <5% shells, strong organic odor, dark gray. Advance HW drill casing to 15 ft.	OH	
13	5						Advance 3-7/8 in. roller bit from 11 to 15 ft.		
14	4								
15	5								
16	9	S-5	24/6	15-17	WOH/12"	0	Organic soil with sand (OH); very soft, 75% organic clay/silt, 25% fine sand, <5% shell fragments, strong organic odor, dark gray. Advance HW drill casing to 20 ft.	OH	
17	7						Advance 3-7/8 in. roller bit from 15 to 20 ft.		
18	7								
19	8								
20	15								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation 12. R denotes core run number.
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REMARKS:  
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Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-24

SHEET 2 of 3

FILE NO. 48136.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location

Mudline El.

Date Start

northing 2697050.8 easting 814049.7

-2.3

9/14/99

Datum NGVD

Date End 9/14/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2489)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	22	S-6	24/18	20-22	4-6-10-11	16	S-6A: Silty sand (SM); medium dense, 50% fine sand, 30% medium sand, 20% silt, moderate organic odor, gray. (6 in.)	SM	
22	25						S-6B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 40% medium sand, 15% coarse sand, 15% fine sand, 20% gravel, 10% silt, slight organic odor, gray. (12 in.)	SP-SM	
23	25						Advance HW drill casing to 25 ft.		
24	26						Advance 3-7/8 in. roller bit from 20 to 25 ft.		
26	24								
26	30	S-7	24/14	25-27	21-16-7-8	23	Poorly graded sand with silt and gravel (SP-SM); medium dense, 25% medium sand, 20% coarse sand, 20% fine sand, 25% gravel, 10% silt, gray.	SP-SM	
27	35						Advance HW drill casing to 30 ft.		
28	41						Add bentonite to drilling fluid.		
29	45						Advance 3-7/8 in. roller bit from 25 to 30 ft.		
30	47								
31	30	S-8	24/6	30-32	28-9-5-3	14	Silty sand with gravel (SM); medium dense, 30% medium sand, 20% fine sand, 10% coarse sand, 20% gravel, 20% silt, gray.	SM	
32	24						Advance HW drill casing to 35 ft.		
33	25						Advance 3-7/8 in. roller bit from 30 to 35 ft.		
34	26								
36	44								
36	55	S-9	24/12	35-37	29-45-23-15	68	Silty sand with gravel (SM); very dense, 20% coarse sand, 10% medium sand, 10% fine sand, 40% gravel, 20% silt, gray.	SM	
37	72						Advance HW drill casing to 40 ft.		
38	97						Advance 3-7/8 in. roller bit from 35 to 40 ft.		
39	97								
40	156								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UG denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number

REMARKS:

- 1)
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- 3)
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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-24

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697050.8 easting 814049.7  
 Driller A. Carter Mudline El. -2.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/14/99 Date End 9/14/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Blows (R)	Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
41	Open Hole	S-10	5/4	40-	125/5"	—	Silty sand with gravel (SM); 25% fine sand, 15% coarse sand, 10% medium sand, 30% gravel, 20% silt, brown. (GLACIAL TILL)	SM (GLACIAL TILL)	
42	Open Hole						Advance 3-7/8 in. button bit from 40 to 42 ft. (open hole)		
43	Open Hole	S-11	8/6	42-	27-17/2" -	—	Silty sand with gravel (SM); 25% fine sand, 10% coarse sand, 10% medium sand, 35% gravel, 20% silt, brown. (GLACIAL TILL)	SM (GLACIAL TILL)	
44							Advance 3-7/8 in. button bit from 42 to 42.7 ft. (open hole)		
45							Top of bedrock at 42.7 ft.		
46							Advance 3-7/8 in. button bit from 42.7 to 44.7 ft. to confirm bedrock.	BEDROCK	
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photolization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UD denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-25

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller R. Pryce  
Logged By R. Chase

Boring Location northing 2697209.8 easting 814043.7  
Ground Surface El. 7.19 Datum NGVD  
Date Start 8/26/99 Date End 8/30/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Spin	S-1	24/16	0-2	26-29-32-25	61	Poorly graded sand (SP); dry, very dense, 75% fine sand, 5% coarse sand, 5% medium sand, 5% fine gravel, 5% silt, 5% asphalt, gray. (FILL) Advance HW drill casing to 3 ft.	SP (FILL)	
2	Spin								
3	Spin								
4	Spin	S-2	24/10	3-5	22-18-15-15	33	Similar to S-1, except dense, and wet. Advance HW drill casing to 8 ft.	SP (FILL)	
5	Spin								
6	Spin								
7	Spin								
8	Spin								
9	Spin	S-3	21/8	8-9.8	49-38-20-50/3"	58	Poorly graded sand with gravel (SP); wet, very dense, 50% fine sand, 10% medium sand, 6% coarse sand, 30% fine gravel, 5% silt, gray. (FILL) Advance HW drill casing to 13 ft.	SP (FILL)	
10	Spin								
11	Spin								
12	Spin								
13	Spin								
14	Spin	S-4	24/8	13-15	44-17-8-4	25	Silty sand (SM); wet, medium dense, 80% fine sand, 5% coarse sand, 5% medium sand, 30% silt, gray. Advance HW drill casing to 18 ft.	SM	
15	Spin								
16	Spin								
17	Spin								
18	Spin								
19	Spin	S-5	24/12	18-20	5-6-6-6	12	Organic soil (OL); wet, stiff, 100% organic silt, gray. Advance HW drill casing to 23 ft.	OL	
20	Spin								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
1)  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-25

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697209.8 easting 814043.7  
 Driller R. Pryce Ground Surface El. 7.19 Datum NGVD  
 Logged By R. Chase Date Start 8/26/99 Date End 8/30/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH	Casing Diameter (in)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2485)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin								
22	Spin								
23	Spin						Inferred strata change at 23 ft.		
24	Spin	S-6	24/17	23-25	9-5-8-11	14	Silty sand (SM); wet, medium dense, 80% fine sand, 20% silt, gray. Advance HW drill casing to 28 ft.	SM	
25	Spin								
26	Spin								
27	Spin								
28	Spin								
29	Spin	S-7	24/6	28-30	22-20-15-15	35	Similar to S-6, except dense. Advance HW drill casing to 33 ft.	SM	
30	Spin								
31	Spin								
32	Spin								
33	Spin								
34	Spin	S-8	24/7	33-35	24-12-15-15	27	Poorly graded sand (SP); wet, medium dense, 70% fine sand, 15% medium sand, 5% coarse sand, <5% fine gravel, <5% silt, gray. Advance HW drill casing to 38 ft.	SP	
35	Spin								
36	Spin								
37	Spin								
38	Spin								
39	Spin	S-9	24/7	38-40	14-10-9-7	19	Well-graded sand (SW); wet, medium dense, 65% fine sand, 20% medium sand, 10% coarse sand, <5% silt, gray. Advance HW drill casing to 43 ft.	SW	
40	Spin								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number
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REMARKS:  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-25

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited      Boring Location northing 2697209.8      easting 814043.7  
 Driller R. Pryce      Ground Surface El. 7.19      Datum NGVD  
 Logged By R. Chase      Date Start 8/26/99      Date End 8/30/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer  
 free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (H-W) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)

Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	Spin								
42	Spin								
43	Spin								
44	Spin	S-10	24/2	43-45	14-14-20-13	34	Poorly graded gravel (GP); wet, dense, 95% fine gravel, <2% fine sand, <1% medium sand, <1% coarse sand, <1% silt, gray.	GP	
45	Spin						Advance 3-7/8 in. roller bit to 50 ft.		
46	Spin						Advance HW drill casing to 50 ft.		
47	Spin								
48	Spin						Probable boulder from 47.5 to 49.1 ft.	Probable Boulder	
49	Spin								
50	Spin								
51	Spin	S-11	3/3	50-50.3	50/3*	>50	Poorly graded sand (SP); wet, 90% fine sand, 5% medium sand, 5% silt, gray.	SP	
52	Spin						Advance HW casing to 53 ft.	Probable Boulder	
53	Spin						Probable cobble/boulder from 50.3 to 51.5 ft.		
54	Spin	S-12	24/6	53-55	11-6-5-5	11	Poorly graded sand (SP); wet, medium dense, 75% fine sand, <5% medium sand, <5% coarse sand, 10% fine gravel, <5% silt, gray.	SP	
55	Spin						Advance 3-7/8 in. roller bit to 55.5 ft.		
56	Spin						Advance HW casing to 56 ft.		
57	Spin						Advance 3-7/8 in. roller bit to 60.5 ft.	POSSIBLE BEDROCK	
58	Spin						Possible bedrock from 55.8 to 57.5 ft.		
59	Spin						Possible void from 57.5 to 58.5 ft.	Probable Void	
60	Spin						Top of apparent bedrock at 58.5 ft.		
60	Spin						Bottom of exploration at 60.5 ft; refusal.	BEDROCK	

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 15 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel sampler.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
 8. PPM denotes parts per million.  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RQD denotes Rock Quality Designation.  
 12. R denotes core run number.

REMARKS:  
 1)  
 2)  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-26

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697349.6 easting 814116.2  
 Driller R. Pryce Ground Surface El. 7.48 Datum NGVD  
 Logged By R. Chase Date Start 8/24/99 Date End 8/25/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
8/25	6:45 PM	3.4 ft.	4.08	Upon completion of drilling

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Spin	S-1	24/14	0-2	10-22-20-18	42	Poorly graded sand (SP); dry, dense, 85% fine sand, 5% medium sand, 5% fine gravel, 5% silt, gray. (FILL) Advance HW drill casing to 2.5 ft.	SP (FILL)	
2	Spin								
3	Spin	S-2	12/9	2.5-3.5	86-54	>54	Similar to S-1, except wet. Advance HW drill casing to 7.5 ft.	SP (FILL)	
4	Spin								
5	Spin								
6	Spin								
7	Spin								
8	Spin	S-3	24/12	7.5-9.5	15-14-36-15	50	Poorly graded sand (SP); wet, dense, 85% fine sand, 5% medium sand, 5% silt, <5% wood, dark gray. (FILL) Advance HW drill casing to 12.5 ft.	SP (FILL)	
9	Spin								
10	Spin								
11	Spin								
12	Spin								
13	Spin	S-4	18/4	12.5-14	18-12-50	62	Poorly graded gravel with sand (GP); wet, very dense, 50% fine gravel, 40% fine sand, 5% medium sand, 5% silt, gray. Advance HW drill casing to 17.5 ft.	GP	
14	Spin								
15	Spin								
16	Spin								
17	Spin								
18	Spin	S-5	24/3	17.5-19.5	14-13-11-10	24	Sandy silt (ML); wet, very stiff, 55% silt, 40% fine sand, <5% medium sand, gray. Advance HW drill casing to 22.5 ft.	ML	
19	Spin								
20	Spin								

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel sampler.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
 8. PPM denotes parts per million.  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RQD denotes Rock Quality Designation.  
 12. R denotes core run number.

REMARKS:  
 1) Grout the completed borehole from 0 to 50.5 ft.  
 2)  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-26

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Troitier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697349.6 easting 814116.2  
 Driller R. Pryce Ground Surface El. 7.48 Datum NGVD  
 Logged By R. Chase Date Start 8/24/99 Date End 8/25/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch I.D. (H/W) flush-joint casing, spin and wash.

**Groundwater Readings (from ground surface)**

Date	Time	Depth	Elev.	Stabilization Time
8/25	6:45 PM	3.4 ft	4.08	Upon completion of drilling

D E P T H	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin								
22	Spin								
23	Spin	S-6	24/10	22.5- 24.5	11-11-12-13	23	Poorly graded sand with silt (SP-SM); wet, medium dense, 85% fine sand, 5% fine gravel, 10% silt, gray. Advance HW drill casing to 27.5 ft.	SP-SM	
24	Spin								
25	Spin								
26	Spin								
27	Spin								
28	Spin	S-7	24/10	27.5- 29.5	9-14-17-21	31	Similar to S-6, except dense. Advance 3-7/8 in. roller bit to 32 ft. Advance HW drill casing to 32.5 ft.	SP-SM	
29	Spin								
30	Spin								
31	Spin								
32	Spin								
33	Spin	S-8	24/0	32.5- 34.5	12-19-27-39	46	No recovery. Advance 3-7/8 in. roller bit to 37 ft. Advance HW drill casing to 37.5 ft.		
34	Spin								
35	Spin								
36	Spin								
37	Spin								
38	Spin	S-9	24/6	37.5- 39.5	18-15-20-14	35	Poorly graded gravel with sand (GP); wet, dense, 75% fine gravel, 10% medium sand, 5% coarse sand, 5% fine sand, 5% silt, gray. Advance HW drill casing to 43 ft.	GP	
39	Spin								
40	Spin								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) Grout the completed borehole from 0 to 50.5 ft.
- 2)
- 3)
- 4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-26

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller R. Pryce  
Logged By R. Chase

Boring Location northing 2697349.6 easting 814116.2  
Ground Surface El. 7.48 Datum NGVD  
Date Start 8/24/99 Date End 8/25/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
8/25	6:45 PM	3.4 ft.	4.09	Upon completion of drilling

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	Spin								
42	Spin								
43	Spin								
44	Spin	5-10	24/6	43-45	17-15-18-16	33	Poorly graded gravel (GP); wet, dense, 85% fine gravel, <5% medium sand, <5% fine sand, <5% silt. Advance HW drill casing to 47.2 ft.	GP	
45	Spin								
46	Spin								
47	Spin						Casing refusal at 47.2 ft. Top of bedrock at 47.2 ft.		
48							Advance 3-7/8 in. roller bit to 50.5 ft. to confirm bedrock.	BEDROCK	
49									
50									
51							Bottom of exploration at 50.5 ft.; boring terminated in probable bedrock.		
52									
53									
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Grout the completed borehole from 0 to 50.5 ft.  
2)  
3)  
4)



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Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-27

SHEET 1 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697480.4 easting 814091.9  
 Driller R. Pryce Ground Surface El. 7.47 Datum NGVD  
 Logged By R. Chase Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: CME 75 truck mount  
 Drilling Method: 4-inch (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Spin	S-1	24/17	0-2	5-10-12-6	22	Poorly graded sand with gravel (SP); dry, medium dense, 50% fine sand, 10% coarse sand, 5% medium sand, 30% fine gravel, 5% silt, brown. (FILL) Advance HW drill casing to 3 ft.	SP (FILL)	
2	Spin								
3	Spin								
4	Spin	S-2	24/12	3-5	10-13-11-10	24	Poorly graded sand with gravel (SP); wet, medium dense, 20% coarse sand, 20% medium sand, 20% fine sand, 35% fine gravel, 5% silt, brown. (FILL) Advance HW drill casing to 8 ft.	SP (FILL)	
5	Spin								
6	Spin								
7	Spin								
8	Spin								
9	Spin	S-3	24/8	8-10	7-6-7-45	13	Silty sand (SM); wet, medium dense, 10% medium sand, 50% fine sand, 10% gravel, 30% silt, brown. (FILL) Advance HW drill casing to 13 ft.	SM (FILL)	
10	Spin								
11	Spin								
12	Spin								
13	Spin								
14	Spin	S-4	24/20	13-15	WOH/24"	0	Sandy organic soil (OH); moist to wet, very soft, 65% organic clay/silt, 30% fine sand, 5% shell fragments, slight organic odor, dark gray.	OH	
15	Spin								
16	Spin	S-5	24/24	15-17	WOH/12"-1-1	1	Sandy organic soil (OH); moist, very soft, 60% organic clay/silt, 35% fine sand, 5% shell fragments, dark gray. Advance HW drill casing to 17 ft.	OH	
17	Spin								
18	Spin	S-6	24/20	17-19	1-2-4-6	6	Silty sand (SM); wet, loose, 80% fine sand, 20% silt, gray to brown.	SM	
19	Spin								
20	Spin	S-7	24/21	19-21	4-6-8-10	14	Poorly graded sand (SP); wet, medium dense, 20% medium sand, 75% fine sand, 5% silt, brown.	SP	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler 5. REC denotes recovered length of sample 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number
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REMARKS:  
1)  
2)  
3)  
4)



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-27

SHEET 2 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller R. Pryce  
Logged By R. Chase

Boring Location northing 2697480.4 easting 814091.9  
Ground Surface El. 7.47 Datum NGVD  
Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: CME 75 truck mount

Drilling Method: 4-inch (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)

Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT No. Value			
21	Spin						Advance HW drill casing to 23 ft.		
22	Spin								
23	Spin								
24	Spin	S-8	24/12	23-25	3-3-5-5	8	Silty sand (SM); wet, loose, 85% fine sand, 15% silt, brown.	SM	
25	Spin								
26	Spin	S-9	24/24	25-27	9-8-10-10	18	Poorly graded sand with silt (SP-SM); wet, medium dense, 10% coarse sand, 10% medium sand, 60% fine sand, 10% gravel, 10% silt, brown.	SP-SM	
27	Spin						Advance HW drill casing to 26 ft.		
28	Spin								
29	Spin	S-10	24/10	28-30	1-5-5-6	10	Poorly graded sand (SP); loose, 80% fine sand, 10% medium sand, 5% coarse sand, 5% silt, brown.	SP	
30	Spin						Advance HW drill casing to 33 ft.		
31	Spin								
32	Spin								
33	Spin								
34	Spin	S-11	22/7	33-34.8	7-9-9-50/4*	18	Poorly graded sand (SP); wet, medium dense, 35% coarse sand, 35% medium sand, 15% fine sand, 10% gravel, 5% silt, brown.	SP	
35	Spin						Advance HW drill casing to 36 ft.		
36	Spin						Begin NX rock core at 36 ft. Not bedrock; probable boulder from 35 to 36.5 ft. Advance HW drill casing to 38 ft.	Probable Boulder	
37	Spin								
38	Spin								
39	Spin	S-12	24/7	38-40	16-6-4-5	10	Well-graded sand with gravel (SW); loose, 35% medium sand, 25% coarse sand, 15% fine sand, 20% gravel, 5% silt, gray.	SW	
40	Spin						Advance HW drill casing to 43 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1)
- 2)
- 3)
- 4)



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-27  
SHEET 3 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697480.4 easting 814091.9  
Driller R. Pryce Ground Surface El. 7.47 Datum NGVD  
Logged By R. Chase Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	Spin								
42	Spin								
43	Spin								
44	Spin	S-13	24/1	43-45	5-5-5-4	10	Poorly graded gravel (GP); loose, 100% fine gravel, gray. Advance HW drill casing to 47 ft. Advance 3-7/8 in. roller bit to 48 ft.	GP	
45	Spin								
46	Spin								
47	Spin								
48	Spin						Probable boulder from 47 to 48 ft.	Probable Boulder	
49	Spin	S-14	24/10	48-50	10-8-8-9	16	Poorly graded sand (SP); wet, medium dense, 80% fine sand, 5% medium sand, 10% fine gravel, 5% silt, gray. Advance 3-7/8 in. roller bit to 53 ft. Advance HW drill casing to 53 ft.	SP	
50	Spin								
51	Spin								
52	Spin								
53	Spin								
54	Spin	S-15	24/17	53-55	12-11-10-8	21	Poorly graded sand (SP); wet, medium dense, 85% fine sand, 5% medium sand, 5% fine gravel, 5% silt, gray. Advance HW drill casing to 58 ft.	SP	
55	Spin								
56	Spin								
57	Spin								
58	Spin								
59		S-16	14/4	58-59.2	23-30-50/2"	>50	Poorly graded sand with gravel (SP); wet, very dense, 75% fine sand, 5% medium sand, 15% fine gravel, 5% silt, gray. Top of bedrock at 59.2 ft. (boring log continued on next page)	SP	
								BEDROCK	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. UJ denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
1)  
2)  
3)  
4)



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-27  
SHEET 4 of 4  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697480.4 easting 814091.9  
Driller R. Pryce Ground Surface El. 7.47 Datum NGVD  
Logged By R. Chase Date Start 8/19/99 Date End 8/23/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: CME 75 truck mount  
Drilling Method: 4-inch (HW) flush-joint casing; spin and wash.

Groundwater Readings (from ground surface)				
Date	Time	Depth	Elev.	Stabilization Time
No water levels recorded				

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT (N-VALUE)			
60							Begin NX rock core at 60 ft.	BEDROCK	
61		R1	60-61		5 mins.		R1: 60 to 65 ft.		
62			61-62		5.5 mins.		Fresh, medium hard, gray, aphanitic GNEISS with low angle, very closely spaced, rough, planar, fresh, open, joints.		
63			62-63		6 mins.		REC = 100%; RQD = 70%		
64			63-64		6 mins.		90% of rock core breaks are mechanical.		
65			64-65		6.75 mins.				
66		R2	65-66		7.75 mins.		R2: 65 to 70 ft.		
67			66-67		6.5 mins.		Similar to R1.		
68			67-68		6.5 mins.		REC = 100%; RQD = 90%		
69			68-69		6.75 mins.				
70			69-70		7.5 mins.				
71							Bottom of exploration at 70 ft.; boring terminated in bedrock.		
72									
73									
74									
75									
76									
77									
78									
79									

- |  |  |  |   |
|--|--|--|---|
| 80 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UD denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photobronzation Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation<br>12. R denotes core run number. |
|--|--|--|---|

REMARKS  
1)  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit C1.

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-28

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2697357.3 easting 814553.5  
Mudline El. -13.9 Datum NGVD  
Date Start 8/5/99 Date End 8/6/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush-joint inner casing.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Boring

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	Type	SAMPLE INFORMATION			SPT N-Value	SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
			PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES				
1	Hyd. Push						Advance PW outer drill casing to 3 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	UO-1	24/24	3-5			Sandy organic soil (OH); 40% organic clay, 20% organic silt, 30% fine sand, 10% shells and shell fragments, dark gray.	OH	
5	Hyd. Push						Advance PW outer drill casing to 6 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 3 to 6 ft.		
6	Hyd. Push								
7	Hyd. Push	UO-2	24/24	6-8			Similar to UO-1. Advance PW outer drill casing to 9 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 6 to 9 ft.	OH	
8	Hyd. Push								
9	Hyd. Push								
10	Hyd. Push	UO-3	24/17	9-11			Top: Sandy organic soil (OH); 35% organic silt, 15% organic clay, 40% fine sand, 10% shells and shell fragments, dark gray. (disturbed) Bottom: Organic soil with sand (OH); 50% organic clay, 30% organic silt, 15% fine sand, 5% shells and shell fragments, dark gray.	OH	
11	Hyd. Push						Advance PW outer drill casing to 12 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 9 to 12 ft.		
12	Hyd. Push								
13	Hyd. Push	UO-4	24/6	12-14			Organic soil with sand (OH); 45% organic clay, 35% organic silt, 20% fine sand, strong organic odor, dark gray. (jarred sample) Advance PW outer drill casing to 15 ft. (hydraulic push) Very difficult push to 15 ft. Advance 4-7/8 in. roller bit from 12 to 15 ft.		1
14	Hyd. Push								
15	Hyd. Push								
16	37	S-1	24/24	15-17	13-6-9-11	15	S-1A: Poorly graded sand with silt (SP-SM); medium dense, 40% fine sand, 25% medium sand, 15% coarse sand, 10% gravel, 10% silt, moderate organic odor, gray. (6 in.) S-1B: Poorly graded sand (SP); medium dense, 70% fine sand, 25% medium sand, 5% silt, slight organic odor, gray. (18 in.)	SP-SM SP	
17	35						Telescope HW inner drill casing to 20 ft. Advance 3-7/8 in. button bit from 15 to 20 ft.		
18	20								
19	11								
20	18								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
1) Due to low recovery, sample was removed from Shelby Tube and placed into a sample jar.  
2)  
3)  
4)





Noihs Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-28  
SHEET 2 of 3  
FILE NO. 48138.07  
CHKD BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2897357.3 easting 814553.5  
Driller A. Carter Mudline El. -13.9 Datum NGVD  
Logged By E. Thibodeau Date Start 8/5/99 Date End 8/6/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush-joint inner casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

**Groundwater Readings Not Applicable for Offshore Boring**

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
21	22	S-2	24/12	20-22	13-5-4-7	9	Silty sand (SM); loose, 65% fine sand, 10% medium sand, 25% silt, mild organic odor, gray. Advance HW inner drill casing to 25 ft. Advance 3-7/8 in. button bit from 20 to 25 ft.	SM	
22	27								
23	18								
24	23								
25	32								
26	20	S-3	24/20	25-27	9-3-1-1	4	Sandy silt (ML); soft, 40% silt, 30% clay, 30% fine sand, brown to gray. Advance HW inner drill casing to 30 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 25 to 30 ft.	ML	
27	15								
28	13								
29	31								
30	32								
31	33	S-4	24/12	30-32	20-10-11-9	21	Poorly graded sand (SP); medium dense, 45% medium sand, 30% fine sand, 10% coarse sand, 10% gravel, 5% silt, brown. Advance HW inner drill casing to 35 ft. Advance 3-7/8 in. button bit from 30 to 35 ft.	SP	
32	55								
33	60								
34	58								
35	61								
36	32	S-5	24/8	35-37	20-11-10-5	21	Well-graded sand with gravel (SW); medium dense, 35% medium sand, 25% fine sand, 20% coarse sand, 15% gravel, 5% silt, brown. Advance HW inner drill casing to 40 ft. Advance 3-7/8 in. button bit from 35 to 40 ft.	SW	
37	39								
38	40								
39	43								
40	59								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation 12. R denotes core run number
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REMARKS:  
1) Due to low recovery, sample was removed from Shelby Tube and placed into a sample jar.  
2)  
3)  
4)



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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-28

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited  
Driller A. Carter  
Logged By E. Thibodeau

Boring Location northing 2697357.3 easting 814553.5  
Mudline El. -13.9 Datum NGVD  
Date Start 8/5/99 Date End 8/6/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush joint outer casing and 4-inch I.D. (HW) flush-joint inner casing.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Boring				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS	
		Blows (ft)	Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES				SPT N-Value
41	52		S-6	24/10	40-42	18-8-7-8	15	Well-graded sand with gravel (SW); medium dense, 35% medium sand, 25% fine sand, 20% coarse sand, 15% gravel, 5% silt, brown.	SW	
42	56							Advance HW inner drill casing to 45 ft.		
43	60							Advance 3-7/8 in. button bit from 40 to 45 ft.		
44	52									
45	44									
46	30		S-7	24/6	45-47	11-6-10-14	16	Poorly graded sand with gravel (SP); medium dense, 40% coarse sand, 20% medium sand, 20% fine sand, 15% gravel, 5% silt, brown.	SP	
47	62							Advance HW inner drill casing to 48.9 ft.		
48	84							Advance 3-7/8 in button bit from 45 to 48.9 ft.		
49	11"	150'	S-8	1/0	48.9-49.0	50/1"	---	Trace amount of drill cuttings recovered.		
50								Top of bedrock at 48.9 feet.		
51			R1	50.9-51.9		5 mins.		Advance 3-7/8 in. button bit from 48.9 to 50.9 ft.	BEDROCK	
52				51.9-52.9		2.5 mins.		Begin NX rock core at 50.9 ft.		
53				52.9-53.9		5 mins.		R1: 50.9 to 55.9 ft.		
54				53.9-54.9		6 mins.		Fresh, moderately hard, light gray, aphanitic GNEISS with horizontal to moderately dipping, very close to closely spaced, rough, planar, slightly discolored, open joints.		
55				54.9-55.9		6 mins.		REC = 78%; ROD = 53% (fair)		
56								Core barrel dropped from 51.9 to 52.2 ft. Probable void or cavity.		
57								Loss of drilling fluid noted at 52.9 ft.		
58										
59										
60										
								Bottom of exploration at 55.9 ft.; boring terminated in bedrock.		

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. ROD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:  
1) Due to low recovery, sample was removed from Shelby Tube and placed into a sample jar.  
2)  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-29

SHEET 1 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697062.2 easting 814575.0  
 Driller A. Carter Mudline El. -14.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/31/99 Date End 9/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Perform continuous field vane shear testing from 1 to 6.8 ft. (no samples taken)		
2	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push)		
3	Hyd. Push						Advance 3-7/8 in. button bit from 0 to 7 ft.		
4	Hyd. Push								
5	Hyd. Push								
6	Hyd. Push								
7	Hyd. Push								
8	Hyd. Push	S-1	24/18	7-9	WOR/24"	0	Organic soil with sand (OH); very soft, 50% organic clay, 30% organic silt, 20% fine sand, strong organic odor, dark gray.	OH	
9	Hyd. Push						Advance HW drill casing to 10 ft. (hydraulic push)		
10	Hyd. Push						Advance 3-7/8 in. button bit from 7 to 10 ft.		
11	Hyd. Push	S-2	24/6	10-12	WOR/18"-2	0	Silty sand (SM); very loose, 40% fine sand, 35% medium sand, 20% silt, 5% shell fragments, strong organic odor, gray.		
12	Hyd. Push						Advance HW drill casing to 13 ft. (hydraulic push)		
13	Hyd. Push						Advance 3-7/8 in. button bit from 10 to 13 ft.	SM	
14	10	S-3	24/18	13-15	2-3-4-6	7	Poorly graded sand (SP); loose, 60% medium sand, 30% fine sand, 5% coarse sand, 5% silt, gray.		
15	14						Advance HW drill casing to 15 ft. Add bentonite to drilling fluid.		
16	10	S-4	24/13	15-17	4-7-7-7	14	Advance 3-7/8 in. button bit from 13 to 15 ft.	SP	
17	17						S-4A: Poorly graded sand (SP); medium dense, 60% medium sand, 20% fine sand, 10% coarse sand, 5% gravel, 5% silt, gray. (10 in.) S-4B: Silty sand (SM); medium dense; 40% fine sand, 30% medium sand, 25% silt, 5% clay, gray. (3 in.)	SM	
18	20						Advance HW drill casing to 20 ft.		
19	27						Advance 3-7/8 in. button bit from 15 to 20 ft.		
20	31								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation 12. R denotes core run number.
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REMARKS:  
1)  
2)  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-29

SHEET 2 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697062.2 easting 814575.0  
 Driller A. Carter Mudline El. -14.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/31/99 Date End 9/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEWREC (Inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
21	19	S-5	24/12	20-22	5-3-4-7	7	S-SA: Poorly graded sand (SP); loose, 60% medium sand, 35% fine sand, 5% silt, gray. (10 in.)	SP	
22	15						S-SB: Silty sand (SM); loose, 50% fine sand, 25% medium sand, 25% silt, gray. (2 in.) Advance HW drill casing to 25 ft. Advance 3-7/8 in. button bit from 20 to 25 ft.	SM	
23	18								
24	17								
25	31								
26	15	S-6	24/16	25-27	3-5-4-6	9	Poorly graded sand (SP); loose, 50% medium sand, 30% fine sand, 10% coarse sand, 5% gravel, 5% silt, gray to brown. Advance HW drill casing to 30 ft. Advance 3-7/8 in. button bit from 25 to 30 ft.	SP	
27	17								
28	24								
29	29								
30	33								
31	33	S-7	24/4	30-32	3-5-2/12"	6	Poorly graded sand (SP); loose, 35% medium sand, 35% fine sand, 15% coarse sand, 10% gravel, 5% silt, brown. Advance HW drill casing to 32 ft. Advance 3-7/8 in. button bit from 30 to 32 ft.	SP	
32	44								
33	21	S-8	24/14	32-34	WOR/12"	6	S-8A: Silty sand (SM); loose, 60% fine sand, 10% medium sand, 30% silt, brown to gray. (2 in.) S-8B: Poorly graded sand (SP); loose, 70% medium sand, 25% fine sand, 5% silt, gray. (12 in.) Advance HW drill casing to 35 ft. Advance 3-7/8 in. button bit from 32 to 35 ft.	SM	
34	26								
35	28								
36	44	S-9	24/4	35-37	8-8-8-11	16	Poorly graded sand with gravel (SP); medium dense, 35% medium sand, 20% fine sand, 15% coarse sand, 25% gravel, 5% silt, brown. Advance HW drill casing to 40 ft. Advance 3-7/8 in. button bit from 35 to 40 ft.	SP	
37	53								
38	54								
39	51								
40	57								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1)
- 2)
- 3)
- 4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-29

SHEET 3 of 4

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697062.2 easting 814575.0  
 Driller A. Carter Mudline El. -14.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/31/99 Date End 9/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive. All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (feet)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	49	S-10	24/8	40-42	4-2-2-11	4	Poorly graded sand with gravel (SP); very loose, 30% medium sand, 20% coarse sand, 15% fine sand, 30% gravel, 5% silt, brown.	SP	
42	44						Advance HW drill casing to 45 ft.		
43	76						Advance 3-7/8 in. button bit from 40 to 45 ft.		
44	58								
45	65								
46	89	S-11	24/4	45-47	7-5-7-7	12	Silty sand with gravel (SM); dense, 20% medium sand, 20% fine sand, 15% coarse sand, 30% gravel, 15% silt, brown.	SM	
47	72						Advance HW drill casing to 50 ft.		
48	67						Advance 3-7/8 in. button bit from 45 to 50 ft.		
49	98						Loss of drilling fluid return at 50 ft.		
50	99						Add more bentonite to drilling fluid.		
51	120	S-12	18/6	50-51.5	9-20-21-50/0"	41	Silty sand with gravel (SM); dense, 20% medium sand, 20% fine sand, 10% coarse sand, 30% gravel, 20% silt, brown.	SM	
	137/						Advance HW drill casing to 51.5 ft.		
52	6"	R1		51.5-52.5	5 mins.		Advance 3-7/8 in. button bit from 50 to 51.5 ft.		
53				52.5-53.5	6 mins.		Top of bedrock at 51.5 ft.	BEDROCK	
54				53.5-54.5	6 mins.		Telescope and advance NW inner drill casing to 52 ft for coring. (spin) Begin NX rock core at 51.5 ft.		
55				54.5-55.5	4.5 mins.		Mixture of bentonite and polymer drilling muds used for coring.		
56				55.5-56.5	5 mins.		R1: 51.5 to 61.5 ft.		
57				58.5-57.5	5 mins.		Fresh, moderately hard, gray, fine grained GNEISS. Near horizontal foliation; 10 degrees. Primary joint set: horizontal, sand filled, moderate to widely spaced, rough, planar, fresh, and light.		
58				57.5-58.5	5 mins.		REC = 85%; RQD = 75% (good)		
59				58.5-59.5	5 mins.		Fractured zone noted from 53.7 to 54.5 ft.		
60				59.5-60.5	4 mins.				

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test           | 12. R denotes core run number.            |

REMARKS:  
1)  
2)  
3)  
4)



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 P.O. Box 2890  
 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-29

SHEET 4 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697062.2 easting 814575.0  
 Driller A. Carter Mudline El. -14.2 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/31/99 Date End 9/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2468)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
61		R1	60.5-61.5	4.5 mins.		BEDROCK		
62		cont.						
63					Bottom of exploration at 61.5 ft.; boring terminated in bedrock.			
64					Note: Pumped approximately 74 gallons of grout to grout completed borehole to top of HW drill casing.			
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1)  
 2)  
 3)  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 30

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696533.2 easting 814545.8  
Driller A. Carter Mudline El. -19.4 Datum NGVD  
Logged By E. Thibodeau Date Start 8/26/99 Date End 8/30/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing and 3-inch I.D. (NW) flush-joint drill casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	Hyd. Push	UO-1	24/21	1-3			Sandy organic clay (OH); 56% organic clay/silt, 38% fine sand, 6% medium sand, strong organic odor, dark gray.	OH	1
3	Hyd. Push						Advance HW drill casing to 4 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 4 ft.		
4	Hyd. Push								
5	Hyd. Push	UO-2	24/24	4-6			Clayey sand (SC); 40% fine sand, 17% medium sand, 2% coarse sand, 1% gravel, 40% organic clay, moderate organic odor, gray to dark gray.	SC	1
6	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 4 to 7 ft.		
7	Hyd. Push								
8	Hyd. Push	UO-3	24/24	7-9			Top: Silty sand (SM); 40% fine sand, 25% medium sand, 35% organic clay, moderate organic odor, gray. Bottom: Sandy organic soil (OH); 40% organic clay, 20% organic silt, 40% fine sand, strong organic odor, dark gray.	SM	
9	Hyd. Push						Advance HW drill casing to 10 ft. (hydraulic push) Very difficult push at 9.5 ft.	OH	
10	Hyd. Push						Advances 3-7/8 in. button bit from 7 to 10 ft.		
11	10	UO-4	24/0	10-12			UO-4: No recovery; probable sands. Advance HW drill casing to 12 ft.		
12	17						Advance 3-7/8 in. button bit from 10 to 12 ft.		
13	15	S-1	24/15	12-14	7-5-8-10	13	Poorly graded sand with silt (SP-SM); medium dense, 60% medium sand, 30% fine sand, 10% silt, brown. Approximate 1 in. and 1/2 in. silt/clay lenses noted in sample. Advance HW drill casing to 15 ft.	SP-SM	
14	18						Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 12 to 15 ft.		
15	15								
16	0	S-2	24/16	15-17	3-5-6-7	11	S-2A: Clayey sand (SC); medium dense, 50% fine sand, 25% medium sand, 25% clay, brown. (6 in.) S-2B: Poorly graded sand with silt (SP-SM); medium dense, 60% fine sand, 30% medium sand, 10% silt, brown. (10 in.)	SC	
17	0						HW drill casing advanced from 15 to 17 ft. under self-weight.	SP-SM	
18	17						Advance HW drill casing to 20 ft.		
19	19						Advance 3-7/8 in. button bit from 15 to 20 ft.		
20	15								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2) Strata break changed from 9.5 ft (shown on the field log) to 4 ft. based on the laboratory test data.  
3)  
4)



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PO Box 2498  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-30

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696533.2 easting 814545.8  
 Driller A. Cater Mudline El. -19.4 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/26/99 Date End 8/30/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount.  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing and 3-inch I.D. (NW) flush-joint drill casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS	
	CASING Blows (ft)	Type & Sig.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES				SPT N-value
21	22	S-3	24/10	20-22	4-5-6-6	11	Poorly graded sand with gravel (SP); medium dense, 45% medium sand, 20% fine sand, 10% coarse sand, 20% gravel, 5% silt, brown. Advance HW drill casing to 25 ft. Advance 3-7/8 in. button bit from 20 to 25 ft.	SP	
22	25								
23	31								
24	28								
25	38								
26	45	S-4	24/8	25-27	9-11-8-12	19	Silty gravel (SM); medium dense, 47% gravel, 16% medium sand, 15% fine sand, 10% coarse sand, 13% silt, brown. (GLACIAL TILL) Advance HW drill casing to 27.4 ft. Advance 3-7/8 in. button bit from 25 to 27.4 ft.	SM (GLACIAL TILL)	
27	61								
28	65/	S-5	0/0	27.4-	50/0*	—	No recovery. Telescope and advance NW drill casing to 27.9 ft. for coring. (spin)	Probable Boulder	
29	Spin						Begin NX rock core at 27.4 ft. Core barrel popped out of probable cobble/boulder at 28.4 ft. Advance NW inner drill casing to 30 ft.		
30	Spin	S-6	24/3	30-32	11-7-6-6	13	Poorly graded sand with silt and gravel (SP-SM); medium dense, 20% medium sand, 15% coarse sand, 15% fine sand, 40% gravel, 10% silt, brown. (Glacial Till) Advance NW inner drill casing to 35 ft.	SP-SM (GLACIAL TILL)	
31	Spin								
32	Spin								
33	Spin								
34	Spin								
35	Spin								
36	Spin	S-7	24/4	35-37	20-19-21-13	40	Silty sand with gravel (SM); dense, 40% fine sand, 10% coarse sand, 10% medium sand, 20% gravel, 20% silt, brown. (Glacial Till) Traces of weathered bedrock noted in sample. Advance NW inner drill casing to 38.7 ft. Top of bedrock at 38.7 ft. (assumed) Advance NW inner drill casing to 39.2 ft. for coring. (spin) Begin NX rock core at 38.7 ft.	SM (GLACIAL TILL)	
37	Spin								
38	Spin								
39		R1	38.7-39.7		3 mins.		R1: 38.7 to 44.7 ft. 38.7 to 39.3 ft: Fresh, medium hard, gray, aphanitic GNEtSS with one low angle, rough, undulating, discolored, wide joint. Possible cobble/boulder.	Possible Cobble/Boulder	
40			39.7-40.7		4 mins.			BEDROCK	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler 2. U denotes 3-inch O.D. undisturbed sample 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation 12. R denotes core run number
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
 2) Strata break changed from 9.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
 3)  
 4)





Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-30

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696533.2 easting 814545.8  
 Driller A. Carter Mudline El. -19.4 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/26/99 Date End 8/30/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing and 3-inch I.D. (NW) flush-joint drill casing.  
 All casing driven with a 300 lb. center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	R1		40.7-41.7		3.5 mins.		39.3 to 40.1 ft: mixture of apparent fractured bedrock and gravel. 40.1 to 44.7 ft: Fresh, moderately hard, gray, aphanitic GNEISS. No joint pattern noted. REC = 75%; RQD = 49% (poor)	BEDROCK	
42	cont.		41.7-42.7		6 mins.		Core barrel advanced rapidly from 39.3 to 40.1 ft.		
43			42.7-43.7		3.5 mins.		43.1 to 43.7 ft: core barrel dropped. 43.8 to 44.7 ft: core barrel dropped.		
44			43.7-44.7		1 min.		Sound hole at completion of core run; core hole caved from 39.7 to 44.7 ft. Drive 2-in. split-barrel from 39.7 to 41.7 ft. S-8: Poorly graded sand with silt (SP-SM); 55% medium sand, 30% fine sand, 5% coarse sand, 10% silt, reddish brown.		
45	R2		44.7-45.7		1 min.		R2: 44.7 to 46.4 ft. Slightly discolored, very fractured bedrock. REC = 85%; RQD = 0% (very poor)		
46			45.7-46.4		6 mins.		Core barrel advanced rapidly from 44.7 to 46.4 ft. No water return observed during coring operations.		
47	R3		46.4-47.4		6.5 mins.		Core barrel jammed at 46.4 ft; core run terminated. R3: 46.4 to 51.0 ft.		
48			47.4-48.4		3.5 mins.		Fresh, medium hard, gray, aphanitic GNEISS with horizontal to low angle, very close to closely spaced, rough, planar, slightly discolored, wide joints.		
49			48.4-49.4		2 mins.		REC = 100%; RQD = 64% (fair) 49.4 to 49.6 ft: sand filled joint or void noted.		
50			49.4-50.4		4 mins.				
51			50.4-51.0		10 mins.		No water return observed during coring operations. Core barrel full at 51.0 ft.; core run terminated.		
52							Bottom of exploration at 51.0 ft.; boring terminated in bedrock.		
53									
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 26, 1999.  
 2) Strata break changed from 9.5 ft. (shown on the field log) to 4 ft. based on the laboratory test data.  
 3)  
 4)



Nobis Engineering  
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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 31

SHEET 3 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697298.2 easting 814345.8  
 Driller A. Carter Mudline El. -7.5 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/3/99 Date End 8/4/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 5-inch I.D. (PW) flush-joint casing and 4-inch I.D. (HW) flush-joint casing. All casing driven with a 300 lb. center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	44	S-6	24/10	40-42	17-8-8-5	16	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 25% fine sand, 15% coarse sand, 25% gravel, 5% silt, brown. Advance HW inner drill casing to 45 ft.	SP	
42	50						Advance 3-7/8 in. button bit from 40 to 45 ft.		
43	31								
44	35								
45	38								
46	48	S-7	24/0	45-47	15-13-7-5	20	No recovery. Piece of gravel lodged in tip of sampler. Advance HW inner drill casing to 47 ft. Advances 3-7/8 in. button bit from 45 to 47 ft.		
47	85								
48	52	S-8	24/1	47-49	18-15-16-19	31	Poorly graded gravel with silt and sand (GP-GM); dense, 65% gravel, 10% coarse sand, 10% medium sand, 5% fine sand, 10% silt, brown. Advance HW inner drill casing to 50 ft.	GP-GM	2
49	56						Advance 3-7/8 in. button bit from 47 to 50 ft.		3
50	92								
51	68	S-9	24/8	50-52	18-13-24-19	37	S-9A: Poorly graded sand with gravel (SP); dense, 25% coarse sand, 25% medium sand, 15% fine sand, 30% gravel, 5% silt, brown. (6 in.) S-9B: bedrock fragments. (2 in.) Advance HW inner drill casing to 52 ft.	SP	2
52	157						Top of bedrock at 52.0 ft.		
53	2'						Advance 3-7/8 in. button bit from 50 to 53.5 ft. Advance HW inner drill casing to 52.2 ft. Begin MX rock core at 53.5 ft.	BEDROCK	
54		R1	53.5-54.5		7 mins.		R1: 53.5 to 63.5 ft.		
55			54.5-55.5		3.5 mins.		Fresh, hard, light gray, aphanitic GNEISS with horizontal to low angle, close to moderately spaced, smooth, planar, slightly discolored, tight to open joints. REC = 90%, RQD = 60% (fair)		
56			55.5-56.5		3.5 mins.				
57			56.5-57.5		3.6 mins.				
58			57.5-58.5		7.5 mins.				
59			58.5-59.5		8 mins.				
60			59.5-60.5		5 mins.				

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1 S denotes split-barrel sampler. 2 U denotes 3-inch O.D. undisturbed sample. 3 UD denotes 3-inch Osterberg undisturbed sample. 4 PEN denotes penetration length of sampler. 5 REC denotes recovered length of sample. 6 SPT denotes Standard Penetration Test.	7 PID denotes Photoionization Detector 8 PPM denotes parts per million. 9 PP denotes Pocket Penetrometer. 10 FVST denotes field vane shear test 11 RQD denotes Rock Quality Designation. 12 R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
 2) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 30 inches.  
 3) Loss of drilling fluid noted during advancement of button bit.  
 4)



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 Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 31

SHEET 4 of 4

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697298.2 easting 814345.8  
 Driller A. Carter Mudline El. -7.5 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/3/99 Date End 8/4/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drift Rig: Acker AD2 truck mount  
 Drilling Method: 5-inch I.D. (PW) flush-joint casing and 4-inch I.D. (HW) flush-joint casing. All casing driven with a 300 lb. center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 5 INCHES			
61		R1	60.5-61.5		4.5 mins.	BEDROCK		
62		cont.	61.5-62.5		7 mins.			
63			62.5-63.5		7.5 mins.			
64					Bottom of exploration at 63.5 ft.; boring terminated in bedrock.			
65								
66								
67								
68								
69								
70								
71								
72								
73								
74								
75								
76								
77								
78								
79								
80								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTessing Express, dated October 28, 1999.  
 2) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 30 inches.  
 3) Loss of drilling fluid noted during advancement of button bit.  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-32  
SHEET 1 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696749.0 easting 814392.8  
Driller A. Carter Mudline El. -10.8 Datum NGVD  
Logged By E. Thibodeau Date Start 7/30/99 Date End 8/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush-joint casing and 4-inch I.D. (HW) flush-joint casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT BL/Value			
1	Hyd. Push						Advance PW outer drill casing to 6 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 0 to 6 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push								
5	Hyd. Push								
6	Hyd. Push								
7	Hyd. UO-1 Push	24/24	8-8				Sandy organic clay (OH); 69% organic clay, 25% fine sand, 5% medium sand, 1% coarse sand, slight organic odor, dark gray. Shells and shell fragments noted in sample.	OH	1
8	Hyd. Push						Advance PW outer drill casing to 10 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 6 to 10 ft.		
9	Hyd. Push								
10	Hyd. Push								
11	Hyd. UO-2 Push	24/24	10-12				Top: Poorly graded sand with silt (SP-SM); 85% fine sand, 5% medium sand, 10% silt, gray. Bottom: Similar to UO-1.	SP-SM	2
12	Hyd. Push						Advance PW outer drill casing to 16 ft. (hydraulic push) Advance 4-7/8 in. roller bit from 10 to 16 ft.	OH	
13	Hyd. Push								
14	Hyd. Push								
15	Hyd. Push								
16	Hyd. Push								
17	3	S-1	24-20	16-18	2-5-5-10	10	Poorly graded sand with silt (SP-SM); loose, 65% medium sand, 20% fine sand, 5% coarse sand, 10% silt, gray. Approximate 2 in. organic layer noted in sample. Shell fragments noted in top portion of sample.	SP-SM	
18	8						Telescope and advance HW inner drill casing to 20 ft. Advance 3-7/8 in. button bit from 16 to 20 ft.		
19	18						Organic material noted in wash cuttings.		
20	23								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation 12. R denotes core run number.
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**REMARKS:**  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2) Tide dropped substantially during sampling activities; therefore, actual sample interval may be slightly deeper than indicated here.  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-32

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696749.0 easting 814392.8  
 Driller A. Carter Mudline El. -10.8 Datum NGVD  
 Logged By E. Thibodeau Date Start 7/30/99 Date End 8/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 5-inch I.D. (PW) flush-joint casing and 4-inch I.D. (HW) flush-joint casing. All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	24	S-2	24/12	20-22	12-10-9-11	19	S-2A: Poorly graded sand with silt (SP-SM); medium dense, 40% medium sand, 30% fine sand, 10% coarse sand, 10% gravel, 10% silt, gray (6 in.)	SP-SM	
22	20						S-2B: Silt with sand (ML); 50% silt, 30% clay, 20% fine sand, brown. (6 in.)	ML	
23	19						Advance HW inner drill casing to 25 ft. Advance 3-7/8 in. button bit from 20 to 25 ft.		
24	17								
25	22								
26	34	S-3	24/18	25-27	11-10-11-11	21	Silt with sand (ML); very stiff, 70% silt, 10% clay, 20% fine sand, brown. Approximately 1 in. coarse to medium sand lensa noted in bottom portion of sample.	ML	
27	56						Advance HW inner drill casing to 30 ft. Advance 3-7/8 in. button bit from 25 to 30 ft.		
28	51								
29	48								
30	47								
31	38	S-4	24/6	30-32	6-16-8-6	24	Poorly graded sand with silt (SP-SM); medium dense, 45% medium sand, 25% fine sand, 15% coarse sand, 5% gravel, 10% silt, brown.	SP-SM	
32	40						Advance HW inner drill casing to 35 ft. Advance 3-7/8 in. button bit from 30 to 35 ft.		
33	55								
34	42								
35	59								
36	25	S-5	24/10	35-37	4-4-24-14	28	S-5A: Poorly graded sand (SP); medium dense, 50% fine sand, 45% medium sand, 5% silt, brown. (8 in.)	SP	
37	48						S-5B: Poorly graded sand (SP); medium dense, 40% coarse sand, 25% medium sand, 20% fine sand, 10% gravel, 5% silt, brown. (2 in.)		
38	73						Advance HW inner drill casing to 40 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 35 to 40 ft.		
39	66								
40	71								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UQ denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTetsing Express, dated October 28, 1999.  
 2) Tide dropped substantially during sampling activities; therefore, actual sample interval may be slightly deeper than indicated here.  
 3)  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-32  
SHEET 3 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696749.0 easting 814392.8  
Driller A. Carter Mudline EL. -10.8 Datum NGVD  
Logged By E. Thibodeau Date Start 7/30/99 Date End 8/2/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 5-inch I.D. (PW) flush-joint casing and 4-inch I.D. (HW) flush-joint casing;  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH F T H	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	RE M K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	117	S-6	24/12	40-42	62-29-29-31	58	Poorly graded sand with gravel (SP); very dense, 40% medium sand, 30% fine sand, 10% coarse sand, 15% gravel, 5% silt, brown.	SP	
42	128						Advance HW inner drill casing to 45 ft.		
43	127						Advance 3-7/8 in. button bit from 40 to 45 ft.		
44	127								
45	141								
46	111	S-7	21/4	45-46.7	45-25-15- 14/3"-25/0"	40	Poorly graded sand with silt (SP-SM); dense, 45% fine sand, 25% medium sand, 15% coarse sand, 5% gravel, 10% silt, brown.	SP-SM	
47	175/ 9"						Advance HW inner drill casing to 48.7 ft.; casing refusal. Advance 3-7/8 in. button bit from 45 to 46.7 ft.		
48							Top of bedrock at 46.7 ft. Advance 3-7/8 in. button bit from 46.7 to 48.2 ft.	BEDROCK	
49		R1	48.2-48.2		4 mins.		Begin NX rock core at 48.2 ft. R1: 48.2 to 50.5 ft.		
50			49.2-50.2		8 mins.		Fresh, hard, gray, aphanitic GNEISS with low angle, very close, rough, planar, discolored, open, joints. REC = 100%, RQD = 48% (poor) 49.2 ft. loss of water return observed.		
51			50.2-50.5		2 mins.		50.5 to 51.3 ft. core barrel dropped; probable void or cavity.		
52		R2	51.3-52.3		8 mins.		Terminate core run at 51.3 ft., attempt split-barrel sample. S-8: 51.3 to 51.3 ft. 25/0". No material recovered. R2: 51.3 to 56.6 ft.		
53			52.3-53.3		5 mins.		Fresh, hard, gray, aphanitic GNEISS with horizontal, moderately spaced, rough, planar, slightly discolored, partly open joints.		
54			53.3-54.3		6 mins.		REC = 100%; RQD = 90% (excellent) 51.5 to 51.8 ft. highly fractured zone.		
55			54.3-55.3		8 mins.				
56			55.3-56.3		4 mins.				
57			56.3-56.6		1 min.		Bottom of exploration at 56.6 ft.; boring terminated in bedrock.		
58									
59									
60									

- |                         |                       |  |  |
|-------------------------|-----------------------|--|--|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector  |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.        |
| 11 to 20 - Medium Dense | 5 to 8 - Medium Stiff | 3. UD denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.  |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test           | 12. R denotes core run number            |

REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 3, prepared by GeoTesting Express, dated October 28, 1999.  
2) Tide dropped substantially during sampling activities; therefore, actual sample interval may be slightly deeper than indicated here.  
3)  
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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-33  
SHEET 1 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696779.7 easting 814163.2  
Driller A. Carter Mudline El. -4.4 Datum NGVD  
Logged By E. Thibodeau Date Start 9/8/99 Date End 9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Type	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Penrec (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
0	Hyd.					Perform continuous field vane shear testing through organic clay; move barge approximately 7 ft. west and start boring.		
1	Push	S-1	24/8	1-3	WOR/24"	0	Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.	OH
2	Push						S-1: Organic soil (OH); very soft, 70% organic clay, 20% organic silt, 5% fine sand, 5% shell fragments, strong organic odor, slight sheen, dark gray to black.	
3	Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 3 ft.	
4	Push	S-2	24/8	3-5	WOR/12" -1-1	0	Organic soil with sand (OH); very soft, 70% organic clay, 10% organic silt, 15% fine sand, 5% shell fragments, strong organic odor, dark gray to black.	OH
5	Push						Advance HW drill casing to 5 ft. (hydraulic push)	
6	Push	S-3	24/12	5-7	WOR/12"	0	Advance 3-7/8 in. button bit from 3 to 5 ft.	
7	Push						Sandy organic soil (OH); very soft, 40% organic clay, 25% organic silt, 25% fine sand, 10% shells, strong organic odor, dark gray.	OH
8	Push	S-4	24/8	7-9	WOR/24"	0	Advance HW drill casing to 7 ft. (hydraulic push)	
9	Push						Advance 3-7/8 in. button bit from 5 to 7 ft.	
10	2	S-5	24/20	9-11	WOR/24"	0	Organic soil with sand (OH); very soft, 40% organic clay 35% organic silt, 20% fine sand, 5% shells, strong organic odor, dark gray.	OH
11	3						Advance HW drill casing to 9 ft.	
12	4	S-6	24/18	11-13	WOR/24"	0	Advance 3-7/8 in. button bit from 7 to 9 ft.	
13	4						Organic soil with sand (OH); very soft, 40% organic silt 35% organic clay, 20% fine sand, 5% medium sand, strong organic odor, dark gray.	OH
14	4	S-7	24/24	13-15	WOR/24"	0	Advance HW drill casing to 11 ft.	
15	4						Advance 3-7/8 in. button bit from 11 to 13 ft.	
16	6	S-8	24/10	15-17	WOR/18" 2	0	Sandy organic soil (OH); very soft, 40% organic silt, 30% organic clay, 10% medium sand, 10% fine sand, 5% coarse sand, 5% shells, strong organic odor, dark gray.	OH
17	9						Advance HW drill casing to 15 ft.	
18	22	S-8	24/16	17-19	4-5-6-8	11	Advance 3-7/8 in. button bit from 13 to 15 ft.	OH
19	26						S-8A: Organic soil with sand (OH); very soft, 40% organic clay, 40% organic silt, 20% fine sand, strong organic odor, dark gray. (8 in.)	OH
20	31						S-8B: Silty sand (SM); 40% medium sand, 30% fine sand, 30% silt, moderate organic odor, dark gray. (2 in.)	SM
							Advance HW drill casing to 17 ft. Advance 3-7/8 in. button bit from 15 to 17 ft.	SP-SM
							S-9: Poorly graded sand with silt (SP-SM); medium dense, 50% medium sand, 30% fine sand, 10% coarse sand, 10% silt, gray.	
							Advance HW drill casing to 20 ft.	
							Add bentonite to drilling fluid.	
							Advance 3-7/8 in. button bit from 17 to 20 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number
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REMARKS:  
1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.  
2) No water return noted during rock coring activities.  
3)  
4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-33

SHEET 2 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location

northing 2696779.7 easting 814163.2

Mudline El.

