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Delaware Department of
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Delaware Beneficial Use of Dredged Material for the Delaware River

Feasibility Report and Integrated Environmental Assessment
Technical Appendices

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Appendix C4 – Geotechnical Data

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Gahagan & Bryant Associates, Inc. – March 2013

Philadelphia Regional Port Authority
U.S. Army Corps of Engineers – Philadelphia District

DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

Supplemental Geotechnical Subsurface Investigation

Reach E - Stations 350+000 To 515+000

Final Report

March 2013

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LIST OF ABBREVIATIONS AND ACRONYMS

ASI	–	Aqua Survey, Inc.
ASTM	–	American Society for Testing and Materials
DGPS	–	Differential Global Positioning System
GBA	–	Gahagan and Bryant Associates, Inc.
MLLW	–	Mean Lower Low Water
NAD	–	North American Datum
PRPA	–	Philadelphia Regional Port Authority
USACE	–	United States Army Corps of Engineers-Philadelphia District
USCS	–	Unified Soil Classification System

1.0 INTRODUCTION

The design team for the Delaware River Main Channel Deepening Project (Deepening Project) identified the need for conducting supplemental geotechnical sampling from Stations 249+000 to 515+000 that encompasses Reaches D and E. The United States Army Corps of Engineers-Philadelphia District (USACE) asked the Philadelphia Regional Port Authority (PRPA) to perform the sampling; PRPA requested that Gahagan & Bryant Associates, Inc. (GBA) provide the required services. In late November 2012 and December 2012, fifty-one (51) locations in Reach E were sampled.

This report provides the description, procedure, and results of sediment sampling in Reach E (350+00 to 515+00). The location of Reach E within the Delaware Bay is shown in Figure 1 and the 51 vibracore sampling locations are shown in Figure 2 (Appendix A).

1.1 Purpose

This investigation was performed to obtain additional information on the type, nature, and characteristics of subaqueous materials as well as the extent and conditions of these materials as they exist in Reach E of the Deepening Project.

Furthermore, this investigation provides geotechnical information that will further define the type of material that may be encountered during the deepening of Reach E of the Deepening Project from existing grade to a depth of -45 feet Mean Lower Low Water (MLLW) plus one foot of allowable over-depth (-46 feet MLLW).

This report presents the results of vibracoring operations and sediment sampling results to assist in analyzing the physical characteristics of sediments in Reach E. Section 2.0 of this report contains the procedures and equipment used to obtain sediment samples. The sediment analyses performed are described in Section 3.0. Summaries of results are discussed in Section 4.0. Appendix A contains report figures; Appendix B contains the vibracore logs; Appendix C lists the laboratory test results; and Appendix D presents photographs of vibracores.

1.2 Project Location

The area for this project is shown on Figure 1 and extends from Station 350+000 in the Liston Range to Station 515+000 in the Brandywine Range of the Delaware Bay.

This portion of the channel is 1000 feet wide (with the exception of channel bends) and is bordered by New Jersey on the east and Delaware to the west.

1.3 Project Organization

The supplemental geotechnical investigation was requested and sponsored by the USACE and the PRPA. Vibracore sampling activities were conducted on the work vessel *Northstar Commander*. Vibracoring equipment and crew were provided by Aqua Survey, Inc. (ASI). The oversight (quality assurance) for the field sampling was provided by a professional geologist from AEON Geosciences, Inc. Laboratory testing of samples was performed by GeoTesting Express, Inc. (GeoTesting). Figure 3 (Appendix A) depicts the project organization chart.

2.0 PROCEDURE & EQUIPMENT

The work vessel and sampling equipment were mobilized on November 27, 2012, to Cape May, New Jersey. Vibracoring began on November 28, 2012, and was completed on December 17, 2012. Locations of the 51 vibracores are displayed on Figure 2 and in more detail on Figures 4 through 6 in Appendix A. Location details are provided in Table 1.

Positioning at the sampling locations was accomplished using a Trimble SPS351 Differential Global Positioning System (DGPS), resulting in positioning accuracies of +/- 5 feet. Elevations were taken from multibeam surveys conducted by USACE in the spring and fall of 2012 due to the lack of reliable tide gage information in the study area.

2.1 Vibracoring Procedure

ASI utilized a DGPS to position the work vessel within 50 feet of the proposed sampling locations. Once the *Northstar Commander* was on location, the work vessel was anchored. Core coordinates, dates, sampling times, and water depths were recorded on each vibracoring log and in the project field book.

Once the work vessel was anchored the vibracorer (fitted with a flexible core liner) was lowered to the sediment surface. The vibracorer was lowered into the sediment to attempt the recovery of a 10-foot sediment core; Table 1 lists the sampling depths at each location. After the vibracore reached refusal, the unit was brought on deck and the core liner was removed. The sediment sample was examined and logged by the professional geologist and samples were collected for visual and physical analyses.

2.2 Equipment

2.2.1 Vessel

As previously noted, the work vessel *Northstar Commander* was used to conduct vibracoring at the 51 sample locations. The *Northstar Commander* is a 92-foot work vessel equipped with an electric winch on the stern deck.

2.2.2 Vibracorer

A Rossfelder P-3 electric vibracorer, provided by ASI, was employed to collect continuous sediment samples. The Rossfelder was equipped with a 4-inch diameter steel barrel, core catcher, and flexible polyethylene core liner to collect sediment.

2.2.3 Positioning Equipment

The positioning equipment consisted of a Trimble SPS351 DGPS system, capable of accuracies of +/- 5 feet.

2.3 Sampling Locations

Proposed sampling locations were selected by the project design team to provide additional information on the type, nature, and characteristics of subaqueous materials as well as the extent and conditions of these materials as they exist in locations not previously investigated.

Sampling locations were chosen using data from difference plots generated using a Spring 2012 hydrographic condition survey completed by USACE and analysis of previous geotechnical investigations in Reach E.

Elevations of top of vibracore, provided in Table 1 and on the vibracore logs in Appendix B, represent elevations obtained from USACE multibeam surveys. Elevations provided do not reflect measurements taken at the time of vibracore collection. The vibracores reflect the material collected from the surface at the time of collection.

Table 1 - Sampling Locations

Core Designation	Date	Easting (NJ NAD83, U.S. Survey Feet)	Northing (NJ NAD83, U.S. Survey Feet)	2012 Surface Elevation (ft MLLW)	Approximate Station Location
DRV-129	12/17/2012	243498	171230	-42.1[a]	351+517
DRV-130	12/6/2012	245023	168273	-43.5[a]	354+747
DRV-131	12/17/2012	246318	166735	-43.3[a]	356+737
DRV-132	12/17/2012	248158	165345	-43.2[a]	359+008
DRV-133	12/17/2012	249891	163932	-45.7[a]	361+232
DRV-134	12/17/2012	259013	153843	-42.8[a]	374+808
DRV-135	12/17/2012	259854	152864	-42.5[a]	376+100
DRV-136	12/14/2012	261715	150729	-43.5[a]	379+108
DRV-137	12/14/2012	263787	148382	-43.1[a]	382+067
DRV-138	12/13/2012	265706	145925	-44.0[a]	385+052
DRV-139	12/13/2012	266441	141906	-41.9[a]	389+032
DRV-140	12/13/2012	267610	140626	-44.9[a]	390+680
DRV-141	12/13/2012	268562	138656	-45.6[a]	392+867
DRV-142	12/13/2012	272039	131591	-43.0[a]	400+725
DRV-143	12/13/2012	273168	128974	-44.5[a]	403+575
DRV-144	12/13/2012	273319	127963	-44.9[a]	404+580
DRV-145	12/13/2012	274983	126025	-37.9[a]	407+147
DRV-146	12/12/2012	276715	123399	-42.9[a]	410+292
DRV-147	12/12/2012	277561	120540	-44.2[a]	413+118
DRV-148	12/12/2012	278818	118775	-44.3[a]	415+285
DRV-149	12/12/2012	280151	117365	-43.9[a]	417+202
DRV-150	12/12/2012	281280	115667	-43.2[a]	419+250
DRV-151	12/12/2012	282551	113946	-43.1[a]	421+383
DRV-152	12/12/2012	283819	112053	-43.7[a]	423+665
DRV-153	12/7/2012	284858	110557	-43.0[b]	425+483
DRV-154	12/7/2012	288526	105343	-42.2[b]	431+850
DRV-155	12/7/2012	289480	103883	-43.1[b]	433+597
DRV-156	12/7/2012	290869	101933	-44.3[b]	436+000
DRV-157	12/7/2012	292965	98887	-44.7[b]	439+687
DRV-158	12/7/2012	294151	97009	-42.3[b]	441+908

Core Designation	Date	Easting (NJ NAD83, U.S. Survey Feet)	Northing (NJ NAD83, U.S. Survey Feet)	2012 Surface Elevation (ft MLLW)	Approximate Station Location
DRV-159	12/4/2012	295283	95452	-43.4 [b]	443+833
DRV-160	12/4/2012	296415	93503	-43.6 [b]	446+083
DRV-161	12/4/2012	297430	91390	-43.9 [b]	448+498
DRV-162	11/29/2012	299256	87891	-43.9 [b]	452+425
DRV-163	11/29/2012	300087	86078	-44.4 [b]	454+417
DRV-164	12/4/2012	301077	83494	-44.0 [b]	457+187
DRV-165	12/4/2012	301975	81533	-44.3 [b]	459+346
DRV-166	12/4/2012	302975	79076	-43.4 [b]	462+000
DRV-167	12/4/2012	304173	77152	-44.7 [b]	464+245
DRV-168	12/3/2012	304712	74595	-43.7 [b]	466+806
DRV-169	12/3/2012	305527	72639	-44.1 [b]	468+924
DRV-170	11/29/2012	306516	70461	-43.8 [b]	471+312
DRV-171	11/29/2012	307402	68457	-45.1 [b]	473+505
DRV-172	11/29/2012	308157	66204	-44.7 [b]	475+873
DRV-173	12/3/2012	308917	64024	-44.5 [b]	478+169
DRV-174	12/3/2012	309919	61614	-44.3 [b]	480+797
DRV-175	12/3/2012	317369	44539	-45.8 [b]	499+414
DRV-176	12/3/2012	318641	41895	-44.1 [b]	502+351
DRV-177	12/3/2012	319478	39905	-44.8 [b]	504+515
DRV-178	12/3/2012	320677	37213	-45.1 [b]	507+456
DRV-179	12/3/2012	321770	34406	-43.6 [b]	510+473

[a] – elevations based upon Spring 2012 USACE-Philadelphia multibeam condition survey
[b] – elevations based upon Fall 2012 USACE-Philadelphia multibeam condition survey

3.0 LABORATORY PROCEDURES & TESTS

Sediment samples were collected by the professional geologist for laboratory testing, labeled, and shipped to GeoTesting Express, a USACE validated geotechnical laboratory, in Acton, Massachusetts. Table 2 depicts the testing that was undertaken by GeoTesting.

Table 2 – Laboratory Testing

Laboratory Test	Number of Tests	ASTM
Moisture Content	81	D 2216
Specific Gravity	81	D 854
Grain Size Analysis (Sieve only)	72	D 422
Grain Size Analysis (Hydrometer)	9	D 422
Grain Size Analysis (Sieve and Hydrometer)	3	D 422
Atterberg Limits	13	D 4318
Unified Soil Classification System	24	D 2487

4.0 LABORATORY RESULTS

Results of laboratory analyses are presented below. Laboratory results are shown in Appendix C.

4.1 Grain Size, Moisture Content, Atterberg Limits, and Specific Gravity

Seventy-two sediment samples from 51 sampling locations were submitted for grain size analysis with sieves only, nine samples were submitted for grain size analysis with hydrometer, and three samples were submitted for grain size analysis with sieves and hydrometer. Eighty-one samples were submitted for moisture content analysis, thirteen samples were submitted for Atterberg limits, and eighty-one samples were submitted for specific gravity analysis. Twenty-four samples were classified using the Unified Soil Classification System (USCS). Detailed test results are shown in Tables 3 and 4. The test results are summarized below:

- The grain size samples consisted predominantly of sand fractions greater than 50% (92% of samples).
- Gravel fraction greater than 50% was found in 3 of the 72 grain size samples.
- 12% of grain size samples (9 of 72) were greater than 50% silt and clay.
- Moisture contents ranged from 5.5% to 90.1% and had an average of 23%.
- Liquid limits ranged from 33 to 84, plastic limits ranged from 16 to 29, plasticity index values ranged from 15 to 55, and specific gravity values had an average of 2.67.
- Sample classifications varied from fat clay to silty sand.

Table 3 – Grain Size and Moisture Content Results

Boring #	Sample ID	Depth in Boring (ft)	Moist. Content (%)	% Cobble	% Gravel	% Sand	% Silt/Clay
DRV-129-R4	A	1-2	20.9	0	0.9	95.3	3.8
DRV-130	B	5-6	12.1	0	34.7	64.4	0.9
DRV-131-R2	A	0-1	7.3	0	55.2	42.1	2.7
DRV-132	A	0.5-2.5	18.2	0	15.3	83.6	1.1
DRV-133	A	0-1	83.8	0	0	17.3	82.7
DRV-133	B	4.5-5.5	59.3				89*
DRV-134	B	2-3	15.7	0	5.7	92.1	2.2
DRV-135-R2	A	2-3	14.6	0	1.0	96.3	2.7
DRV-136-R2	A	0-0.5	14.0	0	9.7	51.9	38.4
DRV-136-R2	B	2-3	11.1	0	16.8	57.6	25.6
DRV-136-R2	C	3.6-4.5	12.2	0	14.2	72.4	13.4
DRV-137-R3	A	0-1.5	18.4	0	1.0	93.6	5.4

Boring #	Sample ID	Depth in Boring (ft)	Moist. Content (%)	% Cobble	% Gravel	% Sand	% Silt/Clay
DRV-138-R2	A	0-2.2(R1), 0-1.5(R2)	13.2	0	52.6	42.8	4.6
DRV-138-R1	B	1.5-2.5	15.4	0	5.0	91.9	3.1
DRV-139	A	0.5-1.5	27.2	0	0	81.6	18.4
DRV-139	B	3.5-4.5	25.2	0	0	68.9	31.1
DRV-140	A	0.5-1.5	20.8	0	1.0	93.4	5.6
DRV-140	B	3.5-4.0	90.1				86*
DRV-141	A	0-1	20.9	0	0.1	92.2	7.7
DRV-141	B	5.5-6.5	72.7				81*
DRV-142	A	1-2	29.6	0	0	83.6	16.4
DRV-143-R2	A	0.5-1.5	25.9	0	1.9	80.1	18.0
DRV-143-R2	C	5.5-6.5	24.5	0	0	88.3	11.7
DRV-144	A	1-2	15.5	0	2.1	95.8	2.1
DRV-144	B	2.5-3.5	10.4	0	31.0	59.2	9.8
DRV-144	D	4.6-5.2	30.5	0	4.7	71.4	23.9
DRV-145	A	0.5-1.5	16.3	0	0.9	94.8	4.3
DRV-145	B	3-4	26.3	0	0.5	84.7	14.8
DRV-146	A	0-3	31.6	0	0	88.1	11.9
DRV-147	A	0-4	27.8	0	0	80.2	19.8
DRV-148-R3	A	0-3	26.7	0	0	77.4	22.6
DRV-149	A	0-1	21.4	0	0.2	95.0	4.8
DRV-149	B	1-6	26.2	0	0	79.2	20.8
DRV-150	A	0-6	21.8	0	0	87.8	12.2
DRV-151	A	0-2	15.8	0	0.7	97.1	2.2
DRV-151	B	3-5	21.1	0	1.0	82.7	16.3
DRV-152	A	0-2	18.9	0	1.6	95.1	3.3
DRV-153-R2	A	0-1	13.7	0	7.4	91.6	1.0
DRV-153-R2	B	3-4	37.8				95*
DRV-154-R3	A	0.5-1.5	5.5	0	50.1	48.5	1.4
DRV-154-R3	B	2.5-3.5	22.3	0	1.2	78.9	19.9
DRV-154-R3	C	4-5	20.9				24*
DRV-155-R2	A	0-2	17.3	0	4.8	94.1	1.1
DRV-156	A	0-1.3	11.7	0	19.7	78.9	1.4

Boring #	Sample ID	Depth in Boring (ft)	Moist. Content (%)	% Cobble	% Gravel	% Sand	% Silt/Clay
DRV-156	B	3-4	22.3	0	0	84.6	15.4
DRV-156	C	6-7.5	28.7	0	0	73.6	26.4
DRV-157	A	0-1.5	17.5	0	1.4	88.8	9.8
DRV-157	B	1.6-3.2	37.1				60*
DRV-158	A	1-3	18.0	0	0.7	98.5	0.8
DRV-159	A	0.5-2	12.8	0	5.3	93.3	1.4
DRV-159	B	3.5-4.5	24.1	0	0	71.4	28.6
DRV-160	A	1-2	19.7	0	4.6	84.6	10.8
DRV-160	B	5-6	22.6	0	0	83.3	16.7
DRV-161	A	0.5-1.5	20.5	0	1.2	91.8	7.0
DRV-161	B	2-3.5	17.3	0	2.2	70.1	27.7
DRV-161	C	4-4.9	22.0	0	0	10.2	89.8
DRV-162	B	1.5-2.5	21.3	0	0.3	78.6	21.1
DRV-163	A	0.5-0.9	14.2	0	5.3	93.0	1.7
DRV-163	B	2.5-3	23.5	0	0	38.2	61.8
DRV-164	A	1.5-3	19.3	0	0	90.8	9.2
DRV-165	B	3.5-5	13.5	0	10.8	85.9	3.3
DRV-166-R2	A	0.5-1.5	17.4	0	0.4	97.6	2.0
DRV-166-R2	B	3-5	16.2	0	0	65.2	34.8
DRV-167-R2	B	2.5-3.6	22.9	0	0	94.7	5.3
DRV-168	A	0-2	17.3	0	1.1	97.3	1.6
DRV-168	B	3-5	29.7				83*
DRV-169	A	0-3	18.0	0	0.8	96.6	2.6
DRV-170	B	1.3-3.3	24.2	0	0.1	97.8	2.1
DRV-171-R2	B	2-3	18.2	0	2.7	92.3	5.0
DRV-172	A	1-2.5	17.9	0	0.3	98.1	1.6
DRV-173	A	0-2	26.0	0	0	62.3	37.7
DRV-173	B	2-4	15.7	0	0	94.0	6.0
DRV-174	A	0-4	13.0	0	0.3	94.5	5.2
DRV-175	B	2-4	17.9	0	0.5	91.8	7.9
DRV-176	A	0-4	20.1	0	0.3	95.5	4.2
DRV-177	A	0-3	20.6	0	0.4	97.3	2.3
DRV-177	B	3.5-7	14.0	0	15.6	80.7	3.7

Boring #	Sample ID	Depth in Boring (ft)	Moist. Content (%)	% Cobble	% Gravel	% Sand	% Silt/Clay
DRV-178	A	0-4	20.0	0	0.2	97.0	2.8
DRV-178	B	4-6	23.4				24*
DRV-179	A	0-4	15.6	0	2.4	96.5	1.1
DRV-179	B	4-6	23.9				25*

* - percent passed through No. 200 sieve (0.0029 inch opening). Detailed hydrometer results are located in Appendix C.

Table 4 – Atterberg Limits and Specific Gravity Results

Boring #	Sample ID	Depth in Boring (ft)	Specific Gravity	LL	PL	PI	LI	USCS
DRV-129-R4	A	1-2	2.66					SP
DRV-130	B	5-6	2.67					SP
DRV-131-R2	A	0-1	2.67					GP
DRV-132	A	0.5-2.5	2.66					SP
DRV-133	A	0-1	2.66	69	23	46	1	CH
DRV-133	B	4.5-5.5	2.68	56	21	35	1	
DRV-134	B	2-3	2.66					SP
DRV-135-R2	A	2-3	2.66					SP
DRV-136-R2	A	0-0.5	2.70					
DRV-136-R2	B	2-3	2.67					
DRV-136-R2	C	3.6-4.5	2.65					
DRV-137-R3	A	0-1.5	2.66					
DRV-138-R2	A	0-2.2(R1), 0-1.5(R2)	2.65					GP
DRV-138-R1	B	1.5-2.5	2.66					SP
DRV-139	A	0.5-1.5	2.66					
DRV-139	B	3.5-4.5	2.68					
DRV-140	A	0.5-1.5	2.67					
DRV-140	B	3.5-4.0	2.68	84	29	55	1	
DRV-141	A	0-1	2.68					
DRV-141	B	5.5-6.5	2.69	63	24	39	1	
DRV-142	A	1-2	2.67	NP	NP	NP	NP	SM
DRV-143-R2	A	0.5-1.5	2.70					
DRV-143-R2	C	5.5-6.5	2.67					

Boring #	Sample ID	Depth in Boring (ft)	Specific Gravity	LL	PL	PI	LI	USCS
DRV-144	A	1-2	2.67					
DRV-144	B	2.5-3.5	2.67					
DRV-144	D	4.6-5.2	2.64					
DRV-145	A	0.5-1.5	2.67					
DRV-145	B	3-4	2.67					
DRV-146	A	0-3	2.68					
DRV-147	A	0-4	2.68					
DRV-148-R3	A	0-3	2.68					
DRV-149	A	0-1	2.66					
DRV-149	B	1-6	2.69					
DRV-150	A	0-6	2.66					
DRV-151	A	0-2	2.67					
DRV-151	B	3-5	2.66					
DRV-152	A	0-2	2.65					SP
DRV-153-R2	A	0-1	2.66					
DRV-153-R2	B	3-4	2.72					
DRV-154-R3	A	0.5-1.5	2.66					
DRV-154-R3	B	2.5-3.5	2.68					
DRV-154-R3	C	4-5	2.67	NP	NP	NP	NP	
DRV-155-R2	A	0-2	2.65					SP
DRV-156	A	0-1.3	2.65					
DRV-156	B	3-4	2.67					
DRV-156	C	6-7.5	2.67	35	19	16	1	SC
DRV-157	A	0-1.5	2.67					
DRV-157	B	1.6-3.2	2.71	50	16	34	1	
DRV-158	A	1-3	2.65					SP
DRV-159	A	0.5-2	2.65					
DRV-159	B	3.5-4.5	2.67					
DRV-160	A	1-2	2.67					
DRV-160	B	5-6	2.66					
DRV-161	A	0.5-1.5	2.67					
DRV-161	B	2-3.5	2.66	NP	NP	NP	NP	SM
DRV-161	C	4-4.9	2.70	33	17	16	0	CL

Boring #	Sample ID	Depth in Boring (ft)	Specific Gravity	LL	PL	PI	LI	USCS
DRV-162	B	1.5-2.5	2.68					
DRV-163	A	0.5-0.9	2.68					
DRV-163	B	2.5-3	2.68					
DRV-164	A	1.5-3	2.66					
DRV-165	B	3.5-5	2.66					SP
DRV-166-R2	A	0.5-1.5	2.67					
DRV-166-R2	B	3-5	2.67					
DRV-167-R2	B	2.5-3.6	2.68					
DRV-168	A	0-2	2.67					
DRV-168	B	3-5	2.69	33	18	15	1	
DRV-169	A	0-3	2.66					SP
DRV-170	B	1.3-3.3	2.68					SP
DRV-171-R2	B	2-3	2.66					
DRV-172	A	1-2.5	2.64					SP
DRV-173	A	0-2	2.65					
DRV-173	B	2-4	2.66					
DRV-174	A	0-4	2.66					
DRV-175	B	2-4	2.66					
DRV-176	A	0-4	2.67					SP
DRV-177	A	0-3	2.68					
DRV-177	B	3.5-7	2.66					SP
DRV-178	A	0-4	2.67					SP
DRV-178	B	4-6	2.66	NP	NP	NP	NP	
DRV-179	A	0-4	2.66					SP
DRV-179	B	4-6	2.66	NP	NP	NP	NP	

LL = Liquid Limit *PI = Plasticity Index* *USCS = Unified Soil Classification System*
PL = Plastic Limit *LI = Liquidity Index* *NP = non-plastic*

5.0 REFERENCES

ASTM International. "ASTM D 422". *Standard Test Method for Particle-Size Analysis of Soils*, 2007: 1-8.

ASTM International. "ASTM D 854-06". *Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer*, 2006. 1-7.

ASTM International. "ASTM D 2216", *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*, 2010. 1-7.

ASTM International. "ASTM D 2487", *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*, 2011. 1-11.

ASTM International. "ASTM D 4318", *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils*, 2010. 1-16.

APPENDIX A

Figures

FIGURE 1: LOCATION OF REACH E

P:\Delaware_River\2008_616_PRPA_45ft_Deepening\Reach_E\2012ReachE_Figure2.dwg

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BALTIMORE, MARYLAND
(410) 682–5595

DELAWARE RIVER
DEEPENING PROJECT

FIGURE 2: REACH E PROJECT SITE

Drawing Date:	Dec. 2012
Drawn By:	E. Cook
Checked By:	T. Ward
Drawing Name:	Figure_2_RD
Drawing Scale:	1' = 20,000"

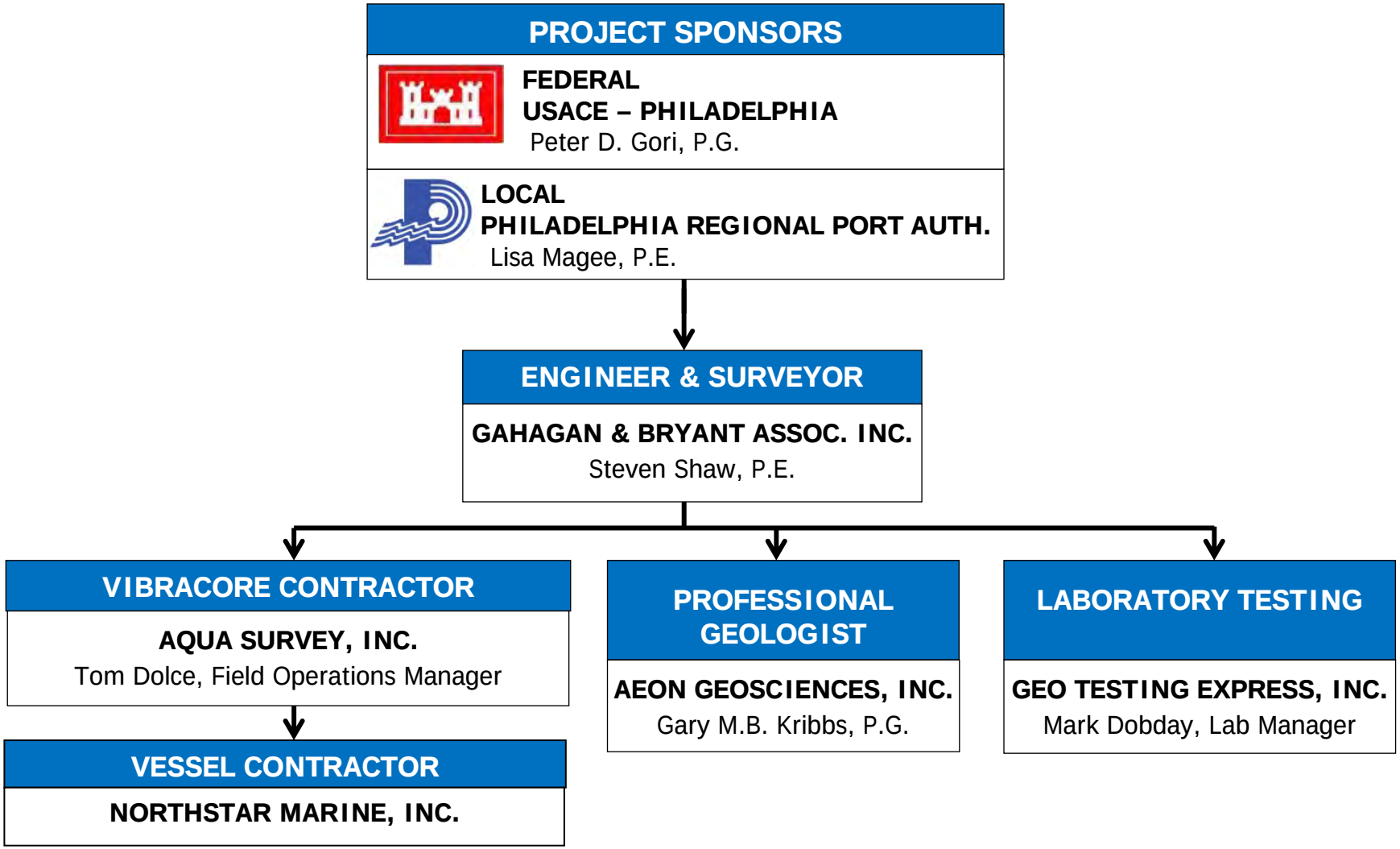
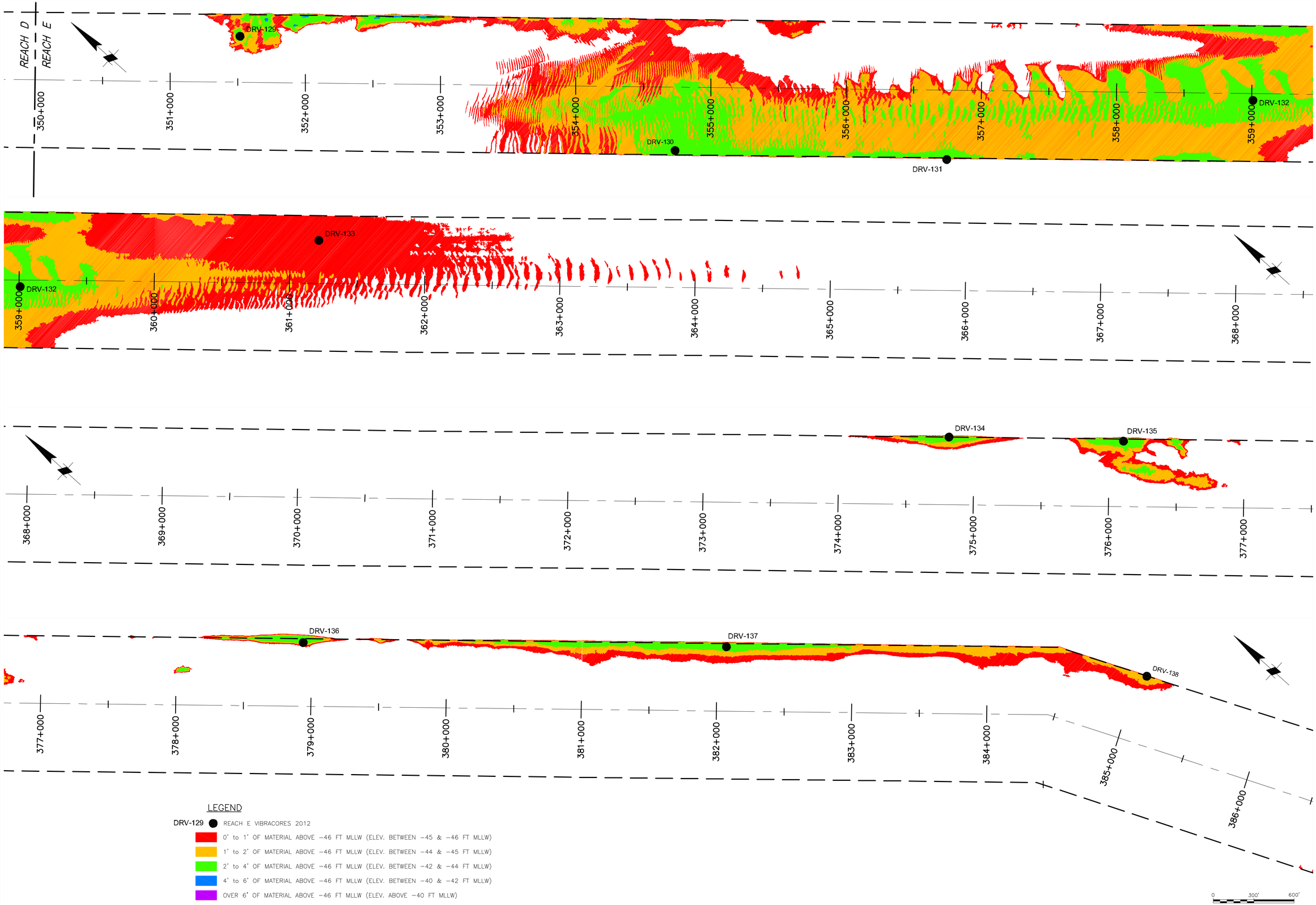


FIGURE 3:

REACH E SUPPLEMENTAL GEOTECHNICAL SUBSURFACE INVESTIGATION ORGANIZATION CHART



NOTES:
1. PLOTS FROM STA. 350+000 TO STA. 515+000 ARE BASED ON 2012 USACE MULTI-BEAM SURVEY.

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.

Designed by: –
Dwn by: DCM
Ckd by: SCS
Reviewed by:
Submitted by:
Date: DEC 2012
Rev.
Drawing Name: 2012_Reach-E
Scale: AS SHOWN
Plot scale: 1 = 1

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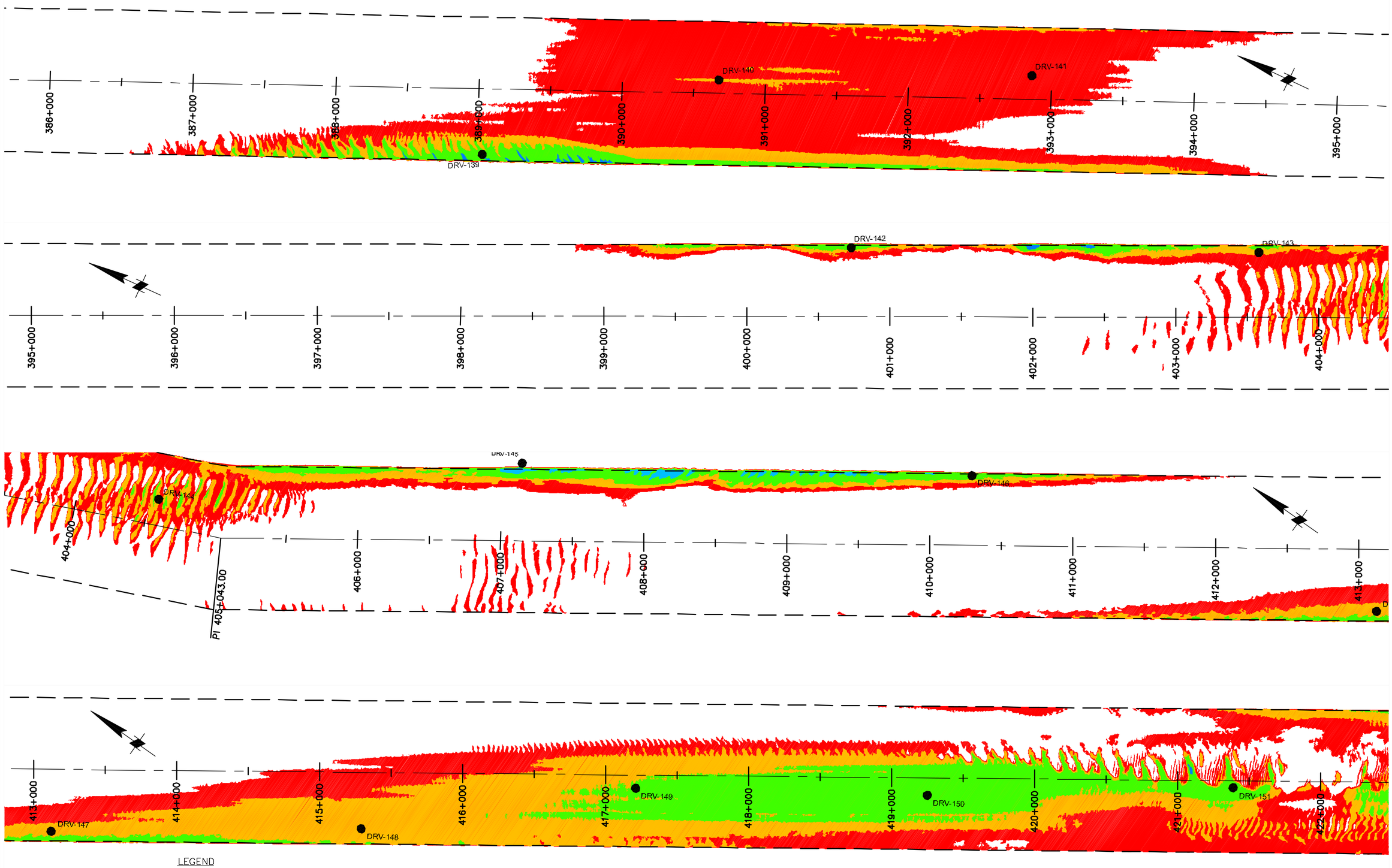
DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

FIGURE 4 – REACH E
VIBRACORE LOCATIONS
STA 350+000 – 386+000

SEAL



LEGEND

DRV-129 ● REACH E VIBRACORES 2012

- 0' to 1' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −45 & −46 FT MLLW)
- 1' to 2' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −44 & −45 FT MLLW)
- 2' to 4' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −42 & −44 FT MLLW)
- 4' to 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −40 & −42 FT MLLW)
- OVER 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. ABOVE −40 FT MLLW)

NOTES:
1. PLOTS FROM STA. 350+000 TO STA. 515+000 ARE BASED ON 2012 USACE MULTI-BEAM SURVEY.

0 300' 600'
GRAPHIC SCALE

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.

Designed by: –
Dwn by: DCM
Ckd by: SCS
Reviewed by: –
Submitted by: –
Date: DEC 2012
Drawing Name: 2012_Reach-E
Scale: AS SHOWN
Plot scale: 1 = 1
Rev.

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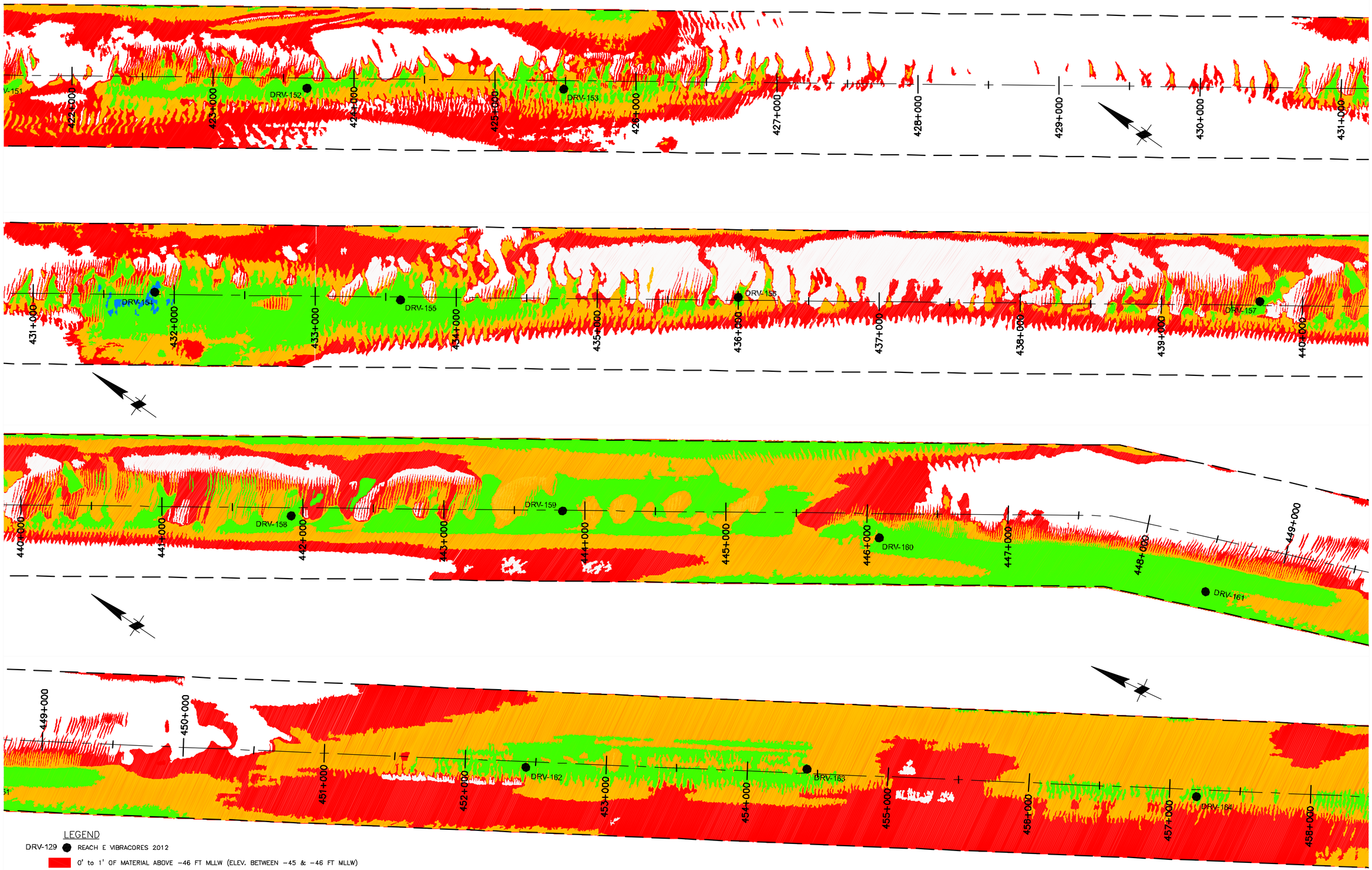
DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

FIGURE 5 – REACH E
VIBRACORE LOCATIONS
STA 386+000 – 422+000

SEAL

F:\Delaware_River\2008.418-FPPA_UDI_Dredging\Reach_E\2012_Proposal_Revision\2012_Reach_E_Layout-1Revision.dwg



LEGEND

DRV-129 ● REACH E VIBRACORES 2012

- 0' to 1' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −45 & −46 FT MLLW)
- 1' to 2' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −44 & −45 FT MLLW)
- 2' to 4' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −42 & −44 FT MLLW)
- 4' to 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −40 & −42 FT MLLW)
- OVER 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. ABOVE −40 FT MLLW)

NOTES:
1. PLOTS FROM STA. 350+000 TO STA. 515+000 ARE BASED ON 2012 USACE MULTI-BEAM SURVEY.

0 300' 600'
GRAPHIC SCALE

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.

Designed by: –
Dwn by: DCM
Ckd by: SCS
Reviewed by: –
Submitted by: –
Date: DEC 2012
Rev.
Drawing Name: 2012_Reach-E
Scale: AS SHOWN
Plot scale: 1 = 1

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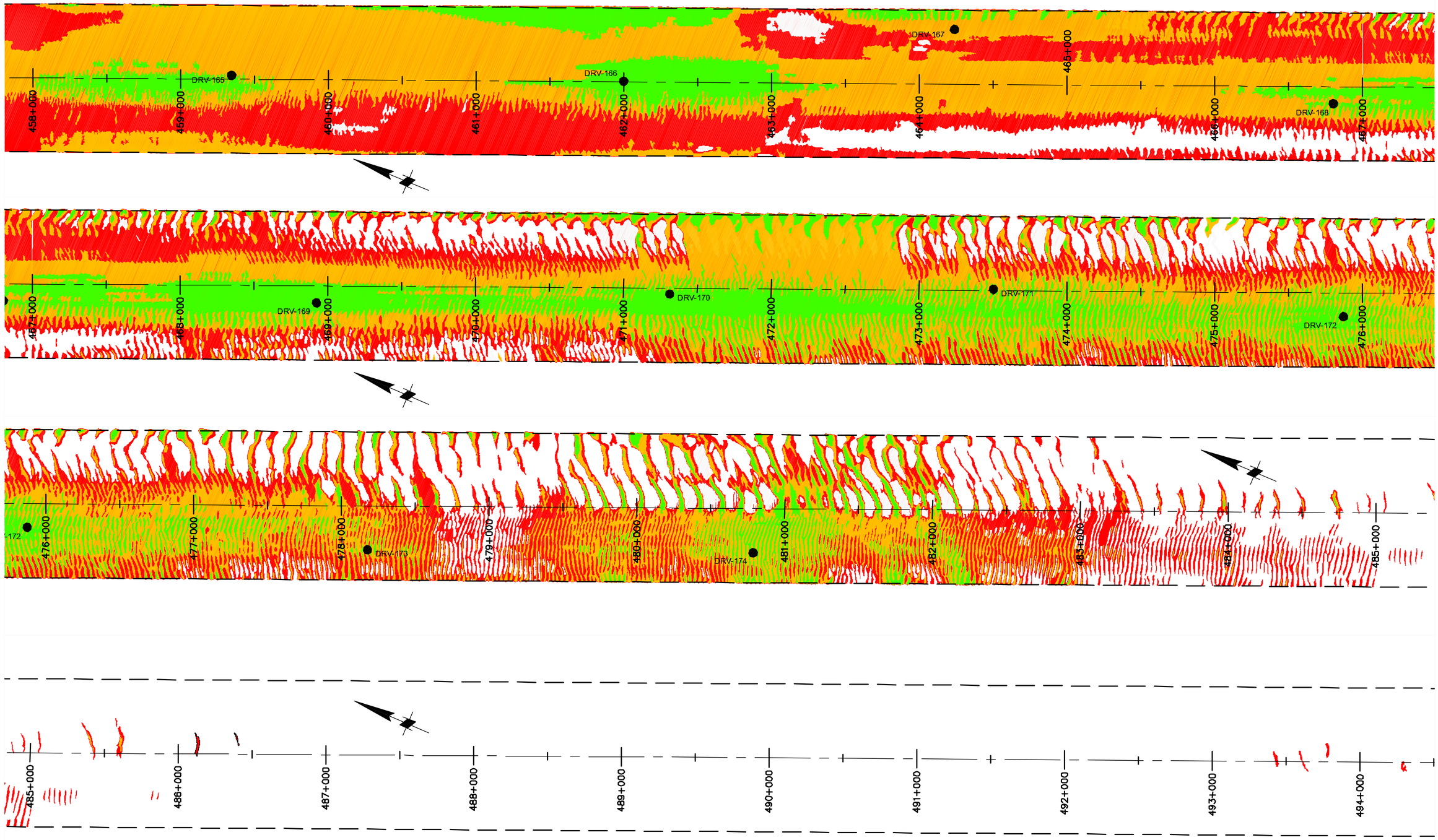
FIGURE 6 – REACH E
VIBRACORE LOCATIONS
STA 422+000 – 458+000

SEAL



LEGEND

DRV-129 ● REACH E VIBRACORES 2012

- 0' to 1' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −45 & −46 FT MLLW)
- 1' to 2' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −44 & −45 FT MLLW)
- 2' to 4' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −42 & −44 FT MLLW)
- 4' to 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −40 & −42 FT MLLW)
- OVER 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. ABOVE −40 FT MLLW)

NOTES:
1. PLOTS FROM STA. 350+000 TO STA. 515+000 ARE BASED ON 2012 USACE MULTI-BEAM SURVEY.

0 300' 600'
GRAPHIC SCALE

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.

Designed by: –
Dwn by: DCM
Ckd by: SCS
Reviewed by:
Submitted by:
Date: DEC 2012
Rev.
Drawing Name: 2012_Reach-E
Scale: AS SHOWN
Plot scale: 1 = 1

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DELAWARE RIVER MAIN CHANNEL DEEPENING PROJECT

FIGURE 7 – REACH E
VIBRACORE LOCATIONS
STA 458+000 – 494+000

SEAL

LEGEND

DRV-129 ● REACH E VIBRACORES 2012

- 0' to 1' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −45 & −46 FT MLLW)
- 1' to 2' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −44 & −45 FT MLLW)
- 2' to 4' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −42 & −44 FT MLLW)
- 4' to 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. BETWEEN −40 & −42 FT MLLW)
- OVER 6' OF MATERIAL ABOVE −46 FT MLLW (ELEV. ABOVE −40 FT MLLW)

NOTES:
1. PLOTS FROM STA. 350+000 TO STA. 515+000 ARE BASED ON 2012 USACE MULTI-BEAM SURVEY.

0 300' 600'
GRAPHIC SCALE

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.

Designed by: –
Dwn by: DCM
Ckd by: SCS
Reviewed by: –
Submitted by: –
Date: DEC 2012
Drawing Name: 2012_Reach-E
Rev.
Scale: AS SHOWN
Plot scale: 1 = 1

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GERAGHTY & BRAUN, INC.
1818 MARKET STREET, SUITE 1820
PHILADELPHIA, PENNSYLVANIA 19103
PHONE: (215) 665-9515
FAX: (215) 665-9516

DELAWARE RIVER MAIN CHANNEL
DEEPENING PROJECT

FIGURE 8 – REACH E
VIBRACORE LOCATIONS
STA 494+000 – 515+000

SEAL

APPENDIX B

Vibracore Logs

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 171230 243498	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -42.1 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 129 R-4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 17, 2012 — COMPLETED December 17, 2012
	17. ELEVATION TOP OF HOLE 42.1 MLLW
7. THICKNESS OF OVERBURDEN 2.2	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 2.2	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-43.1	1		Tan/gray fine **SAND** with rounded pebble and cobble size gravel, trace clay poorly sorted (medium-loose)		A 1-2	Penetration 3' SP A-3 (0)
-44.1	2					
			Limit of Vibracore Recovery 2.2'			
						Previous Run Recoveries R-1- 0% R-2 -0% R-3 -0% Location very hard surface

ENG FORM 1836 MAR 71	PREVIOUS EDITIONS ARE OBSOLETE	PROJECT DRDP-RE	HOLE NO.DRV- 129 R-4

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 168273 245023	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.5 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 130	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 06, 2012 — COMPLETED December 06, 2012
	17. ELEVATION TOP OF HOLE -43.5 MLLW
7. THICKNESS OF OVERBURDEN 6.9	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 6.9	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
					A	Penetration 7'
-44.5	1				1-2	
-45.5	2					
-46.5	3		Brown medium to coarse **SAND** with rounded pebble size gravel trace small cobbles, silt and clay (medium-loose)			
-47.5	4					
					B	SP
-48.5	5				5-6	A-1-b (0)
-49.5	6					
	7		Limit of Vibracore Recovery 6.9'			

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 166735 246318	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.3 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 131 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 17, 2012 — COMPLETED December 17, 2012
	17. ELEVATION TOP OF HOLE -43.3 MLLW
7. THICKNESS OF OVERBURDEN 3.1	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 3.1	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.3	1		Brown **GRAVEL and SAND** poorly sorted		A 0-1	GP Penetration 4' A-1-a (0)
-45.3	2		Gray/brown coarse **SAND and GRAVEL**		B 1-2	
-46.3	3		Gray fine **SAND** trace rounded gravel & silt		C 2-3	
			Limit of Vibracore Recovery 3.1'			R-1 1.3' Sand & Gravel

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 131 R-2

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 165345 248158	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.2 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 132	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 17, 2012 — COMPLETED December 17, 2012
	17. ELEVATION TOP OF HOLE -43.2 MLLW
7. THICKNESS OF OVERBURDEN 2.7	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 2.7	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.2 -45.2	1 2		Light brown silty medium **SAND** little rounded gravel trace shell fragment (medium-loose) poorly sorted		A 0.5-2.5	Penetration 5' SP A-3 (0)
-46.2	3		Limit of Vibracore Recovery 2.7'			

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Hole No. DRV- 133

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 163932 249891	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -45.7 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV-133	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Captain Matt Shappell	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 17, 2012 — COMPLETED December 17, 2012
	17. ELEVATION TOP OF HOLE -45.7 MLLW
7. THICKNESS OF OVERBURDEN 9.6	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 9.6'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-46.7	1		Dark gray sandy silty **CLAY** (fat)		A 0-1	Penetration 10' CH A-7-6 (46)
-47.7	2					
-48.7	3					
-49.7	4					
-50.7	5		Dark gray sandy clayey **SILT** abundant shell fragments layering like varving		B 4.5-5.5	CH
-51.7	6					
-52.7	7					
-53.7	8		Dark gray silty **CLAY** no shell fragments		C 8-9	
-54.7	9					
			Limit of Vibracore Recovery 9.6'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 133

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 153843 259013	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -42.8 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 134	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 17, 2012 — COMPLETED December 17, 2012
	17. ELEVATION TOP OF HOLE -42.8 MLLW
7. THICKNESS OF OVERBURDEN 3.1	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 3.1	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Black/gray silty **SAND** trace gravel		A 0 -.9	Penetration 4'
-43.8	1					
-44.8	2		Brown medium to coarse **SAND** little to trace silt poorly sorted		B 2-3	SP A-1-b (0)
-45.8	3					
			Limit of Vibracore Recovery 3.1'			

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 152864 259854	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -42.5 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 135 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER N/A
	16. DATE HOLE — STARTED December 17, 2012 — COMPLETED December 17, 2012
	17. ELEVATION TOP OF HOLE -42.5 MLLW
7. THICKNESS OF OVERBURDEN 3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Dark gray medium **SAND**		NS	Penetration 3'
-43.5	1		1-2" **GRAVEL**		NS	
-44.5	2		Brown- tan medium to coarse **SAND** with trace silt and rounded pebble size gravel		A 2-3	SP A-1-b (0)
-45.5	3					
			Limit of Vibracore Recovery 3.0'			
						R-1 REC-1.4' photos Gray silty SAND

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. RV- 135 R-2

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Hole No. DRV- 136 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 150624 261844	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.5 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 136 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 14, 2012 — COMPLETED December 14, 2012
	17. ELEVATION TOP OF HOLE -43.5 MLLW
7. THICKNESS OF OVERBURDEN 4.6	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 4.6	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.5	1		Dark gray medium **SAND**		A 0-0.5	Penetration 5' A-4 (0)
-45.5	2		Brown- tan medium to coarse **SAND** with trace silt and rounded pebble size gravel		B 2-3'	A-2-4 (0)
-46.5	3		Brown- tan medium to coarse **SAND** and rounded gravel		C 3.6-4.5	A-1-b (0)
-47.5	4					
			Limit of Vibracore Recovery 4.6'			R-1 REC 0%

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 136R-2

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 148382 263787	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.1 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 137 R-3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 14, 2012 — COMPLETED December 14, 2012
	17. ELEVATION TOP OF HOLE -43.1 MLLW
7. THICKNESS OF OVERBURDEN 1.5	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 1.5	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.1	1		Dark gray medium to coarse silty **SAND** with shell fragment (v. loose)		A 0-1.5	Penetration 2' A-3 (0)
-45.1	2		Limit of Vibracore Recovery 1.5'			R-1 1.9 rec. Dark gray sandy CLAY (Hard pan) Off Station R-2 0% Rec.