-4.4

Datum

NGVD

Date Start

9/8/99

Date End

9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HWH) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2489)	STRATUM DESCRIPTION	R E M A R K S
		Type & Size	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
21	11	S-10	24/18	20-22	8-8-10-10	18	Poorly graded sand with silt (SP-SM); medium dense, 40% medium sand, 25% fine sand, 15% coarse sand, 10% gravel, 10% silt, gray.	SP-SM	
22	14						Advance HW drill casing to 25 ft.		
23	17						Add more bentonite to drilling fluid.		
24	18						Advance 3-7/8 in. button bit from 20 to 25 ft.		
25	25								
26	15	S-11	24/10	25-27	8-5-6-7	11	Silty sand (SM), medium dense, 30% medium sand, 25% fine sand, 15% coarse sand, 10% gravel, 20% silt, gray.	SM	
27	22						Advance HW drill casing to 30 ft.		
28	22						Advance 3-7/8 in. button bit from 25 to 30 ft.		
29	28								
30	37								
31	25	S-12	24/0	30-32	7-7-8-10	13	No recovery.		
32	30						Advance HW drill casing to 35 ft.		
33	61						Advance 3-7/8 in. button bit from 30 to 35 ft.		
34	79								
35	82								
36	36	S-13	24/3	35-37	10-8-6-12	12	Well-graded sand with gravel (SW); medium dense, 26% medium sand, 25% fine sand, 20% coarse sand, 25% gravel, 5% silt, brown.	SW	
37	43						Advance HW drill casing to 37 ft.		
38	56	S-14	24/1	37-39	15-9-4-3	13	Poor recovery; washed sample.		
39	44						Advance HW drill casing to 40 ft.		
40	38						Advance 3-7/8 in. button bit from 37 to 40 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample  
6. SPT denotes Standard Penetration Test

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million  
9. PP denotes Pocket Penetrometer  
10. FVST denotes field vane shear test  
11. ROD denotes Rock Quality Designation  
12. R denotes core run number

REMARKS:

- 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.
- No water return noted during rock coring activities.
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Notes Engineering  
PO Box 2890  
Concord, New Hampshire 03302

<b>PROJECT</b>		BORING NO.	FD-33
Remediat Design For Operable Unit 01		SHEET	3 of 7
New Bedford Harbor Superfund Site		FILE NO.	48138.07
New Bedford, Massachusetts		CHKD. BY	J. Trotter

Boring Co.	Atlantic Testing Laboratories, Limited	Boring Location	northing 2696779.7	easting 814163.2	
Driller	A. Carter	Mudline El.	-4.4	Datum	NGVD
Logged By	E. Thibodeau	Date Start	9/8/99	Date End	9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	38	S-15	24/0	40-42	5-3-3-5	6	No recovery. Advance HW drill casing to 42 ft. Advance 3-7/8 in. button bit from 40 to 42 ft.		1
42	38								
43	31	S-16	24/3	42-44	11-7-7-12	14	Poor recovery; washed sample. Advance HW drill casing to 44 ft. Add more bentonite to drilling fluid.		1
44	49						Advance 3-7/8 in. button bit from 42 to 44 ft.		
45	50	S-17	24/9	44-46	8-6-4-5	10	Poorly graded sand (SP); loose, 45% medium sand, 30% fine sand, 15% coarse sand, 5% gravel, 5% silt, subrounded particles, brown. Advance HW drill casing to 48 ft.	SP	
46	39						Advance 3-7/8 in. button bit from 44 to 49 ft.		
47	41								
48	52								
49	53								
50	119	S-18	14/6	49- 50.2	19-17-50/2'	—	Poorly graded sand with silt and gravel (SP-SM); 20% medium sand, 15% fine sand, 10% coarse sand, 45% gravel, 10% silt, subrounded to subangular particles, brown. Advance HW drill casing to 50 ft. Top of bedrock at 50.0 ft. Telescope and advance NW inner drill casing to 50.5 ft. for coring. (spin) NW drill casing advanced rapidly; probable weathered bedrock. Advance NW inner drill casing to 51.0 ft. for coring. (spin) Begin NX rock core at 50.0 ft. (boring log continued on next page)	SP-SM  BEDROCK	

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:

- 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.
- No water return noted during rock coring activities.
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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit D1

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-33  
SHEET 4 of 7  
FILE NO. 48138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696779.7 easting 814163.2  
Driller A. Carter Mudline El. -4.4 Datum NGVD  
Logged By E. Thibodeau Date Start 9/8/99 Date End 9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
50.5		R1	50.0 - 51.0	4.5 mins.	Begin R1 at 50.0 ft. Fresh, moderately hard, gray, fine grained GNEISS. Near horizontal foliation; 20 degrees. REC = 83%; ROD = 73% (fair) 50.0 to 50.2 ft: fractured bedrock from advancing NW inner drill casing. 50.6 ft: mechanical break in rock core.	
51.0			51.0 - 52.0	5 mins.	51.2 ft: Primary joint: low angle, very widely spaced, rough, planar, slightly discolored, and tight.	
51.5			52.0 - 53.0	5 mins.	52.6 to 53.1 ft: Quartz inclusion.	
52.0			53.0 - 54.0	30 sec.	53.1 to 53.4 ft: core barrel dropped; probable void or cavity. Loss of drilling water return at 53.1 ft. 53.6 to 54.1 ft: core barrel dropped; probable void or cavity.	
52.6			54.0 - 55.0	3 mins.	54.1 to 54.4 ft: Secondary joint: high angle, moderate to widely spaced, rough, planar, trash, and open. 54.6 ft: mechanical break in rock core.	
53.0					End R1 at 55.0 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. EVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation 12. R denotes core run number
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**REMARKS:**

- 1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.
- 2) No water return noted during rock coring activities.
- 3)
- 4)



Novus Engineering  
PO Box 2890  
Concord, New Hampshire 03307

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-33

SHEET 5 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696779.7 easting 814163.2  
 Driller A. Carter Mudline El. -4.4 Datum NGVD  
 Logged By E. Thibodeau Date Start 9/8/99 Date End 9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive. All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
55.5		R2	55.0 - 56.0	3.5 mins.	Begin R2 at 55.0 ft. Slightly weathered, moderately hard, gray, fine grained GNEISS. Foliation approximately 30 degrees. REC = 93%; RQD = 62% (fair) 55.0 to 55.7 ft: fractured bedrock.	2
56.0					55.7 to 56.0 ft: Secondary joint: high angle, moderate to widely spaced, rough, planar, discolored, and open.	
56.5			56.0 - 57.0	4 mins.	56.0 to 56.2 ft: discoloration/weathering noted.	
57.0						
57.5			57.0 - 58.0	3.5 mins.		
58.0					57.8 to 58.3 ft: core barrel dropped; probable void or cavity.	
58.5			58.0 - 59.0	3.5 mins.	58.3 to 58.8 ft: Secondary joint: high angle, moderate to widely spaced, rough, planar, discolored, and open.	
59.0						
59.5			59.0 - 60.0	4 mins.	59.4 to 59.8 ft: discoloration/weathering noted.	
60.0					59.8 ft: Primary joint: moderately dipping, very widely spaced, rough, planar, slightly discolored, and tight. End R2 at 60.0 ft.	

SYMBOLS		SYMBOLS	
0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UD denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. ROD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test	12. R denotes core run number.

REMARKS:  
 1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.  
 2) No water return noted during rock coring activities  
 3)  
 4)



Notus Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-33  
SHEET 6 of 7  
FILE NO. 46138.07  
CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696779.7 easting 814163.2  
Driller A. Carter Mudline El. -4.4 Datum NGVD  
Logged By E. Thibodeau Date Start 9/8/99 Date End 9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HMA) flush-joint casing; wash and drive  
All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
60.5		R3	60.0 - 61.0	3 mins.	Begin R3 at 60.0 ft. Slightly weathered, moderately hard, gray, fine grained GNEISS. Foliation approximately 30 degrees. REC = 100%; RQD = 100% (excellent) 60.0 to 60.5 ft: discoloration/weathering noted.	2
61.0						
61.5			61.0 - 62.0	3.5 mins.	61.0 ft: Primary joint: low angle, closely spaced, smooth, planar, decomposed, and very wide. 61.0 to 61.3 ft: discoloration/weathering noted.  61.4 ft: Primary joint: low angle, closely spaced, smooth, planar, slightly discolored, and open.	
62.0						
62.5			62.0 - 63.0	5 mins.		
63.0					62.9 to 63 ft: Quartz inclusion.	
63.5			63.0 - 64.0	6.5 mins.		
64.0					64.0 ft: core barrel blocked/full; core run terminated. End R3 at 64.0 ft.	
64.5		R4	64.0 - 65.0	3.5 mins.	Begin R4 at 64.0 ft. Fresh, moderately hard, gray, fine grained GNEISS. Foliation near horizontal; approximately 10 degrees REC = 93%; RQD = 93% (excellent)	2
65.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler 5. REC denotes recovered length of sample 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.  
2) No water return noted during rock coring activities  
3)  
4)



Nobile Engineering  
PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-33

SHEET 7 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited

Driller A. Carter

Logged By E. Thibodeau

Boring Location

northing 2696779.7 easting 814163.2

Mudline El.

-4.4

Datum

NGVD

Date Start

9/8/99

Date End

9/13/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drift Rig: Acker AC2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
65.5		R4 (cont.)	65.0 - 66.0	3.5 mins.		
66.0					65.8 to 66.5 ft: Quartz inclusion.	
66.5			66.0 - 67.0	3.5 mins.		
67.0						
67.5			67.0 - 68.0	4.5 mins.		
68.0						
68.5			68.0 - 69.0	5.5 mins.	68.0 ft: mechanical break in rock core.	
69.0					68.6 ft: mechanical break in rock core.	
					End R4 at 69.0 ft.	
					Bottom of exploration at 69.0 ft.; boring terminated in bedrock.	

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector.  |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. ROD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:  
1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb center hole hammer free falling from a height of 24 inches.  
2) No water return noted during rock coring activities.  
3)  
4)



Nolet's Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-34

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697646.5 easting 814916.5  
 Driller A. Carter Mudline El. -12.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/11/99 Date End 8/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	S-1	24/0	3-5	WOR/24"	0	No recovery; probable very soft sediments. Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.		
5	Hyd. Push								
6	Hyd. Push	S-2	24/0	5-7	WOR/24"	0	No recovery. Remove basket from split-barrel sampler. Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 7 ft.		
7	Hyd. Push								
8	Hyd. Push	S-3	24/10	7-9	WOR/24"	0	Organic soil (OH); very soft, 80% organic clay, 25% organic silt, 10% fine sand, 5% shell fragments, strong organic odor, dark gray. Advance HW drill casing to 10 ft. (hydraulic push) Advance 3-7/8 in. button bit from 7 to 10 ft.	OH	
9	Hyd. Push								
10	Hyd. Push								
11	Hyd. Push	S-4	24/6	10-12	WOR/24"	0	Organic soil with sand (OH); very soft, 50% organic clay, 25% organic silt, 15% fine sand, 5% medium sand, 5% shell fragments, slight organic odor, dark gray. Advance HW drill casing to 15 ft. (hydraulic push) Advance 3-7/8 in. button bit from 10 to 15 ft.	OH	
12	Hyd. Push								
13	Hyd. Push								
14	Hyd. Push								
15	Hyd. Push								
16	19	S-5	24/24	15-17	5-12-19-17	31	S-5A: Similar to S-4. (6 in.) S-5B: Poorly graded sand with silt (SP-SM); dense, 45% medium sand, 30% fine sand, 10% coarse sand, 5% gravel, 10% silt, gray. (18 in.) Advance HW drill casing to 20 ft. Add bentonite to drilling fluid. Advance 3-7/8 in. button bit from 15 to 20 ft.	OH SP-SM	
17	75								
18	55								
19	40								
20	46								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Loss of water return at 39.9 ft.  
 2)  
 3)  
 4)



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-34

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697646.5 easting 814916.5  
 Driller A. Carter Mudline El. -12.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/11/99 Date End 8/12/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.  
 All casing driven with a 300 lb. center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-Value			
21	52	S-6	24/8	20-22	18-12-10-12	22	Poorly graded sand with gravel (SP); medium dense, 25% medium sand, 20% fine sand, 15% coarse sand, 35% gravel, 5% silt, brown. Advance HW drill casing to 25 ft.	SP	
22	54						Advance 3-7/8 in. button bit from 20 to 25 ft.		
23	45								
24	45								
25	63								
26	11	S-7	24/8	25-27	9-6-5-10	11	Poorly graded sand with gravel (SP); medium dense, 40% medium sand, 25% fine sand, 15% coarse sand, 15% gravel, 5% silt, brown. Advance HW drill casing to 30 ft.	SP	
27	17						Advance 3-7/8 in. button bit from 25 to 30 ft.		
28	87								
29	130								
30	79								
31	46	S-8	24/10	30-32	25-14-13-10	27	Poorly graded sand with silt and gravel (SP-SM); medium dense, 35% medium sand, 20% coarse sand, 20% fine sand, 15% gravel, 10% silt, brown. Advance HW drill casing to 35 ft.	SP-SM	
32	50						Advance 3-7/8 in. button bit from 30 to 35 ft.		
33	35								
34	30								
35	50								
36	3"	S-9	6/5	35-35.5	26-50/0"	—	Poorly graded sand with silt and gravel (SP-SM); 30% medium sand, 30% fine sand, 15% coarse sand, 15% gravel, 10% silt, brown. Advance HW drill casing to 35.3 ft.	SP-SM	
37	0"	R1		36.3-37.3	4 mins.		Top of bedrock at 35.3 ft. Advance 3-7/8 in. button bit from 35 to 36.3 ft. Begin NX rock core at 36.3 ft.	BEDROCK	
38				37.3-38.3	4 mins.		R1: 36.3 to 41.9 ft.		
39				38.3-39.3	3.5 mins.		Fresh, moderately hard gray, aphanitic GNEISS with horizontal to low angle, very close to moderately spaced, smooth, undulating, fresh to discolored, wide joints.		
40				39.3-40.3	4 mins.		REC = 90%; RCD = 60% (fair)		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 15 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation 12. R denotes core run number
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REMARKS:  
 1) Loss of water return at 39.9 ft.  
 2)  
 3)  
 4)



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Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-34

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697646.5 easting 814916.5  
 Driller A. Carter Mudline El. -12.1 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/11/99 Date End 8/12/99

Sampler: 2-inch O.D. SPIR-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount.  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
41		R1	40.3-41.3	9.5 mins.		39.3 to 41.9 ft: some core grinding noted.	BEDROCK	
42		cont.	41.3-41.9	9 mins.		41.9 ft: core barrel blocked; core run terminated.		
43		R2	41.9-42.9	5 mins.		R2: 41.9 to 46.9 ft. Fresh, moderately hard, gray, aphanitic GNEISS with low angle to moderately dipping, close to moderately spaced, rough, planar, fresh, partly open joints.		
44			42.9-43.9	4.5 mins.		REC = 92%; RQD = 82% (good)		
45			43.9-44.9	6.5 mins.				
46			44.9-46.9	5.5 mins.		45.4 to 46.2 ft: Quartz inclusion.		
47			45.9-46.9	5.5 mins.				
48						Bottom of exploration at 46.9 ft.; boring terminated in bedrock.		
49								
50								
51								
52								
53								
54								
55								
56								
57								
58								
59								
60								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes SPIR-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UQ denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS  
 1) Loss of water return at 39.9 ft  
 2)  
 3)  
 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-35

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2695890.1 easting 814853.7  
 Driller A. Carter Mudline El. -10.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/16/99 Date End 8/17/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	S-1	24/7	3-5	WOR/3"	0	Organic soil with sand (OH); very soft, 40% organic clay, 40% organic silt, 10% fine sand, 5% medium sand, 5% shell fragments, strong organic odor, black.	OH	
5	Hyd. Push				WOH/12"-1/8"		Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.		
6	Hyd. Push	S-2	24/12	5-7	WOR/24"	0	Similar to S-1.	OH	
7	Hyd. Push						Advance HW drill casing to 10 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 10 ft.		
8	Hyd. Push								
9	Hyd. Push								
10	Hyd. Push								
11	3	S-3	24/12	10-12	WOR/15"-2	0	S-3A: Organic soil with sand (OH); very soft, 50% organic silt, 25% organic clay, 20% fine sand, 5% shell fragments, moderate organic odor, dark gray. (8 in.) S-3B: Similar to S-3A but with approximately 20% Peat (Pt), fibrous, dark brown. (4 in.)	OH	
12	5						Advance HW drill casing to 15 ft. Advance 3-7/8 in. button bit from 10 to 15 ft.	Pt	
13	5								
14	7								
15	7								
16	15	S-4	24/18	15-17	1-2-13-18	15	S-4A: Peat (Pt); fibrous, dark brown. (12 in.) S-4B: Silty sand (SM); medium dense, 75% fine sand, 25% silt, slight organic odor, gray. (6 in.)	Pt	
17	37						Advance HW drill casing to 20 ft. Advance 3-7/8 in. button bit from 15 to 20 ft.	SM	
18	24								
19	26								
20	38								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UC denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1)  
2)  
3)  
4)



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PO Box 7890  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-35

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696890.1 easting 814853.7  
 Driller A. Carter Mudline El. -10.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/16/99 Date End 8/17/99

Sampler: 2-inch O.D. split barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT Blow Value			
21	24	S-5	24/18	20-22	5-7-6-8	13	S-5A: Poorly graded sand (SP); medium dense, 50% medium sand, 35% fine sand, 5% coarse sand, 5% gravel, 5% silt, reddish brown. Some iron staining noted. (6 in.) S-5B: Poorly graded sand (SP); medium dense, 60% medium sand, 35% fine sand, 5% silt, brown. (12 in.)	SP	
22	17						Advance HW drill casing to 25 ft.		
23	35						Add bentonite to drilling fluid.		
24	32						Advance 3-7/8 in. button bit from 20 to 25 ft.		
25	28								
26	40	S-6	24/18	25-27	4-7-10-10	17	S-6A: Poorly graded sand (SP); medium dense, 75% medium sand, 20% fine sand, 5% silt, brown. (12 in.) S-6B: Poorly graded sand with silt (SP-SM); medium dense, 45% medium sand, 30% fine sand, 5% coarse sand, 10% gravel, 10% silt, reddish brown. Some iron staining noted. (6 in.)	SP SP-SM	
27	35						Advance HW drill casing to 30 ft.		
28	37						Advance 3-7/8 in. button bit from 25 to 30 ft.		
29	42								
30	48								
31	49	S-7	24/18	30-32	7-10-10-10	20	Silty sand (SM); medium dense, 75% fine sand, 25% silt, gray.	SM	
32	39						Advance HW drill casing to 35 ft.		
33	41						Advance 3-7/8 in. button bit from 30 to 35 ft.		
34	40								
35	35								
36	53	S-8	24/2	35-37	7-8-10-14	18	Poorly graded sand with silt (SP-SM); medium dense, 45% medium sand, 30% fine sand, 5% coarse sand, 10% gravel, 10% silt, brown.	SP-SM	
37	56						Advance HW drill casing to 40 ft.		
38	48						Advance 3-7/8 in. button bit from 35 to 40 ft.		
39	50								
40	41								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
1)  
2)  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-35

SHEET 3 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696890.1 easting 814853.7  
 Driller A. Carter Mudline El. -10.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/16/99 Date End 8/17/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.  
 All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Case No.	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	53	S-9	24/8	40-42	7-6-6-9	12	Poorly graded sand with silt and gravel (SP-SM); medium dense, 40% medium sand, 20% fine sand, 15% coarse sand, 15% gravel, 10% silt, gray.	SP-SM	
42	42						Advance HW drill casing to 43.8 ft.		
43	40						Advance 3-7/8 in. button bit from 40 to 46 ft.		
44	91/10						Probable cobble or boulder from 43.8 to 44.5 feet.	Probable Cobble/boulder	
45	34						Button bit advanced with little effort from 44.5 to 46 ft.		
46	41								
47	35	S-10	24/12	48-48	4-5-3-4	8	Poorly graded sand (SP); loose, 70% medium sand, 20% fine sand, 5% gravel, 5% silt, gray.	SP	
48	52						Advance HW drill casing to 48.8 ft.; casing refusal.		
49	116/9						Attempt to advance 3-7/8 in. button bit to 48.8 ft; drive shoe and lead section of HW drill casing damaged. Boring terminated at 48.8 ft.		
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

- S denotes split-barrel sampler
- U denotes 3-inch O.D. undisturbed sample.
- UO denotes 3-inch Osterberg undisturbed sample.
- PEN denotes penetration length of sampler.
- REC denotes recovered length of sample.
- SPT denotes Standard Penetration Test.

- PID denotes Photoionization Detector
- PPM denotes parts per million.
- PP denotes Pocket Penetrometer.
- FVST denotes field vane shear test.
- RQD denotes Rock Quality Designation.
- R denotes core run number

REMARKS:  
 1)  
 2)  
 3)  
 4)



Nobis Engineering  
PO Box 3890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 36

SHEET 1 of 3

FILE NO. 48138.07

CHKD. BY J. Trottler

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696220.5 casting 814914.5  
 Driller A. Carter Mudline El. -12.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/25/99 Date End 8/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEWREC (lbs/ft)	DEPTH (ft)	BLOWS PER 4 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 3 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 3 ft.		
2	Hyd. Push								
3	Hyd. Push								
4	Hyd. Push	S-1	24/4	3-5	WOR/24"	0	Sandy organic soil (OH); very soft, 50% organic clay, 20% organic silt, 25% fine sand, 5% medium sand, strong organic odor, dark gray. Advance HW drill casing to 5 ft. (hydraulic push) Advance 3-7/8 in. button bit from 3 to 5 ft.	OH	
5	Hyd. Push								
6	Hyd. Push	S-2	24/0	5-7	WOR/24"	0	Organic soil with sand (OH); very soft, 50% organic clay, 35% organic silt, 15% fine sand, strong organic odor, dark gray. (logged from trimmings) Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 5 to 7 ft.	OH	
7	Hyd. Push								
8	Hyd. Push	S-3	24/2	7-9	WOR/24"	0	Similar to S-2. Advance HW drill casing to 9 ft. (hydraulic push) Advance 3-7/8 in. button bit from 7 to 9 ft.	OH	
9	Hyd. Push								
10	Hyd. Push	S-4	24/18	9-11	WOR/24"	0	Organic soil (OH); very soft, 60% organic clay, 30% organic silt, 10% fine sand, trace shell fragments, strong organic odor, dark gray. Advance HW drill casing to 14 ft. (hydraulic push) Very difficult push at 13.5 ft. Advance HW drill casing to 15 ft. Advance 3-7/8 in. button bit from 9 to 15 ft.	OH	
11	Hyd. Push								
12	Hyd. Push								
13	Hyd. Push								
14	Hyd. Push								
15	13								
16	8	S-5	24/16	15-17	4-5-5-8	10	S-5A: Poorly graded sand with silt (SP-SM); loose, 50% medium sand, 35% fine sand, 5% gravel, 10% silt, moderate organic odor, gray. (4 in.) S-5B: Poorly graded sand (SP); loose, 60% medium sand, 20% fine sand, 10% coarse sand, 5% gravel, 5% silt, moderate organic odor, gray. (12 in.) Advance HW drill casing to 20 ft. Advance 3-7/8 in. button bit from 15 to 20 ft.	SP-SM SP	
17	7								
18	9								
19	11								
20	9								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. PVST denotes field vane shear test 11. RQD denotes Rock Quality Designation 12. R denotes core run number.
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REMARKS:  
 1) Possible run-in sands during driving of sampler; therefore, N-value may be biased low.  
 2)  
 3)  
 4)



Nobis Engineering  
PO Box 1890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-36

SHEET 2 of 3

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696220.5 easting 814914.5  
 Driller A. Cater Mudline El. -12.3 Datum NGVD  
 Logged By E. Thibodeau Date Start 8/25/99 Date End 8/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Aker AD2 truck mount.

Drilling Method: 4-inch I.D. (HW) flush-joint casing; wash and drive.

All casing driven with a 300 lb center hole hammer free falling from a height of 30-inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	10	S-6	24/12	20-22	4-3-7-7	10	Poorly graded sand with silt (SP-SM); loose, 40% medium sand, 25% fine sand, 15% coarse sand, 10% gravel, 10% silt, slight organic odor, gray.	SP-SM	
22	12						Advance HW drill casing to 25 ft.		
23	16						Add bentonite to drilling fluid.		
24	22						Advance 3-7/8 in. button bit from 20 to 25 ft.		
25	33								
26	10	S-7	24/12	25-27	4-4-4-5	8	Poorly graded sand (SP); loose, 75% medium sand, 20% fine sand, 5% silt, gray.	SP	
27	15						Advance HW drill casing to 30 ft.		
28	20						Advance 3-7/8 in. button bit from 25 to 30 ft.		
29	32								
30	49	S-8	24/20	30-32	1-2-2-4	4	Poorly graded sand (SP); very loose, 60% medium sand, 35% fine sand, 5% silt, gray.	SP	1
31	20						Advance HW drill casing to 35 ft.		
32	25						Add bentonite to drilling fluid.		
33	38						Advance 3-7/8 in. button bit from 30 to 35 ft.		
34	87								
35	120								
36	41	S-8	24/18	35-37	5-8-10-13	18	Poorly graded sand (SP); medium dense, 50% fine sand, 45% medium sand, 5% silt, gray.	SP	
37	36						Advance HW drill casing to 40 ft.		
38	37						Advance 3-7/8 in. button bit from 35 to 40 ft.		
39	43								
40	112								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler,  
2. U denotes 3-inch O.D. undisturbed sample  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Possible run-in sands during driving of sampler; therefore, N-value may be biased low.
- 
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PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-36  
SHEET 3 of 3  
FILE NO. 48138.07  
CHKD. BY J. Trolier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2696220.5 easting 814914.5  
Driller A. Carler Mudline El. -12.3 Datum NGVD  
Logged By E. Thibodeau Date Start 8/25/99 Date End 8/26/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing, wash and drive.  
All casing driven with a 300 lb center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
	Casing Blows (ft)	Type	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
41	50	S-10	24/18	40-42	3-4-5-6	9	Poorly graded sand (SP); loose, 50% medium sand, 45% fine sand, 5% silt, gray. Advance HW drill casing to 45 ft. Add bentonite to drilling fluid.	SP
42	56						Advance 3-7/8 in. button bit from 40 to 45 ft.	
43	59							
44	58							
45	67							
46	84	S-11	24/13	45-47	3-3-3-4	6	Poorly graded sand with silt (SP-SM); loose, 45% medium sand, 30% fine sand, 5% coarse sand, 10% gravel, 10% silt, gray. Advance HW drill casing to 50 ft.	SP-SM
47	108						Advance 3-7/8 in. button bit from 45 to 50 ft.	
48	117							
49	113							
50	89							
51	114	S-12	24/10	50-52	6-13-11-9	24	S-12A: Silty sand (SM); medium dense, 55% fine sand, 5% medium sand, 40% silt, gray. (5 in.) S-12B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 30% medium sand, 15% coarse sand, 15% fine sand, 30% gravel, 10% silt, gray. (5 in.) Advance HW drill casing to 55 ft.	SM SP-SM
52	142						Advance 3-7/8 in. button bit from 50 to 55.5 ft.	
53	153							
54	162							
55	281							
56	Open Hole	S-13	24/16	55.5-	23-14-16-12	30	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 20% fine sand, 15% coarse sand, 30% gravel, 5% silt, gray. Switch to open hole mud rotary drilling techniques with bentonite drilling mud at 56 ft.	SP
57	Open Hole			57.5			Advance 3-7/8 in. button bit from 55.5 to 58.0 ft.	
58	Open Hole						Top of bedrock at 58.0 ft.	
59	Open Hole						Advance 3-7/8 in. button bit from 58 to 59 ft. to confirm bedrock.	BEDROCK
60							Bottom of exploration at 59.0 ft.; boring terminated in probable bedrock.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Possible run-in sands during driving of sampler; therefore, N-value may be biased low.  
2)  
3)  
4)



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Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 50

SHEET 1 of 5

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697581.9 easting 814307.4  
Driller A. Carter Mudline El. -12.7 Datum NGVD  
Logged By E. Thibodeau Date Start 10/20/99 Date End 10/21/89

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (H-W) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Type	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	Hyd. Push	UO-1	24/17	1-3			Sandy organic clay (OH); 59% organic clay, 21% coarse sand, 11% medium sand, 9% fine sand, strong organic odor, dark gray to black.	OH	1
3	Hyd. Push						Advance HW drill casing to 4 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 4 ft.		
4	Hyd. Push								
5	Hyd. Push	UO-2	24/24	4-6			Sandy organic clay (OH); 59% organic clay, 4% coarse sand, 2% medium sand, 34% fine sand, 1% gravel, strong organic odor, dark gray.	OH	1
6	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 4 to 7 ft.		
7	Hyd. Push								
8	Spin	UO-3	24/23	7-9			Top: Similar to UO-2. Bottom: Silty sand (SM); 60% fine sand, 40% silt, gray.	OH	
9	Spin						Advance HW drill casing to 9 ft. Advance 3-7/8 in. button bit to 9 ft.	SM	
10	Spin	S-1	24/6	9-11	1-2-4-5	6	Silty sand (SM); loose, 65% fine sand, 5% medium sand, 30% silt, gray.	SM	
11	Spin						Advance HW drill casing to 13 ft. Advance 3-7/8 in. button bit to 13 ft.		
12	Spin								
13	Spin								
14	0						Attempt borehole permeability test at 13 ft.; casing advanced 11 in. under self weight. Perform borehole permeability test at 14 feet.		
15	Spin	S-2	24/13	14-16	2-2-2-2	4	Silty sand (SM); very loose, 50% fine sand, 5% coarse sand, 5% medium sand, 40% silt, brown. Some iron staining noted in sample.	SM	
16	Spin						Advance HW drill casing to 19 ft.		
17	Spin								
18	Spin								
19	Spin								
20	Spin	S-3	24/3	19-21	9-8-8-7	16	S-3A: rock/gravel fragments. (1 in.) S-3B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 30% medium	SP-SM	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
3) Long core times due to the hardness of the bedrock formation and polishing of the Series 2 core bit.  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 50

SHEET 2 of 5

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697581.9 easting 814307.4  
 Driller A. Carter Mudline El. -12.7 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/20/99 Date End 10/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-Value			
21	Spin						sand, 20% fine sand, 15% coarse sand, 25% gravel, 10% silt, brown. (2 in.) Advance HW drill casing to 21 ft.		
22	Spin	S-4	24/1	21-23	8-5-4-5	9	Approximately 6 in. of material in casing; advance 3-7/8 in. button bit to clean out. S-4: Poor recovery; button bit cuttings and wash.		
23	Spin						Advance HW drill casing to 23 ft. Perform borehole permeability test at 23 ft.		
24	Spin	S-5	24/1	23-25	6-6-7-11	13	Poor recovery; piece of gravel/fractured rock lodged in tip of sampler. Possible cobbles.		
25	Spin						Advance HW drill casing to 25 ft.		
26	Spin	S-6	24/1	25-27	16-17-19-7	36	Poor recovery; fractured rock. Possible cobbles.		
27	Spin						Advance HW drill casing to 27 ft.		
28	Spin	S-7	24/7	27-29	3-4-5-10	9	Poorly graded sand (SP); loose, 48% medium sand, 37% fine sand, 8% coarse sand, 3% gravel, 4% silt, brown. Advance HW drill casing to 29.2 ft.	SP	2
29	Spin						Very difficult drilling at 29.2 ft.		
30	Spin	S-8	9/8	29.2-30.1	16-18/3-	---	Silty sand with gravel (SM); 25% fine sand, 20% coarse sand, 10% medium sand, 25% gravel, 20% silt, brown. Top of bedrock at 30.1 ft. Advance HW drill casing to 30.4 ft. for coring. (spin) Check seal on casing; water level in casing dropped quickly. Begin HV rock core at 30.1 ft. (boring log continued on next page)	SM	
								BEDROCK	

- |   |  |  |   |
|---|--|--|---|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler<br>5. REC denotes recovered length of sample<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number |
|---|--|--|---|

**REMARKS**  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
 3) Long core times due to the hardness of the bedrock formation and polishing of the Series 2 core bit  
 4)





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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD - 50  
SHEET 3 of 5  
FILE NO. 48138.07  
CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697581.9 easting 814307.4  
Driller A. Carter Mudline El. -12.7 Datum NGVD  
Logged By E. Thibodeau Date Start 10/20/99 Date End 10/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (H-W) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
30.5	DCC	R1	30.1 - 31.1	6.5 mins.	Begin R1 at 30.1 ft. (3rd gear) Fresh, hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 100%; RQD = 97% (excellent) 30.1 to 30.2 ft: fractured rock; slight discoloration noted.		
31.0							
31.5			31.1 - 32.1	7 mins.			
32.0							
32.5			32.1 - 33.1	7.5 mins.			
33.0							
33.5			33.1 - 34.1	6.5 mins.			33.1 ft: mechanical break in rock core.
34.0							
34.5		34.1 - 35.1	7.5 mins.				
35.0				34.8 ft: mechanical break in rock core. End R1 at 35.1 ft.			

QUALITY DESIGNATION (RQD)	RESISTIVE DESIGNATION (R)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**  
1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.  
3) Long core times due to the hardness of the bedrock formation and polishing of the Series 2 core bit.  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 50

SHEET 4 of 5

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited	Boring Location northing 2697581.9	easting 814307.4
Driller A. Carter	Mudline El. -12.7	Datum NGVD
Logged By E. Thibodeau	Date Start 10/20/99	Date End 10/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
35.5		R2	35.1 - 36.1	8.5 mins.	Begin R2 at 35.1 ft. Fresh, hard, gray, fine grained GNEISS. Low angle foliation; approximately 10-20 degrees. REC = 100%; ROD = 100% (excellent)	
36.0			36.1 - 37.1	9 mins.		
36.5						
37.0						36.9 ft: mechanical break in rock core.
37.5			37.1 - 38.1	13 mins.		
38.0						
38.5			38.1 - 39.1	13.5 mins.		
39.0						Switch drill rig into 4th gear.
39.5			39.1 - 40.1	9 mins.		39.1 ft: mechanical break in rock core.
						39.6 ft: mechanical break in rock core.
						39.9 ft: mechanical break in rock core.
40.0						End R2 at 40.1 ft.

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample	11. ROD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test	12. R denotes core run number

**REMARKS:**

- 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
- 3) Long core times due to the hardness of the bedrock formation and polishing of the Series 2 core bit.
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 50

SHEET 5 of 5

FILE NO. 48138.07

CHKD. BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited	Boring Location northing 2697581.9 easting 814307.4
Driller A. Carter	Mudline El. -12.7 Datum NGVD
Logged By E. Thibodeau	Date Start 10/20/99 Date End 10/21/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.

Drill Rig: Ackar AD2 truck mount

Drilling Method: 4-inch I.D. (HWH) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
40.5		R3	40.1 - 41.1	13 mins.	Begin R3 at 40.1 ft. (4th gear) Fresh, hard to very hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 100%; RQD = 100% (excellent)	
41.0					40.6 ft: mechanical break in rock core.	
41.5			41.1 - 42.1	14.5 mins.		
42.0						
42.5			42.1 - 43.1	21.5 mins.		3
43.0						
43.5			43.1 - 44.1	48 mins.		3
44.0						
44.5			44.1 - 44.8	59 mins.	44.2 ft: mechanical break in rock core.  44.6 ft: mechanical break in rock core.	3
45.0					End R3 at 44.8 ft. Bottom of exploration at 44.8 ft.; boring terminated in bedrock.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.
- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 5, prepared by GeoTesting Express, dated November 29, 1999.
- Long core times due to the hardness of the bedrock formation and polishing of the Series 2 core bit.
-



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PO Box 2890  
Concord, New Hampshire 03302

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-51

SHEET 1 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697228.5 easting 814725.2  
 Driller A. Carter Mudline El. -22.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/26/99 Date End 10/29/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No	PENREC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	Hyd. Push						Advance HW drill casing to 1 ft. (hydraulic push) Advance 3-7/8 in. button bit from 0 to 1 ft.		
2	Hyd. Push	UO-1	24/24	1-3			Organic clay with sand (OH); 78% organic clay, 7% coarse sand, 4% medium sand, 10% fine sand, 1% gravel, strong organic odor, black.	OH	1
3	Hyd. Push						Advance HW drill casing to 4 ft. (hydraulic push) Advance 3-7/8 in. button bit from 1 to 4 ft.		
4	Hyd. Push								
5	Hyd. Push	UO-2	24/24	4-6			Top: Sandy organic soil (OH); 60% organic clay/silt, 30% fine sand, 5% medium sand, 5% shells, strong organic odor, black. Bottom: Silty sand (SM); 3% coarse sand, 32% medium sand, 37% fine sand, 2% gravel, 26% silt, dark gray. Piece of wood approximately 2 in. in length and 1 in. in diameter noted in bottom of sample; possible root or branch.	OH	
6	Hyd. Push							SM (Sand Layer)	1
7	Hyd. Push						Advance HW drill casing to 7 ft. (hydraulic push) Advance 3-7/8 in. button bit from 4 to 7 ft.		
8	Spin	UO-3	24/18	7-9			UO-3: Top: Clayey sand (SC); 1% coarse sand, 19% medium sand, 37% fine sand, 6% gravel, 37% organic clay, dark gray. UO-3: Bottom: Silty sand (SM); 50% fine sand, 5% coarse sand, 5% medium sand, 10% gravel, 30% silt, gray to black.	SC	1
9	Spin								
10	Spin	S-1	24/13	9-11	8-6-7-5	13	Advance HW drill casing to 9 ft. S-1: Silty sand (SM); medium dense, 55% fine sand, 5% medium sand, 40% silt; gray.	SM	
11	Spin						Advance HW drill casing to 12 ft.		
12	Spin								
13	Spin	S-2	24/16	12-14	2-2-2-2	4	Silt with sand (ML); soft, 72% non-plastic silt, 27% fine sand, 1% medium sand, gray.	ML	2
14	Spin						Advance HW drill casing to 14 ft.		
15	Spin	S-3	24/10	14-16	1/12"-1/12"	1	Sandy silt (ML); very soft, 50% silt, 10% clay, 40% fine sand, brown to gray.	ML	
16	Spin						Advance HW drill casing to 16 ft.		
17	Spin	S-4	24/18	16-18	3-4-5-4	9	S-4A: Sandy lean clay (CL); 40% clay, 30% silt, 30% fine sand, olive brown. (8 in.) S-4B: Poorly graded sand with gravel (SP); loose, 30% medium sand, 30% fine sand, 15% coarse sand, 20% gravel, 5% silt, brown. (10 in.)	CL	
18	Spin						Advance HW drill casing to 18 ft.	SP	
19	Spin	S-5	24/0	18-20			No recovery. Drill string with sampler attached was dropped into borehole; no blow counts recorded.		
20	Spin						Advance HW drill casing to 20 ft.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation  
12. R denotes core run number.

REMARKS:

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- Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.
- Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.
- Calculated RQD changes over the length of the core run: 45.9 to 46.9 ft: RQD = 0%; 46.9 to 50.5 ft: RQD = 67%.
- Core time not recorded (NR).



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-51  
SHEET 2 of 7  
FILE NO. 48138.07  
CHKD BY J. Trottier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697228.5 easting 814725.2  
Driller A. Carter Mudline El. -22.9 Datum NGVD  
Logged By E. Thibodeau Date Start 10/26/99 Date End 10/29/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.

Drill Rig: Acker AD2 truck mount

Drilling Method: 4-inch I.D. (HW) flush-joint casing, spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2487)	STRATUM DESCRIPTION	REMARKS
		Type S.No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT Blows			
21	Spin	S-6	24/3	20-22	15-8-7-6	15	Poorly graded sand with gravel (SP); medium dense, 30% medium sand, 15% coarse sand, 15% fine sand, 35% gravel, 5% silt, brown. Traces of fractured rock and a shell noted in sample.	SP	
22	Spin						Advance HW drill casing to 22 ft.		
23	Spin	S-7	24/0	22-24	4-5-5-7	10	No recovery.	Possible Cobbles	
24	Spin						Advance HW drill casing to 24 ft. Encountered possible cobbles during the advancement of the casing.		
25	Spin	S-8	24/0	24-26	6-6-5-8	11	No recovery with 2 in. split-barrel. Attempt to resample material with 3-in. split-barrel. Drove sampler 12 in.; drill casing was advancing during driving operations. No material recovered.		
26	Spin						Approximately 2 to 3 ft. of material in bottom of casing; advance 3-7/8 in. button bit to remove material.		
27	Spin						Attempt to resample material with 2-in. split-barrel: 3 in. of recovery. Poorly graded sand (SP); medium dense, 25% coarse sand, 50% medium sand, 10% fine sand, 10% gravel, 5% silt, brown.	SP	
28	Spin	S-9	24/6	27-29	8-6-5-7	11	Advance HW drill casing to 27 ft.		
29	Spin						S-9: Poorly graded sand with gravel (SP); medium dense, 35% medium sand, 15% fine sand, 15% coarse sand, 30% gravel, 5% silt, brown. Piece of fractured rock noted in top of sample. Possible gravel or cobble.	SP	
30	Spin	S-10	24/7	29-31	9-5-6-7	11	Advance HW drill casing to 29 ft.		
31	Spin						S-10: Poorly graded sand with gravel (SP); medium dense, 40% medium sand, 30% fine sand, 10% coarse sand, 15% gravel, 5% silt, brown. Piece of gravel lodged in tip of sampler.		
32	Spin	S-11	24/1	31-33	4-5-6-7	11	Advance HW drill casing to 31 ft. Approximately 8 in. of material in bottom of casing; advance 3-7/8 in. button bit to remove material.	SP	
33	Spin						S-11: Poor recovery. Washed material, very angular. Possible button bit cuttings.		
34	Spin	S-12	24/9	33-35	4-5-4-6	9	Advance HW drill casing to 33 ft. Approximately 6 in. of material in bottom of casing; advance 3-7/8 in. button bit to remove material.	SP	
35	Spin						S-12: Poorly graded sand with gravel (SP); loose, 31% medium sand, 17% fine sand, 13% coarse sand, 35% gravel, 4% silt, brown.	SP-SM	3
36	Spin	S-13	24/4	35-37	4-4-6-10	12	Advance HW drill casing to 35 ft. Approximately 7 in. of material in bottom of casing; advance 3-7/8 in. button bit to remove material.		
37	Spin						S-13: Poorly graded sand with silt and gravel (SP-SM); medium dense, 20% fine sand, 15% coarse sand, 10% medium sand, 45% gravel, 10% silt, brown.	GP	
38	Spin	S-14	24/6	37-39	6-6-7-6	13	Advance HW drill casing to 37 ft. Approximately 6 in. of material in bottom of casing; advance 3-7/8 in. button bit to remove material.		
39	Spin						S-14: Poorly graded gravel with sand (GP); medium dense, 65% gravel, 15% fine sand, 10% coarse sand, 5% medium sand, 5% silt, brown.		
40	Spin						Advance HW drill casing to 40 ft. Approximately 6 in. of material in bottom of casing;		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
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11. RQD denotes Rock Quality Designation.  
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REMARKS:  
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3) Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.  
4) Calculated RQD changes over the length of the core run: 45.9 to 46.9 ft: RQD = 0%; 46.9 to 50.6 ft: RQD = 67%.  
5) Core time not recorded (NR).



Nobis Engineering  
PO Box 2890  
Concord, New Hampshire 03302

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD - 51

SHEET 3 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697228.5 easting 814725.2  
 Driller A. Carter Mudline El. -22.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/26/99 Date End 10/29/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT R-Value			
41	Spin	S-15	24/5	40-42	9-9-12-5	21	advance 3-7/8 in. button bit to remove material. S-15A: Fractured rock/quartz. (top)	SP-SM	2
42	Spin						S-15B: Poorly graded sand with silt and gravel (SP-SM); medium dense, 21% fine sand, 18% medium sand, 6% coarse sand, 44% gravel, 11% silt, brown. (5 in.)		
43	Spin	S-16	24/2	42-44	9-5-6-4	11	Piece of fractured rock/quartz noted in top of sample. Advance HW drill casing to 42 ft.	SM	3
44	Spin						S-16: Poor recovery. Pieces of fractured rock and button bit cuttings. Advance HW drill casing to 44 ft.		
45	Spin	S-17	23/6	44-45.9	9-7-3-8/5"	10	Silty sand with gravel (SM); loose, 30% fine sand, 5% coarse sand, 5% medium sand, 40% gravel, 20% silt, brown. Piece of fractured bedrock noted in tip of sampler. Top of bedrock at 45.9 ft.	BEDROCK	
46	Spin						Advance HW drill casing to 46.5 ft. for coring. (spin) Begin HV rock core at 45.3 ft. (boring log continued on next page)		

STANDARD SOILS TABLE	RESISTIVE SOILS TABLE	SYMBOLS	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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 3) Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.  
 4) Calculated RQD changes over the length of the core run: 45.9 to 46.9 ft: RQD = 0%; 46.9 to 50.6 ft: RQD = 67%.  
 5) Core time not recorded (NR).



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-51

SHEET 4 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2897228.5 easting 814725.2  
Driller A. Carter Mudline El. -22.9 Datum NGVD  
Logged By E. Thibodeau Date Start 10/26/99 Date End 10/29/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
tree falling from a height of 30 inches.  
Drill Rig: Ackex AD2 truck mount  
Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
46.5		R1	45.9 - 46.9	6.5 mins.	Check seal on HW drill casing; water level in casing kept at a constant level by the addition of approximately 1.5 to 2 gallons per minute. Begin R1 at 45.9 ft. (3rd gear) Water return color: reddish brown to milky white. Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 30 degrees. REC = 100%; RQD = 67% (fair) 45.9 to 46.7 ft: pieces of fractured bedrock. One piece of fractured quartz noted; possible quartz vein. 46.9 to 46.7 ft: RQD = 0%.	4
47.0					46.9 ft: water return color: milky white. 47.0 ft: mechanical break in rock core. 47.3 ft: mechanical break in rock core.	
47.5			46.9 - 47.9	11.5 mins.		
48.0						
48.5			47.9 - 48.9	8 mins.		
49.0						
49.5			48.9 - 49.9	9 mins.	49.1 ft: mechanical break in rock core. Quartz/GNEISS interface. 49.1 to 49.7 ft: Quartz vein; dark gray. Quartz/GNEISS interface appears to be intact. (mechanical breaks) 49.1 to 49.7 ft: Fracture in quartz vein: high angle, to vertical, rough, planar, slightly discolored, and partly open. Possibly a healed joint. 49.7 ft: mechanical break in rock core. Quartz/GNEISS interface.	
50.0						
50.5			49.9 - 50.6	17.5 mins.	50.0 ft: mechanical break in rock core. 50.3 ft: healed joint. Good water return observed throughout core run. End R1 at 50.6 ft.	

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PJD denotes Photoionization Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|--|

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2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
3) Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.  
4) Calculated RQD changes over the length of the core run; 45.9 to 46.9 ft: RQD = 0%; 46.9 to 50.6 ft: RQD = 67%  
5) Core time not recorded (NR).



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-51

SHEET 5 of 7

FILE NO. 48138.07

CHKD. BY J. Trotier

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697228.5 easting 814725.2  
 Driller A. Carter Mudline El. -22.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/26/99 Date End 10/29/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-Inch I.O. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.0		R2	50.6 - 51.6	8.5 mins.	Check seal on HW drill casing; water level in casing held at a constant level by the addition of approximately 1 gallon per minute with 2.7 ft. of head above harbor water level. Begin R2 at 50.6 ft. (3rd gear) Water return color: milky white. Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 15-20 degrees. REC = 100%; RQD = 67% (fair)	5
51.5			51.6 - 52.6	7.5 mins.		
52.0			52.6 - 53.6	6.5 mins.	52.8 ft: mechanical break in rock core; slight discoloration noted. 52.8 to 53.7 ft: Secondary joint; high angle, very widely spaced, rough, stepped, discolored, and partly open.	
52.5			53.6 - 54.6	5.5 mins.	53.5 ft: mechanical break in rock core; slight discoloration noted due to secondary joint. 53.7 ft: mechanical break in rock core. Quartz/GNEISS interface. 53.7 to 54.5 ft: Quartz vein; dark gray, very brittle, some healed fractures noted. 53.9 and 54.1 ft: mechanical breaks in quartz vein. Possible healed joints. 53.7 to 54.3 ft: fractures in quartz vein: high angle to vertical, widely spaced, rough, stepped to undulating, discolored, and open. Possibly healed joints. Parallel set of fractures.	
53.0			54.6 - 54.9	NR	54.4 to 54.5 ft: Feldspar inclusion, pink in color. 54.5 to 54.9 ft: slightly different texture and color noted in GNEISS; coarser texture and lighter color.	
54.0				Perform constant head permeability test from 46.5 to 54.9 ft. End R2 at 54.9 ft.		
54.5						
55.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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 3) Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.  
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 5) Core time not recorded (NR).





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-51

SHEET 6 of 7

FILE NO. 48138.07

CHKD. BY J. Trotter

Boring Co. Atlantic Testing Laboratories, Limited Boring Location northing 2697228.5 easting 814725.2  
 Driller A. Carter Mudline El. -22.9 Datum NGVD  
 Logged By E. Thibodeau Date Start 10/26/99 Date End 10/29/99

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer  
 free falling from a height of 30 inches.  
 Drill Rig: Acker AD2 truck mount  
 Drilling Method: 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
55.5		R3	54.9 - 55.9	6.5 mins.	Begin R3 at 54.9 ft. (3rd gear) Water return color: milky white. Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 10 degrees. REC = 100%; RQD = 100% (excellent)	
56.0						
56.5			55.9 - 56.9	7 mins.		
57.0					56.9 ft. mechanical break in rock core.	
57.5			56.9 - 57.9	8.5 mins.		
58.0						
58.5			57.9 - 58.9	8 mins.		
59.0					58.8 ft. mechanical break in rock core.	
59.5			58.9 - 59.4	3.5 mins.	59.0 to 59.4 ft: Quartz/feldspar inclusion; pink in color. 59.0 ft: Primary joint: low angle, widely spaced, rough, planar, discolored, and open.	
					End R3 at 59.4 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. RFC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. EVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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 3) Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.  
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 5) Core time not recorded (NR).



Nobis Engineering  
PO Box 2890  
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**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

**BORING NO.** FD-51  
**SHEET** 7 of 7  
**FILE NO.** 48138.07  
**CHKD. BY** J. Troitier

**Boring Co.** Atlantic Testing Laboratories, Limited      **Boring Location** northing 2697228.5      easting 814725.2  
**Driller** A. Carter      **Mudline El.** -22.9      **Datum** NGVD  
**Logged By** E. Thibodeau      **Date Start** 10/26/99      **Date End** 10/29/99

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb safety hammer free falling from a height of 30 inches.  
**Drill Rig:** Acker AD2 truck mount  
**Drilling Method:** 4-inch I.D. (HW) flush-joint casing; spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
60.0		R4	59.4 - 60.4	10 mins.	Begin R4 at 59.4 ft. Water return color: milky white. Fresh, moderately hard, gray, fine grained GNEISS. Low angle foliation; approximately 20 degrees. REC = 100%; RQD = 100% (excellent) 59.4 to 59.5 ft: Quartz/feldspar inclusion; pink in color. (continued from R3)	
60.5						
61.0			60.4 - 61.4	11 mins.		
61.5						
62.0			61.4 - 62.4	14 mins.		
62.5						
63.0			62.4 - 63.4	16 mins.		
63.5				63.2 ft: mechanical break in rock core.		
64.0		63.4 - 64.4	12.5 mins.			
64.5					Perform constant head permeability test from 46.5 to 64.4 ft. End R4 at 64.4 ft. Bottom of exploration at 64.4 ft.; boring terminated in bedrock.	

<b>0 to 4 - Very Loose</b> <b>5 to 10 - Loose</b> <b>11 to 30 - Medium Dense</b> <b>31 to 50 - Dense</b> <b>Over 50 - Very Dense</b>	<b>0 to 2 - Very Soft</b> <b>3 to 4 - Soft</b> <b>5 to 8 - Medium Stiff</b> <b>9 to 15 - Stiff</b> <b>16 to 30 - Very Stiff</b> <b>Over 30 - Hard</b>	<b>1, S</b> denotes split-barrel sampler. <b>2, U</b> denotes 3-inch O.D. undisturbed sample. <b>3, UO</b> denotes 3-inch Osterberg undisturbed sample. <b>4, PEN</b> denotes penetration length of sampler. <b>5, REC</b> denotes recovered length of sample. <b>6, SPT</b> denotes Standard Penetration Test.	<b>7, PID</b> denotes Photoionization Detector <b>8, PPM</b> denotes parts per million. <b>9, PP</b> denotes Pocket Penetrometer. <b>10, FVST</b> denotes field vane shear test. <b>11, ROD</b> denotes Rock Quality Designation. <b>12, R</b> denotes core run number.
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**REMARKS:**  
 1) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 6, prepared by GeoTesting Express, dated December 23, 1999.  
 2) Sample description based on laboratory test data and ASTM D2487. Refer to Test Report No. 8, prepared by GeoTesting Express, dated February 2, 2000.  
 3) Possible fractured bedrock and quartz veins with soil filled voids. Driller notes increase in water pressure during advancement of HW drill casing.  
 4) Calculated RQD changes over the length of the core run: 45.9 to 46.9 ft: RQD = 0%; 46.9 to 50.6 ft: RQD = 67%.  
 5) Core time not recorded (NR)



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**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford Harbor Superfund Site

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New Bedford, Massachusetts

BORING NO. FD-101

SHEET 1 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321

Driller S. Laurenza Mudline El. -8.37 Datum NGVD

Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC								
2	WOC								
3	WOC	S-1	24/24	2-4	WOR/24"	—	Sandy organic soil (OH); 60% organic clay/silt, 40% fine sand, organic odor, gray. Shells noted. Advance PW drill casing to 4 ft. Advance 3-7/8 in. roller bit to 4 ft.	ORGANIC CLAY	
4	12								
5	7	S-2	24/18	4-6	WOR/24"	—	Similar to S-1. Advance PW drill casing to 6 ft. Advance 3-7/8 in. roller bit to 6 ft.		
6	5								
7	5	WOH	24/5	6-8	WOR/24"	—	Sandy organic soil (OH); 60% organic clay/silt, 40% fine sand, trace gravel, organic odor, gray. Shells noted. Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft.		
8	8								8.0 ft.
9	15	S-4	24/12	8-10	2-4-3-4	7	Poorly graded sand (SP); loose, 75% fine sand, 20% medium sand, 5% silt, light gray to light brown. Advance PW drill casing to 10 ft. Advance 3-7/8 in. roller bit to 10 ft.	MARINE SAND	
10	19						Perform falling head permeability test at 10 ft.		

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.

2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.