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 137 R-3

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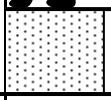
Hole No. DRV- 138 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 145925 265706	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.0 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 138 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -44.0 MLLW
7. THICKNESS OF OVERBURDEN 2.6	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 2.6	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.0	1		**GRAVEL** rounded poorly sorted		A A 0-1.5	A composite of all of R-1 and R-2 1.5 feet Bulk GP A-1-a (0)
-46.0	2		Brown coarse **SAND**		B 1.5-2.5	SP A-1-b (0)
-47.0	3		Limit of Vibracore Recovery 2.6'			Penetration 4' R-1 Recovery 2.2'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO.DRV- 138 R-2

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Hole No. DRV- 139

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 141906 266441	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -41.9 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 139	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Captain Matt Shappell	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -41.9 MLLW
7. THICKNESS OF OVERBURDEN 4.8	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 4.8'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-42.9	1		Dark gray silty **SAND** poorly graded		A 0.5-1.5	Penetration 6.0' A-2-4 (0)
-43.9	2					
-44.9	3		Dark clayey **SAND** lens			
-45.9	4		Dark gray medium **SAND** trace silty clay		B 3.5-4.5	A-2-4 (0)
-46.9	5		Limit of Vibracore Recovery 4.8'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 139

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Hole No. DRV- 140

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 140626 267610	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.9 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 140	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Captain Matt Shappell	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -44.9 MLLW
7. THICKNESS OF OVERBURDEN 5.8	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 5.8'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 6'
-45.9	1		Black silty **SAND** with shell fragments		A 0.5-1.5	A-3 (0)
-46.9	2		Shells and shell fragment zone			
-47.9	3		Dark gray silty **CLAY** (fat) (very stiff/firm)			
-48.9	4				B 3.5-4.0	CH
-49.9	5		Limit of Vibracore Recovery 5.8'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 140

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Hole No. DRV- 141

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 138656 268562	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -45.6 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 141	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -45.6 MLLW
7. THICKNESS OF OVERBURDEN 7.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 7.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 9'
-46.6	1		Black medium **SAND**		A 0 -1	A-3 (0)
-47.6	2					
-48.6	3		Dark gray silty **CLAY** (fat) shell zones			
-49.6	4					
-50.6	5				B 5.5-6.5	CH
-51.6	6					
-52.6	7					
			Limit of Vibracore Recovery 7.2'			

ENG FORM 1836 MAR 71	PREVIOUS EDITIONS ARE OBSOLETE	PROJECT DRDP-RE	HOLE NO. DRV- 141

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Hole No. DRV- 142

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 131591 272039	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.0 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 142	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -43.0 MLLW
7. THICKNESS OF OVERBURDEN 6.9'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 6.9'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Black clayey **SAND**			
-44.0	1		Black clayey silty medium **SAND**		A 1-2	SM A-2-4 (0)
-45.0	2					Penetration 9'
-46.0	3					
-47.0	4		Brown/dark gray silty clayey medium **SAND**		B 4.5-5.5	
-48.0	5					
-49.0	6		Black silty **SAND** trace clay		C 5.5-6.5	
-50.0	7		Limit of Vibracore Recovery 6.9'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 142

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Hole No. DRV- 143 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 128974 273168	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.5 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 143 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -44.5 MLLW
7. THICKNESS OF OVERBURDEN 6.9'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 6.9'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.5	1		Black silty medium **SAND** (v. loose)		A 0.5-1.5	Penetration 7' A-2-4 (0)
-46.5	2		**GRAVEL** (rounded poorly sorted)		NS	
-47.5	3		Black- dark gray medium silty **SAND** trace clay		B 2.1-3.0	
-48.5	4		Brown to gray/black medium silty **SAND** trace clay			
-49.5	5					
-50.5	6				C 5.5-6.5	A-2-4 (0)
-51.5	7		Limit of Vibracore Recovery 6.9'			R-1 2.7 rec. photos only

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-143 R2

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Hole No. DRV- 144

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 127963 273319	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.9 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 144	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 4 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -44.9 MLLW
7. THICKNESS OF OVERBURDEN 5.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 5.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Brown medium **SAND** trace shells fragments			Penetration 7'
-45.9	1		Black- dark gray medium **SAND** trace silt & clay		A 1-2	SP A-1-b (0)
-46.9	2					
-47.9	3		Black- dark gray medium silty **SAND** trace clay		B 2.5-3.5	A-3 (0)
-48.9	4					
			Dark gray clayey **SILT**		C 4.0-4.5	
-49.9	5		Gray medium **SAND** trace silt		D 4.6-5.2	A-2-4 (0)
			Limit of Vibracore Recovery 5.2'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 144

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 126025 274983	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -37.9 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 145	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -37.9 MLLW
7. THICKNESS OF OVERBURDEN 4.5 '	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 4.5'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-38.9 -39.9	1 2		Black med-coarse **SAND** trace silt		A 0.5-1.5	Penetration 6' SP A-3 (0)
-40.9	3		Brown- tan medium **SAND** with wood fragments and peat		B 3-4	A-2-4 (0)
-41.9	4		Gray- tan medium **SAND**		NS	
			Limit of Vibracore Recovery 4.5'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 145

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 123399 276715	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -42.9 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 146	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -42.9 MLLW
7. THICKNESS OF OVERBURDEN 3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 3'
-43.9	1		Dark gray to black sandy **SILT** with wood fragments		A 0-3	A-2-4 (0)
-44.9	2					
-45.9	3					
			Limit of Vibracore Recovery 3.0'			

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Hole No. DRV- 147

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 120540 277561	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.2 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 147	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -44.2 MLLW
7. THICKNESS OF OVERBURDEN 8'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 8'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 8'
-45.2	1					
-46.2	2				A	
					0-4	A-2-4 (0)
-47.2	3					
-48.2	4		Dark gray to gray fine **SAND** with some silt			
-49.2	5					
-50.2	6					
-51.2	7					
-52.2	8					
			Limit of Vibracore Recovery 8.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 147

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Hole No. DRV- 148 R-3

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 118775 278818	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.3 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 148 R-3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -44.3 MLLW
7. THICKNESS OF OVERBURDEN 8.0	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 8.0	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 8'
-45.3	1					
-46.3	2				A	
					0-3	A-2-4 (0)
-47.3	3					
-48.3	4		Dark gray to gray fine **SAND** with some silt-clay poorly graded trace shell fragments			
-49.3	5					
-50.3	6					
-51.3	7					
-52.3	8					
			Limit of Vibracore Recovery 8.0'			
						R-1 poor recovery
						R-2 poor recovery

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 148 R-3

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Hole No. DRV- 149

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 117365 280151	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.9 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 149	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -43.9 MLLW
7. THICKNESS OF OVERBURDEN 8.0	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 8.0	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Dark gray fine **SAND**		A 0-1	Penetration 8' SP / A-3 (0)
-44.9	1					
-45.9	2		Light gray to gray clayey **SILT** with fine grained sand		B 1-6	A-2-4 (0)
-46.9	3					
-47.9	4					
-48.9	5					
-49.9	6					
-50.9	7		Shells - dense with fine to medium **SAND**		NS	
-51.9	8					
			Limit of Vibracore Recovery 8.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 149

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Hole No. DRV- 150

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 115667 281280	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.2 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 150	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -43.2 MLLW
7. THICKNESS OF OVERBURDEN 10.0	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 10.0	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.2	1					Penetration 10'
-45.2	2				A 0-6'	A-2-4(0)
-46.2	3		Dark gray fine **SAND and SILT** with high shell content			
-47.2	4					
-48.2	5					
-49.2	6					
-50.2	7		Gray **CLAY** some silt high organic content		B 6-10'	
-51.2	8					
-52.2	9					
-53.2	10					
			Limit of Vibracore Recovery 10.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 150

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Hole No. DRV- 151

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 113946 282551	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.1 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 151	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -43.1 MLLW
7. THICKNESS OF OVERBURDEN 7.4'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 7.4'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.1 -45.1	1 2		Gray medium to coarse **SAND** and shell fragments		A 0-2	Penetration 7.4' SP A-3 (0)
-46.1 -47.1	3 4		Gray fine to medium **SAND** and shell fragments		B 3-5	A-2-4 (0)
-48.1 -49.1 -50.1	5 6 7		Gray **CLAY** with fine sand high organic content		NS	
			Gray coarse to medium **SAND**		NS	
	8 9 10		Limit of Vibracore Recovery 7.4'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 151

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 112053 283819	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.7 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 152	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -43.7 MLLW
7. THICKNESS OF OVERBURDEN 2	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Pete Gori, P.G.
9. TOTAL DEPTH OF HOLE 2	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.7	1		Dark gray medium **SAND** trace shell fragments poorly sorted		A 0-2	SP A-3 (0) Penetration 2'
-45.7	2					
			Limit of Vibracore Recovery 2.0'			

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Hole No. DRV- 153 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 110557 284858	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.0 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 153 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Captain Matt Shappell	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 07, 2012 — COMPLETED December 07, 2012
	17. ELEVATION TOP OF HOLE -43.0 MLLW
7. THICKNESS OF OVERBURDEN 4.8	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 4.8'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.0	1		Gray medium to coarse **SAND** trace to little gravel		A 0-1	Penetration 5' SP A-1-b (0)
-45.0	2					
-46.0	3		Dark gray silty **CLAY** (fat) (very stiff/firm/dense)		B 3-4	CH*
-47.0	4					
			Limit of Vibracore Recovery 4.8'			R-1 lost barrel * classification by G. Kribbs

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 105343 288526	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -42.2 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 154 R-3	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Captain Matt Shappell	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 07, 2012 — COMPLETED December 07, 2012
	17. ELEVATION TOP OF HOLE -42.2 MLLW
7. THICKNESS OF OVERBURDEN 6.1'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 6.1	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 9'
-43.2	1		Gray coarse **SAND**		A	GP
					0.5-1.5	A-1-a (0)
-44.2	2					
-45.2	3		Gray clayey **SAND**		B	
			slightly organic		2.5-3.5	A-2-4 (0)
-46.2	4					
			Orange brown clayey **SAND**		C	
-47.2	5				4-5	SC*
-48.2	6					
			Limit of Vibracore Recovery 6.1'			* classified by G. Kribbs
						R-1 Rec 0%
						R-2 Rec 1.7
						Photos only

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 154 R-3

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Hole No. DRV- 155 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 103883 289480	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.1 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 155 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 12, 2012 — COMPLETED December 12, 2012
	17. ELEVATION TOP OF HOLE -43.1 MLLW
7. THICKNESS OF OVERBURDEN 3	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 3	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 3'
-44.1	1		Gray/orange brown medium		A	SP
			SAND trace silt and gravel		0-2	A-3 (0)
-45.1	2					
-46.1	3					
			Limit of Vibracore Recovery 3.0'			
						R-1 Rec 0.9
						Photos only

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-155 R-2

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Hole No. DRV- 156

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 101933 290869	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.3 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 156	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 07, 2012 — COMPLETED December 07, 2012
	17. ELEVATION TOP OF HOLE -44.3 MLLW
7. THICKNESS OF OVERBURDEN 8.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 8.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.3	1		Gray medium **SAND** poorly sorted		A 0-1.3	Penetration 8.2' SP A-1-b (0)
-46.3	2		Orange gray clayey **SAND** mottled			
-47.3	3				B 3-4	
-48.3	4					
-49.3	5					
-50.3	6				C 6-7.5	CL A-2-6 (2)
-51.3	7					
-52.3	8					
			Limit of Vibracore Recovery 8.2'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 156

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Hole No. DRV- 157

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 98887 292965	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.7 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 157	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 7, 2012 — COMPLETED December 7, 2012
	17. ELEVATION TOP OF HOLE -44.7 MLLW
7. THICKNESS OF OVERBURDEN 3.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 3.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.7	1		Gray/black tan medium **SAND** trace silt and round gravel		A 0-1.5	Penetration 5' A-3 (0)
-46.7	2		Dark gray clayey **SILT**		B 1.6-3.2	OH
-47.7	3					
			Limit of Vibracore Recovery 3.2'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-157

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Hole No. DRV- 158

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 97009 294151	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -42.3 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 158	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 7, 2012 — COMPLETED December 7, 2012
	17. ELEVATION TOP OF HOLE -42.3 MLLW
7. THICKNESS OF OVERBURDEN 4.2	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 4.2	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 5'
-43.3	1		Gray medium			
			SAND trace silt and gravel		A	SP
-44.3	2		and shells		1-3	A-3 (0)
-45.3	3					
-46.3	4					
			Limit of Vibracore Recovery 4.2'			

ENG FORM 1836 MAR 71	PREVIOUS EDITIONS ARE OBSOLETE	PROJECT DRDP-RE	HOLE NO. DRV-158

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Hole No. DRV- 159

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 95452 295283	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.4 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 159	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 04, 2012 — COMPLETED December 04, 2012
	17. ELEVATION TOP OF HOLE -43.4 MLLW
7. THICKNESS OF OVERBURDEN 7.5'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 7.5'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.4	1		Dark gray medium **SAND** poorly sorted shells and trace gravel	1-2'	A 0.5-2	Penetration 8' SP A-1-b (0)
-45.4	2					
-46.4	3		Gray clayey **SAND** trace gravel		NS	
-47.4	4		Inter-bedded gray and tan silty **SAND** trace clay		B 3.5-4.5	A-2-4 (0)
-48.4	5					
-49.4	6					
-50.4	7		less clay at base			
	8		Limit of Vibracore Recovery 7.5'			
	9					
	10					
	11					
	12					
	13					
	14					
	15					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 159

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Hole No. DRV- 160

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 93503 296415	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.6 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 160	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 4, 2012 — COMPLETED December 4, 2012
	17. ELEVATION TOP OF HOLE -43.6 MLLW
7. THICKNESS OF OVERBURDEN 6.3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 6.3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 8'
-44.6	1		Light gray medium to coarse **SAND** trace silt and gravel v. loose		A 1-2	A-2-4 (0)
-45.6	2					
-46.6	3					
-47.6	4					
-48.6	5				B 5-6	A-2-4 (0)
-49.6	6		Brown-gray clayey **SAND**		NS	
			Limit of Vibracore Recovery 6.3'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-160

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Hole No. DRV- 161

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 91390 297430	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.9 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 161	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 4, 2012 — COMPLETED December 4, 2012
	17. ELEVATION TOP OF HOLE -43.9 MLLW
7. THICKNESS OF OVERBURDEN 4.9'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 4.9'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.9	1		Dark gray medium to coarse **SAND** trace silt and shell frags.		A 0.5-1.5	Penetration 9' A-3 (0)
-45.9	2		Gray medium to fine **SAND** trace to little silt and clay		B 2-3.5	SM A-2-4 (0)
-46.9	3					
-47.9	4		Gray clayey **SILT** trace gravel and sand		C 4-4.9	CL A-6 (14)
-48.9	5		Limit of Vibracore Recovery 4.9'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-161

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Hole No. DRV- 162

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 87891 299256	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.9 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 162	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED November 29, 2012 — COMPLETED November 29, 2012
	17. ELEVATION TOP OF HOLE -43.9 MLLW
7. THICKNESS OF OVERBURDEN 2.6'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 2.6'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.9	1		Gray medium to coarse **SAND** shells and frags.		A 0.5-1.2	Penetration 8'
-45.9	2		Gray\brown medium **SAND**		B 1.5-2.5	SP* A-2-4 (0)
			Limit of Vibracore Recovery 2.6'			* classified by G. Kribbs

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-162

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Hole No. DRV- 163

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 86078 300087	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.4 MLLW
3. DRILLING AGENCY Aqua Survey, Inc. Flemington New Jersey/North Star Marine	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 163	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED November 29, 2012 — COMPLETED November 29, 2012
	17. ELEVATION TOP OF HOLE -44.4 MLLW
7. THICKNESS OF OVERBURDEN 6.4'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs, P.G.
9. TOTAL DEPTH OF HOLE 6.4'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.4	1		Light gray medium to coarse silty **SAND** trace gravel v. loose		A 0.5-0.9	Penetration 7' SP A-1-b (0)
-46.4	2					
-47.4	3				B 2.5-3.0'	A-4 (0)
-48.4	4					
-49.4	5		Brown-gray clayey **SILT**		C 4-5.5	
-50.4	6					
			Limit of Vibracore Recovery 6.4'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-163

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Hole No. DRV- 164

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 83494 301077	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.0 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 164	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 04, 2012 — COMPLETED December 04, 2012
	17. ELEVATION TOP OF HOLE -44.0 MLLW
7. THICKNESS OF OVERBURDEN 9.3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 9.3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Dark gray medium to coarse **SAND** shells and trace gravel		NS	
-45.0	1				A	Penetration 11'
-46.0	2		Gray medium poorly sorted **SAND** trace silt and clay loose		1.5-3	A-3 (0)
-47.0	3					Strong sulfur odor
-48.0	4					
-49.0	5		Big shell			
-50.0	6		Gray medium poorly sorted **SAND** little silt and clay trace of shells dense		B 3.5-4.5	Very Strong Sulfur Odor
-51.0	7					
-52.0	8					
-53.0	9					
			Limit of Vibracore Recovery 9.3'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 164

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Hole No. DRV- 165

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 81533 301975	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.3 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 165	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 04, 2012 — COMPLETED December 04, 2012
	17. ELEVATION TOP OF HOLE -44.3 MLLW
7. THICKNESS OF OVERBURDEN 5.8'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 5.8'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.3	1		Dark gray medium to coarse **SAND** shells and trace gravel			Penetration 9'
-46.3	2				A 0.5-1	
-47.3	3		Gray/white medium to coarse **SAND and GRAVEL** trace silt			
-48.3	4				B 3.5-5	SP A-1-b (0)
-49.3	5					
-50.3	6		Limit of Vibracore Recovery 5.8'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 165

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Hole No. DRV- 166 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 79076 302975	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.4 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 166 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 04, 2012 — COMPLETED December 04, 2012
	17. ELEVATION TOP OF HOLE -43.4 MLLW
7. THICKNESS OF OVERBURDEN 7.7'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 7.7'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.4	1		Dark gray medium to coarse **SAND** trace shells		A 0.5-1.5	Penetration 10' SP A-3 (0)
-45.4	2		Gray medium silty **SAND** trace clay			
-46.4	3					
-47.4	4				B 3-5	A-2-4 (0)
-48.4	5					
			Fine **GRAVEL**		NS	
-49.4	6		Gray sandy **SILT**		C 5.5-7	
-50.4	7					
			Gray clayey **SILT** very dense		NS	
			Limit of Vibracore Recovery 7.7'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-166 R-2

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Hole No. DRV- 167 R-2

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 77152 304173	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.7 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 167 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 3 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 04, 2012 — COMPLETED December 04, 2012
	17. ELEVATION TOP OF HOLE -44.7 MLLW
7. THICKNESS OF OVERBURDEN 8.3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 8.3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.7	1		Dark gray medium to coarse **SAND** trace silt		A 0.5-2	Penetration 11'
-46. 60	2					
-47.7	3		Gray fine **SAND** trace silt		B 2.5-3.5	A-3 (0)
-48.7	4					
			Fine **GRAVEL**			
-49.7	5		Gray **CLAY** little sand trace silt		NS C 5-6	
-50.7	6					
-51.7			Gray **CLAY** (fat) little to trace sand, trace silt		NS	
-52.7	7					
-53.7	8					
			Limit of Vibracore Recovery 8.3'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-167 R-2

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Hole No. DRV- 168

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 74595 304712	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.7 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 168	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 13, 2012 — COMPLETED December 13, 2012
	17. ELEVATION TOP OF HOLE -43.7 MLLW
7. THICKNESS OF OVERBURDEN 5.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 5.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.7	1		Dark gray medium to fine **SAND** some shell fragments		A 0-2	Penetration 10' SP A-3 (0)
-45.7	2					
-46.7	3		Gray clayey **SILT** trace sand		B 3-5	CL
-47.7	4					
-48.7	5					
			Limit of Vibracore Recovery 5.2'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-168

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Hole No. DRV- 169

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 72639 305527	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.1 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 169	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -44.1 MLLW
7. THICKNESS OF OVERBURDEN 3.3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 3.3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.1	1		Dark gray medium to fine **SAND** some shell fragments		A 0-3	SP A-3 (0)
-46.1	2					Penetration 10'
-47.1	3					
			Limit of Vibracore Recovery 3.3'			

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Hole No. DRV- 170

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 70461 306516	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.8 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 170	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER AJ Mottola ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED November 29, 2012 — COMPLETED November 29, 2012
	17. ELEVATION TOP OF HOLE -43.8 MLLW
7. THICKNESS OF OVERBURDEN 3.3'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 3.3'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
			Gray medium to coarse **SAND** shell fragments		A 0-0.9	Penetration 7'
-44.8	1		Gray sandy clayey **SILT**		NS	
-45.8	2		Gray medium **SAND** poorly sorted		B 1.3-3.3	SP A-3 (0)
-46.8	3					
			Limit of Vibracore Recovery 3.3'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-170

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DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 68457 307402	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -45.1 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 171 R-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER AJ Mottola ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED November 29, 2012 — COMPLETED November 29, 2012
	17. ELEVATION TOP OF HOLE -45.1 MLLW
7. THICKNESS OF OVERBURDEN 3.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 3.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-46.1	1		Gray medium to coarse **SAND** shell fragments		A 0-0.9	Penetration 8'
-47.1	2		Gray-white coarse to medium **SAND**		B 2-3	A-3 (0)
-48.1	3					
			Limit of Vibracore Recovery 3.2'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-171 R-2

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Hole No. DRV- 172

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 66204 308157	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.7 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 172	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER AJ Mottola ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED November 29, 2012 — COMPLETED November 29, 2012
	17. ELEVATION TOP OF HOLE -44.7 MLLW
7. THICKNESS OF OVERBURDEN 7.4'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Gary M.B Kribbs P.G.
9. TOTAL DEPTH OF HOLE 7.4'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
						Penetration 9'
-45.7	1		Gray-white-black medium to coarse **SAND** trace shell fragments		A 1-2.5	SP A-3 (0)
-46.7	2					
-47.7	3					
-48.7	4					
-49.7	5		Gray medium **SAND** trace silt and clay		B 5-6	
-50.7	6					
-51.7	7					
			Limit of Vibracore Recovery 7.4'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV-172

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Hole No. DRV- 173

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 64024 308917	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.5 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 173	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -44.5 MLLW
7. THICKNESS OF OVERBURDEN 8.2'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 8.2'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.5	1		Gray silty **CLAY** trace fine sand firm to soft	1-2'	A 0-2	Penetration 10' A-4 (0)
-46.5	2					
-47.5	3		Gray fine to medium **SAND** loose		B 2-4	A-3 (0)
-48.5	4					
-49.5	5					
-50.5	6		Gray coarse **SAND** some silt		NS	
-51.5	7		Gray fine to medium **SAND** some silt and gravel		NS	
-52.5	8					
			Limit of Vibracore Recovery 8.2'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 173

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Hole No. DRV- 174

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 61614 309919	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.3 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 174	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -44.3 MLLW
7. THICKNESS OF OVERBURDEN 7.5'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 7.5'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.3	1		Gray medium **SAND** trace clay firm		A 0-4	Penetration 10'
-46.3	2					A-3 (0)
-47.3	3					
-48.3	4					
			Limit of Vibracore Recovery 4.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 174

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Hole No. DRV- 175

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 44539 317369	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -45.8 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 175	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -45.8 MLLW
7. THICKNESS OF OVERBURDEN 4.4'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 4.4'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-46.8	1		Gray fine to medium **SAND** trace gravel rounded poorly sorted firm		A 0-2	Penetration 10'
-47.8	2					
-48.8	3				B 2-4	A-3 (0)
-49.8	4					
			Limit of Vibracore Recovery 4.4'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 175

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Hole No. DRV- 176

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 41895 318641	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.1 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 176	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 1 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -44.1 MLLW
7. THICKNESS OF OVERBURDEN 7.4'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 7.4'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.1	1					Penetration 10'
					A	SP
-46.1	2				0-4	A-3 (0)
-47.1	3		Gray fine to medium **SAND** trace rounded poorly sorted gravel trace shall fragments			
-48.1	4					
-49.1	5					
-50.1	6					
-51.1	7		Lt brown/tan medium to coarse **SAND** some fine gravel			
			Limit of Vibracore Recovery 7.4'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 176

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Hole No. DRV- 177

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 39905 319478	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -44.8 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 177	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -44.8 MLLW
7. THICKNESS OF OVERBURDEN 7.1'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 7.1'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-45.8	1		Gray fine to medium **SAND** trace silt some shall fragments		A 0-3	Penetration 10' SP A-3 (0)
-46.8	2					
-47.8	3					
-48.8	4					
-49.8	5		Lt brown/tan medium to coarse **SAND** some rounded gravel		B 3.5-7	SP A-3 (0)
-50.8	6					
-51.8	7					
			Limit of Vibracore Recovery 7.1'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 177

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Hole No. DRV- 178

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 37213 320677	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -45.1 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 178	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -45.1 MLLW
7. THICKNESS OF OVERBURDEN 9'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 9'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-46.1	1		Gray fine to medium **SAND** trace silt some shall fragments poorly sorted		A 0-4	Penetration 10' SP A-3 (0)
-47.1	2					
-48.1	3					
-49.1	4					
-50.1	5		Gray silty **CLAY** some fine sand and shell fragments		B 4-6	OH*
-51.1	6					
-52.1	7					
-53.1	8					
-54.1	9					
			Limit of Vibracore Recovery 9'			* classified by G. Kribbs

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 178

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Hole No. DRV- 179

DRILLING LOG	DIVISION North Atlantic	INSTALLATION Philadelphia District	SHEET 1 OF 1

1. PROJECT Delaware River Deepening Project Reach E	10. SIZE AND TYPE OF BIT 4" barrel and nose Cone
2. LOCATION *(Coordinates or Station) NJ State Plan N E* 34406 321770	11. DATUM FOR ELEVATION SHOWN *(TBM or MSL)* -43.6 MLLW
3. DRILLING AGENCY Aqua Survey Flemington New Jersey	12. MANUFACTURERS DESIGNATION OF DRILL Rossfelder Vibracore
4. HOLE NO. *(As shown on drawing title and title number)* DRV- 179	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 2 — DISTURBED Yes — UNDISTURBED
5. NAME OF DRILLER Matt Shappell ASI	14. TOTAL NUMBER CORE BOXES N/A
	15. ELEVATION GROUND WATER N/A
6. DIRECTION OF HOLE x VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	16. DATE HOLE — STARTED December 03, 2012 — COMPLETED December 03, 2012
	17. ELEVATION TOP OF HOLE -43.6 MLLW
7. THICKNESS OF OVERBURDEN 8'	18. TOTAL CORE RECOVERY FOR BORING N/A
8. DEPTH DRILLED INTO ROCK N/A	19. SIGNATURE OF INSPECTOR Peter Gori P.G.
9. TOTAL DEPTH OF HOLE 89'	

ELEVATION a	DEPTH b	General condition of vibracore LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	Vibracore run Length & REC e	SAMPLE Number f	REMARKS g
-44.6	1		Brown to tan fine to medium **SAND** trace silt some shall fragments poorly sorted		A 0-4	Penetration 10' SP A-1-b (0)
-45.6	2					
-46.6	3		Gray fine to medium **SAND** poorly sorted		NS	
-47.6	4					
-48.6	5		Gray clayey **SILT** some fine sand and shell fragments		B 4-6	OH*
-49.6	6					
-50.6	7					
-51.6	8					
			Limit of Vibracore Recovery 8'			* classified by G. Kribbs

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE PROJECT DRDP-RE HOLE NO. DRV- 179

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APPENDIX C

Laboratory Test Results

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258560		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	129 A	1-2 ft.	Moist, light brown sand	20.9
---	130 B	5-6 ft.	Moist, yellowish brown sand with gravel	12.1
---	131 A	0-1 ft.	Moist, yellowish brown gravel with sand	7.3
---	132A	0.5-2.5 ft.	Moist, yellowish brown sand with gravel	18.2
---	133 A	0-1 ft.	Moist, gray clay with sand	83.8
---	133 B	---	Moist, gray clay	59.3
---	134 B	2-3 ft.	Moist, yellowish brown sand	15.7
---	136 C	3.6-4.5 ft.	Moist, brown silty sand	12.2
---	137 A	0-1.5 ft.	Moist, dark gray sand	18.4
---	139 A	0.5-1.5 ft.	Moist, dark gray silty sand	27.2

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258562		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	140 B	3.5-4.0 ft.	Moist, gray clay	90.1
---	141 A	0-1 ft.	Moist, gray sand with silt	20.9
---	141 B	5.5-6.5 ft.	Moist, gray clay with sand	72.7
---	142 A	1-2 ft.	Moist, yellowish brown silty sand	29.6
---	143 A	0.5-1.5 ft.	Moist, dark gray silty sand	25.9
---	143 C	5-6 ft.	Moist, olive brown sand with silt	24.5
---	144 D	4.6-5.2 ft.	Moist, gray silty sand	30.5
---	145 B	3-4 ft.	Moist, light gray silty sand	26.3
---	146 A	0-3 ft.	Moist, dark gray sand with silt	31.6
---	147 A	0-4 ft.	Moist, dark gray silty sand	27.8

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258650		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	148 A	0-3 ft.	Moist, dark gray silty sand	26.7
---	149 B	1-6 ft.	Moist, gray silty sand	26.2
---	150 A	0-6 ft.	Moist, dark gray silty sand	21.8
---	151 B	3-5 ft.	Moist, gray silty sand	21.1
---	152 A	0-2 ft.	Moist, grayish brown sand	18.9
---	153 B	3-4 ft.	Moist, dark gray clay	37.8
---	155 A	0-2 ft.	Moist, yellowish brown sand	17.3
---	156 C	6-7.5 ft.	Moist, yellowish brown clayey sand	28.7
---	157 B	1.6-3.2 ft.	Moist, dark gray sandy clay	37.1
---	158 A	1-3 ft.	Moist, grayish brown sand	18.0

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258613		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	159 B	3.5-4.5 ft.	Moist, light yellowish brown silty sand	24.1
---	160 B	5-6 ft.	Moist, light gray silty sand	22.6
---	161 B	2-3.5 ft.	Moist, gray silty sand	17.3
---	161 C	4-4.9 Ft.	Moist, gray clay	22.0
---	162 B	1.5-2.5 ft.	Moist, olive brown silt with clay	21.3
---	163 B	2.5-3 ft.	Moist, mottled gray and yellowish brown sandy silt	23.5
---	164 A	1.5-3 ft.	Moist, gray sand with silt	19.3
---	165 B	3.5-5 ft.	Moist, gray sand	13.5
---	166 B	3-5 ft.	Moist, gray silty sand	16.2
---	168 B	3-5 ft.	Moist, grayish brown clay with sand	29.7

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258617		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	169 A	0-3 ft.	Moist, olive brown sand	18.0
---	170 B	1.3-3.3 ft.	Moist, light gray sand	24.2
---	172	1-2.5 ft.	Moist, light gray sand	17.9
---	173	2-4 ft.	Moist, light gray sand with silt	15.7
---	174	0-4 ft.	Moist, gray sand with silt	13.0
---	175 B	2-4 ft.	Moist, gray sand with silt	17.9
---	176	0-4 ft.	Moist, dark grayish brown sand	20.1
---	177	3.5-7 ft.	Moist, yellowish brown sand with gravel	14.0
---	178 A	0-4 ft.	Moist, grayish brown sand	20.0
---	178 B	4-6 ft.	Moist, gray silty sand	23.4

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258586		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	179 B	4-6 ft.	Moist, dark gray silty sand	23.9
---	179 A	0-4 ft.	Moist, grayish brown sand	15.6
---	178 B	4-6 ft.	Moist, gray silty sand	23.4
R-1	138 B	---	Moist, brown sand	15.4
R-1	171	2-3 ft.	Moist, light gray sand	18.2
R-1 _R-2	138 A	---	Moist, olive gray gravel with sand	13.2
R-2	135	---	Moist, yellowish brown sand	14.6
R-2	167	2.5-3.5 ft.	Moist, gray sand with silt	22.9
R-3	154 C	4-5 ft.	Moist, yellow silty sand	20.9

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	02/11/13	Checked By:	jdt
Depth :	---	Test Id:	260881		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	136 A	0-0.5	Moist, gray silty sand	14.0
---	136 B	2-3	Moist, grayish brown silty sand with gravel	11.1
---	139 B	3.5-4.5	Moist, olive gray silty sand	25.2
---	140 A	0.5-1.5	Moist, very dark brown sand with silt	20.8
---	144 A	1-2	Moist, grayish brown sand	15.5
---	144 B	2.5-3.5	Moist, dark gray sand with silt and gravel	10.4
---	145 A	0.5-1.5	Moist, grayish brown sand	16.3
---	149 A	0-1	Moist, dark olive brown sand	21.4
---	151 A	0-2	Moist, dark grayish brown sand	15.8
---	153 A	0-1	Moist, grayish brown sand	13.7

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	02/11/13	Checked By:	jdt
Depth :	---	Test Id:	260891		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	154 A	0.5-1.5	Moist, yellowish brown gravel with sand	5.5
---	154 B	2.5-3.5	Moist, yellowish brown silty sand	22.3
---	156 A	0-1.3	Moist, light brown sand with gravel	11.7
---	156 B	3-4	Moist, yellowish brown silty sand	22.3
---	157 A	---	Moist, yellowish brown sand with silt	17.5
---	159 A	0.5-2	Moist, grayish brown sand	12.8
---	160 A	1-2	Moist, olive gray sand with silt	19.7
---	161 A	0.5-1.5	Moist, gray sand with silt	20.5
---	163 A	0.5-0.9	Moist, grayish brown sand	14.2
---	166 A	0.5-1.5	Moist, gray sand	17.4

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	jek
Sample ID:	---	Test Date:	02/11/13	Checked By:	jdt
Depth :	---	Test Id:	260894		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
---	168 A	0-2	Moist, gray sand	17.3
---	173 A	0-2	Moist, gray silty sand	26.0
---	177 A	0-3	Moist, grayish brown sand	20.6

Notes: Temperature of Drying : 110° Celsius

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258551		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	129 A	1-2 ft.	Moist, light brown sand	2.66
---	130 B	5-6 ft.	Moist, yellowish brown sand with gravel	2.67
---	131 A	0-1 ft.	Moist, yellowish brown gravel with sand	2.67
---	132A	0.5-2.5 ft.	Moist, yellowish brown sand with gravel	2.66
---	133 A	0-1 ft.	Moist, gray clay with sand	2.66
---	133 B	---	Moist, gray clay	2.68
---	134 B	2-3 ft.	Moist, yellowish brown sand	2.66
---	136 C	3.6-4.5 ft.	Moist, brown silty sand	2.65
---	137 A	0-1.5 ft.	Moist, dark gray sand	2.66
---	139 A	0.5-1.5 ft.	Moist, dark gray silty sand	2.66

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258553		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	140 B	3.5-4.0 ft.	Moist, gray clay	2.68
---	141 A	0-1 ft.	Moist, gray sand with silt	2.68
---	141 B	5.5-6.5 ft.	Moist, gray clay with sand	2.69
---	142 A	1-2 ft.	Moist, yellowish brown silty sand	2.67
---	143 A	0.5-1.5 ft.	Moist, dark gray silty sand	2.70
---	143 C	5-6 ft.	Moist, olive brown sand with silt	2.67
---	144 D	4.6-5.2 ft.	Moist, gray silty sand	2.64
---	145 B	3-4 ft.	Moist, light gray silty sand	2.67
---	146 A	0-3 ft.	Moist, dark gray sand with silt	2.68
---	147 A	0-4 ft.	Moist, dark gray silty sand	2.68

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258645		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	148 A	0-3 ft.	Moist, dark gray silty sand	2.68
---	149 B	1-6 ft.	Moist, gray silty sand	2.69
---	150 A	0-6 ft.	Moist, dark gray silty sand	2.66
---	151 B	3-5 ft.	Moist, gray silty sand	2.66
---	152 A	0-2 ft.	Moist, grayish brown sand	2.65
---	153 B	3-4 ft.	Moist, dark gray clay	2.72
---	155 A	0-2 ft.	Moist, yellowish brown sand	2.65
---	156 C	6-7.5 ft.	Moist, yellowish brown clayey sand	2.67
---	157 B	1.6-3.2 ft.	Moist, dark gray sandy clay	2.71
---	158 A	1-3 ft.	Moist, grayish brown sand	2.65

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258606		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	159 B	3.5-4.5 ft.	Moist, light yellowish brown silty sand	2.67
---	160 B	5-6 ft.	Moist, light gray silty sand	2.66
---	161 B	2-3.5 ft.	Moist, gray silty sand	2.66
---	161 C	4-4.9 Ft.	Moist, gray clay	2.70
---	162 B	1.5-2.5 ft.	Moist, olive brown silt with clay	2.68
---	163 B	2.5-3 ft.	Moist, mottled gray and yellowish brown sandy silt	2.68
---	164 A	1.5-3 ft.	Moist, gray sand with silt	2.66
---	165 B	3.5-5 ft.	Moist, gray sand	2.66
---	166 B	3-5 ft.	Moist, gray silty sand	2.67
---	168 B	3-5 ft.	Moist, grayish brown clay with sand	2.69

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258610		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	169 A	0-3 ft.	Moist, olive brown sand	2.66
---	170 B	1.3-3.3 ft.	Moist, light gray sand	2.68
---	172	1-2.5 ft.	Moist, light gray sand	2.64
---	173	2-4 ft.	Moist, light gray sand with silt	2.66
---	174	0-4 ft.	Moist, gray sand with silt	2.66
---	175 B	2-4 ft.	Moist, gray sand with silt	2.66
---	176	0-4 ft.	Moist, dark grayish brown sand	2.67
---	177	3.5-7 ft.	Moist, yellowish brown sand with gravel	2.66
---	178 A	0-4 ft.	Moist, grayish brown sand	2.67
---	178 B	4-6 ft.	Moist, gray silty sand	2.66

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	01/10/13	Checked By:	jek
Depth :	---	Test Id:	258577		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	179 A	0-4 ft.	Moist, grayish brown sand	2.66
---	179 B	4-6 ft.	Moist, dark gray silty sand	2.66
R-1	138 B	---	Moist, brown sand	2.66
R-1	171	2-3 ft.	Moist, light gray sand	2.66
R-2	135	---	Moist, yellowish brown sand	2.66
R-2	167	2.5-3.5 ft.	Moist, gray sand with silt	2.68
R-1 _R-2	138 A	---	Moist, olive gray gravel with sand	2.65
R-3	154 C	4-5 ft.	Moist, yellow silty sand	2.67

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	02/11/13	Checked By:	jdt
Depth :	---	Test Id:	260858		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	136 A	0-0.5	Moist, gray silty sand	2.70
---	136 B	2-3	Moist, grayish brown silty sand with gravel	2.67
---	139 B	3.5-4.5	Moist, olive gray silty sand	2.68
---	140 A	0.5-1.5	Moist, very dark brown sand with silt	2.67
---	144 A	1-2	Moist, grayish brown sand	2.67
---	144 B	2.5-3.5	Moist, dark gray sand with silt and gravel	2.67
---	145 A	0.5-1.5	Moist, grayish brown sand	2.67
---	149 A	0-1	Moist, dark olive brown sand	2.66
---	151 A	0-2	Moist, dark grayish brown sand	2.67
---	153 A	0-1	Moist, grayish brown sand	2.66

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	02/11/13	Checked By:	jdt
Depth :	---	Test Id:	260868		

Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	154 A	0.5-1.5	Moist, yellowish brown gravel with sand	2.66
---	154 B	2.5-3.5	Moist, yellowish brown silty sand	2.68
---	156 A	0-1.3	Moist, light brown sand with gravel	2.65
---	156 B	3-4	Moist, yellowish brown silty sand	2.67
---	157 A	---	Moist, yellowish brown sand with silt	2.67
---	159 A	0.5-2	Moist, grayish brown sand	2.65
---	160 A	1-2	Moist, olive gray sand with silt	2.67
---	161 A	0.5-1.5	Moist, gray sand with silt	2.67
---	163 A	0.5-0.9	Moist, grayish brown sand	2.68
---	166 A	0.5-1.5	Moist, gray sand	2.67

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	---	Tested By:	ema
Sample ID:	---	Test Date:	02/11/13	Checked By:	jdt
Depth :	---	Test Id:	260871		

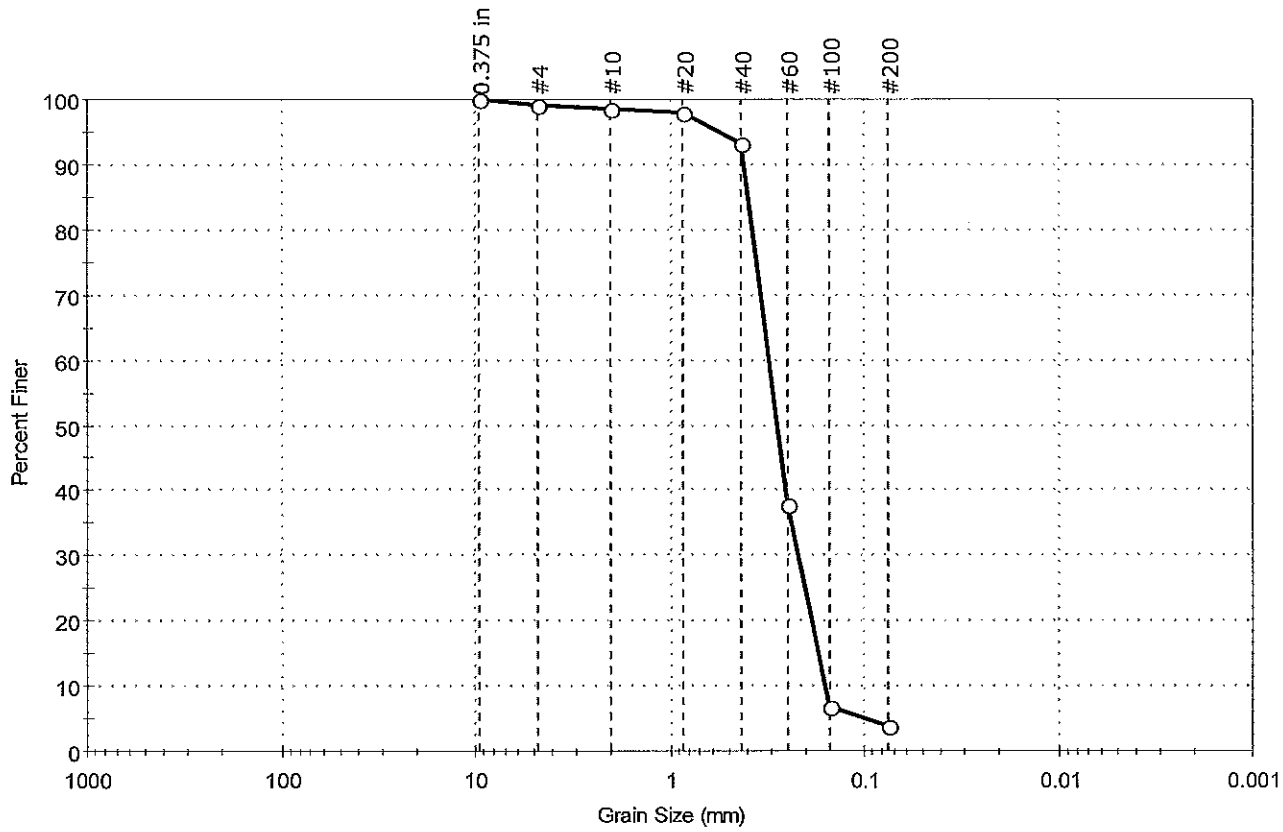
Specific Gravity of Soils by ASTM D 854-10

Boring ID	Sample ID	Depth	Visual Description	Specific Gravity
---	168 A	0-2	Moist, gray sand	2.67
---	173 A	0-2	Moist, gray silty sand	2.65
---	177 A	0-3	Moist, grayish brown sand	2.68

Notes: Specific Gravity performed by using method A (oven dried specimens) of ASTM D 854
Moisture Content determined by ASTM D 2216.

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 129 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 1-2 ft.	Test Id: 258509		
Test Comment:	---		
Sample Description:	Moist, light brown sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.9	95.3	3.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	99		
#20	0.85	98		
#40	0.42	93		
#60	0.25	38		
#100	0.15	7		
#200	0.075	4		

Coefficients

D_{85} = 0.3927 mm D_{30} = 0.2197 mm

D_{60} = 0.3091 mm D_{15} = 0.1717 mm

D_{50} = 0.2808 mm D_{10} = 0.1582 mm

C_u = 1.954 C_c = 0.987

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

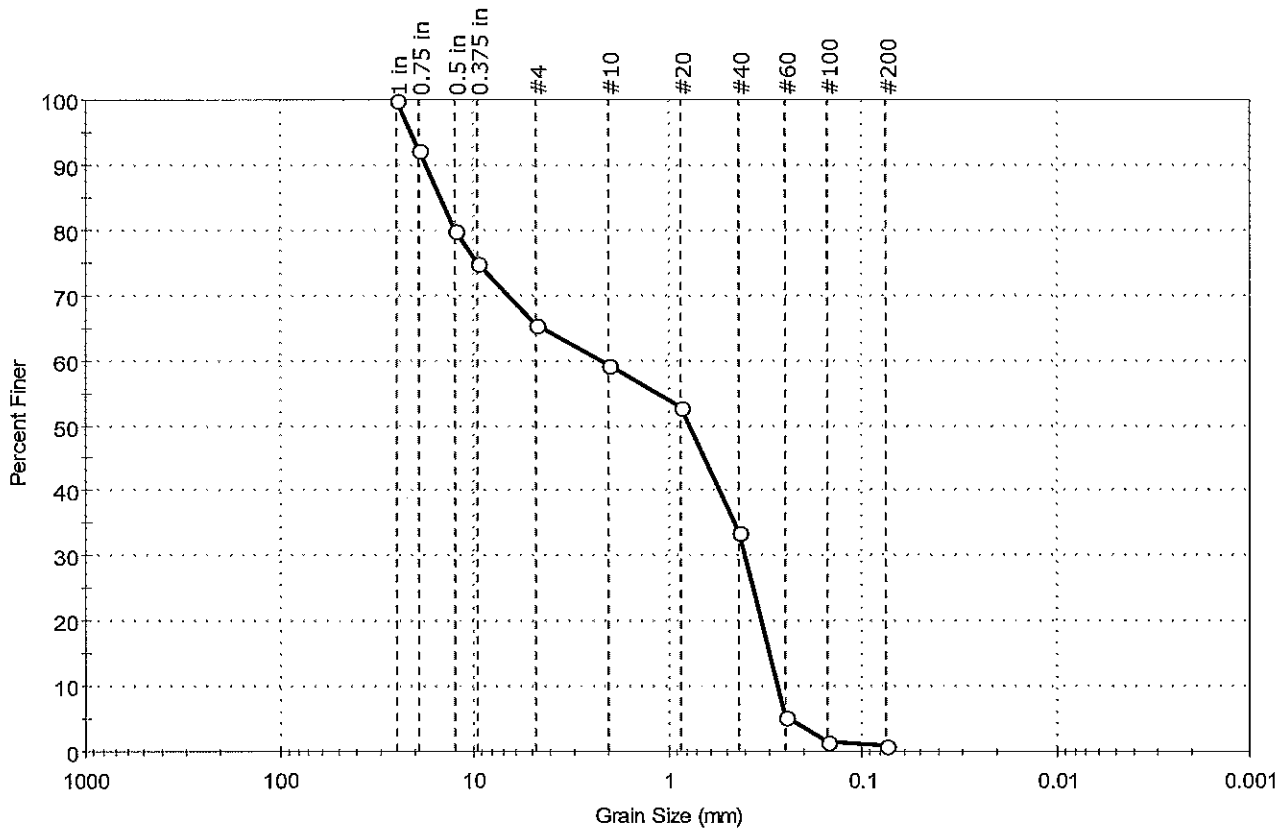
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 130 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 5-6 ft.	Test Id: 258510		
Test Comment:	---		
Sample Description:	Moist, yellowish brown sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



%Cobble	%Gravel	%Sand	%Silt & Clay Size
—	34.7	64.4	0.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	92		
0.5 in	12.50	80		
0.375 in	9.50	75		
#4	4.75	65		
#10	2.00	59		
#20	0.85	53		
#40	0.42	34		
#60	0.25	5		
#100	0.15	1		
#200	0.075	1		

Coefficients

D_{85} =14.8337 mm	D_{30} =0.3964 mm
D_{60} =2.1723 mm	D_{15} =0.2995 mm
D_{50} =0.7651 mm	D_{10} =0.2728 mm
C_u =7.963	C_c =0.265

Classification

ASTM Poorly graded sand with gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

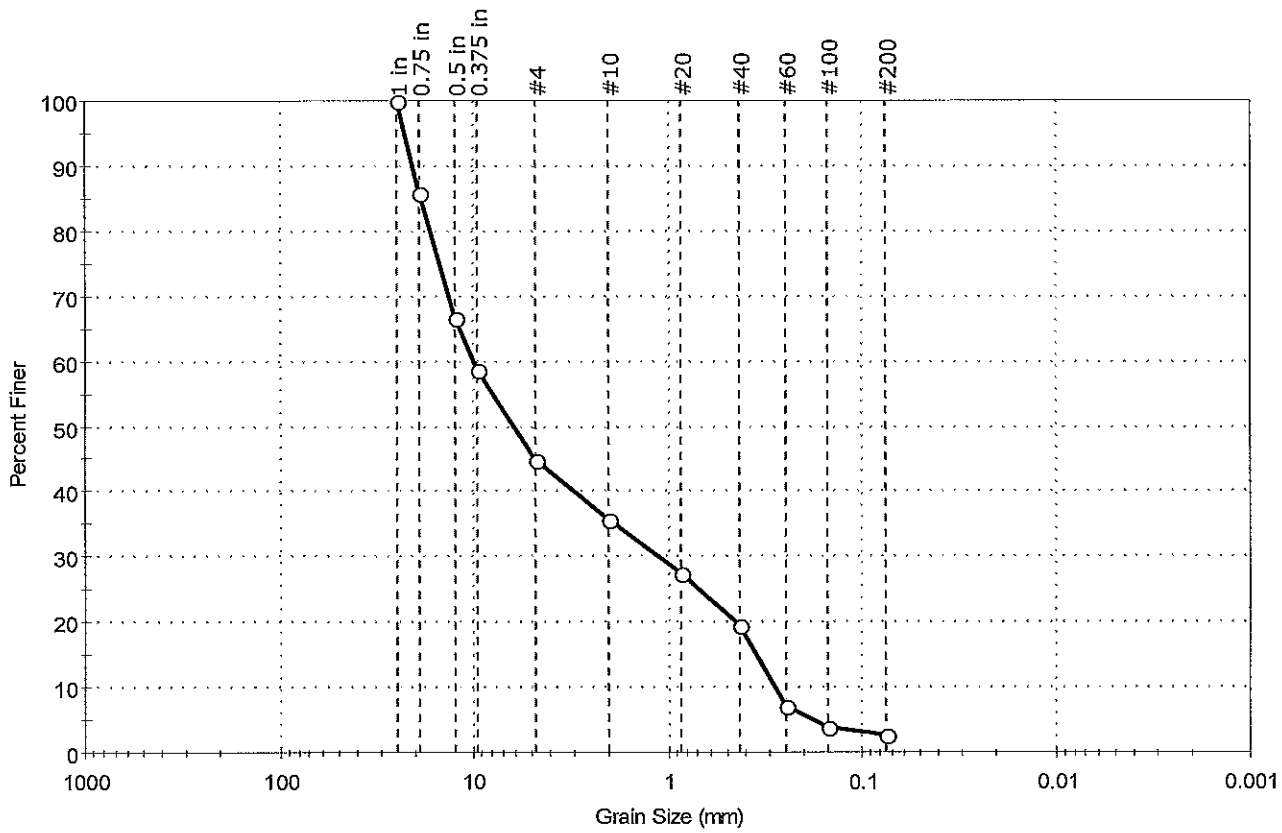
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 131 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-1 ft.	Test Id: 258511		
Test Comment:	---		
Sample Description:	Moist, yellowish brown gravel with sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	55.2	42.1	2.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	86		
0.5 in	12.50	67		
0.375 in	9.50	59		
#4	4.75	45		
#10	2.00	36		
#20	0.85	27		
#40	0.42	19		
#60	0.25	7		
#100	0.15	4		
#200	0.075	3		

Coefficients

D_{85} = 18.6480 mm	D_{30} = 1.1151 mm
D_{60} = 9.8880 mm	D_{15} = 0.3508 mm
D_{50} = 6.1513 mm	D_{10} = 0.2823 mm
C_u = 35.027	C_c = 0.445

Classification

ASTM Poorly graded gravel with sand (GP)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (0))

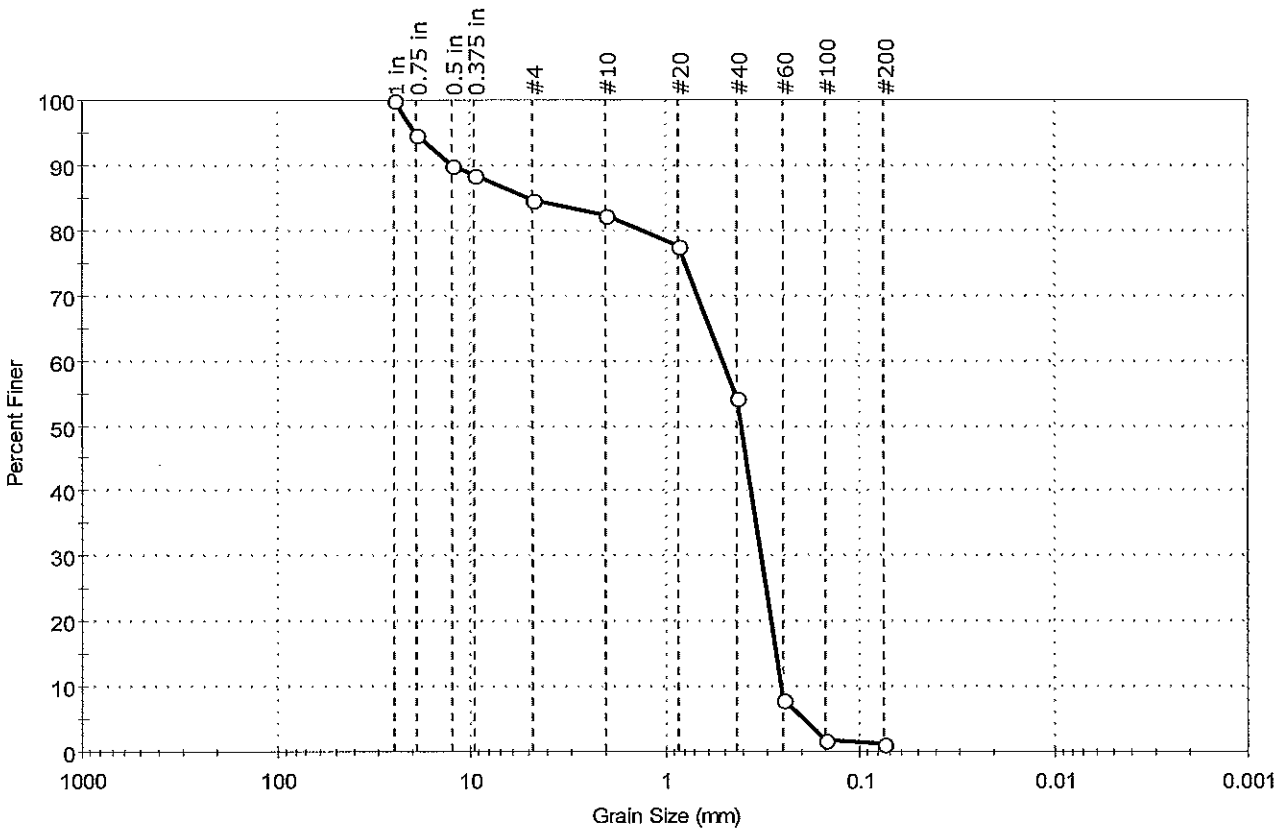
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 132A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0.5-2.5 ft.	Test Id: 258642		
Test Comment: ---			
Sample Description: Moist, yellowish brown sand with gravel			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	15.3	83.6	1.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	95		
0.5 in	12.50	90		
0.375 in	9.50	88		
#4	4.75	85		
#10	2.00	82		
#20	0.85	77		
#40	0.42	54		
#60	0.25	8		
#100	0.15	2		
#200	0.075	1		

Coefficients

D_{85} = 5.0080 mm D_{30} = 0.3216 mm
D_{60} = 0.5031 mm D_{15} = 0.2710 mm
D_{50} = 0.4042 mm D_{10} = 0.2560 mm
C_u = 1.965 C_c = 0.803

Classification

ASTM Poorly graded sand with gravel (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

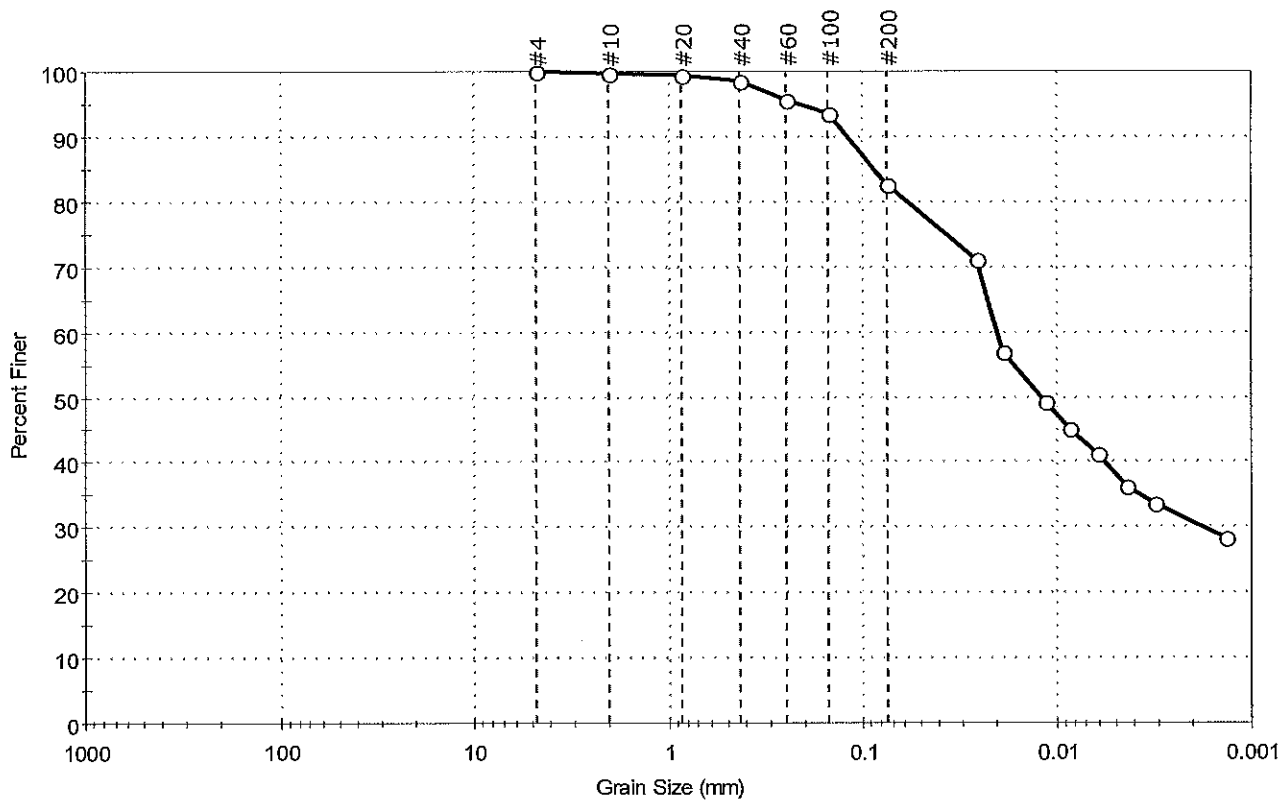
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 133 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-1 ft.	Test Id: 258515		
Test Comment: ---			
Sample Description: Moist, gray clay with sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	17.3	82.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	99		
#60	0.25	96		
#100	0.15	93		
#200	0.075	83		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0256	71		
---	0.0187	57		
---	0.0114	49		
---	0.0086	45		
---	0.0061	41		
---	0.0044	36		
---	0.0031	34		
---	0.0014	28		

Coefficients

D_{85} = 0.0869 mm	D_{30} = 0.0017 mm
D_{60} = 0.0200 mm	D_{15} = N/A
D_{50} = 0.0121 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM fat clay with sand (CH)

AASHTO Clayey Soils (A-7-6 (46))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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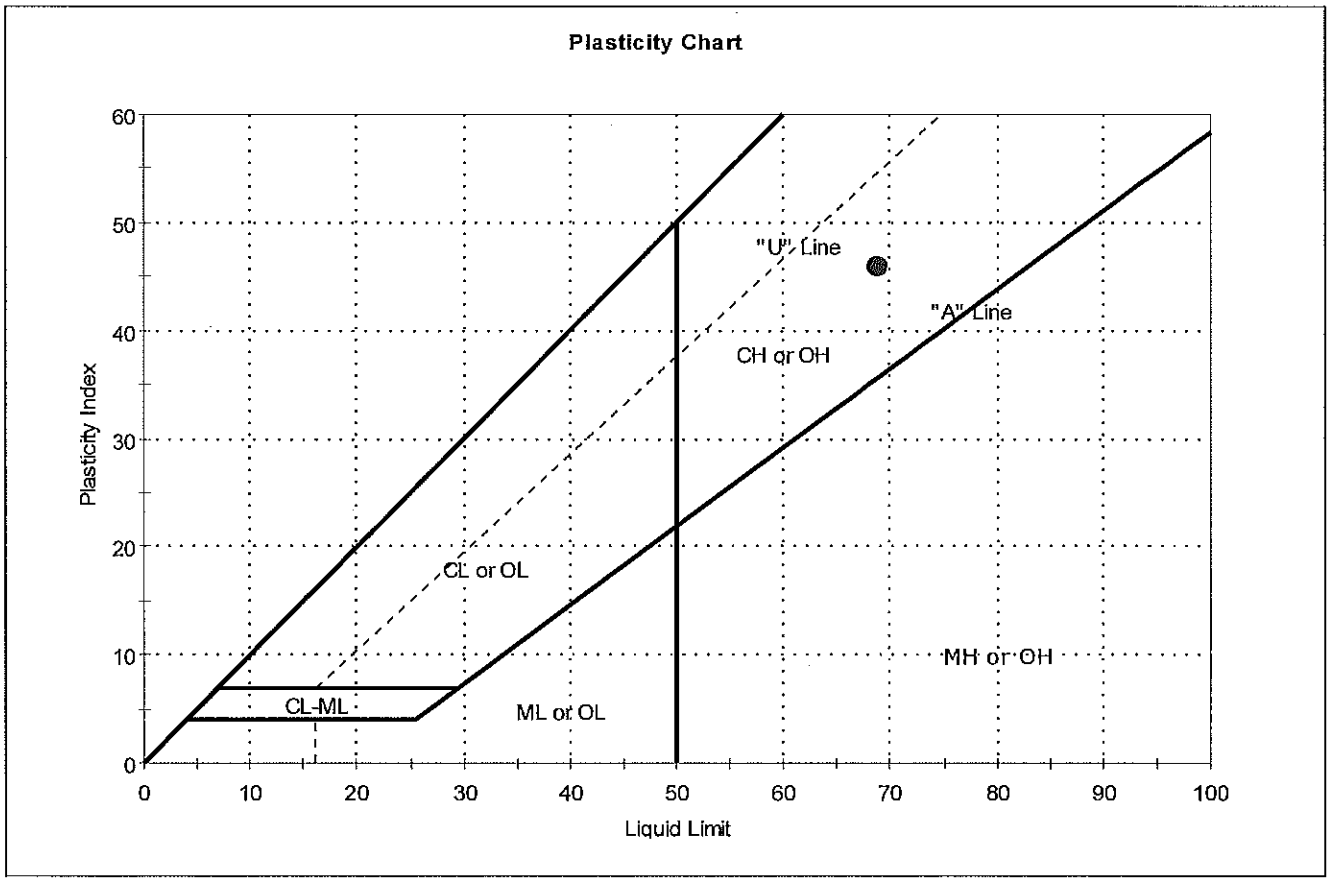
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	133 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	0-1 ft.	Test Id:	258518		
Test Comment:	---				
Sample Description:	Moist, gray clay with sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	133 A	---	0-1 ft.	84	69	23	46	1	fat clay with sand (CH)

Sample Prepared using the WET method

1% Retained on #40 Sieve

Dry Strength: VERY HIGH

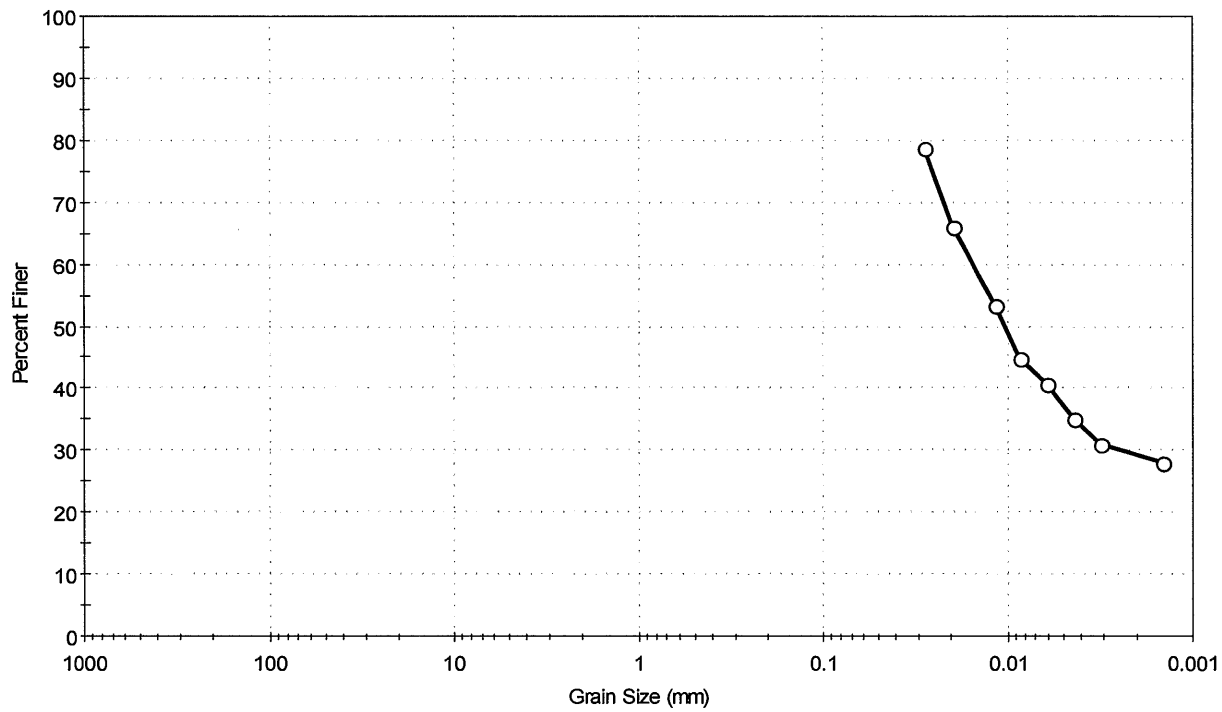
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	133 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	---	Test Id:	258516		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, gray clay				
Sample Comment:	89% passing the number 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	–	–	–

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0285	79		
---	0.0197	66		
---	0.0118	53		
---	0.0086	45		
---	0.0061	41		
---	0.0044	35		
---	0.0032	31		
---	0.0015	28		

Coefficients

D_{85} = N/A D_{30} = 0.0025 mm
D_{60} = 0.0154 mm D_{15} = N/A
D_{50} = 0.0104 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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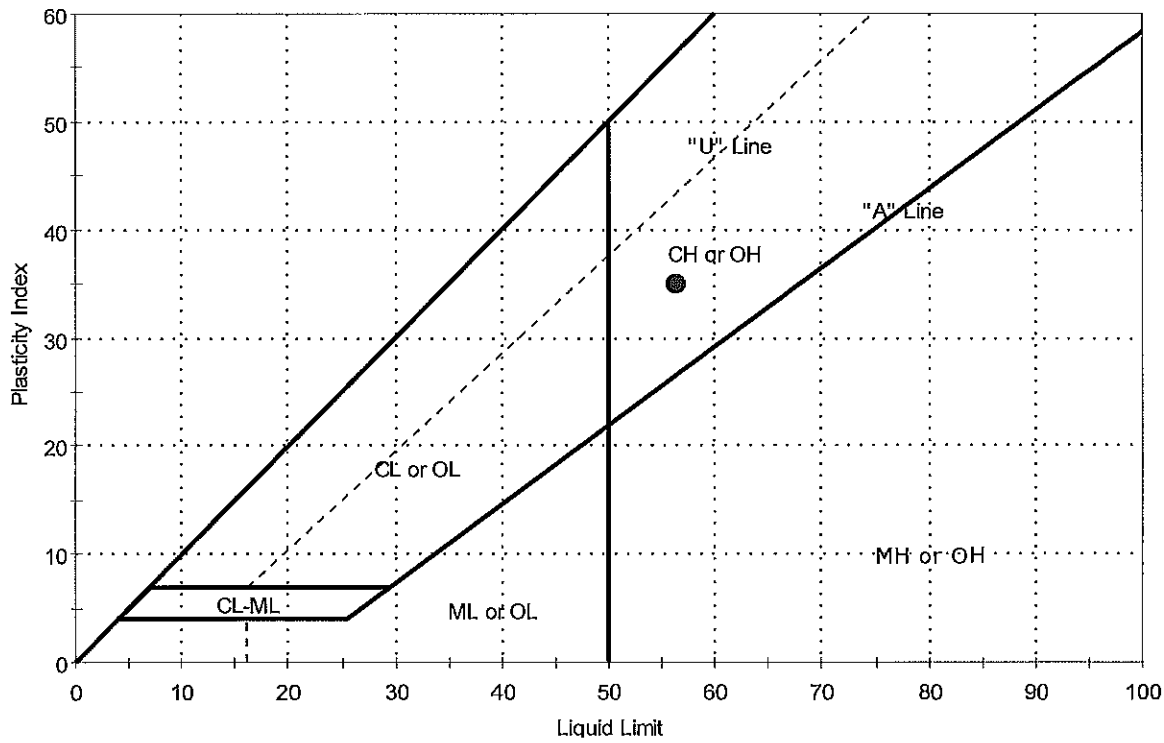
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	133 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	---	Test Id:	258519		
Test Comment:	---				
Sample Description:	Moist, gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	133 B	---	---	59	56	21	35	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

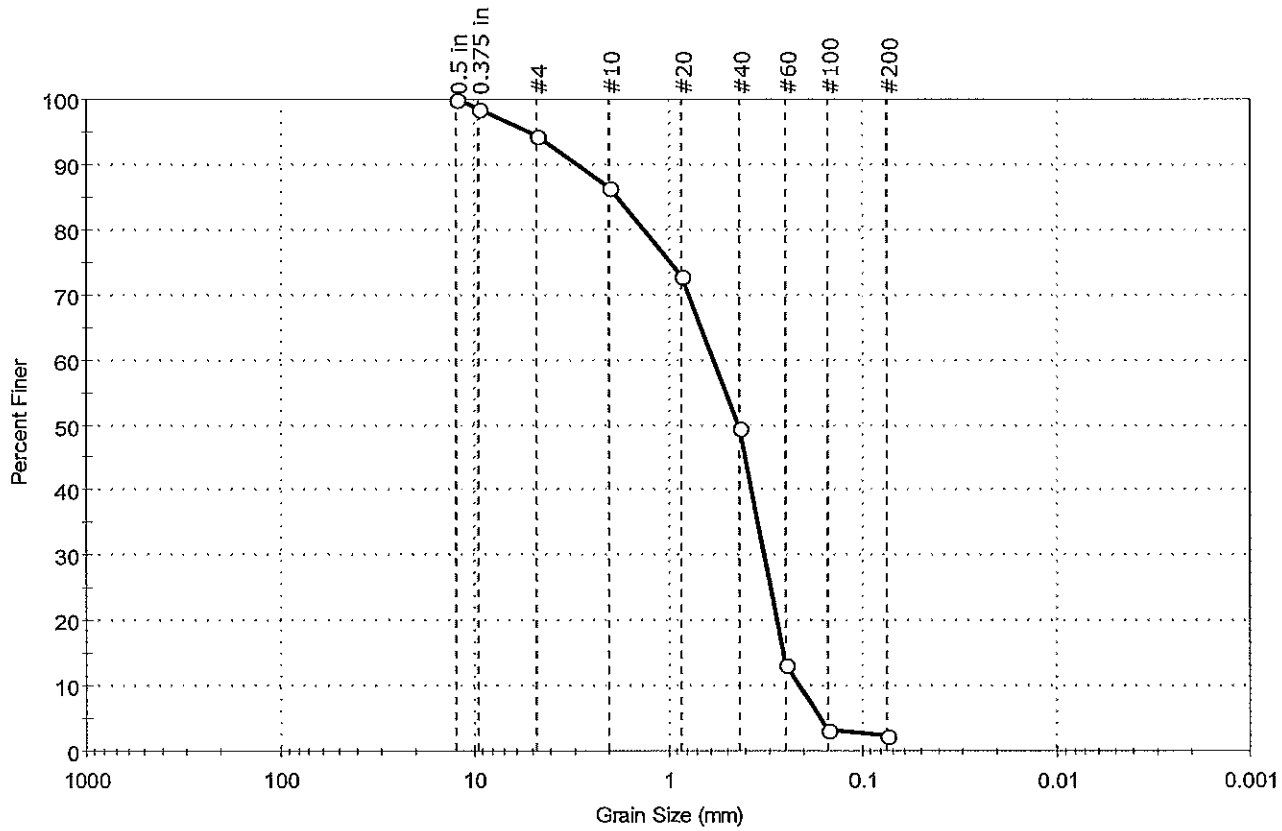
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	134 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	2-3 ft.	Test Id:	258512		
Test Comment:	----				
Sample Description:	Moist, yellowish brown sand				
Sample Comment:	----				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.7	92.1	2.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	94		
#10	2.00	86		
#20	0.85	73		
#40	0.42	49		
#60	0.25	13		
#100	0.15	3		
#200	0.075	2		

Coefficients

D_{85} =1.8330 mm D_{30} =0.3192 mm

D_{60} =0.5815 mm D_{15} =0.2560 mm

D_{50} =0.4318 mm D_{10} =0.2109 mm

C_u =2.757 C_c =0.831

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

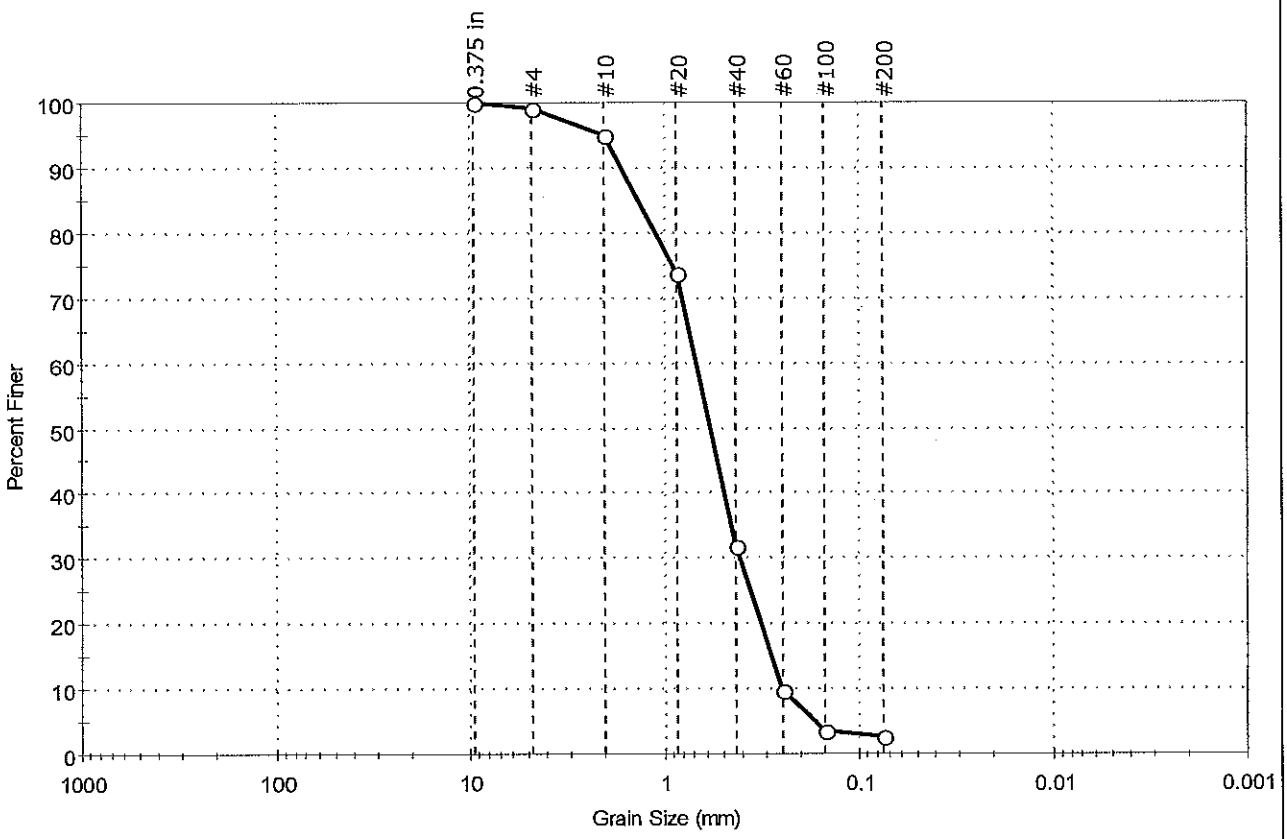
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: R-2	Sample Type: jar	Tested By:	jbr
Sample ID: 135	Test Date: 01/10/13	Checked By:	jdt
Depth : ---	Test Id: 258513		
Test Comment:	---		
Sample Description:	Moist, yellowish brown sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.0	96.3	2.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	95		
#20	0.85	74		
#40	0.42	32		
#60	0.25	10		
#100	0.15	4		
#200	0.075	3		

Coefficients

D_{85} = 1.3404 mm D_{30} = 0.4074 mm

D_{60} = 0.6780 mm D_{15} = 0.2841 mm

D_{50} = 0.5747 mm D_{10} = 0.2519 mm

C_u = 2.692 C_c = 0.972

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

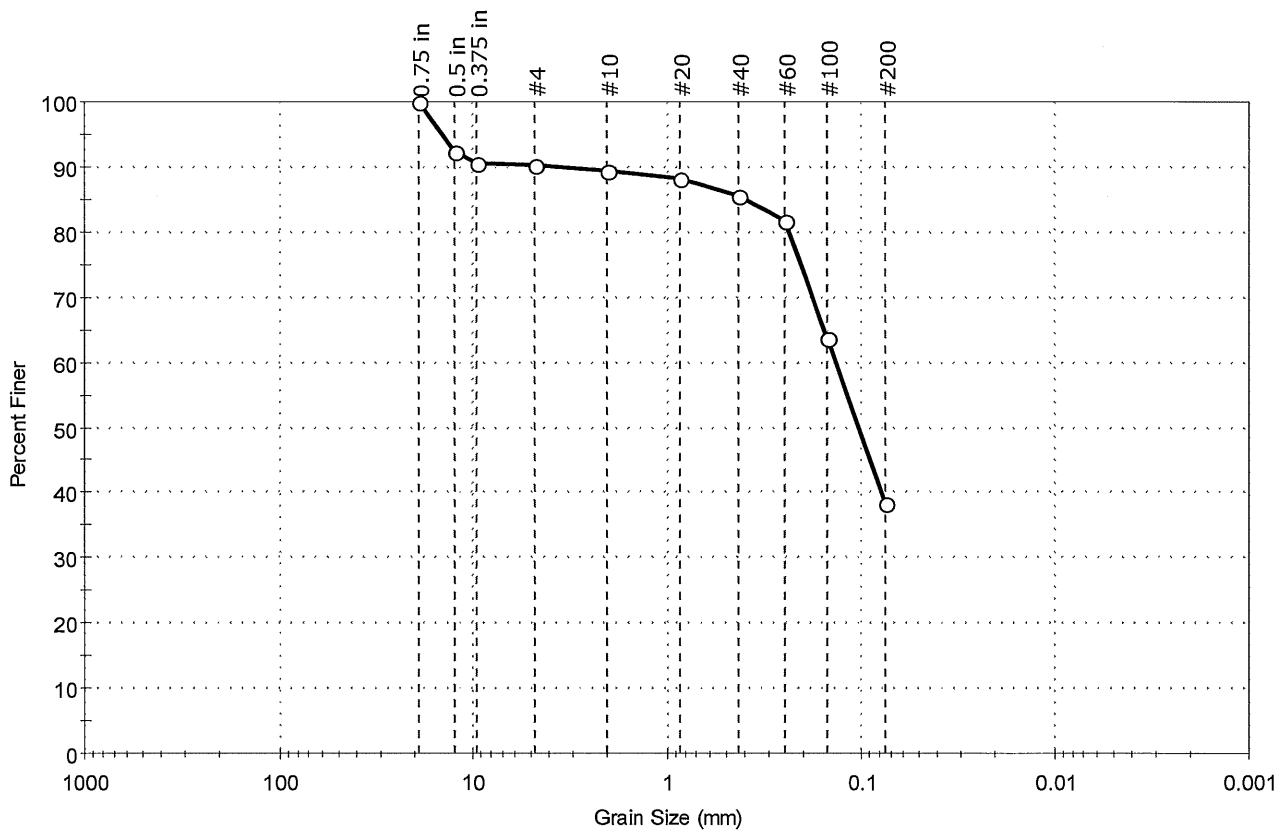
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 136 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-0.5	Test Id: 260826		
Test Comment: ---			
Sample Description: Moist, gray silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	9.7	51.9	38.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	92		
0.375 in	9.50	91		
#4	4.75	90		
#10	2.00	89		
#20	0.85	88		
#40	0.42	86		
#60	0.25	82		
#100	0.15	64		
#200	0.075	38		

Coefficients

D_{85} =0.3886 mm D_{30} =N/A
D_{60} =0.1356 mm D_{15} =N/A
D_{50} =0.1031 mm D_{10} =N/A
C_u =N/A C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

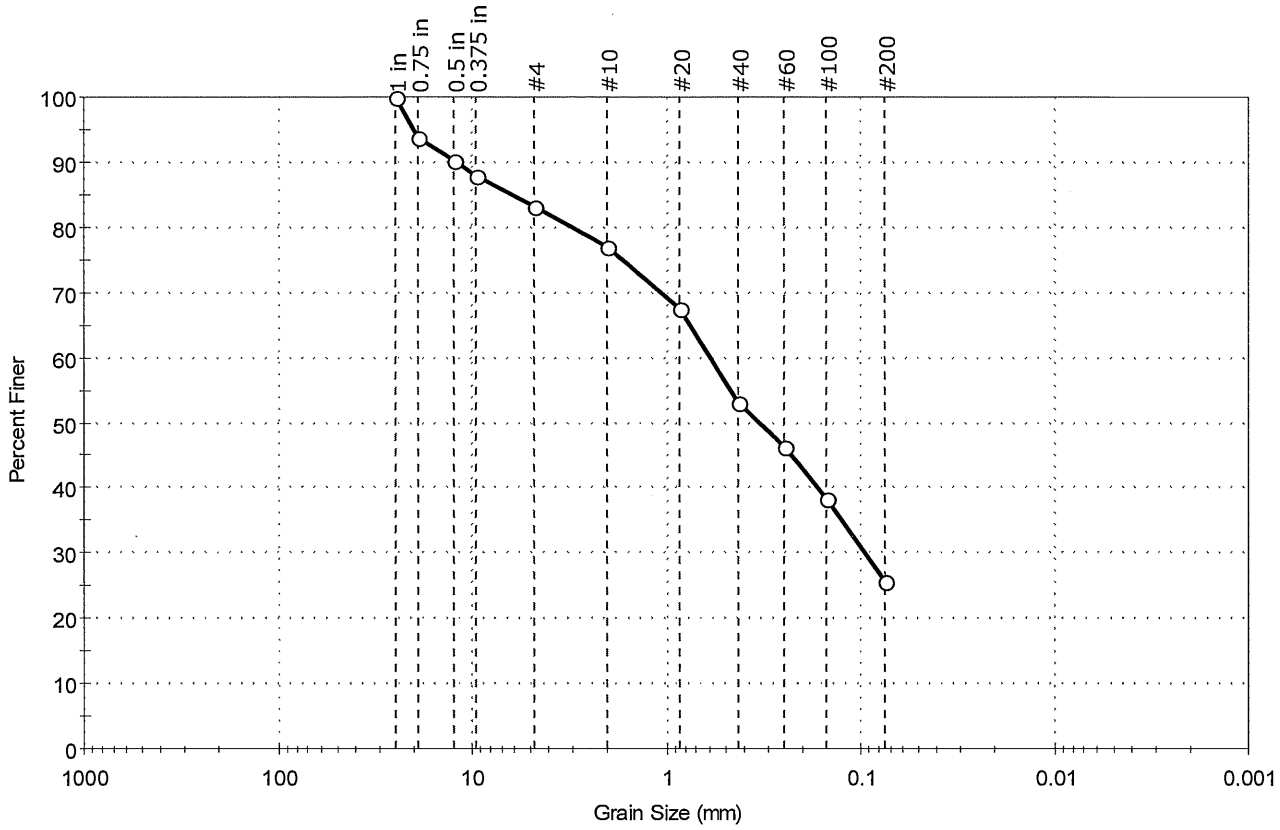
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 136 B	Test Date: 02/11/13	Checked By:	jdt
Depth : 2-3	Test Id: 260827		
Test Comment: ---			
Sample Description:	Moist, grayish brown silty sand with gravel		
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	16.8	57.6	25.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	94		
0.5 in	12.50	90		
0.375 in	9.50	88		
#4	4.75	83		
#10	2.00	77		
#20	0.85	68		
#40	0.42	53		
#60	0.25	46		
#100	0.15	38		
#200	0.075	26		

Coefficients

D_{85} =6.1797 mm	D_{30} =0.0951 mm
D_{60} =0.5920 mm	D_{15} =N/A
D_{50} =0.3342 mm	D_{10} =N/A
C_u =N/A	C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

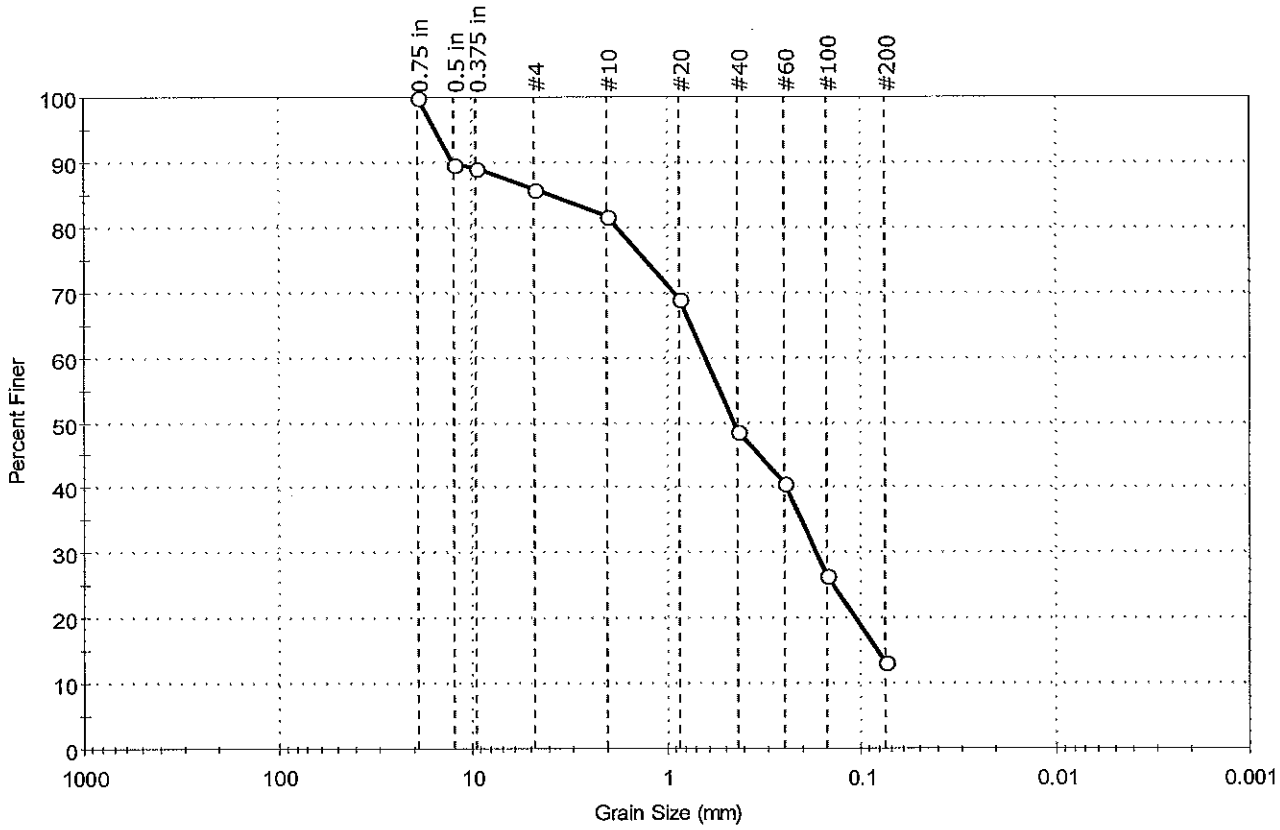
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	136 C	Test Date:	01/10/13	Checked By:	jdt
Depth :	3.6-4.5 ft.	Test Id:	258514		
Test Comment:	---				
Sample Description:	Moist, brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	14.2	72.4	13.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	90		
0.375 in	9.50	89		
#4	4.75	86		
#10	2.00	82		
#20	0.85	69		
#40	0.42	49		
#60	0.25	41		
#100	0.15	27		
#200	0.075	13		

Coefficients

D_{85} =3.9950 mm D_{30} =0.1697 mm
D_{60} =0.6268 mm D_{15} =0.0816 mm
D_{50} =0.4456 mm D_{10} =0.0627 mm
C_u =9.997 C_c =0.733

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

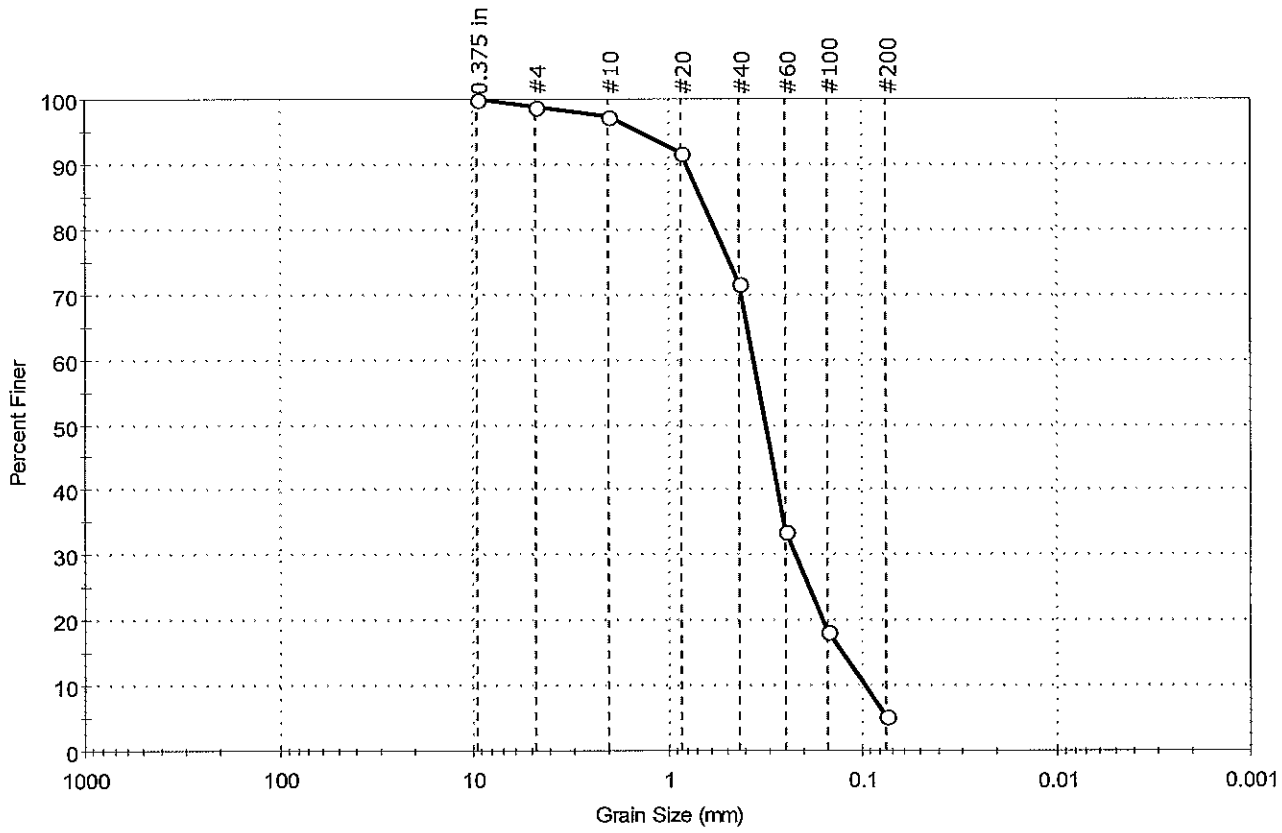
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening - Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 137 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-1.5 ft.	Test Id: 258544		
Test Comment: ---			
Sample Description:	Moist, dark gray sand		
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.0	93.6	5.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	97		
#20	0.85	92		
#40	0.42	72		
#60	0.25	34		
#100	0.15	18		
#200	0.075	5		

Coefficients

D_{85} =0.6747 mm D_{30} =0.2220 mm

D_{60} =0.3612 mm D_{15} =0.1258 mm

D_{50} =0.3143 mm D_{10} =0.0962 mm

C_u =3.755 C_c =1.418

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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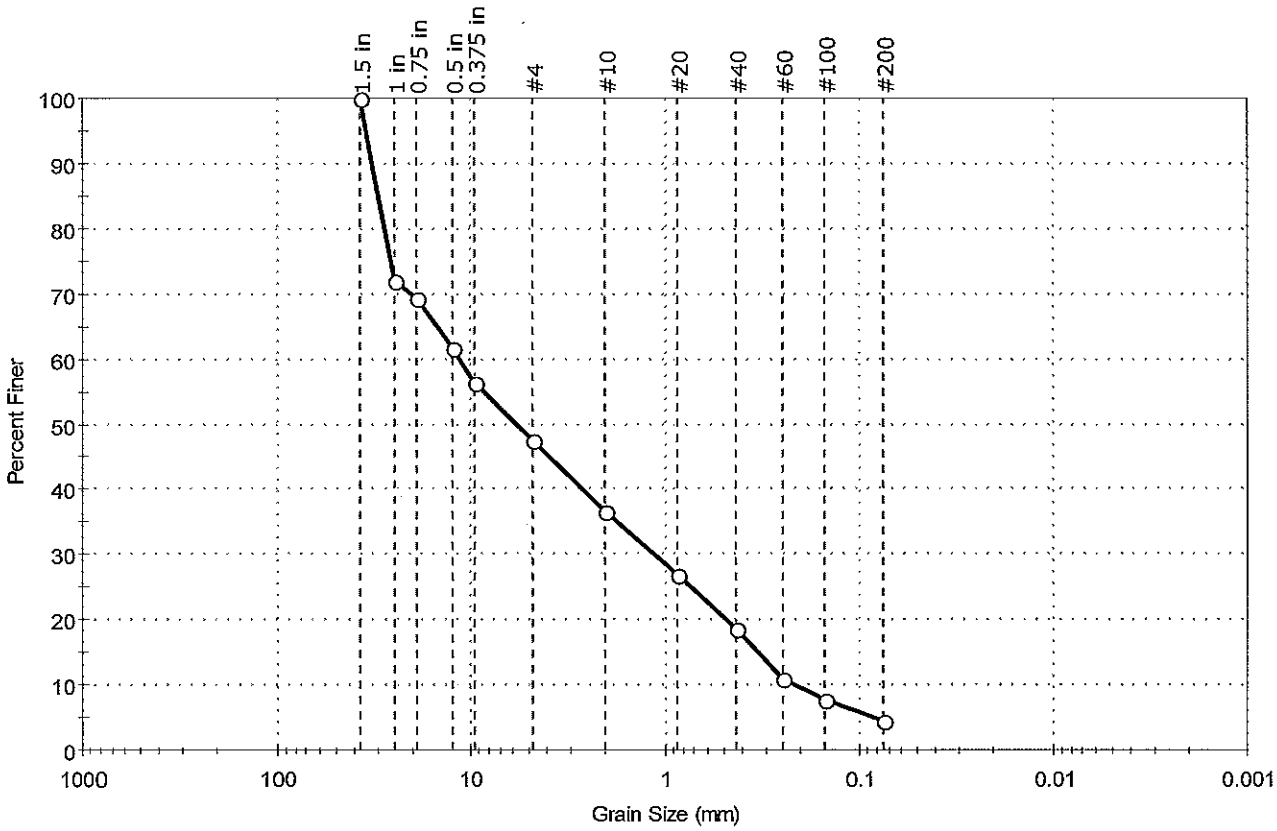
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	R-1 & R-2	Sample Type:	bucket	Tested By:	jbr
Sample ID:	138 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	---	Test Id:	258568		
Test Comment:	---				
Sample Description:	Moist, olive gray gravel with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	52.6	42.8	4.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	72		
0.75 in	19.00	69		
0.5 in	12.50	62		
0.375 in	9.50	56		
#4	4.75	47		
#10	2.00	37		
#20	0.85	27		
#40	0.42	19		
#60	0.25	11		
#100	0.15	8		
#200	0.075	5		

Coefficients

D_{85} = 30.1527 mm D_{30} = 1.1262 mm

D_{60} = 11.5122 mm D_{15} = 0.3319 mm

D_{50} = 5.8115 mm D_{10} = 0.2211 mm

C_u = 52.068 C_c = 0.498

Classification

ASTM Poorly graded gravel with sand (GP)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (0))

Sample/Test Description

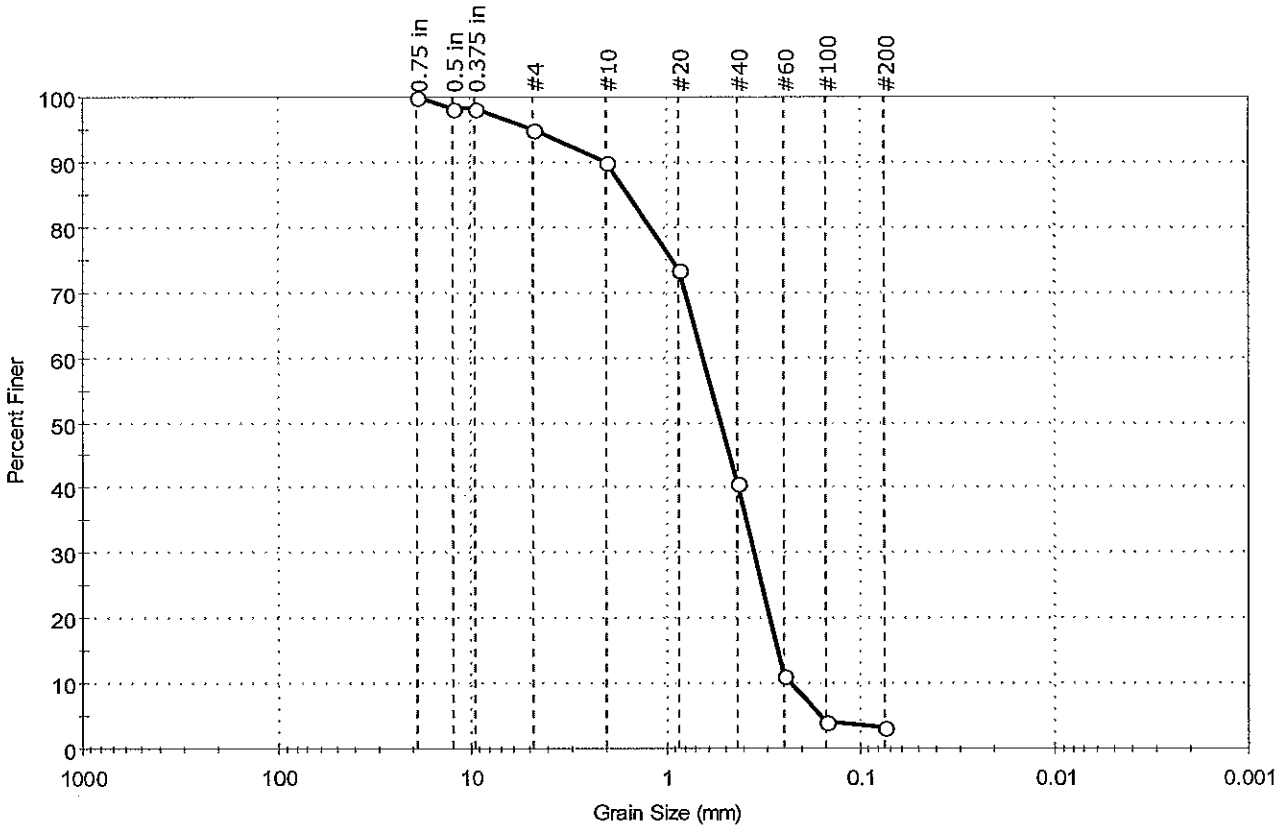
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening -- Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: R-1	Sample Type: jar	Tested By:	jbr
Sample ID: 138 B	Test Date: 01/10/13	Checked By:	jdt
Depth : ---	Test Id: 258545		
Test Comment:	---		
Sample Description:	Moist, brown sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	5.0	91.9	3.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	98		
#4	4.75	95		
#10	2.00	90		
#20	0.85	74		
#40	0.42	41		
#60	0.25	11		
#100	0.15	4		
#200	0.075	3		

Coefficients

D_{85} = 1.5504 mm D_{30} = 0.3509 mm

D_{60} = 0.6389 mm D_{15} = 0.2682 mm

D_{50} = 0.5173 mm D_{10} = 0.2310 mm

C_u = 2.766 C_c = 0.834

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

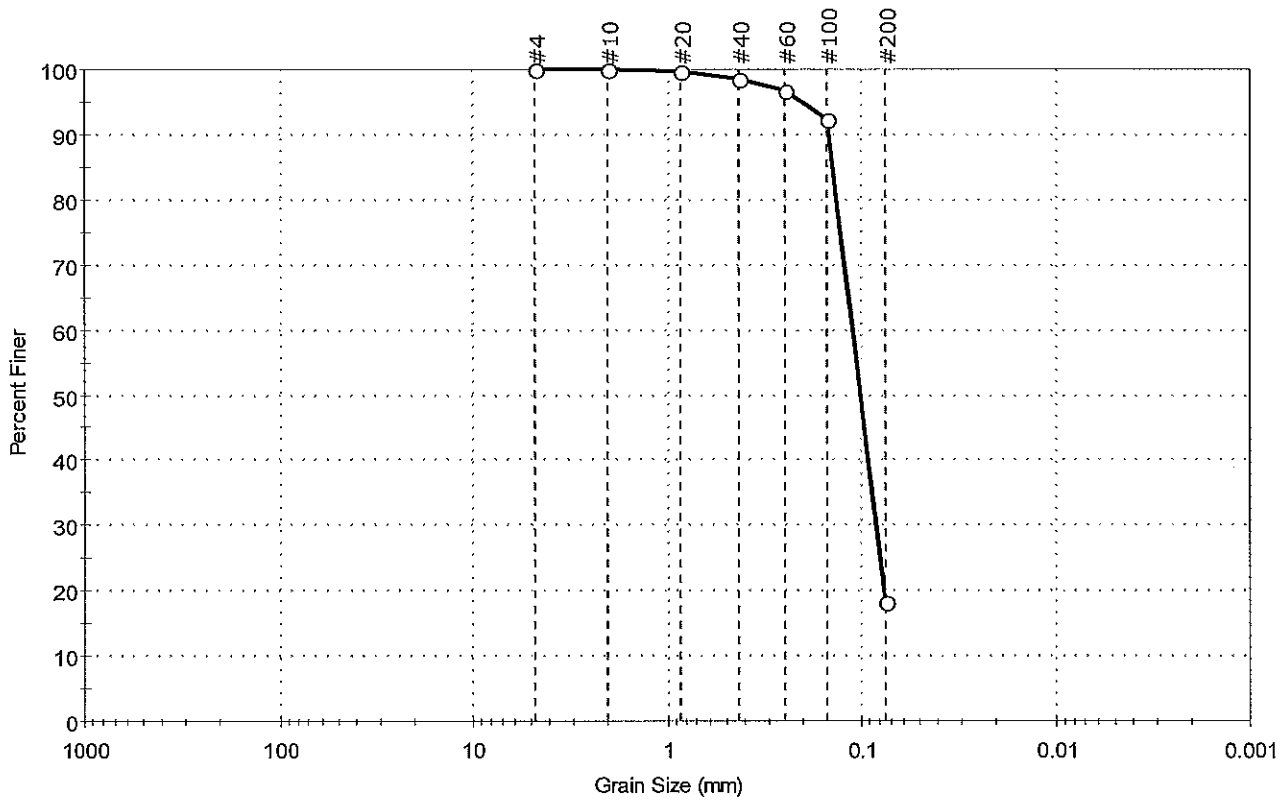
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 139 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0.5-1.5 ft.	Test Id: 258569		
Test Comment:	---		
Sample Description:	Moist, dark gray silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	81.6	18.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	97		
#100	0.15	92		
#200	0.075	18		

Coefficients

D_{85} = 0.1402 mm D_{30} = 0.0836 mm
D_{60} = 0.1108 mm D_{15} = N/A
D_{50} = 0.1009 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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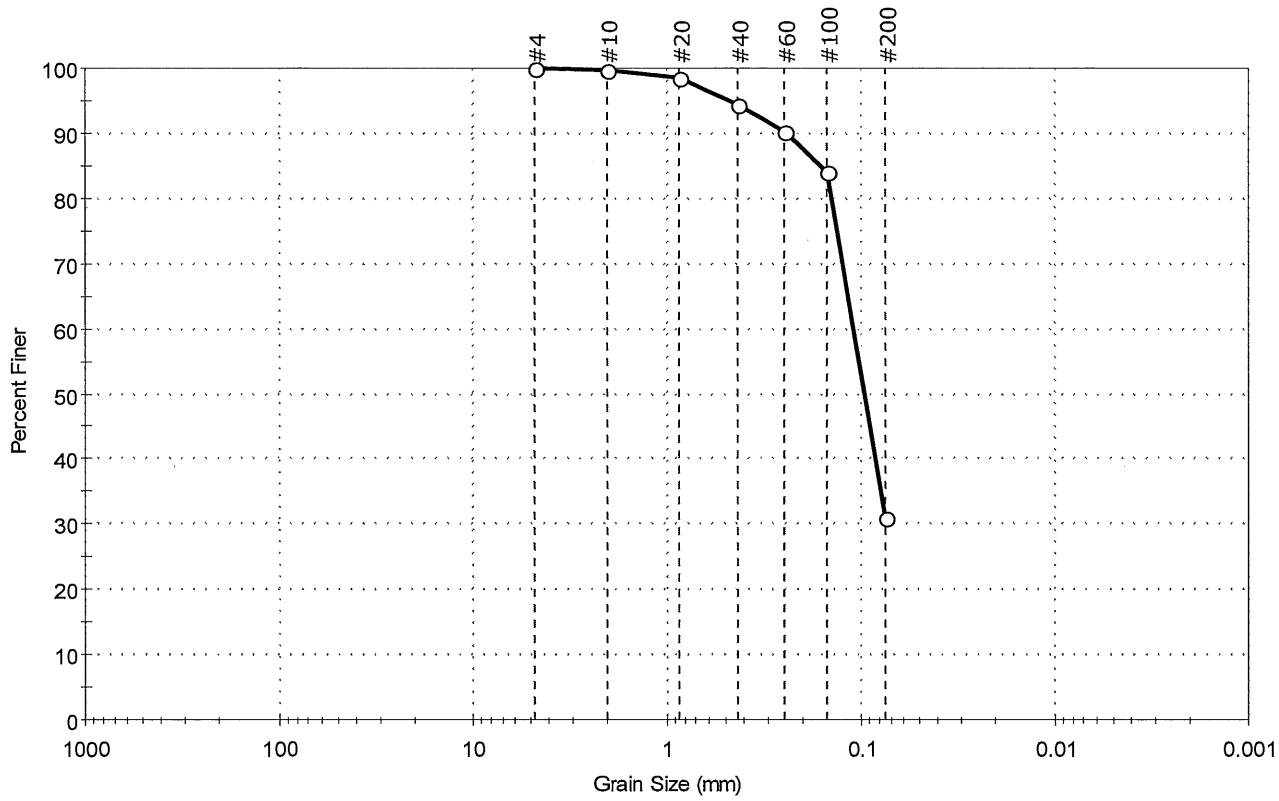
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 139 B	Test Date: 02/11/13	Checked By:	jdt
Depth : 3.5-4.5	Test Id: 260828		
Test Comment:	---		
Sample Description:	Moist, olive gray silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	68.9	31.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	98		
#40	0.42	94		
#60	0.25	90		
#100	0.15	84		
#200	0.075	31		