3)

4)



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18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-101  
SHEET 2 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Failing Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing, Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-5	24/12	10-12	5-2-4-5	6	<b>Silty sand (SM); 58% fine sand, 3% medium sand, 1% coarse sand, 1% gravel, 37% silt, grayish-brown.</b>	MARINE SAND	1
11	23						Advance PW drill casing to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.		
12	22								
		S-6	24/16	12-14	4-3-5-5	8	Poorly graded sand (SP); loose, 60% fine sand, 40% medium sand, brown, Iron staining noted		
13	6						Advance PW drill casing to 14 ft. Advance 3-7/8 in. roller bit to 14 ft.		
14	10								
		S-7	24/11	14-16	3-1-1-5	2	Silty sand (SM); very loose, 75% fine sand, 10% medium sand, 15% silt, gray. Iron staining noted.		
15	WOH						Advance PW drill casing to 16 ft. Advance 3-7/8 in. roller bit to 16 ft.		
16	13								
		S-8	24/6	16-18	3-1-4-6	5	<b>Silty sand (SM); 53% fine sand, 10% medium sand, 1% gravel, 36% silt, red and gray.</b>		
17	16						Brown interbedded silt lenses. Advance PW drill casing to 18 ft. Advance 3-7/8 in. roller bit to 18 ft.		
18	25								
		S-9	24/6	18-20	5-3-5-7	8	<b>Silty sand with gravel (SM); 29% fine sand, 19% medium sand, 9% coarse sand, 15% gravel, 28% silt, brown.</b>	1	
19	24						Interbedded silt lenses. Advance PW drill casing to 20 ft. Advance 3-7/8 in. roller bit to 20 ft.		
20	27						Estimated strata change at 20 ft.		

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-101

SHEET 3 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
 Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
 Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	28	S-10	24/14	20-22	4-4-3-7	7*	Poorly graded sand with gravel (SP); 16% fine sand, 23% medium sand, 17% coarse sand, 42% gravel, 2% silt, brown. Subrounded to subangular sand and gravel. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.	GLACIO FLUVIAL	1,2
22	30								
23	24	S-11	24/0"	22-24	4-6-6-6	12*	Washed sample. Advance PW drill casing to 27 ft. Advance 3-7/8 in. roller bit to 27 ft. Mix bentonite drilling mud, specific gravity = 1.07.		2
24	31								
25	46								
26	43								
27	70								
28	53	S-12	24/0"	27-29	15-4-3-3	7	Washed sample. Advance PW drill casing to 32 ft. Advance 3-7/8 in. roller bit to 32 ft.		
29	57								
30	109								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-101

SHEET 4 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
 Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
 Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31	164						GLACIO FLUVIAL	32.0 ft.	
32	106								
33						Top of bedrock at 32.0 ft. Advance 3-7/8 in. roller bit to 32.8 ft. Telescope HW drill casing to 32.8 ft. Begin HQ rock core at 32.8 ft. (boring log continued on next page)	BEDROCK		
34									
35									
36									
37									
38									
39									
40									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01  
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New Bedford, Massachusetts

BORING NO. FD-101  
SHEET 5 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

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Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
33.3		R1	32.8-33.8	5 min.	Begin R1 at 32.8 ft. Fresh, hard to very hard, fine to medium grained GNEISS. Low angle foliation (approx. 10 to 20 degrees). REC. = 100%; RQD = 100% (excellent). Water return color: milky white.	
33.8						
34.3			33.8-34.8	5.25 min.		
34.8						
35.3			34.8-35.8	7 min.		
35.8						
36.3			35.8-36.8	6 min.		
36.8						
37.3			36.8-37.8	6 min.	37.5 ft.: Mechanical break in rock core. End R1 at 37.8 ft.	
37.8						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-101

SHEET 6 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
 Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
 Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Failing Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
38.3		R2	37.8-38.8	5.5 min	Begin R2 at 37.8 ft. Fresh, hard to very hard, fine to medium grained GNEISS. Low angle foliation (approx. 10 to 20 degrees). REC. = 100%; RQD = 100% (excellent). Water return color: milky white, except as noted.	
38.8						
39.3			38.8-39.8	5 min	38.9 ft.: Mechanical break in rock core.  39.4 to 40.5 ft.: Zone of red coloration, no change in grain size or texture noted. Water return color: pink to rusty.	
39.8						
40.3			39.8-40.8	6 min	39.8 and 40.1 ft.: Mechanical breaks in rock core.	
40.8						
41.3			40.8-41.8	6.5 min	40.8 and 40.9 ft.: Mechanical breaks in rock core. Core grinding noted.  41.3 ft.: Mechanical break in rock core. Core grinding noted.	
41.8						
42.3			41.8-42.8	6.25 min	41.9 ft.: Mechanical break in rock core.  42.2 ft.: Mechanical break in rock core.	
42.8					End R2 at 42.8 ft.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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- 4)





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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-101  
SHEET 7 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Failing Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
43.3		R3	42.8-43.8	5.5 min.	Begin R3 at 42.8 ft. Fresh, hard to very hard, fine grained GNEISS. Low angle foliation (approx. 10 to 20 degrees). REC. = 100%; RQD = 100% (excellent). Water return color: milky white.	
43.8						
44.3			43.8-44.8	5.75 min.		
44.8						
45.3			44.8-45.8	5 min.		
45.8						
46.3			45.8-46.8	4.5 min.		
46.8						
47.3			46.8-47.8	6.75 min.		
47.8						
47.1 ft.: Mechanical break in rock core.  End R3 at 47.8 ft. Bottom of exploration at 47.8 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.44.						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-101  
SHEET 8 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
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Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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<b>PROJECT</b>		BORING NO.	FD-101
Remedial Design For Operable Unit 01		SHEET	9 of 10
New Bedford Harbor Superfund Site		FILE NO.	48138.27
New Bedford, Massachusetts		CHKD. BY	J. Trottier

Boring Co.	Warren George, Inc.	Boring Location	northing 2697418	easting 814321	
Driller	S. Laurenza	Mudline El.	-8.37	Datum	NGVD
Logged By	S. Bonis	Date Start	1/8/2001	Date End	1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Drill Rig: Falling Truck Rig Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.	Groundwater Readings Not Applicable for Offshore Borings				
	Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-101  
SHEET 10 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697418 easting 814321  
Driller S. Laurenza Mudline El. -8.37 Datum NGVD  
Logged By S. Bonis Date Start 1/8/2001 Date End 1/9/2001

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Reddish discoloration noted in R2

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-102

SHEET 1 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
 Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
 Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC								
2	WOC								
3	WOC	UO-1	24/24	2-4			Sandy organic soil (OH); 60% organic clay/silt, 10% medium sand, 30% fine sand, organic odor, dark gray.	ORGANIC CLAY	
4	WOC								
5	WOC							5.0 ft.	
6	WOC	UO-2	24/24	5-7			Clayey sand (SC); 45% organic clay/silt, 20% medium sand, 25% fine sand, 10% coarse sand, organic odor, dark gray.	CLAYEY SAND	
7	WOC								
8	WOC								
9	WOC	UO-3	12/11	8-9			Similar to UO-2, except light gray to black. Osterberg sampler did not fully extend due to density of soils.		
10	44	S-1	24/11	9-11	26-12-12-14	24	S-1A: Clayey sand (SC); very stiff, 10% coarse sand, 20% medium sand, 25% fine sand, 45% organic clay/silt, organic odor, dark gray. (3 in.) S-1B: Poorly graded sand (SP); medium dense, 10% medium sand, 85% fine sand, 5% silt, olive brown. (8 in.)	9.5 ft. MARINE SAND	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-102

SHEET 2 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co.	<u>Warren George, Inc.</u>	Boring Location	<u>northing 2697476</u>	easting <u>814636</u>
Driller	<u>S. Laurenza</u>	Mudline El.	<u>-15.11</u>	Datum <u>NGVD</u>
Logged By	<u>A. Juneau</u>	Date Start	<u>11/30/2000</u>	Date End <u>12/8/2000</u>

Sampler:	2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.	Groundwater Readings Not Applicable for Offshore Borings				
Drill Rig:	Failing Truck Rig	Date	Time	Depth	Elev.	Stabilization Time
Drilling Method:	5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing, Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.					

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	42								
12	NR	S-2	24/14	11.5-13.5	5-3-4-15	7	Perform falling head permeability test at 11.5 ft. S-2A: Poorly graded sand (SP); loose, 10% medium sand, 85% fine sand, 5% silt, light gray. (9 in.) S-2B: Poorly graded sand with gravel (SP); loose, 40% coarse sand, 30% medium sand, 25% gravel, 5% fine sand, shells, angular to subangular sand and gravel, dark olive-gray. (5 in.)	MARINE SAND	
13	39						Advance PW drill casing to 13.5 ft. Mix bentonite drilling mud, specific gravity = 1.07.		
	47						Advance 4-7/8 in. roller bit to 13.5 ft.		
14		S-3	24/15	13.5-15.5	9-4-5-5	9	S-3A: Silty sand (SM); loose, 80% fine sand, 5% medium sand, 15% silt, organic odor. (4 in.) <b>S-3B: Silty sand (SM); 50% fine sand, 1% medium sand, 49% silt, gray. (11 in.)</b>		1
15							Advance PW drill casing to 15.5 ft. Advance 4-7/8 in. roller bit to 15.5 ft.		
16		S-4	24/17	15.5-17.5	6-3-4-2	7	Similar to S-3B, except olive gray. 1/16 in. seams of silt noted. Advance PW drill casing to 17.5 ft. Advance 4-7/8 in. roller bit to 17.5 ft.		
17									
	36								
18		S-5	24/20	17.5-19.5	8-5-5-4	10	<b>Silt with sand (ML); 28% fine sand, 72% silt, gray.</b> 1/16 to 1/4 in. seams of silt noted. Advance PW drill casing to 20 ft. Advance 4-7/8 in. roller bit to 20 ft.		1
19	20								
20	21							20.0 ft.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-102

SHEET 3 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2697476</u>	easting <u>814636</u>
Driller <u>S. Laurenza</u>	Mudline El. <u>-15.11</u>	Datum <u>NGVD</u>
Logged By <u>A. Juneau</u>	Date Start <u>11/30/2000</u>	Date End <u>12/8/2000</u>

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.	Groundwater Readings Not Applicable for Offshore Borings				
Drill Rig: Falling Truck Rig	Date	Time	Depth	Elev.	Stabilization Time
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.					

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-6	24/18	20-22	5-1-1-7	2	<b>S-6A: Silty clay (CL-ML); 10% fine sand, 1% medium sand, 89% silt/clay, grayish brown.</b> Fine sand lenses (1/16 in.), high plasticity. (14 in.)	MARINE SAND	1
21	21						<b>S-6B: Silty sand (SM); very loose, 55% fine sand, 30% silt, 15% clay, yellow brown. Slight to moderate plasticity. (4 in.)</b>		
		S-7	24/13	22-24	11-13-12-12	25	<b>S-7A: Silt with sand (ML); 27% fine sand, 2% medium sand, 71% silt, grayish brown. (8 in.)</b> <b>S-7B: Poorly graded sand with gravel (SP); medium dense, 5% coarse sand, 40% medium sand, 40% fine sand, 15% gravel, subangular to round gravel, subangular to subround sand, oxidized 2 in. horizon at soil interface. (5 in.)</b>	23.0 ft.	1
23	41							GLACIO FLUVIAL	1
24	45								
25	44						Perform falling head permeability test at 25 ft.		
		S-8	24/11	25-27	26-36-38-28	74	<b>S-8A: Silty sand (SM); very dense, 75% fine sand, 25% silt, yellow brown. (4 in.)</b> <b>S-8B: Well-graded gravel with sand (GW); 10% coarse sand, 13% medium sand, 9% fine sand, 66% gravel, 2% silt, yellowish-brown. (7 in.)</b>		
26	50						Advance PW drill casing to 30 ft. Advance 3-7/8 in. roller bit to 30 ft.		
27	41								
28	34								
29	26								
30	13								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-102

SHEET 4 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
 Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
 Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31	NR	S-9	24/6	30-32	11-9-15-7	24	Well-graded sand (SW); medium dense, 25% coarse sand, 35% medium sand, 30% fine sand, 5% gravel, 5% silt, subangular to subround sand and gravel, yellow brown. Advance PW drill casing to 35 ft. Advance 3-7/8 in. roller bit to 35 ft.	GLACIO FLUVIAL	1
32	26								
33	35								
34	30								
35	35								
36	11	S-10	24/7	35-37	6-7-24-35	31	<b>S-10A: Silt (ML); 4% fine sand, 1% medium sand, 95% silt, light brown. (2 in.)</b> <b>S-10B: Silty sand (SM); 85% fine sand, 15% silt, yellow orange iron stained. (3 in.)</b> <b>S-10C: Poorly graded sand (SP); 60% fine sand, 25% medium sand, 5% coarse sand, 5% gravel, 5% silt, subround to angular sand and gravel, yellow brown. (2 in.)</b> Advance PW drill casing to 40 ft. Advance 3-7/8 in. roller bit to 40 ft.		
37	17								
38	71								
39	61								
40	42						Perform falling head permeability test at 40 ft.		

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
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 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

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New Bedford, Massachusetts

BORING NO. FD-102

SHEET 5 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
 Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
 Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-11	24/12	40-42	24-54-39-11	93*	<b>Poorly graded gravel with silt and sand (GP-GM); 13% fine sand, 17% medium sand, 11% coarse sand, 50% gravel, 9% silt, brown.</b> Coarse (1-1/2 to 2 in.) angular to subrounded gravel. Obstruction passed at 41.3 ft. during sampling. Advance PW drill casing to 45 ft. Advance 3-7/8 in. roller bit to 45 ft.	GLACIO FLUVIAL	1,2
41	12								
42	67								
43	104								
44	88								
45	106								
		S-12	24/2	45-47	28-11-9-8	21	Washed sample. Sample consists predominantly of coarse wash (disturbed sample). Sample anticipated to be similar to S-11 (ball check clogged in spoon). Advance PW drill casing to 50 ft. Advance 3-7/8 in. roller bit to 50 ft.	GLACIO FLUVIAL	
46	60								
47	60								
48	66								
49	112								
50	242								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-102

SHEET 6 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
 Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
 Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
51	122	S-13	24/14	50-52	32-36-35-24	71	Poorly graded sand with gravel (SP); very dense, 60% medium sand, 25% fine sand, 15% gravel, angular to subangular sand, subrounded to subangular gravel, light olive brown. Advance PW drill casing to 53.2 ft.	GLACIO FLUVIAL	53.2 ft.
52	132								
53	152								BEDROCK
54	232/3"						Top of bedrock at 53.2 ft. Advance 3-7/8 in. roller bit to 54.2 ft. Telescope HW casing to 54.2 ft. Begin HQ rock core at 54.2 ft. (boring log continued on next page)		
55									
56									
57									
58									
59									
60									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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BORING NO. FD-102  
SHEET 7 of 12  
FILE NO. 48138.27  
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

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Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
54.5		R1	54.2-55.2	30.5 min.	<p>Begin R1 at 54.2 ft.</p> <p>Fresh, very hard, gray, fine to medium grained GNEISS. No natural joints/fractures observed in recovered pieces, semi-planar, low angle biotite foliation (approx. 15 to 25 degrees), no discontinuities or weathered zones observed in recovered pieces of core.</p> <p>REC = 70%; RQD =70%</p> <p>Water return color: milky white.</p> <p>Drive head pressure not used during first foot of core run R1 (54.2 - 55.2 ft.). No recovery obtained during core run R1 and first overcore of R1, three consecutive overcores of R1 yielded recoveries of 14, 12 and 16 in., respectively; with a total recovery of 42 in. Core recovery and RQD for core run R1 low due to core grinding during numerous overcores.</p> <p>Rock integrity is estimated to be similar to R2.</p> <p>RQD based upon Geologist interpretation of rock core and total recovery of 70%.</p>	
55.0			55.2-56.2	13.8 min.		
56.0			56.2-57.2	12.25 min.		
56.5						
57.0			57.2-58.2	18.25 min.		
57.5						
58.0			58.2-59.2	16 min.		
58.5						
59.0						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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BORING NO. FD-102  
SHEET 8 of 12  
FILE NO. 48138.27  
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Failing Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
59.5		R2	59.2-60.2	10 min.	Begin R2 at 59.2 ft. Fresh, very hard, pinkish gray, fine to medium grained GNEISS. No natural joints/fractures observed semi-planar, low angle biotite foliation (approx. 15 degrees), no discontinuities or weathered zones observed. R2 included 2.4 ft. of overcore from R1. REC = 100%; RQD =100% Water return color: milky white to light gray.	
60.0						
60.5			60.2-61.2	9.5 min.		
61.0					60.8 ft.: Mechanical break in rock core, no noticeable core grinding observed.	
61.5			61.2-62.3	10.4 min.	61.3 ft.: Mechanical break in rock core, no noticeable core grinding observed.	
62.0						
62.5		R3	62.2-63.2	11.2 min.	End R2 at 62.2 ft. Begin R3 at 62.2 ft. Fresh, very hard, pinkish gray, fine to medium grained GNEISS. No natural joints/fractures observed semi-planar, low angle biotite foliation (approx. 10 to 15 degrees), no discontinuities or weathered zones observed. REC = 100%; RQD =100% Water return color: milky white.	
63.0						
63.5			63.2-64.2	11.5 min.	63.0 ft.: Mechanical break in rock core, no core grinding noted. 63.1 ft.: Mechanical break in rock core along biotite foliation, no core grinding noted.	
64.0					63.5 ft.: Mechanical break in rock core, no core grinding noted.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



Nobis Engineering  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-102

SHEET 9 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
 Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
 Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Failing Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
64.5			64.2-65.2	12.5 min.	65.4 ft.: High angle mechanical break in rock core, no noticeable core grinding noted.	
65.0			65.2-66.2	10.7 min.		
65.5			66.2-67.1	8.7 min.		
66.0			67.1-68.1	8.8 min.		
66.5			68.1-69.1	7.3 min.		
67.0						
67.5						
68.0						
68.5						
69.0						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-102

SHEET 10 of 12

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697476 easting 814636  
 Driller S. Laurenza Mudline El. -15.11 Datum NGVD  
 Logged By A. Juneau Date Start 11/30/2000 Date End 12/8/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Failing Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
69.5			69.1-70.1	6.5 min.	69.9 ft.: Mechanical break in rock core, no noticeable grinding noted.	
70.0						
70.5			70.1-71.1	6.3 min.		
71.0						
71.5			71.1-72.1	11.5 min.	End R4 at 72.1 ft. Bottom of exploration at 72.1 ft. Boring terminated in bedrock.	
72.0						
72.5						
73.0						
73.5						
74.0						

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-103

SHEET 1 of 10

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
 Driller E. Thomas Mudline El. -21.27 Datum NGVD  
 Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft. Advance 3-7/8 in. roller bit to 2 ft. No water return noted in casing.	ORGANIC CLAY	
1	WOC								
2	WOC								
							Attempt sample from 2 to 4 ft. Driller dropped drill string with sampler down drill casing. Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft.		
3	WOC								
4	WOC								
5	WOC								
6	WOC								
7	WOC								
8	WOC								
		UO-1 24/0	8-10				Estimated strata change at 8 ft. No recovery.	8.0 ft.	
		S-1 24/6	8-10	3-2-2-1	4		Silty Sand (SM); loose, 75% fine sand, 25% silt, strong organic odor, gray.		
9	15						Advance PW drill casing to 10 ft. Mix bentonite drilling mud, specific gravity = 1.07. Advance 3-7/8 in. roller bit to 10 ft.	MARINE SAND	
10	28								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-103

SHEET 2 of 10

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2697531</u>	<u>easting 814770</u>
Driller <u>E. Thomas</u>	Mudline El. <u>-21.27</u>	Datum <u>NGVD</u>
Logged By <u>E. Thibodeau / S. Bonis</u>	Date Start <u>11/20/2000</u>	Date End <u>11/27/2000</u>

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.	Groundwater Readings Not Applicable for Offshore Borings				
Drill Rig: Acker AD II Truck Rig	Date	Time	Depth	Elev.	Stabilization Time
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.					

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-2	24/13	10-12	7-4-1-1	5	<b>Silty clay with sand (CL-ML); 14% fine sand, 2% medium sand, 84% silt/clay, brown.</b>		1
11	35						Advance PW drill casing to 12 ft. Advance 4-7/8 in. roller bit to 12 ft.	MARINE SAND	
12	21								
		S-3	24/10	12-14	6-2-3-4	5	<b>S-3A: Similar to S-2. (7-in.) S-3B: Silty sand (SM); 9% coarse sand, 29% medium sand, 36% fine sand, 2% gravel, 24% silt, brown. Subangular sand and gravel. (3 in.)</b>		1
13	40						Advance PW drill casing to 14 ft. Advance 4-7/8 in. roller bit to 14 ft.		
14	43							13.5 ft.	
		S-4	24/8	14-16	5-2-3-4	5	<b>Poorly graded sand with silt and gravel (SP-SM); 14% coarse sand, 27% medium sand, 18% fine sand, 36% gravel, 5% silt, brown. Subangular sand and gravel.</b>		1
15	34						Advance PW drill casing to 16 ft. Advance 4-7/8 in. roller bit to 16 ft.		
16	41							GLACIO FLUVIAL	
		S-5	24/7	16-18	6-4-3-6	7	<b>Similar to S-4. Subangular sand and gravel.</b>		
17	41						Advance PW drill casing to 18 ft. Advance 4-7/8 in. roller bit to 18 ft.		
18	44								
		S-6	24/8	18-20	23-8-10-9	18	<b>Poorly graded sand with silt and gravel (SP-SM); 11% coarse sand, 20% medium sand, 17% fine sand, 43% gravel, 9% silt, brown. Subangular to angular sand and gravel.</b>		1
19	WOC						Advance PW drill casing to 23 ft. Advance 4-7/8 in. roller bit to 23 ft. Specific gravity of drill fluid = 1.10.		
20	WOC								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-103

SHEET 3 of 10

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
 Driller E. Thomas Mudline El. -21.27 Datum NGVD  
 Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	40								
22	34								
23	44								
24	17	S-7	24/8	23-25	6-7-8-6	15	<b>Silty sand (SM); 14% coarse sand, 31% medium sand, 27% fine sand, 10% gravel, 18% silt, brown. Subangular sand and gravel.</b> Advance PW drill casing to 28 ft. Advance 4-7/8 in. roller bit to 28 ft.	GLACIO FLUVIAL	1
25	45								
26	46								
27	34								
28	42								
29	WOC	S-8	24/9	28-30	10-8-8-9	16	<b>Well-graded sand with gravel (SW); medium dense, 30% coarse sand, 35% medium sand, 20% fine sand, 15% gravel, subangular sand and gravel, red-brown. Iron staining noted.</b> Advance PW drill casing to 33 ft. Advance 4-7/8 in. roller bit to 33 ft.		
30	40								

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-103

SHEET 4 of 10

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
 Driller E. Thomas Mudline El. -21.27 Datum NGVD  
 Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31	45							GLACIO FLUVIAL	1
32	46								
33	48								
		S-9	24/6	33-35	18-10-9-10	19	<b>Silty sand with gravel (SM); 9% coarse sand, 24% medium sand, 23% fine sand, 26% gravel, 18% silt, brown. Subangular to angular sand and gravel.</b> Advance PW drill casing to 36.5 ft.		
34	61								
35	87								
36	59								
	71								
37							Refusal of PW drill casing at 36.5 ft. Advance 4-7/8 in. roller bit to 36.5 ft. Advance 4-7/8 in. roller bit to 38 ft. to confirm bedrock.		
38									
39									
40							Break through at 40 ft. with 4-7/8 in. roller bit.	40.0 ft.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

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BORING NO. FD-103

SHEET 5 of 10

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
 Driller E. Thomas Mudline El. -21.27 Datum NGVD  
 Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	SPIN	S-10	24/6	40-42	25-25-36-32	>50	Poorly graded sand with gravel (SP); very dense, 15% coarse sand, 55% medium sand, 15% fine sand, 15% gravel, angular to subangular sand and gravel, brown. Telescope HW drill casing to 42 ft. Advance 3-7/8 in. roller bit to 43 ft.	GLACIO FLUVIAL	
42	SPIN						Probable cobble/boulder from 42 to 43 ft.	42.0 ft. COBBLE/BOULDER	
43	SPIN						Estimated strata change at 43 ft.	43.0 ft.	
44	SPIN	S-11	14/13	43-44.2	23-39- 13/2"-25/0"	—	Silty sand with gravel (SM); 10% coarse sand, 30% medium sand, 20% fine sand, 25% gravel, 15% silt, angular to sub-angular sand and gravel, brown (GLACIAL TILL) Advance HW drill casing to 45.5 ft. Advance 3-7/8 in. roller bit to 45.5 ft.	GLACIAL TILL	
45	SPIN						Top of bedrock at 45 ft. Begin HQ rock core at 45.5 ft. (Boring log continued on next page)	45.0 ft. BEDROCK	
46									
47									
48									
49									
50									

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-103

SHEET 6 of 10

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
 Driller E. Thomas Mudline El. -21.27 Datum NGVD  
 Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
46.0		R1	45.5-46.5	6 min.	Begin R1 at 45.5 ft. Fresh, hard, gray, fine-grained GNEISS. No jointing observed. Low angle foliation (10 degrees). REC=98%; RQD=98% (excellent). Water return color: milky white.	
46.5			46.5-47.5	6 min.		
47.0						
47.5					47.4 ft.: Mechanical break in rock core. Minor core grinding noted.	
48.0			47.5-48.5	6 min.	47.8 ft.: Mechanical break in rock core. Minor core grinding noted. 48.1 ft.: Mechanical break in rock core. Minor core grinding noted.	
48.5					48.4 ft.: Mechanical break in rock core.	
49.0			48.5-49.5	6.5 min.	48.9 ft.: Mechanical break in rock core.	
49.5					49.3 ft.: Mechanical break in rock core.	
50.0			49.5-50.5	8.5 min.	49.5 ft.: Mechanical break in rock core.	
50.5					End R1 at 50.5 ft.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2)
- 3)
- 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-103  
SHEET 7 of 10  
FILE NO. 48138.27  
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
Driller E. Thomas Mudline El. -21.27 Datum NGVD  
Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.0		R2	50.5-51.5	6 min.	Begin R2 at 50.5 ft. Fresh, very hard, gray, fine-grained GNEISS. Low angle foliation (approx. 10-20 degrees). REC=98%; RQD 95% (excellent) Water return color: milky white. 50.8 ft.: Mechanical break in rock core.	
51.5			51.5-52.5	8 min.		
52.0						
52.5						
53.0					52.6 ft.: Mechanical break in rock core.	
53.5						
54.0						
54.5					54.5 ft.: Mechanical break in rock core.	
55.0					54.5 ft.: Primary joint: low angle, rough, planar, slightly discolored and open.	
55.5					End R2 at 55.5 ft.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-103  
SHEET 8 of 10  
FILE NO. 48138.27  
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
Driller E. Thomas Mudline El. -21.27 Datum NGVD  
Logged By E. Thibodeau / S. Bonis Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
56.0		R3	55.5-56.5	8 min.	Begin R3 at 55.5 ft. Fresh, very hard, gray, fine-grained GNEISS. Low angle foliation (approx. 20 degrees). REC=96%; RQD=96% (excellent) Water return color: milky white.	
56.5					56.3 ft.: Mechanical break in rock core. 56.3 to 56.8 ft.: Quartz vein. Pink to dark gray in color.	
57.0			56.5-57.5	20 min.	56.5 ft.: Primary joint: moderately dipping, smooth, planar, slightly discolored and open.	
57.5					56.9 ft.: Mechanical break in rock core.	
58.0		R4	57.5-58.5	7 min.	End R3 at 57.5 ft. Core run terminated due to core bit polishing and long core time. Begin R4 at 57.5 ft. Fresh, very hard, gray, fine-grained GNEISS. Low angle foliation (approx. 20 degrees). REC=92%; RQD=92% (excellent)	
58.5					58.3 to 58.3 ft.: Quartz vein. Pink to dark gray in color.	
59.0			58.5-59.5	13 min.		
59.5						
60.0			59.5-60.5	14 min.	59.7 ft.: Mechanical break in rock core.	
60.5					End R4 at 60.5 ft. Perform constant head permeability test from 45.5 to 60.5 ft.. Bottom of exploration at 60.5 ft. Boring terminated in bedrock. Grout completed borehole to mudline. Specific gravity = 1.46.	

GRANULAR SOILS (N-Values)	COHESIVE SOILS (N-Values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2)
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-103  
SHEET 9 of 10  
FILE NO. 48138.27  
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697531 easting 814770  
Driller E. Thomas Mudline El. -21.27 Datum NGVD  
Logged By E. Thibodeau Date Start 11/20/2000 Date End 11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Drill Rig: Acker AD II Truck Rig Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.	Groundwater Readings Not Applicable for Offshore Borings				
	Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Run R4

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2)  
 3)  
 4)



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18 Chenell Drive  
Concord, New Hampshire 03301

<b>PROJECT</b>		BORING NO.	FD-103
Remedial Design For Operable Unit 01		SHEET	10 of 10
New Bedford Harbor Superfund Site		FILE NO.	48138.27
New Bedford, Massachusetts		CHKD. BY	S. Bonis

Boring Co.	Warren George, Inc.	Boring Location	northing 2697531	easting 814770	
Driller	E. Thomas	Mudline El.	-21.27	Datum	NGVD
Logged By	E. Thibodeau	Date Start	11/20/2000	Date End	11/27/2000

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Drill Rig: Acker AD II Truck Rig Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.	Groundwater Readings Not Applicable for Offshore Borings				
	Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Quartz/feldspar vein noted in R3



Quartz/feldspar vein noted in R4

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2)
- 3)
- 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 1 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (RW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC						Advance sampler to 2 ft.		
2	WOC								
		UO-1	24/24	2-4			Organic soil (OH); 90% organic clay/silt, 10% fine sand, moderate organic odor, dark gray.		
3	WOC						Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft. No water return noted.		
4	WOC								
5	WOC								
		UO-2	24/24	5-7			Clayey sand (SC); 60% fine sand, 40% organic clay/silt, moderate organic odor, gray.		
6	WOC						Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft. Water return noted.		
7	WOC								
8	WOC								
		S-1	24/10	8-10	WOR-4-3-2	7	S-1A; Similar to UO-2. (6 in.) S-1B; Lean clay with sand (CL); medium stiff, 75% clay, 25% fine sand, olive brown. (4 in.)	8.50 ft.	
9	WOC						Advance PW drill casing to 10 ft. Advance 3-7/8 in. roller bit to 10 ft.		
10	WOC								

GRANULAR SOILS (INCHES)	COHESIVE SOILS (INCHES)	SYMBOL KEY	
0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.  
 3)  
 4)



Nobis Engineering  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 2 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Bore No.	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-2	24/12	10-12	4-2-1-1	3	Sandy lean clay (CL); soft, 40% clay, 25% silt, 35% fine sand, olive-brown, 1/2 in. thick medium to fine sand seam noted in sample.	MARINE SAND	
11	WOC						Advance PW drill casing to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.		
12	WOC							12.0 ft.	
		S-3	24/12	12-14	5-4-5-6	9	S-3A: Silty sand (SM); 1% coarse sand, 32% medium sand, 26% fine sand, 12% gravel, 27% silt, olive-brown. Some shell fragments noted (8 in.) S-3B: Poorly graded sand with gravel (SP); loose, 15% coarse sand, 30% medium sand, 20% fine sand, 30% gravel, 5% silt, subrounded to subangular sand and gravel, brown (4 in.)	GLACIO FLUVIAL	1
13	15						Mix bentonite drilling mud. Specific gravity = 1.07. Advance PW drill casing to 14 ft. Advance 3-7/8 in. roller bit to 14 ft.		
14	8						S-4: Poorly graded gravel with sand (GP); 14% coarse sand, 20% medium sand, 13% fine sand, 50% gravel, 3% silt, brown. Subrounded sand and gravel. Advance PW drill casing to 16 ft. Advance 3-7/8 in. roller bit to 16 ft.		
15	20	S-4	24/7	14-16	6-3-4-4	7			
16	27								
		S-5	24/1	16-18	9-4-9-9	13	Poor recovery; washed sample. Mixed additional bentonite into drilling mud. Advance PW drill casing to 18 ft. Advance 3-7/8 in. roller bit to 18 ft.	GLACIO FLUVIAL	
17	22								
18	20	S-6	24/2	18-20	4-4-3-4	7	Poor recovery; washed sample. Advance PW drill casing to 20 ft. Advance 3-7/8 in. roller bit to 20 ft.		
19	11						Approximately 6 in. of gravel in drill casing, unable to remove material from casing.		
20	8								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) 3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 3 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697289 easting 814756  
 Driller E. Thomas Mudline El. -20.91 Datum NGVD  
 Logged By E. Thibodeau Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches. Groundwater Readings Not Applicable for Offshore Borings  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (FW) flush joint drill casing. Date Time Depth Elev. Stabilization Time  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

DEPTH	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-Value			
21	11	S-7	24/9	20-22	5-4-4-5	8*	Poorly graded sand with gravel (SP); 13% coarse sand, 26% medium sand, 23% fine sand, 36% gravel, 2% silt, brown. Subangular sand, subrounded gravel. Advance PW drill casing to 21 ft. Casing secured to barge. Advance 3-7/8 in. roller bit to 22 ft.	GLACIO FLUVIAL	1.2
22	DROP								
23	DROP	S-8	24/9	22-24	4-4-5-5	9*	Poorly graded sand (SP); loose, 20% coarse sand, 30% medium sand, 10% fine sand, 35% gravel, 5% silt, subangular sand and gravel, brown. Casing dropped to 25 ft. No material in casing.		
24	DROP								
25	DROP								
26	WOC	S-9	24/1	25-27	4-4-2-3	6	Poor recovery, washed sample. Advance PW drill casing to 30 ft. Casing advanced by own weight to 27.5 ft. Attempted to seal zone off. Mix additional bentonite into drilling mud. Specific gravity = 1.12. Advance 2 15/16 in. roller bit to 30 ft. Approximately 18 in. of cuttings in casing. Mix additional bentonite into drilling mud. Advance roller bit to remove material; approximately 6 to 8 in. of material in casing.		
27	WOC								
28	WOC								
29	32								
30	19								

0 to 4 - Very Loose  
 5 to 10 - Loose  
 11 to 30 - Medium Dense  
 31 to 50 - Dense  
 Over 50 - Very Dense

0 to 2 - Very Soft  
 3 to 4 - Soft  
 5 to 8 - Medium Stiff  
 9 to 15 - Stiff  
 16 to 30 - Very Stiff  
 Over 30 - Hard

1. S denotes split-barrel sampler.  
 2. U denotes 3-inch O.D. undisturbed sample.  
 3. UO denotes 3-inch Osterberg undisturbed sample.  
 4. PEN denotes penetration length of sampler.  
 5. REC denotes recovered length of sample.  
 6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector.  
 8. PPM denotes parts per million.  
 9. PP denotes Pocket Penetrometer.  
 10. FVST denotes field vane shear test.  
 11. RQD denotes Rock Quality Designation.  
 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.  
 3)  
 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 4 of 11

FILE NO. 48138.27

CHKD. BY S. Boris

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) Bush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S		
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value					
		S-10	24/6	30-32	8-7-5-6	12*	<b>Poorly graded gravel with sand (GP); 55% gravel, 10% coarse sand, 18% medium sand, 14% fine sand, 3% silt, gray. Subrounded to subangular gravel and sand. Switch to mud rotary drilling techniques at 32 ft. Attempt 5 ft. open hole. Advance 3- 7/8 in. roller bit to 37 ft. Hole stayed open, slowly losing mud during roller bit advancement.</b>	GLACIO FLUVIAL	1,2		
31	NR										
32	NR										
33	NR										
34	NR										
35	NR										
36	NR										
37	NR										
		S-11	24/4	37-39	6-4-4	8				<b>Poorly graded sand with gravel (SP); 11% coarse sand, 23% medium sand, 15% fine sand, 47% gravel, 4% silt, gray. Subrounded to subangular sand and gravel. Advance PW drill casing to 40 ft. Mix additional bentonite drilling mud. Advance 3-7/8 in. roller bit to 40 ft. Approximately 8 to 12 in. cuttings in casing. Unable to remove material.</b>	1
38	NR										
39	NR										
40	NR										

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)



Noble Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 5 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-12	24/6	40-42	6-4-4-5	8	Poorly graded gravel with silt and sand (GP-GM); 72% gravel, 5% coarse sand, 9% medium sand, 8% fine sand, 6% silt, gray. Subrounded to subangular sand and gravel. Advance 3-7/8 in. roller bit to 45 ft. by mud rotary open hole.	GLACIO FLUVIAL	1
41	NR								
42	NR								
43	NR								
44	NR						44.0 ft.	GLACIAL TILL	
						Change in drilling resistance at 44 ft. Estimated strata change at 44 ft.			
45	NR	S-13	24/6	45-47	6-20-30-37	50	Silty sand with gravel (SM); very dense, 10% coarse sand, 15% medium sand, 30% fine sand, 25% gravel, 20% silt, angular gravel, brown. (Glacial Till) Mix additional bentonite drilling mud. Advance 3-7/8 in. roller bit to 47 ft. by mud rotary. Top of bedrock 47 ft. Advance PW drill casing to 45.5 ft. Advance 3-7/8 in roller bit to 47.6 ft. Telescope HW drill casing to begin HQ bedrock coring at 47.6 ft. (boring log continued on next page)		
46							47.0 ft.	BEDROCK	
47									
48									
49									
50									

GRAVEL SOILS (VALUES)	COHESIVE SOILS (VALUES)	SYMBOLS	REMARKS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) 1.5-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 6 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD H Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
48		R1	47.6-48.6	8 mins	Begin R1 at 47.6 ft. Fresh, hard, gray, fine grained GNEISS, low angle foliation (approximately 20 to 30 degrees). REC = 93%; RQD = 92% (excellent) Water return color: milky white. Most of water return noted coming up PW drill casing. 47.8 ft.: Mechanical break in rock core. Minor core grinding noted.	
48.5			48.6-49.6	7 mins		
49						
49.5			49.6-50.6	9 mins		
50						
50.5			50.6-51.6	8.5 mins	50.9 ft.: Mechanical break in rock core.	
51					51.4 ft.: Mechanical break in rock core.	
51.5			51.6-52.6	6.5 mins	51.5 ft.: Mechanical break in rock core. 51.6 ft.: Mechanical break in rock core. Minor core grinding noted. 51.7 ft.: Primary joint: low angle, rough, planar, discolored, and open.	
52						
52.5					End R1 at 52.6 ft.	

<p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photolionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
--	--	--	---

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 7 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
53		R2	52.6 - 53.6	3 mins.	Begin R2 at 52.6 ft. Fresh, hard, gray, fine-grained GNEISS. Low angle foliation (approx. 20 degrees). REC=100%; RQD=95% (excellent) Water return color: milky white. Water return noted only from PW drill casing. 53 to 53.2 ft.: Mechanical break in rock core (vertical). 53.1ft.: Mechanical break in rock core (horizontal).	
53.5						
54			53.6 - 54.6	3.5 mins.	53.8 to 54.4 ft.: Secondary joint; high angle, rough, planar, discolored and open. 53.9 to 54.7 ft.: High angle to vertical healed joint. 54.1ft.: Mechanical break in rock core.	
54.5						
55			54.6 - 55.6	4 mins.	54.4 to 57.6 ft.: High angle to vertical healed joint. Several mechanical breaks noted.	
55.5						
56			55.6 - 56.6	4.5 mins.		
56.5						
57		56.6 - 57.6	6 mins.	56.5 to 57.3 ft.: High angle to vertical healed joint. 56.6 ft.: Primary joint; low angle, rough, undulating, discolored and open.		
57.5				End R2 at 57.6 ft.		

GRANULAR SOILS (INVERT)	COHESIVE SOILS (INVERT)	MECHANICAL
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.

- 7. PID denotes Photoionization Detector
- 8. PPM denotes parts per million.
- 9. PP denotes Pocket Penetrometer.
- 10. FVST denotes field vane shear test.
- 11. RQD denotes Rock Quality Designation.
- 12. R denotes core run number.

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 8 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acter AD II Truck Rig.  
Drilling Method: 3-inch (PW) flush joint drill casing 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
58		R3	57.6 - 58.6	3.5 mins.	<p>Begin R3 at 57.6 ft. Fresh; hard, gray, fine-grained GNEISS. Low angle foliation (approx. 20 - 30 degrees). REC = 100%, RQD = 100% (excellent) Water return color: milky white. Water return noted from PW drill casing only. 57.6 to 58.4 ft.: Healed joint. High angle to vertical. Continuation from core run R2.</p>	
58.5			58.6 - 59.6	4.5 mins.		
59			59.6 - 60.6	7 mins.		
59.5			60.6 - 61.6	4 mins.		
60			61.6 - 62.6	4 mins.	60.5 ft: Mechanical break in rock core. Minor core grinding noted.	
60.5						
61						
61.5						
62						
62.5					End of R3 at 62.6 ft. Attempt to seat and seal HW drill casing into bedrock for constant head permeability test. Attempt unsuccessful. Bottom of exploration at 62.6 ft.; boring terminated in bedrock. Grouted completed borehole to mudline, specific gravity = 1.42.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UQ denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 9 of 11

FILE NO. 48138.27

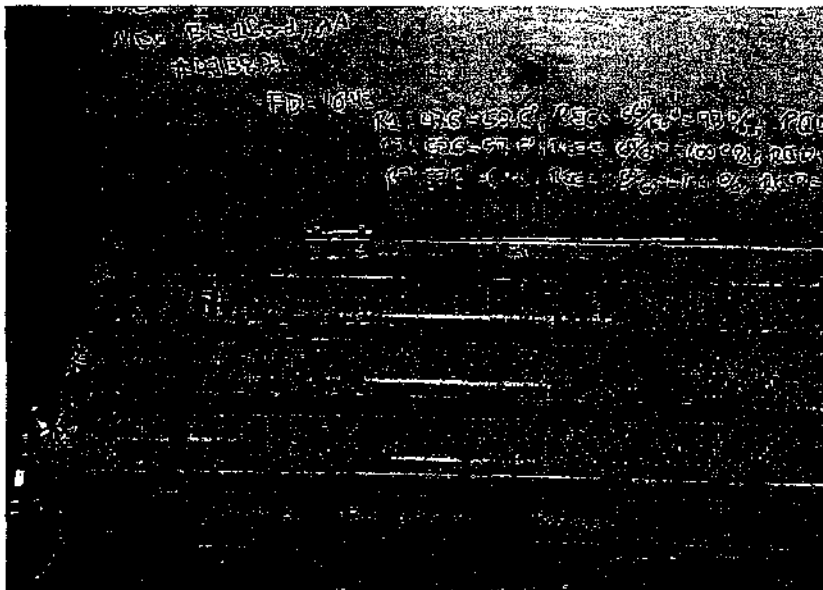
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697289 easting 814756  
 Driller E. Thomas Mudline El. -20.91 Datum NGVD  
 Logged By E. Thibodeau Date Start 11/28/00 Date End 11/30/00

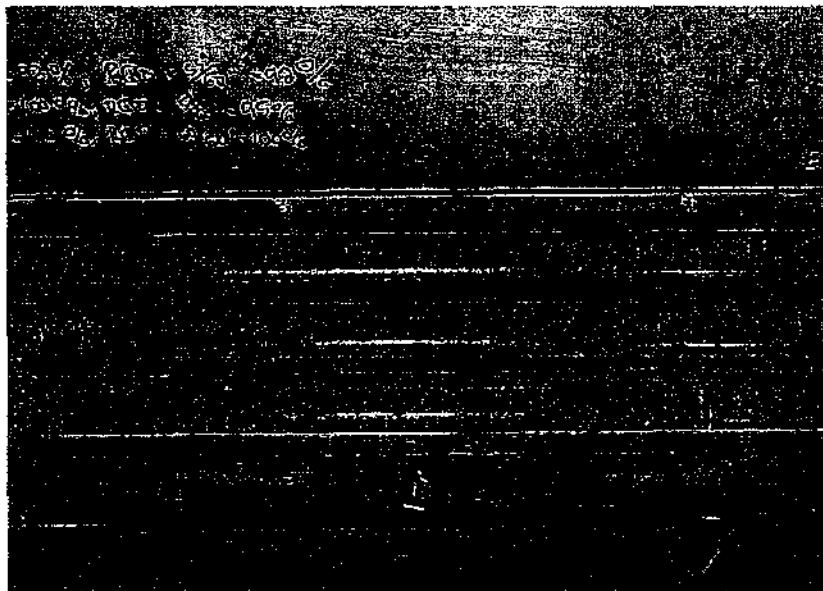
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-104

SHEET 10 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

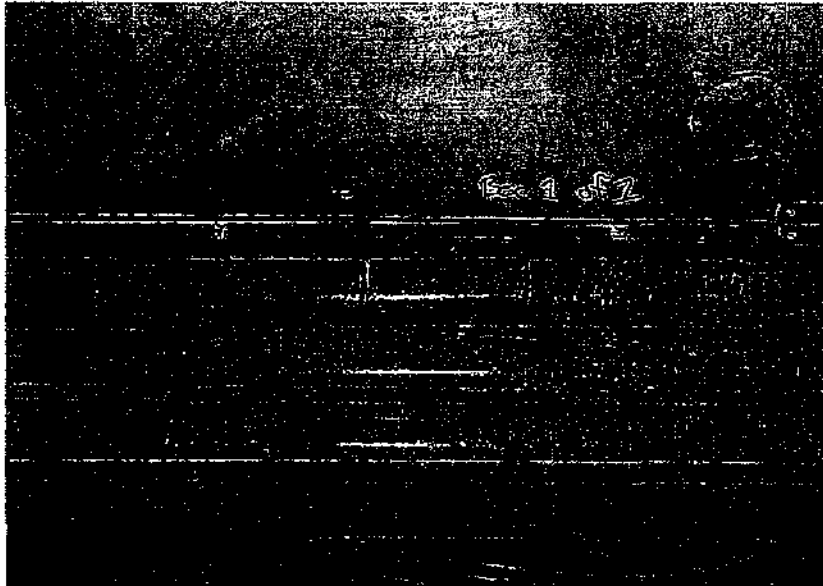
Boring Location northing 2697289 easting 814756  
Mudline El. -20.91 Datum NGVD  
Date Start 11/28/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

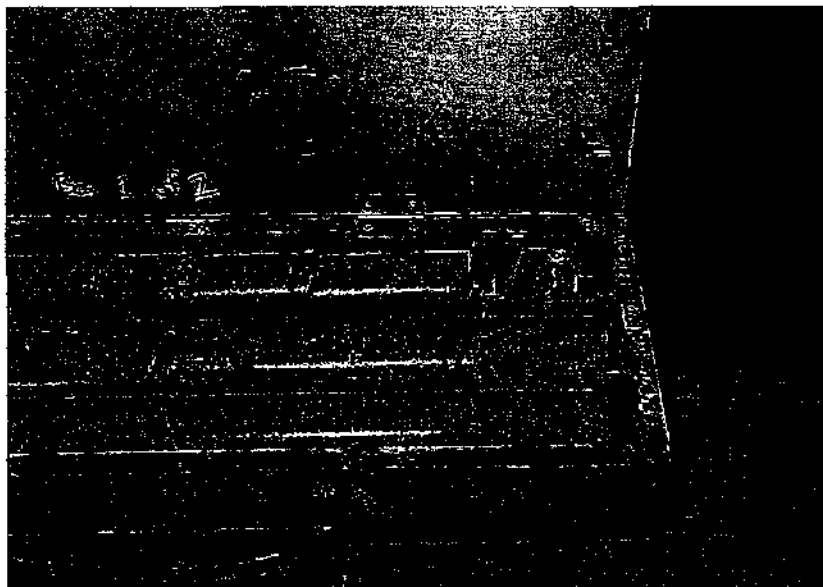
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)



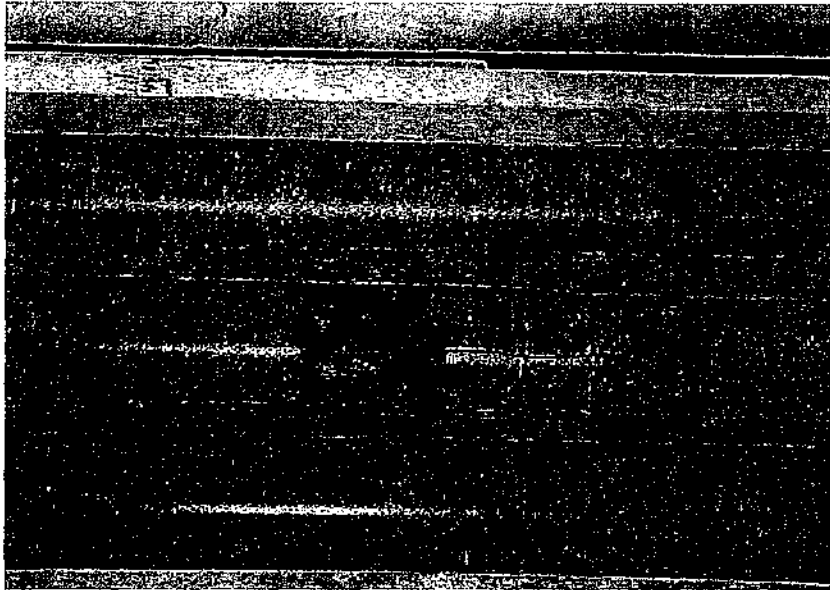
Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

<b>PROJECT</b>		BORING NO. <u>FD-104</u>
<u>Remedial Design For Operable Unit 01</u>		SHEET <u>11 of 11</u>
<u>New Bedford Harbor Superfund Site</u>		FILE NO. <u>48138.27</u>
<u>New Bedford, Massachusetts</u>		CHKD. BY <u>S. Bonis</u>

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2697289</u>	<u>easting 814756</u>
Driller <u>E. Thomas</u>	Mudline El. <u>-20.91</u>	Datum <u>NGVD</u>
Logged By <u>E. Thibodeau</u>	Date Start <u>11/28/00</u>	Date End <u>11/30/00</u>

Sampler: <u>2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.</u> Drill Rig: <u>Acker AD II Truck Rig</u> Drilling Method: <u>5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.</u> Casing driven with a <u>300 lb. center hole hammer free falling from a height of 24 inches.</u>	Groundwater Readings Not Applicable for Offshore Borings				
	Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Secondary joint noted in R2

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split barrel sampler driven with a 140-lb automatic hammer free-falling from a height of 30 inches.
- 3)
- 4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105

SHEET 1 of 5

FILE NO. 48138.27

CHKD. BY S. Bonis

Drilling Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2697207  
Mudline El. -12.29  
Date Start 11/21/00

easting 814556  
Datum NGVD  
Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Rig: Falling Truck Rig

Logging Method: 5-inch (PW) flush joint drill casing, 4-inch (H-W) flush joint drill casing, logging driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing (ft)	Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES			
						Advance sampler to 2 ft.		
	WOC							
	WOC							
		UO-1	24/24	2-4		Organic soil with sand (OH); 5% coarse sand/shells, 15% fine sand, 80% organic clay/silt, strong organic odor, olive gray Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft.		
	WOC							
	WOC							
		UO-2	24/24	5-7		Similar to UO-1, possible disturbed sample. Advance PW drill casing to 8.5 ft. Advance 3-7/8 in. roller bit to 8.5 ft.	ORGANIC CLAY	
	WOC							
	WOC							
	WOC							
		UO-3	24/24	8.5-10.5		Sandy organic soil (OH); 35% fine sand, 65% organic clay/silt, strong organic odor, olive gray Advance PW drill casing to 11 ft. Advance 3-7/8 in. roller bit to 11 ft.		
	WOC							
	WOC							

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105

SHEET 2 of 5

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697207 easting 814556  
 Driller S. Laurenza Mudline El. -12.29 Datum NGVD  
 Logged By A. Juneau Date Start 11/21/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Flow	Stabilization Time

DEPTH	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	WOH	UO-4	24/11	11-13			Sandy organic soil (OH); soft, 5% coarse sand, 35% fine sand, 60% organic clay/silt, strong organic odor, olive gray.	ORGANIC CLAY	
12	WOH						Advance PW drill casing to 13 ft. Advance 3-7/8 in. roller bit to 13 ft.		
	3								
13	20	S-1	24/5	13-15	WOR-6-11-9	17	Poorly graded sand with silt (SP-SM); medium dense, 40% medium sand, 50% fine sand, 10% silt, light gray.	13.5 ft.	
							Estimated strata change at 13.5 ft.		
14	8						Advance PW drill casing to 15 ft. Advance 3-7/8 in. roller bit to 15 ft.	MARINE SAND	
15	10	S-2	24/4	15-17	3-5-4-5	9	Perform falling head permeability test at 15 ft. Poorly graded sand with silt (SP-SM); 1% coarse sand, 9% medium sand, 77% fine sand, 13% silt, brownish gray.		1
							Advance PW drill casing to 17 ft.		
16	11						Advance 3-7/8 in. roller bit to 17 ft.		
17	26	S-3	24/7	17-19	9-6-5-5	11	Silty sand (SM); 2% coarse sand, 4% medium sand, 46% fine sand, 48% silt, light gray. Organic odor.		1
							Casing dropped from 17 ft. to 18.4 ft. from 11-22-00 to 11-27-00.		
18	WOC						Advance PW drill casing to 21 ft. Advance 3-7/8 in. roller bit to 21 ft.		
19	18								
20	20								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105

SHEET 3 of 5

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2697207 easting 814556  
Mudline El. -12.29 Datum NGVD  
Date Start 11/21/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	10						Perform falling head permeability test at 21 ft. S-4A: Poorly graded sand with gravel (SP); loose, 20% coarse sand, 45% fine to medium sand, 30% fine gravel, 5% silt. Subround to round sand and gravel, light gray. (4 in.)		
		S-4	24/8	21-23	6-3-3-5	6	S-4B: Silt with sand (ML); 1% coarse sand, 1% medium sand, 26% fine sand, 1% gravel, 71% silt, grayish brown. (4 in.) Advance PW drill casing to 23 ft. Advance 3-7/8 in. roller bit to 23 ft.		1
22	20								
		S-5	24/8	23-25	5-1-1-6	2	S-5A: Poorly graded sand with gravel (SP); very loose, 10% coarse sand, 20% medium sand, 50% fine sand, 15% gravel, 5% silt. Subround to subangular sand and gravel, light gray. (4 in.) S-5B: Sandy silt (ML); 42% fine sand, 2% medium sand, 56% silt, grayish brown. (4 in.) Advance PW drill casing to 25 ft. Advance 3-7/8 in. roller bit to 25 ft.		1
23	22								
		S-6	24/10	25-27	26-4-3-6	7	S-6A: Poorly graded sand with silt (SP-SM); loose, 85% fine sand, 5% medium sand, 10% silt, light brown. (5 in.) S-6B: Well-graded sand with gravel (SW-SM); loose, 20% coarse sand, 35% medium sand, 25% fine sand, 10% gravel, 10% silt. Subround to subangular sand and gravel, yellow brown. (5 in.) Sample found as thin horizon in top and bottom of spoon sample. Advance PW drill casing to 27 ft. Advance 3-7/8 in. roller bit to 27 ft.	MARINE SAND	
24	22								
		S-7	24/0	27-29	14-3-4-3	7	No sample recovered. Advance PW drill casing to 29 ft. Advance 3-7/8 in. roller bit to 29 ft.		
25	33								
		S-8	24/6	29-31	3-2-1-3	3	Poorly graded sand (SP); very loose, 40% coarse sand, 45% medium sand, 10% fine sand, 5% gravel, subround gravel, subround to subangular sand, yellow brown. Advance PW drill casing to 31 ft.		
26	33								
27	33								
28	44								
29	41								
30	35								

<p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UQ denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
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**REMARKS:**

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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Nobis Engineering  
18 Chasell Drive  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105

SHEET 4 of 5

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2697207 easting 814556  
Mudline El. -12.29 Datum NGVD  
Date Start 11/21/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance 3-7/8 in. roller bit to 31 ft.	MARINE SAND	
31	39						Perform falling head permeability test at 31 ft.	31.0 ft.	
		S-9	24/8	31-33	6-7-18-23	25	Poorly graded sand with gravel (SP); 42% coarse sand, 10% medium sand, 3% fine sand, 43% gravel, 2% silt, brown. Angular to subround sand and gravel, coarse gravel in tip of split spoon sampler.	GLACIO FLUVIAL	1
32	38						Advance PW drill casing to 35 ft. Mix bentonite drilling mud, specific gravity = 1.07.		
33	36						Advance 3-7/8 in. roller bit to 35 ft.		
34	51								
35	171						Perform falling head permeability test at 35 ft.	35.3 ft.	
		S-10	2/2	35-35.1	100/2*	>60	Poorly graded sand with silt (SP-SM); 85% fine sand, 5% medium sand, 10% silt/clay, yellow brown		
38	177						PW casing refusal at 35.3 ft. Telescope HW drill casing to 39.0 ft. (Spin and wash). Advance 3-7/8 in. roller bit to 39 ft.	BOULDER	
37	64								
38	24						Broke through boulder at 38.3 ft.	38.3 ft.	
39	52							GLACIO FLUVIAL	
		S-11	24/10	39-41	12-14-15-15	29	Poorly graded sand (SP); medium dense, 60% fine sand, 30% medium sand, 5% gravel, 5% silt, angular to subangular sand and gravel, light gray.		
40	170						Remove HW drill casing at 39.0 ft., switch to wash and drive.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
18 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UD denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RCD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105

SHEET 5 of 5

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2697207 easting 814556  
 Driller S. Laurenza Mudline El. -12.29 Datum NGVD  
 Logged By A. Juneau Date Start 11/21/00 Date End 11/30/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing, Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
						Advance HW drill casing to 41 ft. Mix bentonite drilling mud, specific gravity = 1.09.		
41	194/6"					Advance 3-7/8 in. roller bit to 41 ft. Advance 3-7/8 in. roller bit to 45 ft. NW drill rod broke at 35.0 ft. Borehole abandoned at 41 ft. Borehole grouted to mudline, specific gravity = 1.50.		
42								
43								
44								
45								
46								
47								
48								
49								
50								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2)  
 3)  
 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 1 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By C. Thunberg

Boring Location northing 2697202 easting 814558  
Mudline El. -13.07 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Flow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	NR						Undisturbed samples obtained for environmental analysis.		
2	NR								
		UO-1	24/24	2-4				Organic soil with sand (OH); 15% fine sand, 85% organic clay/silt, shells, organic odor, dark gray to black.	
3	NR								
4	NR								
		UO-2	24/20	4-6				Similar to UO-1.	
5	NR							Advance PW drill casing to 37.8 ft. Advance 3-7/8 in. roller bit to 38.5 ft., rock chips noted in wash water return.	
6	NR								
7	NR								
8	NR								
9	NR								
10	NR								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FYST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
---	--	--	--

REMARKS:

- 1) ROD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 2 of 16

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By C. Thunberg

Boring Location northing 2697202 easting 814558  
Mudline El. -13.07 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (B)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (Inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
							Advance 3-7/8 in. roller bit to 38.5 ft., rock chips noted in wash water return.		
11	NR								
12	NR								
13	NR								
14	NR								
15	NR								
16	NR								
17	NR								
18	NR								
19	NR								
20	NR								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) RQD biased low due to recovery of less than 100%.  
2)  
3)  
4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 3 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By C. Thunberg

Boring Location northing 2697202 easting 814558  
Mudline El. -13.07 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance 3-7/8 in. roller bit to 38.5 ft., rock chips noted in wash water return.		
21	NR								
22	NR								
23	NR								
24	NR								
25	NR								
26	NR								
27	NR								
28	NR								
29	NR								
30	NR								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) RQD biased low due to recovery of less than 100%.  
2)  
3)  
4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 4 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By C. Thunberg

Boring Location northing 2697202 easting 814558  
Mudline El. -13.07 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Blows (B)	Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
							Advance 3-7/8 in. roller bit to 38.5 ft., rock chips noted in wash water return.		
31	NR								
32	NR								
33	NR								
34	NR								
35	NR								
36	NR								
37	NR								
38	NR								
39	NR							Advance PW drill casing to 43.0 ft.	
40	NR								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) RQD biased low due to recovery of less than 100%.  
2)  
3)  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 5 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
 Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (MW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (B)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2468)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	198								
42	154								
43	>400						43.0 ft.		
44						Casing refusal at 43.0 ft. Top of bedrock at 43.0 ft. Advance 3-7/8 in. roller bit to 45.0 ft. Telescope HW drill casing to 45.0 ft. Begin HQ rock core at 45.0 ft. (boring log continued on next page)	BEDROCK		
45									
46									
47									
48									
49									
50									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) RQD biased low due to recovery of less than 100%.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 6 of 18

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
 Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
45.5		R1	45-46	11.5 min.	Begin R1 at 45.0 ft. Slightly weathered, moderately hard, light gray, medium grained GNEISS. Low angle foliation (approx. 5 to 10 degrees). Primary joint set along foliation. Secondary joint set, high angle. Could not determine joint spacing due to poor recovery. Recovered rock core is highly fractured. Difficult to determine whether breaks are mechanical or natural jointing. REC = 40%; RQD = 10% (very poor) Water return color: clear to gray. Steel recovered in top of R1, probable damaged drive shoe.	1
46.0			46-47	10.5 min.		
46.5			47-48	10.5 min.		
47.0			48-49	5.5 min.		
47.5			49-50	1.5 min.		
48.0						
48.5						
49.0						
49.5						
50.0					End R1 at 50.0 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photokerization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 7 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
 Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (MW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Onshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
50.5		R2	50-51	6 min	Begin R2 at 50.0 ft. Slightly weathered, moderately hard, light gray, medium grained GNEISS. Low angle foliation (approx. 10 to 25 degrees). Primary joints along foliation. No secondary jointing observed. REC = 72%; ROD = 60% (fair) Water return color: milky white to gray. Steel recovered in top of R2, probable damaged drive shoe.	1	
51.0			51-52	5.5 min			
51.5							
52.0							
52.5							52.25 ft.: Mechanical break in rock core. No water return noted after 52.5 ft.
53.0							53.0 ft.: Primary joint.
53.5							
54.0							
54.5							
55.0					End R2 at 55.0 ft.		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) ROD biased low due to recovery of less than 100%.  
 2)  
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**PROJECT**

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New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-105A  
SHEET 9 of 16  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (MW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	R E M A R K S
		CORE RUN	CORE INTERVAL	CORE TIME		
56.5		R4	56-57	13 min.	Begin R4 at 56.0 ft. Fresh, hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 20 to 30 degrees). REC = 100%; RQD = 75% (fair/good) 56.0 to 56.2 ft.: Rock fragments; overcore from R3. 56.2 to 58.8 ft.: Feldspar/Quartz zone. Pink/dark gray/white in color. Very coarse grained. Pegmatic. 56.4 ft.: Mechanical break in rock core.	
57.0					56.8, 57.4, 57.5, 58.0 ft.: Joints/fractures in pegmatic zone. Low angle to moderately dipping, rough, stepped to undulating, discolored, and open to tight. Clay/silt infilling noted on some joints/fractures.	
57.5			57-58	8.5 min.		
58.0						
58.5			58-59	7 min.		
59.0						
59.5			59-60	7.5 min.	59.2 ft.: Primary joint: Horizontal to low angle, smooth, planar, discolored, and tight.	
60.0					59.8 ft.: Primary joint: Low angle, smooth, planar, discolored, and tight.	
60.5			60-61	7.5 min.	60.3 to 60.5 ft.: Feldspar/Quartz vein. Pink/dark gray/white in color. Pegmatic. 60.3 ft.: Mechanical break in rock core. 60.4 ft.: Joint/fracture in pegmatic veins. Moderately dipping, rough, stepped, and discolored.	
61.0					Attempted packer test after R4, could not lower packer down borehole due to obstruction caused by incompetent fractured rock. Attempted to clear obstruction by advancing roller bit, unsuccessful. Telescoped 3 in. NW drill casing to 61 ft. Switch to NX core barrel for R5. End R4 at 61.0 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) RQD biased low due to recovery of less than 100%.  
2)  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 10 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
 Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
 Casing driven with a 300-lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
61.5		R5	61-62	5.5 min.	Begin NX rock core at 61 ft. Begin R5 at 61.0 ft. Fresh, hard, gray, fine grained GNEISS. Low angle foliation (approx. 20 degrees). REC = 83%; RQD = 76% (good) 61.1 ft.: Mechanical break in rock core. 61.3 ft.: Primary joint: Low angle, rough, planar, discolored, and tight. 61.5 ft.: Mechanical break in rock core. 61.9 ft.: Mechanical break in rock core.	1
62.0			62-63	4 min.	62.1 ft.: Primary joint: Low angle, rough, stepped, discolored, and open.  62.6 ft.: Mechanical break in rock core. 62.7 ft.: Primary joint: Low angle, smooth, planar, discolored, and tight. 62.9, 63.1, and 63.2 ft.: Mechanical breaks in rock core.	
62.5			63-64	4 min.	63.0 ft.: Loss of water return noted.  63.4 to 63.6 ft.: Several mechanical breaks in rock core. Appears to be some quartz. Core grinding noted.	
63.0			64-65	6 min.	63.8, 64.0, 64.3, 64.6, 64.7, and 65.0 ft.: Mechanical breaks in rock core. 64.0 ft.: Water return restored.	
63.5			65-66	5 min.	65.3 to 66.0 ft.: Rock core not recovered.	
64.0					End R5 at 66.0 ft.	
64.5						
65.0						
65.5						
66.0						

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolonization Detector.  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 11 of 16

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By C. Thunberg

Boring Location northing 2697202 easting 814558  
Mudline El. -13.07 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
66.5		R6	66-67	6 min.	Begin R6 at 66.0 ft. Fresh, hard, gray, medium to fine grained GNEISS. Low angle foliation (approx. 20 degrees). REC = 95%; RQD = 82% (good) 66.1 ft.: Mechanical break in rock core.	1
67.0					66.9 ft.: Primary joint: Low angle, smooth, planar, discolored, and tight.	
67.5			67-68	5.5 min.	67.5 ft.: Mechanical break in rock core.	
68.0					68.2 ft.: Primary joint: Low angle, smooth, planar, discolored, and open.	
68.5					68.9 ft.: Mechanical break in rock core.	
69.0			69-70	5 min.	69.1 ft.: Primary joint: Low angle, rough, planar, discolored, and open. 69.1 to 69.7 ft.: Several mechanical breaks in rock core, heavily fractured and broken up.	
69.5						
70.0			70-71	5 min.	70.0 and 70.5 ft.: Mechanical breaks in rock core.	
70.5					End R6 at 71 ft. Bottom of exploration at 71 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.32.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UC denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) RQD biased low due to recovery of less than 100%.  
2)  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 13 of 16

FILE NO. 48138.27

CHKD. BY J. Trottier

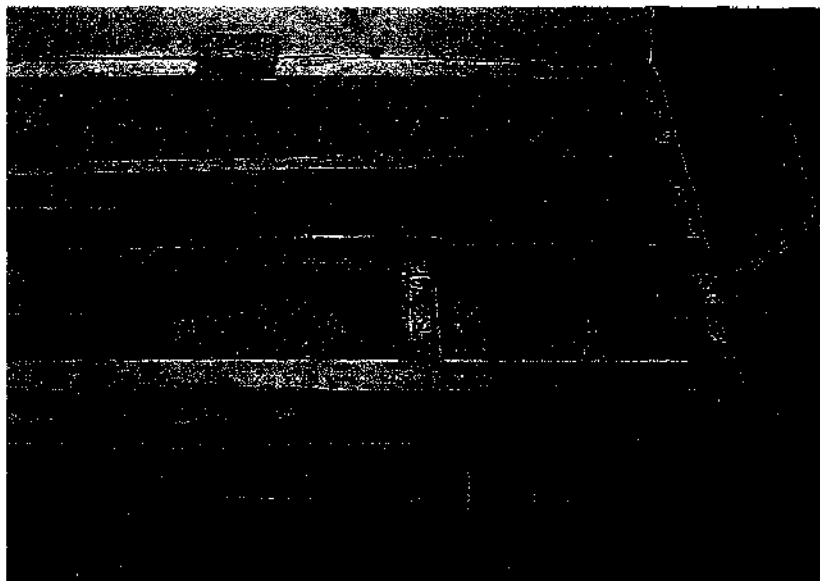
Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
 Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

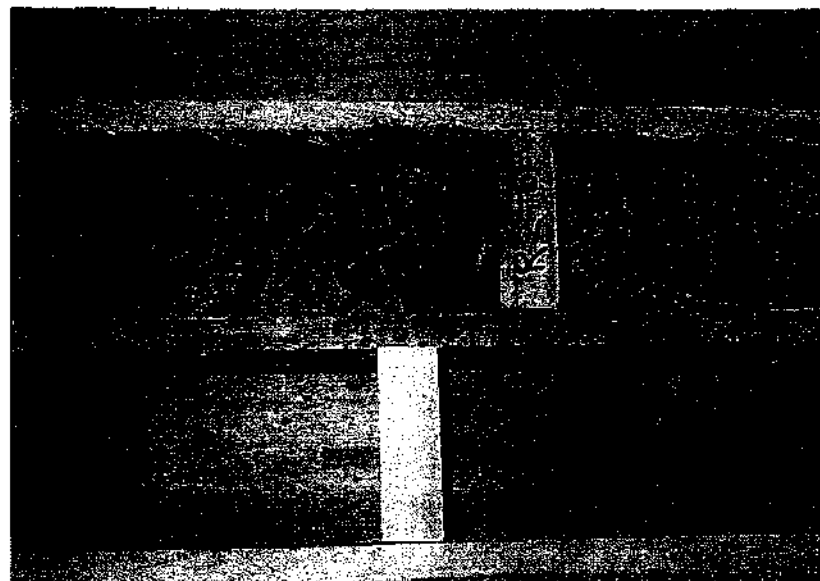
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Steel recovered in top of R2

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-105A  
SHEET 14 of 16  
FILE NO. 48138.27  
CHKD. BY J. Trotter

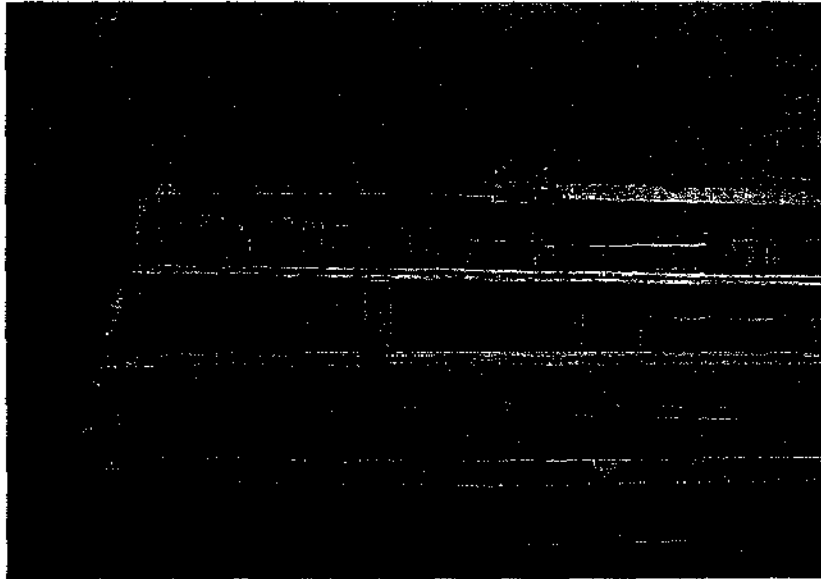
Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

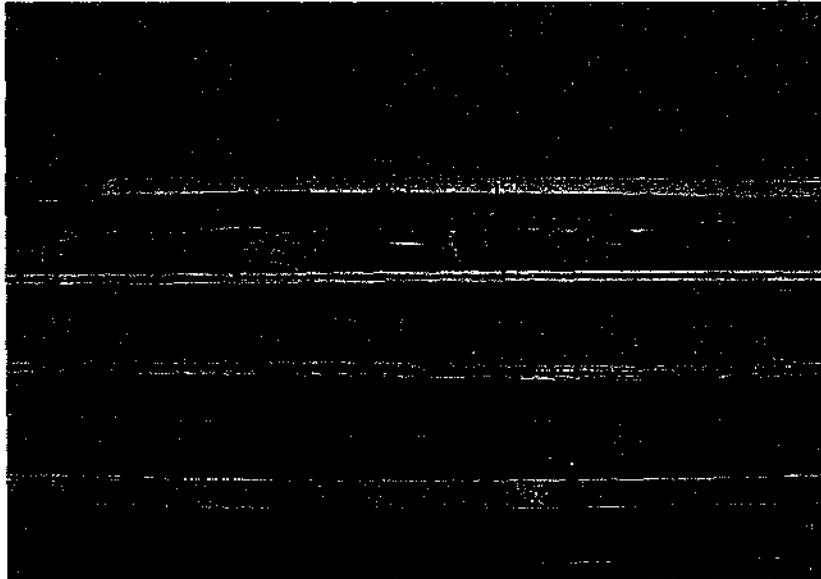
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R4 through R6



Core Runs R4 through R6

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 15 of 16

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
 Driller S. Laurenza Mudline El. -13.07 Datum NGVD  
 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

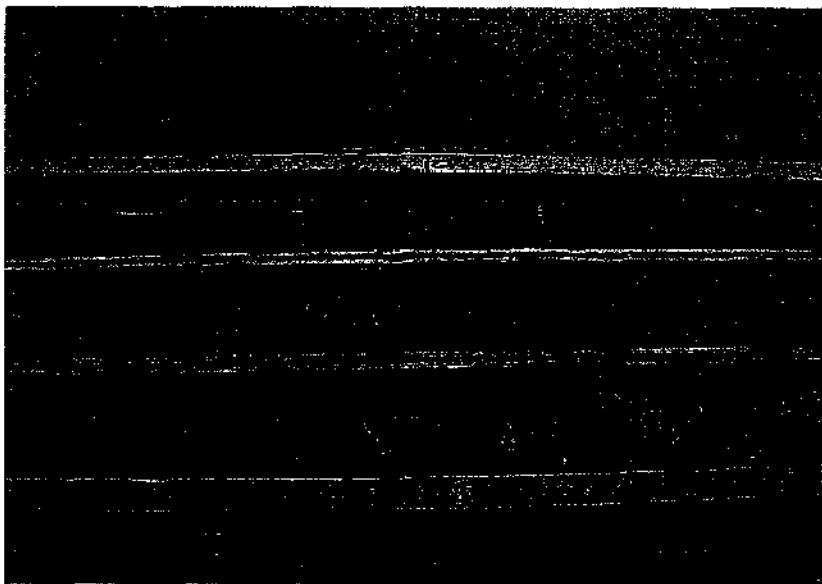
Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

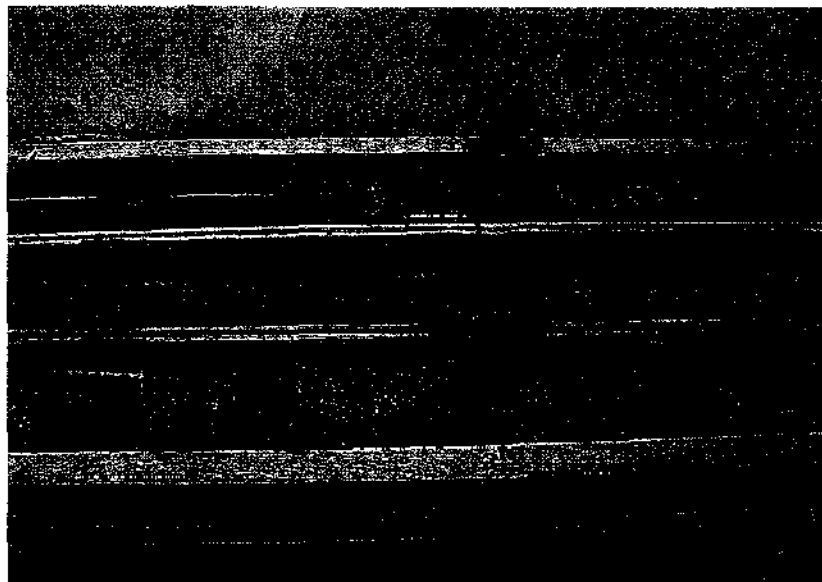
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R4 through R6



Core Runs R4 through R6

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



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18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-105A

SHEET 16 of 16

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2697202 easting 814558  
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 Logged By C. Thunberg Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

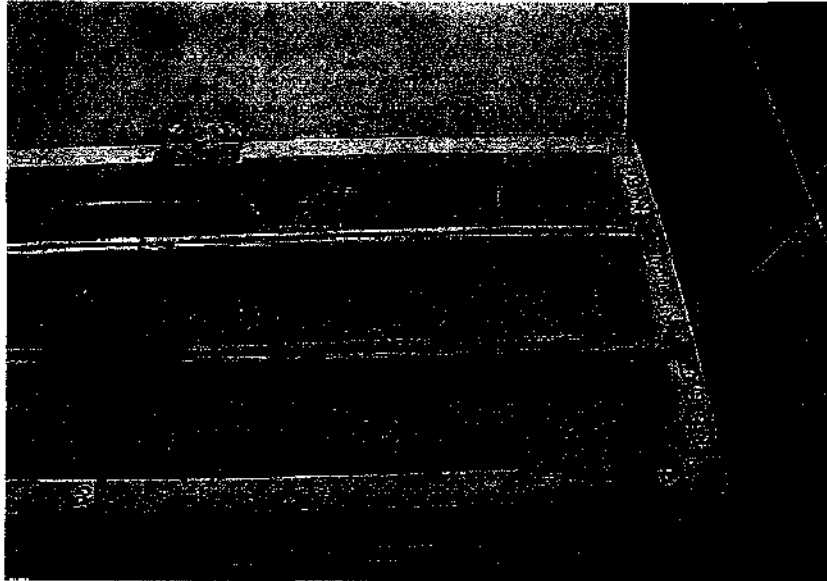
Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

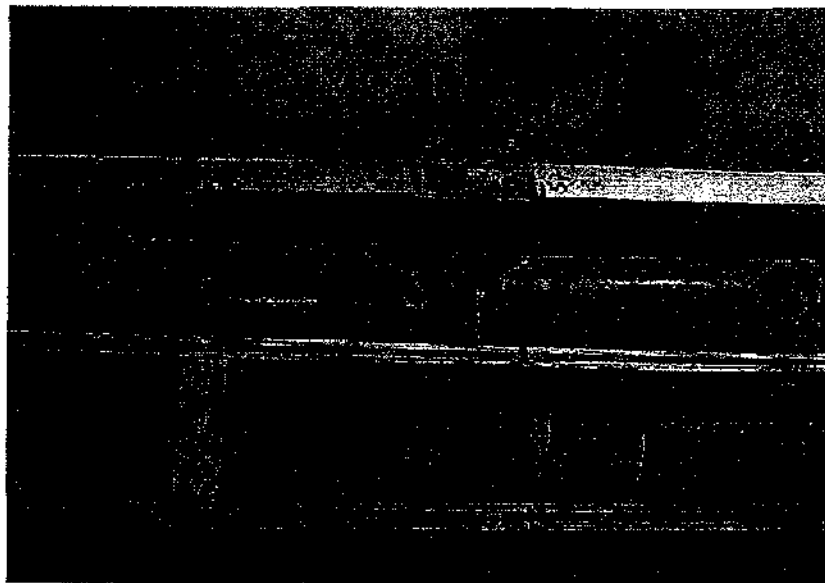
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R4 through R6



Quartz/feldspar (pegmatic) zone noted in R4

**REMARKS:**

- 1) RQD biased low due to recovery of less than 100%.
- 2)
- 3)
- 4)



Nobis Engineering  
18 Chennell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 1 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Junsau

Boring Location northing 2696916 easting 814510  
Mudline El. -10.74 Datum NGVD  
Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Qty.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casino Blows (7)	Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES			
1	WOC							
2	WOC							
3	WOC	UO-1	24/23	2.5-4.5				
4	WOC							
5	WOC							
6	WOC	UO-2	24/24	5-7				
7	WOC							
8	WOC							
9	WOC	UO-3	24/24	8-10				
10	WOC							

Osterberg sampler did not extend when attempting to collect UO sample at 2 ft.; problem corrected and sample collected from 2.5 to 4.5 ft.  
Organic soil with sand (OH); 5% medium sand, 15% fine sand, 60% organic clay/silt, shells, plant material, dark olive gray.  
Advance PW drill casing to 5 ft.  
Advance 4-3/4 in. roller bit to 5 ft.

Organic soil with sand (OH); 10% medium sand, 15% fine sand, 75% organic clay/silt, shell, dark olive gray.  
Advance PW drill casing to 8 ft.  
Advance 4-3/4 in. to 8 ft.

Sandy organic soil (OH); 5% coarse sand, 5% medium sand, 25% fine sand, 5% gravel, 60% organic clay/silt, dark olive gray, subangular to subround sand and gravel.  
Advance PW drill casing to 11 ft.  
Advance 4-3/4 in. roller bit to 11 ft.

ORGANIC CLAY

<p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
3)  
4)





Nobis Engineering  
18 Chevall Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 2 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696916 easting 814510  
Mudline El. -10.74 Datum NGVD  
Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 148 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Onshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	WOC	UO-4	24/17	11-13			Sandy organic soil (OH); 10% medium sand, 25% fine sand, 65% organic claysilt, dark olive gray. Advance PW drill casing to 13 ft. Advance 3-7/8 in. roller bit to 13 ft.	ORGANIC CLAY	
12	WOC							12.5 ft.	
13	WOC	S-1	24/9	13-15	5-7-18-21	25	Poorly graded sand with gravel (SP); medium dense, 25% coarse sand, 40% medium sand, 10% fine sand, 20% gravel, 5% silt, subrounded to subangular sand and gravel, trace shell fragments, gray. Advance PW drill casing to 15 ft. Advance 3-7/8 in. roller bit to 15 ft.	GLACIO FLUVIAL	
14	10								
15	14	S-2	24/6	15-17	19-26-28-24	52	Poorly graded gravel with silt and sand (GP-GM); very dense, 5% coarse sand, 5% medium sand, 30% fine sand, 50% gravel, 10% silt, subround to subangular sand and gravel, gray. Advance PW drill casing to 20 ft. Mix bentonite drilling mud, specific gravity = 1.09. Advance 3-7/8 in. roller bit to 20 ft.		
16	25								
17	27								
18	19								
19	69								
20	78								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 3)
- 4)



Nobis Engineering  
18 Chasell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 3 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696916 easting 814510  
 Driller S. Laurenza Mudline El. -10.74 Datum NGVD  
 Logged By A. Juneau Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2485)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	15	S-3	24/12	20-22	6-6-6-7	12*	Poorly graded sand with silt (SP-SM); 5% coarse sand, 18% medium sand, 56% fine sand, 11% gravel, 10% silt, gray. Subangular to subround sand and gravel. Advance PW drill casing to 25 ft. Advance 3-7/8 in. roller bit to 25 ft.	GLACIO FLUVIAL	1,2
22	47								
23	54								
24	77								
25	94	S-4	24/15	25-27	12-10-9-12	19*	Silty sand with gravel (SM); 11% coarse sand, 23% medium sand, 24% fine sand, 23% gravel, 19% silt, light gray. Subangular to subround sand and gravel. Advance PW drill casing to 30.5 ft. Advance 3-7/8 in. roller bit to 30.5 ft.		
26	76								
27	82								
28	74								
29	55								
30	64								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 3)  
 4)



Nobis Engineering  
18 Chevall Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 4 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2698916 easting 814510  
Mudline El. -10.74 Datum NGVD  
Date Start 12/7/00 Date End 12/15/00

Sampler: 3-inch O.D. split barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-5	24/0	30-32	10-4-3-6	7*	Washed sample Advance PW drill casing to 32 ft. Advance 3-7/8 in. roller bit to 32 ft.	GLACIO FLUVIAL	1
31	51								
		S-6	24/12	32-34	6-4-7-21	11*	Well graded sand with gravel (SW); medium dense, 20% coarse sand, 20% medium sand, 15% fine sand, 40% gravel, 5% silt, subangular to subround sand and gravel, light gray. Refusal of PW drill casing at 34.0 ft. Advanced 3-7/8 in. roller bit to 34.0 ft.	GLACIO FLUVIAL	1
32	46								
							Advance 3-7/8 in. roller bit through boulder from 34 to 36.5 ft.	34.0 ft.	
								BOULDER	
33	73								
								36.5 ft.	
		S-7	24/12	36.7-38.7	13-20-14-14	34*	S-7A: Poorly graded sand with gravel (SP); 20% coarse sand, 20% medium sand, 13% fine sand, 45% gravel, 2% silt, brown. (7 in.) S-7B: Silty sand with gravel (SM); 8% coarse sand, 14% medium sand, 18% fine sand, 48% gravel, 19% silt, brownish gray. Subangular to angular sand and gravel (5 in.) Advance HW drill casing to 41 ft. Advance 3-7/8 in. roller bit to 41 ft.	GLACIO FLUVIAL	1,2 2
34	224/9*								
35	SPIN								
36	SPIN								
37	SPIN								
38	SPIN								
39	SPIN								
40	SPIN								

GRAIN SIZES	CONES OF SOLID (GV VALUES)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.

REMARKS:

- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 5 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696916 easting 814510  
Mudline El. -10.74 Datum NGVD  
Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type E No.	PENREG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	SPIN	S-8	24/0	41-43	15-19-24-27	43*	Washed sample. Advance HW drill casing to 43 ft. Advancing 2-15/16 in. roller bit to 43 ft.	GLACIO FLUVIAL	1
42	42								
43	45	S-9	24/8	44-48	14-21-28-37	49	Washed sample. Advance HW drill casing to 49.0 ft.		
44	40								
45	45								
46	125								
47	154								
48	75								
49	54								
	100/0*						HW drill casing refusal at 49.0 ft. Advance 3-7/8 in. roller bit to 50.5 ft. Advance HW drill casing to 50.5 ft.		
50									

<p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
3)  
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Nobis Engineering  
18 Channel Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 6 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.

Driller S. Laurenza

Logged By A. Juneau

Boring Location northing 2696916

Mudline El. -10.74

Date Start 12/7/00

easting 814510

Datum NGVD

Date End 12/15/00

Sampler: 2-inch O.D. split barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (RW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Beam (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type (ft)	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Begin HQ rock core at 50.6 ft. (boring log continued on next page)		
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- 1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-106  
SHEET 7 of 12  
FILE NO. 48138.27  
CHKD. BY J. Troitier

Boring Co. Warren George, Inc. Boring Location northing 2696916 easting 814510  
Driller S. Laurenza Mudline El. -10.74 Datum NGVD  
Logged By A. Juneau Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.0		R1	50.5-51.5	9 min.	Begin R1 at 50.5 ft. Fresh, very hard, gray, fine to medium grained GNEISS, low angle foliation (approx. 30 degrees), biotite/feldspar foliation, no joints/fractures (discontinuities) noted. REC = 82%; RQD = 82%. Water return color: milky white.	
51.5			51.5-52.5	8.83 min.		
52.0			52.5-53.5	4.75 min.		
52.5			53.5-54.5	5.25 min.		
53.0			54.5-55.5	5.25 min.		
53.5						
54.0					54.6 ft.: Mechanical break in rock core. No core grinding noted.	
54.5					End of R1 recovered length	
55.0						
55.5					End R1 at 55.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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Nobis Engineering  
18 Chevrolet Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 8 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696916 easting 814510  
 Driller S. Laurenza Mudline El. -10.74 Datum NGVD  
 Logged By A. Juneau Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Failing Truck Rig  
 Drilling Method: 5-inch (PHW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
56.0		R2	55.5-56.5	5.5 min.	Begin R2 at 55.5 ft. Fresh, very hard, gray, fine to medium grained GNEISS, low angle foliation (approx. 15 to 30 degrees), biotite/feldspar foliation, no joints/fractures (discontinuities) noted. REC = 102%; RQD = 102% Water return color: milky white.	
56.5			56.5-57.5	4.5 min.		
57.0			57.5-58.5	4.5 min.	58.2 ft.: Mechanical break in rock core. No core grinding noted.	
57.5			58.5-59.5	6.5 min.	58.8 ft.: Mechanical break in rock core. No core grinding noted. End of R2 recovered length	
58.0						
58.5						
59.0						
59.5						
60.0		R3	59.5-60.5	8.5 min.	Begin R3 at 59.5 ft. Slightly weathered, hard to very hard, gray, fine to medium grained GNEISS, low angle foliation (approx. 10 degrees), low angle joints are close to moderately spaced, orange discoloration up to 1/2 in. into rock, partly open to open, with no obvious infilling. REC = 98%; RQD = 96% 59.9 ft.: Irregular fracture at bottom of quartz/feldspar dike (1 in.), low angle (approx. 20 degrees), rough, planar, tight, iron stained, slightly weathered.	
60.5						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 3)  
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Nobis Engineering  
18 Crell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 9 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696916 easting 814510  
 Driller S. Laurenza Mudline El. -10.74 Datum NGVD  
 Logged By A. Juneau Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 340 lb. center hole hammer free falling from a height of 36 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
61.0		R3 (cont.)	60.5-61.5	4.5 min.	60.5 ft.: Irregular joints: rough, planar, partly open, slightly weathered. Core grinding observed. 60.6 ft.: Irregular joint: rough, stepped, open, slightly weathered. Core grinding observed.	
61.5			61.5-62.5	5.5 min.		
62.0					61.9 ft.: Mechanical break in rock core. Minimal core grinding noted.	
62.5			62.5-63.5	5 min.	62.5 ft.: Minor joint, smooth, planar, tight, iron staining on surface only.	
63.0						
63.5					63.3 ft.: Mechanical break in rock core. No core grinding noted.	
64.0			63.5-64.5	4.5 min.	63.7 ft.: Mechanical break in rock core. No core grinding noted. End of R3 recovered length.	
64.5						
65.0		R4	64.5-65.5	5.5 min.	Fresh, very hard, gray, fine to medium grained GNEISS, low angle foliation (approx. 15 degrees), biotite/feldspar foliation, no joints/fractures noted. REC = 100%; RQD = 100% Water return color: milky white.	
65.5						

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:  
 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 10 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696916 easting 814510  
Mudline El. -10.74 Datum NGVD  
Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
66.0			65.5-66.5	5.17 min.		
66.5			66.5-67.5	5 min.		
67.0			67.5-68.5	4.17 min.		
67.5			68.5-69.5	5.63 min.		
68.0					68.2 ft.: Mechanical break in rock core. No core grinding noted.	
68.5					68.5 ft.: Mechanical break in rock core. No core grinding noted.	
69.0					69.0 ft.: Mechanical break in rock core. Minimal core grinding noted. Orthoclase feldspar rich zone from 69.0 to 69.3 ft.	
69.5					End of R4 recovered length. End R4 at 69.5 ft.	
70.0					Bottom of exploration at 69.5 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.40.	
70.5						

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 3)
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 11 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696916 easting 814510  
Mudline El. -10.74 Datum NGVD  
Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

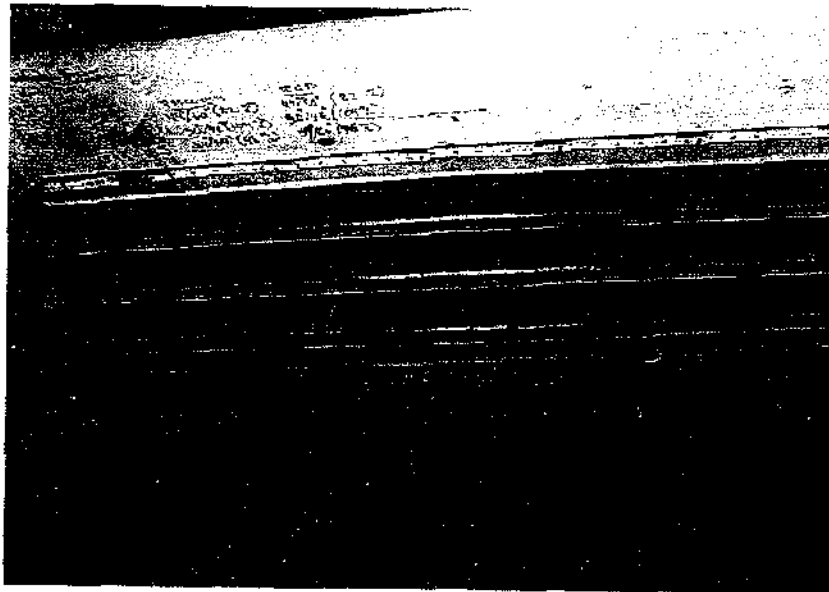
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3

**REMARKS:**

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 3)
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-106

SHEET 12 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696916 easting 814510  
 Driller S. Laurenza Mudline El. -10.74 Datum NGVD  
 Logged By A. Juneau Date Start 12/7/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Run R4



Core Run R4

**REMARKS:**

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 3)
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 1 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Failing Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	RE M K S
		Type & No.	PEN/REG (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC								
2	WOC								
		UO-1	24/23	2-4			Organic soil (OH); 10% fine sand, 90% organic clay/silt, shells, strong organic odor, dark olive gray. Pocket penetrometer: undrained shear strength = 0.06 kips/sf Advance PW drill casing to 5 ft. Advance 4-3/4 in. roller bit to 5 ft.		
3	WOC								
4	WOC								
5	WOC								
		UO-2	24/24	5-7			Organic soil (OH); similar to UO-1 Pocket penetrometer: undrained shear strength = 0.03 kips/sf Advance PW drill casing to 8 ft. Advance 4-3/4 in. roller bit to 8 ft.	ORGANIC CLAY	
6	WOC								
7	WOC								
8	WOC								
		UO-3	24/24	8-10			Sandy organic soil (OH); 60% organic clay/silt, 35% fine sand, 5% medium sand, strong organic odor, dark olive gray. Pocket penetrometer: undrained shear strength = 0.19 kips/sf Advance PW drill casing to 11 ft. Advance 4-3/4 in. roller bit to 11 ft.		
9	WOC								
10	WOC								

GRAIN SIZE	SOIL CLASSIFICATION	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 6 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 2 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696748 easting 814534  
 Driller S. Laurenza Mudline El. -12.71 Datum NGVD  
 Logged By A. Juneau Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 3-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

B E P T H	Casing Blows (#)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	WOC						Organic soil (OH); 90% organic clay/silt, 10% fine sand, organic odor, dark olive gray. Pocket penetrometer: undrained shear strength = 0.19 kips/sf Advance PW drill casing to 15 ft. Advance 4-3/4 in. roller bit to 15 ft.	ORGANIC CLAY	
		UO-4	24/24	11-13					
12	WOC								
13	WOC							13.0 ft.	
14	28						Silty sand (SM); medium dense, 75% fine sand, 10% medium sand, 15% silt, yellow brown, round to subround gravel. Advance PW drill casing to 17 ft. Advance 3-7/8 in. roller bit to 17 ft.	MARINE SAND	
15	48	S-1	24/11	15-17	15-12-10-11	22			
16	9								
17	19						Perform falling head permeability test at 17 ft.		1
		S-2	24/6	17-19	6-5-7-10	12			
18	16						Silty sand (SM); 62% fine sand, 15% medium sand, 2% coarse sand, 5% gravel, 16% silt, brown. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.		
19	33								
20	20								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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Nobis Engineering  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 3 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	22								
22	28								
		S-3	24/8	22-24	7-9-8-18	17	Silty sand (SM); medium dense, 70% fine sand, 10% medium sand, 5% coarse sand, 15% silt, yellow brown. Advance PW drill casing to 25 ft. Advance 3-7/8 in. roller bit to 25 ft.		
23	50								
24	66								
25	50						Perform falling head permeability test at 25 ft. Silty sand with gravel (SM); 38% fine sand, 9% medium sand, 4% coarse sand, 34% gravel, 15% silt, brown. Subround sand and gravel. 1 in. of coarse sand and gravel at 26 ft. Advance PW drill casing to 30 ft. Advance 3-7/8 in. roller bit to 30 ft.	MARINE SAND	1,2
		S-4	24/14	25-27	9-11-15-22	26			
26	48								
27	59								
28	191								
29	96								
30	102								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 4 of 14

FILE NO. 48138.27

CHKD. BY J. Trostler

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 340 lb. center hole hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Drill Rig: Falling Truck Rig  
Drilling Method: 3-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (cycles)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31	52	S-5	24/9	30-32	6-7-10-11	17*	Silty sand with gravel (SM); 21% fine sand, 12% medium sand, 4% coarse sand, 35% gravel, 28% silt, light brown. Subround sand and gravel. Advance PW drill casing to 32 ft. Advance 3-7/8 in. roller bit to 32 ft.	MARINE SAND	1,2
32	58							32.0 ft.	
33	54	S-6	24/10	32-34	5-7-5-4	12*	Poorly graded gravel with sand (GP); 52% gravel, 15% coarse sand, 25% medium sand, 5% fine sand, 3% silt, brown. Subround to subangular sand and gravel. Advance PW drill casing to 35 ft. Advance 3-7/8 in. roller bit to 35 ft.	GLACIO FLUVIAL	1,2
34	64								
35	68						Perform falling head permeability test at 35 ft.	GLACIO FLUVIAL	2
36	70	S-7	24/2	35-37	4-5-6-6	11*	Washed sample. Advance PW drill casing to 37 ft. Advance 3-7/8 in. roller bit to 37 ft.		
37	55								
38	81	S-8	24/6	37-39	5-5-10-21	15*	Well-graded gravel with sand (GW); 61% gravel, 14% coarse sand, 17% medium sand, 7% fine sand, 1% silt, yellowish brown. Subround to subangular sand and gravel. Advance PW drill casing to 42 ft. Advance 3-7/8 in. roller bit to 42 ft.		1,2
39	98								
40	137								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 5 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLDWS PER 5 INCHES	SPT N <sub>60</sub> /blow			
41	126							GLACIO FLUVIAL	
42	156	S-8	5/2	42-42.4	50/5*	>50*	Washed sample. Advance PW drill casing to 44 ft. Top of competent bedrock 44 ft. Telescope HW drill casing to 44.5 ft. Advance 4-3/4 in. roller bit to remove cuttings.	42.5 ft.	2
43	186							WEATHERED BEDROCK	
44	303							44.0 ft.	
45							Begin HQ rock core at 45.0 ft. (boring log continued on next page).	BEDROCK	
46									
47									
48									
49									
50									

GRANULAR SOILS (ASTM D 1586)	ROCKS (ASTM D 1586)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photolization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 6 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
45.5		R1	45.0-46.0	6.5 min.	Begin R1 at 45.0 ft. Fresh to moderately hard, gray, fine to medium grained GNEISS, low angle (approx. 15 to 30 degrees) biotite/feldspar foliation. REC = 80%; RQD = 32% (poor) Water return observed in both HW and PW casing. 45.2 ft.: Mechanical break in rock core. No core grinding noted. 45.3 to 46.8 ft.: Weathered zone. Rock distinctly discolored with iron with no fresh surfaces noted on broken, non-intact core pieces. Only 6 of 18 in. recovered from this zone (assumed).		
46.0			46.0-47.0	5.5 min.	No water return observed from 46.0 to 50.0 ft.		
46.5							
47.0							
47.5				47.0-48.0	4.7 min.	47.0 to 47.5 ft.: Irregular fracture: high angle (approx. 75 degrees), rough, undulating, iron stained and tight. Slight to moderate weathering extends 1/4 to 1 in. into rock. 47.2 ft.: Mechanical break in rock core. No core grinding noted.  47.7 ft.: Irregular fracture: low angle (approx. 20 degrees), rough, undulating, iron stained and tight. 47.7 to 48.0 ft.: Slightly weathered zone with iron staining throughout section.	
48.0							
48.5				48.0-49.0	4.8 min.	48.0 to 48.3 ft.: Highly weathered zone. Non-intact core section is iron stained throughout zone, highly fractured core remnants. 48.3 ft.: Smooth parallel fractures (2): low angle, rough, planar, tight, iron staining and clay deposited on fracture surfaces. Fractures parallel to foliation. 48.5 to 48.8 ft.: Irregular fracture: high angle (approx. 65 degrees), rough, planar, white mineralization (Kaolinite). Additional fractures (healed) extend from 48.0 to 49.0 ft. Performed packer test from 48.5 to 55.0 ft.	
49.0							
49.5				49.0-50.0	4.5 min.	Performed packer test from 49.5 to 55.0 ft.	
50.0						End R1 at 50.0 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - SRF 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolocalization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
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PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 7 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696748 easting 814534  
 Driller S. Laurenza Mudline El. -12.71 Datum NGVD  
 Logged By A. Jureau Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Failing Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
50.5		R2	50.0-51.0	4.2 min.	Begin R2 at 50.0 ft. Fresh, hard, gray to dark gray, fine to medium grained GNEISS, low angle (approx. 15 to 30 degrees) biotite/feldspar foliation. Core from 50.0 to 51.0 ft. noticeably finer grained than remainder of R1 and R2. REC = 80%; RQD = 80% (good) 50.0 to 50.2 ft.: Mechanical breaks along biotite foliations. 50.4 to 50.8 ft.: Irregular fracture: high angle (approx. 60 degrees), rough, undulating, and tight. Serpentine/Kaolinite mineralization along fracture surface. (mechanical)		
51.0			51.0-52.0	3.8 min.	50.7 ft.: Mechanical break along biotite foliation. 51.2 ft.: Mechanical break along biotite foliation. 51.2 to 53.3 ft.: Numerous stress fractures: moderate to high angle dip, rough, undulating, tight to open, extremely close to close, not broken. Fractures healed with serpentine mineralization.		
51.5				52.0-53.0	4 min.	52.7 ft.: Mechanical break in rock core along biotite foliation. 52.8 ft.: Mechanical break in rock core along biotite foliation.	
52.0				53.0-54.0	4.2 min.	53.6 to 54.0 ft.: Irregular joint: high angle (approx. 70 degrees), rough, planar, tight. Minor Kaolinite mineralization along joint, otherwise fresh. (mechanical)	
52.5				54.0-55.0	3.8 min.		
53.0							
53.5							
54.0	CORE NOT RECOVERED						
54.5							
55.0					End R2 at 55.0 ft.		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 8 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Junaau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PV) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
55.5		R3	55.0-56.0	4.5 min.	Begin R3 at 55.0 ft. Fresh, very hard, gray, fine to medium grained GNEISS, low angle (approx. 10 to 15 degrees) biotite/feldspar foliation. REC = 98%; RQD = 98% (excellent)	
56.0			56.0-57.0	4.5 min.	56.0 ft.: Mechanical break in rock core.	
56.5						
57.0			57.0-58.0	7.5 min.	57.0 to 57.5 ft.: Pair of healed joints/fractures. High angle to vertical. 57.2 to 57.7 ft.: Secondary joint: high angle to vertical, smooth, planar, discolored, and tight. Possible mechanical break/healed joint. 57.5 ft.: Mechanical break in rock core.	
57.5						
58.0					57.8 ft.: Healed joint/fracture.	
58.5			58.0-59.0	7.3 min.	58.1 ft.: Mechanical break in rock core. 58.3 to 59.0 ft.: Secondary joint: high angle, rough, planar, discolored, and tight. Possible mechanical break/healed joint. Several mechanical breaks noted along joint surfaces.	
59.0					58.9 to 59.2 ft.: Secondary joint: moderately dipping, rough, undulating, discolored, and tight. Possible mechanical break/healed joint.	
59.5			59.0-60.0	4.5 min.	59.3 ft.: Healed joint/fracture. 59.4 ft.: Mechanical break in rock core.	
60.0					End R3 at 60.0 ft.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolonization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
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12. R denotes core run number.

REMARKS:

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- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 9 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
60.5		R4	60.0-61.0	5.2 min.	Begin R4 at 60.0 ft. Fresh, hard, gray, fine to medium grained GNEISS, low angle (approx. 10 to 20 degrees) foliation. REC = 100%; RQD = 100% (excellent) 60.0 to 60.2 ft.: Reddish to maroon discoloration noted. Slightly different texture noted.  61.6 ft.: Mechanical break in rock core.  Core barrel return water blocked at 63.0 ft. Perform packer test from 55.0 to 63.0 ft. End R4 at 63.0 ft. Bottom of exploration at 63.0 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.45.	
61.0						
61.5			61.0-62.0	4.2 min.		
62.0						
62.5						
63.0				62.0-63.0		
63.5						
64.0						
64.5						
65.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
---	--	--	--

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 
-



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Concord, New Hampshire 03301

PROJECT  
Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

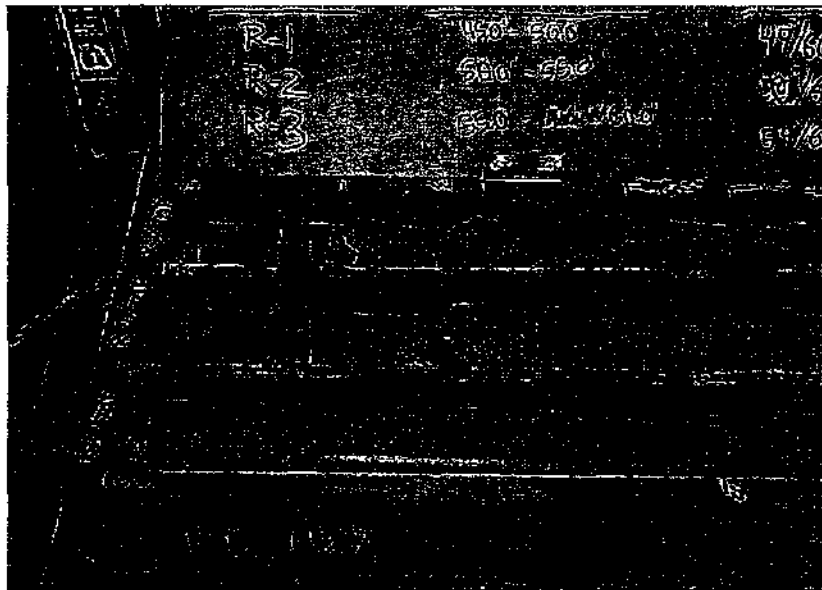
BORING NO. FD-107  
SHEET 10 of 14  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696748 easting 814534  
Driller S. Laurenza Mudline El. -12.71 Datum NGVD  
Logged By A. Juneau Date Start 12/18/00 Date End 12/21/00

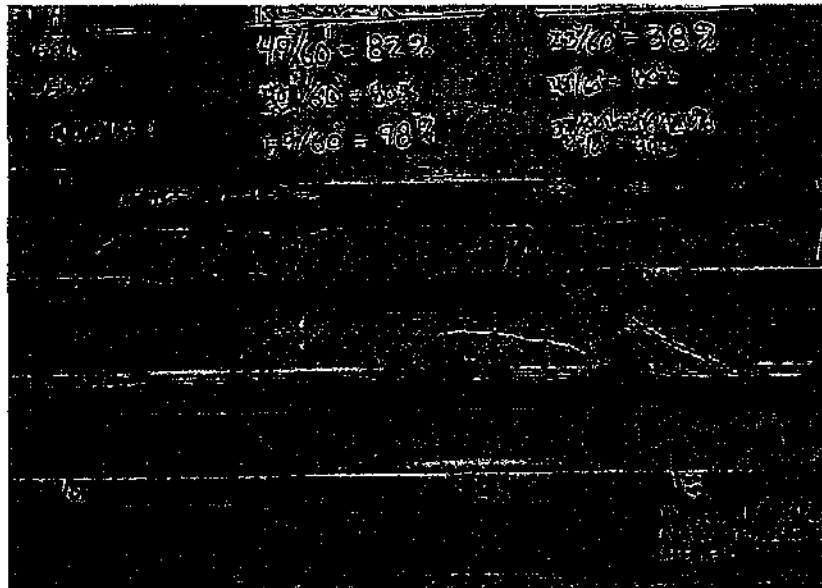
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (FW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 11 of 14

FILE NO. 48138.27

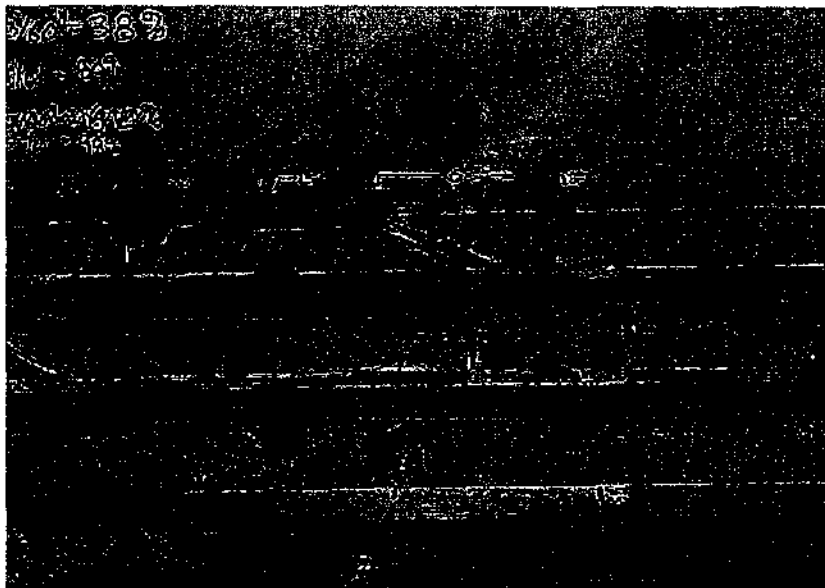
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696748 easting 814534  
 Driller S. Laurenza Mudline El. -12.71 Datum NGVD  
 Logged By A. Juneau Date Start 12/18/00 Date End 12/21/00

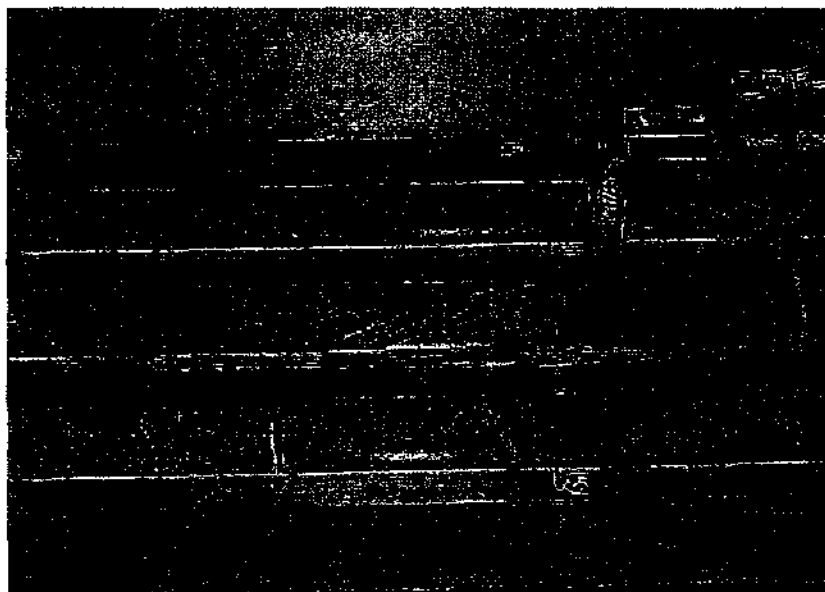
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 12 of 14

FILE NO. 48138.27

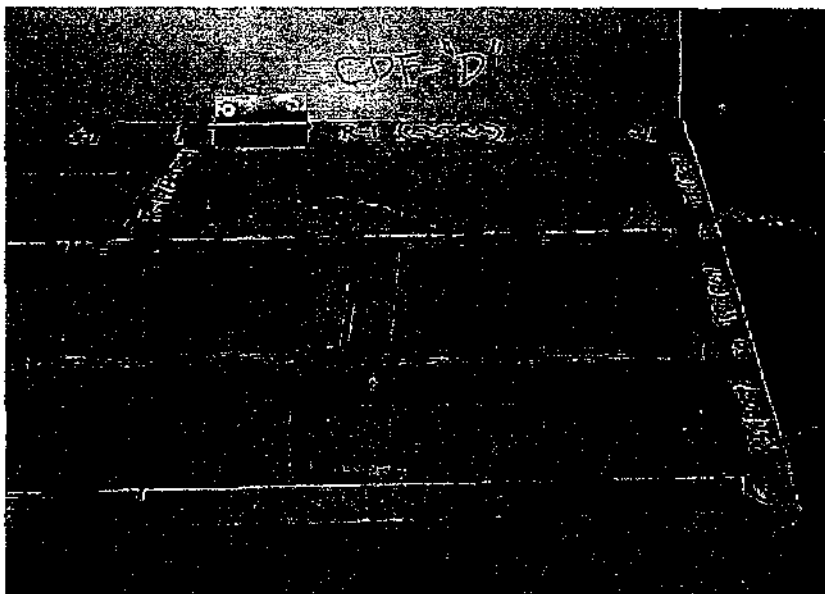
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696748 easting 814534  
 Driller S. Laurenza Mudline El. -12.71 Datum NGVD  
 Logged By A. Juneau Date Start 12/18/00 Date End 12/21/00