Coefficients

D_{85} = 0.1612 mm D_{30} = N/A
D_{60} = 0.1094 mm D_{15} = N/A
D_{50} = 0.0960 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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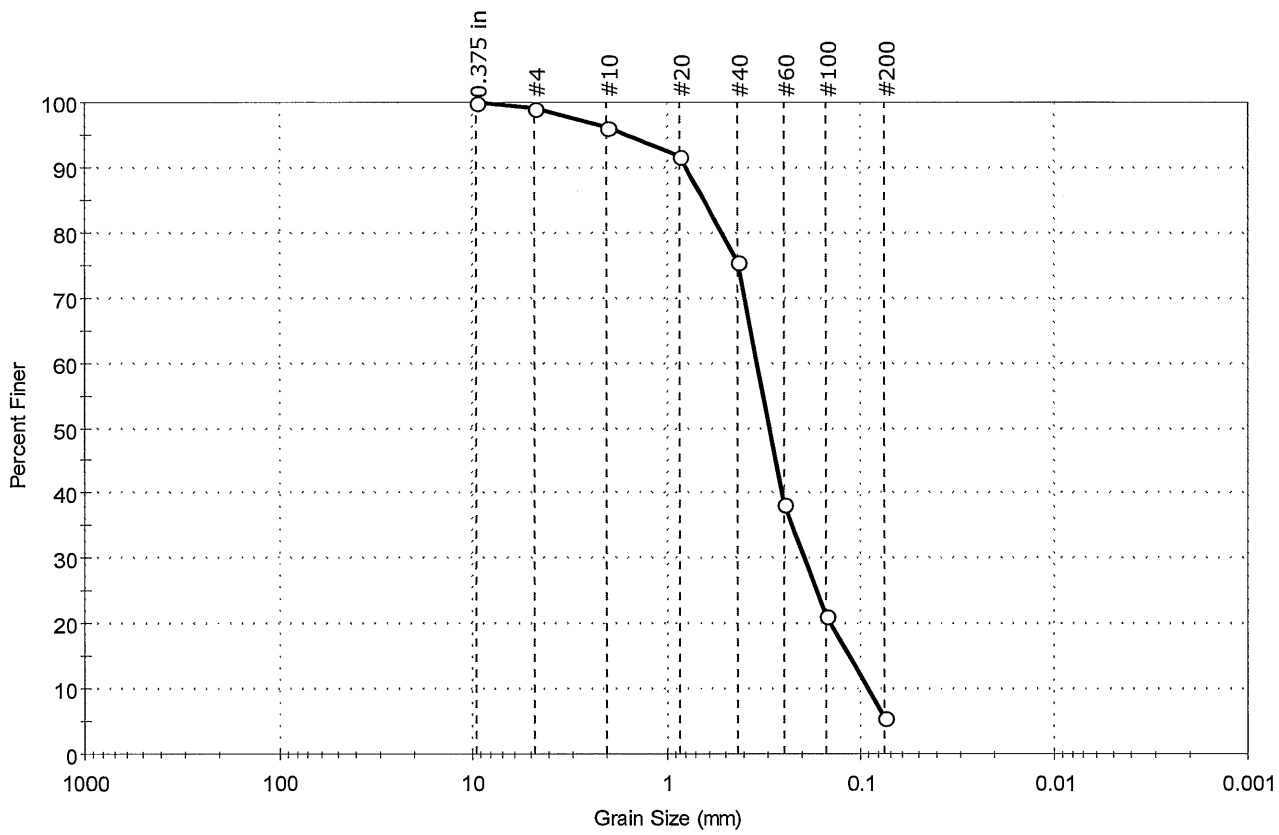
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 140 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0.5-1.5	Test Id: 260829		
Test Comment:	---		
Sample Description:	Moist, very dark brown sand with silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.0	93.4	5.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	96		
#20	0.85	92		
#40	0.42	76		
#60	0.25	38		
#100	0.15	21		
#200	0.075	6		

Coefficients

D_{85} = 0.6363 mm D_{30} = 0.1948 mm
D_{60} = 0.3405 mm D_{15} = 0.1134 mm
D_{50} = 0.2954 mm D_{10} = 0.0910 mm
C_u = 3.742 C_c = 1.225

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

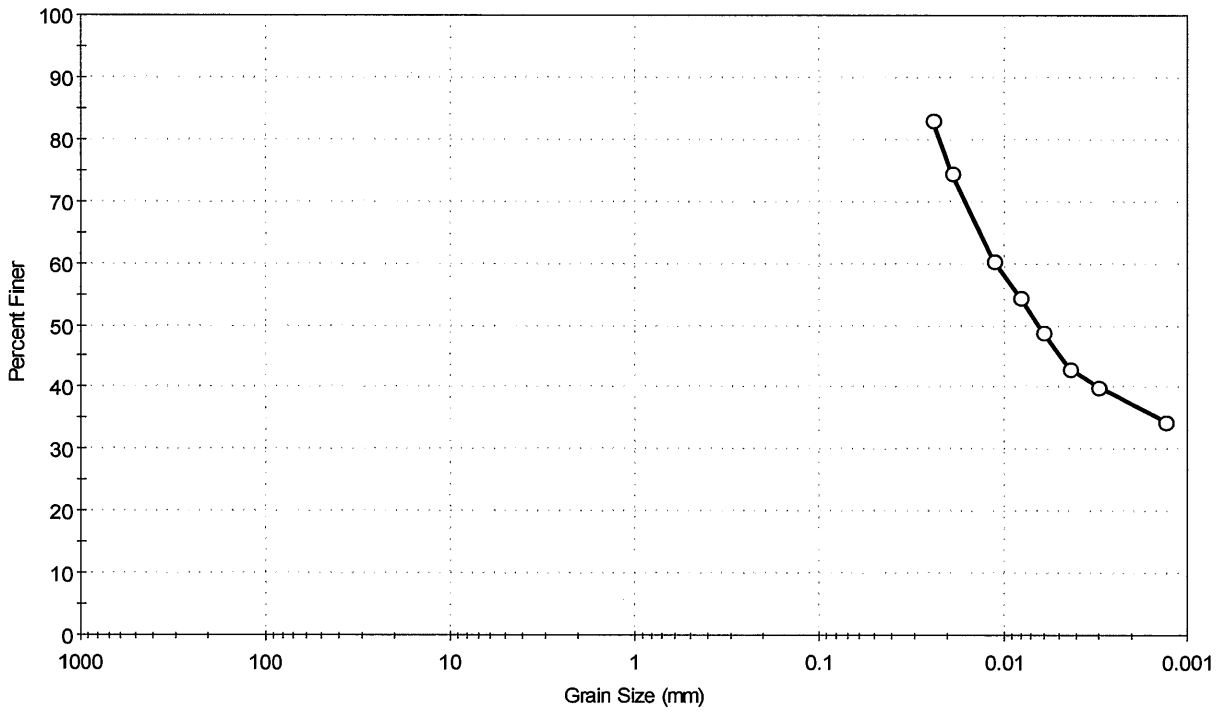
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	140 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	3.5-4.0 ft.	Test Id:	258517		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, gray clay				
Sample Comment:	86% passing the No. 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	—	—

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0247	83		
---	0.0191	75		
---	0.0114	60		
---	0.0083	55		
---	0.0061	49		
---	0.0044	43		
---	0.0031	40		
---	0.0013	34		

Coefficients

D_{85} = N/A D_{30} = N/A
D_{60} = 0.0112 mm D_{15} = N/A
D_{50} = 0.0065 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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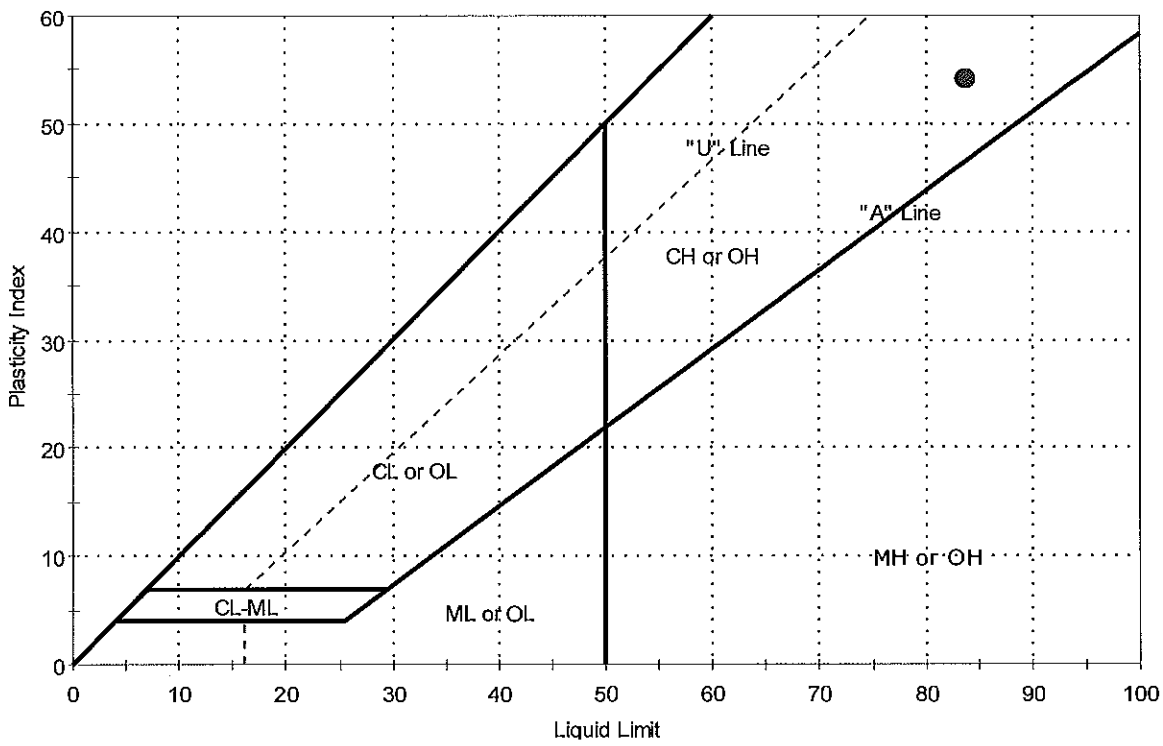
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	140 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	3.5-4.0 ft.	Test Id:	258520		
Test Comment:	---				
Sample Description:	Moist, gray clay				
Sample Comment:	86% passing the No. 200 sieve				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	140 B	---	3.5-4.0 ft.	90	84	29	55	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

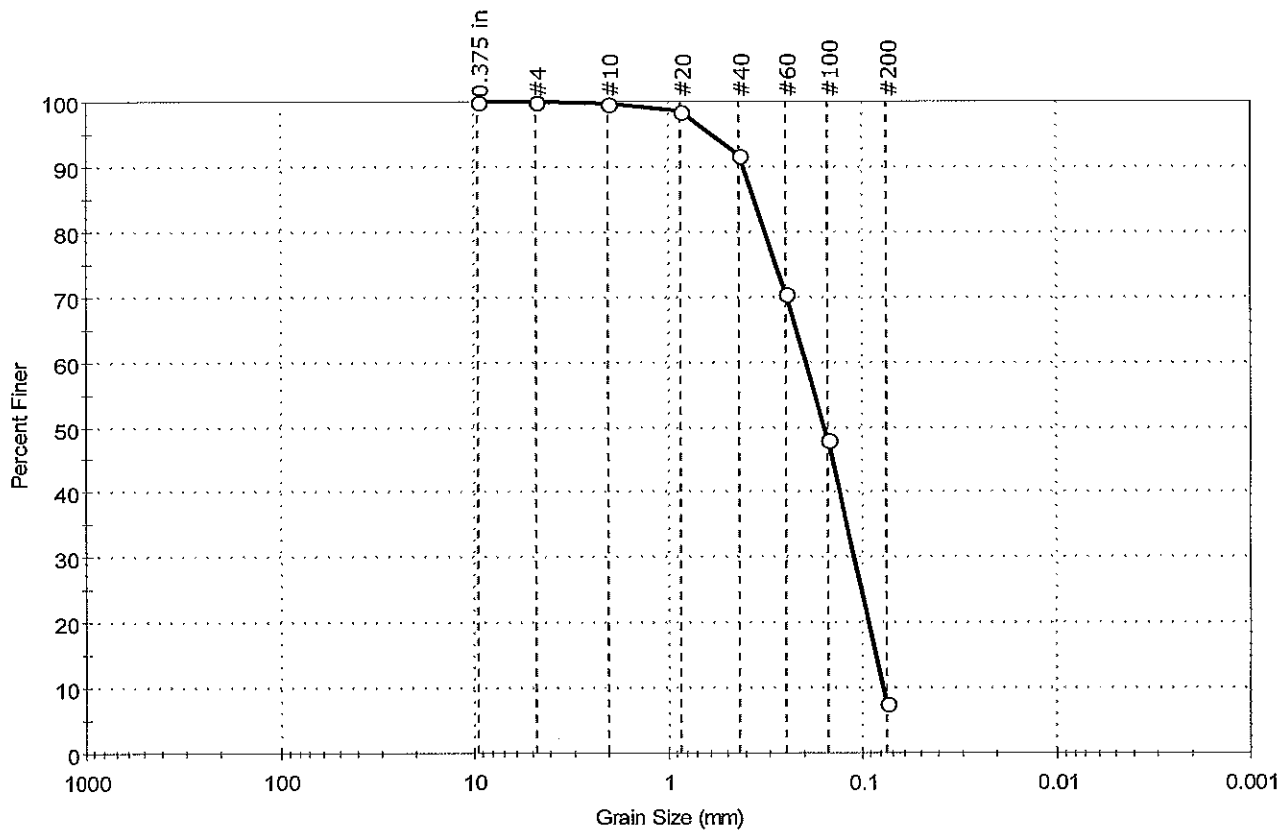
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 141 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-1 ft.	Test Id: 258539		
Test Comment: ---			
Sample Description: Moist, gray sand with silt			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.1	92.2	7.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	92		
#60	0.25	71		
#100	0.15	48		
#200	0.075	8		

Coefficients

D_{85} =0.3600 mm D_{30} =0.1101 mm
D_{60} =0.1970 mm D_{15} =0.0851 mm
D_{50} =0.1570 mm D_{10} =0.0781 mm
C_u =2.522 C_c =0.788

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

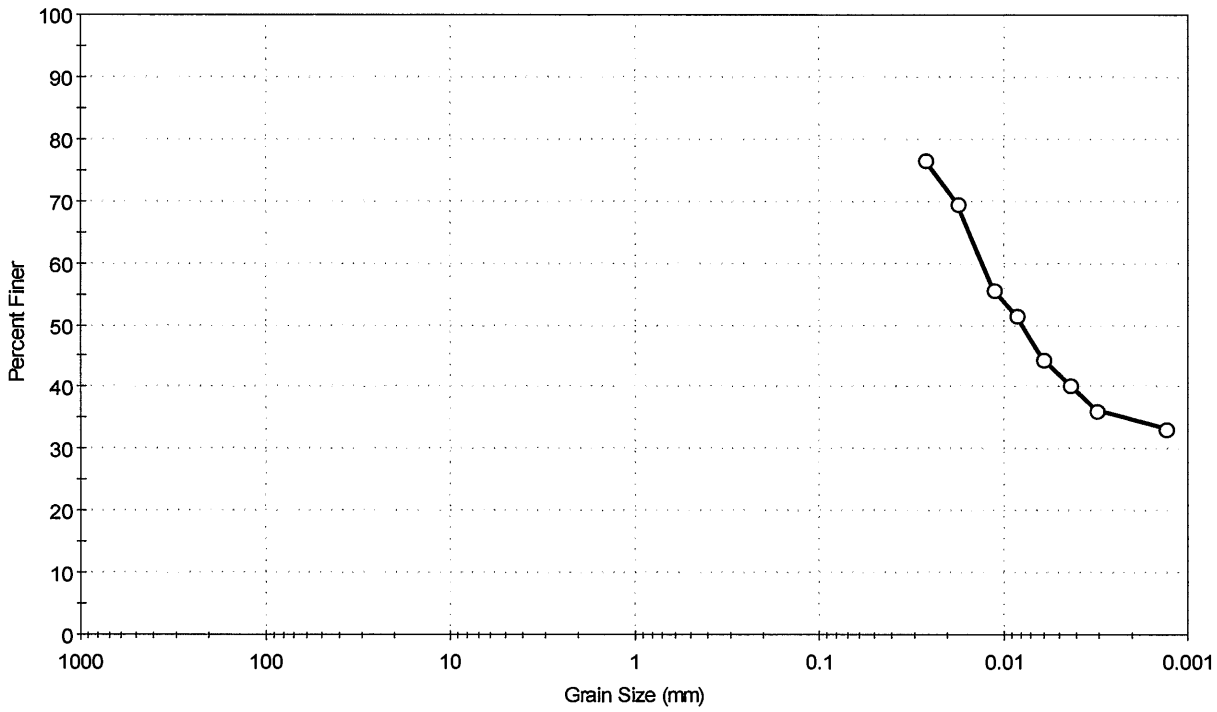
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	141 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	5.5-6.5 ft.	Test Id:	258547		
Test Comment:	81% passing the number 200 sieve				
Sample Description:	Moist, gray clay with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	–	–	–

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0270	77		
---	0.0180	70		
---	0.0114	56		
---	0.0085	52		
---	0.0061	45		
---	0.0044	40		
---	0.0031	36		
---	0.0013	33		

Coefficients

D_{85} = N/A D_{30} = N/A
D_{60} = 0.0131 mm D_{15} = N/A
D_{50} = 0.0079 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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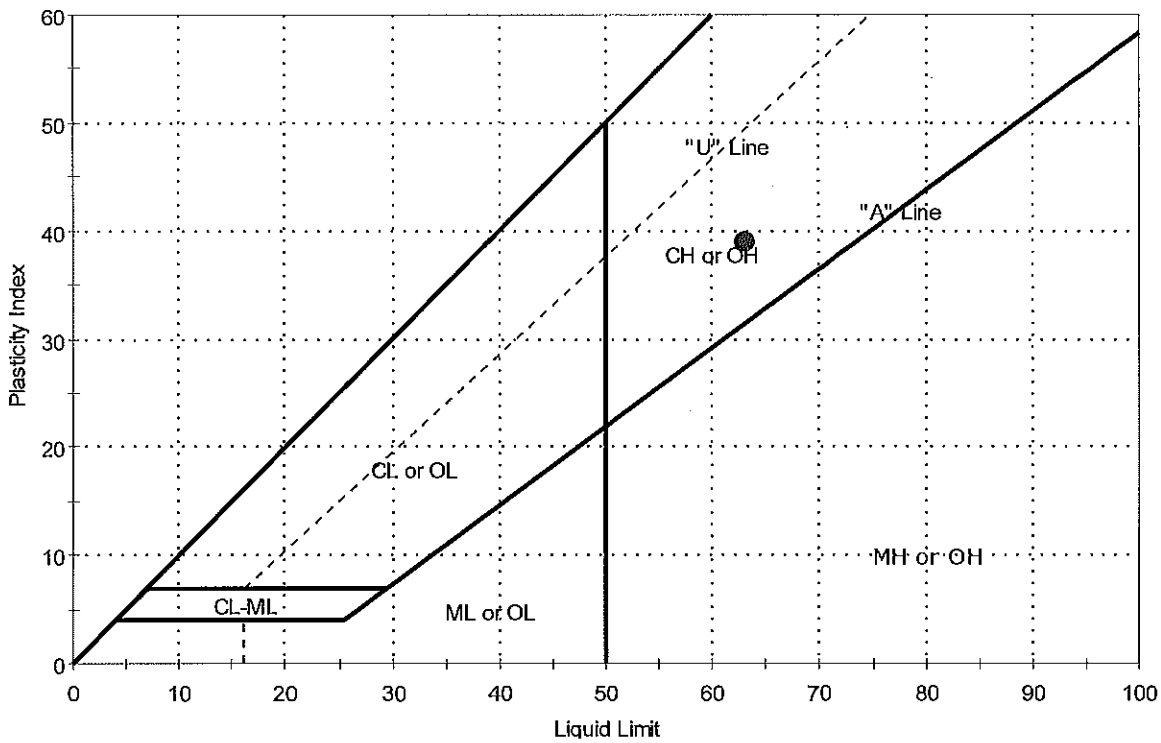
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	141 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	5.5-6.5 ft.	Test Id:	258548		
Test Comment:	---				
Sample Description:	Moist, gray clay with sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	141 B	---	5.5-6.5 ft.	73	63	24	39	1	

Sample Prepared using the WET method

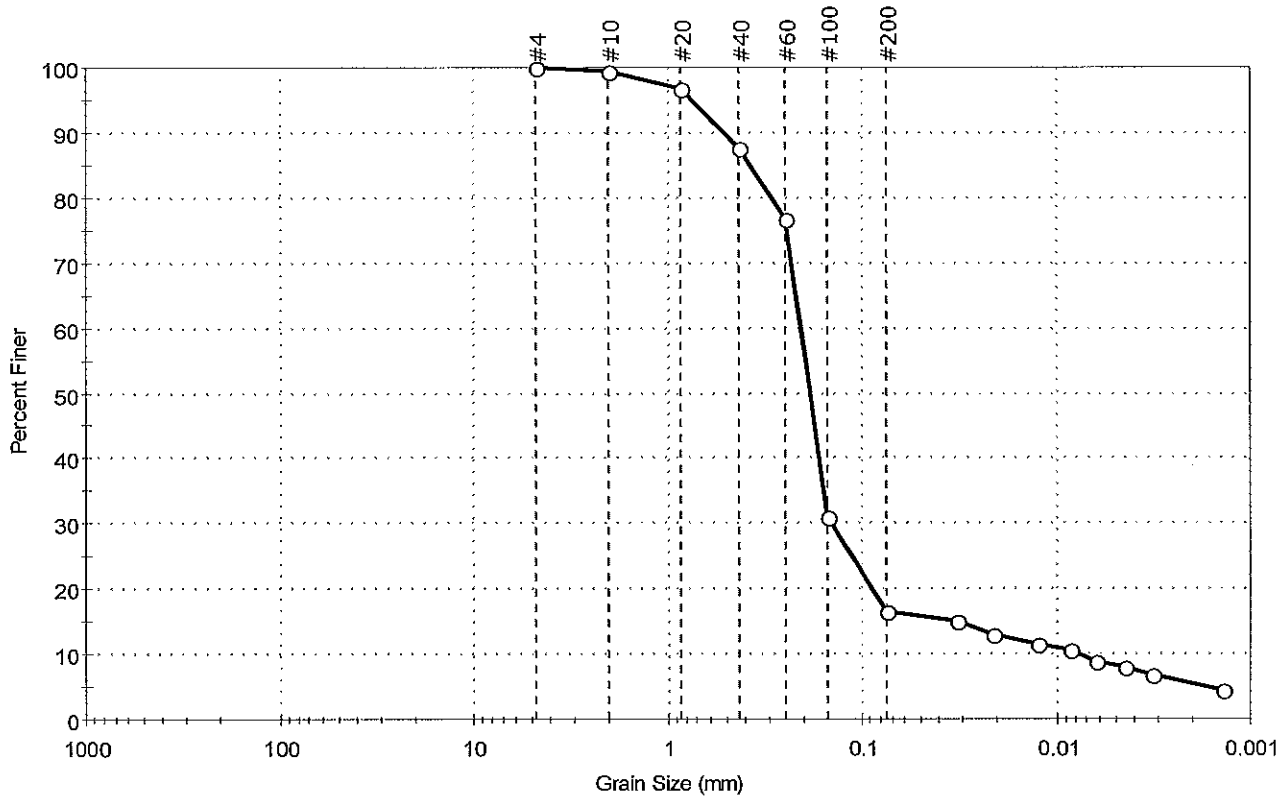
Dry Strength: VERY HIGH

Dilatancy: SLOW

Toughness: LOW

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 142 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 1-2 ft.	Test Id: 258546		
Test Comment:	---		
Sample Description:	Moist, yellowish brown silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	83.6	16.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	97		
#40	0.42	88		
#60	0.25	77		
#100	0.15	31		
#200	0.075	16		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0325	15		
---	0.0212	13		
---	0.0124	12		
---	0.0086	11		
---	0.0063	9		
---	0.0045	8		
---	0.0032	7		
---	0.0014	4		

Coefficients

D_{85} =0.3733 mm D_{30} =0.1431 mm

D_{60} =0.2076 mm D_{15} =0.0318 mm

D_{50} =0.1856 mm D_{10} =0.0077 mm

C_u =26.961 C_c =12.810

Classification

ASTM Silty sand (SM)

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	142 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	1-2 ft.	Test Id:	258549		
Test Comment:	---				
Sample Description:	Moist, yellowish brown silty sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	142 A	---	1-2 ft.	30	n/a	n/a	n/a	n/a	Silty sand (SM)

12% Retained on #40 Sieve

Dry Strength: LOW

Dilatancy: RAPID

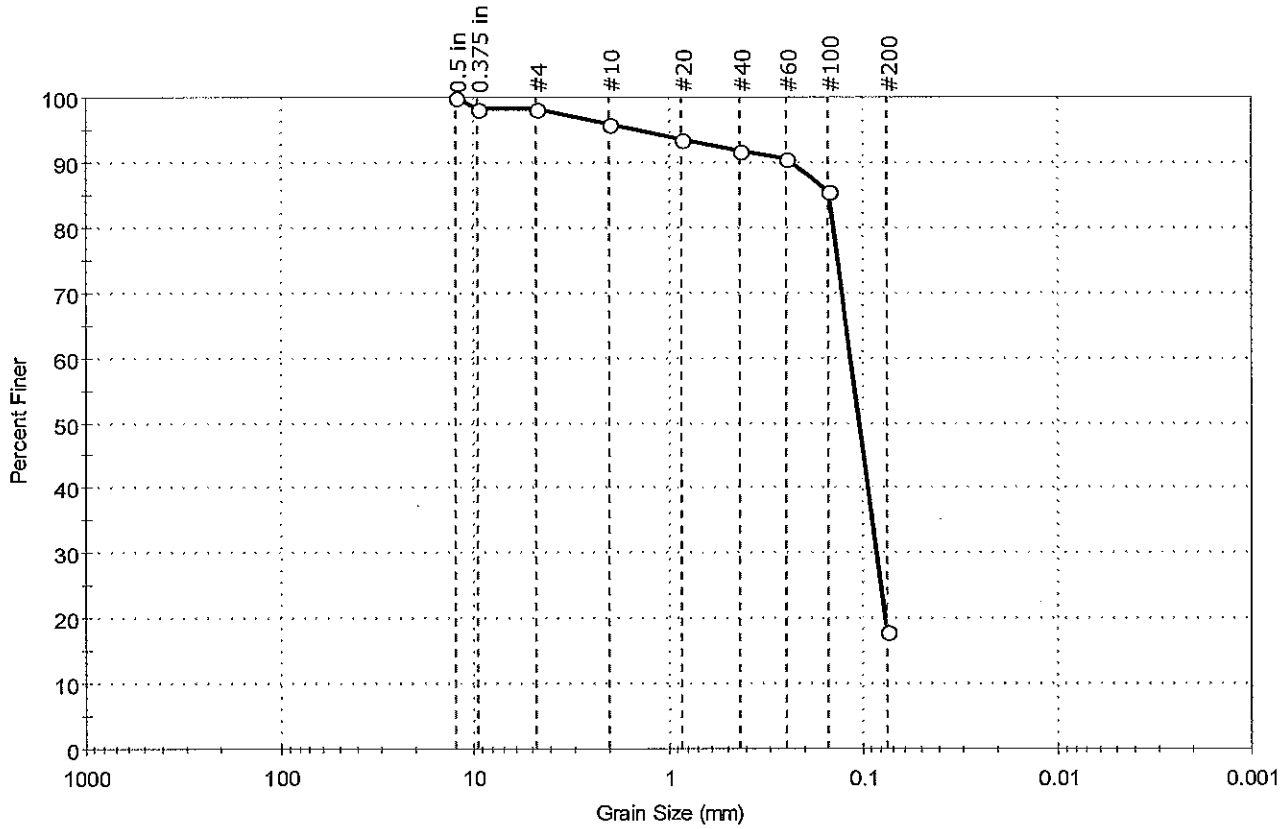
Toughness: n/a

The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 143 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0.5-1.5 ft.	Test Id: 258540		
Test Comment: ---			
Sample Description: Moist, dark gray silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.9	80.1	18.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	98		
#10	2.00	96		
#20	0.85	94		
#40	0.42	92		
#60	0.25	91		
#100	0.15	86		
#200	0.075	18		

Coefficients

D_{85} = 0.1491 mm D_{30} = 0.0848 mm
D_{60} = 0.1154 mm D_{15} = N/A
D_{50} = 0.1041 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

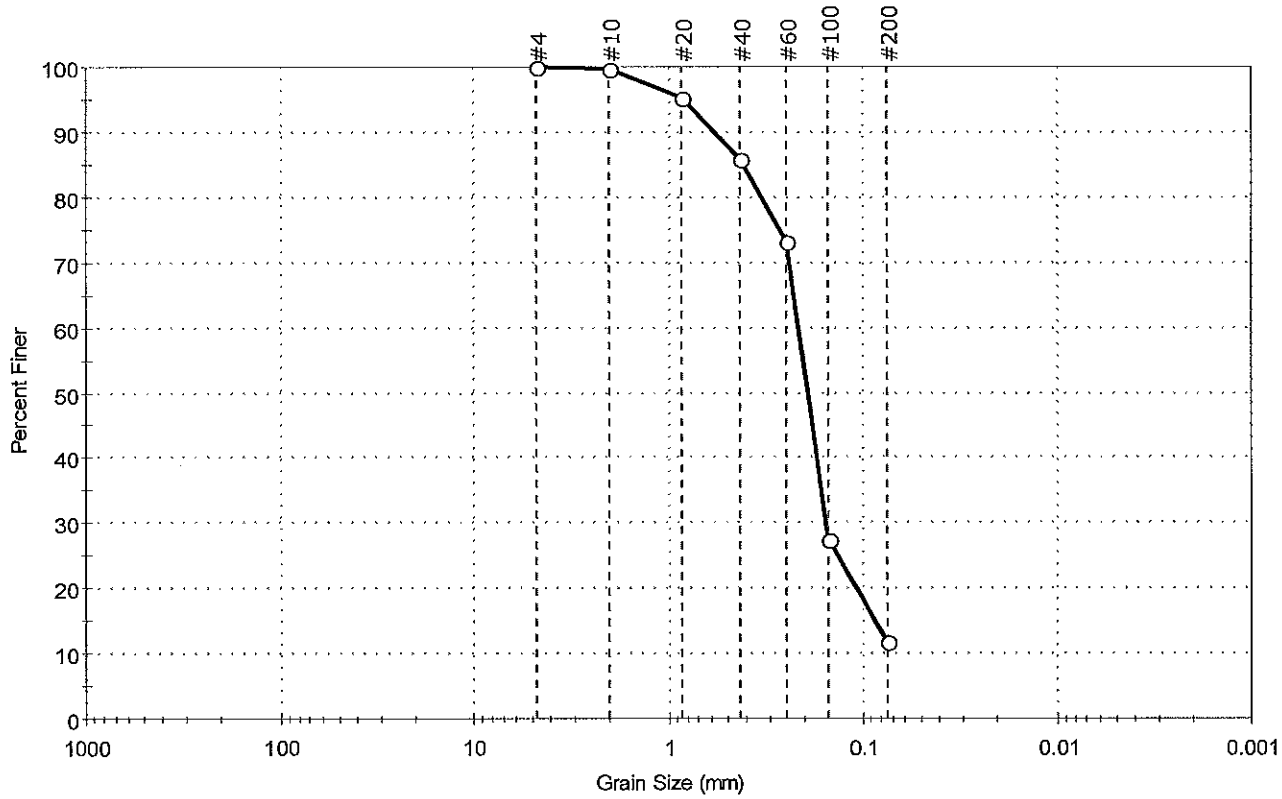
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	143 C	Test Date:	01/10/13	Checked By:	jdt
Depth :	5-6 ft.	Test Id:	258541		
Test Comment:	---				
Sample Description:	Moist, olive brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	88.3	11.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	95		
#40	0.42	86		
#60	0.25	73		
#100	0.15	28		
#200	0.075	12		

Coefficients

D_{85} = 0.4124 mm D_{30} = 0.1542 mm
D_{60} = 0.2156 mm D_{15} = 0.0866 mm
D_{50} = 0.1928 mm D_{10} = 0.0695 mm
C_u = 3.102 C_c = 1.587

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

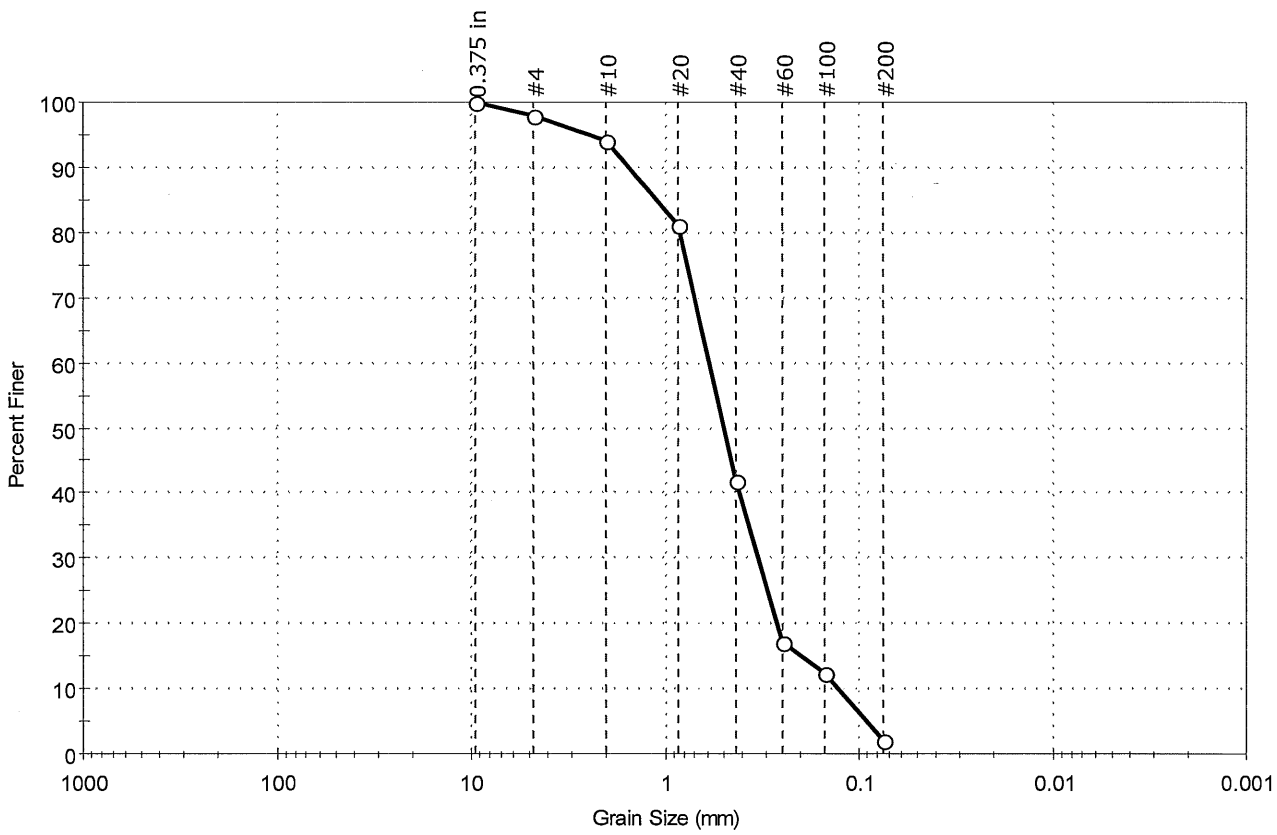
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	144 A	Test Date:	02/11/13	Checked By:	jdt
Depth :	1-2	Test Id:	260830		
Test Comment:	---				
Sample Description:	Moist, grayish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.1	95.8	2.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	94		
#20	0.85	81		
#40	0.42	42		
#60	0.25	17		
#100	0.15	13		
#200	0.075	2		

Coefficients

D_{85} = 1.1032 mm D_{30} = 0.3298 mm

D_{60} = 0.5854 mm D_{15} = 0.1988 mm

D_{50} = 0.4905 mm D_{10} = 0.1268 mm

C_u = 4.617 C_c = 1.465

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

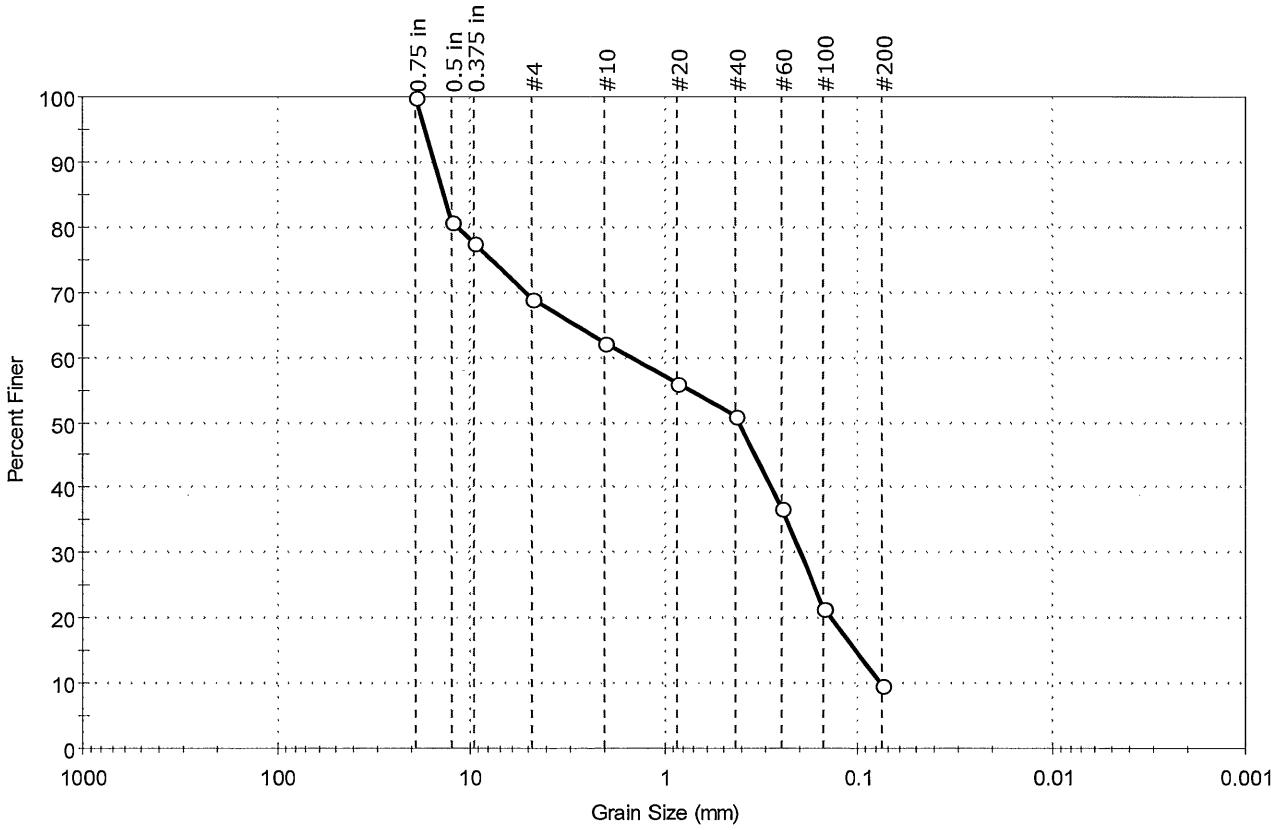
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	144 B	Test Date:	02/11/13	Checked By:	jdt
Depth :	2.5-3.5	Test Id:	260831		
Test Comment:	---				
Sample Description:	Moist, dark gray sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	31.0	59.2	9.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	81		
0.375 in	9.50	77		
#4	4.75	69		
#10	2.00	62		
#20	0.85	56		
#40	0.42	51		
#60	0.25	37		
#100	0.15	22		
#200	0.075	10		

Coefficients

D_{85} = 13.6956 mm D_{30} = 0.1987 mm
D_{60} = 1.4531 mm D_{15} = 0.1019 mm
D_{50} = 0.4077 mm D_{10} = 0.0759 mm
C_u = 19.145 C_c = 0.358

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

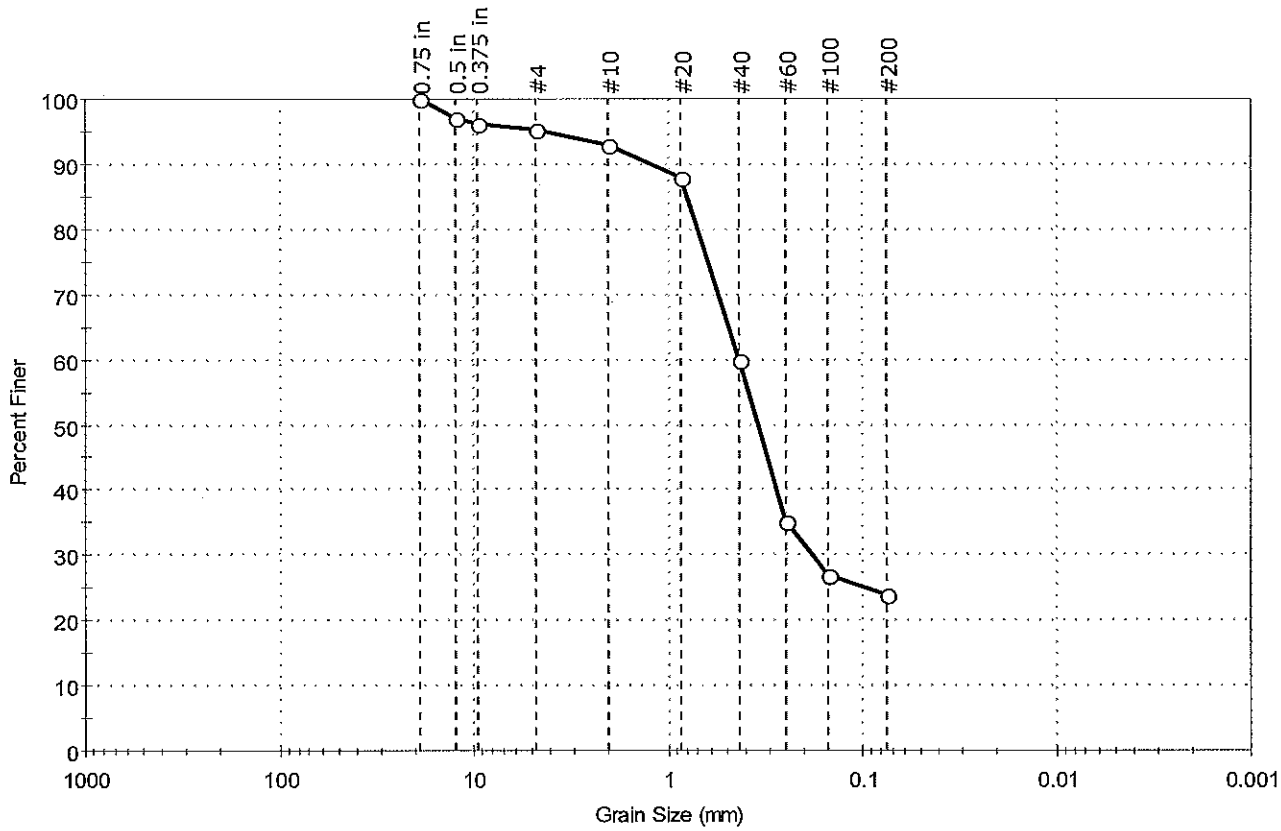
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	144 D	Test Date:	01/10/13	Checked By:	jdt
Depth :	4.6-5.2 ft.	Test Id:	258542		
Test Comment:	---				
Sample Description:	Moist, gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.7	71.4	23.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	97		
0.375 in	9.50	96		
#4	4.75	95		
#10	2.00	93		
#20	0.85	88		
#40	0.42	60		
#60	0.25	35		
#100	0.15	27		
#200	0.075	24		

Coefficients

D_{85} = 0.7908 mm D_{30} = 0.1835 mm
D_{60} = 0.4270 mm D_{15} = N/A
D_{50} = 0.3444 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

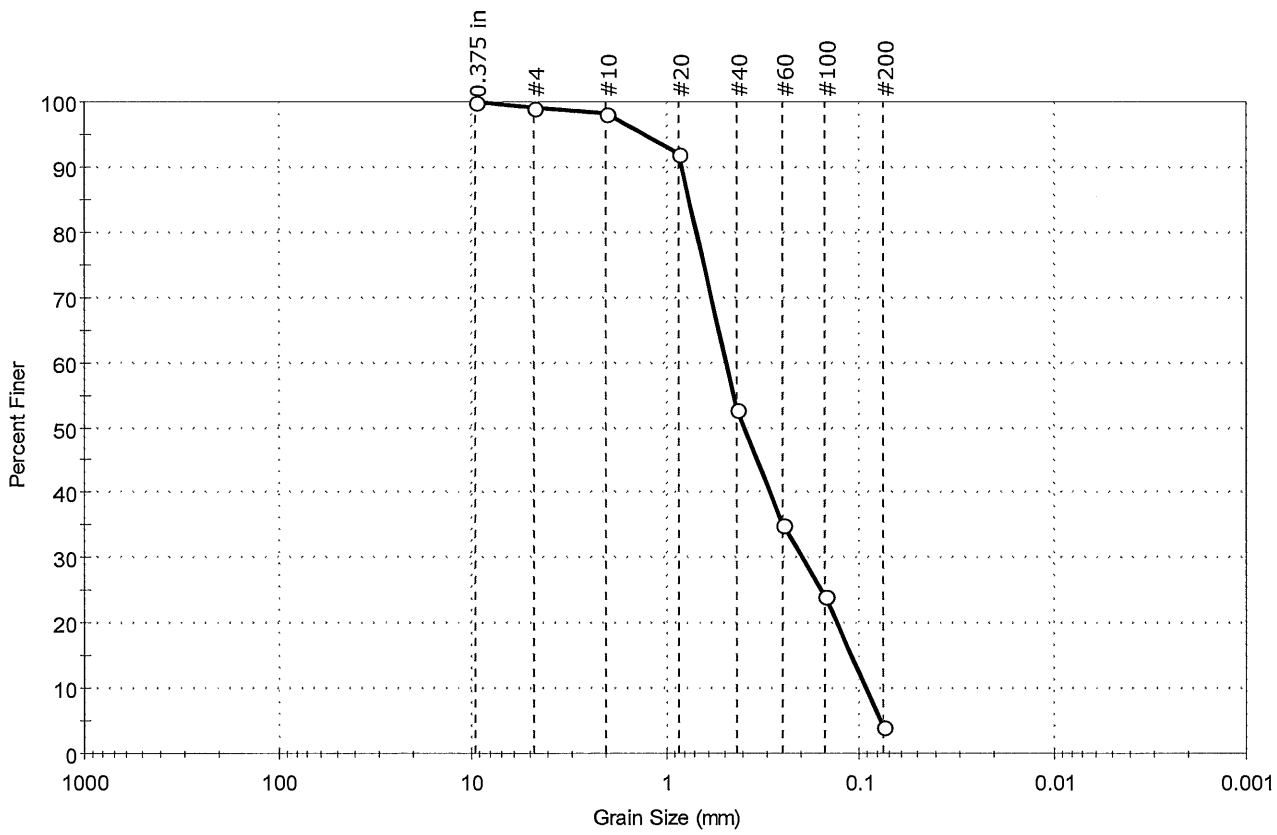
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	145 A	Test Date:	02/14/13	Checked By:	jdt
Depth :	0.5-1.5	Test Id:	261100		
Test Comment:	---				
Sample Description:	Moist, grayish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.9	94.8	4.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	92		
#40	0.42	53		
#60	0.25	35		
#100	0.15	24		
#200	0.075	4		

Coefficients

D_{85} =0.7502 mm	D_{30} =0.1970 mm
D_{60} =0.4828 mm	D_{15} =0.1088 mm
D_{50} =0.3912 mm	D_{10} =0.0915 mm
C_u =5.277	C_c =0.879

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

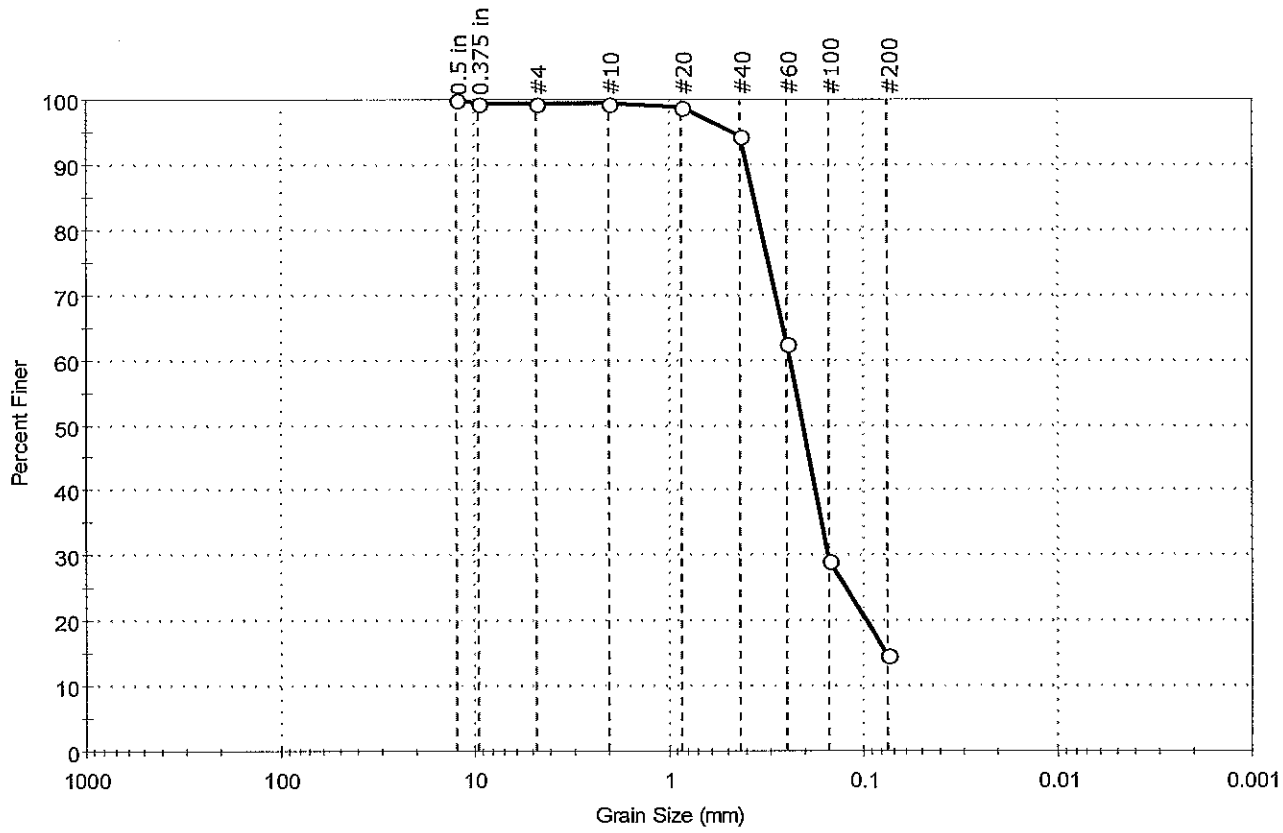
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	145 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	3-4 ft.	Test Id:	258543		
Test Comment:	---				
Sample Description:	Moist, light gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.5	84.7	14.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	99		
#10	2.00	99		
#20	0.85	99		
#40	0.42	94		
#60	0.25	63		
#100	0.15	29		
#200	0.075	15		

Coefficients

D_{85} =0.3636 mm D_{30} =0.1517 mm

D_{60} =0.2402 mm D_{15} =0.0757 mm

D_{50} =0.2061 mm D_{10} =0.0596 mm

C_u =4.030 C_c =1.608

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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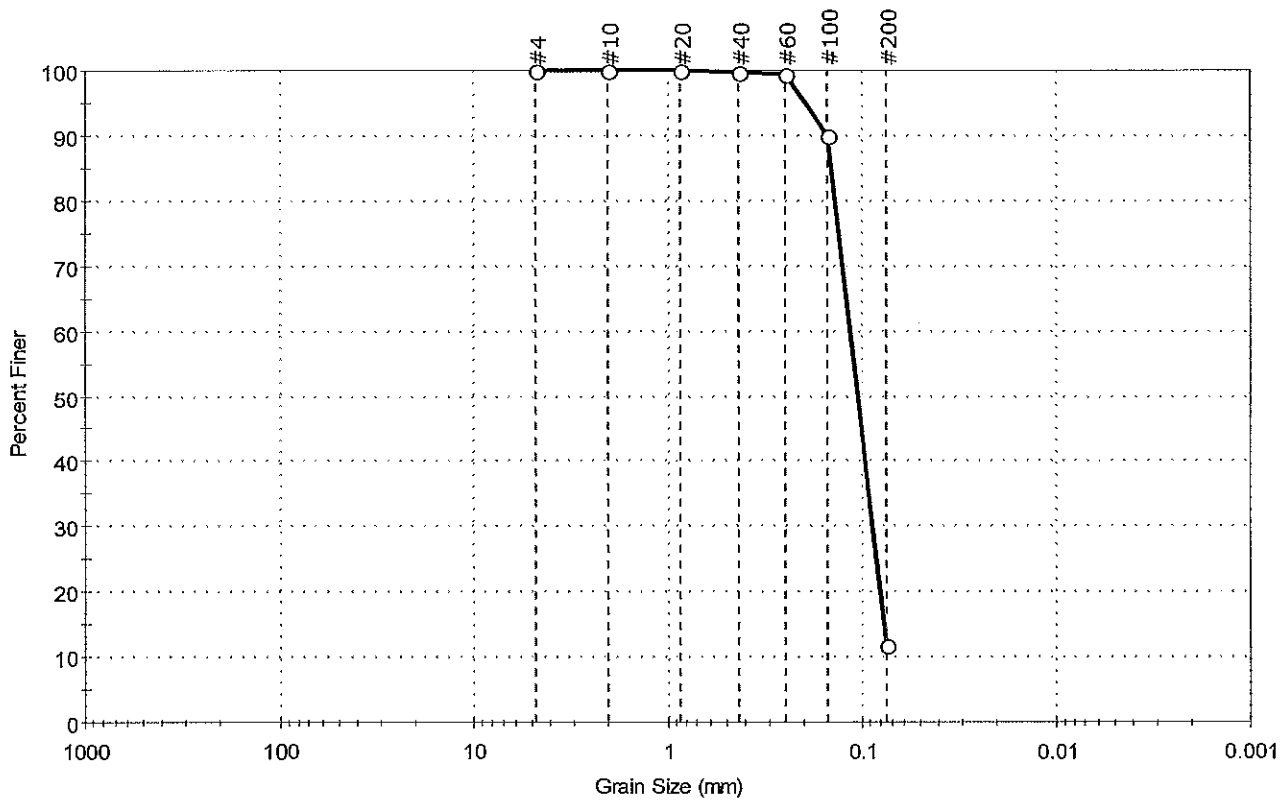
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	146 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	0-3 ft.	Test Id:	258570		
Test Comment:	---				
Sample Description:	Moist, dark gray sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	88.1	11.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	90		
#200	0.075	12		

Coefficients

D_{85} =0.1435 mm D_{30} =0.0881 mm

D_{60} =0.1150 mm D_{15} =0.0771 mm

D_{50} =0.1052 mm D_{10} =0.0737 mm

C_u =1.560 C_c =0.916

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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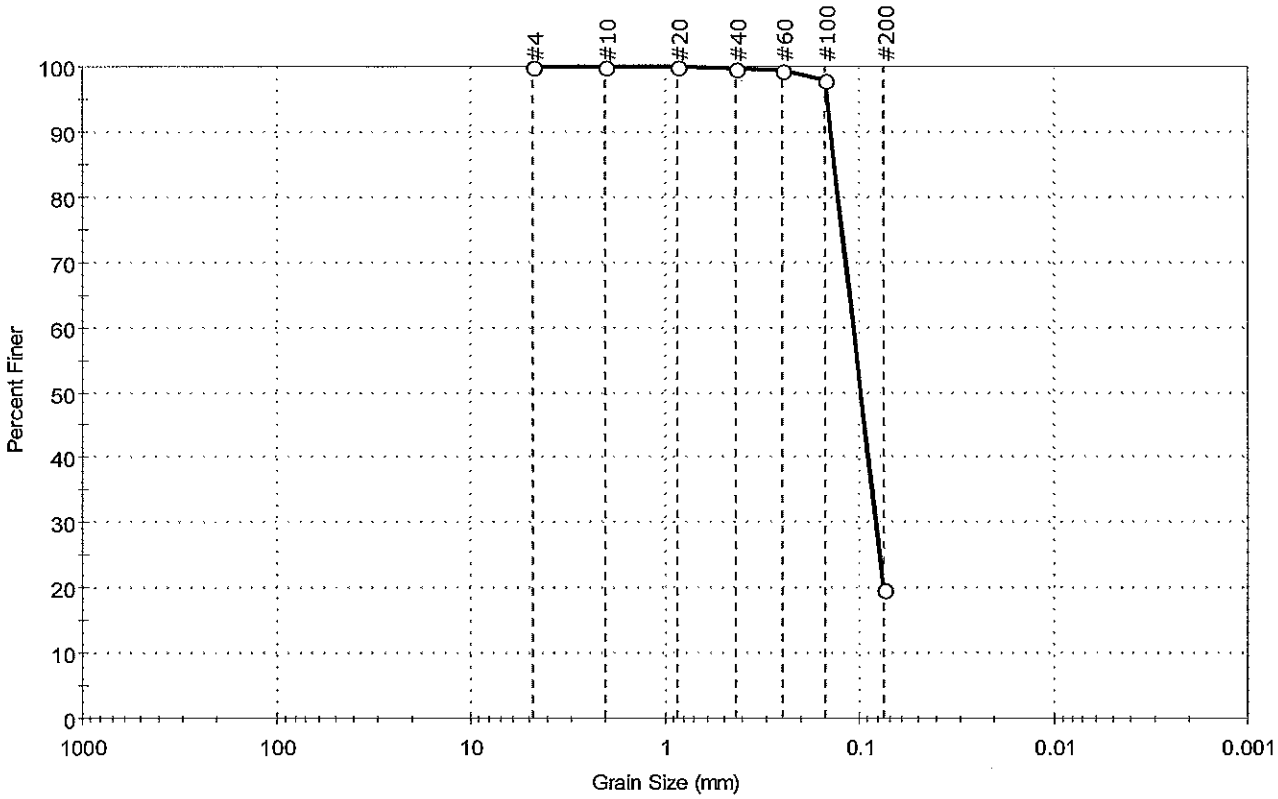
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	147 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	0-4 ft.	Test Id:	258571		
Test Comment:	---				
Sample Description:	Moist, dark gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	80.2	19.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	98		
#200	0.075	20		

Coefficients

D_{85} = 0.1338 mm D_{30} = 0.0821 mm

D_{60} = 0.1072 mm D_{15} = N/A

D_{50} = 0.0981 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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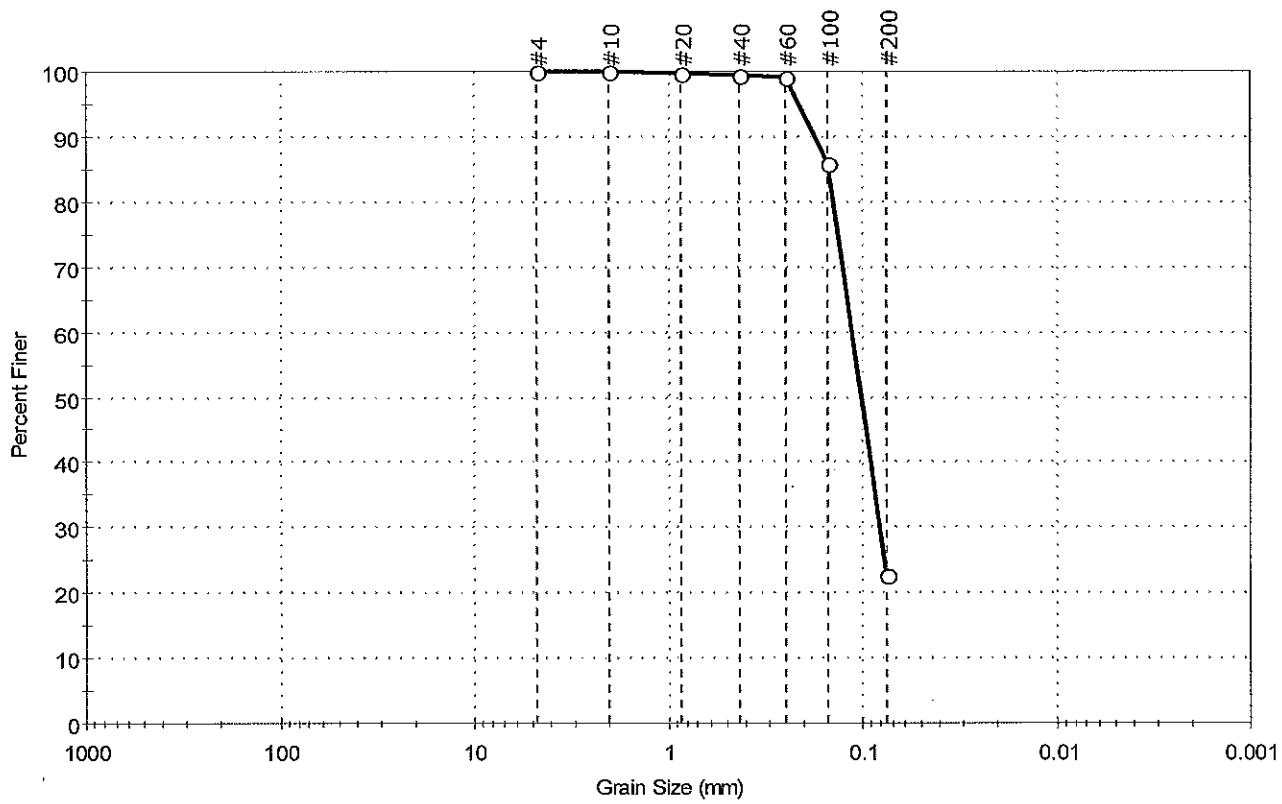
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	148 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	0-3 ft.	Test Id:	258572		
Test Comment:	---				
Sample Description:	Moist, dark gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	77.4	22.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	99		
#100	0.15	86		
#200	0.075	23		

Coefficients

D_{85} =0.1487 mm D_{30} =0.0813 mm

D_{60} =0.1130 mm D_{15} =N/A

D_{50} =0.1013 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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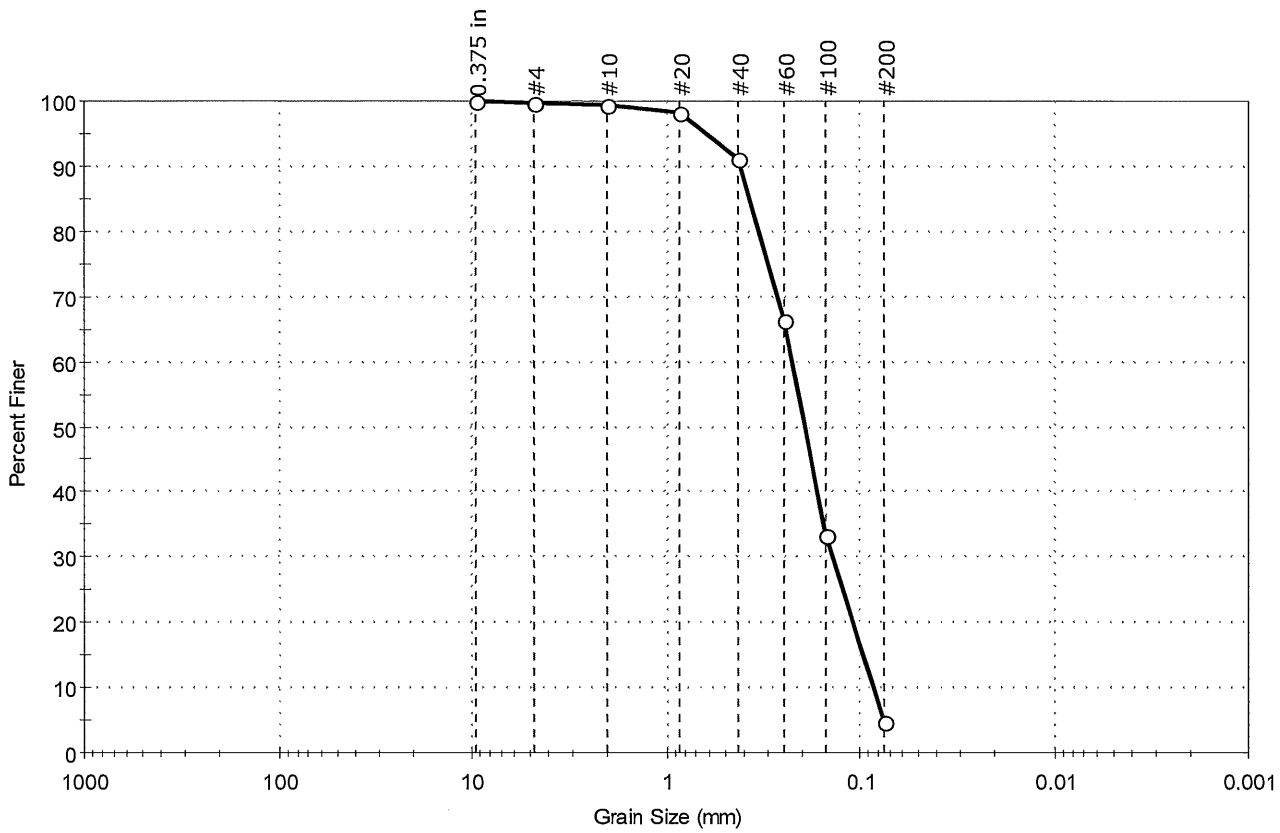
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 149 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-1	Test Id: 260833		
Test Comment: ---			
Sample Description: Moist, dark olive brown sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.2	95.0	4.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	98		
#40	0.42	91		
#60	0.25	66		
#100	0.15	33		
#200	0.075	5		

Coefficients

D_{85} =0.3730 mm D_{30} =0.1383 mm
D_{60} =0.2265 mm D_{15} =0.0961 mm
D_{50} =0.1941 mm D_{10} =0.0851 mm
C_u =2.662 C_c =0.992

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

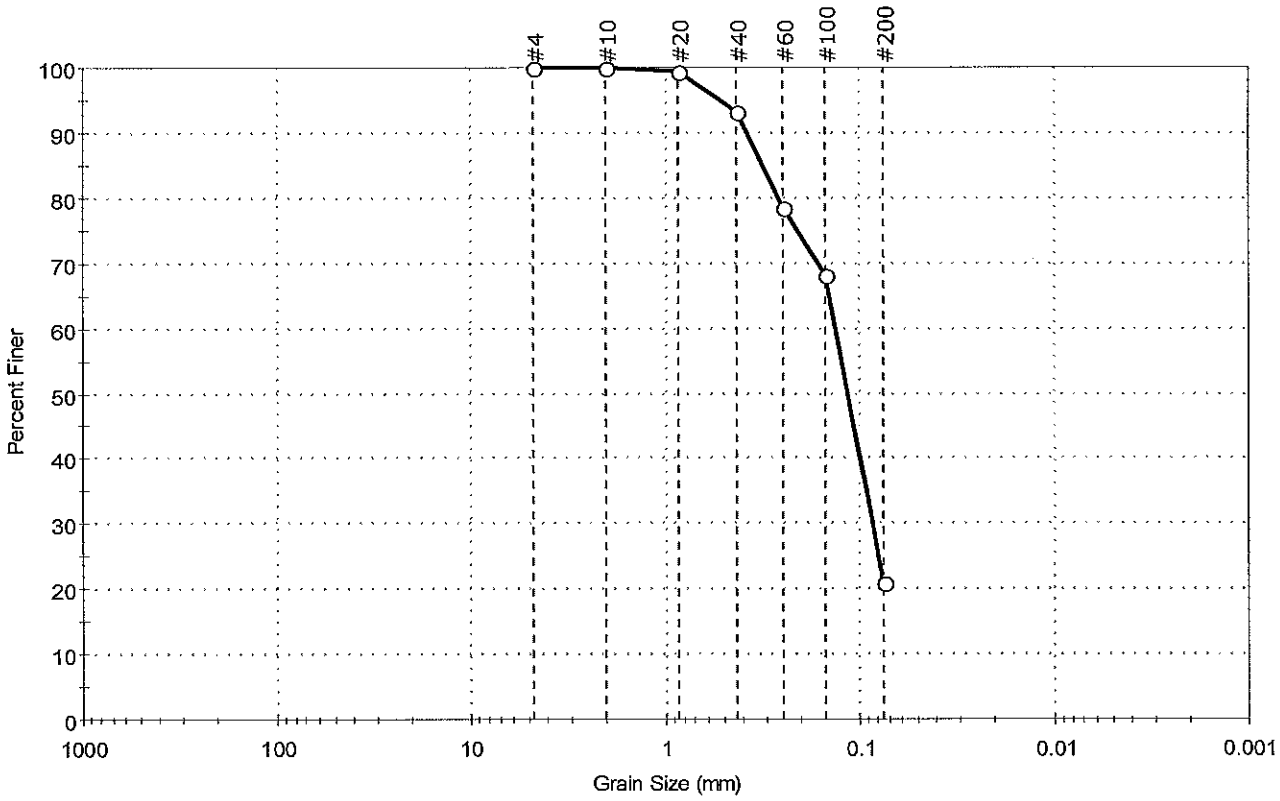
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 149 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 1-6 ft.	Test Id: 258573		
Test Comment: ---			
Sample Description: Moist, gray silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	79.2	20.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	93		
#60	0.25	79		
#100	0.15	68		
#200	0.075	21		

Coefficients

D_{85} = 0.3160 mm D_{30} = 0.0858 mm
D_{60} = 0.1330 mm D_{15} = N/A
D_{50} = 0.1149 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

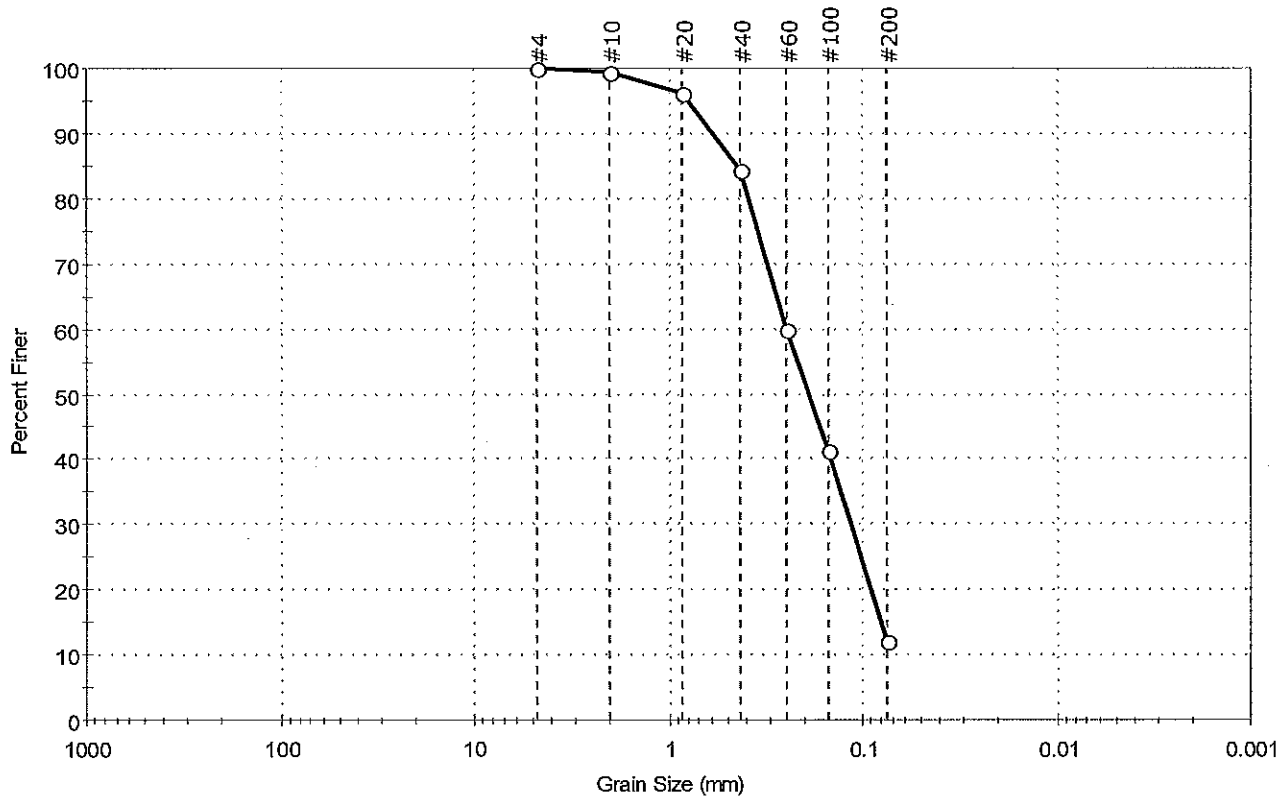
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	150 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	0-6 ft.	Test Id:	258574		
Test Comment:	---				
Sample Description:	Moist, dark gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	87.8	12.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	96		
#40	0.42	84		
#60	0.25	60		
#100	0.15	41		
#200	0.075	12		

Coefficients

D_{85} =0.4397 mm D_{30} =0.1145 mm

D_{60} =0.2500 mm D_{15} =0.0802 mm

D_{50} =0.1901 mm D_{10} =0.0712 mm

C_u =3.511 C_c =0.737

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

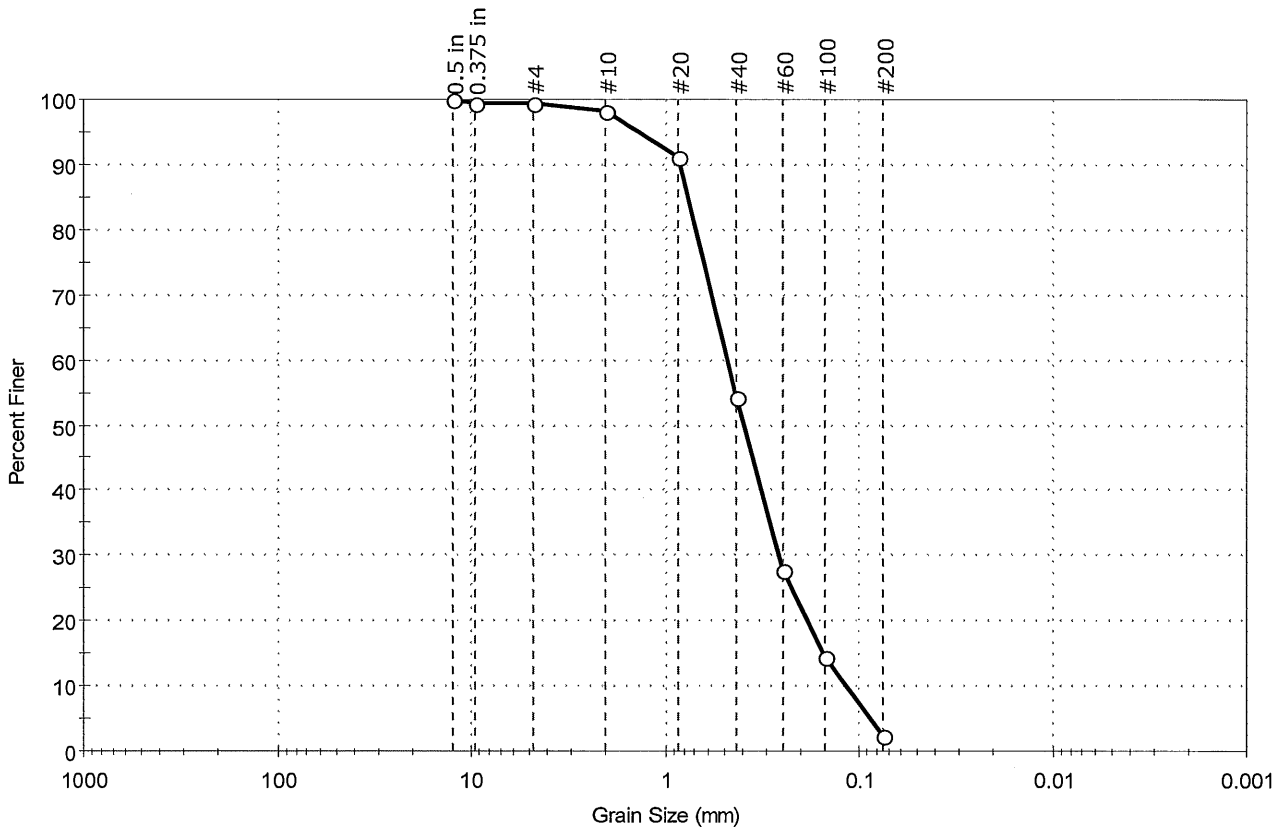
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 151 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-2	Test Id: 260834		
Test Comment:	---		
Sample Description:	Moist, dark grayish brown sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.7	97.1	2.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	99		
#10	2.00	98		
#20	0.85	91		
#40	0.42	54		
#60	0.25	28		
#100	0.15	15		
#200	0.075	2		

Coefficients

D_{85} = 0.7576 mm D_{30} = 0.2617 mm

D_{60} = 0.4743 mm D_{15} = 0.1528 mm

D_{50} = 0.3911 mm D_{10} = 0.1162 mm

C_u = 4.082 C_c = 1.243

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

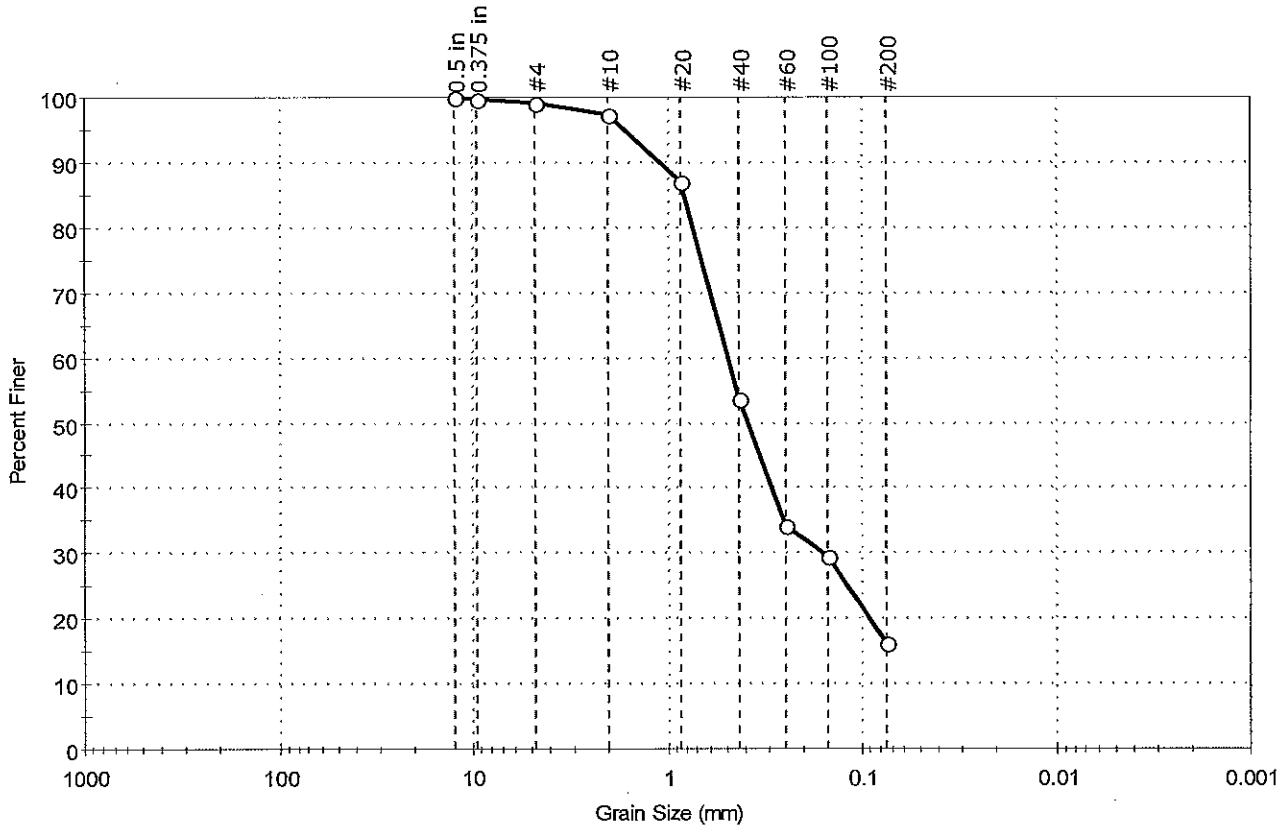
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 151 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 3-5 ft.	Test Id: 258575		
Test Comment:	---		
Sample Description:	Moist, gray silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.0	82.7	16.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	97		
#20	0.85	87		
#40	0.42	54		
#60	0.25	34		
#100	0.15	29		
#200	0.075	16		

Coefficients

D_{85} = 0.8170 mm D_{30} = 0.1589 mm
D_{60} = 0.4856 mm D_{15} = N/A
D_{50} = 0.3849 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

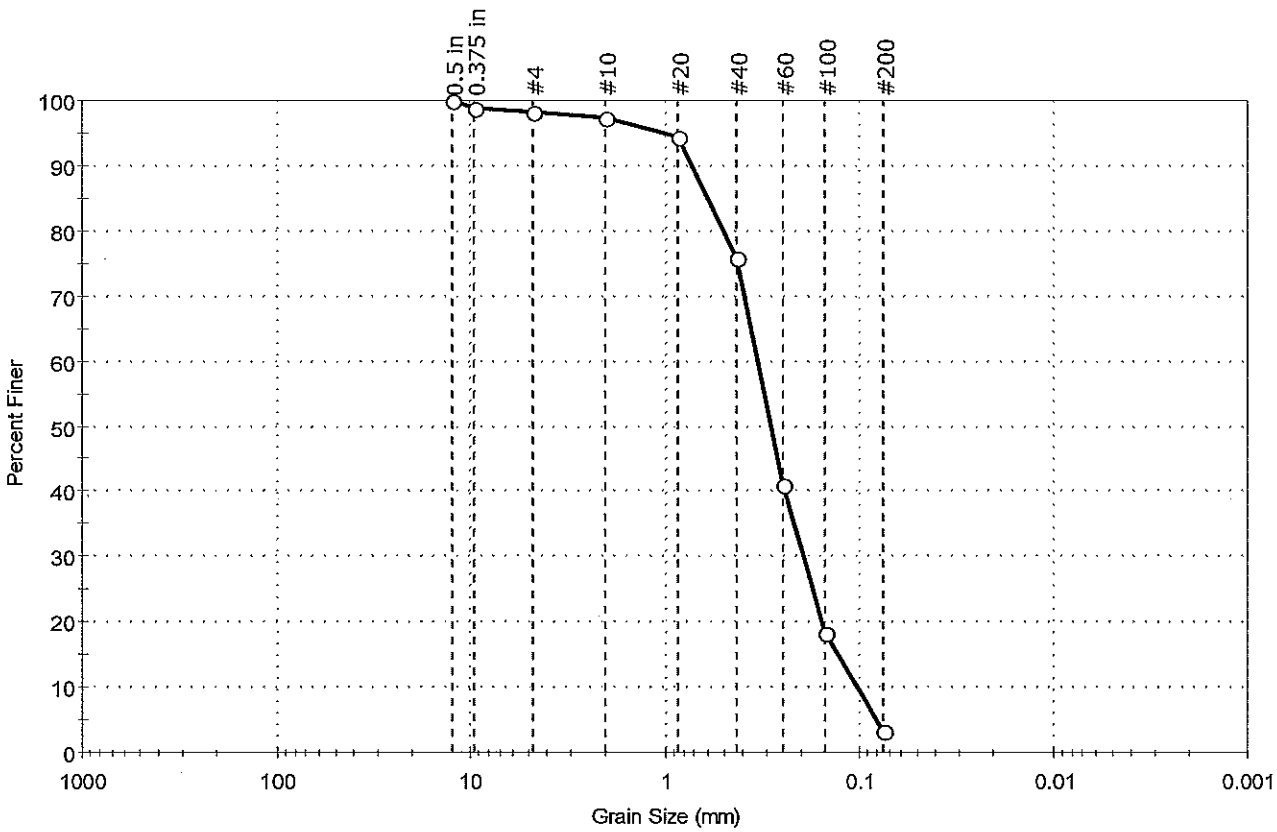
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	152 A	Test Date:	01/10/13	Checked By:	jdt
Depth :	0-2 ft.	Test Id:	258641		
Test Comment:	----				
Sample Description:	Moist, grayish brown sand				
Sample Comment:	----				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.6	95.1	3.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	98		
#10	2.00	97		
#20	0.85	94		
#40	0.42	76		
#60	0.25	41		
#100	0.15	18		
#200	0.075	3		

Coefficients

D_{85} =0.5984 mm D_{30} =0.1952 mm

D_{60} =0.3339 mm D_{15} =0.1286 mm

D_{50} =0.2869 mm D_{10} =0.1022 mm

C_u =3.267 C_c =1.117

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

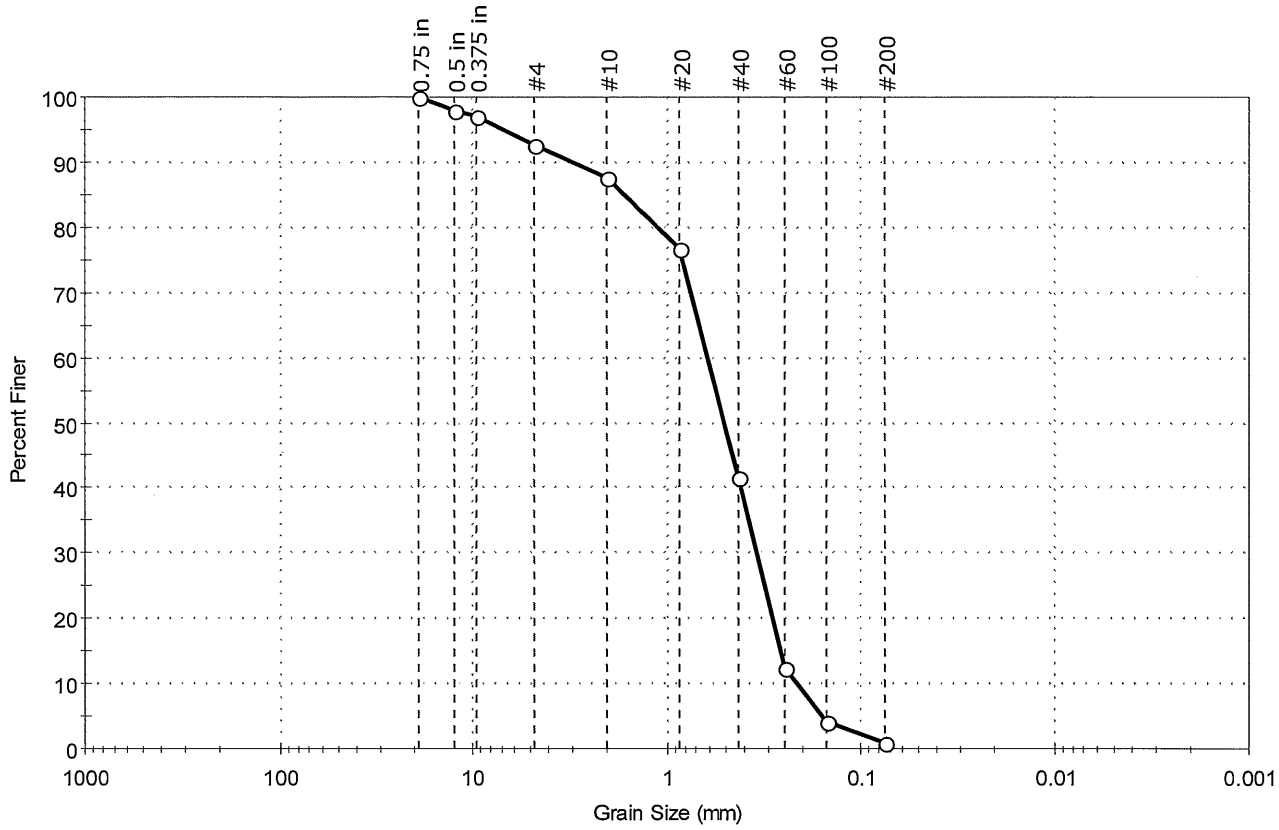
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 153 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-1	Test Id: 260835		
Test Comment: ---			
Sample Description: Moist, grayish brown sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	7.4	91.6	1.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	97		
#4	4.75	93		
#10	2.00	88		
#20	0.85	77		
#40	0.42	41		
#60	0.25	12		
#100	0.15	4		
#200	0.075	1		

Coefficients

D_{85} = 1.6177 mm	D_{30} = 0.3447 mm
D_{60} = 0.6111 mm	D_{15} = 0.2623 mm
D_{50} = 0.5022 mm	D_{10} = 0.2164 mm
C_u = 2.824	C_c = 0.898

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

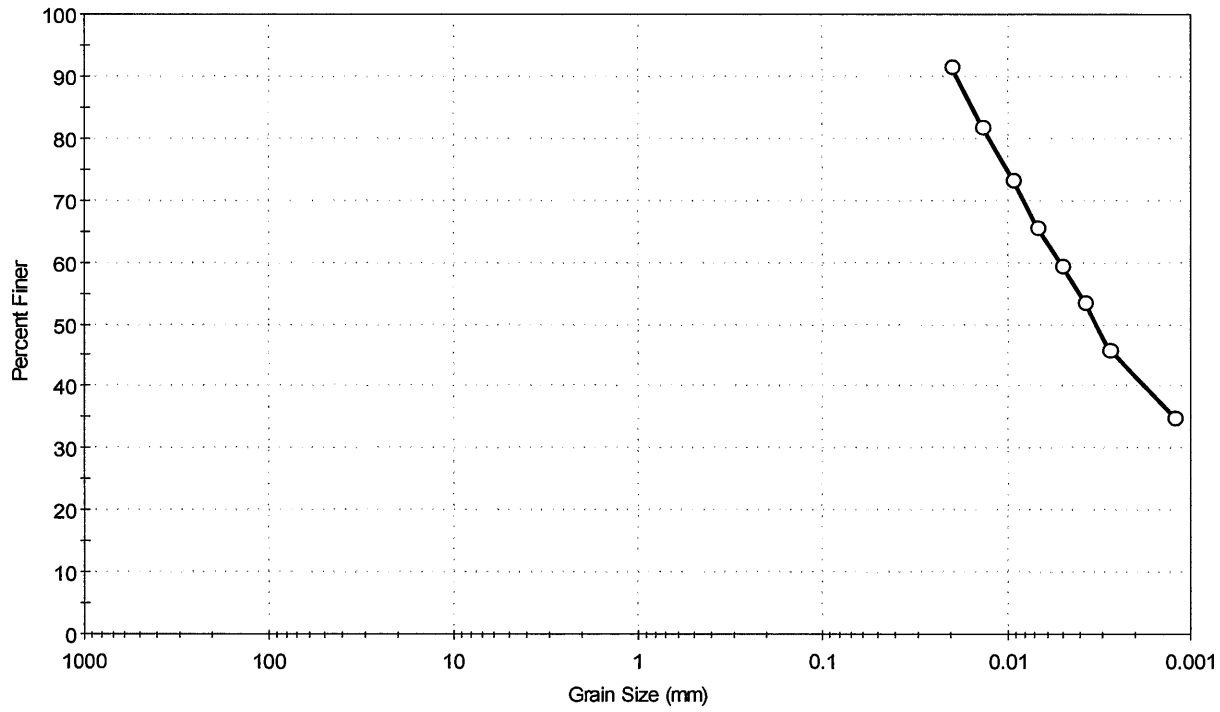
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	153 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	3-4 ft.	Test Id:	258576		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, dark gray clay				
Sample Comment:	95% passing the No. 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	–	–	–

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0202	92		
---	0.0138	82		
---	0.0094	73		
---	0.0070	66		
---	0.0051	60		
---	0.0038	54		
---	0.0028	46		
---	0.0012	35		

Coefficients

D_{85} = 0.0155 mm D_{30} = N/A
D_{60} = 0.0052 mm D_{15} = N/A
D_{50} = 0.0033 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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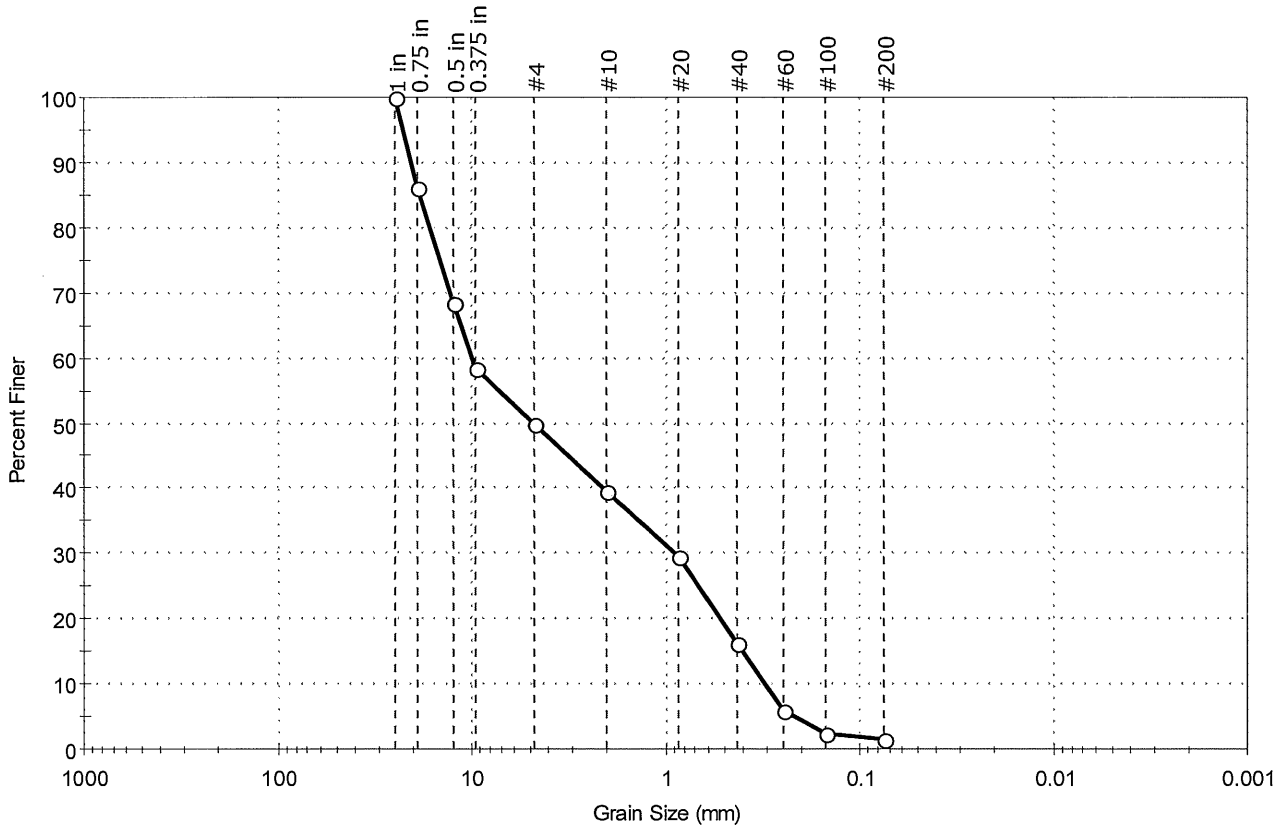
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	154 A	Test Date:	02/11/13	Checked By:	jdt
Depth :	0.5-1.5	Test Id:	260836		
Test Comment:	---				
Sample Description:	Moist, yellowish brown gravel with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	50.1	48.5	1.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	86		
0.5 in	12.50	68		
0.375 in	9.50	58		
#4	4.75	50		
#10	2.00	40		
#20	0.85	30		
#40	0.42	16		
#60	0.25	6		
#100	0.15	2		
#200	0.075	1		

Coefficients

D_{85} = 18.4806 mm D_{30} = 0.8867 mm
D_{60} = 9.9317 mm D_{15} = 0.3972 mm
D_{50} = 4.7933 mm D_{10} = 0.3091 mm
C_u = 32.131 C_c = 0.256

Classification

ASTM Poorly graded gravel with sand (GP)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (0))

Sample/Test Description

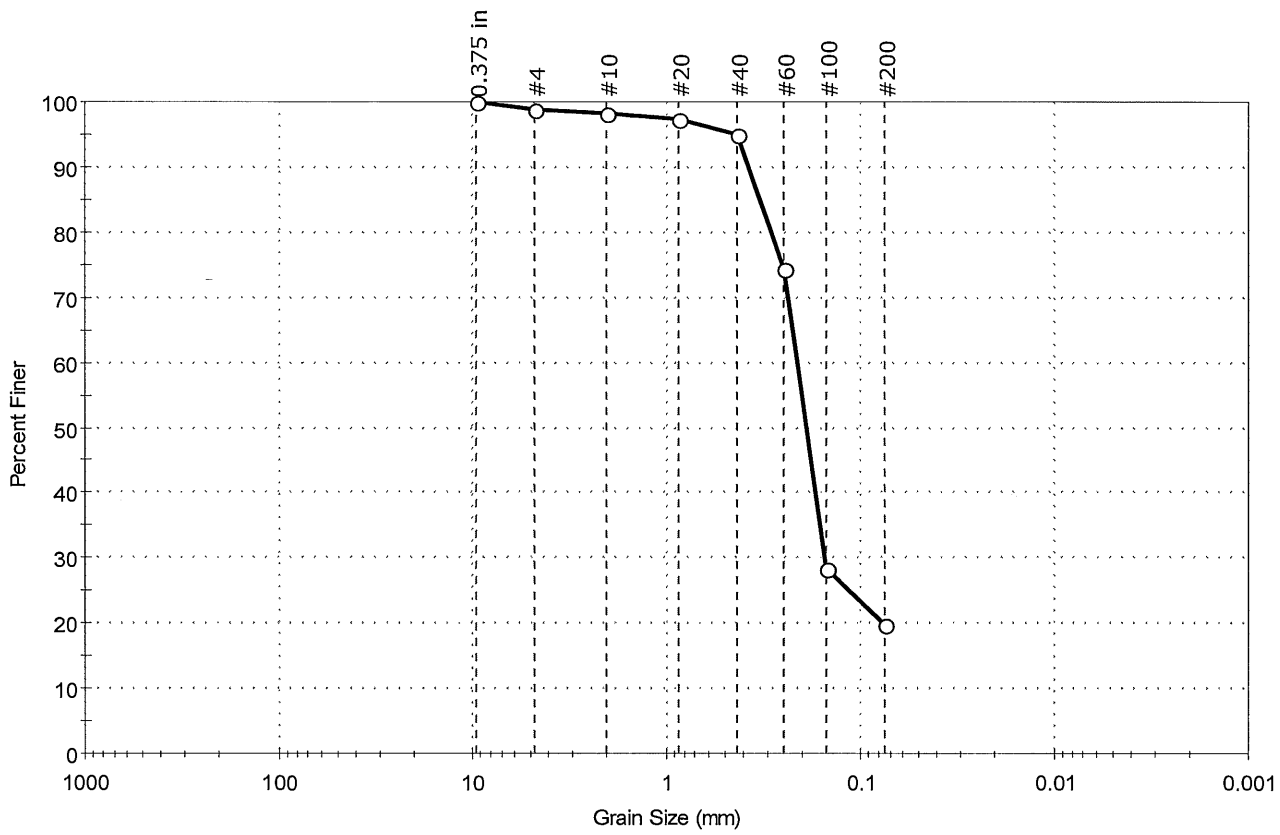
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 154 B	Test Date: 02/11/13	Checked By:	jdt
Depth : 2.5-3.5	Test Id: 260837		
Test Comment: ---			
Sample Description:	Moist, yellowish brown silty sand		
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.2	78.9	19.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	97		
#40	0.42	95		
#60	0.25	74		
#100	0.15	28		
#200	0.075	20		

Coefficients

D_{85} = 0.3288 mm D_{30} = 0.1526 mm
D_{60} = 0.2129 mm D_{15} = N/A
D_{50} = 0.1906 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

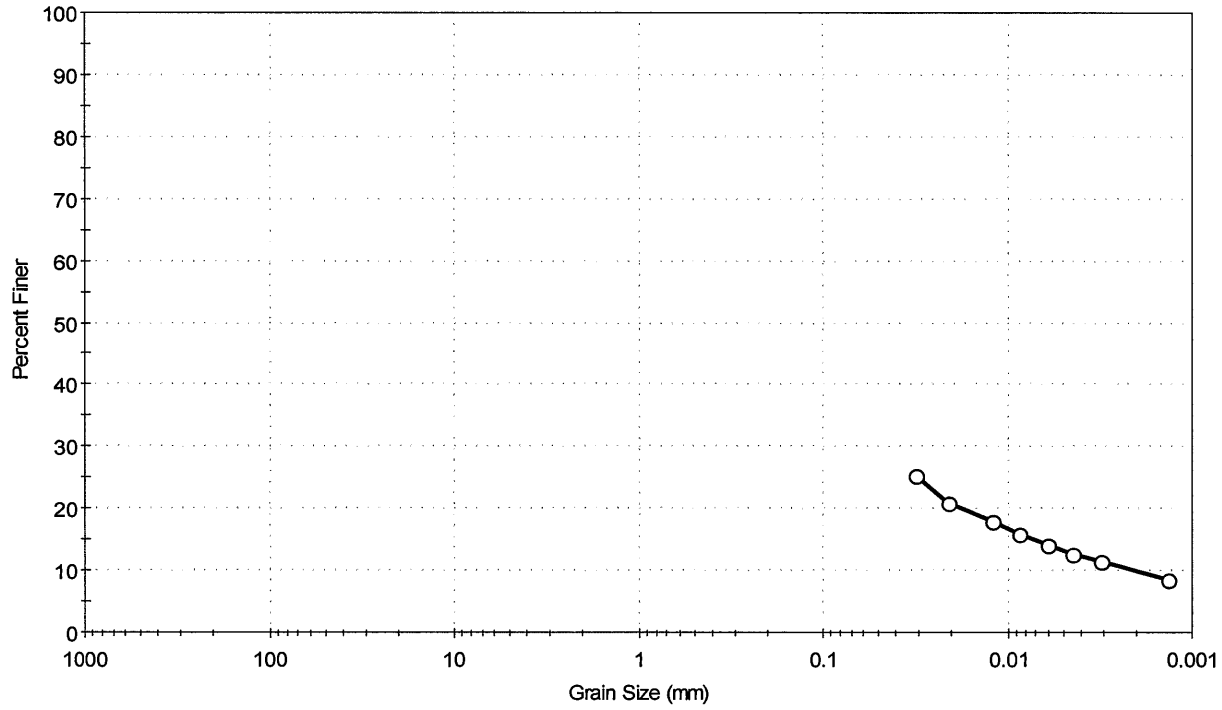
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	R-3	Sample Type:	jar	Tested By:	jbr
Sample ID:	154 C	Test Date:	01/15/13	Checked By:	jdt
Depth :	4-5 ft.	Test Id:	258601		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, yellow silty sand				
Sample Comment:	29% passing the number 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	–	–	–

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0315	25		
---	0.0214	21		
---	0.0122	18		
---	0.0087	16		
---	0.0062	14		
---	0.0045	13		
---	0.0031	12		
---	0.0014	8		

Coefficients

D_{85} = N/A D_{30} = N/A
D_{60} = N/A D_{15} = 0.0073 mm
D_{50} = N/A D_{10} = 0.0021 mm
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	R-3	Sample Type:	jar	Tested By:	cam
Sample ID:	154 C	Test Date:	01/11/13	Checked By:	jdt
Depth :	4-5 ft.	Test Id:	258603		
Test Comment:	---				
Sample Description:	Moist, yellow silty sand				
Sample Comment:	29% passing the number 200 sieve				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	154 C	R-3	4-5 ft.	21	n/a	n/a	n/a	n/a	

Dry Strength: LOW

Dilatancy: RAPID

Toughness: n/a

The sample was determined to be Non-Plastic

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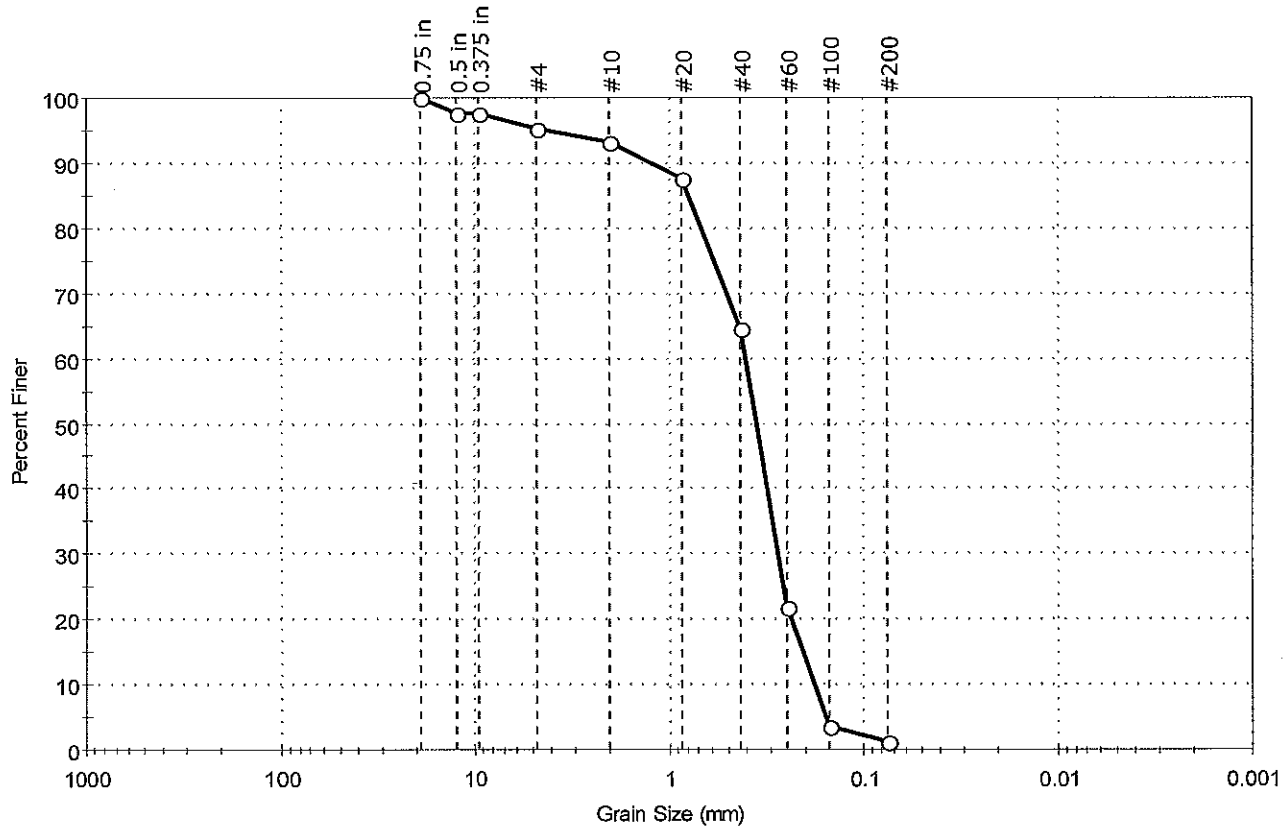
Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 155 A	Test Date: 01/11/13	Checked By:	jdt
Depth : 0-2 ft.	Test Id: 258595		
Test Comment:	---		
Sample Description:	Moist, yellowish brown sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.8	94.1	1.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	98		
#4	4.75	95		
#10	2.00	93		
#20	0.85	87		
#40	0.42	65		
#60	0.25	22		
#100	0.15	4		
#200	0.075	1		