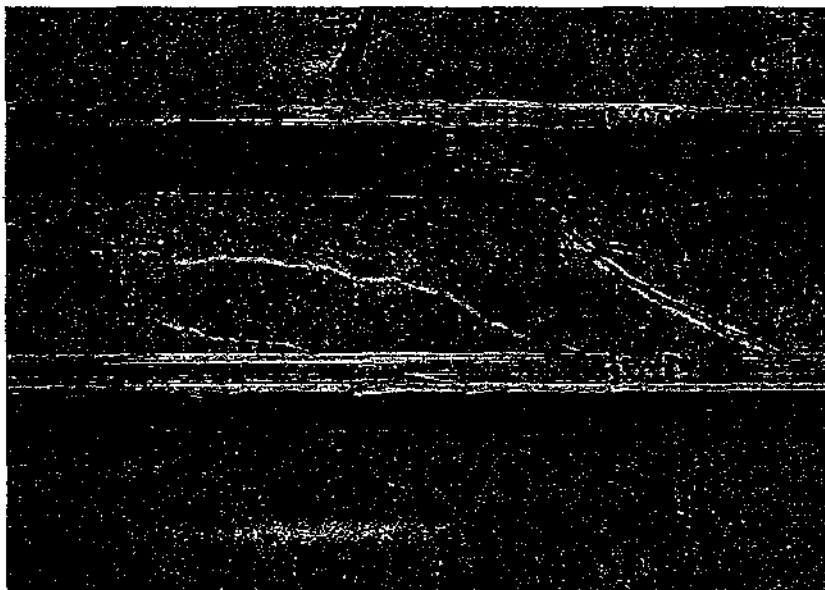
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
 Drill Rig: Falling Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Healed fractures noted in R2

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 13 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696748 easting 814534  
 Driller S. Laurenza Mudline El. -12.71 Datum NGVD  
 Logged By A. Juneau Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

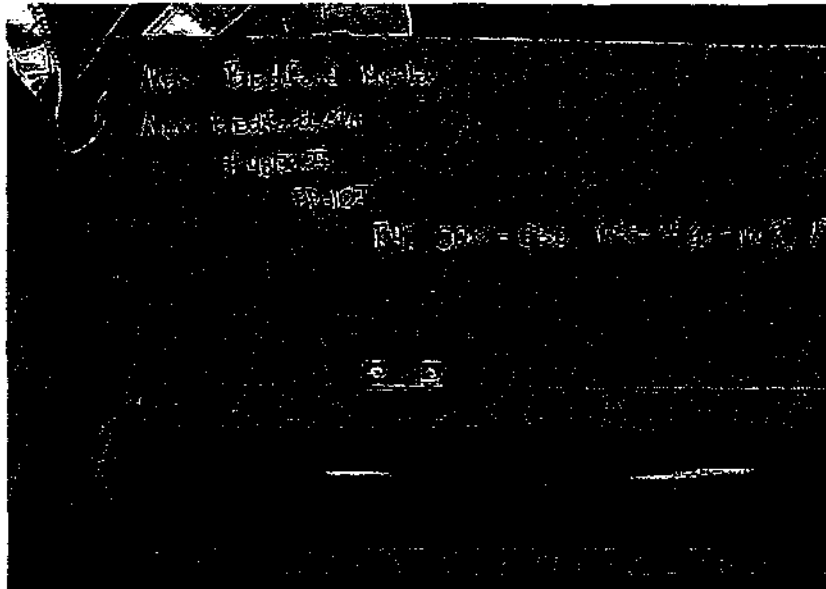
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Run R4



Core Run R4

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-107

SHEET 14 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau

Boring Location northing 2696748 easting 814534  
Mudline El. -12.71 Datum NGVD  
Date Start 12/18/00 Date End 12/21/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

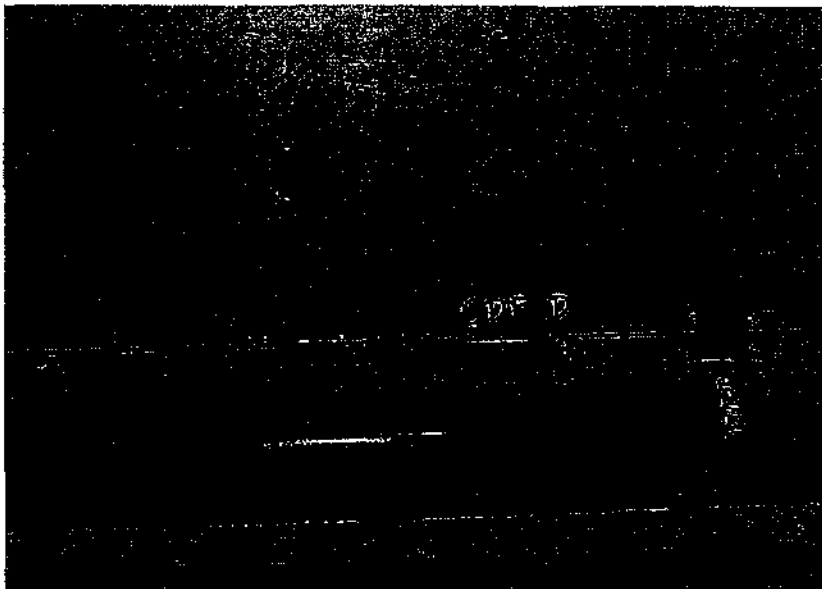
Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

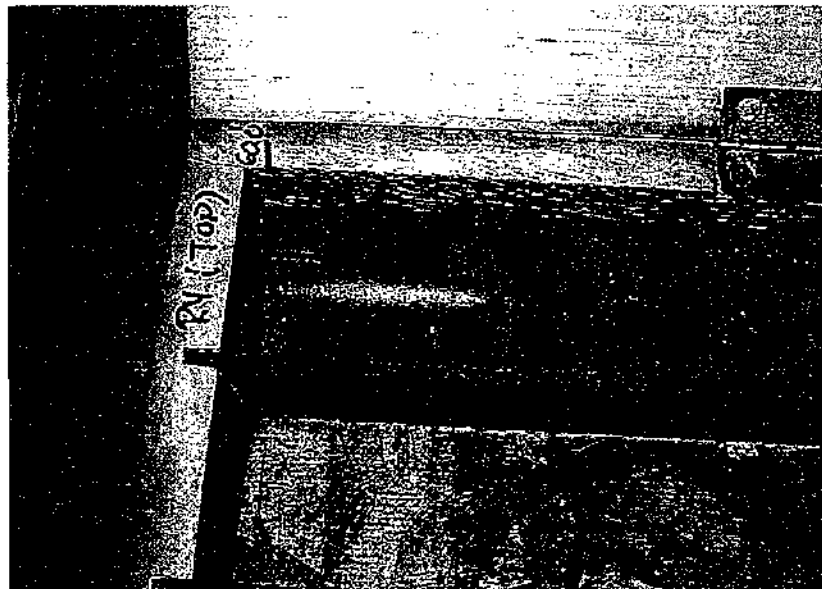
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Run R4



Discoloration/texture change noted in top of R4

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 1 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH Feet	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC								
2	WOC								
3	WOC	UO-1	24/17	2-4			Organic soil (OH); 10% fine sand, 90% organic clay/silt, shells, strong organic odor, dark olive gray/black. Pocket penetrometer: undrained shear strength = 0.02 kips/sf Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft.		
4	WOC								
5	WOC								
6	WOC	UO-2	24/23	5-7			Organic soil (OH); similar to UO-1 Pocket penetrometer: undrained shear strength = 0.05 kips/sf Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft.		
7	WOC								
8	WOC								
9	WOC	UO-3	24/20	8-10			Sandy organic soil (OH); 40% fine sand, 60% organic clay/silt, shells, organic odor, dark olive gray. Pocket penetrometer: undrained shear strength = 0.05 kips/sf Advance PW drill casing to 11 ft. Advance 3-7/8 in. roller bit to 11 ft.		
10	WOC								

ORGANIC CLAY

GRAIN SIZE	COHESIVE SOILS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.

- 7. PID denotes Photoionization Detector
- 8. PPM denotes parts per million.
- 9. PP denotes Pocket Penetrometer.
- 10. FVST denotes field vane shear test.
- 11. RQD denotes Rock Quality Designation.
- 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of less than 100%.
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 2 of 15

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.\*

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	WOC	UO-4	24/13	11-13			Sandy organic soil (OH); 5% medium sand, 35% fine sand, 60% organic clay/silt, shells, strong organic odor, dark olive gray. Pocket penetrometer: undrained shear strength = 0.19 kips/sf Advance PW drill casing to 14 ft. Advance 3-7/8 in. roller bit to 14 ft.	ORGANIC CLAY	
12	WOC								
13	WOC								
14	WOC								
15	WOC	UO-5	18/18	14-15.5			Sandy organic soil (OH); 5% medium sand, 45% fine sand, 50% organic clay/silt, organic odor, dark olive gray. Sampler did not fully extend. Pocket penetrometer: undrained shear strength = 0.22 kips/sf	15.5 ft.	
16	WOC	S-1	24/11	15.5-17.5	2-4-6-7	10	S-1A: Silty sand (SM); loose, 5% medium sand, 70% fine sand, 20% silt, 5% clay, organic odor, dark olive brown. (4 in.) S-1B: Poorly graded sand (SP); 10% coarse sand, 35% medium sand, 50% fine sand, 5% gravel, gray. (7 in.) Advance PW drill casing to 17.5 ft. End A. Juneau log: 12-21-00 12-28-00 Rig inspector C. Thunberg Advance PW drill casing to 20.5 ft. Advance 3-7/8 in. roller bit to 20.5 ft.	MARINE SAND	
17	10								
18	22								
19	30								
20	37								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolysis Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- RQD biased low due to recovery of less than 100%.
-



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO: FD-108

SHEET 3 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck P9g

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-value			
21	42	S-2	24/11	20.5-22.5	13-12-15-20	27	Sandy silt (ML); 40% fine sand, 2% medium sand, 58% silt, brown. Thinly stratified. Advance PW drill casing to 25.5 ft. Advance 3-7/8 in. roller bit to 25.5 ft. Fine gravel noted in wash water return.	MARINE SAND	1
22	68								
23	61								
24	58								
25	63								
26	62	S-3	24/5	25.5-27.5	33-19-18-15	35	Poorly graded gravel with silt and sand (GP-GM); 12% fine sand, 18% medium sand, 11% coarse sand, 52% gravel, 7% silt, reddish brown. Advance PW drill casing to 27.5 ft. Mix drilling mud, specific gravity = 1.09. Advance 3-7/8 in. roller bit to 27.5 ft.	GLACIO FLUVIAL	1
27	70								
28	85	S-4	24/3	27.5-29.5	13-10-8-6	18*	2-1/2 in. piece of gravel with small amount of medium to coarse sand. Insufficient volume of sand to classify, reddish brown. Advance PW drill casing to 29.5 ft. Advance 3-7/8 in. roller bit to 29.5 ft.		2
29	44								
30	47	S-5	24/11	29.5-31.5	10-6-4-5	10*	Silty sand with gravel (SM); 21% fine sand, 21% medium sand, 10% coarse sand, 18% silt, 30% gravel, light brown. Subangular gravel.		1,2

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
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**REMARKS:**

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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- RQD biased low due to recovery of less than 100%.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 4 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696532 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 6-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (#)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEMREC (Inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
35							Advance PW drill casing to refusal at 34 ft. Advance 3-7/8 in. roller bit to 34.5 ft. Rock fragments noted in drilling mud.		
31									
44									
32									
60									
33									
77									
34	100/4*								
35									
36									
37							Telescope HW casing to 34.5 ft. Begin HQ rock core at 34.5 ft. (boring log continued on next page)		
38									
39									
40									

<p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photoluminescence Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
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**REMARKS:**

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- RQD biased low due to recovery of less than 100%.
-



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 5 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.

Driller S. Laurenza

Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464

Mudline El. -12.46 Datum NGVD

Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Failing Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
35.0	34.7 ft	R1	34.5-35.5	11 min.	Begin R1 at 34.5 ft. Fresh, moderately hard, pinkish gray, medium grained GRANITE, with horizontal (approx. 0 to 5 degrees) joints, moderately spaced and rough. Several joints filled with fine sand. REC = 100%; RQD = 87% (good) No water return noted.	
36.0			35.5-36.5	11.5 min.		
37.0	36.6 ft		36.5-37.5	13.5 min.	36.6 ft: Break at horizontal joint.	
37.5	37.3 ft		37.5-38.5	8 min.	37.3 ft: Break at horizontal joint, sand seam.	
38.0	37.8 ft		38.5-39.5	8.5 min.	38.75 ft: Break with two pieces of broken gravel, sand seam. 38.0 ft: Break at horizontal joint, sand seam.	
39.0	38.9 ft				38.9 ft: Mechanical break in rock core. 39.2 ft: Mechanical break in rock core. 39.3 ft: Mechanical break in rock core.	
39.5					End R1 at 39.5 ft.	

<p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photolocalization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
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REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- RQD biased low due to recovery of less than 100%.
-



Nobis Engineering  
18 Chasell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 6 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2698632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
40.0	WASHED GRAVEL	R2	39.5-40.5	11 min.	Begin R2 at 39.5 ft. Fresh, moderately hard, pinkish gray, medium grained GRANITE, with horizontal ( approx. 0 to 5 degrees) joints, moderately spaced and rough. Several joints filled with fine sand. 12 in. of 36 in. rock core recovered, remainder of barrel filled with washed gravel. REC = 22%; ROD = 22% (very poor) Water return color: clear to gray, change to milky white at 40.5 ft., change to brown from 41.5 to 42.5 ft.	
40.5			40.5-41.5	4.5 min.	Attempted to clear hole with roller bit and light drilling mud, attempted to spin casing; no success. Telescope NW casing to 46.0 ft. 39.5 to 43.4 ft.: Semi-angular/rounded gravel recovered in core barrel. Sample preserved in sample jar.	
41.0						
41.5						
42.0						
42.5						
43.0						
43.5						
44.0			43.5-44.5	NR	43.5 ft.: Mechanical break in rock core. Broken rock fragments. Core grinding noted on break surfaces.  43.8 ft.: Mechanical break in rock core.	
44.5					End R2 at 44.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3) ROD biased low due to recovery of less than 100%.  
4)



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 7 of 15

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
45.0	TELESCOPE CASING		44.5-45.5		44.5 to 46.0 ft.: Telescope NW drill casing. Not cored.	
45.5			45.5-46.0			
46.0		R3	46.0-47.0	6 min.	Begin NX rock core at 46.0 ft. Begin R3 at 46.0 ft. Fresh, hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 20 to 30 degrees). No joints noted.	
46.5			47.0-48.0	3.5 min.	REC = 97%; RQD = 97% (excellent) Water return color: milky white. 46.0 to 46.3 ft.: Discoloration noted.	
47.0					47.1 to 47.4 ft.: Healed joint: high angle, sand infilled.	
47.5						
48.0			48.0-49.0	6 min.	47.8 ft.: Healed joint: low angle, sand infilled. 48.0 ft.: Mechanical break in rock core. 48.3 ft.: Mechanical break in rock core.	
48.5						
49.0			49.0-50.0	4.5 min.		
49.5						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- RQD biased low due to recovery of less than 100%.
-





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18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 8 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Data Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
50.0		R3 (cont.)	50.0-51.0	5 min.		
50.5						
51.0		R4	51.0-52.0	6 min.	End R3 at 51.0 ft. Begin R4 at 51.0 ft. Fresh, moderately hard, gray, medium grained GNEISS. Low angle foliation (approx. 5 to 10 degrees). No joints noted. REC = 94%; RQD = 94% (excellent) Water return color: milky white.	
51.5						
52.0			52.0-53.0	6 min.		
52.5					52.3 ft.: Mechanical break in rock core.	
53.0			53.0-54.0	6 min.		
53.5						
54.0			54.0-55.0	4.5 min.		
54.5						

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- RQD biased low due to recovery of less than 100%.
-



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 9 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW); 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
55.0		R4 (cont.)	55.0-56.0	6 min.		
55.5						
56.0		R5	56.0-57.0	6 min.	55.7 to 56.0 ft.: Rock core not recovered. Attempt constant head permeability test. Test unsuccessful, water return noted up HW drill casing. End R4 at 56.0 ft. Begin R5 at 56.0 ft. Fresh, moderately hard, gray, medium grained GNEISS. Low angle foliation (approx. 5 to 10 degrees). No joints noted. REC = 100%; RQD = 100% (excellent) Water return color: milky white.	
56.5						
57.0			57.0-58.0	5 min.		
57.5						
58.0			58.0-59.0	5 min.		
58.5						
59.0			59.0-60.0	5.5 min.	58.5 ft.: Mechanical break in rock core.	
59.5						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 3) RQD biased low due to recovery of less than 100%.  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 10 of 15

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.  
Drill Rig: Falling Truck Rig  
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
60.0	-	R5 (cont.)	60.0-61.0	6 min.	60.2 ft.: Mechanical break in rock core.	
60.5						
61.0	-		61.0-62.0		60.8 ft.: Mechanical break in rock core. End R5 at 61.0 ft. Bottom of exploration at 61.0 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.40.	
61.5						
62.0			62.0-63.0			
62.5						
63.0			63.0-64.0			
63.5						
64.0			64.0-65.0			
64.5						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 11 of 15

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696632 easting 814464  
 Driller S. Laurenza Mudline El. -12.46 Datum NGVD  
 Logged By A. Juneau / C. Thunberg Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

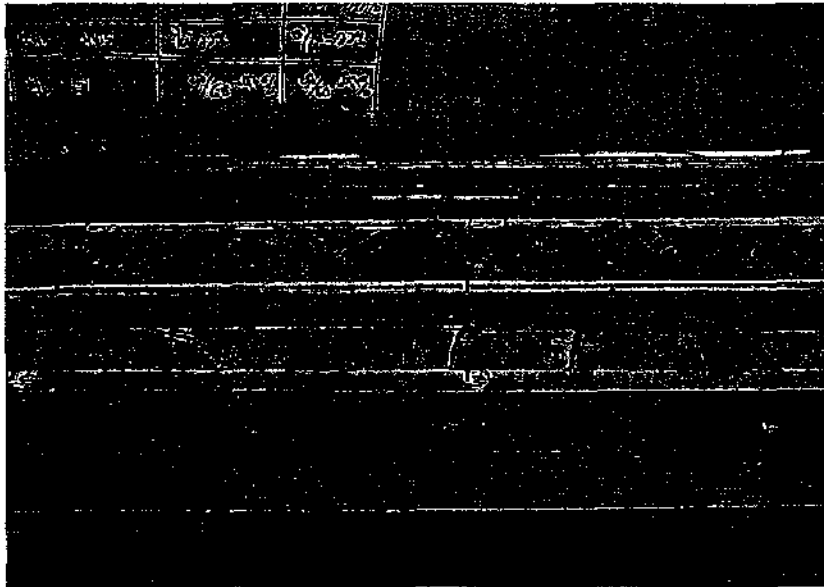
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of less than 100%.
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-108  
SHEET 12 of 15  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696632 easting 814464  
Driller S. Laurenza Mudline El. -12.46 Datum NGVD  
Logged By A. Juneau / C. Thunberg Date Start 12/21/00 Date End 12/29/00

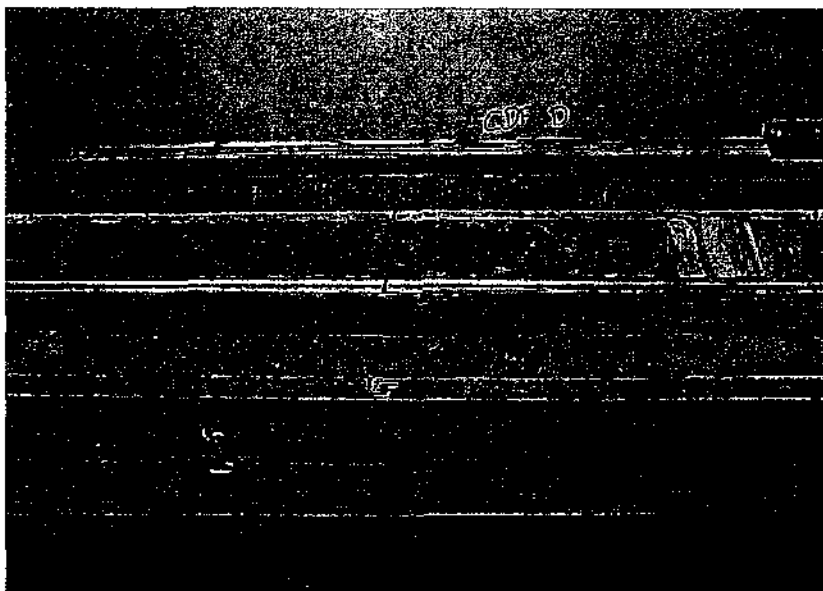
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

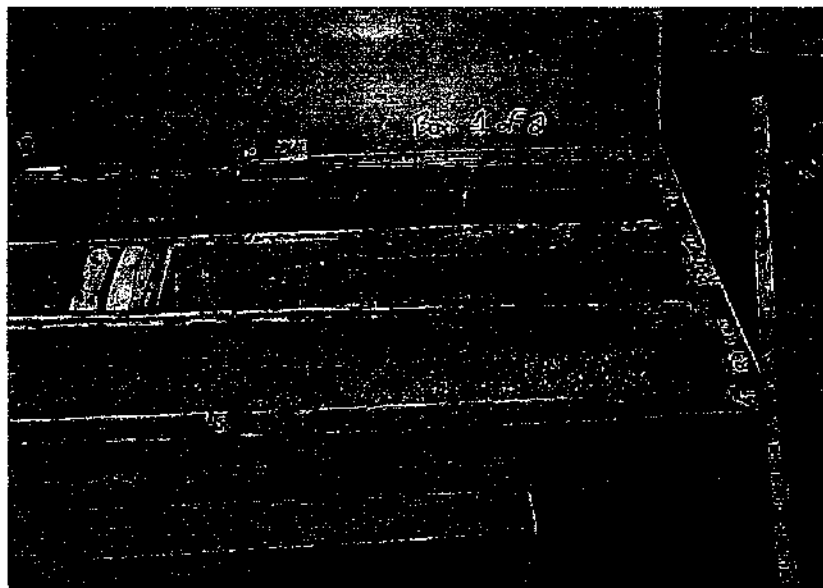
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of less than 100%.
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 13 of 15

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.

Driller S. Laurenza

Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464

Mudline El. -12.46 Datum NGVD

Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

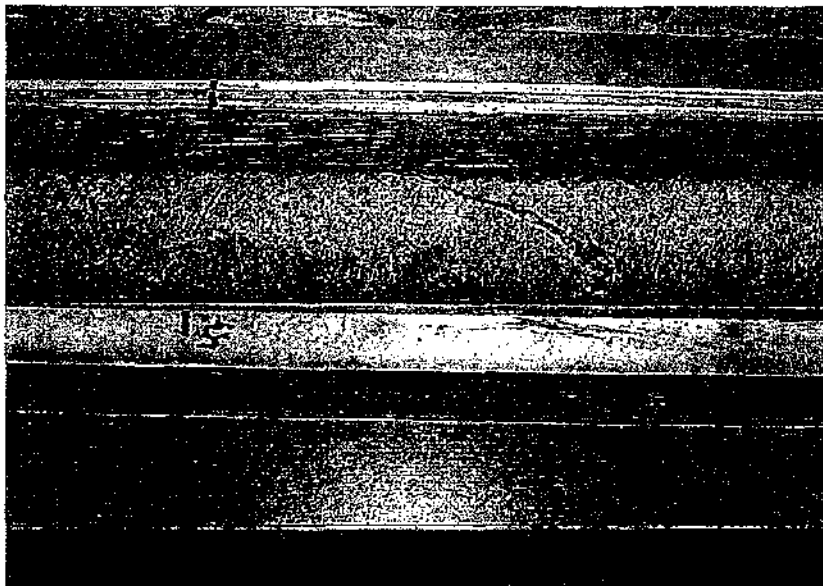
Drilling Method: 5-inch (PWF), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Heated sand infilled joint noted in R3



Core Runs R4 and R5

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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- 4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-108

SHEET 14 of 15

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller S. Laurenza  
Logged By A. Juneau / C. Thunberg

Boring Location northing 2696632 easting 814464  
Mudline El. -12.46 Datum NGVD  
Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

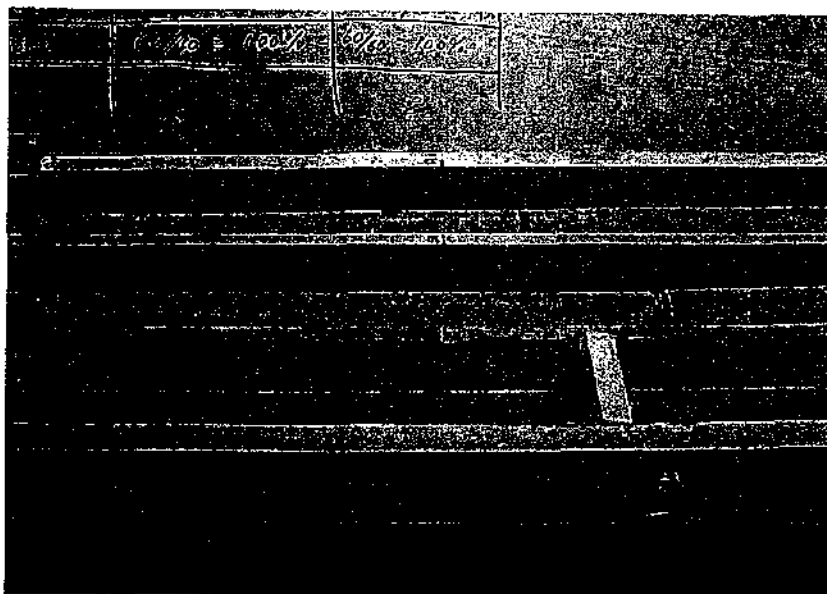
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

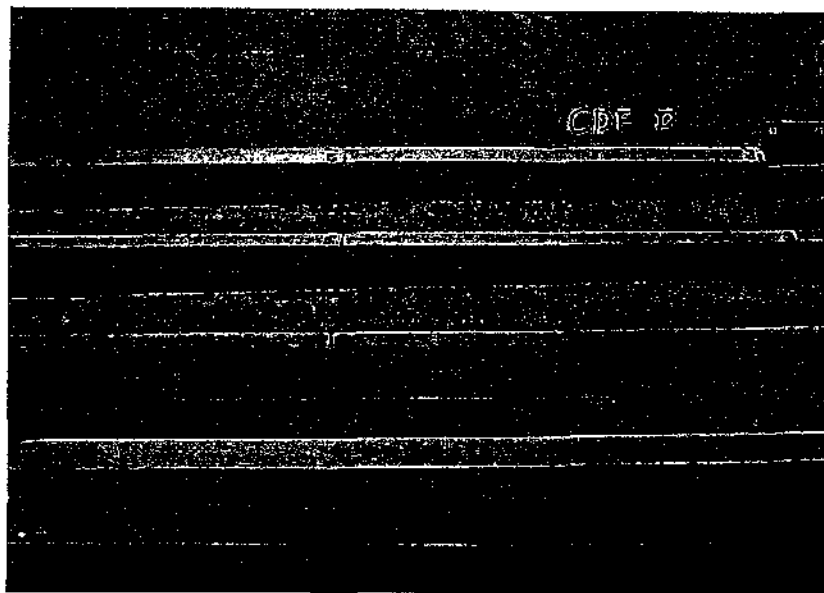
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R4 and R5



Core Runs R4 and R5

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of less than 100%.
- 4)



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PROJECT

Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-108

SHEET 15 of 15

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696632 easting 814464  
 Driller S. Laurenza Mudline El. -12.46 Datum NGVD  
 Logged By A. Juneau / C. Thunberg Date Start 12/21/00 Date End 12/29/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 30 inches.

Drill Rig: Falling Truck Rig

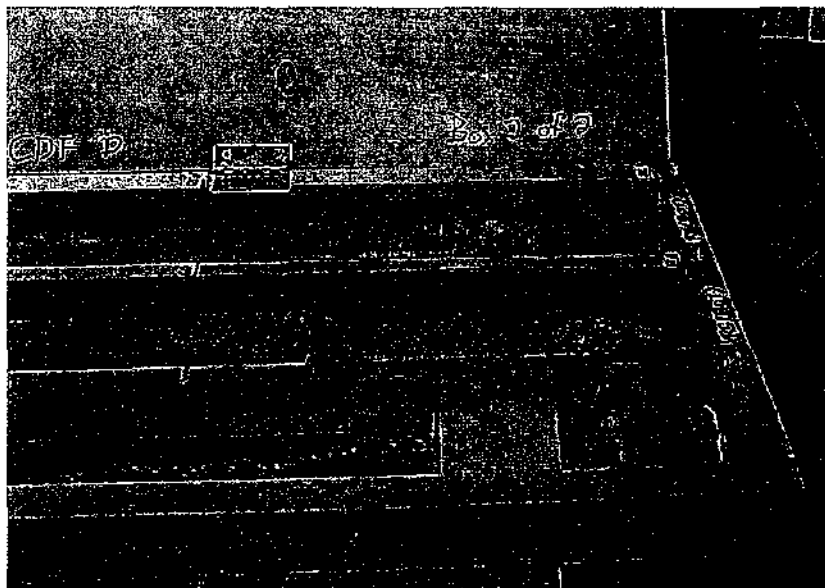
Drilling Method: 5-inch (PW), 4-inch (HW), and 3-inch (NW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R4 and R5

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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- 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109

SHEET 1 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
Mudline El. -33.04 Datum NGVD  
Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.		
1	WOC								
2	WOC								
		S-1	24/6	2-4	WOR/24		Organic soil (OH); 95% organic clay/silt, 5% fine sand, strong organic odor, black to dark gray. Advance PW drill casing to 4 ft.	ORGANIC CLAY	
3	WOC								
4	WOC								
		S-2	24/18	4-6	WOR/18-8		S-2A: Organic soil (OH); similar to S-1. (12 in.) S-2B: Silty sand (SM); 10% coarse sand, 35% medium sand, 35% fine sand, 5% gravel, 15% silt, subround sand and gravel, gray. (6 in.) Advance PW drill casing to 6 ft. Advance 3-7/8 in. roller bit to 6 ft.		5.5 ft.
5	WOC								
6	WOC						Perform falling head permeability test at 6 ft. Silty sand with gravel (SM); 10% coarse sand, 20% medium sand, 19% fine sand, 33% gravel, 18% silt, light brown. Subround to subangular sand and gravel. Advance PW drill casing to 11 ft. Advance 3-7/8 in. roller bit to 11 ft.	MARINE SAND	1
		S-3	24/6	6-8	15-12-10-11	22			
7	37								
8	35							GLACIO FLUVIAL	
9	21								
10	23								

GRANULAR SOILS (SANDS)	COHESIVE SOILS (CLAYS)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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- 3)
- 4)



Nobis Engineering  
18 Chennell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109

SHEET 2 of 12

FILE NO. 48136.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
Mudline El. -33.04 Datum NGVD  
Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD # Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing (ft)	Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
11	20							
		S-4	24/10	11-13	8-8-6-14	14	Well-graded gravel with silt and sand (GW-GM); 50% gravel, 13% coarse sand, 18% medium sand, 12% fine sand, 7% silt, brown. Subangular sand and gravel.	
12	22						Advance PW drill casing to 16 ft. Advance 3-7/8 in. roller bit to 16 ft.	
13	35							
14	29							
15	27						Approximately 12 in. of material in bottom of casing. Mix bentonite drilling mud to remove material, specific gravity = 1.08. Flush casing with water to remove drilling mud.	
16	28						Perform falling head permeability test at 16 ft. Poor recovery; spoon refusal on probable cobble. Advance PW drill casing to 16.5 ft. Advance 3-7/8 in. roller bit to 17.5 ft. Probable cobble from 17 to 17.5 ft.	
17	109/6	S-5	11/2	16-16.9	18-75/5			17.0 ft. COBBLE 17.5 ft.
18	40						Advance PW drill casing to 21 ft. Mix additional bentonite drilling mud, specific gravity = 1.09. Advance 3-7/8 in. roller bit to 21 ft.	
19	57							GLACIO FLUVIAL
20	54							

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109

SHEET 3 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
Mudline El. -33.04 Datum NGVD  
Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing, Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH Feet	Casing Down (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 5 INCHES	SPT N-Value			
21	53	S-6	24/10	21-23	12-14-15-17	29	Well-graded gravel with silt and sand (GW-GM); 62% gravel, 6% coarse sand, 13% medium sand, 12% fine sand, 7% silt, brown. Subangular sand and gravel.	GLACIO FLUVIAL	1
22	57						Advance PW drill casing to 23 ft. Advance 3-7/8 in. roller bit to 23 ft. with bentonite drilling mud to remove material from casing. Flush casing with water to remove drilling mud.		
23	63						Perform constant head permeability test at 23 ft.		
		S-7	24/6	23-25	40-59-16-14	75	Poorly graded gravel with silt and sand (GP-GM); 12% coarse sand, 16% medium sand, 15% fine sand, 48% gravel, 9% silt, brown. Subround to subangular sand and gravel.		
24	100						Advanced sampler past probable cobble from 23 to 24 ft. Advanced PW drill casing to 25 ft. Pushed probable cobble with casing. Mix additional bentonite drilling mud. Advance 3-7/8 in. roller bit to 26 ft. past cobble.		
25	95								
26	64						Unable to keep hole open, Advance PW drill casing to 27 ft. Mix additional bentonite drilling mud, specific gravity = 1.09. Advance 3-7/8 in. roller bit to 27 ft.		
27	113								
		S-8	24/10	27-29	14-14-14-12	28	Poorly graded sand with silt and gravel (SP-SM); medium dense, 10% coarse sand, 40% medium sand, 20% fine sand, 20% gravel, 10% silt, subrounded to subangular sand and gravel, brown.		
28	60						Advance PW drill casing to 31.5 ft; casing refusal. Top of bedrock 31.5 ft. Advance 3-7/8 in. roller bit to 32 ft.		
29	52								
30	58								

GRANDS	RESISTANCE	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UC denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-109

SHEET 4 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
Mudline El. -33.04 Datum NGVD  
Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD-8 Truck Rig  
Drilling Method: 5-inch (FW) flush joint drill casing, 4-inch (FW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31	90						Advance 4-7/8 in. roller bit to 32.5 ft. Cuttings indicate possible weathered bedrock. Telescope NW drill casing to 33 ft. (spin).	GLACIO FLUVIAL	31.5 ft.
	123								
32							Begin HQ rock core at 32.5 ft. (boring log continued on next page)	BEDROCK	
33									
34									
35									
36									
37									
38									
39									
40									

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-109

SHEET 5 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
Mudline El. -33.04 Datum NGVD  
Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	R E M A R K S
		CORE RUN	CORE INTERVAL	CORE TIME		
33.0		R1	32.5-33.5	6.5 min.	Begin R1 at 32.5 ft. Fresh, hard, gray medium to fine grained GNEISS. Low angle foliation (approx. 10-15 degrees). REC = 92%; ROD = 80% (good). Water return color: rust.	
33.5					33.4 ft.: Mechanical break in rock core.	
34.0			33.5-34.5	5 min.	33.5 ft.: Pause advancement of core R1 to advance HW drill casing to achieve better casing seal.	
34.5					34.2 ft.: Mechanical break in rock core.	
35.0			34.5-35.5	4.5 min.	34.4 and 34.5 ft.: Primary joints: low angle, rough, planar, discolored, and open. 34.5 ft.: Loss of water return noted. 34.4 to 34.8 ft.: Discoloration of rock core noted.	
35.5					35.1 ft.: Primary joint: low angle, rough, planar, partially discolored, and tight. Possible mechanical break.	
36.0			35.5-36.5	4 min.	35.5 ft.: Primary joint: horizontal, rough, planar, discolored, and open. 35.5 to -35.7 ft.: Secondary joint: moderately dipping to high angle, smooth, planar, discolored, and open. 35.6 to 36.1 ft.: Distinct discoloration and slight weathering of core noted. 36.0 ft.: Primary joint: low angle, rough, stepped, discolored, and open. Possible mechanical break.	
36.5					36.2 and 36.3 ft.: Mechanical break in rock core.	
37.0			36.5-37.5	5.5 min.	36.6 to 37.2 ft.: Quartz/feldspar vein. Dark gray to milky white/pink in color. (pegmatic)	
37.5					37.2 ft.: Primary joint: low angle, rough, undulating, discolored, and tight.	
					End R1 at 37.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109

SHEET 6 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
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Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
		R2	37.5-38.5	4.5 min.	Begin R2 at 37.5 ft. Fresh, hard, gray, medium to fine grained GNEISS: Low angle foliation (approx. 10-20 degrees). No natural joints/fractures or mechanical breaks noted. REC = 93%; RQD = 93% (excellent). No water return noted during R2.	2
38.0						
38.5			38.5-39.5	4 min.		
39.0						
39.5			39.5-40.5	3.5 min.		
40.0						
40.5			40.5-41.5	4 min.		
41.0						
41.5			41.5-42.5	2.5 min.		
42.0						
42.5					End R2 at 42.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-109  
SHEET 7 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696353 easting 814480  
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Logged By E. Thibodeau Date Start 12/20/00 Date End 12/27/00

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Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
43.0		R3	42.5-43.5	4.5 min.	Begin R3 at 42.4 ft. Fresh to slightly weathered, hard, gray, medium to fine grained, GNEISS. Low angle foliation (approx. 10 degrees). REC = 90%; RQD = 90% (good/excellent). No water return noted during R2.	2
43.5					43.4 ft.: Mechanical break in rock core.	
44.0			43.5-44.5	4 min.	43.6 ft.: Mechanical break in rock core. 43.8 ft.: Mechanical break in rock core. 44.0 ft.: Primary joint: low angle, smooth, planar, discolored, and open.	
44.5						
45.0			44.5-45.5	5 min.	44.9 ft.: Mechanical break in rock core.	
45.5						
46.0			45.5-46.5	4 min.	45.6 to 47.0 ft.: Slightly weathered zone; minor discoloration noted. 45.7 ft.: Primary joint: low angle, smooth, planar, discolored, and open. 46.2 ft.: Mechanical break in rock core. 46.3 and 46.4 ft.: Mechanical breaks in rock core.	
46.5						
47.0			46.5-47.5	4.5 min.	47.0 ft.: Mechanical break in rock core. 47.0 to 47.1 ft.: Quartz/feldspar vein. Dark gray to pink in color.	
47.5					End R3 at 47.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-109

SHEET 8 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2698353 easting 814480  
 Driller E. Thomas Mudline El. -33.04 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
48.0		R4	47.5-48.5	5.5 min.	Begin R4 at 47.5 ft. Fresh to slightly weathered, hard, gray, medium to fine grained GNEISS. REC = 100%; RQD = 85% (good). No water return noted during R4. 47.5 to 47.6 ft.: Weathered zone; discoloration noted. 48.4 ft.: Mechanical break in rock core.	
48.5			48.5-49.5	3.5 min.	48.9 ft.: Primary joint: low angle, rough, planar, discolored, and tight. 48.9 to 49.5 ft.: Weathered zone. Mechanical break at 49.1 ft. Rock has been weathered to a residual soil along mechanical break; material is friable.	
49.0			49.5-50.0	5.5 min.	49.6 ft.: Primary joint: low angle, to horizontal, smooth, planar, discolored, and tight. Possible mechanical break. 50.2 ft.: Mechanical break in rock core.	
49.5			50.0-50.5	5 min.	51.3 ft.: Mechanical break in rock core.	
50.0			50.5-51.0	5 min.	52.3 ft.: Mechanical break in rock core. 62.4 to 52.5 ft.: Quartz/feldspar vein. Dark gray/pink in color. 52.5 ft.: Primary joint: low angle, smooth, planar, discolored, and open.	
50.5						
51.0						
51.5						
52.0						
52.5					End R4 at 52.5 ft.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
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BORING NO. FD-109

SHEET 9 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
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Logged By E. Thibodeau

Boring Location northing 2696353 easting 814480  
Mudline El. -33.04 Datum NGVD  
Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	R E M A R K S
		CORE RUN	CORE INTERVAL	CORE TIME		
53.0		R5	52.5-53.5	6 min.	Begin R5 at 52.5 ft. Fresh, very hard, gray, medium to fine grained GNEISS. Low angle foliation (approx. 10 degrees). REC = 97%; RQD = 93% (excellent). No water return noted during R5. 52.5 to 52.7 ft.: Secondary joint: moderately dipping, rough, planar, discolored, and open. 53.0 to 53.2 ft.: Quartz/feldspar vein. Dark gray/pink in color. 53.2 ft.: Mechanical break in rock core.	2
53.5			53.5-54.5	5.5 min.	53.9 ft.: Mechanical break in rock core.	
54.0					54.3 ft.: Mechanical break in rock core.	
54.5						
55.0			54.5-55.5	6 min.	55.0 ft.: Mechanical break in rock core. 55.0 to 55.1 ft.: Quartz/feldspar vein. Dark gray/pink in color. 55.3 ft.: Mechanical break in rock core.	
55.5						
56.0			55.5-56.5	7 min.	55.7 ft.: Mechanical break in rock core 56.0 to 56.1 ft.: Quartz/feldspar vein. Dark gray/pink in color.	
56.5					56.4 to 56.5 ft.: Quartz/feldspar vein. Dark gray/pink in color.	
57.0		56.5-57.5	6.5 min.	Perform single packer test from 47.5 to 57.5 ft. Perform single packer test from 37.5 to 57.5 ft. End R5 at 57.5 ft. Bottom of exploration at 57.5 ft; boring terminated in bedrock.		
57.5				Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.40.		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) RQD biased low due to recovery of less than 100%.  
3)  
4)



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18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109

SHEET 10 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

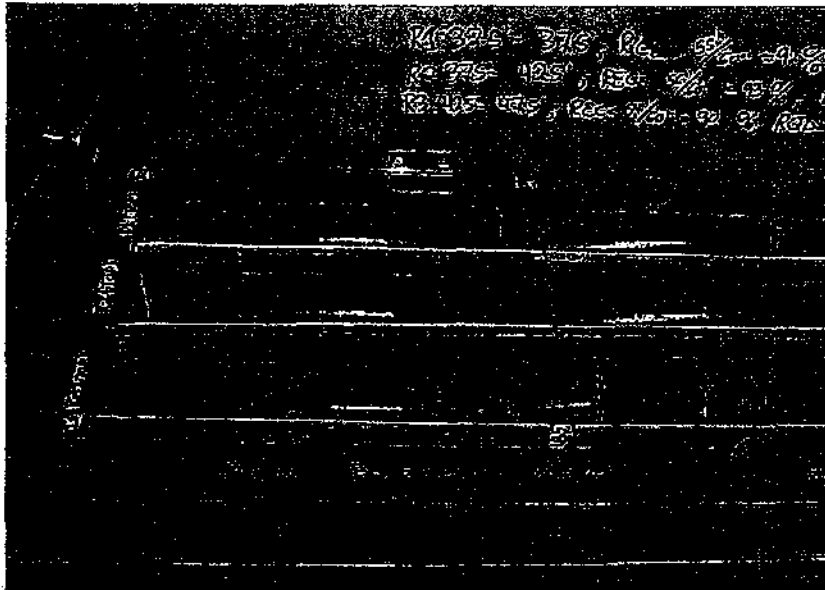
Boring Co. Warren George, Inc. Boring Location northing 2696353 easting 814480  
 Driller E. Thomas Mudline El. -33.04 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/20/00 Date End 12/27/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing, Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

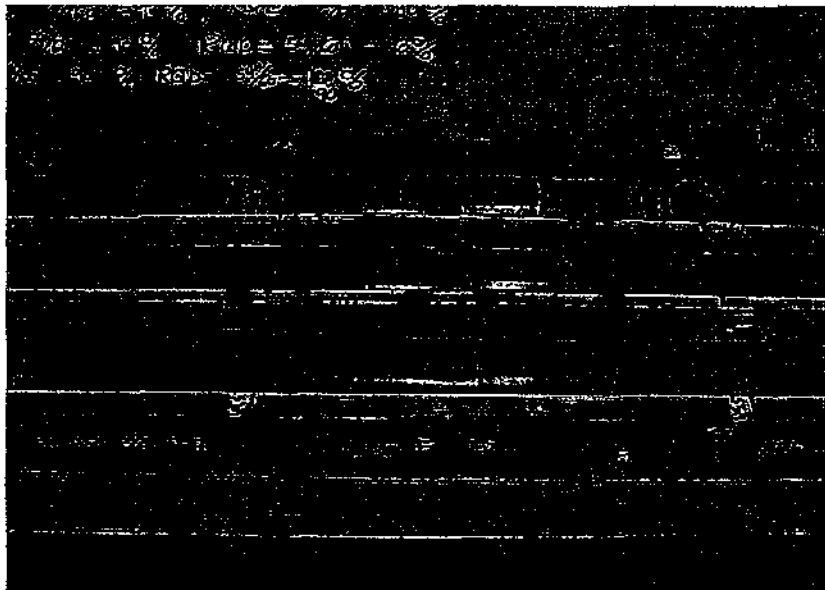
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109

SHEET 11 of 12

FILE NO. 48138.27

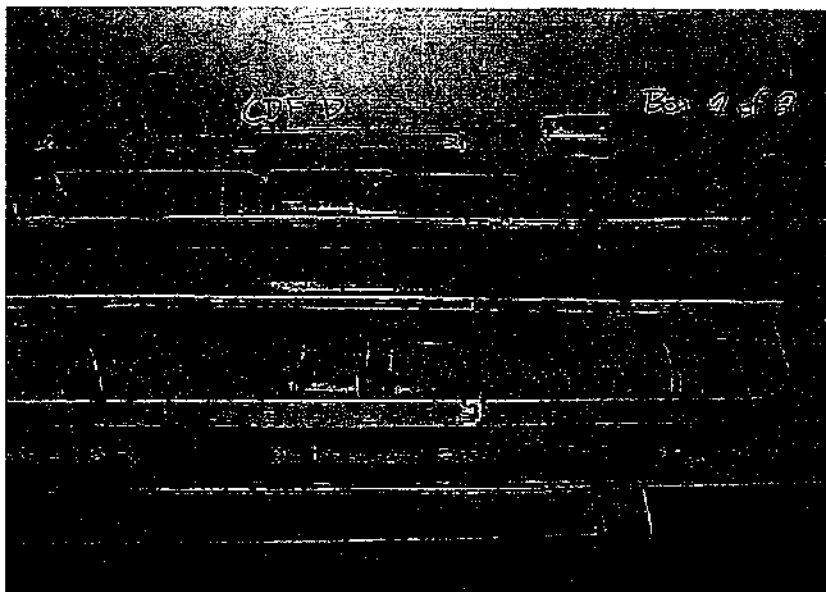
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696353 easting 814480  
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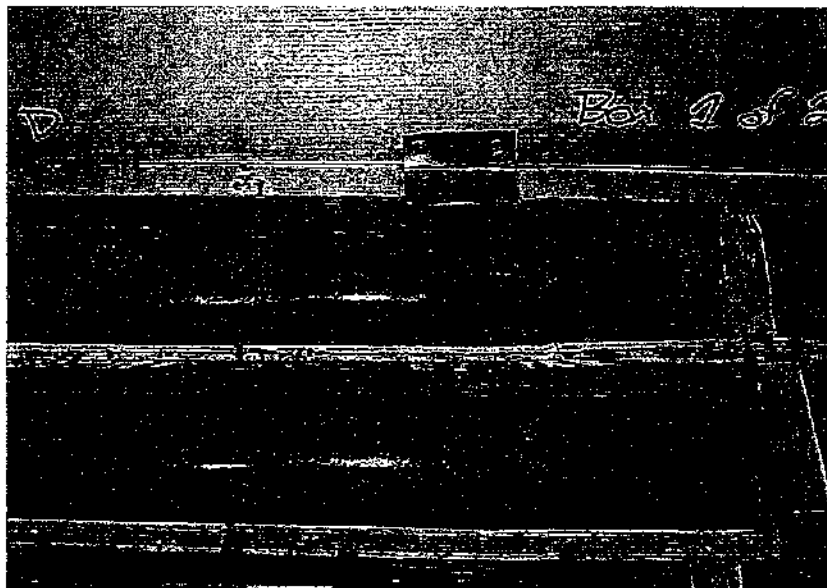
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 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Quartz/feldspar vein (pegmatite) noted in bottom of R1

**REMARKS:**

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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-109  
SHEET 12 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trottier

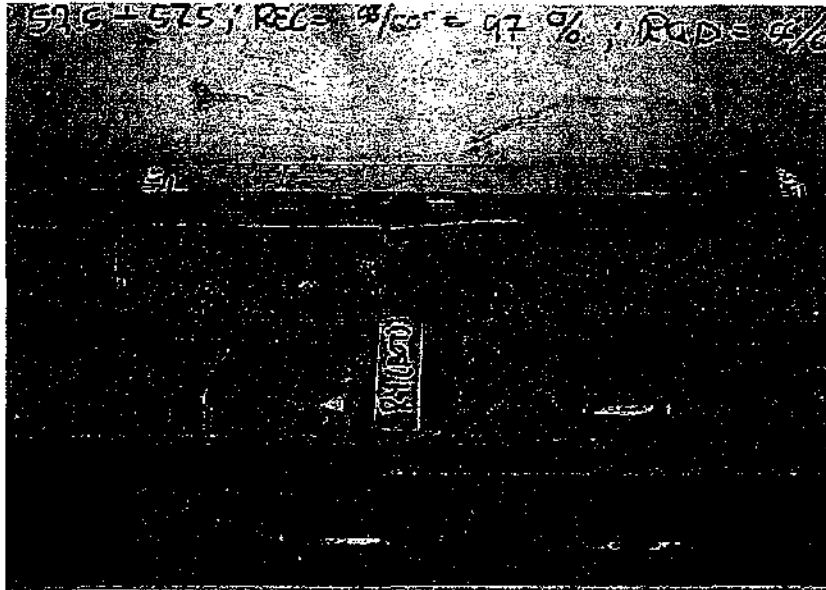
Boring Co. Warren George, Inc. Boring Location northing 2696353 easting 814480  
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Logged By E. Thibodeau Date Start 12/20/00 Date End 12/27/00

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Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

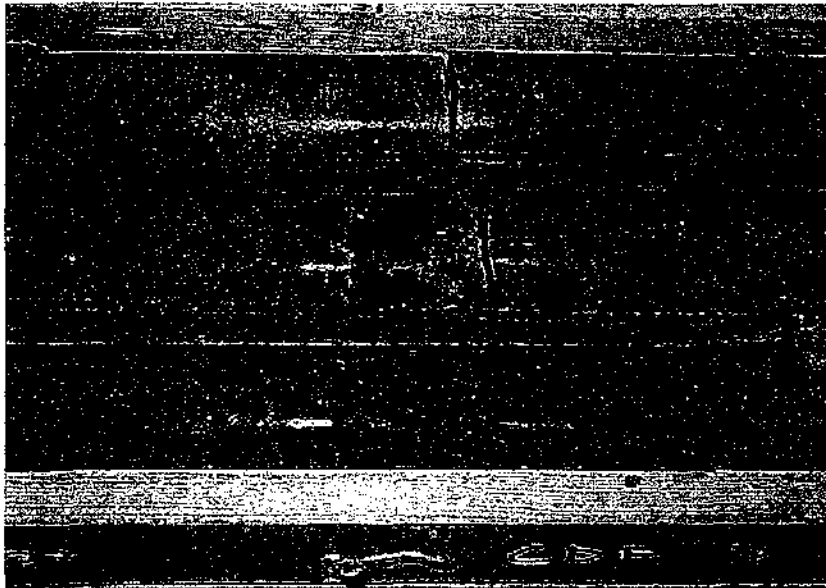
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Weathered zone noted in top of R4



Quartz/feldspar vein noted in R5

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 1 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696313 easting 814763  
Mudline El. -14.29 Datum NGVD  
Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Pég  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casing Blow (60)	Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES			
						Advance sampler to 2 ft., bottom felt hard with depth probe.		
1	WOC							
2	WOC							
		UO-1	24/23	2-4		Organic soil (OH); 95% organic clay/silt, 5% fine sand, strong organic odor, dark gray. Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft.		
3	WOC							
4	WOC							
5	WOC							
		UO-2	24/24	5-7		Sandy organic soil (OH); 65% organic clay/silt, 35% fine sand, strong organic odor, dark gray. Notable amount of fine sand observed in bottom of tube; possible sand seam. Advance PW drill casing to 8 ft. Advance 3-7/8 in roller bit to 8 ft.	ORGANIC CLAY	
6	WOC							
7	WOC							
8	WOC							
		UO-3	24/24	8-10		Organic soil with sand (OH); 75% organic clay/silt, 20% fine sand, 5% shells and shell fragments, strong organic odor, dark gray. Removed large shell fragment from bottom of tube. Advance PW drill casing to 11 ft. Advance 3-7/8 in. roller bit to 11 ft.		
9	WOC							
10	WOC							

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PJD denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-110  
SHEET 2 of 14  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696313 easting 814763  
Driller E. Thomas Mudline El. -14.29 Datum NGVD  
Logged By E. Thibodeau Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Subsidence Time

DEPTH	Casing Blows (R)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type E No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	WOC						Organic soil with sand (OH); 75% organic clay/silt, 25% fine sand, strong organic odor, dark gray. Traces of peat noted in sample.	ORGANIC CLAY	
		UO-4	24/24	11-13					
12	HYD PUSH						Sandy silt (ML); 55% silt, 10% clay, 35% fine sand, gray. Advance PW drill casing to 15 ft. Advance 3-7/8 in. roller bit to 15 ft.	13.0 ft.	
13	HYD PUSH								
14	HYD PUSH						Silt with sand (ML); very soft, 65% silt, 20% clay, 15% fine sand, gray. Advance PW drill casing to 18 ft. Advance 3-7/8 in. roller bit to 18 ft.	MARINE SAND	
15	HYD PUSH								
16	HYD PUSH	S-1	36/24	15-17.5	2-1/12"-1/12"		S-2A: Poorly graded sand (SP); loose, 65% medium sand, 25% fine sand, 5% gravel, 5% silt, gray. (6 in.) S-2B: Poorly graded sand (SP); loose, 60% medium sand, 35% fine sand, 5% silt, olive brown. Some iron staining noted. (9 in.) Advance PW drill casing to 20 ft. Mix bentonite drilling mud, specific gravity = 1.10. Advance 3-7/8 in. roller bit to 20 ft.		
17	HYD PUSH								
18	HYD PUSH								
19	26	S-2	24/15	18-20	1-3-4-5	7			
20	20								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 3 of 14

FILE NO. 48138.27

CHKD. BY J. Trofrier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696313 easting 814763  
Mudline El. -14.29 Datum NGVD  
Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION				SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S	
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES				SPT N-Value
21	33	S-3	24/3	20-22	6-2-2-2	4	Poorly graded sand (SP); very loose, 30% medium sand, 65% fine sand, 5% silt, brown. Some iron staining noted. Advance PW drill casing to 22 ft. Advance 3-7/8 in. roller bit to 22 ft.	MARINE SAND	
22	31								22.0 ft.
23	28	S-4	24/12	22-24	3-2-2-4	4	Silty sand (SM); 71% fine sand, 29% silt, light brown. Advance PW drill casing to 24 ft. Advance 3-7/8 in. roller bit to 24 ft.	GLACIO-FLUVIAL	1
24	39								
25	36	S-5	24/12	24-26	3-2-3-4	5	Similar to S-4, except loose. Advance PW drill casing to 26 ft. Advance 3-7/8 in. roller bit to 26 ft.		
26	65								
27	68	S-6	24/8	26-28	5-3-3-3	6	Poorly graded sand (SP); 1% coarse sand, 7% medium sand, 88% fine sand, 4% silt, yellowish brown. Advance PW drill casing to 28 ft. Advance 3-7/8 in. roller bit to 28 ft.		1
28	86								
29	53	S-7	24/10	28-30	4-6-5-5	11	Poorly graded sand (SP); medium dense, 30% medium sand, 65% fine sand, 5% silt, brown. Advance PW drill casing to 33 ft. Advance 3-7/8 in. roller bit to 33 ft.		
30	75								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 4 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696313 easting 814763  
 Driller E. Thomas Mudline El. -14.29 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD 8 Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (RW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT N-Value			
31	83						Poorly graded sand with silt (SP-SM); 16% medium sand, 73% fine sand, 1% gravel, 8% silt, yellowish brown. Advance PW drill casing to 36 ft. Advance 3-7/8 in. roller bit to 36 ft.	GLACIO FLUVIAL	1
32	92								
33	87								
		S-8	24/10	33-35	5-5-7-8	12			
34	66						Poorly graded sand with gravel (SP); 14% coarse sand, 22% medium sand, 28% fine sand, 32% gravel, 4% silt, grayish brown. Subangular sand and gravel. Advance PW drill casing to 39 ft. Advance 4-7/8 in. roller bit to 41 ft. Probable boulder from 39 to 41 ft.	39.0 ft.	1
35	78								
36	84								
		S-9	24/7	36-38	5-5-4-5	9			
37	83								
38	73								
39	75								
40	SPIN								

- |   |  |  |  |
|---|--|--|--|
| 0 to 4 - Very Loose<br>5 to 10 - Loose<br>11 to 30 - Medium Dense<br>31 to 50 - Dense<br>Over 50 - Very Dense | 0 to 2 - Very Soft<br>3 to 4 - Soft<br>5 to 8 - Medium Stiff<br>9 to 15 - Stiff<br>16 to 30 - Very Stiff<br>Over 30 - Hard | 1. S denotes split-barrel sampler.<br>2. U denotes 3-inch O.D. undisturbed sample.<br>3. UO denotes 3-inch Osterberg undisturbed sample.<br>4. PEN denotes penetration length of sampler.<br>5. REC denotes recovered length of sample.<br>6. SPT denotes Standard Penetration Test. | 7. PID denotes Proliferation Detector<br>8. PPM denotes parts per million.<br>9. PP denotes Pocket Penetrometer.<br>10. FVST denotes field vane shear test.<br>11. RQD denotes Rock Quality Designation.<br>12. R denotes core run number. |
|---|--|--|--|

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 5 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2696313</u>	easting <u>814763</u>
Driller <u>E. Thomas</u>	Mudline El. <u>-14.29</u>	Datum <u>NGVD</u>
Logged By <u>E. Thibodeau</u>	Date Start <u>12/5/00</u>	Date End <u>12/8/00</u>

Sampler: <u>2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.</u>	Groundwater Readings Not Applicable for Offshore Borings				
Drill Rig: <u>Acker AD II Truck Rig</u>	Date	Time	Depth	Elev.	Stabilization Time
Drilling Method: <u>5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.</u>					
Casing driven with a <u>300 lb. center hole hammer free falling from a height of 24 inches.</u>					

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type S.No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
41	SPIN							PROBABLE BOULDER 41.0 ft.	
42	SPIN	S-10	24/6	41-43	7-5-8-10	13	Poorly graded sand with gravel (SP); medium dense, 25% medium sand, 10% fine sand, 40% gravel, 20% coarse sand, 5% silt, subrounded to subangular sand and gravel; brown; Mix additional bentonite drilling mud, specific gravity = 1.15. Advance 4-7/8 in. roller bit to 44 ft. Probable boulder at 44 ft. Advance 4-7/8 in. roller bit to 47.5 ft. Attempt rock core.	GLACIO- FLUVIAL	
43	SPIN						Telescope HW drill casing to 44.8 ft. (spin), unable to achieve casing seat; sands falling into roller bit hole. Telescope NW drill casing to 47.6 ft., remove HW drill casing. Advance 2-7/8 in. roller bit to remove sand from hole. Check seal on casing, water level dropped slowly.		
44	SPIN							44.0 ft.	
45	SPIN								
46	SPIN							BOULDER	
47	SPIN								
48	SPIN						Begin NX rock core at 47.5 ft. R1: 47.5 to 49.5 ft. Core barrel dropped from 48 to 48.5 ft. and 49 to 49.5 ft. Terminate rock core, 5 in. recovery. Fresh, hard, gray, fine-grained GNEISS. Total core time 10 minutes.	48.0 ft. SOIL? 48.5 ft.	
49		S-11	24/18	48.5-50.5	4-7-10-10	17	Poorly graded sand with gravel (SP); medium dense, 25% medium sand, 70% fine sand, 5% gravel, 5% silt, gray. Piece of fractured GNEISS noted in sample. Advance 2-7/8 in. roller bit to 51.5 ft.	COBBLE? 49.0 ft.	
50								GLACIO- FLUVIAL	

<p><b>STANDARD SOILS</b></p> <p>0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense</p>	<p><b>COHESIVE SOILS</b></p> <p>0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard</p>	<p><b>SOILS</b></p> <p>1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UC denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.</p>	<p>7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.</p>
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**PROJECT**

Remedial Design For Operable Unit 01

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New Bedford, Massachusetts

BORING NO. FD-110

SHEET 6 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696313 easting 814763  
Mudline El. -14.29 Datum NGVD  
Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings: Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Bore (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PCNREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
51							Top of bedrock at 51 ft. Advance NW drill casing to 51 ft. Begin NX rock core at 51.5 ft. (boring log continued on next page)	GLACIO FLUVIAL 51.0 ft.	
52								BEDROCK	
53									
54									
55									
56									
57									
58									
59									
60									

- |                         |                       |  |   |
|-------------------------|-----------------------|--|---|
| 0 to 4 - Very Loose     | 0 to 2 - Very Soft    | 1. S denotes split-barrel sampler.                 | 7. PID denotes Photoionization Detector   |
| 5 to 10 - Loose         | 3 to 4 - Soft         | 2. U denotes 3-inch O.D. undisturbed sample.       | 8. PPM denotes parts per million.         |
| 11 to 30 - Medium Dense | 5 to 8 - Medium Stiff | 3. UO denotes 3-inch Osterberg undisturbed sample. | 9. PP denotes Pocket Penetrometer.        |
| 31 to 50 - Dense        | 9 to 15 - Stiff       | 4. PEN denotes penetration length of sampler.      | 10. FVST denotes field vane shear test.   |
| Over 50 - Very Dense    | 16 to 30 - Very Stiff | 5. REC denotes recovered length of sample.         | 11. RQD denotes Rock Quality Designation. |
|                         | Over 30 - Hard        | 6. SPT denotes Standard Penetration Test.          | 12. R denotes core run number.            |

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2)  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

**BORING NO.** FD-110  
**SHEET** 7 of 14  
**FILE NO.** 48138.27  
**CHKD. BY** J. Trottier

**Boring Co.** Warren George, Inc. **Boring Location** northing 2696313 easting 814763  
**Driller** E. Thomas **Mudline El.** -14.29 **Datum** NGVD  
**Logged By** E. Thibodeau **Date Start** 12/5/00 **Date End** 12/8/00

**Sampler:** 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
**Drill Rig:** Acker AD II Truck Rig  
**Drilling Method:** 5-inch (FW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
52.0		R1	51.5-52.5	3.5 min.	Begin R1 at 51.5 ft. Fresh, hard, gray fine grained GNEISS. Low angle foliation (approx. 10 degrees). REC = 97%; RQD = 95% (excellent) Minimal water return noted. Water return color: milky white. 51.5 and 51.6 ft.: Primary joints: low angle, smooth, planar, discolored, and tight. Gray infilling noted on 51.6 ft. joint. 52.0 ft.: Mechanical break in rock core.	
52.5			52.5-53.5	3 min.	51.5 to 52.8 ft.: Zone of feldspar (pink) and quartz (dark gray) nodules. 52.5 ft.: Primary joint: low angle, smooth, planar, discolored, and open. 52.5 ft.: Loss of water return.	
53.0						
53.5			53.5-54.5	3.5 min.	53.4 ft.: Mechanical break in rock core. 53.5 to 53.7 ft.: Quartz/feldspar vein (pink), some discoloration noted. 53.7 ft.: Mechanical break in rock core.	
54.0						
54.5					54.4 ft.: Primary joint: low angle, smooth, planar, discolored, and tight.	
55.0			54.5-55.5	4 min.		
55.5						
56.0			55.5-56.5	3.5 min.	55.8 and 55.9 ft.: Primary joints: low angle, smooth, planar, discolored, and open. 56.0 ft.: Mechanical break in rock core.	
56.5					End R1 at 56.5 ft.	

GRANULAR SOILS	COHESIVE SOILS	SYMBOLS	TESTS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2)  
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18 Church Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 8 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696313 easting 814763  
Mudline El. -14.29 Datum NGVD  
Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Anchor AD-8 Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
57.0		R2	56.5-57.5	2 min.	Begin R2 at 56.5 ft. Fresh to slightly weathered, hard to soft, gray, fine grained GNEISS. Low angle foliation (approx. 10 degrees). REC = 80%; RQD = 43% (poor) No water return noted. 56.9 and 57.1 ft.: Primary joints: low angle to horizontal, smooth, planar, and discolored.	
57.5			57.5-58.5	1.5 min.	57.8 ft.: Mechanical break in rock core. 57.9 to 58.1 ft.: Fractured rock zone. Slight discoloration noted on some of the fractured surfaces. Possible mechanical breaks. 58.1 ft.: Thin quartz/ feldspar vein (pink to dark gray). 58.2 to 60.2 ft.: Weathered zone. Rock distinctly discolored. Rock easily broken with hands; slightly friable. Total of eleven fractures noted throughout this zone. Fractures are low angle, smooth to rough, planar, and discolored. Some fractures may be mechanical in nature. Some residual soil noted along the surfaces of the fractures.	
58.0						
58.5						
59.0						
59.5						
60.0						
60.5			59.5-60.5	2 min.	60.3 ft.: Mechanical break in rock core.	
61.0			60.5-61.5	2 min.	60.5 to 61.5 ft.: No recovery.	
61.5	No Recovery				End R2 at 61.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 9 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696313 easting 814763  
 Driller E. Thomas Mudline El. -14.29 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing; 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings: Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
62.0		R3	61.5-62.5	5 min.	Begin R3 at 61.5 ft. Fresh, hard, gray, fine grained GNEISS. Low angle foliation (approx. 20 degrees). REC = 94%; RQD = 89% (good) No water return noted. 61.5 to 61.9 ft.: Secondary joints: high angle, rough, planar, fresh and open. 62.0 ft.: Mechanical break in rock core.		
62.5			62.5-63.5	4.5 min.	62.5 ft.: Mechanical break in rock core.  62.9 ft.: Mechanical break in rock core.		
63.0							
63.5			63.5-64.5	5.5 min.			
64.0							
64.5			64.5-65.5	5 min.	64.5 ft.: Mechanical break in rock core. 64.7 ft.: Mechanical break in rock core.		
65.0					64.9 to 66.0 ft.: Healed joint: high angle to vertical. Some discoloration noted along joint.		
65.5			65.5-66.0	4 min.			
66.0			R4	66.0-67.0	7 min.		End R3 at 66.0 ft. Core barrel full; core run terminated. Begin R4 at 66.0 ft. Fresh, hard, gray, fine grained GNEISS. Low angle foliation (approx. 20 degrees). REC = 100%; RQD = 100% (excellent) No water return noted.
66.5							

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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Nobis Engineering  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 10 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.

Driller E. Thomas

Logged By E. Thibodeau

Boring Location northing 2696313 easting 814763

Mudline El. -14.29 Datum NGVD

Date Start 12/6/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
67.0		R4 (cont.)			66.0 to 67.0 ft.: Healed joint: high angle to vertical. Some discoloration noted along joint, continuation from R3.	
67.5			67.0-68.0	8.5 min.	67.5 ft.: Mechanical break in rock core. Possible healed joint. 67.6 ft.: Healed joint.	
68.0					67.9 and 68.1 ft.: Mechanical break in rock core.	
68.5			68.0-69.0	8.5 min.	68.4 ft.: Primary joint: low angle, rough, planar, discolored, and tight.	
69.0						
69.5			69.0-70.0	7.5 min.	69.5 to 69.8 ft.: Series of mechanical breaks in rock core.	
70.0					69.9 ft.: Mechanical break in rock core.	
70.5			70.0-71.0	6.5 min.		
71.0					End R4 at 71.0 ft. Begin R5 at 71.0 ft.	
71.5		R5	71.0-72.0	3 min.	Fresh, hard, gray, fine grained GNEISS. Low angle foliation (approx. 20 to 30 degrees). REC = 100%; RQD = 100% (excellent) No water return noted.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 11 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696313 easting 814763  
 Driller E. Thomas Mudline El. -14.29 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
72.0					71.8 ft.: Secondary joint: moderately dipping, rough, planar, slightly discolored, and tight.	
72.5			72.0-73.0	3.5 min.	Possible healed joint. 71.9 to 72.1 ft.: Healed joint: moderately dipping. 72.0 ft.: Mechanical break in rock core. 72.5 ft.: Mechanical break in rock core. Possible healed joint. 72.6 to 72.8 ft.: Healed joint: moderately dipping and undulating.	
73.0						
73.5			73.0-74.0	3 min.	73.3 ft.: Mechanical break in rock core.	
74.0					73.9 ft.: Mechanical break in rock core.	
74.5			74.0-75.0	3.5 min.		
75.0					74.9 ft.: Mechanical break in rock core.	
75.5			75.0-76.0	3.5 min.		
76.0					75.7 ft.: Mechanical break in rock core.	
					End R5 at 76.0 ft. Bottom of exploration at 76.0 ft; boring terminated in bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.32.	

GRAIN SIZES (ASTM D 2487)	COHESIVE SOILS (ASTM D 2487)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
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Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 12 of 14

FILE NO. 48138.27

CHKD. BY J. Trottier

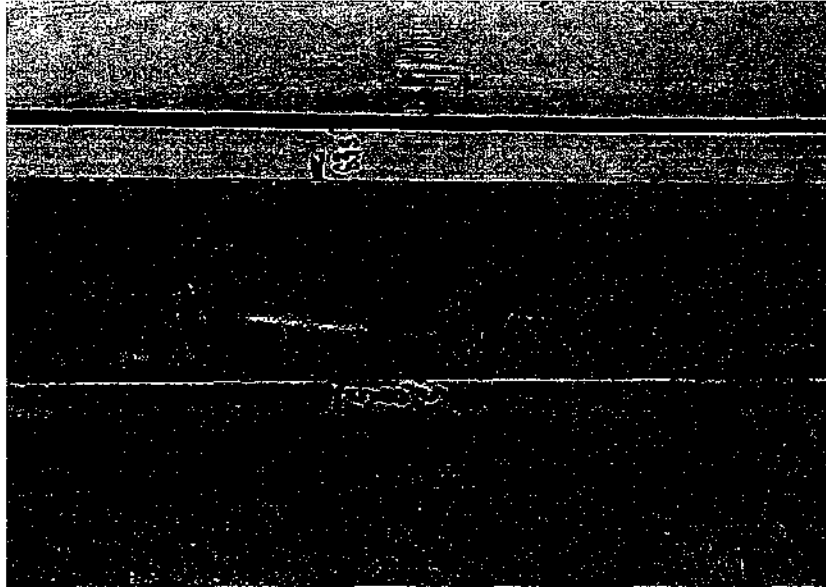
Boring Co. Warren George, Inc. Boring Location northing 2696313 easting 814763  
 Driller E. Thomas Mudline El. -14.29 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

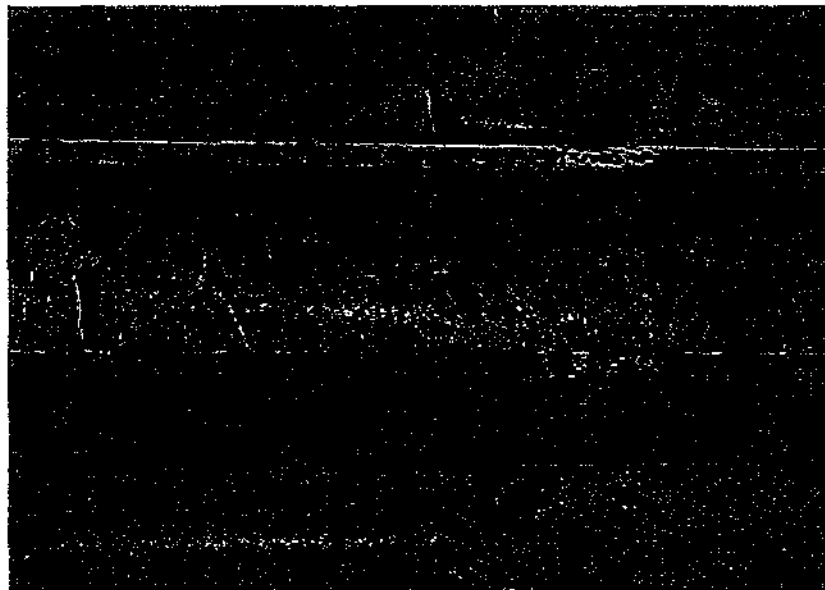
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Quartzfeldspar vein noted in R1



Weathered zone noted in R2

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2)
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- 4)





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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 13 of 14

FILE NO. 48138.27

CHKD. BY J. Trotter

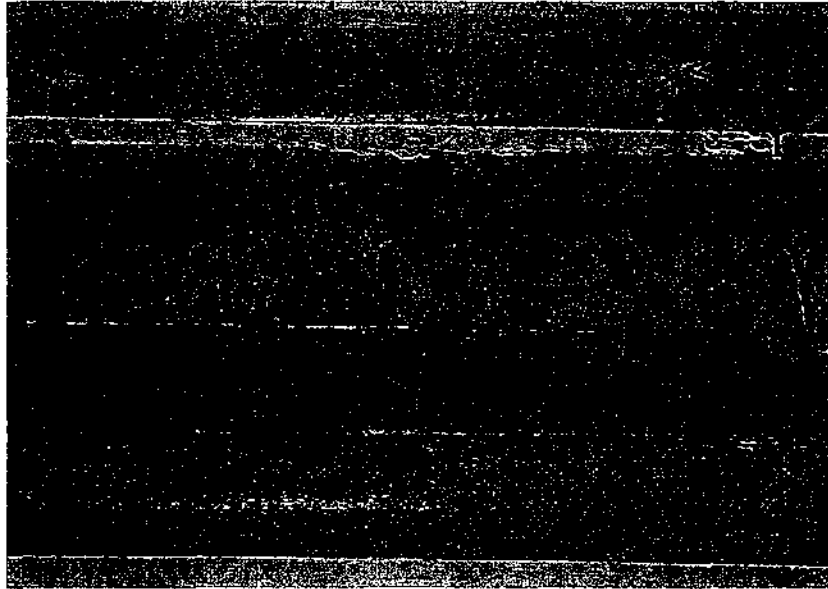
Boring Co. Warren George, Inc. Boring Location northing 2696313 easting 814763  
 Driller E. Thomas Mudline El. -14.29 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/5/00 Date End 12/8/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

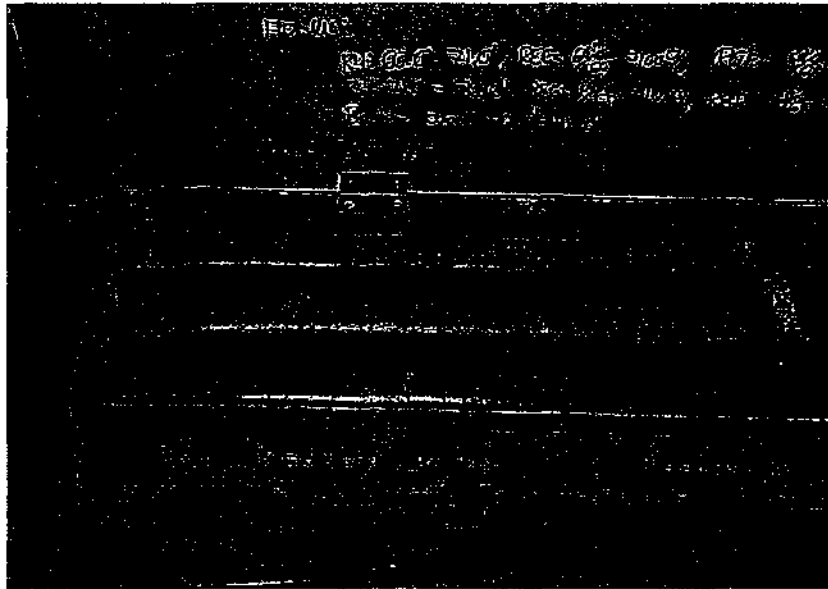
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Weathered zone noted in R2



Core Runs R4 and R5

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-110

SHEET 14 of 14

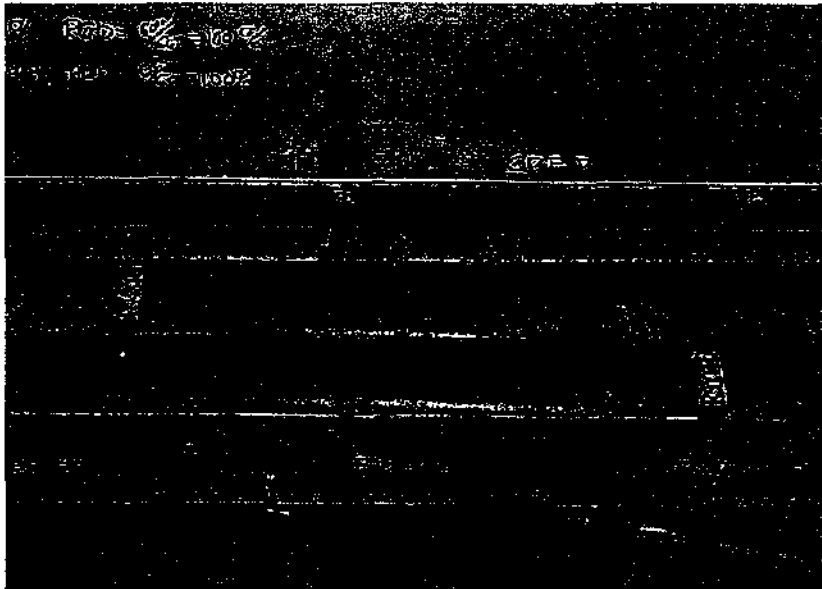
FILE NO. 48138.27

CHKD. BY J. Trottier

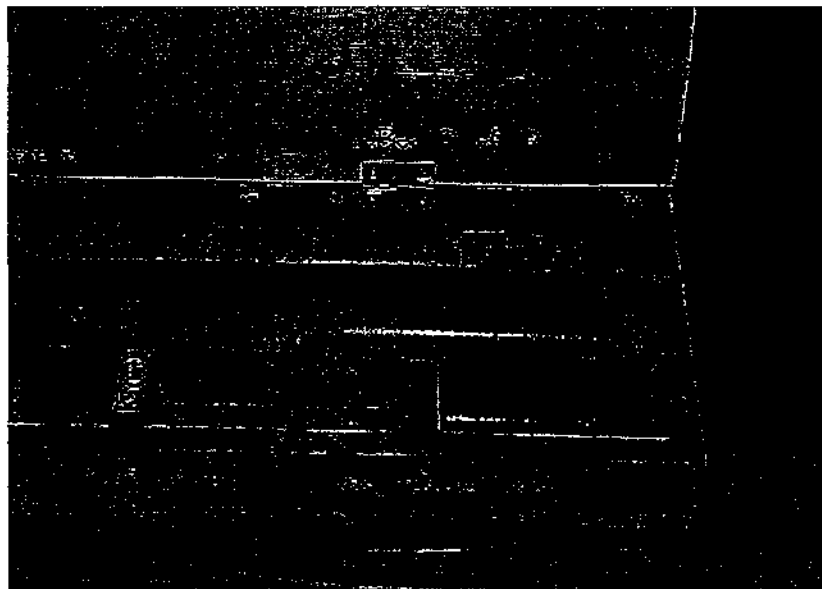
Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2696313</u>	<u>easting 814763</u>
Driller <u>E. Thomas</u>	Mudline El. <u>-14.29</u>	Datum <u>NGVD</u>
Logged By <u>E. Thibodeau</u>	Date Start <u>12/5/00</u>	Date End <u>12/8/00</u>

Sampler: <u>2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.</u>	Groundwater Readings Not Applicable for Offshore Borings			
Drill Rig: <u>Acker AD II Truck Rig</u>	Date	Time	Depth	Elev.
Drilling Method: <u>5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.</u>				Stabilization Time
Casing driven with a <u>300 lb. center hole hammer free falling from a height of 24 inches.</u>				

**ROCK CORE PICTURES**



Core Runs R4 and R5



Core Runs R4, R5, and boulder core.

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2)
- 3)
- 4)



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18 Chenell Drive  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 1 of 11

FILE NO. 48138.27

CHKD. BY J. Troffier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696247 easting 814699  
Mudline El. -32.21 Datum NGVD  
Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Drill Rig: Acker AD H Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.		
1	WOC								
2	WOC								
		S-1	24/5	2-4	WOR/24"		Organic clay (OH); very soft, 95% organic claysilt, 5% fine sand, strong organic odor, black to dark gray. Slight sheen noted on sample. Advance PW drill casing to 4 ft.	ORGANIC CLAY	
3	WOC								
4	WOC								
		S-2	24/5	4-6	WOR/24"		S-2A: Similar to S-1. (5 in.) S-2B: Silty sand (SM); 80% fine sand, 5% gravel, 15% silt, subrounded gravel, gray. (1 in.) Advance PW drill casing to 6 ft. Advance 3-7/8 in. roller bit to 6 ft.		
5	WOC								
6	WOC							6.0 ft.	
		S-3	24/18	6-8	10-7-4-4	11	S-3A: Mixture of silty sand (SM) and disturbed organic soil (OH), (4 in.) S-3B: Poorly graded sand with silt (SP-SM); medium dense, 30% medium sand, 60% fine sand, 10% silt, brown to orange brown. (14 in.) Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft.		
7	18								
8	35						Perform falling head permeability test at 8 ft. Poorly graded sand (SP); 1% coarse sand, 5% medium sand, 91% fine sand, 3% silt, yellowish brown. Approximate 1 inch thick lense of medium to fine sand and gravel noted in sample. Brown with minor black staining with a moderate organic odor. Advance PW drill casing to 10 ft. Advance 3-7/8 in. roller bit to 10 ft.	MARINE SAND	1
		S-4	24/11	8-10	4-3-3-4	6			
9	10								
10	22								

GRAIN SIZE	COHESIVE	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 2 of 11

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Spring Location northing 2696247 easting 814699  
Mudline El. -32.21 Datum NGVD  
Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Adver AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blow (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	11	S-5	24/14	10-12	1-1-2-4	3	Poorly graded sand (SP); very loose, 10% coarse sand, 50% medium sand, 30% fine sand, 5% gravel, 5% silt, brown. Approximate 1 inch thick lense of coarse sand and gravel noted in sample. Black to dark gray in color. Advance PW drill casing to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.	MARINE SAND	1
12	12						Perform constant head permeability test at 12 ft.		
13	11	S-6	24/11	12-14	1-2-2-3	4	Poorly graded sand with silt (SP-SM); 4% coarse sand, 26% medium sand, 61% fine sand, 1% gravel, 8% silt, yellowish brown. Subangular gravel. Advance PW drill casing to 14 ft. Casing dropped 6 inches. Mix bentonite drilling mud, specific gravity = 1.07. Advance 3-7/8 in. roller bit to 14 ft.	14.0 ft.	1
14	17								
15	22	S-7	24/6	14-16	3-3-2-3	5	Poorly graded sand with silt and gravel (SP-SM); 11% coarse sand, 24% medium sand, 32% fine sand, 24% gravel, 9% silt, yellowish brown. Subrounded to subangular sand and gravel. Advance PW drill casing to 16 ft. Advance 3-7/8 in. roller bit to 16 ft.	GLACIO FLUVIAL	1
16	30								
17	32	S-8	24/4	16-18	4-3-2-3	5	Washed sample. Advance PW drill casing to 18 ft. Advance 3-7/8 in. roller bit to 18 ft. with drilling mud to remove coarse wash material. Flush drill casing with water to remove drilling mud. Approximately 3-4 inches of material in bottom of casing. 12/12/00: Remove drill casing from hole to prepare for severe wind event. 12/13/00: Advance PW drill casing to 20 ft. Appears that hole stayed open to approximately 17 ft. Advance 3-7/8 in. roller bit to 20 ft. with drilling mud to remove coarse wash material, specific gravity = 1.07. Flush drill casing with water to remove drilling mud. Approximately 4 inches of material in bottom of casing.		
18	39								
19	49								
20	73						Perform constant head permeability test at 20 ft.		

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. ROD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 3)  
 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 3 of 11

FILE NO. 48138.27

CHKD. BY J. Trotier

Boring Co. Warren George, Inc. Boring Location northing 2696247 easting 814699  
 Driller E. Thomas Mudline El. -32.21 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Ackar AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M K S								
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value											
21	28	S-9	24/6	20-22	3-5-5-8	10*	Poor recovery. Washed sample. Advance PW drill casing to 22 ft. Mix additional bentonite drilling mud, specific gravity = 1.09. Advance 3-7/8 in. roller bit to 22 ft.	GLACIO FLUVIAL	2								
22	31						GLACIO FLUVIAL			2							
23	33	S-10	24/4	22-24	6-2-3-3	5*					Poor recovery. Washed sample. Advance PW drill casing to 24 ft. Mix additional bentonite drilling mud. Advance 3-7/8 in. roller bit to 24 ft.						
24	48										GLACIO FLUVIAL	2					
25	24	S-11	24/0	24-26	8-4-6-8	10*							No recovery. Advance PW drill casing to 26 ft. Advance 3-7/8 in. roller bit to 26 ft.				
26	46												GLACIO FLUVIAL	1,2			
27	21	S-12	24/6	26-28	8-9-10-12	19*									Silty sand with gravel (SM); 4% coarse sand, 10% medium sand, 43% fine sand, 16% gravel, 27% silt, light gray. Subrounded to subangular sand and gravel. (sample placed in 2 jars) Advance PW drill casing to 28 ft. Advance 3-7/8 in. roller bit to 28 ft. with drilling mud to remove coarse wash material. Flush drill casing with water to remove drilling mud. Attempt constant head permeability test at 28 ft. Unable to keep constant water level in casing. Formation taking approximately 10 gallons of water every 20 - 30 seconds with 10 ft. of head.		
28	86														GLACIO FLUVIAL	1,2	
29	53	S-13	24/1	28-30	15-6-4-6	10											Poor recovery. Washed sample. Advance PW drill casing to 32 ft. Advance 3-7/8 in. roller bit to 32 ft.
30	53																GLACIO FLUVIAL

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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**REMARKS:**

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 
-



Nobis Engineering  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 4 of 11

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.

Driller E. Thomas

Logged By E. Thibodeau

Boring Location northing 2696247

Mudline El. -32.21

Date Start 12/11/00

easting 814699

Datum NGVD

Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Actar AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PSMREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N <sub>60</sub> /blow			
31	78								
32	71	S-14	17/6	32-33.4	10-7-8/5-25/0*	-*	Silty sand with gravel (SM); 10% coarse sand, 30% medium sand, 30% fine sand, 15% gravel, 15% silt, subrounded to subangular sand and gravel. Strong hydrocarbon odor. Headspace: 5.9 ppm. (2 jars)	GLACIO FLUVIAL	2
33	87						Advance PW drill casing to 33.7 ft. Top of bedrock at 33.7 ft.		
34	90/ 8"						Advance 4-7/8 in. roller bit to 34 ft. Telescope HW drill casing to 34.3 ft. (spin) Begin HQ rock core at 34 ft. (boring log continued on next page)	33.7 ft.	
								BEDROCK	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. ROD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 5 of 11

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696247 easting 814699  
 Driller E. Thomas Mudline El. -32.21 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (MW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
34.5		R1	34-35	7 mins.	Begin R1 at 34 ft. Fresh to slightly weathered, moderately hard, gray, fine-grained GNEISS. Low angle foliation. (approx. 20 to 30 degrees) REC = 93%; RQD = 77% (good) Water return color: milky white. 34.3 ft.: Mechanical break in rock core. 34.7 to 34.8 ft.: Quartz vein. Gray in color. 34.8 ft.: Mechanical break in rock core. 34.9 ft.: Primary joint: low angle, smooth, planar, slightly discolored, and open.	
35.0			35-36	4.5 mins.	35.0 ft.: Secondary joint: moderately dipping, rough, undulating, slightly discolored, and tight. Loss of water return noted at 35 ft.	
35.5						
36.0					35.9 ft.: Secondary joint: moderately dipping, rough, planar, slightly discolored, and tight.	
36.5						
37.0						
37.5						
38.0						
38.5						
39.0					38.7 and 38.5 ft.: Mechanical breaks in rock core. End R1 at 39 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 3)  
 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 6 of 11

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696247 easting 814699  
Mudline El. -32.21 Datum NGVD  
Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD # Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

**Groundwater Readings Not Applicable for Offshore Borings**

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	R E M A R K S
		CORE RUN#	CORE INTERVAL	CORE TIME		
39.5		R2	39-40	5 mins.	Begin R2 at 39 ft. Fresh, hard, gray, medium-grained GNEISS. Low angle foliation. (approx. 10 to 20 degrees) REC = 97%; RQD = 65% (fair) No water return noted during coring activities. 39.4 ft.: Mechanical break in rock core.	
40.0						
40.5			40-41	4.5 mins.		
41.0						
41.5			41-42	4.5 mins.	41.2 to 43.3 ft.: Weathered zone. Six distinct low angle to horizontal breaks noted in rock core. Some discoloration and core grinding noted on the surfaces. Difficult to determine if breaks are mechanical or natural.	
42.0					41.9 ft.: Primary joint: horizontal, smooth, planar, discolored, and tight. 41.9 to 42.4 ft.: Secondary joint: high angle, rough, planar, discolored, and open.	
42.5			42-43	3.5 mins.	42.4 ft.: Primary joint: low angle, smooth, planar, discolored, and tight. 42.4 to 42.6 ft.: Secondary joint: high angle to moderately dipping, rough, planar, discolored, and open. 42.7 ft.: Mechanical break in weathered zone. Rock around break is friable.	
43.0						
43.5			43-44	5 mins.	43.3 ft.: Set of two primary joints extremely close spacing. Horizontal, smooth, planar, discolored to decomposed, and open. 43.6 and 43.8 ft.: Mechanical breaks in rock core.	
44.0					End R2 at 44 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. FP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. ROD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3)  
4)





Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 7 of 11

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696247 easting 814699  
Mudline El. -32.21 Datum NGVD  
Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD # Truck Rig  
Drilling Method: 5-inch (PW) Bush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
44.5		R3	44-45	5.5 mins.	Begin R3 at 44 ft. Fresh, hard, gray, fine-grained, GNEISS. Low angle foliation. (approx. 20 degrees) REC = 97%; RQD = 97% (excellent) No water return noted during coring activities. 44.0 ft.: Primary joint: low angle, smooth, planar, discolored, and open. 44.6 ft.: Mechanical break in rock core. 44.9 ft.: Mechanical break in rock core.	
45.0						
45.5			45-46	5.5 mins.	45.5 ft.: Primary joint: low angle, smooth, planar, discolored, and tight.	
46.0						
46.5			48-47	6 mins.		
47.0						
47.5			47-48	8 mins.	47.3 ft.: Mechanical break in rock core. 47.8 ft.: Mechanical break in rock core.	
48.0						
48.5			48-49	6 mins.		
49.0					End R3 at 49 ft.	

GRAIN SIZE	SOILS	SOILS	SOILS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 8 of 11

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696247 easting 814699  
Mudline El. -32.21 Datum NGVD  
Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD-11 Truck Rig  
Drilling Method: 5-inch (FW) flush joint drill casing. 4-inch (FW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
49.5		R4	49-50	4 mins.	Begin R4 at 49 ft. Fresh, hard, gray, fine-grained GNEISS. Low angle foliation. (approx. 20 degrees) REC = 100%; RQD = 93% (excellent) No water return noted during coring activities. 49.5 and 49.6ft.: Primary joints: low angle, rough, planar, discolored, and open. 49.7 ft.: Primary joint: horizontal, rough, planar, discolored, and open.	
50.0						
50.5			50-51	4 mins.		
51.0						
51.5			51-52	4.5 mins.		
52.0						
52.5			52-53	6 mins.		
53.0					52.5 ft.: Mechanical break in rock core. 52.8 ft.: Mechanical break in rock core.	
53.5			53-54	6 mins.	53.1 ft.: Mechanical break in rock core. Perform packer test from 45.3 to 54.0 ft. Perform packer test from 47.3 to 54.0 ft. End R4 at 54 ft.	
54.0					Bottom of exploration at 54 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.30.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) 2 3/4-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 9 of 11

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.

Driller E. Thomas

Logged By E. Thibodeau

Boring Location northing 2696247 easting 814699

Mudline El. -32.21 Datum NGVD

Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

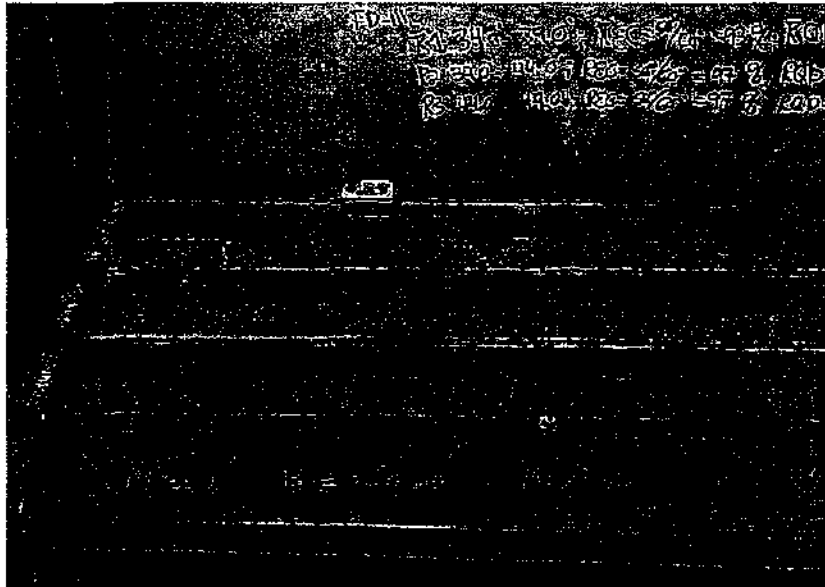
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

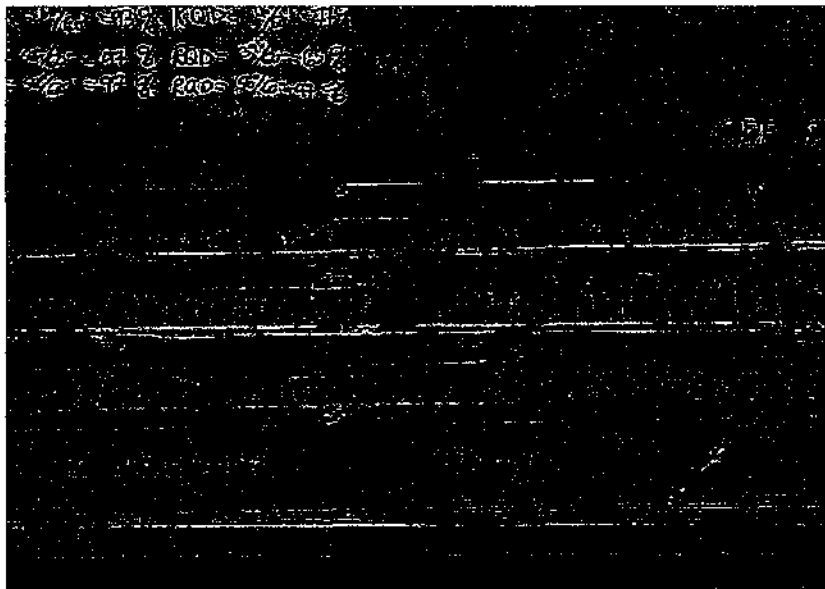
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 10 of 11

FILE NO. 48138.27

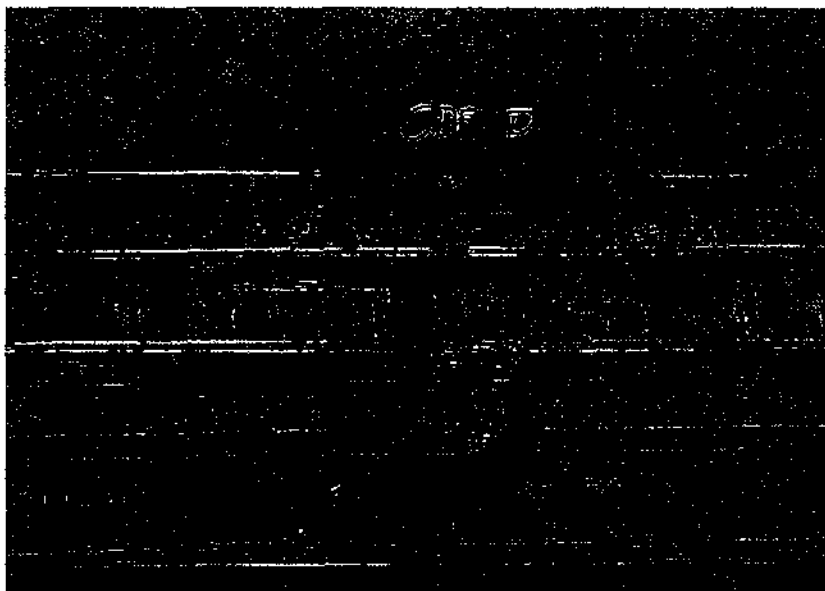
CHKD. BY J. Trottier

Boring Co. <u>Warren George, Inc.</u>	Boring Location <u>northing 2696247</u>	<u>easting 814699</u>
Driller <u>E. Thomas</u>	Mudline El. <u>-32.21</u>	Datum <u>NGVD</u>
Logged By <u>E. Thibodeau</u>	Date Start <u>12/11/00</u>	Date End <u>12/15/00</u>

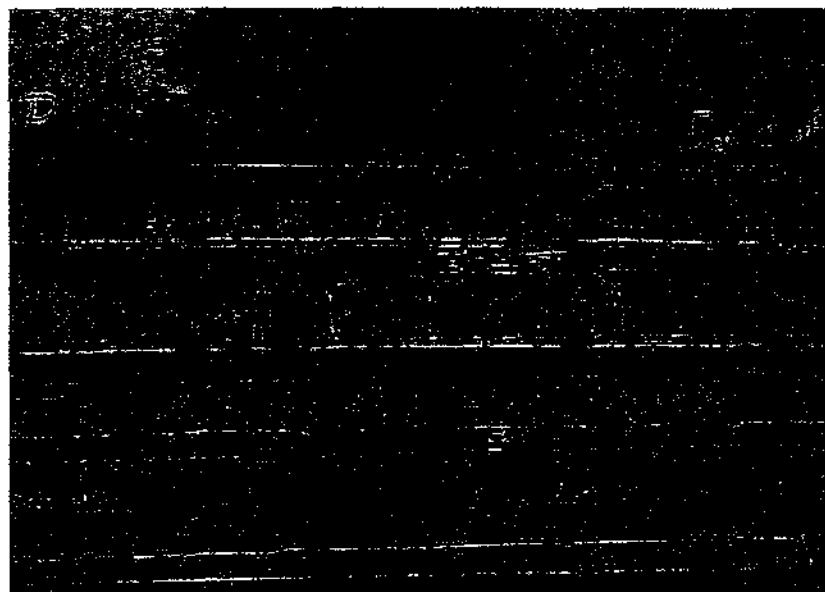
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-111

SHEET 11 of 11

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696247 easting 814699  
 Driller E. Thomas Mudline El. -32.21 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/11/00 Date End 12/15/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

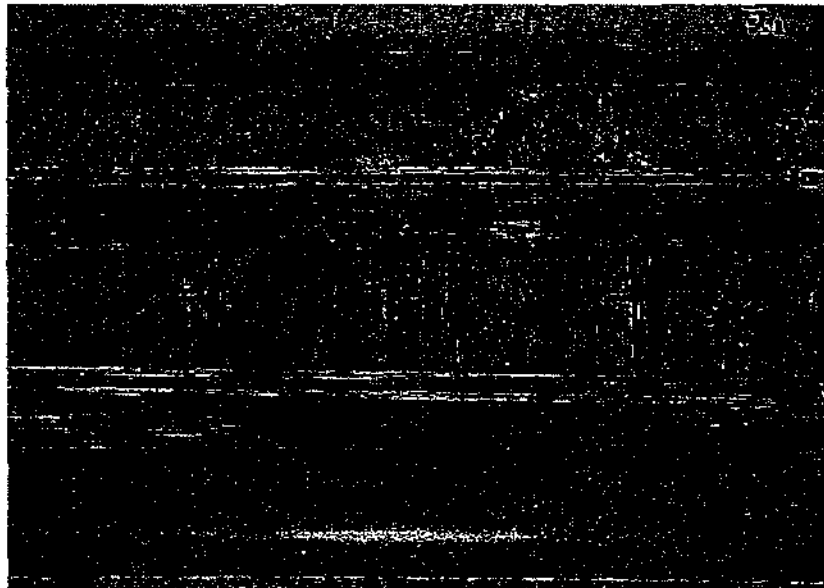
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

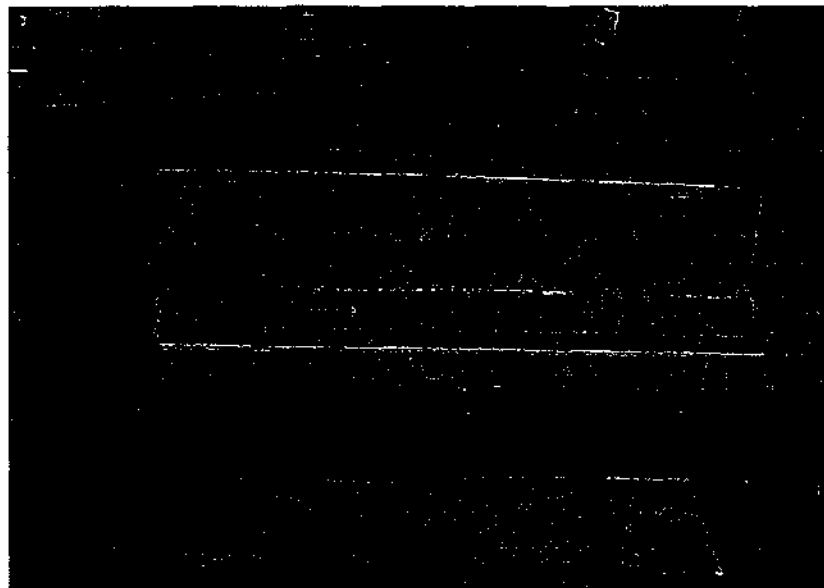
**Groundwater Readings Not Applicable for Offshore Borings**

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Weathered zone noted in R2



Core Run R4

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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- 3)
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 1 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, inc. Boring Location northing 2696171 easting 814570  
 Driller E. Thomas Mudline El. -32.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 Groundwater Readings: Not Applicable for Offshore Borings

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.		
1	WOC								
2	WOC								
		S-1	24/11	2-4	WOR/24*		Organic soil (OH); very soft, 95% organic clay/silt, 5% fine sand, strong organic odor, black to dark gray.	ORGANIC CLAY	
3	WOC						Advance PW drill casing to 4 ft. Advance 3-7/8 in. roller bit to 4 ft.		
4	WOC								
		S-2	24/13	4-6	3-6-5-4	11	Silty sand (SM); medium dense, 5% coarse sand, 25% medium sand, 35% fine sand, 10% gravel, 15% silt, slight organic odor, gray-brown.	4.0 ft.	
5	WOC						Advance PW drill casing to 9 ft. Casing advanced under it's own weight from 4 to 5 ft. Mix bentonite drilling mud, specific gravity = 1.07. Advance 3-7/8 in. roller bit to 9 ft.		
6	14							GLACIO FLUVIAL	
7	17								
8	17								
9	16								
		S-3	24/7	9-11	6-4-3-3	7	Poorly graded sand with silt and gravel (SP-SM); 10% coarse sand, 24% medium sand, 41% fine sand, 19% gravel, 6% silt, yellowish brown. Subrounded to subangular sand and gravel.		1
10	10						Advance PW drill casing to 11 ft.		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.  
 3) RQD biased low due to recovery of 80%.  
 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 2 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2696171 easting 814570  
 Driller E. Thomas Mudline El. -32.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD-II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)					STRATUM DESCRIPTION	REMARKS	
DEPTH (ft)	Casing Blows (ft)	Type	PEN/REC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N-Value							

							Advance 3-7/8 in. roller bit to 11 ft.						
11	10						No Recovery. Advance PW drill casing to 13 ft. Mix additional bentonite drilling mud, specific gravity = 1.11.						
12	23	S-4	24/0	11-13	7-3-3-3	6	Advance 3-7/8 in. roller bit to 13 ft.						
13	22						Poorly graded sand with gravel (SP); loose, 15% coarse sand, 30% medium sand, 10% fine sand, 40% gravel, 5% silt, subangular sand, brown. Pieces of subangular gravel noted in sample.						
14	26						Advance PW drill casing to 15 ft. Advance 3-7/8 in. roller bit to 15 ft.						
15	26	S-6	24/7	15-17	7-4-4-7	8	Poorly graded sand with silt and gravel (SP-SM); 12% coarse sand, 24% medium sand, 23% fine sand, 33% gravel, 8% silt, light brown. Subrounded to subangular sand and gravel.					GLACIO FLUVIAL	1
16	26						Advance PW drill casing to 17 ft. Advance 3-7/8 in. roller bit to 17 ft.						
17	23	S-7	24/6	17-19	8-8-4-4	12	Silty gravel with sand (GM); 9% coarse sand, 18% medium sand, 14% fine sand, 46% gravel, 13% silt, light brown. Subrounded to subangular sand and gravel.						1
18	50						Advance PW drill casing to 19 ft. Advance 3-7/8 in. roller bit to 19 ft.						
19	40	S-8	24/1	19-21	10-7-8-7	13	Poor recovery. Advance PW drill casing to 21 ft. Advance 3-7/8 in. roller bit to 21 ft.						
20	27												

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.  
 3) RQD biased low due to recovery of 80%.  
 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 3 of 11

FILE NO. 48138.27

CHKD. BY S. Boris

Boring Co. Warren George, Inc. Boring Location northing 2696171 easting 814570  
 Driller E. Thomas Mudline El. -32.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (H-W) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PEN/REC (Inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	41						Poor recovery. Attempted to resample with 3 in. sampler. Several large pieces of rock fragments recovered, appears to be GNEISS. Advance PW drill casing to 26 ft.	GLACIO FLUVIAL	
22	58	S-9	24/1	21-23	7-14-14-11	28	Advance 3-7/8 in. roller bit to 26 ft.		
23	62								
24	80								
25	22								
26	140							1	
27	102	S-10	24/4	26-28	33-31-23-14	54	Poorly graded sand with silt and gravel (SP-SM); 41% gravel, 12% coarse sand, 18% medium sand, 17% fine sand, 12% silt, yellow brown. Subangular sand and gravel. Advance PW drill casing to 28 ft. Mix additional bentonite drilling mud. Advance 3-7/8 in. roller bit to 28 ft.		
28	144								
29	WOC	S-11	8/6	28-28.7	22-50/2"	—	S-11A: Poorly graded sand with silt and gravel (SP-SM); 14% coarse sand, 21% medium sand, 16% fine sand, 41% gravel, 8% silt, light brown. Subangular sand and gravel. (4 in.) S-11B: Silty gravel with sand (GM); 70% gravel, 5% coarse sand, 5% medium sand, 5% fine sand, 15% silt, subangular to angular sand and gravel, brown. (GLACIAL TILL) (2 in.) Advance 4-7/8 in. roller bit to 33.5 ft.	28.5 ft.	1.2
30	40							GLACIAL TILL	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.  
 3) RQD biased low due to recovery of 80%.  
 4)





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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 4 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.

Driller E. Thomas

Logged By E. Thibodeau

Boring Location northing 2696171

Mudline El. -32.79

Date Start 12/1/00

easting 814570

Datum NGVD

Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD # Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	SAMPLE INFORMATION						SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
	Casino	Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
31								GLACIAL TILL	
32									
33								33.0 ft	
34							Top of bedrock at 33 ft. Telescope HW drill casing to 33.5 ft. Advance 3-7/8 in. roller bit to 34 ft. Advance HW drill casing to 34 ft. Checked seal on casing, water level dropped slowly. Begin HQ rock core at 34 ft. (boring log continued on next page)	BEDROCK	
35									
36									
37									
38									
39									
40									

GRANULAR SOILS (ASTM D 2488)	PENETRATION INDEX (ASTM D 1586)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-112  
SHEET 5 of 11  
FILE NO. 48138.27  
CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2696171 easting 814570  
Driller E. Thomas Mudline El. -32.79 Datum NGVD  
Logged By E. Thibodeau Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
34.5		R1	34-35	5 min.	Begin R1 at 34 ft. Fresh to slightly weathered; hard, gray, fine-grained GNEISS. Low angle foliation. (approx. 30 degrees) REC = 80%; RQD = 73% (fair) Water return color: milky white. 34.2 ft.: Mechanical break in rock core.	3
35.0			35-36	3.5 min.	35.3 and 35.4 ft.: Primary joints: low angle, smooth, planar, discolored, and open.	
35.5						
36.0						
36.5			36-37	4 min.	36.0 and 36.1 ft.: Mechanical breaks in rock core.	
37.0					36.8 ft.: Primary joint: low angle, smooth, planar, discolored, and open.	
37.5			37-38	6 min.	37.2 ft.: Mechanical break in rock core.	
38.0					37.7 ft.: Mechanical break in rock core.	
38.5			38-39	6.5 min.	38.0-39.0 ft.: Several large pieces of fractured rock. Not recovered upon completion of R1. Over cored and recovered in R2. RQD=0%.	
39.0					Perform constant head permeability test from 34 to 38 ft. End R1 at 39 ft.	

GRAVEL SIZES (INCHES)	COHESIVE SOILS (INCHES)	ABBREVIATIONS	ABBREVIATIONS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Protocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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3) RQD biased low due to recovery of 80%.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 6 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696171 easting 814570  
Mudline El. -32.79 Datum NGVD  
Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD 8 Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
39.5		R2	39-40	5.5 min.	Begin R2 at 39 ft. Fresh, hard, gray, fine-grained GNEISS. Low angle foliation. (approx. 20 degrees) REC = 98%; RQD = 85% (good) Water return color: milky white. 39.3 ft.: Primary joint: low angle, smooth, planar, slightly discolored, and tight. 39.5 ft.: Primary joint: low angle, smooth, undulating, slightly discolored, and tight.	
40.0						
40.5			40-41	6.5 min.		
41.0						
41.5			41-42	6 min.		
42.0					41.5-42.3 ft.: Quartz/feldspar vein, pink and white in color. (pegmatic)	
42.5			42-43	5.5 min.		
43.0						
43.5			43-44	5 min.	End R2 at 43 ft. Begin R3 at 43 ft. Slightly weathered to fresh, moderately hard to hard, gray, fine grained GNEISS. Low angle foliation (approx. 10 degrees). REC=100%; RQD=78% (good). Water return color: milky white. 43.0-43.1 ft.: Quartz/feldspar vein, continued from R1. 43.1 ft.: Primary joint: low angle, rough, planar, discolored and open. Some grinding noted. 43.8 ft.: Primary joint: low angle, smooth planar, discolored (black), end tight. Possibly	
44.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.  
3) RQD biased low due to recovery of 80%.  
4)



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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 7 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc. Boring Location northing 2696171 easting 814570  
 Driller E. Thomas Mudline El. -32.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing - 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
44.5		R3 (cont.)	44-45	5 min.	43.9 ft.: Healed joint. Low angle. 44.0 ft.: Primary joint: low angle, rough, planar, discolored and open. 44.1 ft.: Primary joint: low angle, smooth, planar, discolored and open. Some grinding noted. 44.5 ft.: Primary joint: low angle, smooth, planar, discolored (black) and tight. Possible healed joint. 44.8 ft.: Primary joint: low angle, rough, planar, discolored (black and orange) and tight.	
45.0			45-46	4.5 min.	45.2 ft.: Primary joint: low angle, smooth, planar, discolored (black and orange) and tight.	
45.5		R4	46-47	5 min.	46.6 ft.: Primary joint: low angle, smooth, planar, discolored (black and orange) and tight. Possible healed or mechanical break.	
46.0					46.9 ft.: Primary joint: low angle, smooth, planar, discolored and tight.	
46.5						
47.0			47-48	6 min.		
47.5						
48.0			48-49	8 min.	End R3 at 48 ft. Begin R4 at 48 ft. Fresh, hard, gray, fine-grained GNEISS. Low angle foliation (approx. 10 degrees). REC=100%; RQD=100% (excellent) Water return color: milky white. 48.1 ft.: Mechanical break in rock core. 48.5 ft.: Mechanical break in rock core.	
48.5						
49.0						

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolocalization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
---	--	--	--

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.  
 3) RQD biased low due to recovery of 80%.  
 4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 8 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.