Coefficients

D_{85} = 0.7885 mm D_{30} = 0.2770 mm

D_{60} = 0.4019 mm D_{15} = 0.2069 mm

D_{50} = 0.3550 mm D_{10} = 0.1797 mm

C_u = 2.237 C_c = 1.062

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

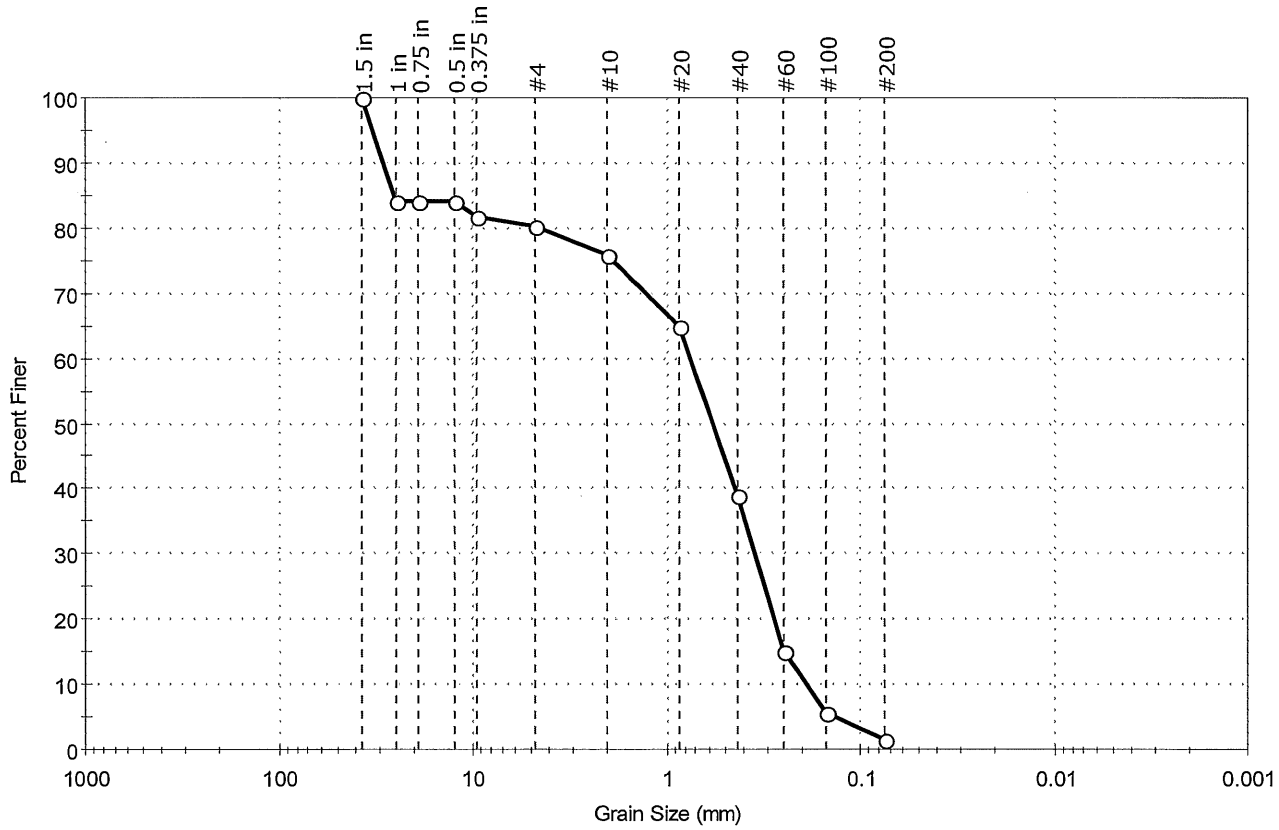
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 156 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-1.3	Test Id: 260838		
Test Comment:	---		
Sample Description:	Moist, light brown sand with gravel		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	19.7	78.9	1.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1 in	25.00	84		
0.75 in	19.00	84		
0.5 in	12.50	84		
0.375 in	9.50	82		
#4	4.75	80		
#10	2.00	76		
#20	0.85	65		
#40	0.42	39		
#60	0.25	15		
#100	0.15	6		
#200	0.075	1		

Coefficients

D_{85} =25.5335 mm	D_{30} =0.3487 mm
D_{60} =0.7466 mm	D_{15} =0.2503 mm
D_{50} =0.5712 mm	D_{10} =0.1911 mm
C_u =3.907	C_c =0.852

Classification

ASTM Poorly graded sand with gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

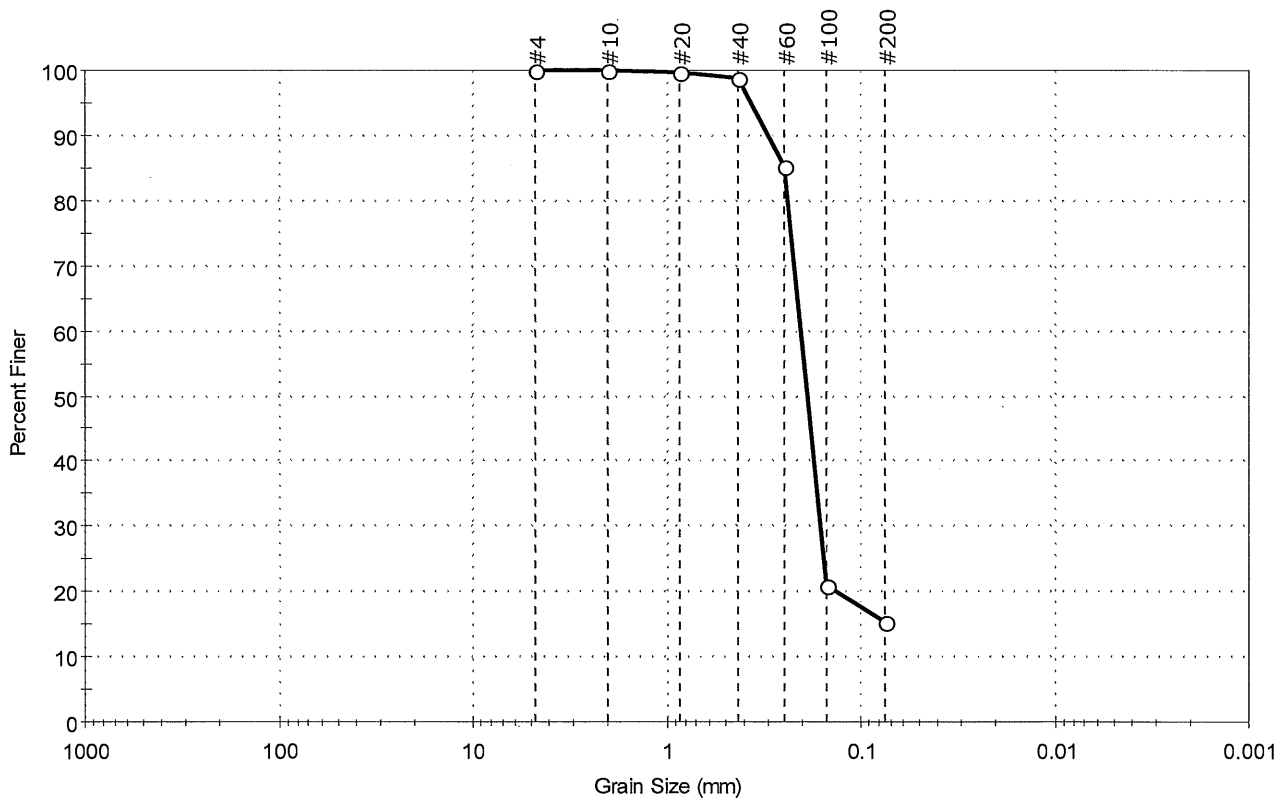
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 156 B	Test Date: 02/11/13	Checked By:	jdt
Depth : 3-4	Test Id: 260839		
Test Comment: ---			
Sample Description: Moist, yellowish brown silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	84.6	15.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	85		
#100	0.15	21		
#200	0.075	15		

Coefficients

D_{85} = 0.2496 mm D_{30} = 0.1612 mm
D_{60} = 0.2046 mm D_{15} = N/A
D_{50} = 0.1890 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

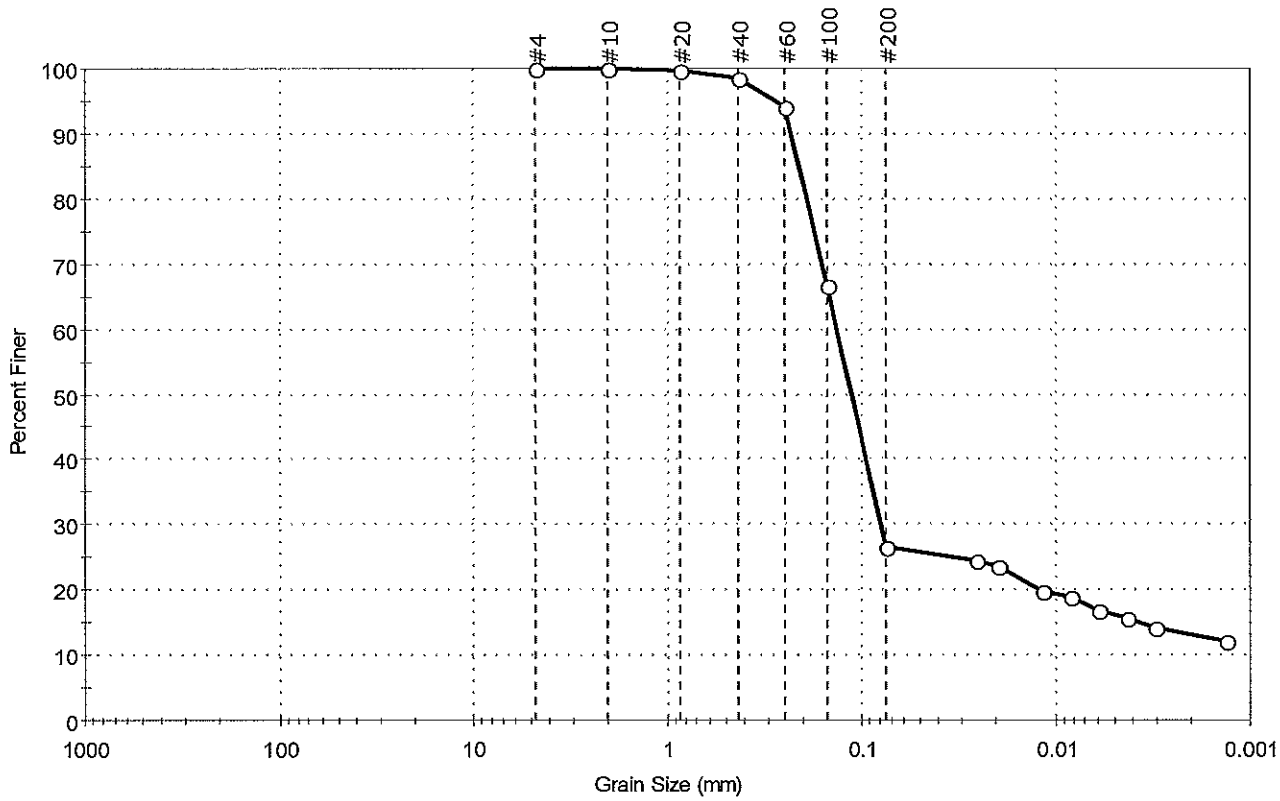
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening - Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 156 C	Test Date: 01/10/13	Checked By:	jdt
Depth : 6-7.5 ft.	Test Id: 258600		
Test Comment:	---		
Sample Description:	Moist, yellowish brown clayey sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	73.6	26.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	94		
#100	0.15	67		
#200	0.075	26		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0255	24		
---	0.0199	24		
---	0.0117	20		
---	0.0083	19		
---	0.0060	17		
---	0.0043	16		
---	0.0031	14		
---	0.0013	12		

Coefficients

D_{85} =0.2107 mm	D_{30} =0.0798 mm
D_{60} =0.1337 mm	D_{15} =0.0038 mm
D_{50} =0.1126 mm	D_{10} =0.0005 mm
C_u =267.400	C_c =95.259

Classification

ASTM Clayey sand (SC)

AASHTO Clayey Gravel and Sand (A-2-6 (2))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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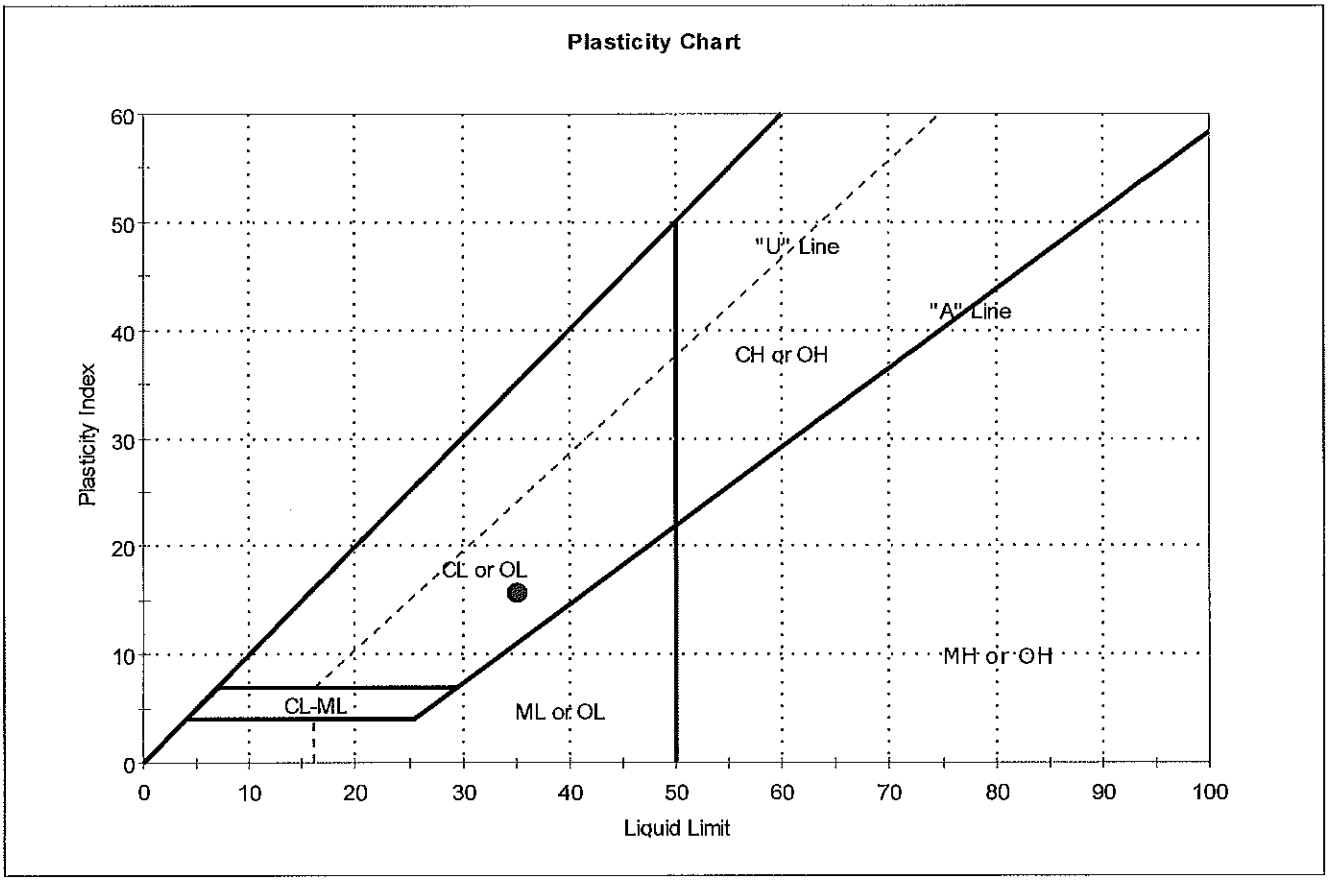
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	156 C	Test Date:	01/10/13	Checked By:	jdt
Depth :	6-7.5 ft.	Test Id:	258604		
Test Comment:	---				
Sample Description:	Moist, yellowish brown clayey sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	156 C	---	6-7.5 ft.	29	35	19	16	1	Clayey sand (SC)

Sample Prepared using the WET method

1% Retained on #40 Sieve

Dry Strength: VERY HIGH

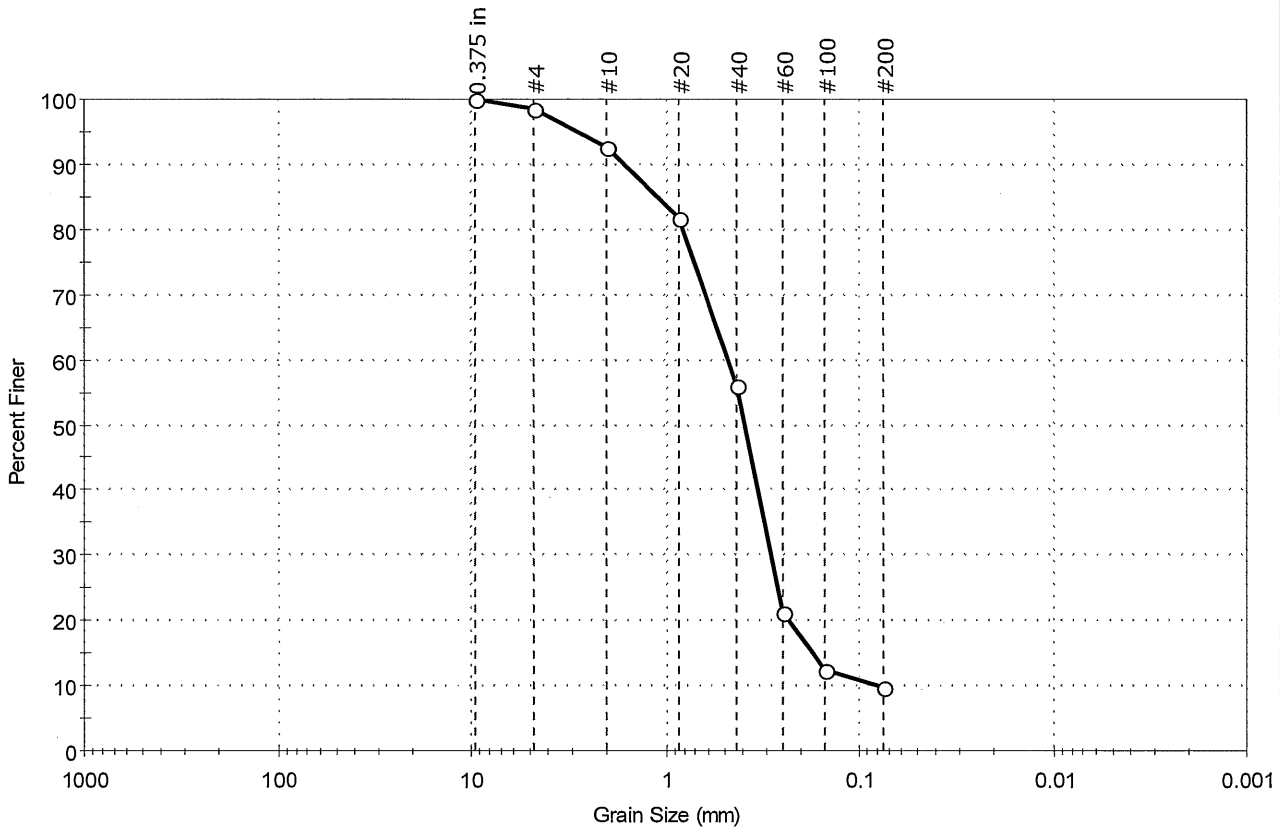
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 157 A	Test Date: 02/11/13	Checked By:	jdt
Depth : ---	Test Id: 260840		
Test Comment:	---		
Sample Description:	Moist, yellowish brown sand with silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.4	88.8	9.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	93		
#20	0.85	82		
#40	0.42	56		
#60	0.25	21		
#100	0.15	12		
#200	0.075	10		

Coefficients

D_{85} = 1.0962 mm D_{30} = 0.2853 mm
D_{60} = 0.4728 mm D_{15} = 0.1739 mm
D_{50} = 0.3875 mm D_{10} = 0.0786 mm
C_u = 6.015 C_c = 2.190

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

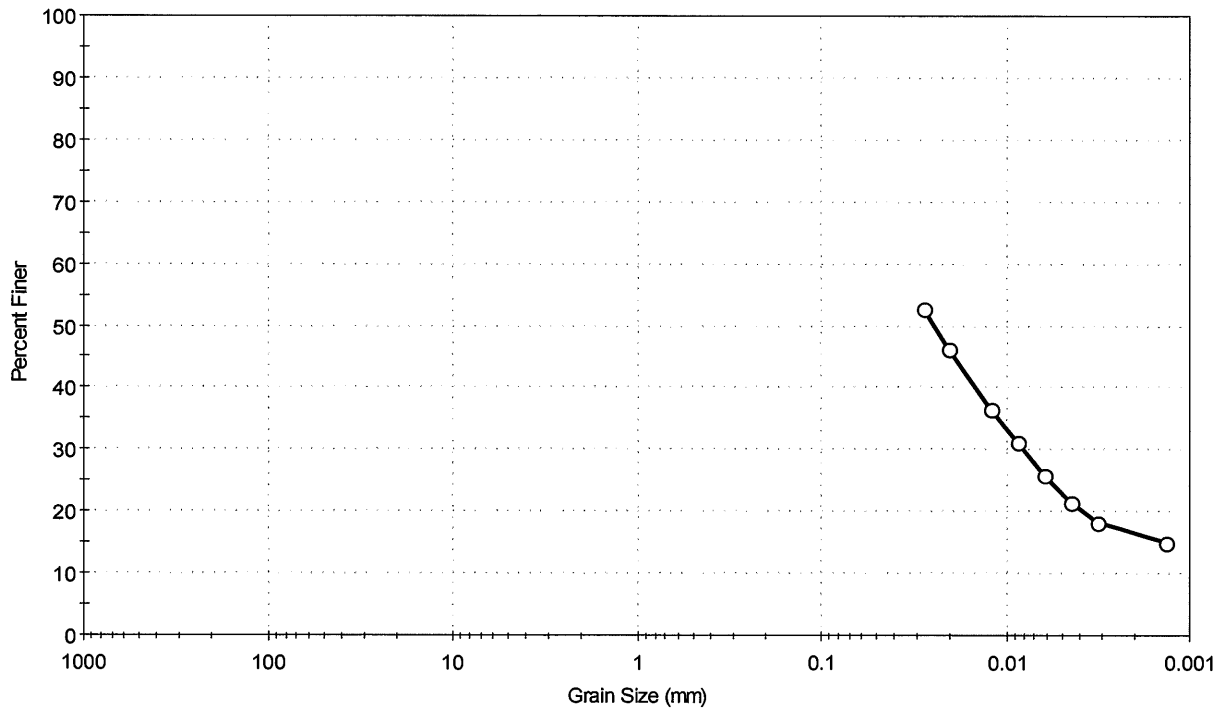
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	157 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	1.6-3.2 ft.	Test Id:	258602		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, dark gray sandy clay				
Sample Comment:	60% passing the No. 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	—	—

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0284	53		
---	0.0206	46		
---	0.0124	37		
---	0.0087	31		
---	0.0062	26		
---	0.0045	22		
---	0.0032	18		
---	0.0014	15		

Coefficients

D_{85} = N/A D_{30} = 0.0080 mm
D_{60} = N/A D_{15} = N/A
D_{50} = 0.0247 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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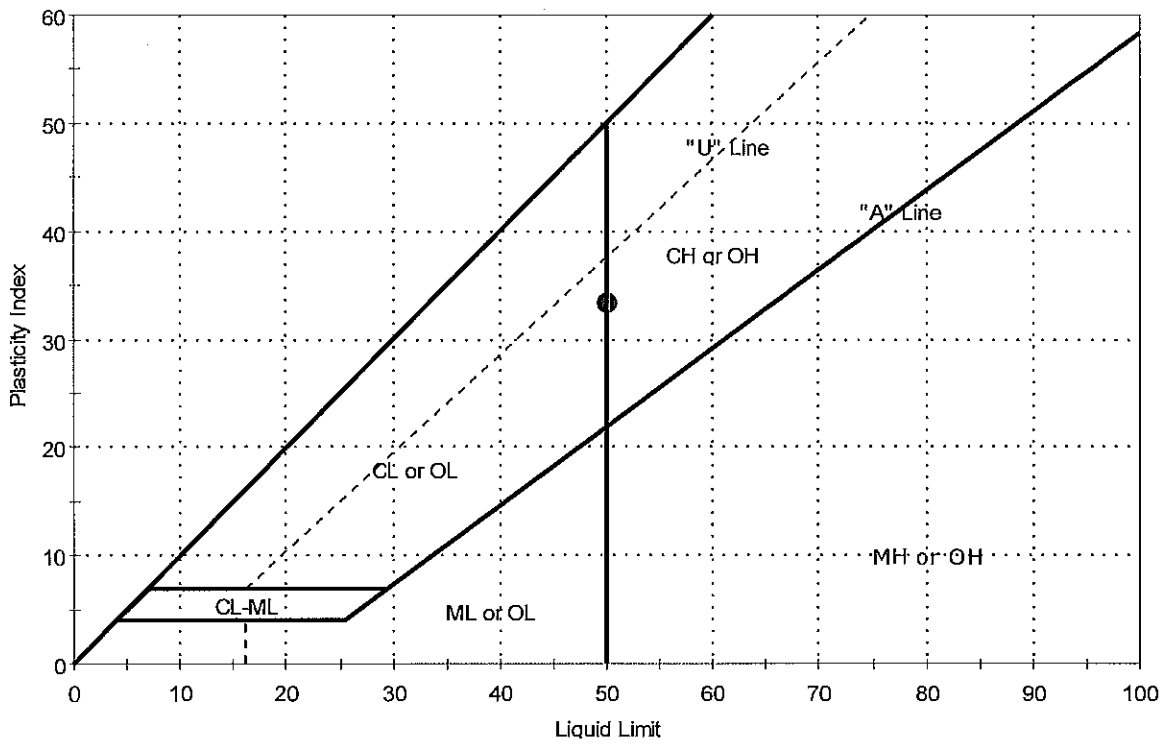
Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening - Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	cam
Sample ID: 157 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 1.6-3.2 ft.	Test Id: 258605		
Test Comment: ---			
Sample Description:	Moist, dark gray sandy clay		
Sample Comment:	60% passing the No. 200 sieve		

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	157 B	---	1.6-3.2 ft.	37	50	16	34	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

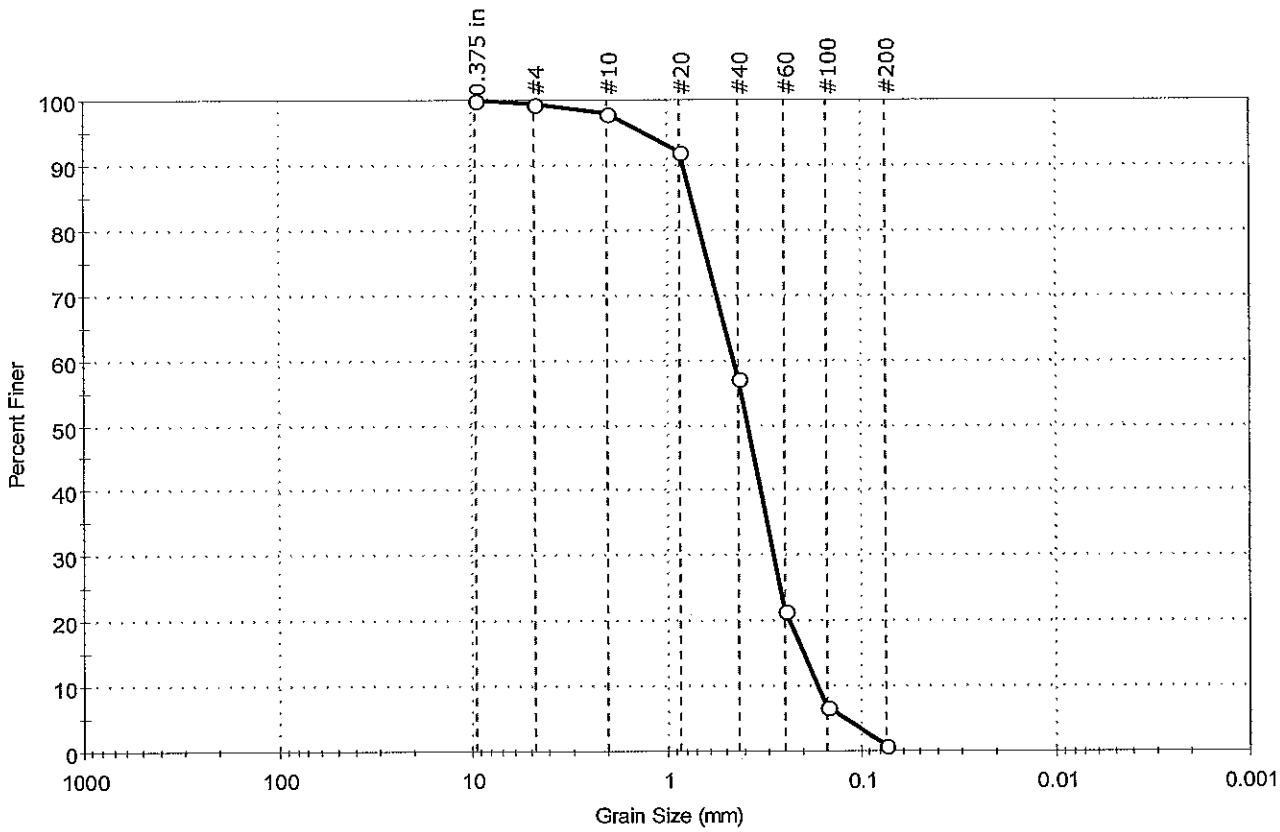
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 158 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 1-3 ft.	Test Id: 258640		
Test Comment: ---			
Sample Description:	Moist, grayish brown sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.7	98.5	0.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	98		
#20	0.85	92		
#40	0.42	57		
#60	0.25	22		
#100	0.15	7		
#200	0.075	1		

Coefficients

D_{85} =0.7392 mm D_{30} =0.2833 mm

D_{60} =0.4490 mm D_{15} =0.1989 mm

D_{50} =0.3816 mm D_{10} =0.1672 mm

C_u =2.685 C_c =1.069

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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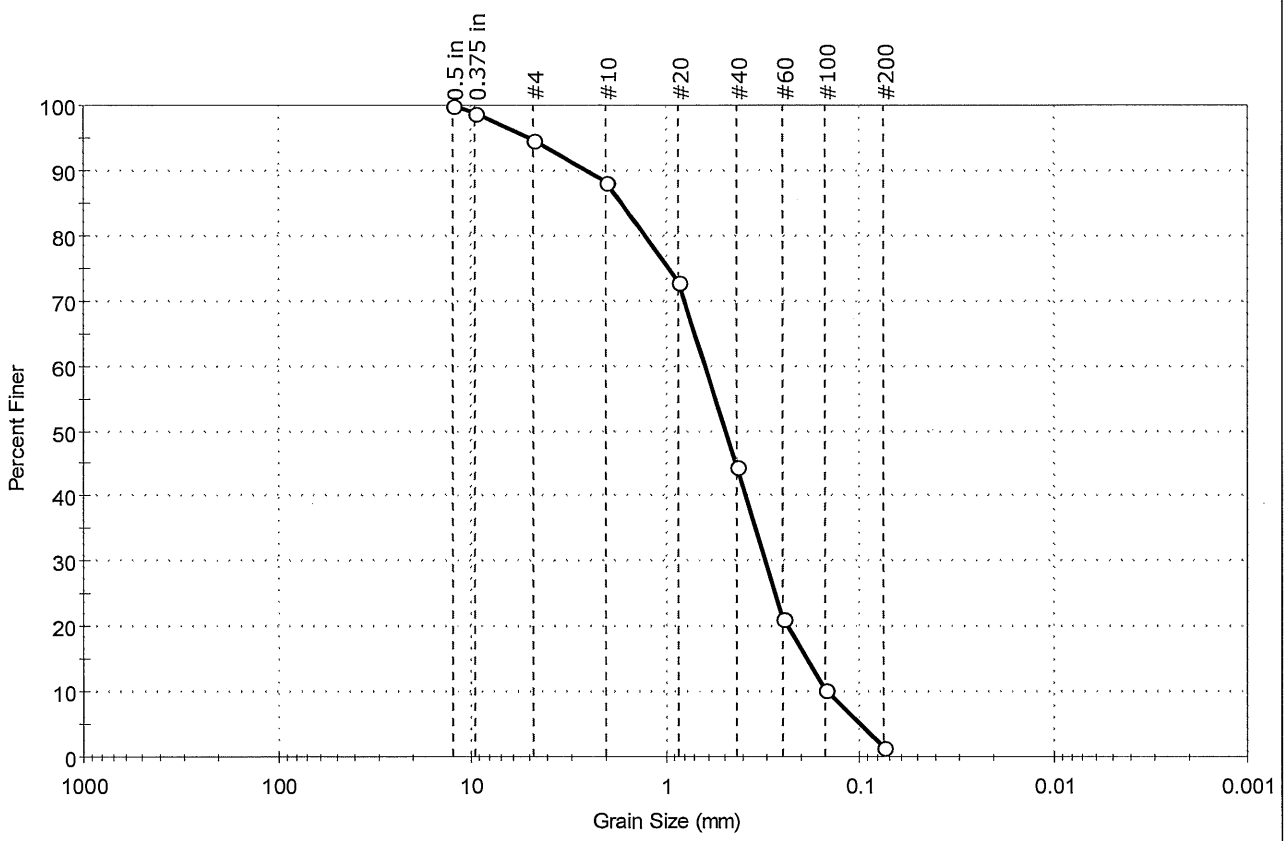
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 159 A	Test Date: 02/12/13	Checked By:	jdt
Depth : 0.5-2	Test Id: 260841		
Test Comment: ---			
Sample Description: Moist, grayish brown sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.3	93.3	1.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	95		
#10	2.00	88		
#20	0.85	73		
#40	0.42	45		
#60	0.25	21		
#100	0.15	10		
#200	0.075	1		

Coefficients

D_{85} = 1.6698 mm D_{30} = 0.3055 mm

D_{60} = 0.6189 mm D_{15} = 0.1877 mm

D_{50} = 0.4845 mm D_{10} = 0.1472 mm

C_u = 4.204 C_c = 1.024

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

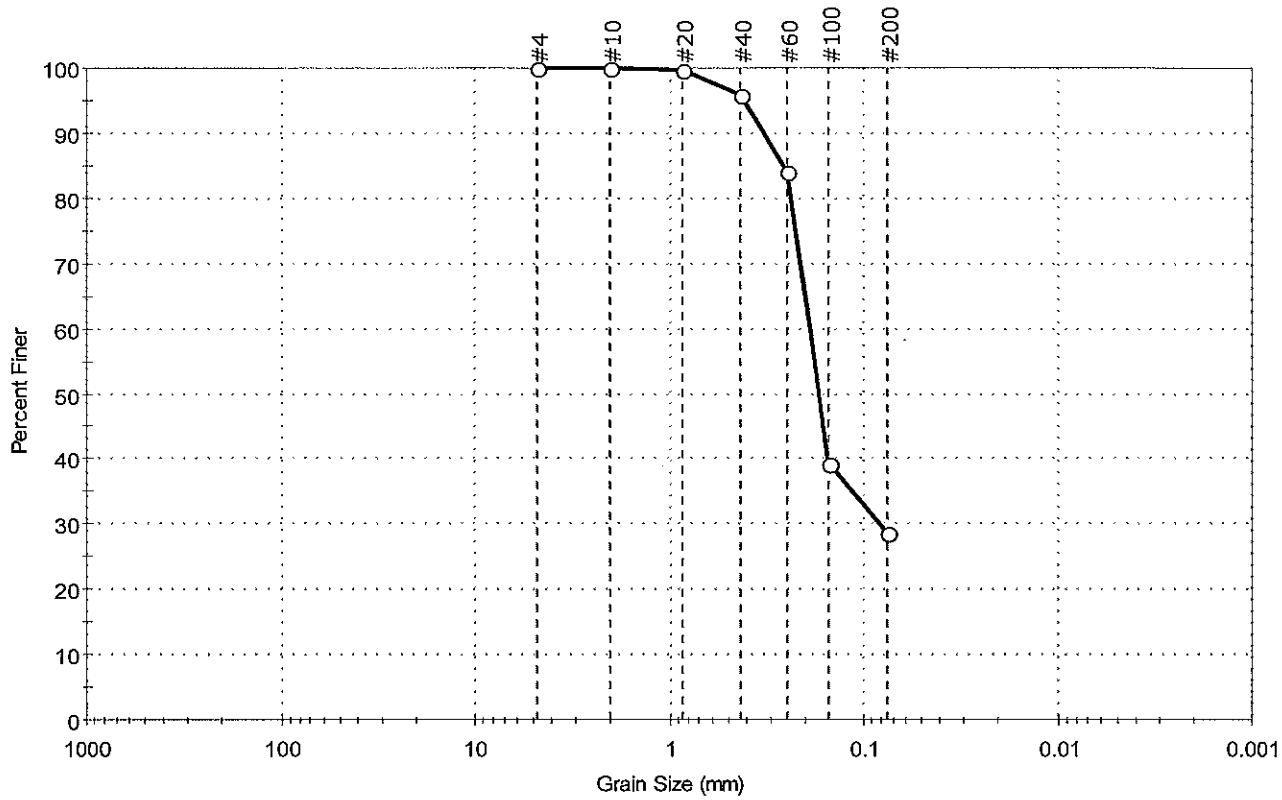
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening -- Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	159 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	3.5-4.5 ft.	Test Id:	258639		
Test Comment:	---				
Sample Description:	Moist, light yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	71.4	28.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	96		
#60	0.25	84		
#100	0.15	39		
#200	0.075	29		

Coefficients

D_{85} = 0.2595 mm D_{30} = 0.0822 mm
D_{60} = 0.1898 mm D_{15} = N/A
D_{50} = 0.1694 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

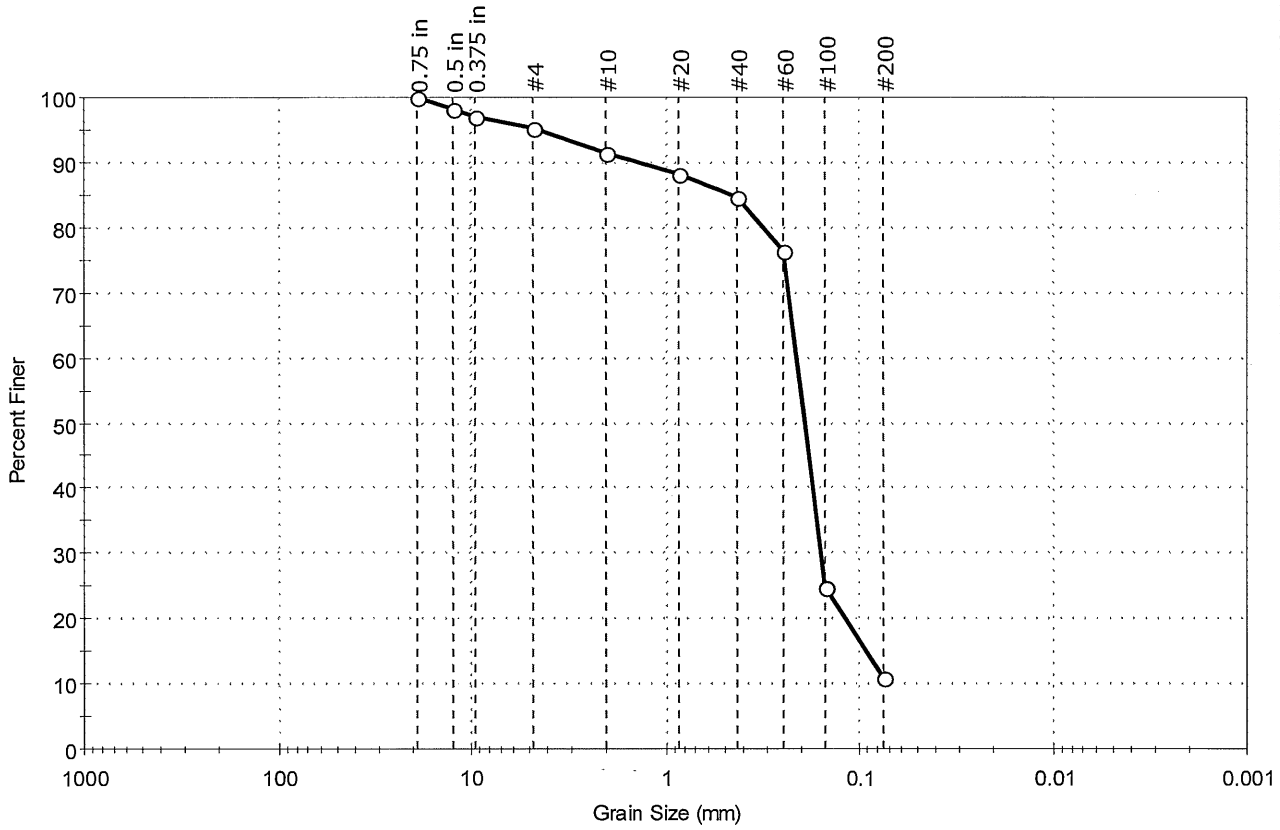
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 160 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 1-2	Test Id: 260842		
Test Comment:	---		
Sample Description:	Moist, olive gray sand with silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	4.6	84.6	10.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	97		
#4	4.75	95		
#10	2.00	92		
#20	0.85	88		
#40	0.42	85		
#60	0.25	76		
#100	0.15	25		
#200	0.075	11		

Coefficients

D_{85} = 0.4465 mm D_{30} = 0.1581 mm
D_{60} = 0.2126 mm D_{15} = 0.0926 mm
D_{50} = 0.1926 mm D_{10} = 0.0721 mm
C_u = 2.949 C_c = 1.631

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

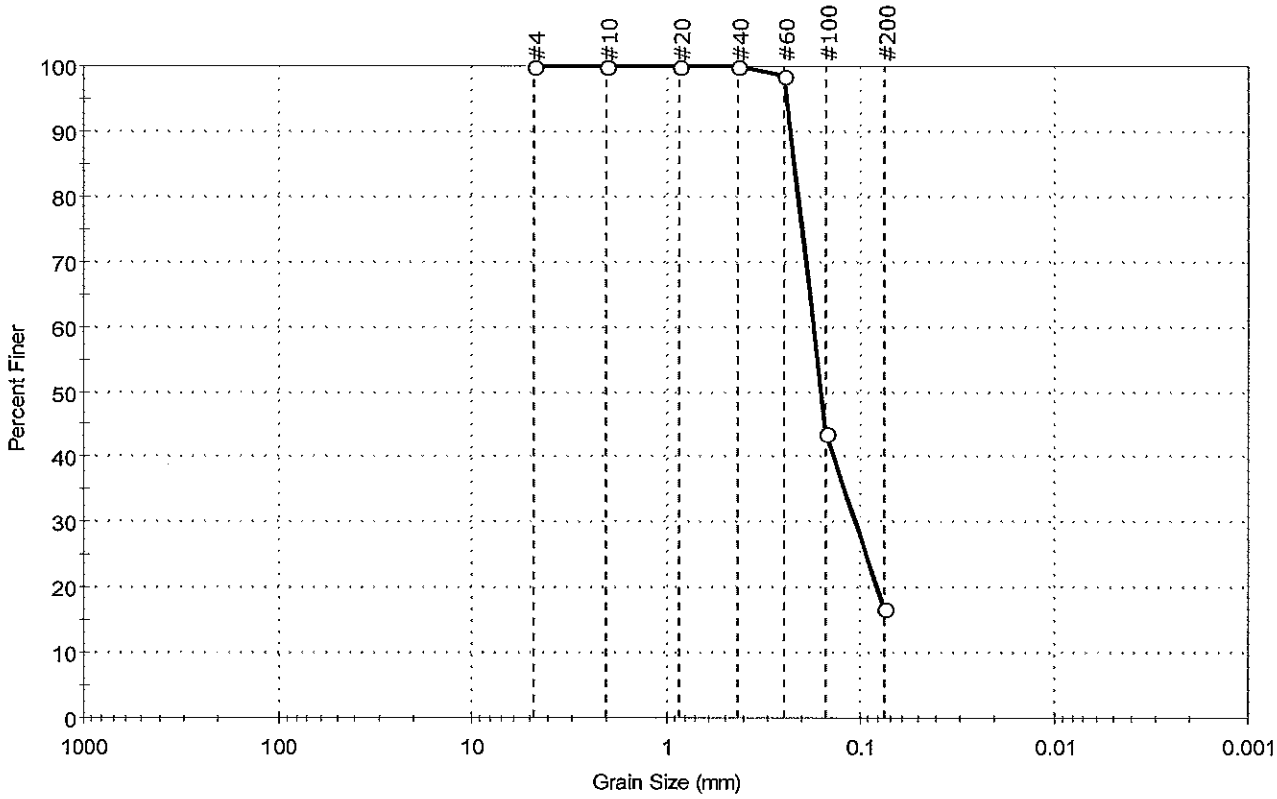
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID:	---	Sample Type: jar	Tested By: jbr
Sample ID:	160 B	Test Date: 01/10/13	Checked By: jdt
Depth :	5-6 ft.	Test Id: 258596	
Test Comment:	---		
Sample Description:	Moist, light gray silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	83.3	16.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	44		
#200	0.075	17		

Coefficients

D_{85} = 0.2202 mm D_{30} = 0.1056 mm
D_{60} = 0.1746 mm D_{15} = N/A
D_{50} = 0.1591 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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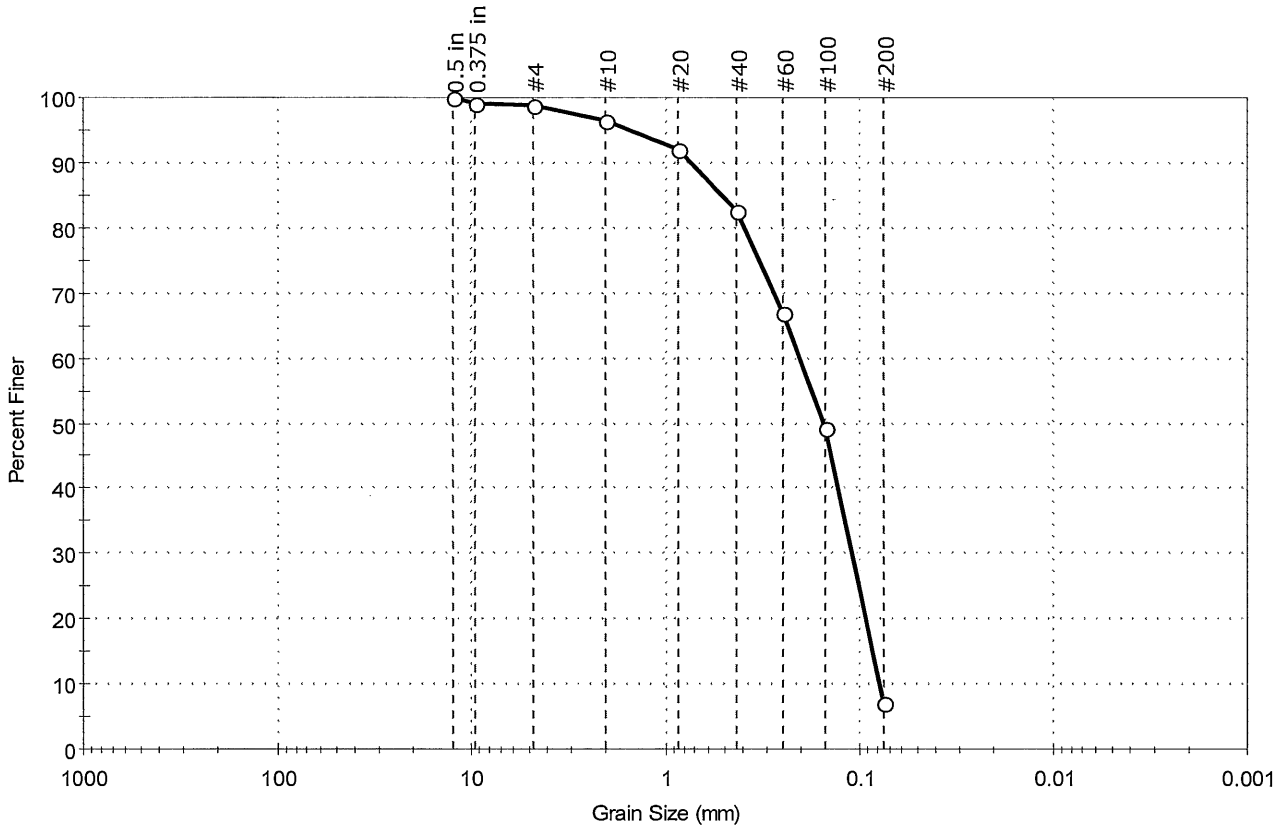
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	161 A	Test Date:	02/11/13	Checked By:	jdt
Depth :	0.5-1.5	Test Id:	260843		
Test Comment:	---				
Sample Description:	Moist, gray sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.2	91.8	7.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	99		
#10	2.00	97		
#20	0.85	92		
#40	0.42	82		
#60	0.25	67		
#100	0.15	49		
#200	0.075	7		

Coefficients

D_{85} = 0.5089 mm D_{30} = 0.1093 mm
D_{60} = 0.2044 mm D_{15} = 0.0855 mm
D_{50} = 0.1531 mm D_{10} = 0.0788 mm
C_u = 2.594 C_c = 0.742

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

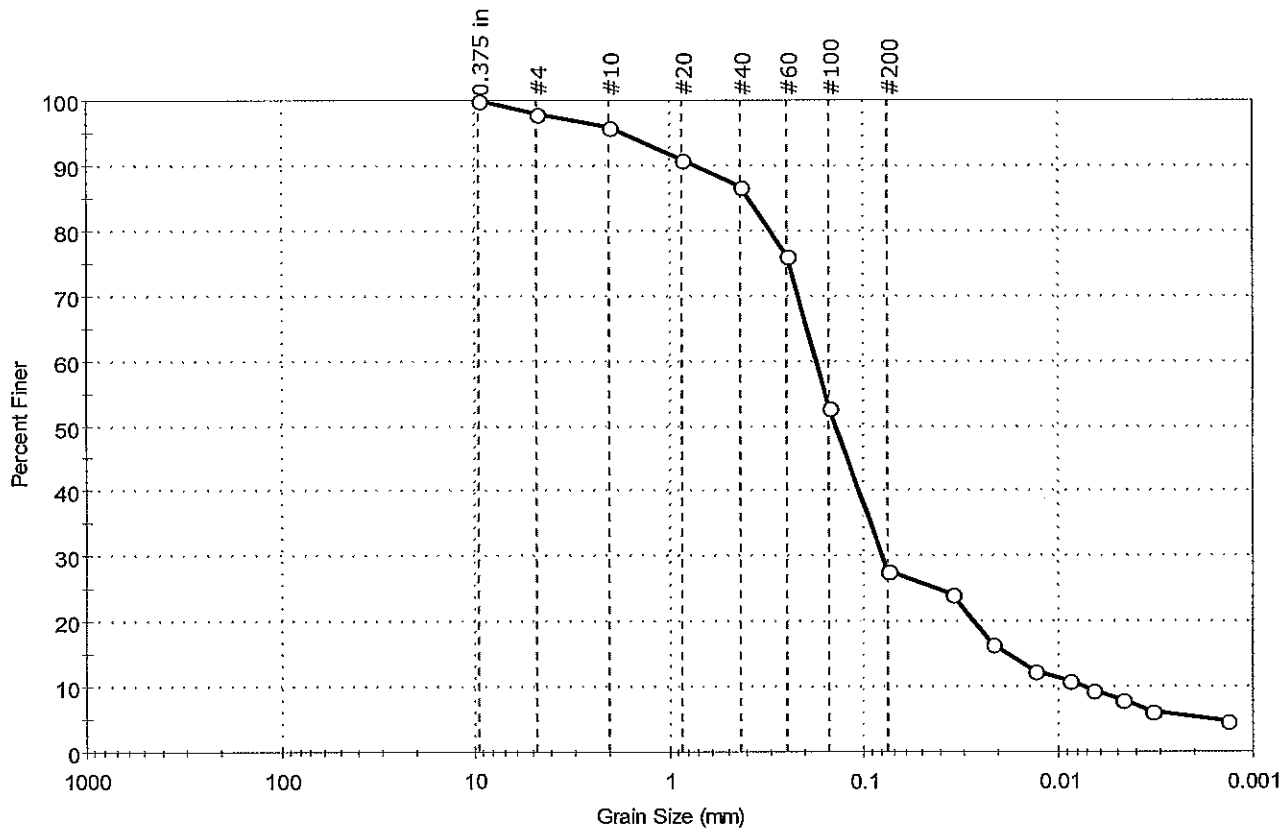
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 161 B	Test Date: 01/11/13	Checked By:	jdt
Depth : 2-3.5 ft.	Test Id: 258915		
Test Comment:	---		
Sample Description:	Moist, gray silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.2	70.1	27.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	96		
#20	0.85	91		
#40	0.42	87		
#60	0.25	76		
#100	0.15	53		
#200	0.075	28		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0353	24		
---	0.0216	16		
---	0.0132	13		
---	0.0088	11		
---	0.0066	9		
---	0.0047	8		
---	0.0033	6		
---	0.0014	5		