Boring Location northing 2696171

easting 814570

Driller E. Thomas

Mudline El. -32.79

Datum NGVD

Logged By E. Thibodeau

Date Start 12/1/00

Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
49.5	---	R4 (cont.)	49-50	8.5 min.	49.0 ft.: Mechanical break in rock core.	
50.0	---				49.9 ft.: Mechanical break in rock core.	
50.5	---		50-51	6.6 min.		
51.0	---				50.9 ft.: Mechanical break in rock core.	
51.5	---		51-52	5 min.		
52.0	---					
52.5	---		52-53	7 min.		
53.0	---				52.5 ft.: Mechanical break in rock core.	
					Performed constant head permeability test from 34 to 53 ft. End R4 at 53 ft.	
					Bottom of exploration at 53 ft. Boring terminated in bedrock. Grout completed borehole to mudline with cement/bentonite grout, specific gravity = 1.40.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of 80%.
- 4)



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 9 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696171 easting 814570  
Mudline El. -32.79 Datum NGVD  
Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

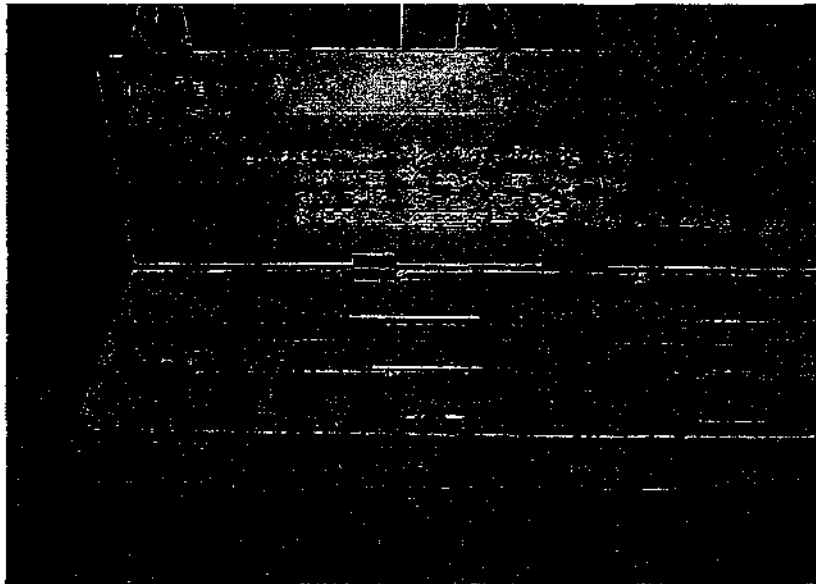
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

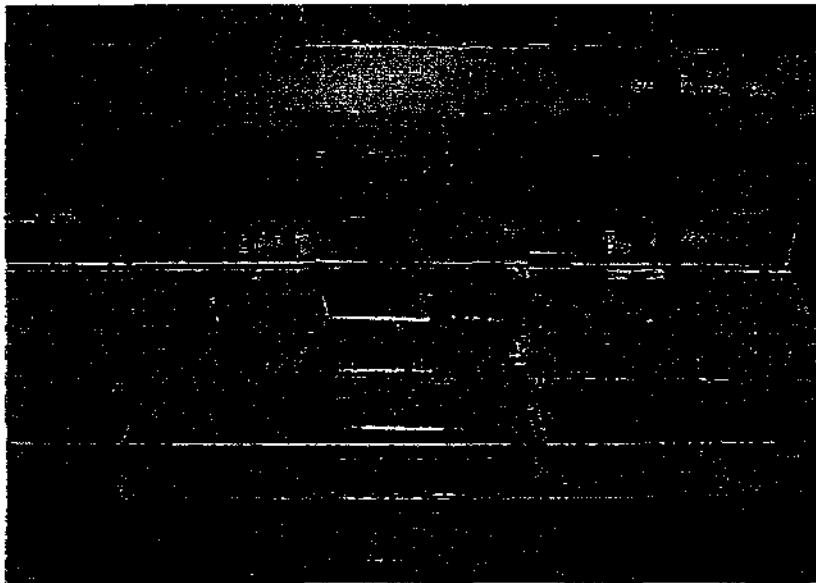
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3, and top of R4

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of 80%.
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 10 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

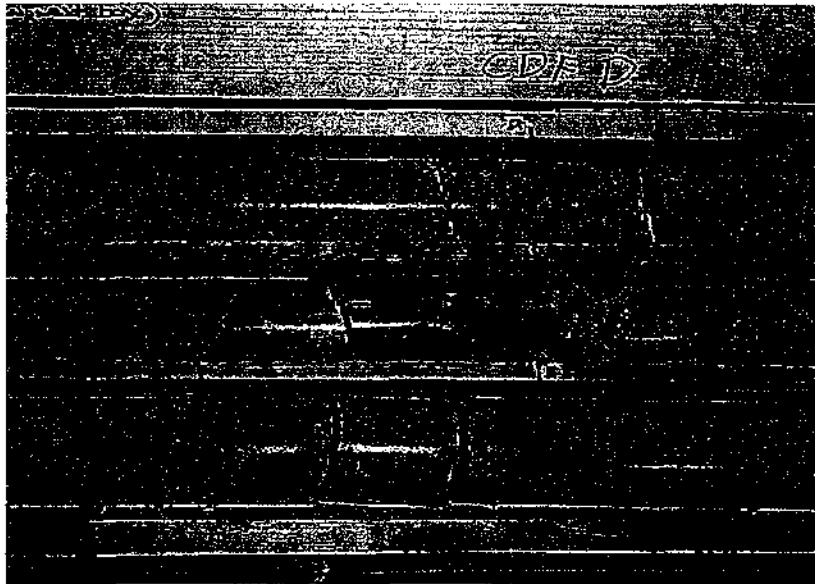
Boring Co. Warren George, Inc. Boring Location northing 2696171 easting 814570  
 Driller E. Thomas Mudline El. -32.79 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

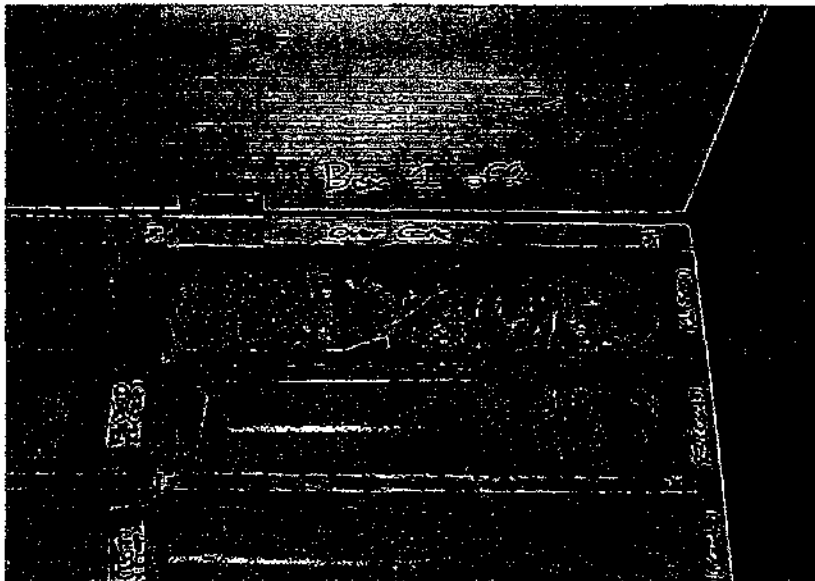
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Quartz/feldspar vein (pegmatic) noted in R2  
Primary joints noted in R3



Overcore from the bottom of R1

**REMARKS:**

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- 3) RQD biased low due to recovery of 80%.
- 4)



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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-112

SHEET 11 of 11

FILE NO. 48138.27

CHKD. BY S. Bonis

Boring Co. Warren George, Inc.

Boring Location northing 2898171 easting 814570

Driller E. Thomas

Mudline El. -32.79 Datum NGVD

Logged By E. Thibodeau

Date Start 12/1/00 Date End 12/4/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

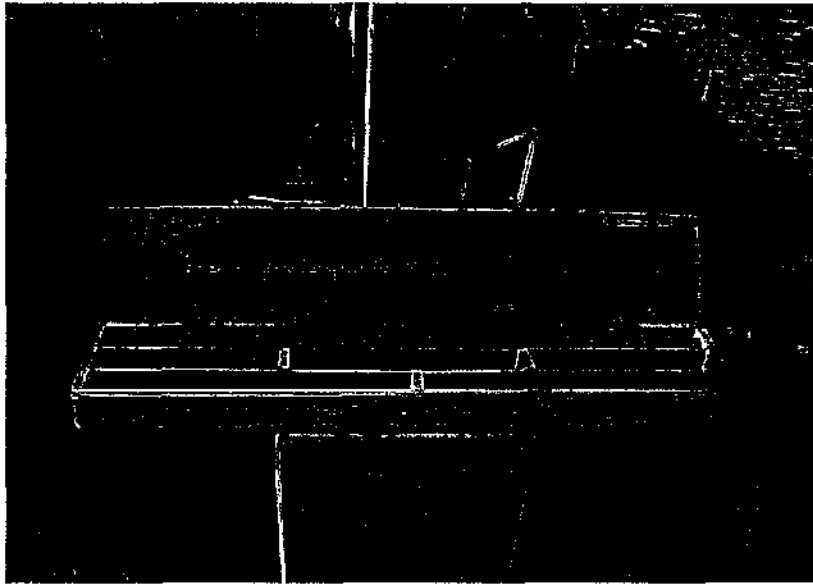
Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (IHW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Run R4

PLACE PICTURE CAPTION HERE (Picture size = 3.85" x 5.65")

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. center hole hammer free falling from a height of 24 inches.
- 3) RQD biased low due to recovery of 80%.
- 4)





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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113  
SHEET 1 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696239 easting 814464  
Driller E. Thomas Mudline El. -33.31 Datum NGVD  
Logged By E. Thibodeau Date Start -12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance PW drill casing to 2 ft.		
1	WOC								
2	WOC								
		S-1	24/1	2-4	WOR/24		Organic soil (OH); 95% organic clay/silt, 5% fine sand, strong organic odor, black. Advance PW drill casing to 4 ft.		
3	WOC								ORGANIC CLAY
4	WOC								
		S-2	24/6	4-6	WOR/24		Organic soil (OH); similar to S-1 except black to dark gray, slight sheen noted. Advance PW drill casing to 6 ft. Advance 3-7/8 in. roller bit to 6 ft., no water return noted.		
5	WOC								
6	WOC								
		S-3	24/18	6-8	WOR/24		S-3A: Organic soil with sand (OH); very soft, 75% organic clay/silt, 25% fine sand, moderate organic odor, black to dark gray. (12 in.) S-3B: Poorly graded sand with silt (SP-SM); 5% coarse sand, 30% medium sand, 55% fine sand, 10% silt, gray-brown. (8 in.) Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft.		7.5 ft.
7	WOC								
		S-4	24/12	8-10	4-3-4-3	7	S-4A: Poorly graded sand (SP); loose, 50% medium sand, 40% fine sand, 5% gravel, 5% silt, gray-brown. (4 in.) S-4B: Poorly graded sand with gravel (SP); 15% coarse sand, 40% medium sand, 15% fine sand, 25% gravel, 5% silt, subrounded to subangular sand and gravel, brown. (8 in.) Advance PW drill casing to 10 ft. Mix bentonite drilling mud, specific gravity = 1.09. Advance 3-7/8 in. roller bit to 10 ft.		MARINE SAND
9	11								9.5 ft.
10	13								GLACIO FLUVIAL

GRANULAR SOILS (ASTM D 1586)	COHESIVE SOILS (ASTM D 2488)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.
		7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 
- 
-



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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit D1

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 2 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696239 easting 814464  
 Driller E. Thomas Mudline El. -33.31 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-VALUE			
11	DROP	S-5	24/12	10-12	3-3-3-3	6	Poorly graded sand with silt (SP-SM); 11% coarse sand, 26% medium sand, 42% fine sand, 13% gravel, 8% silt, yellowish brown. Subrounded to subangular sand and gravel. PW drill casing dropped to 12 ft. Advance 3-7/8 in. roller bit to 12 ft.	GLACIO FLUVIAL	1
12	DROP								
13	26	S-6	24/6	12-14	7-4-3-5	7	Poorly graded sand with gravel (SP); loose, 35% coarse sand, 30% medium sand, 10% fine sand, 20% gravel, 5% silt, subangular to angular sand and gravel, brown. Advanced PW drill casing to 14 ft. Advance 3-7/8 roller bit to 14 ft.		
14	28								
15	7	S-7	24/10	14-16	6-5-6-6	11	Silty sand with gravel (SM); 13% coarse sand, 15% medium sand, 15% fine sand, 41% gravel, 16% silt, brown. Subrounded to subangular sand and gravel. Advance PW drill casing to 19 ft. Advance 3-7/8 in. roller bit to 19 ft.		
16	34								
17	43								
18	69								
19	68								
20	45/10	S-8	9/8	19-19.8	9-5/3-25/0	-	Silty sand with gravel (SM); 20% coarse sand, 10% medium sand, 15% fine sand, 40% gravel, 15% silt, subrounded to subangular sand and gravel, brown. Advance PW drill casing to 19.8 ft. Casing refusal on probable cobble. Advance 4-7/8 in. roller bit to 20.5 ft. Probable cobble from 19.8 to 20.1 ft.		

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2)  
 3)  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 3 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696239 easting 814464  
Mudline El. -33.31 Datum NGVD  
Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
							Advance 4-7/8 in roller bit to 20.5 ft. Telescope HW drill casing to 20.5 ft. Advance 3-7/8 in. roller bit with stabilizer to 21 ft. Probable cobble 20.5 to 21 ft.	GLACIO FLUVIAL COBBLE	
21	SPIN							20.75 ft.	
		S-9	24/5	21-23	15-14-6-6	20	Silty sand with gravel (SM); 11% coarse sand, 20% medium sand, 21% fine sand, 27% gravel, 21% silt, brown. Subangular sand and gravel. Advance HW drill casing to 28 ft.	GLACIO FLUVIAL	1
22	SPIN								
23	SPIN								
24	SPIN								
25	SPIN								
26	SPIN							26.0 ft.	
		S-10	19/14	26-27.6	11-16-21-8/1	37	S-10A: Poorly graded sand with silt and gravel (SP); dense, 60% medium sand, 20% fine sand, 15% gravel, 5% silt. S-10B: Possible Glacial Till; 10% coarse sand, 20% medium sand, 20% fine sand, 30% gravel, 20% silt.	GLACIAL TILL	
27								27.9 ft.	
28									
29							Advance 3-7/8 in. bit with stabilizer to 29 ft. Top of competent bedrock 27.9 ft. Advance HW drill casing to 28.4 ft. Advance 3-7/8 in. roller bit to remove cuttings. Begin HQ rock core at 29 ft. (boring log continued on next page)	BEDROCK	
30									

GRANULAR SOILS (SPT)	COHESIVE SOILS (SPT)	SYMBOLS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 4 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696239 easting 814464  
 Driller E. Thomas Mudline El. -33.31 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acver AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing, Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
28.5		R1	28-30	5 min.	Begin R1 at 29 ft. Fresh, moderately hard, gray, fine-grained GNEISS. Low angle (approx. 10 degrees) foliation. REC = 88%; RQD = 63% (fair). Water return color: milky white.	
30.0					29.6 ft.: Mechanical break in rock core. 29.8 ft.: Primary joint: low angle, rough, undulating, and open. Distinct black discoloration on fracture surface. Loss of return water at 29.8 ft. 29.9 to 30.5 ft.: Secondary joint: high angle to vertical, rough, planar, discolored, and open. Distinct black discoloration noted on fracture surface.	
30.5			30-31	4.5 min.	30.1 ft.: Mechanical break in rock core.	
31.0					30.5 and 30.7 ft.: Primary joints: low angle to horizontal, rough, planar, discolored, and open.	
31.5			31-32	5 min.	31.2 ft.: Primary joint: low angle, smooth, planar, discolored, and open. Distinct black discoloration on fracture surfaces. 31.4 and 31.5 ft.: Primary joints: low angle, rough to smooth, planar, discolored, and open. Distinct black discoloration on fracture surfaces.	
32.0						
32.5			32-33	6 min.	32.4 ft.: Mechanical break in rock core.	
33.0					32.8 ft.: Mechanical break in rock core.	
33.5			33-34	6 min.	33.5 to 34.0 ft.: Rock fragments from overcore of R2. Perform packer test from 30 to 34 ft.	
34.0					End R1 at 34 ft.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
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6. SPT denotes Standard Penetration Test.

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REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site.

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 5 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2896239 easting 814464  
Mudline El. -33.31 Datum NGVD  
Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Groundwater Readings Not Applicable for Offshore Borings

Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
34.5		R2	34-35	4.5 min	Begin R2 at 34 ft. Fresh, moderately hard, gray, fine-grained GNEISS. Low angle (approx. 10 degrees) foliation. REC. = 97%; RQD = 85% (good). No return water noted. 34.2 ft: mechanical break in rock core. 34.4 ft: Primary joint: low angle, smooth, planar, discolored, and tight. 34.5 and 34.6 ft: Tight joints; not fractured during coring. 34.6 to 34.8 ft: Highly to completely weathered zone. Discolored rock weathered to residual soil in the form of sand, silt, and gravel.	
35.0						
35.5			35-36	4 min	35.1 ft: Mechanical break in rock core.  35.6 ft: Mechanical break in rock core.	
36.0						
36.5			36-37	5 min	36.3 ft: Mechanical break in rock core. 36.3 to 36.5 ft.: Secondary joint: high angle, smooth, planar, slightly discolored, and tight.	
37.0						
37.5			37-38	5.5 min	37.4 ft: Mechanical break in rock core.  37.7 ft: Primary joint: low angle, smooth, planar, discolored, and tight.	
38.0						
38.5			38-39	4 min		
39.0					Perform packer test from 32 to 39 ft. End R2 at 39 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2)  
3)  
4)



Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 6 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696239 easting 814464  
Mudline El. -33.31 Datum NGVD  
Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD-11 Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
39.5		R3	39-40	5 min.	Begin R3 at 39 ft. Fresh, very hard, gray, fine-grained GNEISS. Low angle (approx. 10 to 20 degree) foliation. REC = 98%; RQD = 98% (excellent). No water return noted.	
40.0						
40.5			40-41	3 min.		
41.0						
41.5			41-42	3 min.		
42.0					41.8 to 42.2 ft.: Secondary joint: moderately dipping to high angle, smooth, planar, slightly discolored, and tight. Possible mechanical break of healed joint.	
42.5			42-43	3 min.		
43.0						
43.5			43-44	4 min.	43.4 ft.: Mechanical break in rock core.	
44.0					End R3 at 44 ft.	

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UC denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoionization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 7 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696239 easting B14464  
Mudline El. -33.31 Datum NGVD  
Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
44.5		R4	44-45	3 min.	Begin R4 at 44 ft. Fresh, hard, gray, fine-grained GNEISS. Low angle (approx. 20-30 degree) foliation. REC = 100%; RQD = 100% (excellent). No water return noted.	
45.0					44.9 ft.: Mechanical break in rock core.	
45.5			45-46	3 min.	45.0 ft.: Primary joint: horizontal to low angle, smooth, planar, discolored, and tight.  45.4 ft.: Primary joint: horizontal to low angle, smooth, planar, discolored and tight.	
46.0						
46.5			46-47	3.5 min.		
47.0						
47.5			47-48	4.5 min.	46.9 to 47.2 ft.: Secondary joint: high angle, smooth, planar, slightly discolored, and tight. Possible mechanical break of healed joint.	
48.0						
48.5			48-49	6 min.		
49.0					Perform packer test from 39 to 49 ft. End of R4 at 49 ft. Bottom of exploration at 49.0 ft; boring terminated in bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.45.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photocionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 8 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

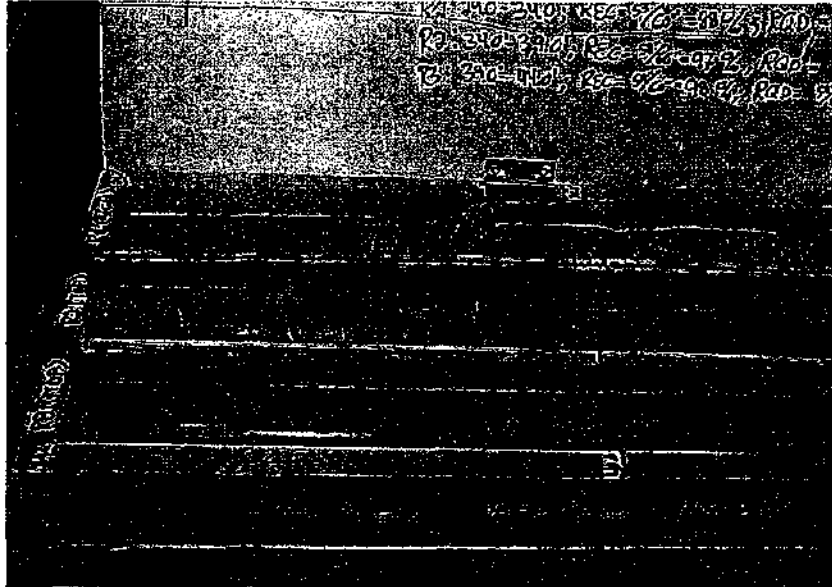
Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696239 easting 814464  
Mudline El. -33.31 Datum NGVD  
Date Start 12/18/00 Date End 12/20/00

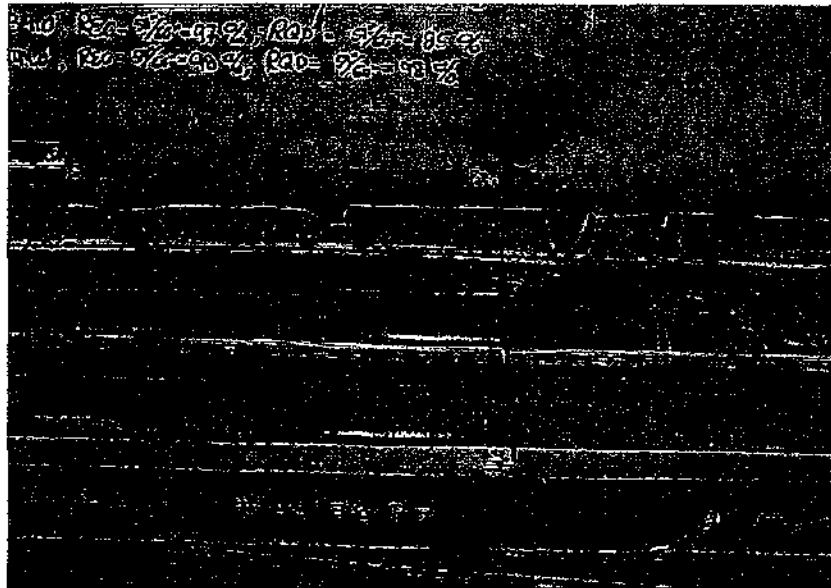
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (FW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 9 of 10

FILE NO. 48138.27

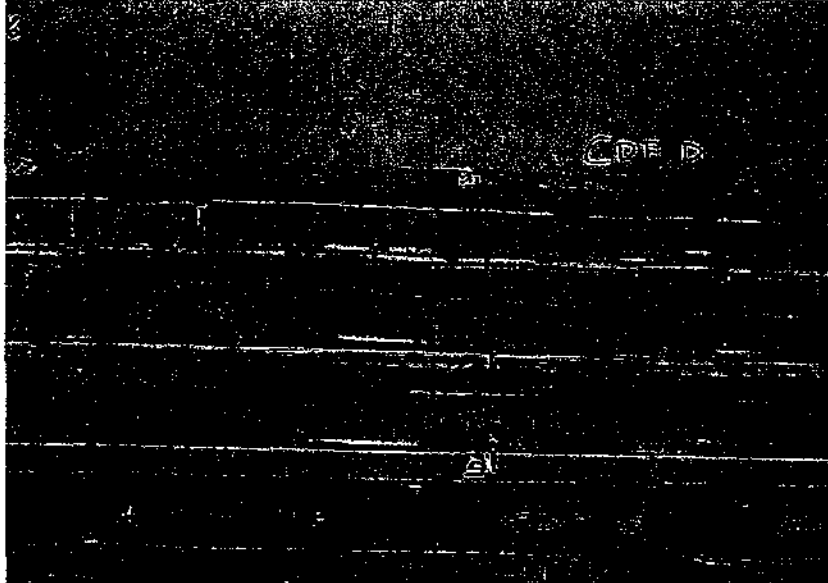
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696239 easting 814464  
 Driller E. Thomas Mudline El. -33.31 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/18/00 Date End 12/20/00

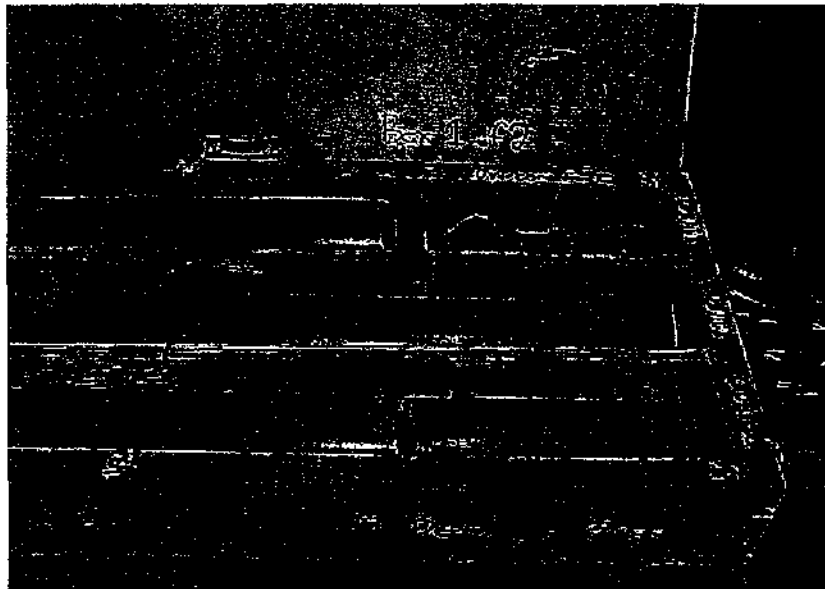
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3 and overcore from bottom of R1

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-113

SHEET 10 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696239 easting 814464  
 Driller E. Thomas Mudline El. -33.31 Datum NGVD  
 Logged By E. Thibodeau Date Start 12/18/00 Date End 12/20/00

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

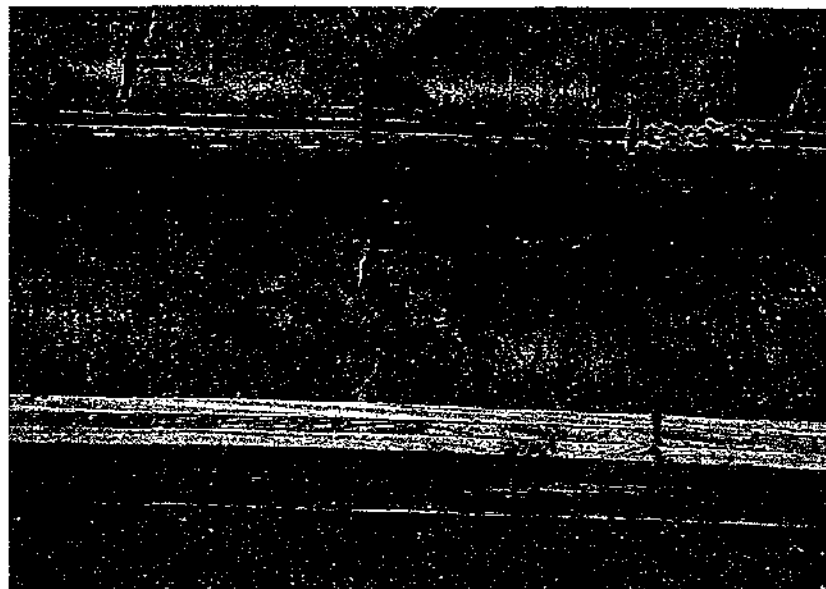
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Weathered/residual soil zone noted in R2



Weathered/residual soil zone noted in R2

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-114  
SHEET 1 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
DnR Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-1	4/1	0-0.3	50/4"	—	Casing resting on mudline, very hard bottom, attempt split barrel sample. S-1: Spoon refusal. Rock fragment noted in tip of sampler. Advance 4-7/8 in. roller bit to 1.2 ft. Probable boulder or piece of debris Telescope HW drill casing to 2 ft. (spin and wash)	BOULDER/ DEBRIS  1.2 ft	
1	SPIN								
2	SPIN								
		S-2	24/8	2-4	1-1-3-6	4	Clayey sand (SC); loose, 20% organic clay/silt, 40% medium sand, 30% fine sand, 5% coarse sand, 5% shell fragments, strong organic odor, black. Advance HW drill casing to 4 ft. Advance 3-7/8 in. roller bit to 4 ft.	ORGANIC CLAY  4.0 ft	
3	SPIN								
4	SPIN								
		S-3	24/8	4-6	7-5-5-11	10*	Poorly graded sand with gravel (SP); loose, 15% coarse sand, 35% medium sand, 20% fine sand, 25% gravel, 5% silt, subrounded to subangular sand and gravel, slight organic odor, gray. Several pieces of gravel were flat and elongated. Advance HW drill casing to 6 ft. Advance 3-7/8 in. roller bit to 6 ft.	MARINE SAND  1	
5	SPIN								
6	SPIN								
		S-4	24/1	6-8	8-8-7-14	15	Poorly graded sand with silt (SP-SM); medium dense, 40% medium sand, 50% fine sand 10% silt, gray-brown. Headspace: < 1 ppm. Advance HW drill casing to 9 ft. Advance 3-7/8 in. roller bit to 9 ft.		
7	SPIN								
8	SPIN								
9	SPIN								
		S-5	24/12	9-11	13-6-1-1	7	Silt with sand (ML); 74% silt, 3% medium sand, 23% fine sand, light brown. Headspace: < 1 ppm. Advance HW drill casing to 14 ft. Advance 3-7/8 in. roller bit to 14 ft.		2
10	SPIN								

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photocolorization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
3)  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-114

SHEET 2 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2896166 easting 814321  
Mudline EL. -20.28 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Actar AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (P)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (ft)	BLOWS PER 6 INCHES	SPT N Value			
11	SPIN								
12	SPIN							MARINE SAND	
13	SPIN								
14	SPIN						Perform falling head permeability test at 14 ft.		
15	SPIN	S-6	24/12	14-16	25-22-11-11	33	Silty sand (SM); 3% coarse sand, 14% medium sand, 56% fine sand, 4% gravel, 23% silt, brown. Subrounded to subangular sand and gravel. Headspace: < 1 ppm. Advance HW drill casing to 19 ft. Advance 3-7/8 in. roller bit to 19 ft.		2
16	SPIN								
17	SPIN								16.5 ft.
18	SPIN								
19	SPIN	S-7	24/3	19-21	13-11-7-4	18	Poorly graded sand with silt and gravel (SP-SM); medium dense, 20% coarse sand, 25% medium sand, 20% fine sand, 25% gravel, 10% silt, brown. Subrounded to subangular sand and gravel. Advance HW drill casing to 21 ft.	GLACIO FLUVIAL	
20	SPIN								

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 16 - Stiff  
18 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photoluminescence Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-114  
SHEET 3 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N VALUE			
							Advance 3-7/8 in. roller bit to 21 ft.		
21	SPIN						Perform constant head permeability test at 21 ft. Poor recovery. Several large pieces of angular coarse gravel recovered. One large angular flat and elongated piece of coarse gravel noted.		
		S-8	24/1	21-23	13-11-5-3	16			
22	SPIN						Advance HW drill casing to 23 ft. Advance 3-7/8 in. roller bit to 23 ft.		
23	SPIN								
		S-9	24/10	23-25	22-17-22-27	39*	Poorly graded sand with silt and gravel (SP-SM); 5% coarse sand, 38% medium sand, 17% fine sand, 34% gravel, 6% silt, brown. Subrounded to subangular sand and gravel. (2 jars)	GLACIO FLUVIAL	1,2
24	SPIN						Headspace: 21 ppm. (jar #2) Advance HW drill casing to 27 ft. Advance 3-7/8 in. roller bit to 27 ft.		
25	SPIN								
26	SPIN								
27	SPIN								
		S-10	24/7	27-29	7-4-4-21	8*	Poorly graded sand with silt and gravel (SP-SM); 11% coarse sand, 16% medium sand, 22% fine sand, 46% gravel, 5% silt, brown. Rounded to subangular sand and gravel. (2 jars)		1,2
28	SPIN						Headspace: 18 ppm. (jar #2) Advance HW drill casing to 29 ft. Advance 3-7/8 in. roller bit to 29 ft. Perform constant head permeability test at 29 ft.		
29	SPIN							29.0 ft.	
		S-11	1/1	29-29.1	75/1*	—	Washed sample. Advance 3-7/8 in. roller bit to 29.5 ft.	BOULDER	
				Interval 29.5-30.5	Time 7.5 min.		Advance HW drill casing to 29.7 ft. Begin HQ rock core at 29.5 ft.		
30	SPIN								

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	5. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	6. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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**PROJECT**

Remedial Design For Operable Unit 01  
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New Bedford, Massachusetts

BORING NO. FD-114  
SHEET 4 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N Value			
				Interval	Time				
31	SPIN			30.5-31.5	5 min.		Core: 29.5 to 32.0 ft. Core barrel penetrated boulder at 32 ft., core run terminated. Advance 3-7/8 in. roller bit to 32 ft. Roller bit cuttings recovered utilizing a U.S. No. 140 sieve and preserved in sample jar. Cuttings indicate coarse to fine sand and gravel. Unable to keep hole through boulder open.	BOULDER	
32	SPIN			31.5-32.0	5 min.		Advance HW drill casing to 32 ft.	32.0 ft.	
		S-12	24/12	32-34	10-12-15-12	27	Poorly graded sand with silt and gravel (SP-SM); 16% coarse sand, 23% medium sand, 31% fine sand, 19% gravel, 11% silt, brown. Subrounded to angular sand and gravel. Headspace: <1 ppm.	GLACIO FLUVIAL	2
33	SPIN						Advance 3-7/8 in. roller bit to 37 ft. Advance HW drill casing to 37 ft.		
34	SPIN						Advance 3-7/8 in. roller bit to wash out casing.		
35	SPIN								
36	SPIN								
37	SPIN								
		S-13	16/9	37-38.3	14-36-75/4"	—	S-13A: Poorly graded gravel with silt and sand (GP-GM); 65% gravel, 10% coarse sand, 10% medium sand, 5% fine sand, 10% silt, subrounded to subangular sand and gravel, brown. (3 in.) Headspace: <1 ppm. (S-13A) S-13B: Weathered bedrock / residual soil. (6 in.) Headspace: <1 ppm. (S-13B)	39.0 ft.	
38	SPIN						Advance 3-7/8 in. roller bit to wash out casing.		
39	SPIN						Advance 3-7/8 in. roller bit to 40.5 ft. Advance HW drill casing to 39.5 ft. Top of competent bedrock at 40.0 ft.		
40	SPIN						Begin HQ rock core at 40.5 ft. (boring log continued on next page)	WEATHERED BEDROCK 40.0 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
3)  
4)



Nobis Engineering  
18 Chanell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-114

SHEET 5 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.

Boring Location northing 2696166 easting 814321

Driller E. Thomas

Mudline El. -20.28 Datum NGVD

Logged By E. Thibodeau

Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (PW) flush joint drill casing. Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
41.0		R1	40.5-41.5	4.5 min.	Begin R1 at 40.5 ft. Slightly weathered, medium to moderately hard, gray, fine to medium grained GNEISS. Low angle (approx. 10-30 degrees) foliation. REC. = 95%; RQD = 45% (poor). Water return color: rust. 40.5 to 42.1 ft.: Weathered zone. Rock notably discolored. Rock structure still intact. Rock is slightly friable from 41 to 41.2 ft.		
41.5			41.5-42.5	6 min.	41.6 ft.: Mechanical break in rock core. 41.6 to 43.0 ft.: Set of three high angle to vertical healed joints or fractures.		
42.0				42.5-43.5	5.5 min.	42.5 ft.: Loss of water return.	
42.5				43.5-44.5	4 min.	43.3 to 45.5 ft.: High angle to vertical joint. Joint is intact from 43.3 to 43.5 ft. Possible machine break from 43.5 to 45.5 ft. joint is smooth, planar, discolored, and tight. 43.5, 43.6, 43.9, 44.2, 44.4, 44.6, 44.7, 44.9, 45.0, and 45.2 ft.: Mechanical break in rock core along foliation and perpendicular to high angle joints. 43.5 to 45.0 ft.: High angle to vertical joint. Joint runs parallel to other high angle joint and the two joints appear to merge at 44.7 ft. Joint is rough, undulating, discoloration noted from 43.5 to 44.3 ft. Joint becomes open but infilled from 44.3 to 45.5 ft. Infilling material is dark gray in color.	
43.0				44.5-45.5	5 min.	Perform packer test from 43 to 45.5 ft. End R1 at 45.5 ft.	
43.5							
44.0							
44.5							
45.0							
45.5							

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 9 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to Geo Testing Express Report dated March 5, 2001. Laboratory description presented in bold.  
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Nobis Engineering  
18 Chasell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-114  
SHEET 6 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (FW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Headings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS	
		CORE RUN	CORE INTERVAL	CORE TIME			
46.0		R2	45.5-48.5	4 min	Begin R2 at 45.5 ft. Fresh, hard, gray, fine to medium grained GNEISS. No distinct foliation noted. REC. = 100%; RQD = 17% (very poor). RQD biased low due to the presence of high angle/vertical joints No water return noted. 45.5 to 47.6 ft.: High angle to vertical joint/fracture. Joint is rough, undulating, and infilled. Joint is intact from 46.7 to 47.6 ft. Several mechanical breaks noted throughout zone. All breaks may be mechanical / broken during coring. Infilling material is dark gray in color. Appears to be comprised mostly of sand.		
46.5			46.5-47.5	4 min			
47.0				47.5-48.5	4.5 min	47.8 to 50.2 ft.: High angle to vertical joint/fracture. Joint is healed and intact with calcite or quartz infilling. Joint runs parallel to another high angle / verticle joint. Joints intersect at 49.2 ft. then split again. Several mechanical breaks noted across joint.	
47.5				48.5-49.5	5.5 min	48.4 to 50.0 ft.: High angle to vertical joint/fracture. Joint is infilled and intact. Intersects aforementioned joint at 49.2 ft. then splits again. Infilling material appears to be comprised mostly of sand.	
48.0				49.5-50.5	6 min	49.5 to 49.7 ft.: Quartz/feldspar zone. Pink/dark gray in color. Pegmatic. 49.8 to 50.2 ft.: Quartz/feldspar zone. Pink/dark gray in color. Pegmatic.	
48.5						50.2 ft.: Mechanical break in rock core.	
49.0						50.2 to 50.5 ft.: High angle/vertical joint. Distinct discoloration and weathering noted on joint surface. End R2 at 50.5 ft.	
49.5							
50.0							
50.5							

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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18 Charrell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-114

SHEET 7 of 12

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.

Boring Location northing 2696166 easting 814321

Driller E. Thomas

Mudline El. -20.28 Datum NGVD

Logged By E. Thibodeau

Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.

Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.0		R3	50.5-51.5	3.5 min.	Begin R3 at 50.5 ft. Fresh to slightly weathered, hard, gray, fine to medium grained GNEISS. Horizontal to low angle foliation (0 to 10 degrees). REC. = 100%; RQD = 30% (poor). RQD biased low due to the presence of high angle/vertical joints. No water return noted. 50.5 to 53.6 ft.: High angle/vertical joint/fracture. Joint is rough, undulating, discolored, and weathered from 50.5 to 51.7 ft. Joint is dark gray in color and consists primarily of sand/silt. Joint is broken/heavily fractured from coring process.	
51.5			51.5-52.5	6 min.	51.5 ft.: Mechanical break in rock core.	
52.0					52.2 ft.: Mechanical break in rock core.	
52.5						
53.0						
53.5						
54.0						
54.5						
55.0						
55.5					55.2 ft.: Mechanical break in rock core. 55.2 to 55.5 ft.: Mechanical break in rock core. (vertical) Perform packer test from 45.5 to 55.5 ft. End R3 at 55.5 ft.	

0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photocionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.
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REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to Geo Testing Express Report dated March 5, 2001. Laboratory description presented in bold.  
3)  
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-114  
SHEET 8 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
56.0		R4	55.5-56.5	2.5 min.	Begin R4 at 55.5 ft. Fresh to slightly weathered, moderately hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 10 to 20 degrees). REC = 100%; RQD = 82% (good). No water return noted. 55.8 to 57.6 ft.: Slight discoloration/weathering noted. 55.5 to 56.3 ft.: Healed joint. High angle to vertical. Some discoloration noted along joint surface. 56.3, 56.5, 57.0, and 57.5 ft.: Mechanical breaks in rock core.	
56.5			56.5-57.5	3 min.	56.3 to 57.1 ft.: Healed joint. High angle to vertical. Some discoloration noted along joint surface. 56.3 to 56.5 ft.: Mechanical break in rock core. 56.5 to 57.5 ft.: Secondary joint: high angle, smooth, planar, discolored, and tight. Healed from 57.0 to 57.5 ft. Possible mechanical break. 57.0 to 57.7 ft.: Secondary joint: high angle, smooth, planar, discolored, and tight. Possible mechanical break.	
57.0			57.5-58.5	3.5 min.		
57.5			58.5-59.5	3 min.	58.8 ft.: Quartz/feldspar vein. Dark gray/pink in color. 58.7 to 58.9 ft.: Quartz/feldspar vein. Dark gray/pink in color.	
58.0			59.5-60.5	3 min.		
58.5						
59.0						
59.5						
60.0						
60.5				End of R4 at 60.5 ft. Bottom of exploration at 60.5 ft; boring terminated in bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.45.		

0 to 4 - Very Loose  
5 to 10 - Loose  
11 to 30 - Medium Dense  
31 to 50 - Dense  
Over 50 - Very Dense

0 to 2 - Very Soft  
3 to 4 - Soft  
5 to 8 - Medium Stiff  
9 to 15 - Stiff  
16 to 30 - Very Stiff  
Over 30 - Hard

1. S denotes split-barrel sampler.  
2. U denotes 3-inch O.D. undisturbed sample.  
3. UO denotes 3-inch Osterberg undisturbed sample.  
4. PEN denotes penetration length of sampler.  
5. REC denotes recovered length of sample.  
6. SPT denotes Standard Penetration Test.

7. PID denotes Photolorization Detector  
8. PPM denotes parts per million.  
9. PP denotes Pocket Penetrometer.  
10. FVST denotes field vane shear test.  
11. RQD denotes Rock Quality Designation.  
12. R denotes core run number.

REMARKS:  
1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

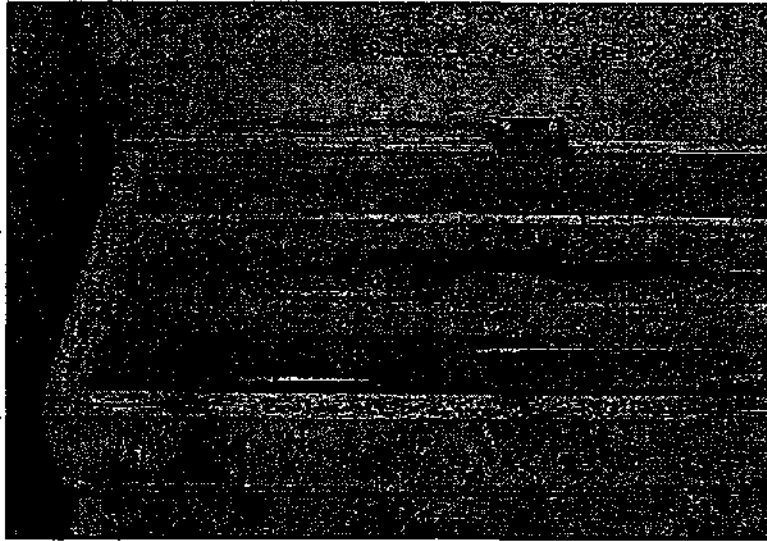
BORING NO. FD-114  
SHEET 9 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

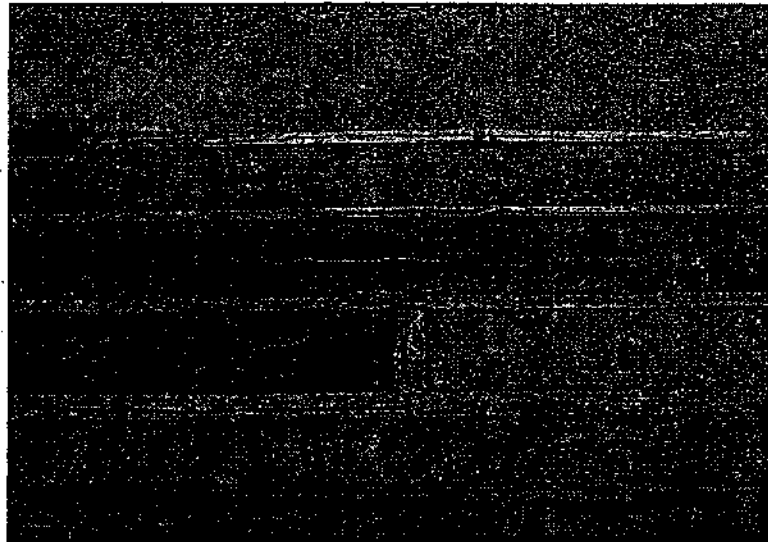
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1, R2, and boulder core



Core Runs R1, R2, and boulder core

POOR ORIGINAL

REMARKS:

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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- 4)



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18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

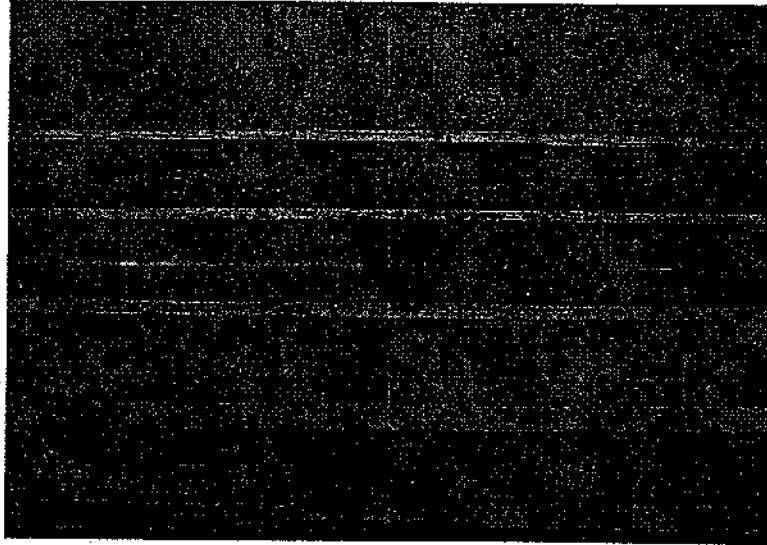
BORING NO. FD-114  
SHEET 10 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

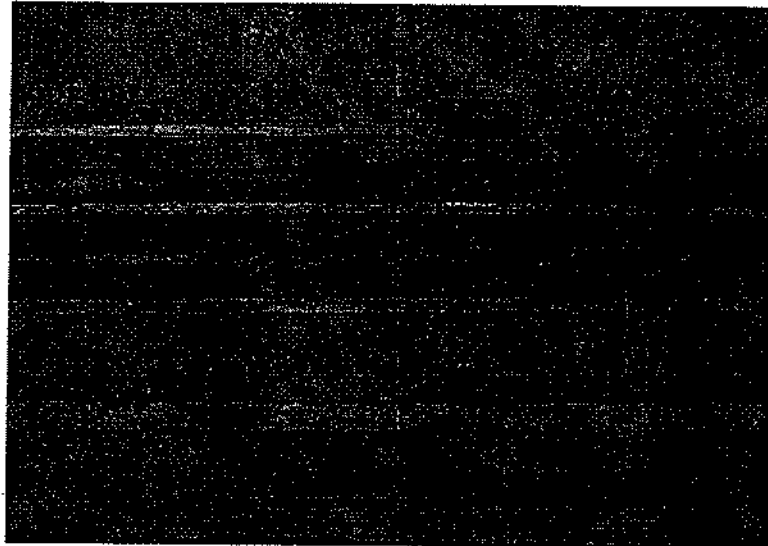
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD 11 Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 and R2



Core Runs R1 and R2

**POOR ORIGINAL**

**REMARKS:**

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
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Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-114

SHEET 11 of 12

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696166 easting B14321  
Mudline El. -20.28 Datum NGVD  
Date Start 1/2/01 Date End 1/5/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

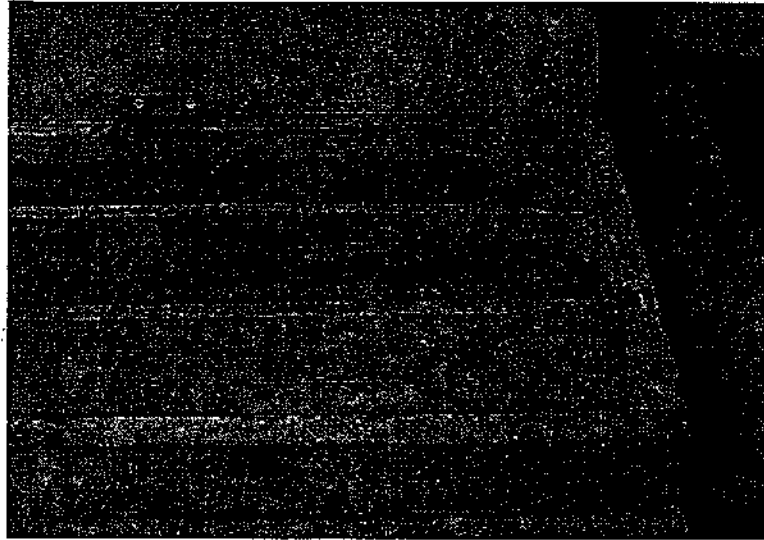
Drill Rig: Acker AD # Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Spin and wash.

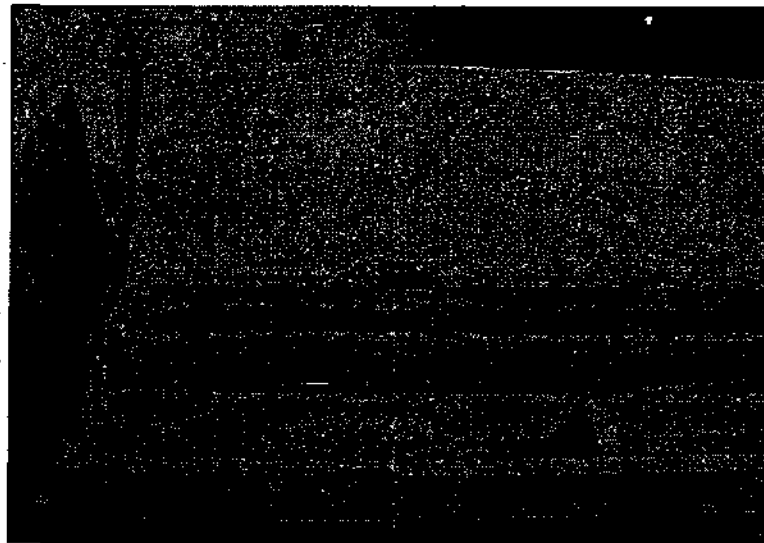
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 and R2



Core Runs R3 and R4

POOR ORIGINAL

REMARKS:

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 2) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 3)
- 4)



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Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

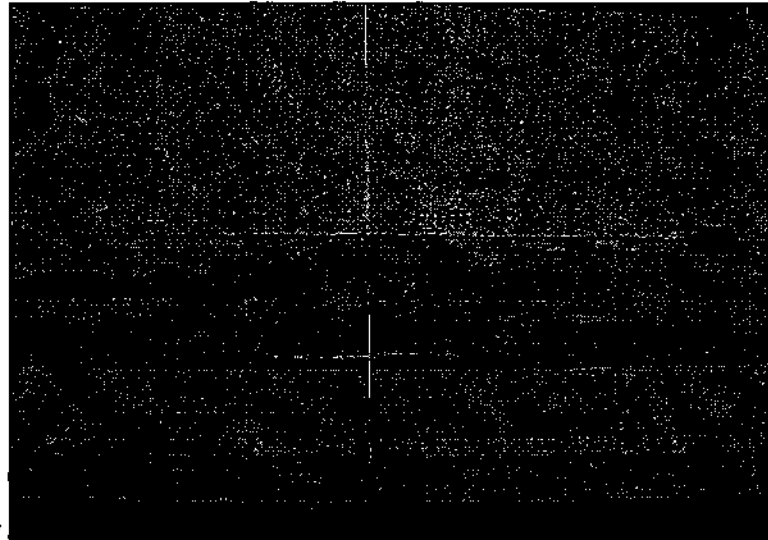
BORING NO. FD-114  
SHEET 12 of 12  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696166 easting 814321  
Driller E. Thomas Mudline El. -20.28 Datum NGVD  
Logged By E. Thibodeau Date Start 1/2/01 Date End 1/5/01

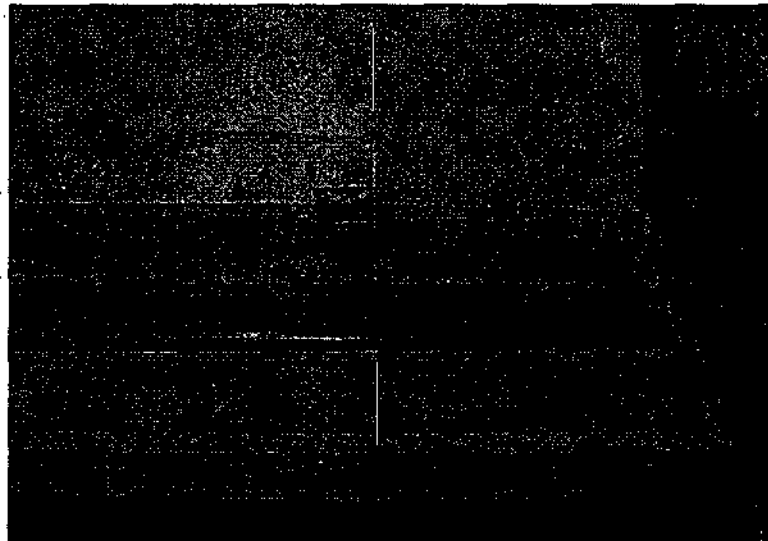
Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Spin and wash.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R3 and R4



Core Runs R3 and R4

POOR ORIGINAL

REMARKS:

- 1) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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- 3)
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Noble's Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 1 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696554 easting 814650  
Mudline El. -22.48 Datum NGVD  
Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC						Advance sampler to 2 ft.		
2	WOC								
3	WOC	UO-1	24/24	2-4			Organic soil (OH); 90% organic clay/silt, 10% fine sand, strong organic odor, black. Tube fell over during preservation, tube discarded. Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft.	ORGANIC CLAY	
4	WOC								
5	WOC								
6	WOC	UO-2	24/24	5-7			Organic soil with sand (OH); 70% organic clay/silt, 25% fine sand, 5% shell fragments, strong organic odor, dark gray. Pocket penetrometer: undrained shear strength = 0.22 kips/sf Advance PW drill casing to 8 ft. Advance 3-7/8 in. roller bit to 8 ft.		
7	WOC								
8	WOC	UO-3	24/24	8-10			Top: Similar to UO-2. Bottom: Poorly graded sand (SP); 45% fine sand, 50% medium sand, 5% silt, moderate organic odor, gray.	8.50 ft.	
9	HYD PUSH						Advance PW drill casing to 11 ft. Advance 3-7/8 in. roller bit to 11 ft.	MARINE SAND	
10	HYD PUSH								

GRANULAR SOILS (NYS 203)	COHESIVE SOILS (NYS 203)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3)  
4)



Nobis Engineering  
18 Chewell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 4 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696554 easting 814650  
Mudline El. -22.48 Datum NGVD  
Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acder AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (FW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 8 INCHES	SPT REMARKS			
31	63								
32	62								
33	67								
		S-9	24/10	33-35	13-13-12-12	25*	Silty sand with gravel (SM); 30% fine sand, 22% medium sand, 8% coarse sand, 17% gravel, 23% silt, brown. Subrounded to subangular sand and gravel. (2 jars) Advance PW drill casing to 38 ft. Advance 3-7/8 in. roller bit to 38 ft.	GLACIO FLUMIAL	1,2
34	69								
35	80								
36	79								
37	55								
38	55								
		S-10	24/4	38-40	25-27-7-25	34*	Silty sand with gravel (SM); dense, 5% clay, 20% fine sand, 15% medium sand, 5% coarse sand, 30% gravel, 25% silt, subangular to angular sand and gravel, gray. Advance PW drill casing to 43 ft. Advance 3-7/8 in. roller bit to 43 ft.	2	
39	88								
40	131								

GRANULAR SOILS	QUESTIONS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photobionization Detector. 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) 2-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3)  
4)





Nobis Engineering  
18 Chenell Drive  
Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 5 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696554 easting 814850  
Mudline El. -22.48 Datum NGVD  
Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (TU)	SAMPLE INFORMATION					SPT N-value	SAMPLE DESCRIPTION (ASTM D2486)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES					
41	160							GLACIO FLUVIAL		
42	140									
43	217	S-11	3/1	43-43.3	20/3*-25/0*	—*	Washed sample. Advance 3-7/8 in. roller bit to 43.5 ft. Advance 4-7/8 in. roller bit to 43.5 ft. Top of bedrock at 43.3 ft. Telescope HW drill casing to 43.8 ft. Begin HQ rock core at 43.5 ft. (boring log continued on next page)	43.3 ft.	2	
44								BEDROCK		
45										
46										
47										
48										
49										
50										

GRANULAR SOILS (N-values)	COHESIVE SOILS (N-values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UQ denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 6 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696554 easting 814650  
 Drifter E. Thomas Mudline El. -22.48 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
44.0		R1	43.5-44.5	3 min.	Begin R1 at 43.5 ft. Fresh moderately hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 20 degrees). REC. = 92%; RQD = 92% (excellent). RQD biased low due to recovery less than 100%. Water return color: milky white. 41.1 to 44.4 ft.: Slight discoloration/weathering noted on surface of rock core. 44.2 ft.: Primary joint: low angle, rough, planar, discolored, and open. Some core grinding noted.	
44.5			44.5-45.5	2.5 min.	44.5 ft.: Loss of water return.	
45.0				45.1 to 46.7 ft.: Slight discoloration/weathering noted on surface of rock core.		
45.5				45.4 ft.: Mechanical break in rock core.		
46.0				45.8 ft.: Mechanical break in rock core.		
46.5				46.2 ft.: Mechanical break in rock core.		
47.0				46.5 ft.: Mechanical break in rock core.		
47.5				46.5 ft.: Mechanical break in rock core.		
48.0				47.5 ft.: Primary joint: low angle, rough, planar, discolored, and open. Some core grinding noted. 47.7 ft.: Mechanical break in rock core.		
48.5				47.9 ft.: Mechanical break in rock core. End R1 at 48.5 ft.		

GRANULAR SOILS (N.Y.S.D.)	COHESIVE SOILS (N.Y.S.D.)	SYMBOLS	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
 3)  
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**PROJECT**

Remedial Design For Operable Unit 01  
New Bedford Harbor Superfund Site  
New Bedford, Massachusetts

BORING NO. FD-115  
SHEET 7 of 10  
FILE NO. 48138.27  
CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696554 easting 814650  
Driller E. Thomas Mudline El. -22.48 Datum NGVD  
Logged By E. Thibodeau Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Dris Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
49.0		R2	48.5-49.5	3.5 min	Begin R2 at 48.5 ft. Fresh hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 20 to 30 degrees). No natural joints/fractures noted. REC = 98%; RQD = 98% (excellent), RQD biased low due to recovery less than 100%. No water return noted.	
49.5			49.5-50.5	4 min	49.7 ft.: Mechanical break in rock core.	
50.0			50.5-51.5	3.5 min	50.6 to 50.9 ft.: Quartz/feldspar vein. Pink/dark gray in color.	
50.5			51.5-52.5	3.5 min	51.8 to 52.0 ft.: Quartz/feldspar vein. Dark gray/pink in color. 52.2 to 52.4 ft.: Quartz/feldspar vein. Dark gray/pink in color.	
51.0			52.5-53.5	4 min	52.3 ft.: Mechanical break in rock core. 53.2 to 53.5 ft.: Quartz/feldspar vein. Dark gray/pink in color. Pegmatic.	
51.5					End R2 at 53.5 ft.	
52.0						
52.5						
53.0						
53.5						

GRANULAR SOILS (NYS)	COHESIVE SOILS (NYS)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photolonization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
3)  
4)



Nobis Engineering  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 8 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696554 easting 814650  
Mudline El. -22.48 Datum NGVD  
Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
54.0		R3	53.5-54.5	3.5 min.	Begin R3 at 53.5 ft. Fresh, hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 10 to 20 degrees). REC = 100%; ROD = 100% (excellent) No water return noted. 53.5 to 53.7 ft.: Quartz/feldspar vein. Dark gray/pink in color. Pegmatic. Continuation from R2. 53.9 ft.: Mechanical break in rock core.	
54.5						
55.0			54.5-55.5	2.5 min.		
55.5					55.3 ft.: Mechanical break in rock core.	
56.0			55.5-56.5	2.5 min.		
56.5						
57.0			56.5-57.5	3.5 min.	56.6 and 56.7 ft.: Mechanical breaks in rock core. 46.9 ft.: Quartz/feldspar vein. Dark gray/pink in color. 57.0 to 57.2 ft.: Quartz/feldspar vein. Pink/dark gray in color. 57.0 to 57.2 ft.: Several mechanical breaks in rock core. 57.3 ft.: Mechanical break in rock core.	
57.5						
58.0			57.5-58.5	3.5 min.	57.7 ft.: Mechanical break in rock core. 57.9 to 58.5 ft.: Quartz/feldspar zone. Very coarse grained. Pink/dark gray in color, Pegmatic.	
58.5					End of R3 at 56.5 ft. Bottom of exploration at 58.5 ft; boring terminated in bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.39.	

0 to 4 - Very Loose	0 to 2 - Very Soft	1. S denotes split-barrel sampler.	7. PID denotes Photoionization Detector
5 to 10 - Loose	3 to 4 - Soft	2. U denotes 3-inch O.D. undisturbed sample.	8. PPM denotes parts per million.
11 to 30 - Medium Dense	5 to 8 - Medium Stiff	3. UO denotes 3-inch Osterberg undisturbed sample.	9. PP denotes Pocket Penetrometer.
31 to 50 - Dense	9 to 15 - Stiff	4. PEN denotes penetration length of sampler.	10. FVST denotes field vane shear test.
Over 50 - Very Dense	16 to 30 - Very Stiff	6. REC denotes recovered length of sample.	11. RQD denotes Rock Quality Designation.
	Over 30 - Hard	8. SPT denotes Standard Penetration Test.	12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 
-



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18 Chenell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 9 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.

Driller E. Thomas

Logged By E. Thibodeau

Boring Location northing 2696554 easting 814650

Mudline El. -22.48 Datum NGVD

Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

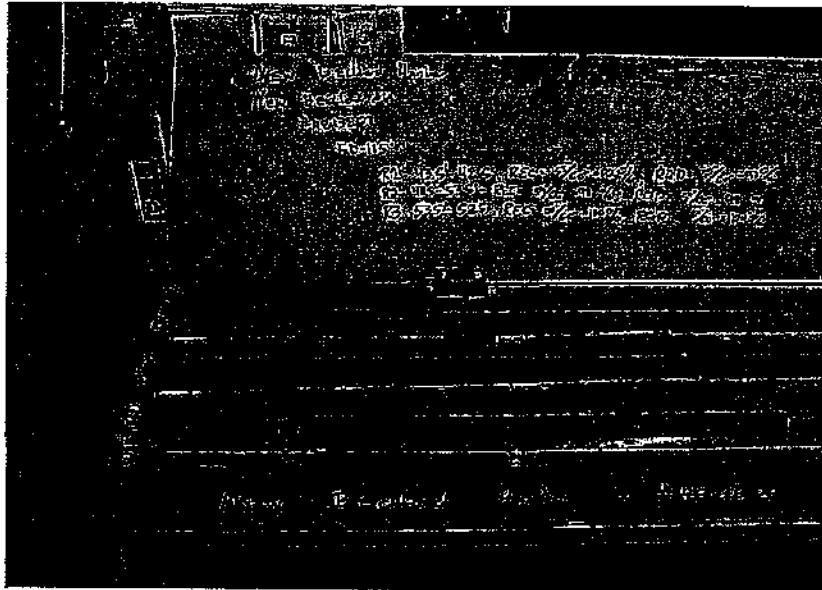
Drilling Method: 8-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

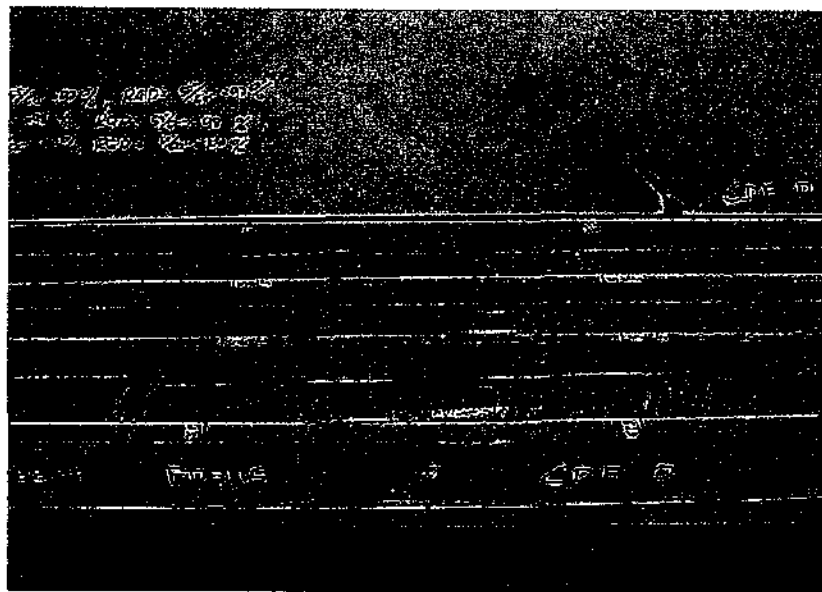
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

ROCK CORE PICTURES



Core Runs R1 through R3



Core Runs R1 through R3

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-115

SHEET 10 of 10

FILE NO. 48138.27

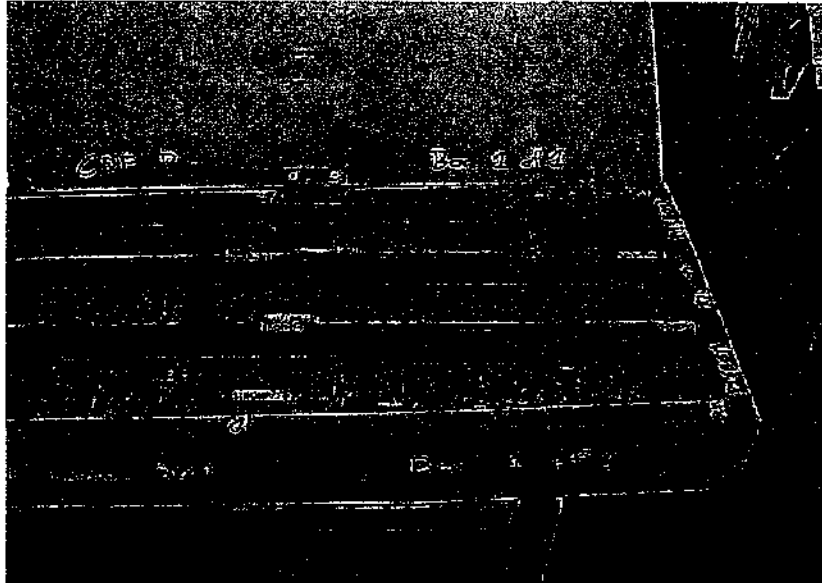
CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696554 easting 814650  
 Driller E. Thomas Mudline El. -22.48 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/9/01 Date End 1/10/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Quartz/feldspar (pegmatic) zones noted in bottom of R2 and R3

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)



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Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 1 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696328 easting 814635  
 Driller E. Thomas Mudline El. -24.16 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
1	WOC								
2	WOC								
3	WOC	UO-1	24/24	2-4			Sandy organic soil (OH); 65% organic clay/silt, 5% medium sand, 30% fine sand, strong organic odor, dark gray. Slight sheen noted on sample. Pocket penetrometer: undrained shear strength = 0.08 kips/sf Advance PW drill casing to 5 ft. Advance 3-7/8 in. roller bit to 5 ft.	ORGANIC CLAY	
4	WOC								
5	WOC								
6	HYD PUSH	UO-2	24/24	5-7			Top: Sandy organic soil (OH); 60% organic clay/silt, 35% fine sand, 5% shell fragments, strong organic odor, dark gray. (UO-2A) Bottom: Poorly graded sand with silt (SP-SM); 60% fine sand, 25% medium sand, 10% silt, strong organic odor, gray. Traces of dark brown organic matter noted. (UO-2B) Advance PW drill casing to 7 ft. Advance 3-7/8 in. roller bit to 7 ft.	6.0 ft.	
7	HYD PUSH								
8	15	S-1	24/13	7-9	3-2-2-2	4	Silty sand (SM); loose, 70% fine sand, 30% silt, moderate organic odor, gray. Advance PW drill casing to 9 ft. Advance 3-7/8 in. roller bit to 9 ft.	MARINE SAND	
9	15								
10	11	S-2	24/6	9-11	5-1/12*-1	1	Silty with sand (ML); very soft, 70% silt, 10% clay, 20% fine sand, gray. Advance PW drill casing to 11 ft. Advance 3-7/8 in. roller bit to 11 ft.		

GRANULAR SOILS (IN SIES)	COHESIVE SOILS (IN SIES)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 2 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696328 easting 814635  
Mudline El. -24.16 Datum NGVD  
Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
11	9	S-3	24/24	11-13	1-1/16"	—	Lean clay with sand (CL); very soft, 85% claysilt, 15% fine sand, gray to olive brown. Interbedded. Advance PW drill casing to 13 ft. Advance 3-7/8 in. roller bit to 13 ft.	MARINE SAND	
12	12								
13	18	S-4	24/18	13-15	WOR/18"-2	—	Silty clay (CL-ML); very soft, 90% claysilt, 10% fine sand, olive brown. Trace of iron staining noted. Atterberg Limit = Liquid Limit = 21 Plastic Limit = 16, Plasticity Index = 5 Advance PW drill casing to 15 ft. Advance 3-7/8 in. roller bit to 15 ft.		1
14	21								1
15	17	S-5	24/12	15-17	4-4-4-4	8	Poorly graded sand with silt (SP-SM); loose, 60% fine sand, 30% medium sand, 10% silt, brown. Traces of iron staining noted. Advance PW drill casing to 17 ft. Mix bentonite drilling mud, specific gravity = 1.08. Advance 3-7/8 in. roller bit to 17 ft.		
16	28								
17	28	S-6	24/15	17-19	3-2-4-2	6	Poorly graded sand (SP); 85% fine sand, 11% medium sand, 4% silt, brown. Advance PW drill casing to 19 ft. Advance 3-7/8 in. roller bit to 19 ft.		1
18	18								
19	27	S-7	24/3	19-21	3-3-4-4	7	Poorly graded sand with silt and gravel (SP-SM); loose, 20% fine sand, 40% medium sand, 10% coarse sand, 20% gravel, 10% silt, subrounded to subangular sand and gravel, brown. Advance PW drill casing to 21 ft. Advance 3-7/8 in. roller bit to 21 ft.	19.0 ft. GLACIO FLUVIAL	
20	15								

GRAVITY CORRECTION VALUES	CONVECTIVE CORRECTION VALUES	SYMBOLS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) 3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
- 3)
- 4)





Nobis Engineering  
18 Chancell Drive  
Concord, New Hampshire 03301

PROJECT

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 3 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc. Boring Location northing 2696328 easting 814635  
 Driller E. Thomas Mudline El. -24.16 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

D E P T H	Casing Blows (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	R E M A R K S
		Type & No.	PENREC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
21	31	S-8	24/6	21-23	3-2-3-4	5	Poorly graded sand with silt and gravel (SP-SM); 28% fine sand, 29% medium sand, 14% coarse sand, 17% gravel, 12% silt, grayish brown. Subrounded to subangular sand and gravel.	GLACIO FLUVIAL	1
22	26						Advance PW drill casing to 23 ft. Advance 3-7/8 in. roller bit to 23 ft.		
23	27	S-9	24/2	23-25	5-4-3-3	7	Poor recovery. Advance HW drill casing to 25 ft. Advance 3-7/8 in. roller bit to 25 ft.		
24	27								
25	38	S-10	24/8	25-27	7-5-5-4	10*	Poorly graded sand with silt and gravel (SP-SM); 29% fine sand, 25% medium sand, 11% coarse sand, 28% gravel, 7% silt, brownish gray. Subrounded to subangular sand and gravel. (2 jars)	GLACIO FLUVIAL	1,2
28	27						Advance PW drill casing to 30 ft. Advance 3-7/8 in. roller bit to 30 ft.		
27	41								
28	28								
29	27								
30	32								

GRANULAR SOILS (IN SPT)	PORESIVE SOILS (IN SPT)	SYMBOL KEY
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UD denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 4 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696328 easting 814635  
Mudline El. -24.16 Datum NGVD  
Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (ft)	Casing (ft)	SAMPLE INFORMATION					SAMPLE DESCRIPTION (ASTM D2488)	STRATUM DESCRIPTION	REMARKS
		Type & No.	PEN/REC (inches)	DEPTH (feet)	BLOWS PER 6 INCHES	SPT N-Value			
		S-11	24/4	30-32	5-13-13-12	26*	Washed sample. Advance PW drill casing to 32 ft. Mix bentonite drilling mud, specific gravity = 1.08. Advance 3-7/8 in. roller bit to 32 ft.		1,2
31	106								
32	88								
		S-12	24/3	32-34	7-12-12-16	24*	Poor recovery. Washed sample. Advance PW drill casing to 34 ft. Advance 3-7/8 in. roller bit to 34 ft.	GLACIO FLUVIAL	1,2
33	27								
34	80								
		S-13	12/4	34-35	25-25-25/0*	—	Silty sand with gravel (SM); 30% fine sand, 15% medium sand, 10% coarse sand, 25% gravel, 20% silt, subrounded to subangular sand and gravel, gray. Advance PW drill casing to 35 ft. Top of bedrock at 35.0 ft. Advance 3-7/8 in. roller bit to 35.3 ft. Advance 4-7/8 in. roller bit to 35.5 ft. Telescope HW drill casing to 35.7 ft. Begin HQ rock core at 35.5 ft. (boring log continued on next page)	35.0 ft. BEDROCK	1,2
35	128								
36									
37									
38									
39									
40									

GRANULAR SOILS (SPT N-Value)	COHESIVE SOILS (SPT N-Value)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Soft 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 5 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696328 easting 814635  
 Driller E. Thomas Mudline El. -24.16 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
36.0		R1	35.5-36.5	6.5 min.	Begin R1 at 35.5 ft. Fresh to slightly weathered, moderately hard to medium, gray, fine to medium grained GNEISS. Low angle foliation (approx. 10 degrees). REC. = 70%; RQD = 48% (poor). RQD biased low due to recovery of less than 100%. Water return color: milky white to rust.	
36.5			36.5-37.5	6 min.	36.6 ft.: Quartz vein: Dark gray in color.	
37.0					37.0 to 38.4 ft.: Missing rock core. Rock not recovered due to probable core grinding. Possible weathered/residual soil zone.	
37.5			37.5-38.5	5 min.		
38.0						
38.5			38.5-39.5	2 min.	38.4 to 38.7 ft.: Several pieces of fractured rock. Core grinding noted. One fragment showed signs of overcore.	
39.0					38.7 to 40.5 ft.: Discoloration noted. Distinct weathering noted from 39.7 to 40.5 ft. Several mechanical breaks noted through this zone. Some core grinding noted at 39.9 ft.	
39.5			39.5-40.5	5 min.		
40.0						
40.5					40.3 to 40.5 ft.: Broken rock fragments from core lifter. End R1 at 40.5 ft.	

GRANULAR SOILS (N/A values)	COHESIVE SOILS (N/A values)	SYMBOL KEY	
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test.	7. PID denotes Photolocalization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:  
 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 6 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696328 easting 814635  
Mudline El. -24.16 Datum NGVD  
Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
Drill Rig: Acker AD II Truck Rig  
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
41.0		R2	40.5-41.5	5.5 min	Begin R2 at 40.5 ft. Slightly weathered to fresh, moderately hard to hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 10 degrees). REC = 100%; RQD = 92% (excellent), RQD biased low due to recovery of less than 100%. No water return noted. 40.5 to 41.0 ft.: Secondary joint: high angle, rough, planar, discolored, and tight. 41.2 ft.: Mechanical break in rock core.	
41.5						
42.0			41.5-42.5	5 min	41.6 ft.: Mechanical break in rock core.	
42.5						
43.0			42.5-43.5	4 min	41.9 to 42.0 ft.: Primary joint: low angle, rough, planar, discolored/weathered, and open. Joint is notably weathered with some material being friable.	
43.5						
44.0			43.5-44.5	5 min	42.6 ft.: Mechanical break in rock core.	
44.5						
45.0			44.5-45.5	5 min	43.5 ft.: Mechanical break in rock core. 44.3 ft.: Mechanical break in rock core. 44.6 ft.: Primary joint: low angle, rough, planar, discolored, and open. Some weathering noted on surface of joint. 44.8 to 45.2 ft.: Weathering/discoloration noted. 45.1 ft.: Primary joint: low angle, rough, planar, discolored, and open. Weathering noted.	
45.5					End R2 at 45.5 ft.	

GRAIN CLASSIFICATION	COHESIVENESS/STIFFNESS	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UG denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

**REMARKS:**  
1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.  
2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.  
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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 7 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

Boring Co. Warren George, Inc. Boring Location northing 2696328 easting 814635  
 Driller E. Thomas Mudline El. -24.16 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
 Drill Rig: Acker AD II Truck Rig  
 Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing. Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings				
Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
46.0		R3	45.5-46.5	7 min.	Begin R3 at 45.5 ft. Fresh, hard, gray, fine to medium grained GNEISS. Low angle foliation (approx. 10 to 20 degrees). REC = 100%; RQD = 100% (excellent) No water return noted.	
46.5					46.3 ft.: Mechanical break in rock core.	
47.0			46.5-47.5	7 min.	46.6 ft.: Mechanical break in rock core.	
47.5					47.0 ft.: Mechanical break in rock core. 47.2 ft.: Mechanical break in rock core.	
48.0			47.5-48.5	5.5 min.	47.5 ft.: Primary joint: low angle, rough, planar, discolored/weathered, and open.	
48.5					48.0 ft.: Mechanical break in rock core. 48.2 ft.: Mechanical break in rock core.	
49.0			48.5-49.5	5 min.	48.4 ft.: Mechanical break in rock core. 48.7 ft.: Mechanical break in rock core.	
49.5					48.9 ft.: Quartz/feldspar vein: Dark gray/pink in color.	
50.0			49.5-50.5	7.5 min.	49.7 to 50.2 ft.: Quartz/feldspar vein. Dark gray and pink in color. 49.7 and 49.8 ft.: Mechanical breaks in rock core.	
50.5					50.4 ft.: Mechanical break in rock core. End R3 at 50.5 ft.	

GRANULAR SOILS (IN %)	COHESIVE SOILS (IN %)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photoionization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

- Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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Concord, New Hampshire 03301

**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 8 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.  
Driller E. Thomas  
Logged By E. Thibodeau

Boring Location northing 2696328 easting 814635  
Mudline El. -24.16 Datum NGVD  
Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

DEPTH (feet)	VISUAL REPRESENTATION	CORE INFORMATION			ROCK CORE DESCRIPTION	REMARKS
		CORE RUN	CORE INTERVAL	CORE TIME		
51.0		R4	50.5-51.5	4 min.	Begin R4 at 50.5 ft. Fresh, hard, gray, fine to medium grained GNEISS. No natural joints/fractures noted. Low angle foliation (approx. 20 to 30 degrees). REC = 100%; RQD = 100% (excellent) No water return noted. 50.8 ft.: Mechanical break in rock core. 51.0 ft.: Mechanical break in rock core. 51.5 ft.: Mechanical break in rock core. 52.2 ft.: Mechanical break in rock core. 53.2 ft.: Quartz/feldspar vein: Dark gray/pink in color. 53.4 ft.: Mechanical break in rock core. 54.8 ft.: Mechanical break in rock core. 55.2 ft.: Mechanical break in rock core. End of R4 at 55.5 ft. Bottom of exploration at 55.5 ft; boring terminated in bedrock. Grout completed boring to mudline with cement/bentonite slurry, specific gravity = 1.37.	
51.5			51.5-52.5	2.5 min.		
52.0			52.5-53.5	3 min.		
52.5			53.5-54.5	3 min.		
53.0			54.5-55.5	3 min.		
53.5						
54.0						
54.5						
55.0						
55.5						

GRAVEL SIZES (mm)	COHESIVE SIZES (mm)	SYMBOLS
0 to 4 - Very Loose 5 to 10 - Loose 11 to 30 - Medium Dense 31 to 50 - Dense Over 50 - Very Dense	0 to 2 - Very Soft 3 to 4 - Soft 5 to 8 - Medium Stiff 9 to 15 - Stiff 16 to 30 - Very Stiff Over 30 - Hard	1. S denotes split-barrel sampler. 2. U denotes 3-inch O.D. undisturbed sample. 3. UO denotes 3-inch Osterberg undisturbed sample. 4. PEN denotes penetration length of sampler. 5. REC denotes recovered length of sample. 6. SPT denotes Standard Penetration Test. 7. PID denotes Photolonization Detector 8. PPM denotes parts per million. 9. PP denotes Pocket Penetrometer. 10. FVST denotes field vane shear test. 11. RQD denotes Rock Quality Designation. 12. R denotes core run number.

REMARKS:

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**PROJECT**

Remedial Design For Operable Unit 01

New Bedford Harbor Superfund Site

New Bedford, Massachusetts

BORING NO. FD-116

SHEET 9 of 10

FILE NO. 48138.27

CHKD. BY J. Trottier

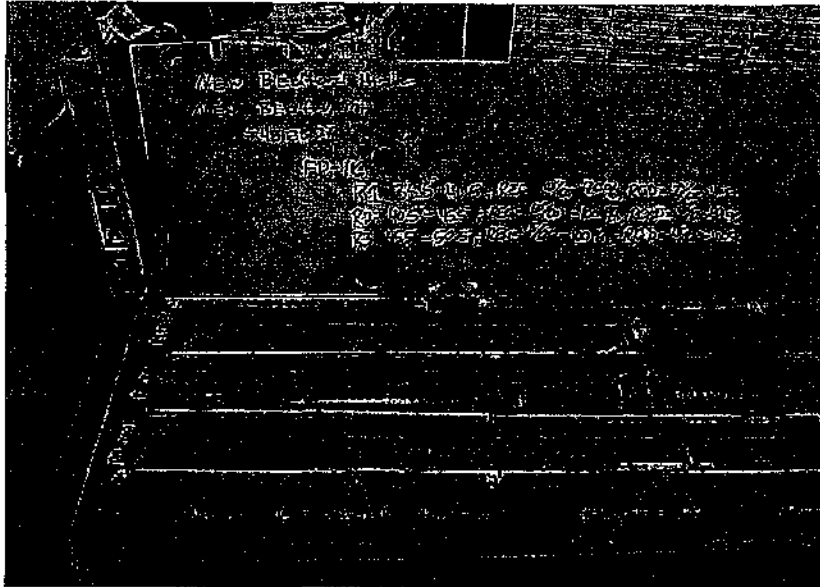
Boring Co. Warren George, Inc. Boring Location northing 2896328 easting 814635  
 Driller E. Thomas Mudline El. -24.16 Datum NGVD  
 Logged By E. Thibodeau Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.  
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 Drilling Method: 5-inch (PW) flush joint drill casing. 4-inch (HW) flush joint drill casing.  
 Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

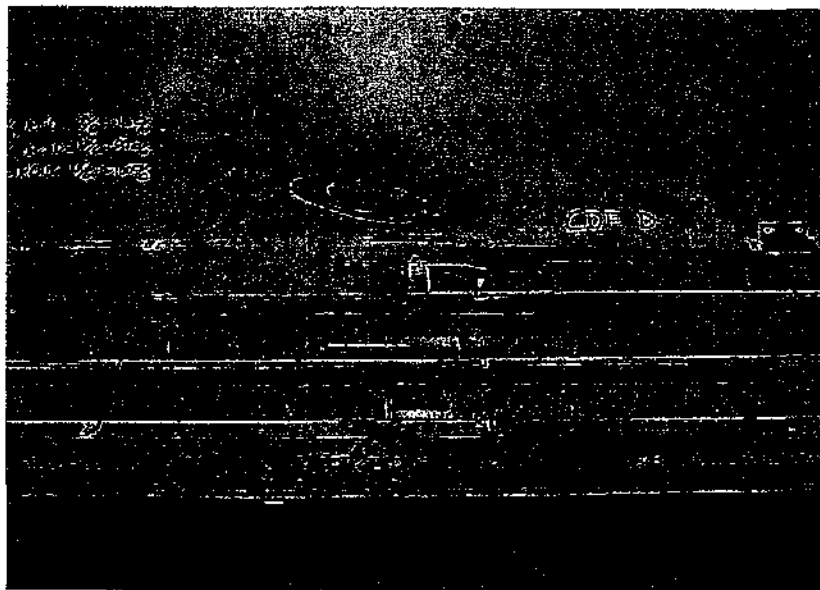
Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Core Runs R1 through R3

**REMARKS:**

- 1) Sample description based on laboratory classification. Refer to GeoTesting Express Report dated March 5, 2001. Laboratory description presented in bold.
- 2) \*3-inch O.D. split-barrel sampler driven 24 inches with a 300 lb. center hole hammer free falling from a height of 24 inches.
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**PROJECT**

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BORING NO. FD-116

SHEET 10 of 10

FILE NO. 48138.27

CHKD. BY J. Trotter

Boring Co. Warren George, Inc.

Driller E. Thomas

Logged By E. Thibodeau

Boring Location northing 2696328 easting 814635

Mudline El. -24.16 Datum NGVD

Date Start 1/5/01 Date End 1/8/01

Sampler: 2-inch O.D. split-barrel sampler driven 24 inches with a 140 lb. automatic hammer free falling from a height of 30 inches.

Drill Rig: Acker AD II Truck Rig

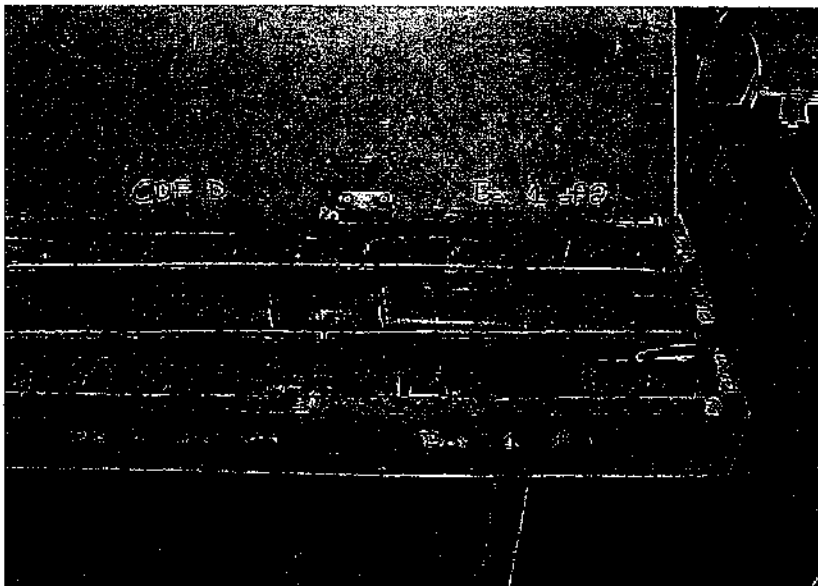
Drilling Method: 5-inch (PW) flush joint drill casing, 4-inch (HW) flush joint drill casing.

Casing driven with a 300 lb. Center hole hammer free falling from a height of 24 inches.

Groundwater Readings Not Applicable for Offshore Borings

Date	Time	Depth	Elev.	Stabilization Time

**ROCK CORE PICTURES**



Core Runs R1 through R3



Weathered primary joint noted in R2

**REMARKS:**

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- 3)
- 4)



DEPTH (FT)	CASING BLOWS/FT	SAMPLE NO. PENETRATION/RECOVERY	LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK / RESIDUAL (PSF) ROD PROBE BLOWS/FT	SOIL DESCRIPTION	SOIL CLASS	STANDARD PENETRATION RESISTANCE BLOWS/FT	PIEZOMETER DATA	ELEV (FT)
							0 10 20 30 40 50 60			
1	WOC					SANDY ORGANIC SILT				
2	WOC			9/15		Dark gray sandy organic silt, little shell fragments. H <sub>2</sub> S odor.				
3		S-1				Very soft, wet.			WDR	
4		S-2		122/37	4.0					
5		S-2		114.9		SILTY SAND			WDR	
		S-3		184/52		Dark gray silty sand, little shell fragments, very loose, H <sub>2</sub> S odor, wet.				
		S-3		203/21		No recovery.			WDR	
		S-3		209/75					WDR	
10	WOC	S-4				Medium dark gray silty sand, little gravel, little shell fragments, medium dense, wet.				
		S-4		235/31	12.0	Layer, 0.05', brown fine fibrous part.				
26		S-5				SAND				
		S-5				Gray fine to coarse sand, little to some gravel, trace silt, dense wet.				
13		S-6								
19		S-7								
21		S-7		12.5		GRAVELLY SAND				
		S-7				Gray gravelly fine to coarse sand, trace silt, medium dense, gap graded, wet.				
22										
54										
61										
46		S-8								
25		S-8								
17										
19										
15										
23										
25										
15										
21										
23										
30										
38										
28		S-10								
19		S-10								
24						Gray gravelly fine to coarse sand, trace silt, medium dense, gap graded, wet.				
43										
42		S-11								
60		S-11				SAND				
40						Light brown fine to coarse sand, trace gravel, very loose, well graded, wet.				
35										
36						Probed from 35.0' to 42.8' with 3W drill rods and hollow stem tip. Recorded blow counts per foot - 140 lb hammer dropped 24".				
53										
73										
90										
73										
40										

PRELIMINARY GEOTECHNICAL INVESTIGATION  
 OF ENGINEERING PROPERTIES  
 NEW BEDFORD HARBOR SUPERFUND SITE  
 BRISTOL COUNTY, MASSACHUSETTS

**E.C. JORDAN CO.**  
 CONSULTING ENGINEERS

Engineering Log of: RW-109A Page 1/2  
 Project No. 4950-19 Date Drilled 2/4 - 2/9/88 Sheet A-12

U: 3" or 3 1/2" thin wall tube S: split spoon R: rock C: 2" thin wall tube

DEPTH (FT.)	CASING BLOWS/FT	SAMPLE NO. PENETRATION	SAMPLE LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK / RESIDUAL (PSI) ROD PROBE (BLOWS/FT)	SOIL DESCRIPTION	SOIL CLASS						PIEZOMETER DATA ELEV (FT)
							0	10	20	30	40	50	
41	90				72	Grayish brown fine to medium sand, dense to very dense.							
42	173 197				172 62	100 - NO PENETRATION							
43						BEDROCK AT 42.8 FEET							
44		4-1 3-1 2-5			42.8	Gray muscovite/biotite gneiss, trace garnet inclusions, some chloritization, schistose, friable.							
45					48.1	ROD = 12.3%							
50						BOTTOM OF EXPLORATION AT DEPTH OF 48.1 FEET							
55						* Rock core obtained with a double barrel N core and NWX core bit.							
60													
65													
70													
75													
80													

U 3" or 3 1/4" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

**PRELIMINARY GEOTECHNICAL INVESTIGATION  
OF ENGINEERING PROPERTIES  
NEW BEDFORD HARBOR SUPERFUND SITE  
BRISTOL COUNTY, MASSACHUSETTS**

**E.C. JORDAN CO.**  
CONSULTING ENGINEERS

Engineering Log of:	BW-109A	Page 2 of 2
Project No. 6930-19	Date Drilled 2/4 - 2/9/88	Sheet A-13

DEPTH (FT)	CASING BLOWS/FT	SAMPLE NO	PENETRATION/RECOVERY	SAMPLE LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK/RESIDUAL (psf)	ROD PROBE (BLOWS/FT)	SOIL DESCRIPTION	STANDARD PENETRATION RESISTANCE BLOWS/FT						PIEZOMETER DATA	ELEV (FT)
									SOIL CLASS	0	10	20	30	40		
1								Refer to Boring Log BW-109A for soil descriptions.								
2																
3		U-1														
4		N 2.0														
5		1.3														
10		U-2					10.0	No recovery.								
		N 2.0						BOTTOM OF EXPLORATION AT DEPTH OF 10.0 FEET. NO REFUSAL ENCOUNTERED.								
		9.0														

U: 3" or 3 1/2" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

<b>PRELIMINARY GEOTECHNICAL INVESTIGATION</b> <b>OF ENGINEERING PROPERTIES</b> <b>NEW BEDFORD HARBOR SUPERFUND SITE</b> <b>BRISTOL COUNTY, MASSACHUSETTS</b>		<b>EC. JORDAN CO.</b> CONSULTING ENGINEERS	
Engineering Log of: BW-1098		Date Drilled: 2/9/88	
Project No. 4934-19		Sheet A-14	

DEPTH (FT.)	CASING BLOWS/FT	SAMPLE NO. PENETRATION SAMPLE LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK/RESIDUAL (psf) ROD PROBE (BLOWS/FT.)	SOIL DESCRIPTION	SOIL CLASS STANDARD PENETRATION RESISTANCE BLOWS/FT						PIEZOMETER DATA ELEV (FT)	
						0	10	20	30	40	50		60
1					ORGANIC SILT Dark gray silt, some shell fragments.								
2			88.5	52/12									
3			76.7		Trace to little fine sand, H <sub>2</sub> S odor, wet.								
4			87.3	52/12	Some fine sand, very soft.								
5													
10			85.6	92/18									
			59.7										
			52.0	221/43	Two layers, =0.1' to 0.3', fine sandy silt.								
				166/13	10.0								
				215/61	SANDY ORGANIC SILT Dark gray fine sandy silt, trace gravel, very soft, H <sub>2</sub> S odor, moist. Layer, 0.2', silty fine sand.								
15			14.0	263.4									
				15.3	SAND Dark gray fine to medium sand, little shell fragments, trace to little silt, very loose, well graded, H <sub>2</sub> S odor, moist.								
					Layers of brown peat, moist. Fine sand, trace medium sand, very loose, faint H <sub>2</sub> S odor. Some brown peat lenses.								
20				23.0	PEAT 1.1'-1.4' Dark brown peat, some shell fragments, trace sand, very soft, H <sub>2</sub> S odor, moist.								
					0.0'-1.1' Blackish dark brown silty peat, very soft, H <sub>2</sub> S odor, moist.								
25													
					Layer: 0.2', gray silt, little fine sand.								
					Gray "super" watered silty peat, saturated.								
					Layer: 0.3' gray silt, little fine sand.								
30					SAND Gray fine to med. sand, trace silt, some silt, trace shell fragments, trace gravel, peat lenses, wet.								
					Gray fine to medium sand, little coarse sand, trace gravel, medium dense, wet.								
35			10.9		Gray gravelly fine to coarse sand, trace silt, dense, gap graded.								
40					Probed from 36.0' to 62.0' with BW drill rods, and hollow stem tip.								

U 3" or 3 1/2" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

**E.C. JORDANCO**  
CONSULTING ENGINEERS

PRELIMINARY GEOTECHNICAL INVESTIGATION  
OF ENGINEERING PROPERTIES  
NEW BEDFORD HARBOR SUPERFUND SITE  
BRISTOL COUNTY, MASSACHUSETTS

Engineering Log of: BW-110      Page 1/2

Project No. 4934-19      Date Drilled 2/9 - 3/10/88      Sheet A-15

DEPTH (FT)	CASING BLOWS/FT	SAMPLE NO. PENETRATION/RECOVERY	WATER CONTENT (%)	SHEAR STRENGTH, Su PEAK/RESIDUAL (PSF) ROD PROBE (BLOWS/FT)	SOIL DESCRIPTION	SOIL CLASS STANDARD PENETRATION RESISTANCE BLOWS/FT						PIEZOMETER DATA	ELEV (FT)	
						0	10	20	30	40	50			60
41				31	Probed from 36.0' to 62.0' with BW drill rods and hollow stem tip. Recorded blow counts per foot = 140 lb. hammer dropped 30".									
42				16										
43				18										
44				23										
45				39										
				53										
				45										
				33										
				21										
50				14										
				20										
				14										
				13										
				20										
55				14										
				19										
				18										
				16										
				45										
60				102										
				124										
				274										
65				62.0	*REFUSAL SURFACE ENCOUNTERED AT DEPTH OF 62.0 FEET									
					- Refusal of drilling tools and sampling equipment with methods used. Refusal surface is assumed to represent bedrock.									
70														
75														
80														

U: 3" or 3 1/2" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

<b>PRELIMINARY GEOTECHNICAL INVESTIGATION</b> <b>OF ENGINEERING PROPERTIES</b> <b>NEW BEDFORD HARBOR SUPERFUND SITE</b> <b>BRISTOL COUNTY, MASSACHUSETTS</b>	<b>E.C. JORDAN CO.</b> CONSULTING ENGINEERS	
	Engineering Log of: BW-110	Page 2/2
	Project No. 4950-10	Date Drilled 2/9 - 2/10/88
		Sheet A-16

DEPTH (FT.)	CASING BLOWS/FT	SAMPLE NO. PENETRATION/RECOVERY SAMPLE LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK / RESIDUAL (LBS)	ROD PROBE (BLOWS/FT.)	SOIL DESCRIPTION	SOIL CLASS					PIEZOMETER DATA	ELEV. (FT.)
							0	10	20	30	40		
1						SAND Brown fine sand, little silt.							
2						Wet.							
3		S-1	18.0			No silt, medium dense, well graded.							
4		S-2				Trace coarse sand, trace shell fragments, loose.							
5		S-3											
6		S-4	33.7			Trace silt, no shell fragments.							
7		S-5											
8		S-6				0.3'-0.9' Some coarse sand, trace medium sand, trace shell fragments, wet.							
9		S-7				Layer, 0.075', brown silt.							
10		S-8				0.0'-0.4' Brown fine sand, well graded, wet.							
11		S-9				Trace coarse sand, medium dense.							
12		S-10											
13		S-11				Grayish brown fine sand, trace coarse sand, trace medium sand, medium dense, well graded, wet.							
14		S-12				brown mottling throughout, layer, 0.15', gray fine sandy silt.							
15		S-13											
16		S-14				Grayish brown fine to coarse sand, little silt, very loose, gap graded, wet.							
17		S-15				Fine sand, no silt, well graded.							
18		S-16											
19		S-17				Brownish gray fine sand, trace medium sand, trace silt, loose, well graded, wet.							
20		S-18											
21		S-19											
22		S-20				0.85'-1.1' Fine to coarse sand, trace gravel							
23		S-21				Layer, 0'-5', brownish gray silty fine sand.							
24		S-22				0.0'-0.4' Brownish gray fine sand, trace silt, loose, well graded, wet.							
25		S-23											
26		S-24											
27		S-25											
28		S-26											
29		S-27											
30		S-28											
31		S-29											
32		S-30											
33		S-31											
34		S-32											
35		S-33	18.6			No silt, very loose.							
36		S-34											
37		S-35											
38		S-36											
39		S-37											
40		S-38				Gray fine sand, trace silt, loose, well graded, wet.							

U: 3" or 3 1/2" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

<b>PRELIMINARY GEOTECHNICAL INVESTIGATION</b> <b>OF ENGINEERING PROPERTIES</b> <b>NEW BEDFORD HARBOR SUPERFUND SITE</b> <b>BRISTOL COUNTY, MASSACHUSETTS</b>		<b>E.C. JORDAN CO.</b> CONSULTING ENGINEERS	
Engineering Log of:	8W-111	Page 1/2	
Project No.	Date Drilled	Sheet A-17	
4950-19	1/28 - 2/3/88		



DEPTH (FT.)	CASING BLOWS/FT.	SAMPLE NO. PENETRATION/RECOVERY LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK / RESIDUAL (PSI) ROD PROBE (BLOWS/FT.)	SOIL DESCRIPTION	SOIL CLASS STANDARD PENETRATION RESISTANCE BLOWS/FT.						PIEZOMETER DATA ELEV. (FT.)	
						0	10	20	30	40	50		60
1	WOC				ORGANIC SILT - Dark gray organic silt, some shell fragments, H <sub>2</sub> S odor.								
2	WOC		38.0	110/15	Trace shell fragments, very soft, wet.								
3	WOC	S-1			SILTY SAND - Dark gray silty fine sand, trace medium sand, very loose, H <sub>2</sub> S odor, wet.								
4	WOC	S-2				No recovery							
5	WOM	S-3			SAND - Dark brown fine to coarse sand, trace silt, very loose, wet. Layer, <0.1', pesc.								
6	WOM	S-4											
10		S-5			Brown fine sand, little medium sand, trace coarse sand, medium dense, wet. Trace medium sand, trace gravel, trace silt, very dense, little mottling.								
12		S-6											
15		S-7			Brownish gray fine sand, little gravel, trace coarse sand, trace medium sand, dense, wet.								
18		S-8											
20		S-9			Little to some gravel, gap graded.								
22		S-10											
25		S-11			Some gravel, little coarse sand, loose.								
26		S-12											
30		S-13			Grayish brown fine to medium sand, some gravel, trace coarse sand, loose, wet.								
32		S-14											
35		S-15			Little coarse sand.								
36		S-16											
40		S-17			0.4'-0.7' Grayish brown coarse sand, little gravel, trace med. sand, trace fine sand, medium dense.								
		S-18			SILTY SAND (Glacial Till) 0.0'-0.4' Gray silty fine sand, little coarse sand, trace medium sand, trace clay, medium dense, wet.								
					42 Probed from 35.0' to 42.8' with BW drill rods and hollow stem tip.								
					49 Recorded blow counts per foot -								
					29 140 lb. hammer dropped 24".								
					53								

U: 3" or 3 1/2" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

<b>PRELIMINARY GEOTECHNICAL INVESTIGATION</b> <b>OF ENGINEERING PROPERTIES</b> <b>NEW BEDFORD HARBOR SUPERFUND SITE</b> <b>BRISTOL COUNTY, MASSACHUSETTS.</b>		<b>E.C. JORDAN CO.</b> CONSULTING ENGINEERS	
Engineering Log of:		BU-112	Page 1/2
Project No. 205919	Date Drilled 2/3/88	Sheet A-19	



DEPTH (FT.)	CASING BLOWS/FT	SAMPLE NO. PENETRATION/RECOVERY	SAMPLE LAB TEST	WATER CONTENT (%)	SHEAR STRENGTH, SU PEAK/RESIDUAL (psf)	ROD PROBE (BLOWS/FT)	SOIL DESCRIPTION	SOIL CLASS						PIEZOMETER DATA	ELEV (FT)	
								0	10	20	30	40	50			60
41					110											
42					183		NO PENETRATION									
43					100.											
44					42.8		*REFUSAL SURFACE ENCOUNTERED AT DEPTH OF 42.8 FEET									
45							* Refusal of drilling tools and sampling equipment with methods used. Refusal surface is assumed to represent bedrock.									
50																
55																
60																
65																
70																
75																
80																

U: 3" or 3 1/2" thin wall tube      S: split spoon      R: rock      C: 2" thin wall tube

<b>PRELIMINARY GEOTECHNICAL INVESTIGATION OF ENGINEERING PROPERTIES NEW BEDFORD HARBOR SUPERFUND SITE BRISTOL COUNTY, MASSACHUSETTS.</b>		<b>E.C. JORDAN CO.</b> CONSULTING ENGINEERS	
		Engineering Log of:      BU-112	Page 2/2
Project No. 4959-19	Date Drilled 2/3/88	Sheet A-20	



UNIFIED SOIL CLASSIFICATION (Including Identification and Description)							
Major Divisions	Group Symbols	Typical Names	Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weight).	Laboratory Classification Criteria			
Coarse-grained Soils More than half of material is larger than No. 200 sieve size.  More than half of material is smaller than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	Gravels More than half of coarse fraction is larger than No. 4 sieve size. (For visual classification, the 1/4-in. size may be used as equivalent to the No. 4 sieve size.)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.			
		GP	Poorly graded gravels, or gravel-sand mixtures, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.			
	Gravels with Fines (LITTLE or no fines)	GM	Silty gravels, gravel-sand-silt mixture.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).			
		GC	Clayey gravels, gravel-sand-clay mixture.	Plastic fines (for identification procedures see CL below).			
	Sands More than half of coarse fraction is smaller than No. 4 sieve size. (For visual classification, the 1/4-in. size may be used as equivalent to the No. 4 sieve size.)	SW	Well-graded sands, gravelly sands, little or no fines.	Wide range in grain size and substantial amounts of all intermediate particle sizes.			
		SP	Poorly graded sands or gravelly sands, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.			
	Sands with Fines (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.	Nonplastic fines or fines with low plasticity (for identification procedures see ML below).			
		SC	Clayey sands, sand-clay mixtures.	Plastic fines (for identification procedures see CL below).			
	Fine-grained Soils More than half of material is smaller than No. 200 sieve size. The No. 200 sieve size is about the smallest particle visible to the naked eye.	Identification Procedures on Fraction Smaller than No. 40 Sieve Size					
		Silt and Clays Liquid limit is less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.	None to slight	Quick to slow	None
CL			Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high	None to very slow	Medium	
OL			Organic silts and organic silty clays of low plasticity.	Slight to medium	Slow	Slight	
Silt and Clays Liquid limit is greater than 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	Slight to medium	Slow to none	Slight to medium	
		CH	Inorganic clays of high plasticity, fat clays.	High to very high	None	High	
		OH	Organic clays of medium to high plasticity, organic silts.	Medium to high	None to very slow	Slight to Medium	
Highly Organic Soils		PT	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture.			

Determine percentage of gravel and sand from grain-size curve. On percentage of material smaller than No. 200 sieve size coarse-grained soils are classified as follows:  
 GW, GP, SW, SP, GM, GC, SM, SC. Borderline cases requiring use of dual symbols.  
 Less than 5%  
 More than 12%  
 5% to 12%

Not meeting all gradation requirements for GW  
 Afterberg limits below "A" line with PI less than 4  
 Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols.  
 Afterberg limits above "A" line with PI greater than 7

Not meeting all gradation requirements for SW  
 Afterberg limits above "A" line or PI less than 4  
 Limits plotting in hatched zone with PI between 4 and 7 are borderline cases requiring use of dual symbols.  
 Afterberg limits above "A" line with PI greater than 7

**PLASTICITY CHART**  
For laboratory classification of fine-grained soils

(1) **Boundary classifications:** Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder.

(2) All sieve sizes on this chart are U. S. standard.

**NOTE**  
For further information on Unified Soil Classification, refer to "The Unified Soil Classification System," Volumes 1 and 2, Technical Memorandum No. 3-357, published by U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. File copies may be examined at Headquarters, U. S. Army Engineer Division, New England, 424 Tropic Road, Waltham, Massachusetts., Building 141, Foundation and Materials Branch.  
 Adopted by Corps of Engineers, and Bureau of Reclamation, January 1952.

Boring No. FD-12 Desig. \_\_\_\_\_ Diam. (Casing) \_\_\_\_\_

FIELD LOG OF TEST BORING

Co-ordinates: N \_\_\_\_\_ E \_\_\_\_\_

Elevation Top of Boring \_\_\_\_\_ M.S.L. Hammer Wt. \_\_\_\_\_ Boring Started \_\_\_\_\_  
 Total Overburden Drilled \_\_\_\_\_ Feet Hammer Drop \_\_\_\_\_  
 Elevation Top of Rock \_\_\_\_\_ M.S.L. Casing Left \_\_\_\_\_ Boring Completed \_\_\_\_\_  
 Total Rock Drilled \_\_\_\_\_ Feet Subsurface Water Data \_\_\_\_\_ Page \_\_\_\_\_  
 Elevation Bottom of Boring \_\_\_\_\_ M.S.L. Obs. Well \_\_\_\_\_  
 Total Depth of Boring \_\_\_\_\_ Feet Drilled By \_\_\_\_\_  
 Core Recovered \_\_\_\_\_ % No. Boxes \_\_\_\_\_ Mfg. Des. Drill \_\_\_\_\_  
 Core Recovered \_\_\_\_\_ Ft : \_\_\_\_\_ Diam. \_\_\_\_\_ In. Inspected By: \_\_\_\_\_  
 Soil Samples \_\_\_\_\_ In. Diam. \_\_\_\_\_ No. Classification By: P. Schmidt / P. Young  
 Soil Samples \_\_\_\_\_ In. Diam. \_\_\_\_\_ No. Classification By: 12 Jan. 2000

DEPTH	CORE/SAMPLE			BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	NO.	SIZE	DEPTH RANGE			
66.7 46.5'			R1	90	Re-calculate RWD for zones w/in Run:  $46.5' - 48.7' = 100\%$ $48.7' - 50.8' = 0\%$ $50.8' - 56.5' = \frac{4.6'}{5.7'} = 81\%$	GRANITE GNEISS: f.-m. grained, hard, fresh except as noted, fol. dips $\leq 10^\circ$ .  $48.7' - 50.8'$ = Vert. Fract. down through core, sfc. is strongly coated blk + orange (Mn + Fe).  $48.9' - 50.9'$ = pegmatitic, lg. xlls of k feldspar + qtz, Qtz. Vein, brittle zone, resulting in many horiz. brks. in core.
47		Fol. 10°		65		
48						
49						
50						
51						

GENERAL REMARKS:  
 Depths are from mudline, elev. - 20.2 NAVD

DEPTH		CORE/SAMPLE			BLOWS PER FT. CORE RECVY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
f.	NO	SIZE	DEPTH RANGE				
52		Fol.		RI cont.			51.7' - 51.8' } C. crystals 52.6' - 52.9' } K feldspar 54.2' - 54.4' }
53							53.3' - 54.1' High Angle / Vert. Fract., irreg. sfc, sl. mineralized.
54							
55							
56							
56.5'							EOB