Coefficients

D_{85} = 0.3905 mm D_{30} = 0.0799 mm
D_{60} = 0.1757 mm D_{15} = 0.0180 mm
D_{50} = 0.1390 mm D_{10} = 0.0074 mm
C_u = 23.743 C_c = 4.910

Classification

ASTM Silty sand (SM)

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	161 B	Test Date:	01/11/13	Checked By:	jdt
Depth :	2-3.5 ft.	Test Id:	258917		
Test Comment:	---				
Sample Description:	Moist, gray silty sand				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	161 B	----	2-3.5 ft.	17	n/a	n/a	n/a	n/a	Silty sand (SM)

13% Retained on #40 Sieve

Dry Strength: HIGH

Dilatancy: RAPID

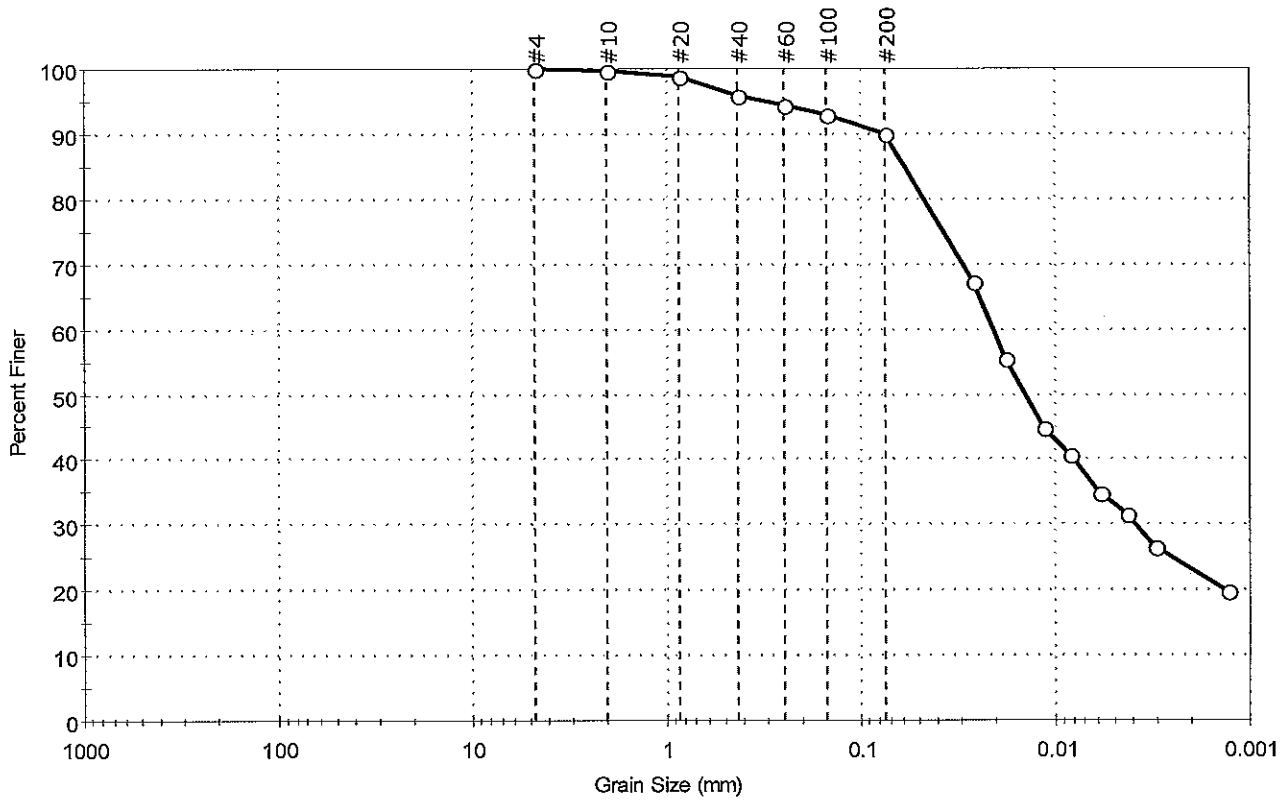
Toughness: n/a

The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 161 C	Test Date: 01/11/13	Checked By:	jdt
Depth : 4-4.9 Ft.	Test Id: 258914		
Test Comment:	---		
Sample Description:	Moist, gray clay		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	10.2	89.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	96		
#60	0.25	94		
#100	0.15	93		
#200	0.075	90		
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0265	67		
---	0.0181	56		
---	0.0113	45		
---	0.0083	41		
---	0.0059	35		
---	0.0043	31		
---	0.0031	27		
---	0.0013	20		

Coefficients

D_{85} =0.0601 mm D_{30} =0.0039 mm

D_{60} =0.0209 mm D_{15} =N/A

D_{50} =0.0142 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM lean clay (CL)

AASHTO Clayey Soils (A-6 (14))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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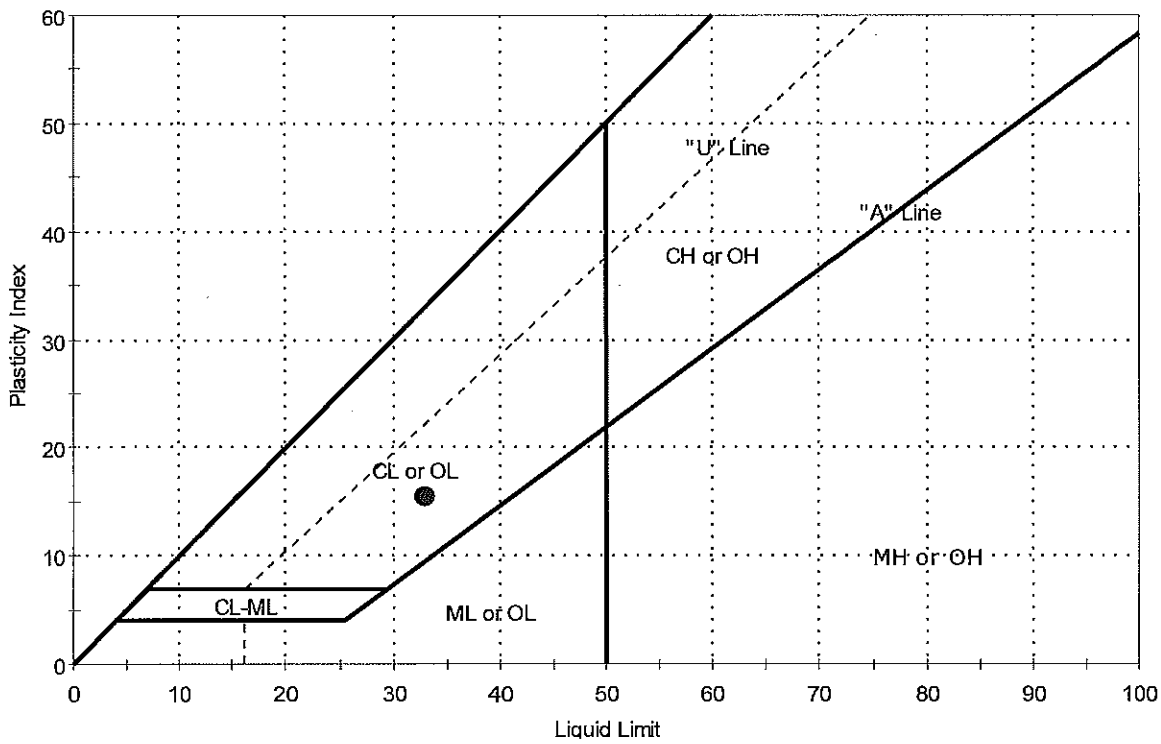
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	161 C	Test Date:	01/11/13	Checked By:	jdt
Depth :	4-4.9 Ft.	Test Id:	258916		
Test Comment:	---				
Sample Description:	Moist, gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



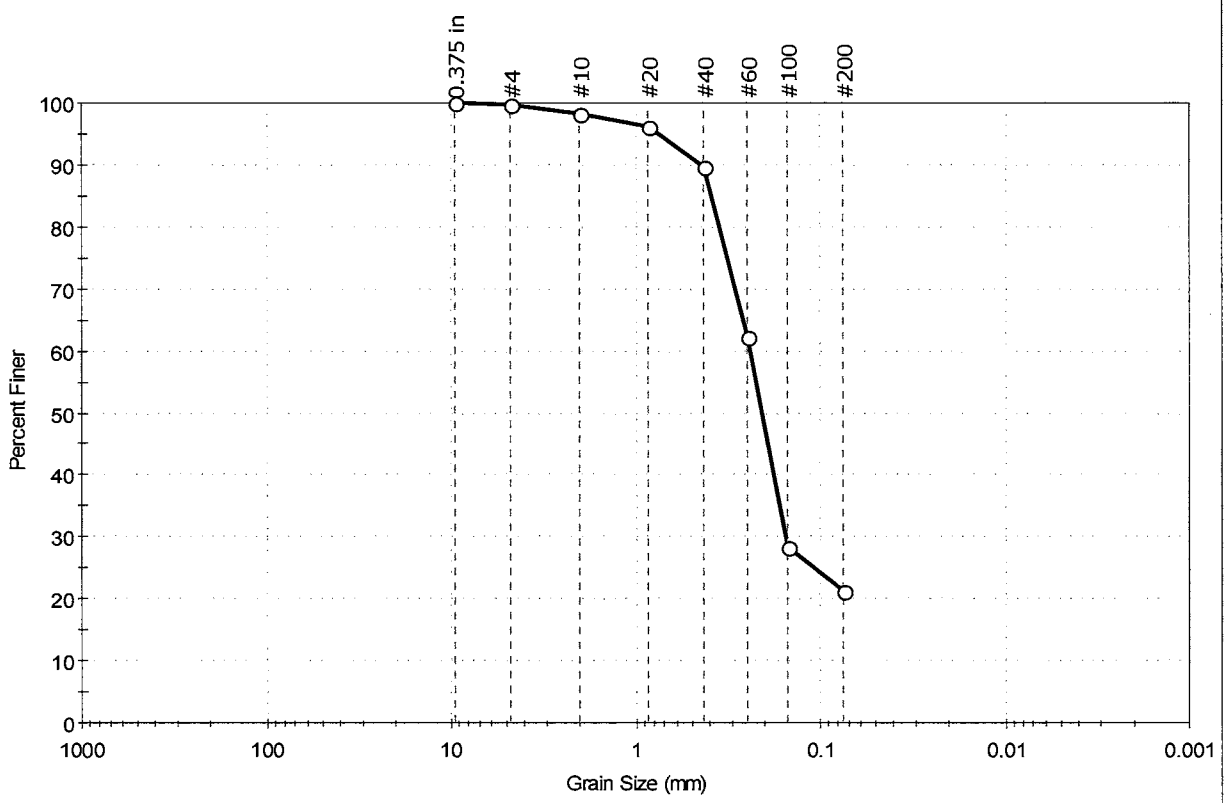
Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	161 C	---	4-4.9 Ft.	22	33	17	16	0	lean clay (CL)

Sample Prepared using the WET method
4% Retained on #40 Sieve
Dry Strength: VERY HIGH
Dilatancy: SLOW
Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening - Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 162 B	Test Date: 01/29/13	Checked By:	jdt
Depth : 1.5-2.5 ft.	Test Id: 260383		
Test Comment: ---			
Sample Description:	Moist, olive brown silty sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.3	78.6	21.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	98		
#20	0.85	96		
#40	0.42	90		
#60	0.25	62		
#100	0.15	28		
#200	0.075	21		

Coefficients

D_{85} = 0.3885 mm D_{30} = 0.1540 mm
D_{60} = 0.2417 mm D_{15} = N/A
D_{50} = 0.2080 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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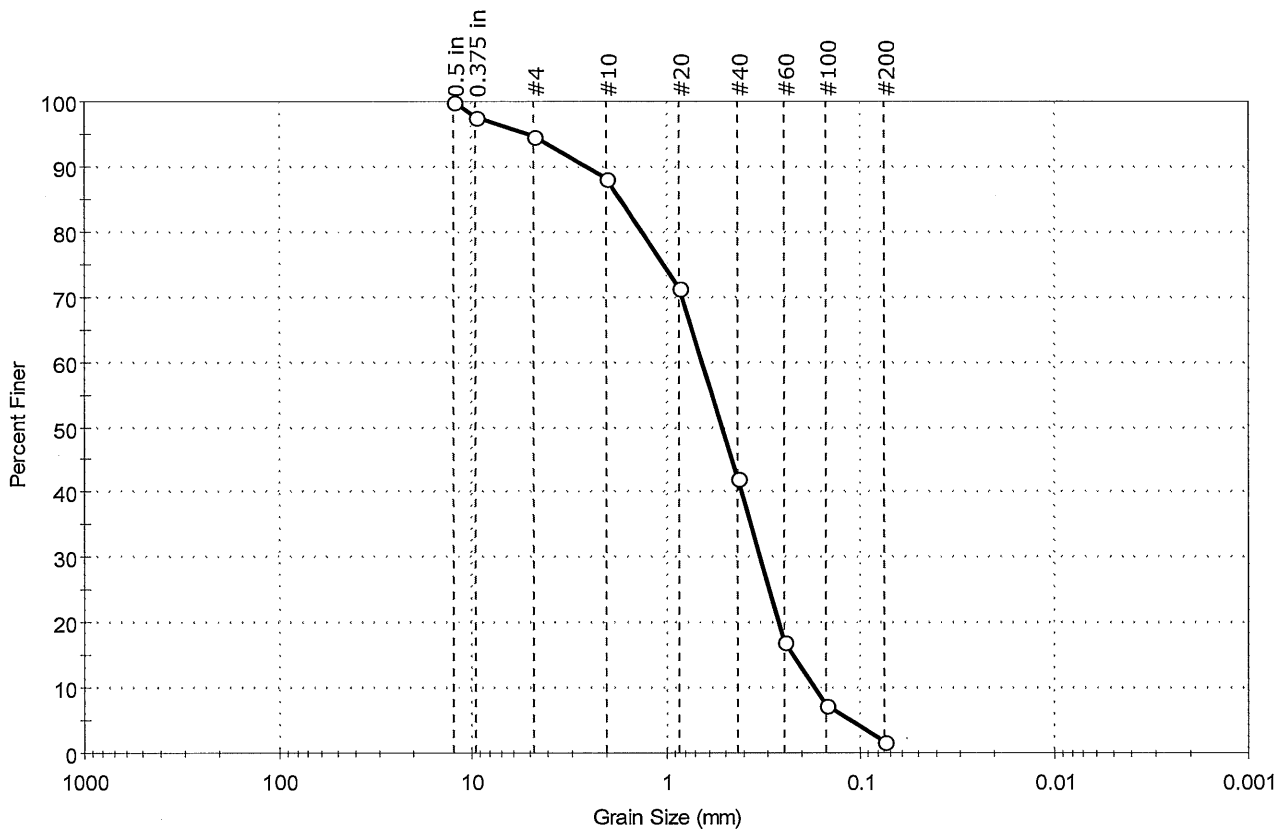
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 163 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0.5-0.9	Test Id: 260844		
Test Comment: ---			
Sample Description: Moist, grayish brown sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	5.3	93.0	1.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	95		
#10	2.00	88		
#20	0.85	71		
#40	0.42	42		
#60	0.25	17		
#100	0.15	7		
#200	0.075	2		

Coefficients

D_{85} = 1.6985 mm D_{30} = 0.3283 mm

D_{60} = 0.6473 mm D_{15} = 0.2248 mm

D_{50} = 0.5103 mm D_{10} = 0.1725 mm

C_u = 3.752 C_c = 0.965

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

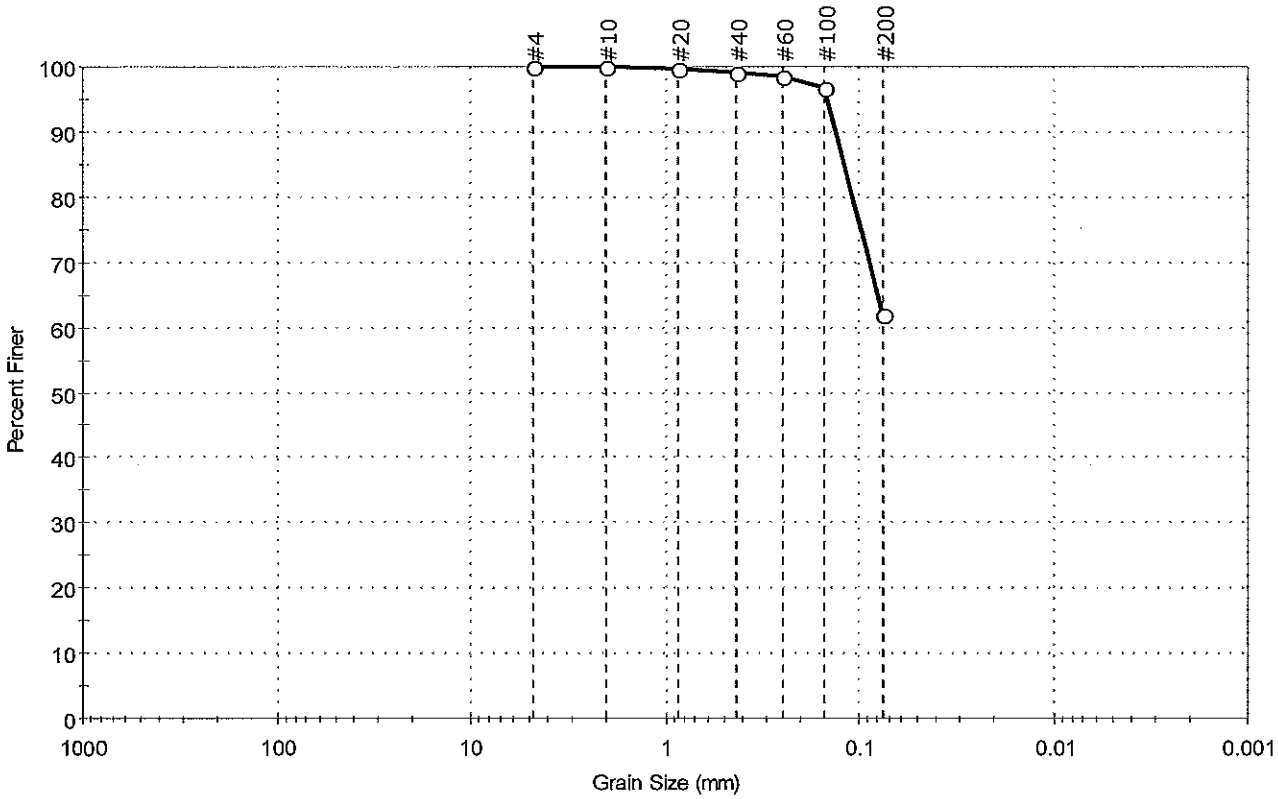
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : SOFT

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening -- Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 163 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 2.5-3 ft.	Test Id: 258638		
Test Comment:	---		
Sample Description:	Moist, mottled gray and yellowish brown sandy silt		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	38.2	61.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	98		
#100	0.15	97		
#200	0.075	62		

Coefficients

D_{85} = 0.1190 mm D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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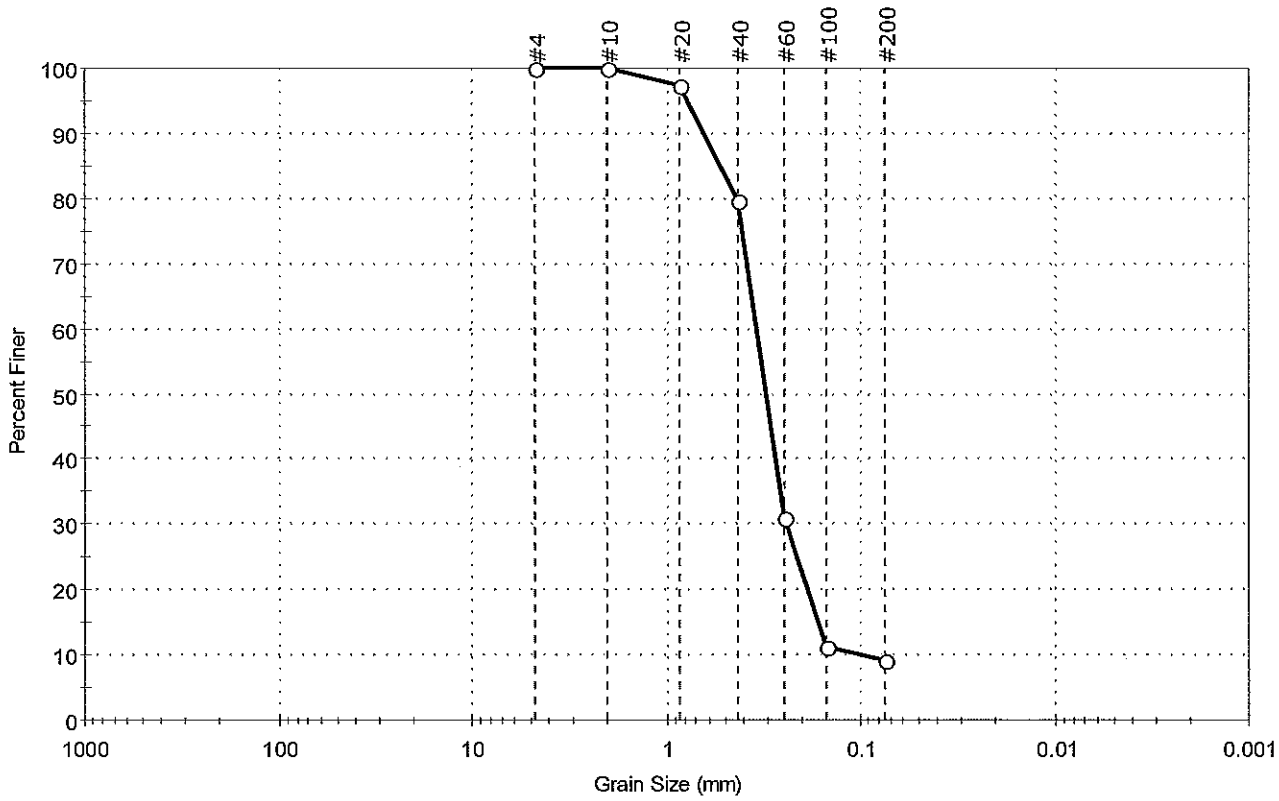
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 164 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 1.5-3 ft.	Test Id: 258668		
Test Comment:	----		
Sample Description:	Moist, gray sand with silt		
Sample Comment:	----		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	90.8	9.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	97		
#40	0.42	80		
#60	0.25	31		
#100	0.15	11		
#200	0.075	9		

Coefficients

D_{85} =0.5228 mm D_{30} =0.2435 mm

D_{60} =0.3428 mm D_{15} =0.1659 mm

D_{50} =0.3074 mm D_{10} =0.1005 mm

C_u =3.411 C_c =1.721

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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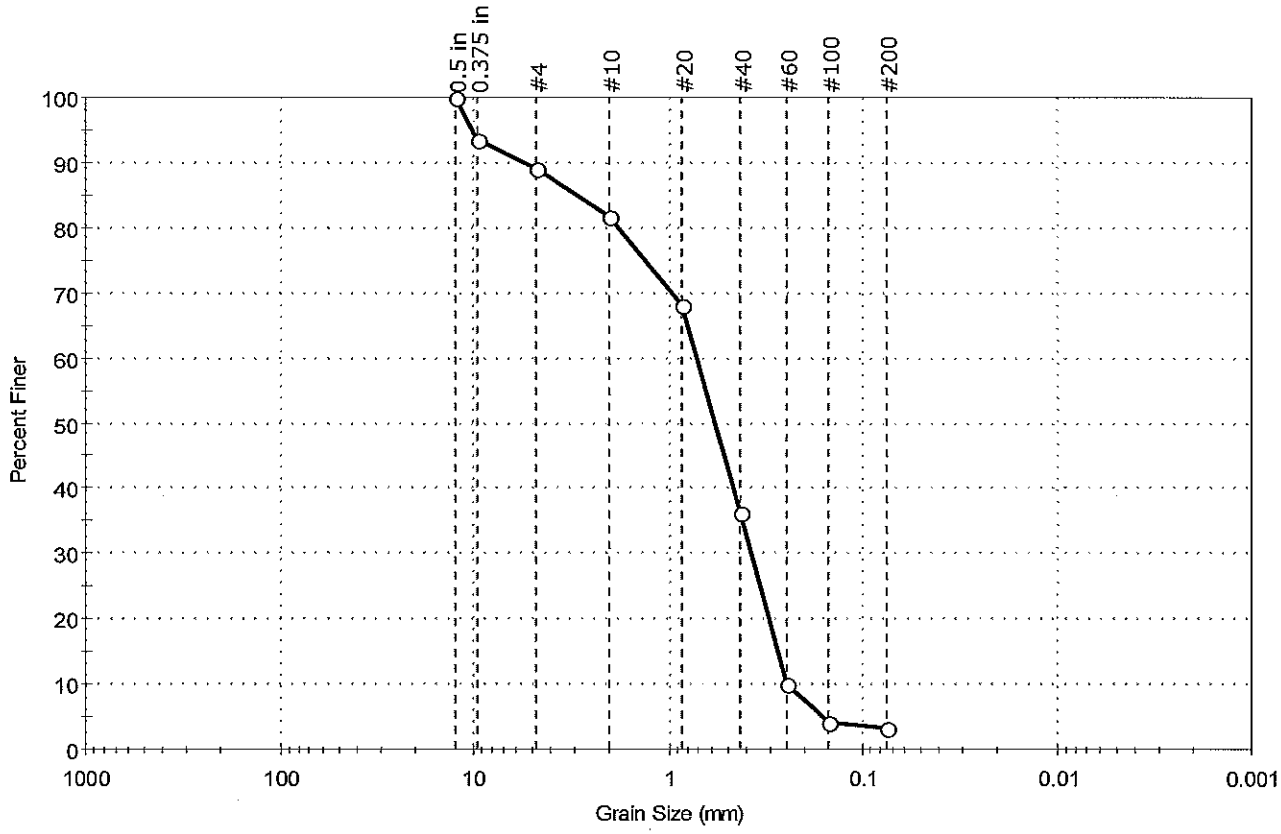
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	165 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	3.5-5 ft.	Test Id:	258598		
Test Comment:	---				
Sample Description:	Moist, gray sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	10.8	85.9	3.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	94		
#4	4.75	89		
#10	2.00	82		
#20	0.85	68		
#40	0.42	36		
#60	0.25	10		
#100	0.15	4		
#200	0.075	3		

Coefficients

D_{85} =2.9206 mm D_{30} =0.3738 mm

D_{60} =0.7123 mm D_{15} =0.2765 mm

D_{50} =0.5723 mm D_{10} =0.2501 mm

C_u =2.848 C_c =0.784

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

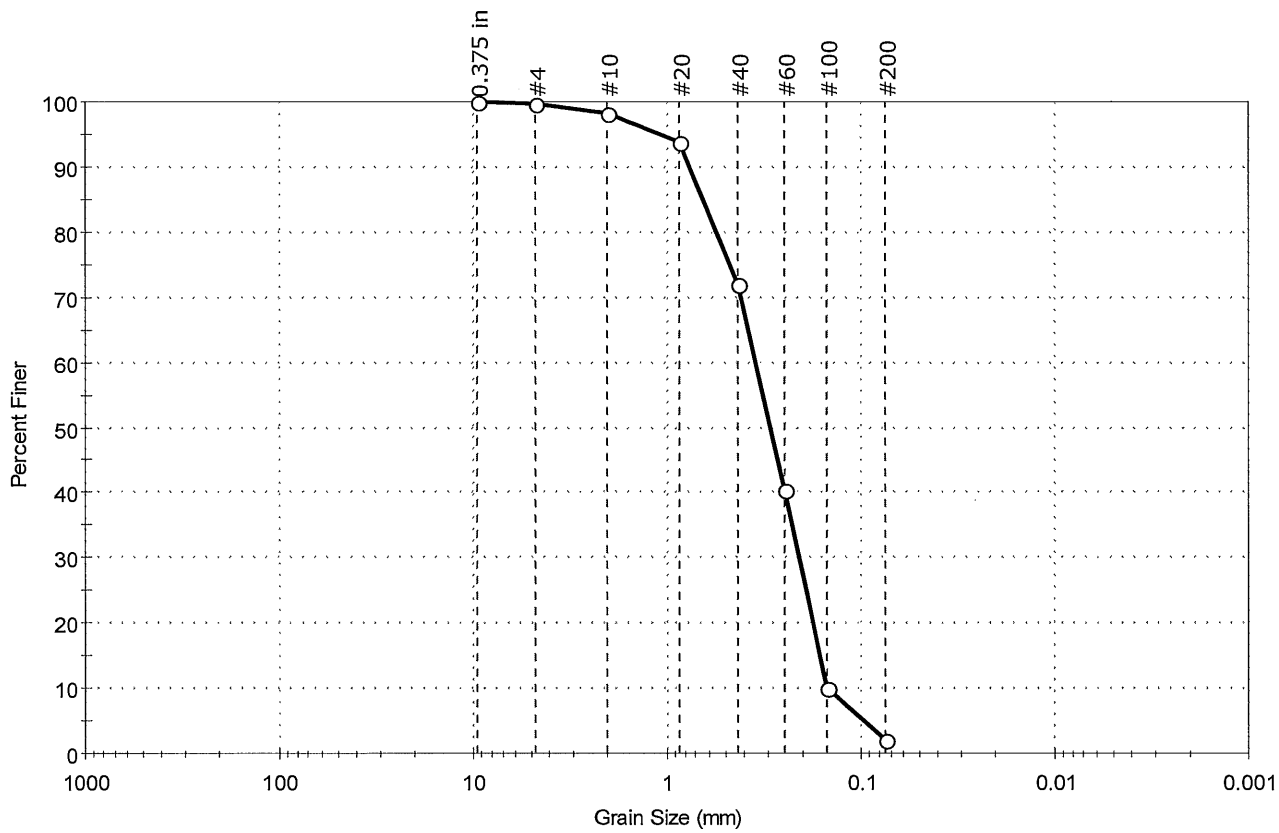
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	166 A	Test Date:	02/11/13	Checked By:	jdt
Depth :	0.5-1.5	Test Id:	260845		
Test Comment:	---				
Sample Description:	Moist, gray sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.4	97.6	2.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	98		
#20	0.85	94		
#40	0.42	72		
#60	0.25	40		
#100	0.15	10		
#200	0.075	2		

Coefficients

D_{85} = 0.6413 mm D_{30} = 0.2102 mm

D_{60} = 0.3473 mm D_{15} = 0.1632 mm

D_{50} = 0.2940 mm D_{10} = 0.1500 mm

C_u = 2.315 C_c = 0.848

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

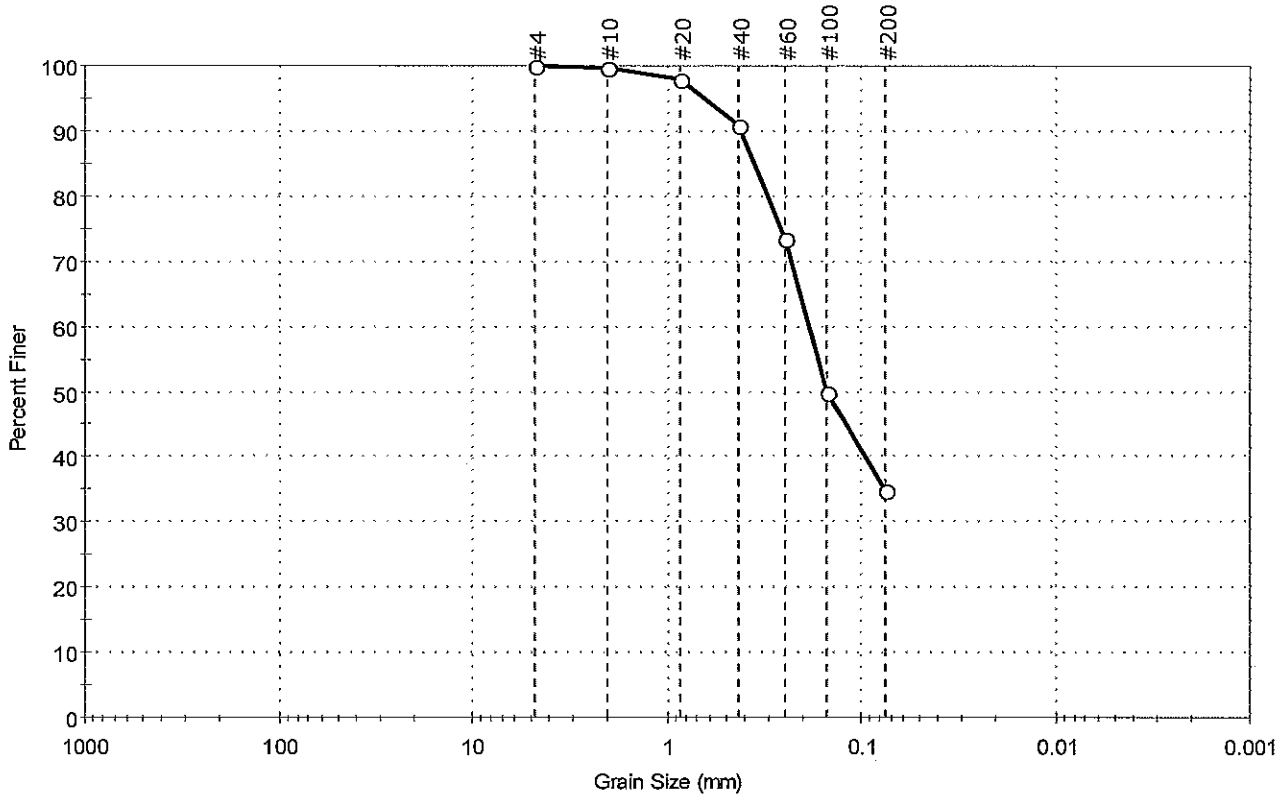
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening -- Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 166 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 3-5 ft.	Test Id: 258599		
Test Comment: ---			
Sample Description: Moist, gray silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	65.2	34.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	98		
#40	0.42	91		
#60	0.25	73		
#100	0.15	50		
#200	0.075	35		

Coefficients

D_{85} = 0.3566 mm D_{30} = N/A

D_{60} = 0.1873 mm D_{15} = N/A

D_{50} = 0.1509 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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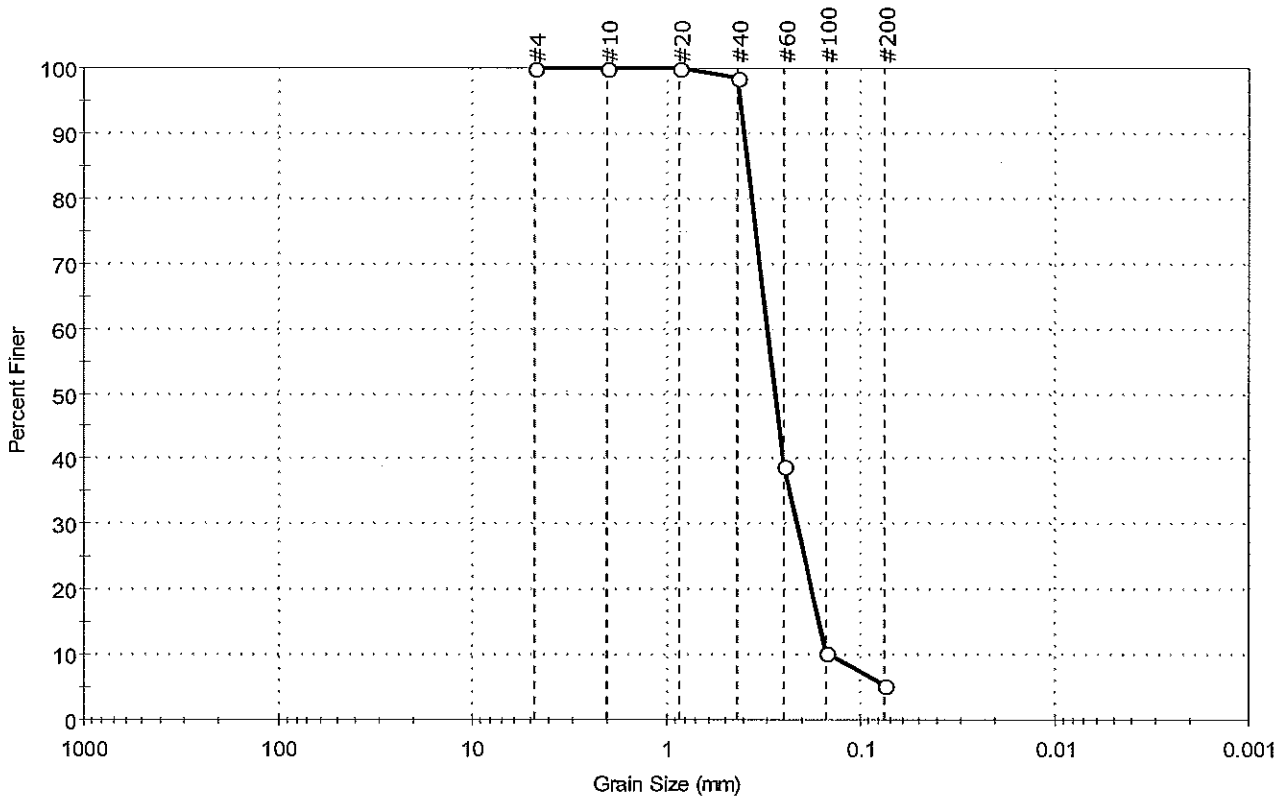
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	R-2	Sample Type:	jar	Tested By:	jbr
Sample ID:	167	Test Date:	01/10/13	Checked By:	jdt
Depth :	2.5-3.5 ft.	Test Id:	258667		
Test Comment:	---				
Sample Description:	Moist, gray sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	94.7	5.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	39		
#100	0.15	10		
#200	0.075	5		

Coefficients

D_{85} =0.3767 mm D_{30} =0.2133 mm

D_{60} =0.3017 mm D_{15} =0.1628 mm

D_{50} =0.2761 mm D_{10} =0.1412 mm

C_u =2.137 C_c =1.068

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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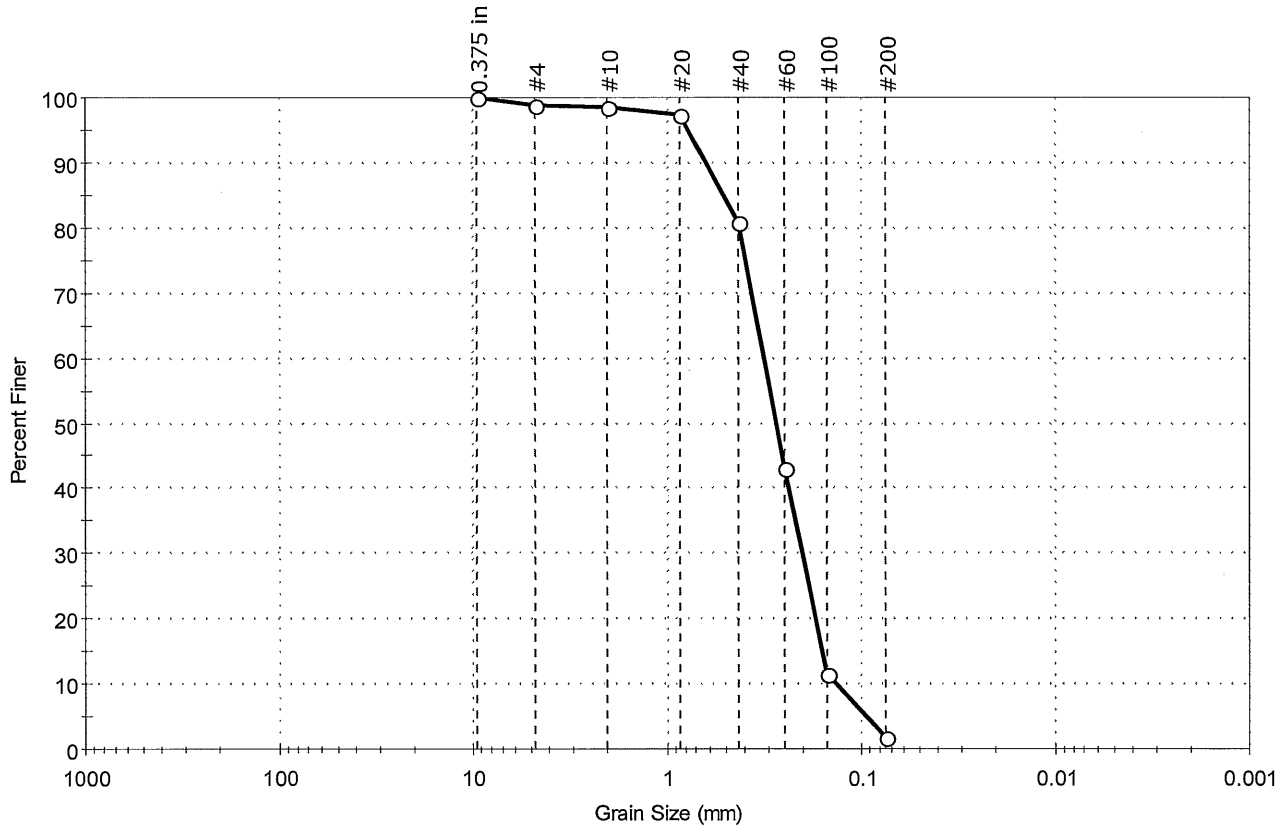
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 168 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-2	Test Id: 260846		
Test Comment:	---		
Sample Description:	Moist, gray sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.1	97.3	1.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	99		
#20	0.85	97		
#40	0.42	81		
#60	0.25	43		
#100	0.15	11		
#200	0.075	2		

Coefficients

D_{85} = 0.5062 mm D_{30} = 0.2024 mm
D_{60} = 0.3171 mm D_{15} = 0.1588 mm
D_{50} = 0.2756 mm D_{10} = 0.1352 mm
C_u = 2.345 C_c = 0.956

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

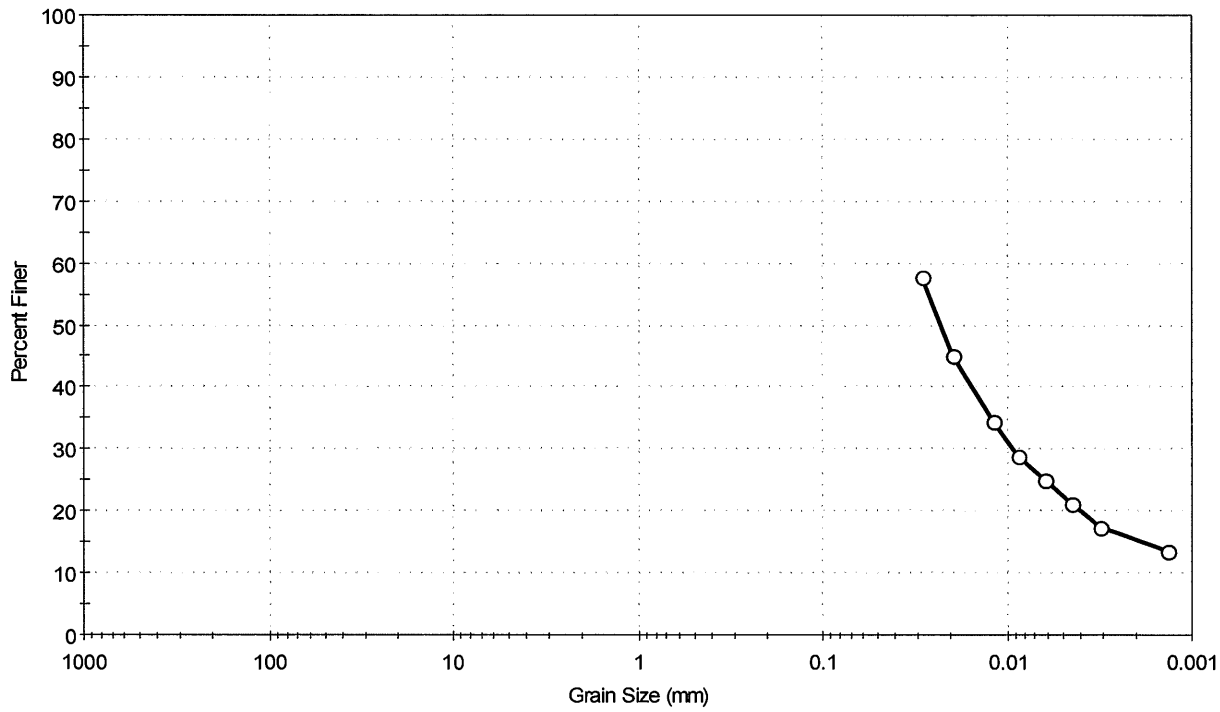
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	168 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	3-5 ft.	Test Id:	258624		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, grayish brown clay with sand				
Sample Comment:	83% passing the No. 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	—	—	—

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0292	58		
---	0.0198	45		
---	0.0120	35		
---	0.0087	29		
---	0.0063	25		
---	0.0045	21		
---	0.0032	17		
---	0.0014	13		

Coefficients

D_{85} =N/A D_{30} =0.0093 mm

D_{60} =N/A D_{15} =0.0019 mm

D_{50} =0.0230 mm D_{10} =0.0006 mm

C_u =N/A C_c =N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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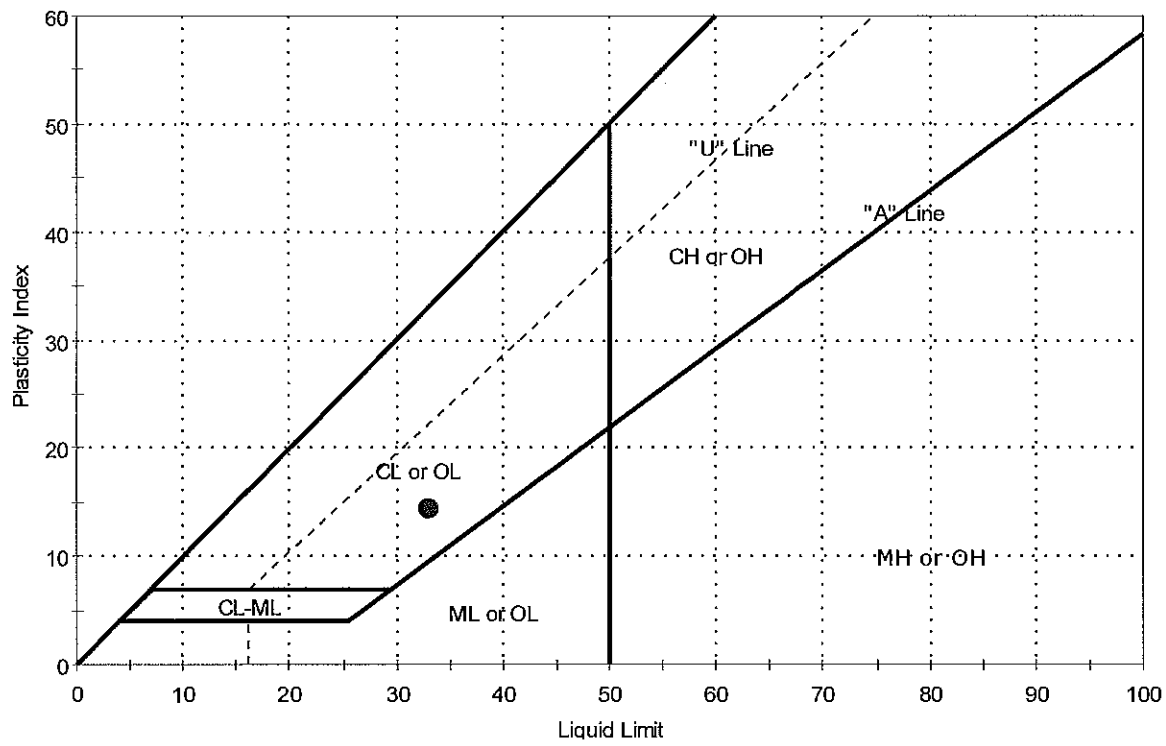
Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	168 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	3-5 ft.	Test Id:	258627		
Test Comment:	---				
Sample Description:	Moist, grayish brown clay with sand				
Sample Comment:	83% passing the No. 200 sieve				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	168 B	---	3-5 ft.	30	33	18	15	1	

Sample Prepared using the WET method

Dry Strength: VERY HIGH

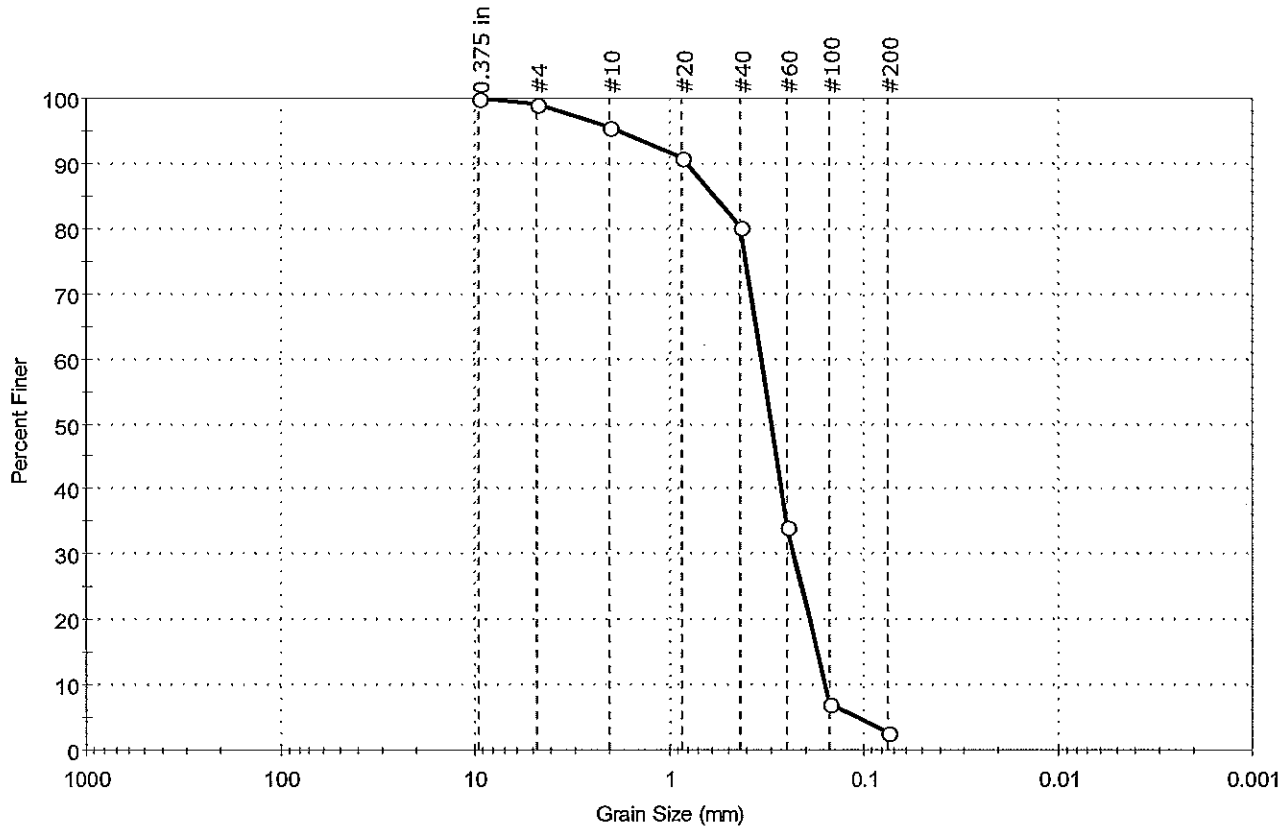
Dilatancy: SLOW

Toughness: LOW

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 169 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-3 ft.	Test Id: 258666		
Test Comment: ---			
Sample Description: Moist, olive brown sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.8	96.6	2.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	96		
#20	0.85	91		
#40	0.42	80		
#60	0.25	34		
#100	0.15	7		
#200	0.075	3		

Coefficients

D_{85} =0.5828 mm D_{30} =0.2305 mm

D_{60} =0.3367 mm D_{15} =0.1742 mm

D_{50} =0.2998 mm D_{10} =0.1586 mm

C_u =2.123 C_c =0.995

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

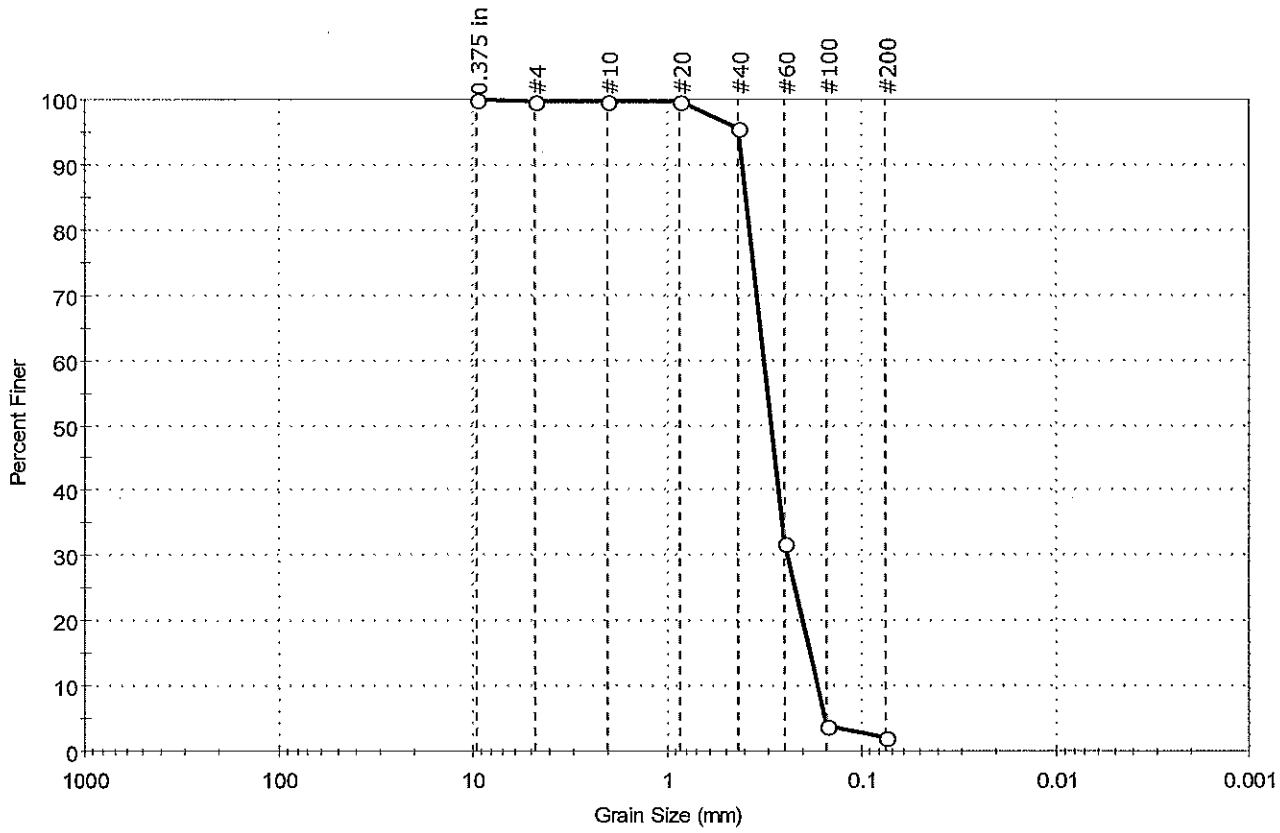
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 170 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 1.3-3.3 ft.	Test Id: 258665		
Test Comment: ---			
Sample Description: Moist, light gray sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.1	97.8	2.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	95		
#60	0.25	32		
#100	0.15	4		
#200	0.075	2		

Coefficients

D_{85} = 0.3893 mm D_{30} = 0.2413 mm

D_{60} = 0.3160 mm D_{15} = 0.1839 mm

D_{50} = 0.2907 mm D_{10} = 0.1680 mm

C_u = 1.881 C_c = 1.097

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

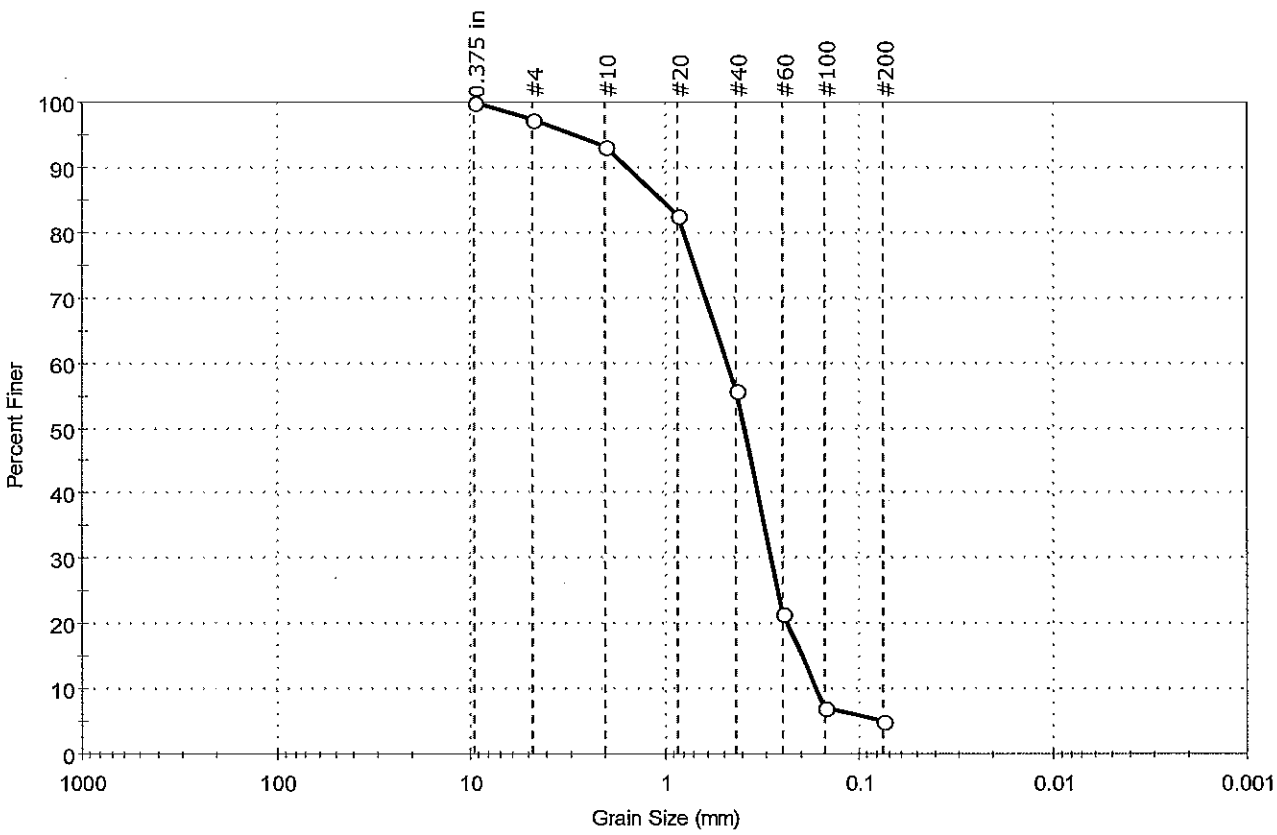
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	R-1	Sample Type:	jar	Tested By:	jbr
Sample ID:	171	Test Date:	01/10/13	Checked By:	jdt
Depth :	2-3 ft.	Test Id:	258664		
Test Comment:	---				
Sample Description:	Moist, light gray sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.7	92.3	5.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	93		
#20	0.85	83		
#40	0.42	56		
#60	0.25	22		
#100	0.15	7		
#200	0.075	5		

Coefficients

D_{85} =1.0327 mm D_{30} =0.2850 mm

D_{60} =0.4757 mm D_{15} =0.1982 mm

D_{50} =0.3893 mm D_{10} =0.1663 mm

C_u =2.860 C_c =1.027

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

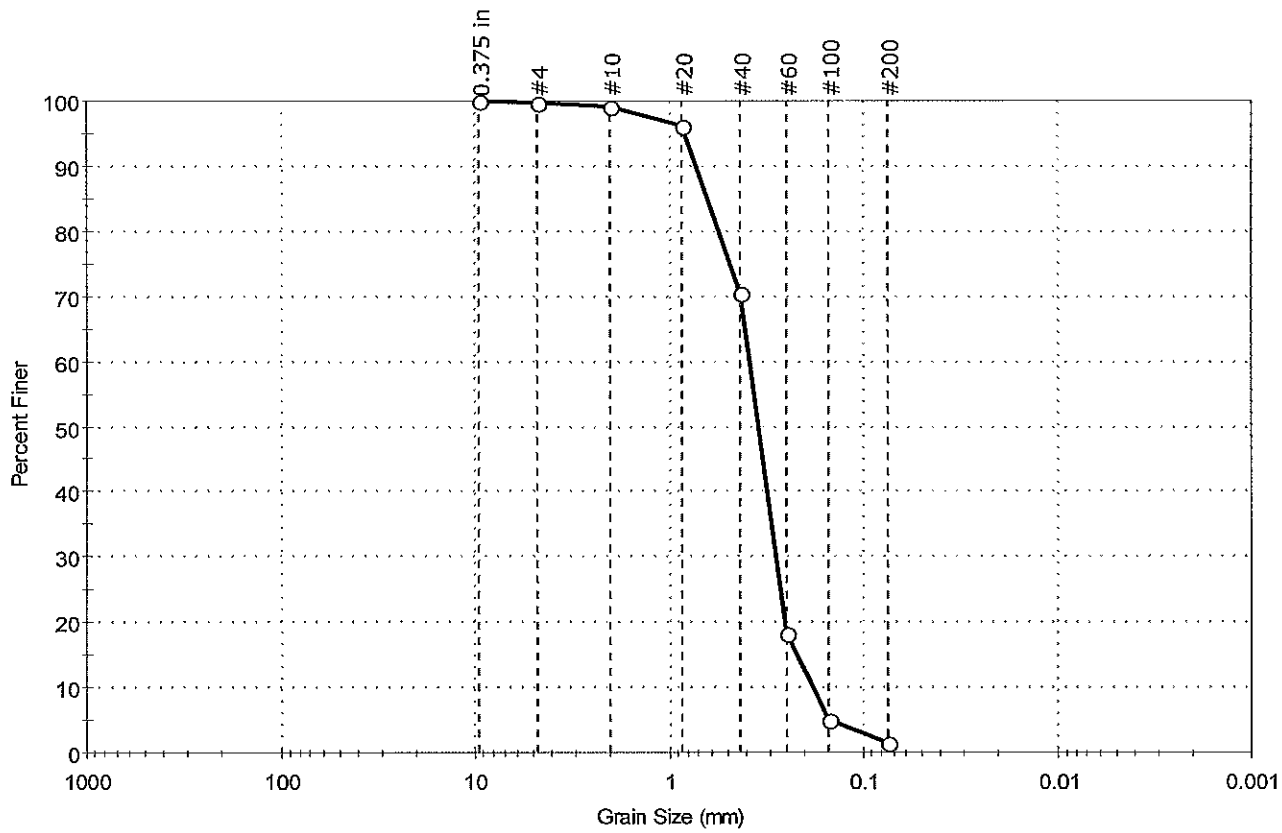
Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening -- Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 172	Test Date: 01/10/13	Checked By:	jdt
Depth : 1-2.5 ft.	Test Id: 258663		
Test Comment:	---		
Sample Description:	Moist, light gray sand		
Sample Comment:	---		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.3	98.1	1.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	96		
#40	0.42	71		
#60	0.25	18		
#100	0.15	5		
#200	0.075	2		

Coefficients

D_{85} =0.6272 mm D_{30} =0.2818 mm

D_{60} =0.3818 mm D_{15} =0.2211 mm

D_{50} =0.3450 mm D_{10} =0.1825 mm

C_u =2.092 C_c =1.140

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

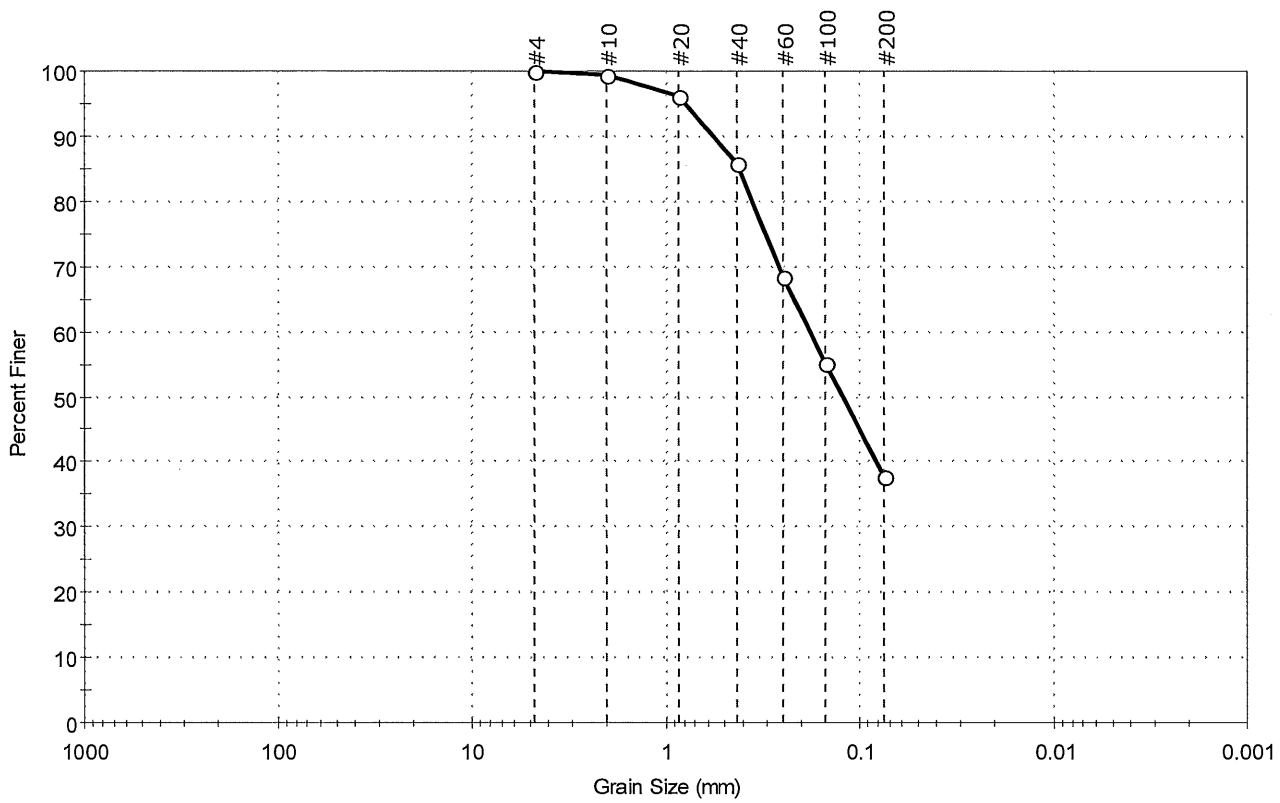
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 173 A	Test Date: 02/11/13	Checked By:	jdt
Depth : 0-2	Test Id: 260847		
Test Comment: ---			
Sample Description: Moist, gray silty sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	62.3	37.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	96		
#40	0.42	86		
#60	0.25	69		
#100	0.15	55		
#200	0.075	38		

Coefficients

D_{85} =0.4155 mm D_{30} =N/A

D_{60} =0.1810 mm D_{15} =N/A

D_{50} =0.1227 mm D_{10} =N/A

C_u =N/A C_c =N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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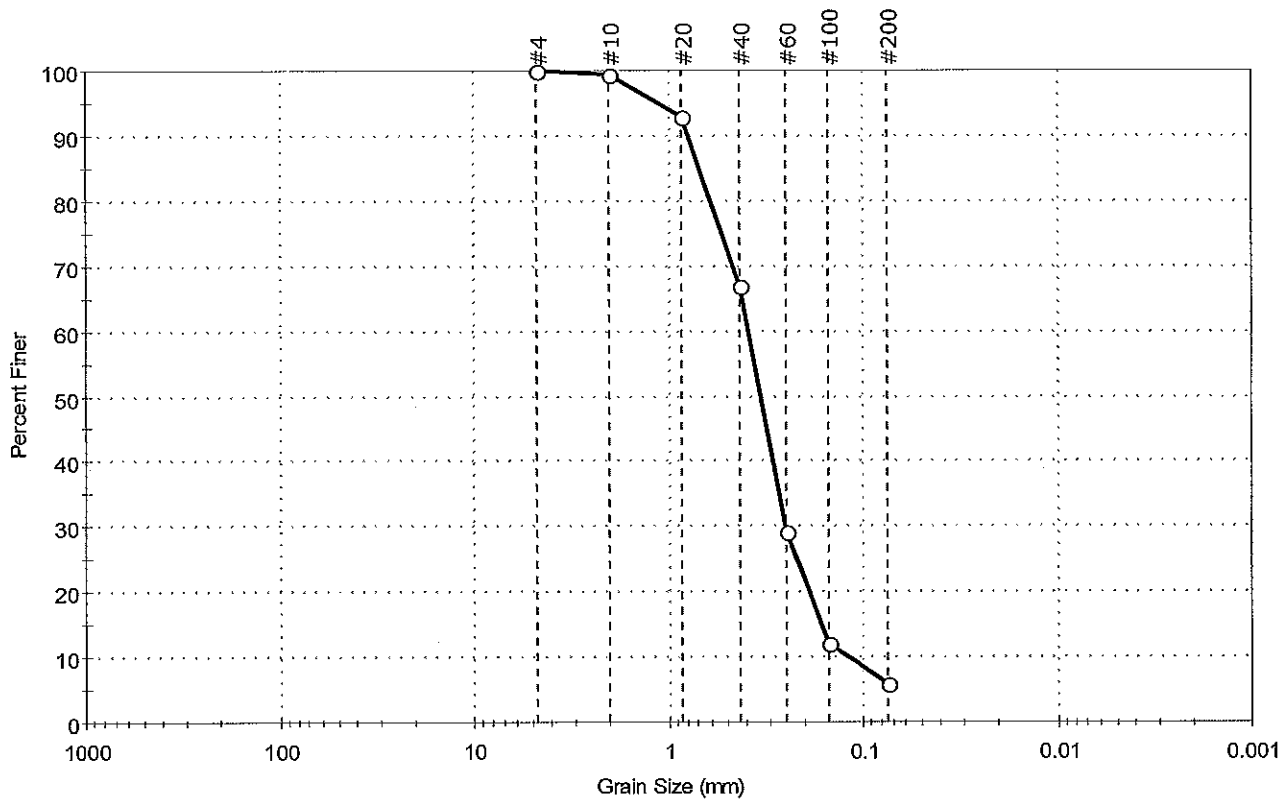
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ----	Sample Type: jar	Tested By:	jbr
Sample ID: 173	Test Date: 01/10/13	Checked By:	jdt
Depth : 2-4 ft.	Test Id: 258662		
Test Comment:	----		
Sample Description:	Moist, light gray sand with silt		
Sample Comment:	----		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.0	94.0	6.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	93		
#40	0.42	67		
#60	0.25	29		
#100	0.15	12		
#200	0.075	6		

Coefficients

D_{85} =0.6883 mm D_{30} =0.2530 mm

D_{60} =0.3855 mm D_{15} =0.1633 mm

D_{50} =0.3350 mm D_{10} =0.1176 mm

C_u =3.278 C_c =1.412

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ----

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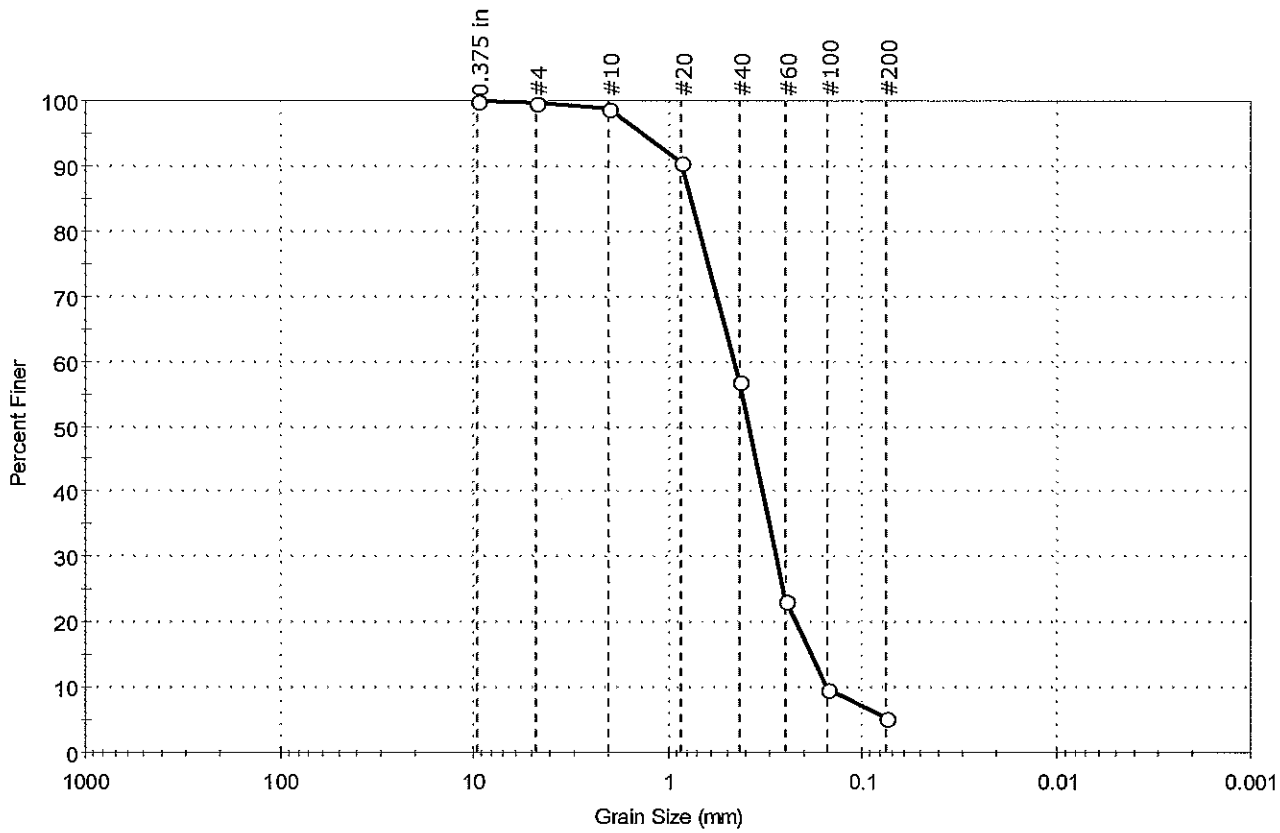
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening -- Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 174	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-4 ft.	Test Id: 258661		
Test Comment: ---			
Sample Description: Moist, gray sand with silt			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.3	94.5	5.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	91		
#40	0.42	57		
#60	0.25	23		
#100	0.15	10		
#200	0.075	5		

Coefficients

D_{85} = 0.7565 mm D_{30} = 0.2776 mm
D_{60} = 0.4523 mm D_{15} = 0.1822 mm
D_{50} = 0.3807 mm D_{10} = 0.1508 mm
C_u = 2.999 C_c = 1.130

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

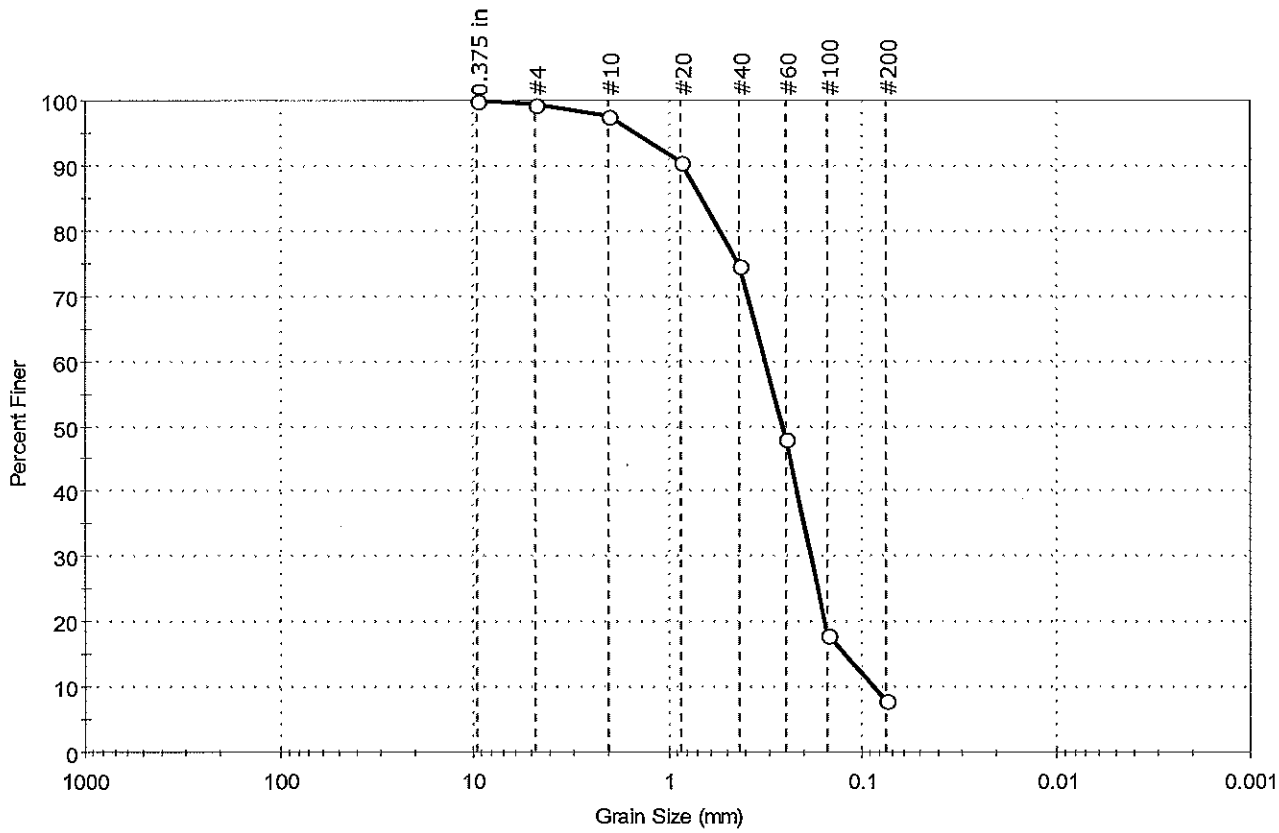
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening - Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 175 B	Test Date: 01/10/13	Checked By:	jdt
Depth : 2-4 ft.	Test Id: 258660		
Test Comment: ---			
Sample Description: Moist, gray sand with silt			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.5	91.6	7.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	98		
#20	0.85	91		
#40	0.42	75		
#60	0.25	48		
#100	0.15	18		
#200	0.075	8		

Coefficients

D_{85} =0.6696 mm D_{30} =0.1838 mm
D_{60} =0.3173 mm D_{15} =0.1219 mm
D_{50} =0.2595 mm D_{10} =0.0866 mm
C_u =3.664 C_c =1.229

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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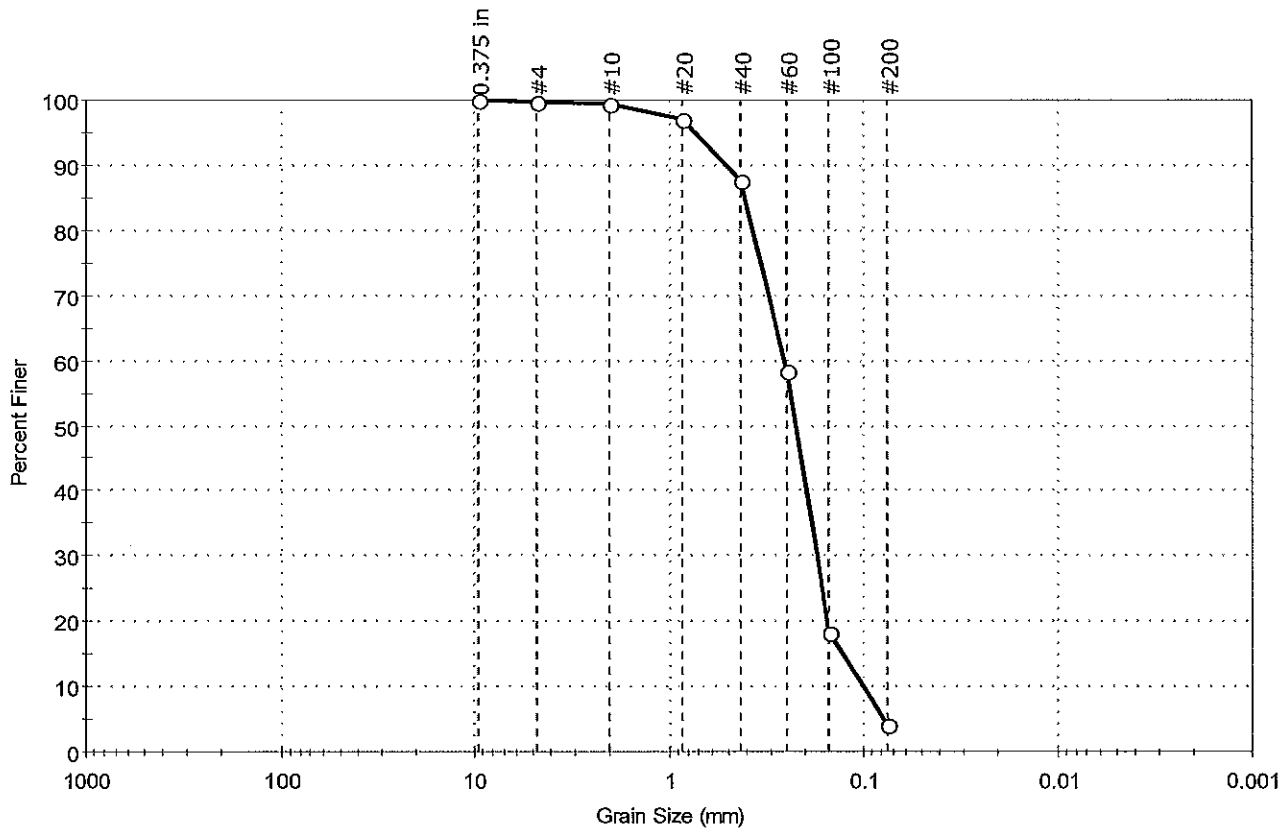
GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening - Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 176	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-4 ft.	Test Id: 258620		
Test Comment:	----		
Sample Description:	Moist, dark grayish brown sand		
Sample Comment:	----		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.3	95.5	4.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	97		
#40	0.42	88		
#60	0.25	58		
#100	0.15	18		
#200	0.075	4		

Coefficients

D_{85} = 0.4060 mm D_{30} = 0.1739 mm
D_{60} = 0.2574 mm D_{15} = 0.1269 mm
D_{50} = 0.2246 mm D_{10} = 0.0994 mm
C_u = 2.590 C_c = 1.182

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

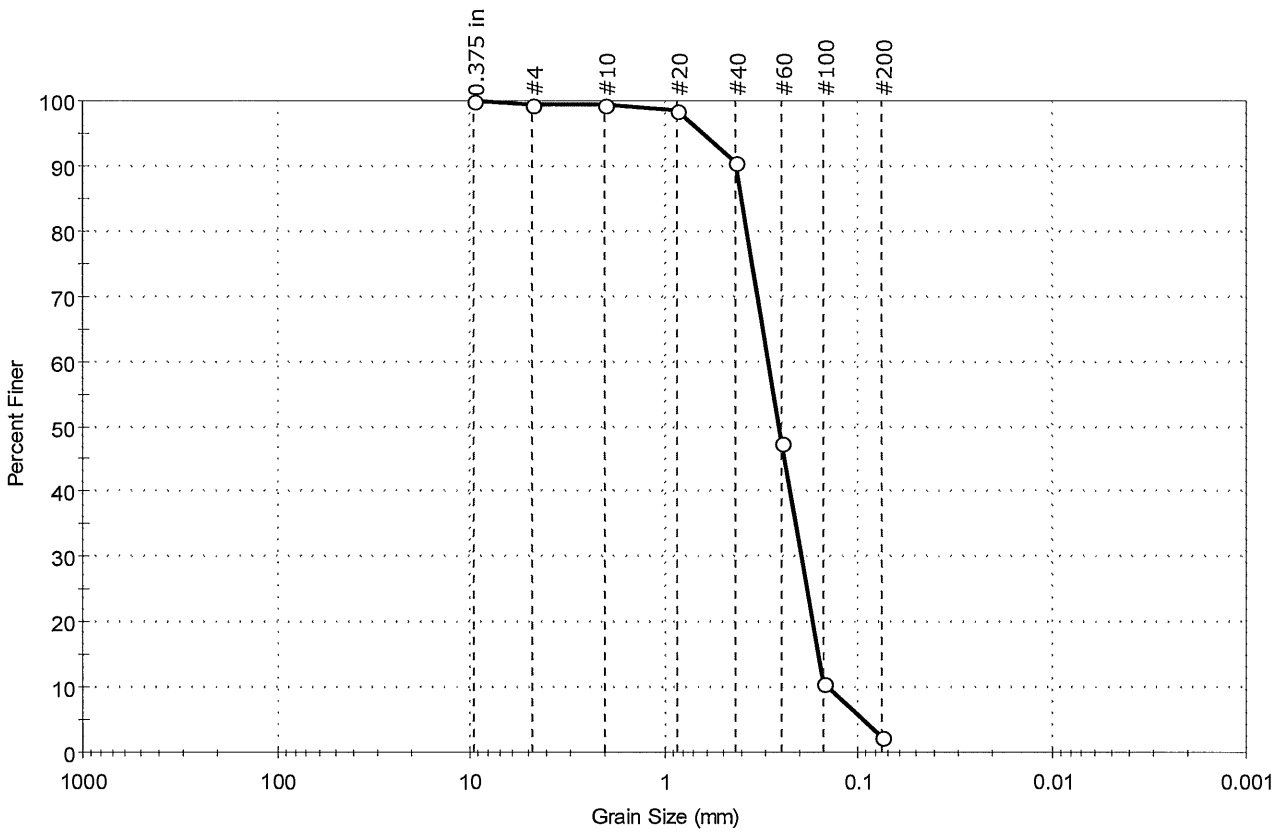
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	177 A	Test Date:	02/11/13	Checked By:	jdt
Depth :	0-3	Test Id:	260848		
Test Comment:	---				
Sample Description:	Moist, grayish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.4	97.3	2.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	99		
#40	0.42	91		
#60	0.25	48		
#100	0.15	11		
#200	0.075	2		

Coefficients

D_{85} =0.3970 mm D_{30} =0.1959 mm

D_{60} =0.2914 mm D_{15} =0.1592 mm

D_{50} =0.2575 mm D_{10} =0.1418 mm

C_u =2.055 C_c =0.929

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

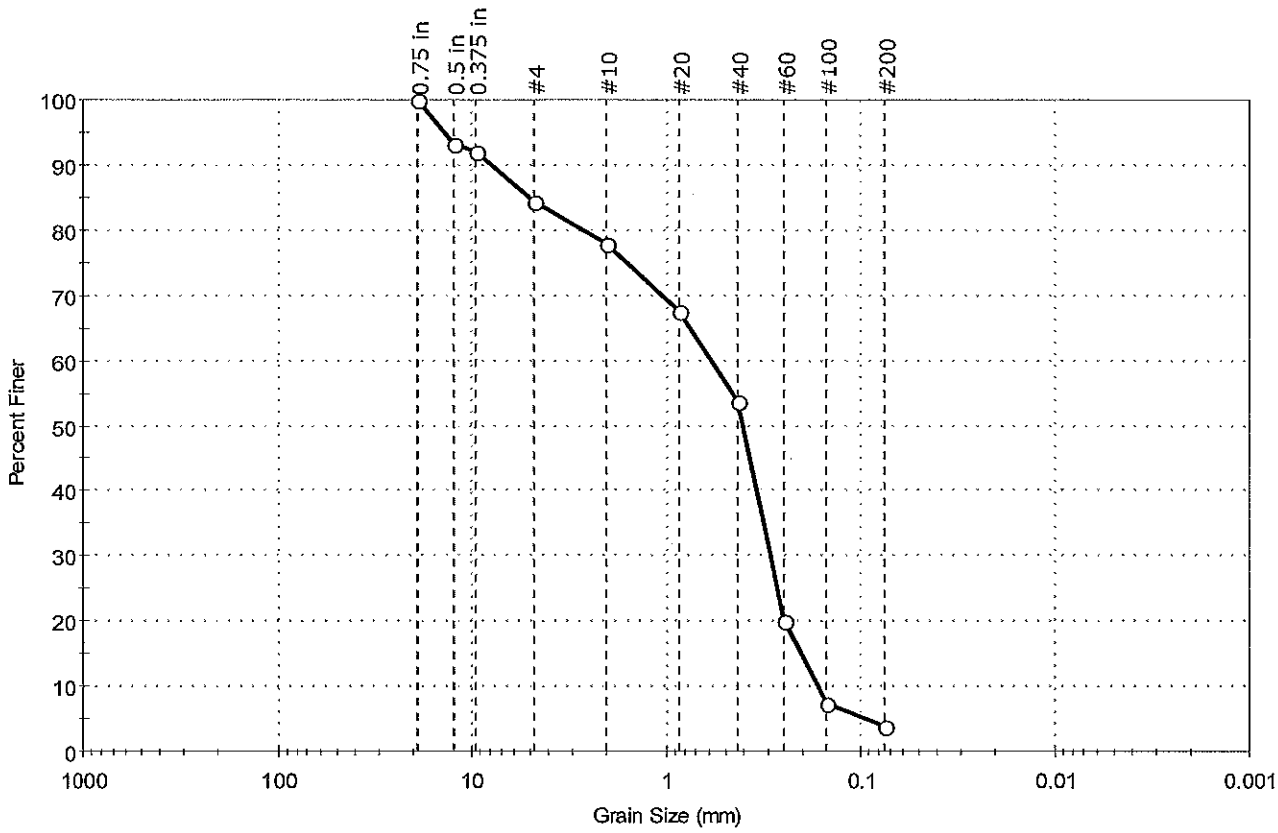
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	177	Test Date:	01/10/13	Checked By:	jdt
Depth :	3.5-7 ft.	Test Id:	258621		
Test Comment:	---				
Sample Description:	Moist, yellowish brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	15.6	80.7	3.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	93		
0.375 in	9.50	92		
#4	4.75	84		
#10	2.00	78		
#20	0.85	68		
#40	0.42	54		
#60	0.25	20		
#100	0.15	7		
#200	0.075	4		

Coefficients

D_{85} = 5.0089 mm D_{30} = 0.2921 mm
D_{60} = 0.5849 mm D_{15} = 0.2037 mm
D_{50} = 0.4014 mm D_{10} = 0.1672 mm
C_u = 3.498 C_c = 0.872

Classification

ASTM Poorly graded sand with gravel (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

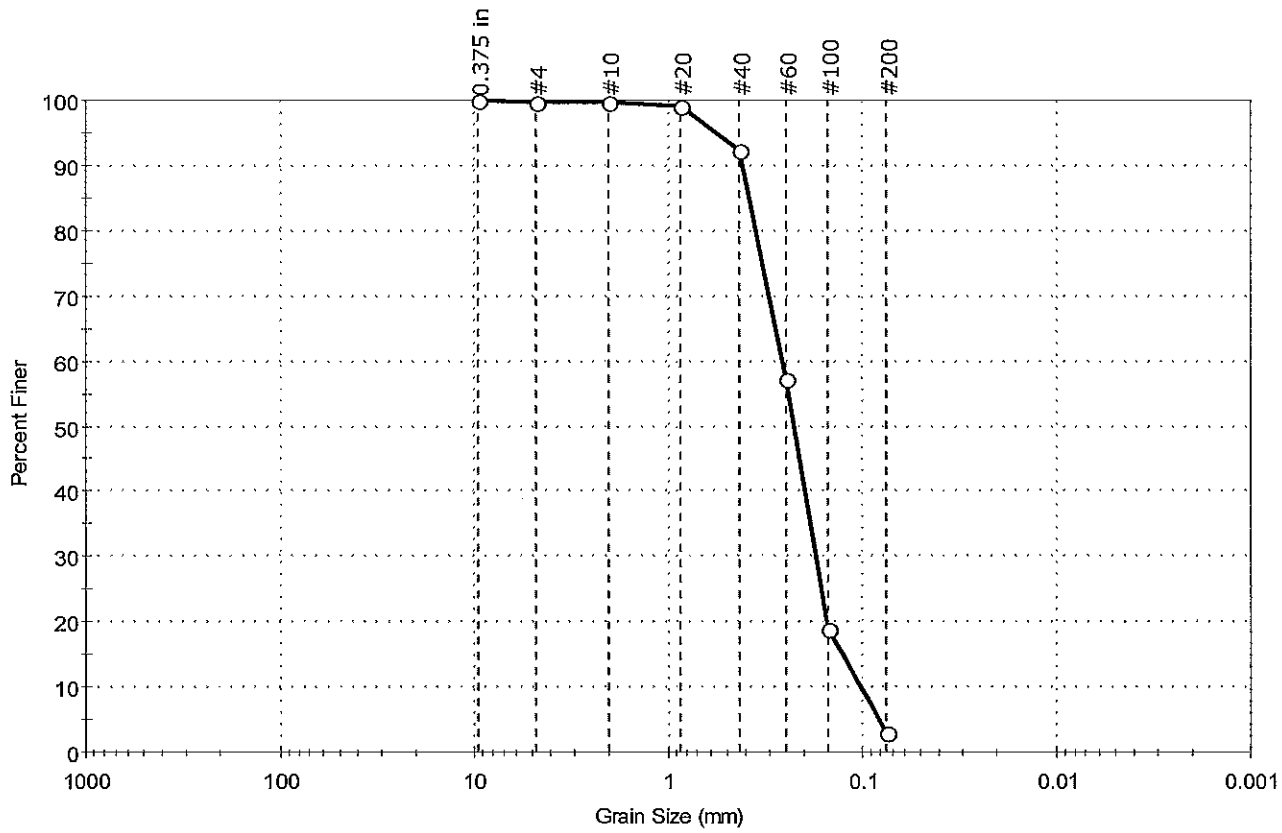
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 178 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-4 ft.	Test Id: 258622		
Test Comment: ---			
Sample Description: Moist, grayish brown sand			
Sample Comment: ---			

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	0.2	97.0	2.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	92		
#60	0.25	57		
#100	0.15	19		
#200	0.075	3		

Coefficients

D_{85} = 0.3802 mm D_{30} = 0.1742 mm
D_{60} = 0.2612 mm D_{15} = 0.1274 mm
D_{50} = 0.2275 mm D_{10} = 0.1025 mm
C_u = 2.548 C_c = 1.133

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

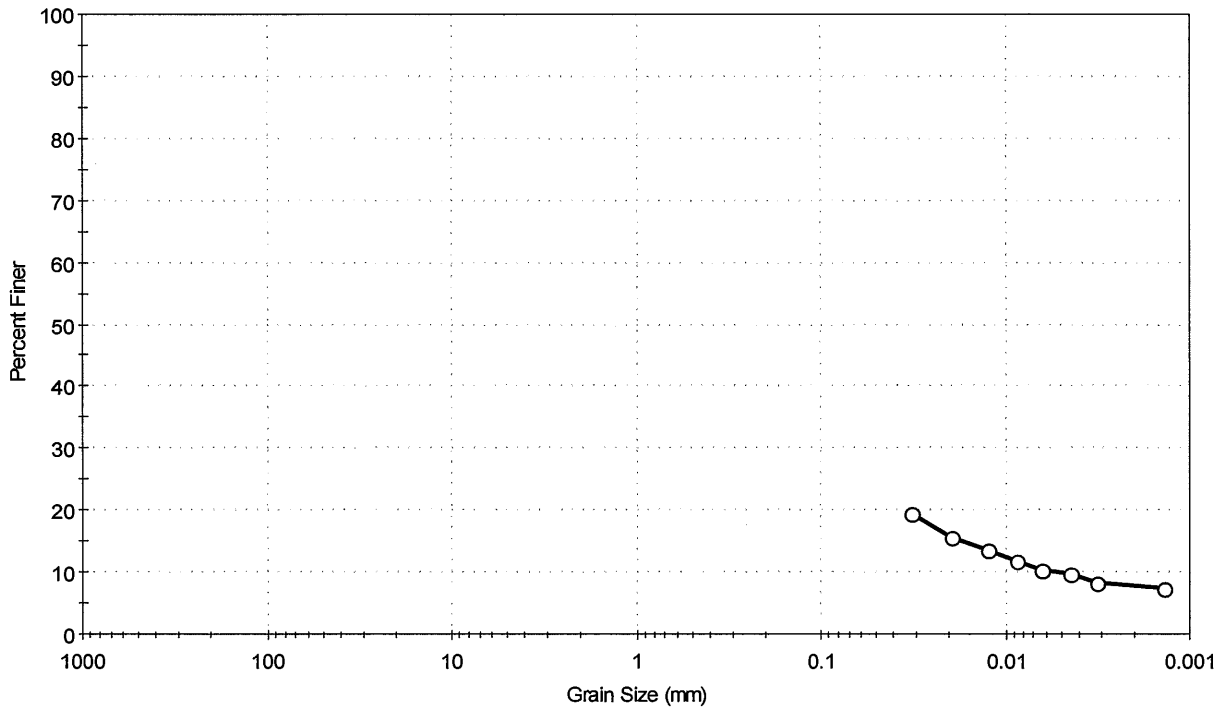
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	178 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	4-6 ft.	Test Id:	258625		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, gray silty sand				
Sample Comment:	24% passing the No. 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	–	–	–

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0328	19		
---	0.0196	16		
---	0.0126	13		
---	0.0089	12		
---	0.0064	10		
---	0.0045	10		
---	0.0033	8		
---	0.0014	7		

Coefficients

D_{85} = N/A D_{30} = N/A
D_{60} = N/A D_{15} = 0.0172 mm
D_{50} = N/A D_{10} = 0.0052 mm
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

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GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	178 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	4-6 ft.	Test Id:	258628		
Test Comment:	----				
Sample Description:	Moist, gray silty sand				
Sample Comment:	24% passing the No. 200 sieve				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	178 B	---	4-6 ft.	23	n/a	n/a	n/a	n/a	

Dry Strength: HIGH

Dilatancy: RAPID

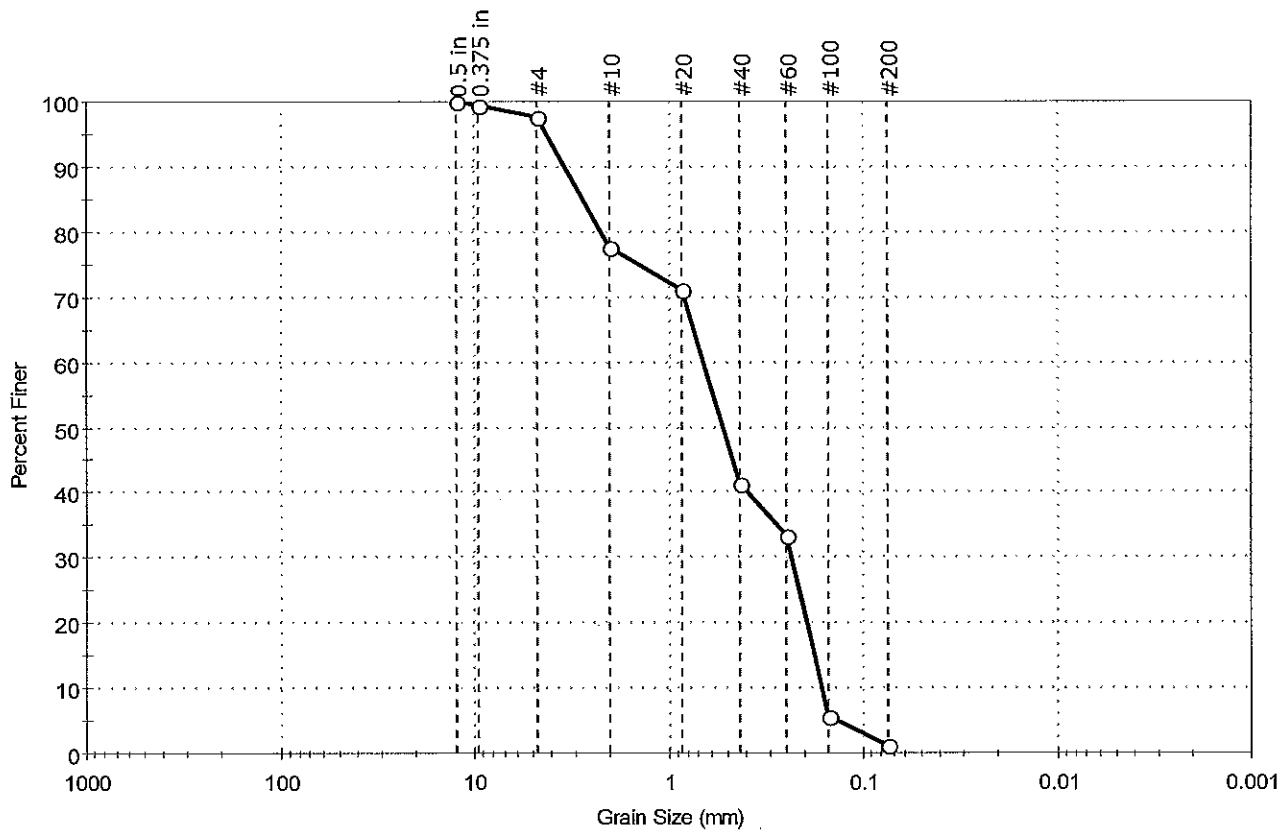
Toughness: n/a

The sample was determined to be Non-Plastic

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates		
Project:	Delaware River Main Channel Deepening – Reach E Vi		
Location:	Delaware River Reach E	Project No:	GTX-300149
Boring ID: ---	Sample Type: jar	Tested By:	jbr
Sample ID: 179 A	Test Date: 01/10/13	Checked By:	jdt
Depth : 0-4 ft.	Test Id: 258623		
Test Comment:	---		
Sample Description:	Moist, grayish brown sand		
Sample Comment:	Sample contains shells		

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.4	96.5	1.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	99		
#4	4.75	98		
#10	2.00	78		
#20	0.85	71		
#40	0.42	41		
#60	0.25	33		
#100	0.15	5		
#200	0.075	1		

Coefficients

D_{85} =2.7561 mm	D_{30} =0.2355 mm
D_{60} =0.6557 mm	D_{15} =0.1787 mm
D_{50} =0.5191 mm	D_{10} =0.1630 mm
C_u =4.023	C_c =0.519

Classification

ASTM Poorly graded sand (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

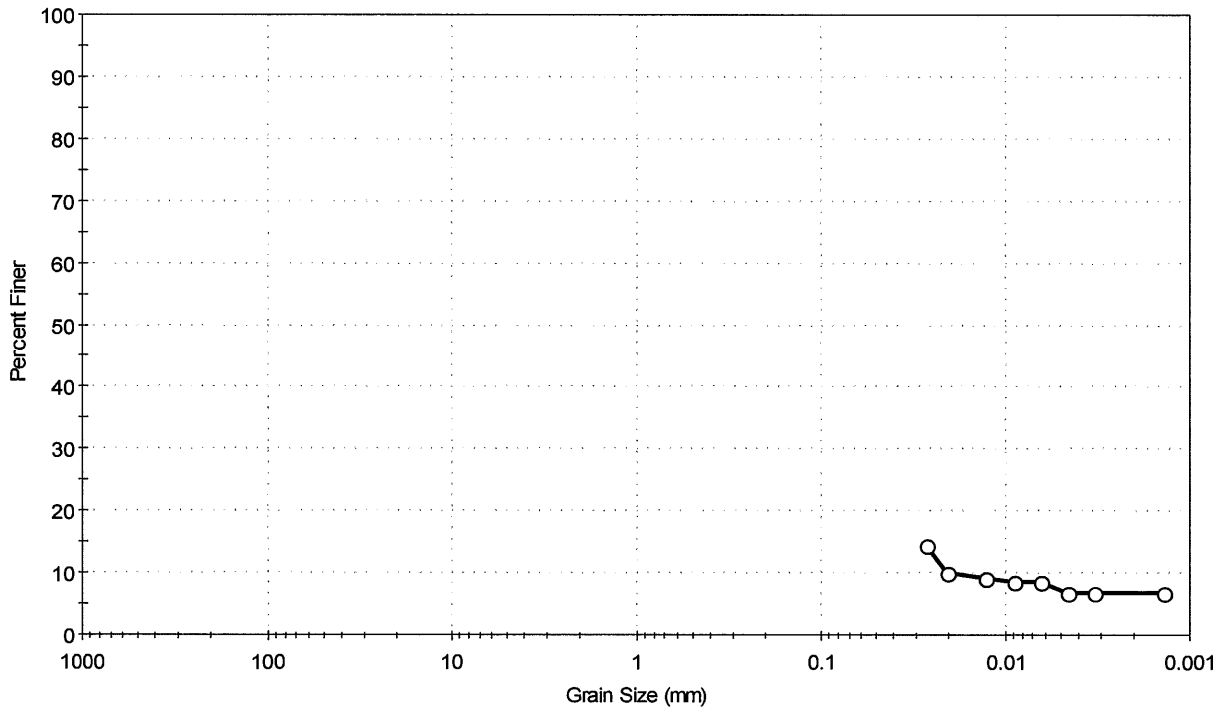
Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening - Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	jbr
Sample ID:	179 B	Test Date:	01/15/13	Checked By:	jdt
Depth :	4-6 ft.	Test Id:	258626		
Test Comment:	Only Hydrometer portion of analysis performed per client request.				
Sample Description:	Moist, dark gray silty sand				
Sample Comment:	25% passing the No. 200 sieve				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	–	–	–

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
---	Particle Size (mm)	Percent Finer	Spec. Percent	Complies
---	0.0272	14		
---	0.0206	10		
---	0.0130	9		
---	0.0090	8		
---	0.0065	8		
---	0.0046	7		
---	0.0033	7		
---	0.0014	7		

Coefficients

D_{85} = N/A D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = 0.0194 mm
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO ()

Sample/Test Description

Sand/Gravel Particle Shape :

Sand/Gravel Hardness :

printed 1/15/2013 8:39:49 AM

GeoTesting EXPRESS

Client:	Gahagan & Bryant Associates				
Project:	Delaware River Main Channel Deepening – Reach E Vi				
Location:	Delaware River Reach E			Project No:	GTX-300149
Boring ID:	---	Sample Type:	jar	Tested By:	cam
Sample ID:	179 B	Test Date:	01/10/13	Checked By:	jdt
Depth :	4-6 ft.	Test Id:	258629		
Test Comment:	---				
Sample Description:	Moist, dark gray silty sand				
Sample Comment:	25% passing the No. 200 sieve				

Atterberg Limits - ASTM D4318

Sample Determined to be non-plastic

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
●	179 B	---	4-6 ft.	24	n/a	n/a	n/a	n/a	

Dry Strength: NONE

Dilatancy: RAPID

Toughness: n/a

The sample was determined to be Non-Plastic

APPENDIX D

Photographs

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-129 R-1, R-2, R-3 & R-4

First attempts at DRV-129 (12-6-2012)
R-1: 0 % recovery
R-2: chunk off collar of vibracore
R-3: 0% recovery

DRV-129, R-4 (12-17-2012)

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-130

DRV-130

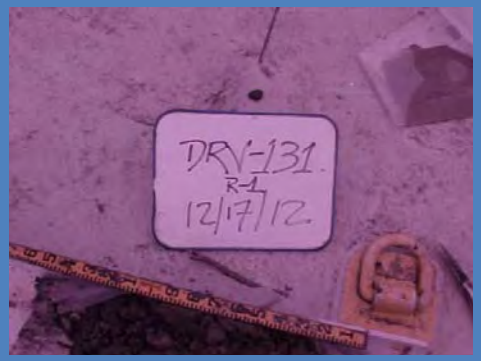
DRV-130

DRV-130

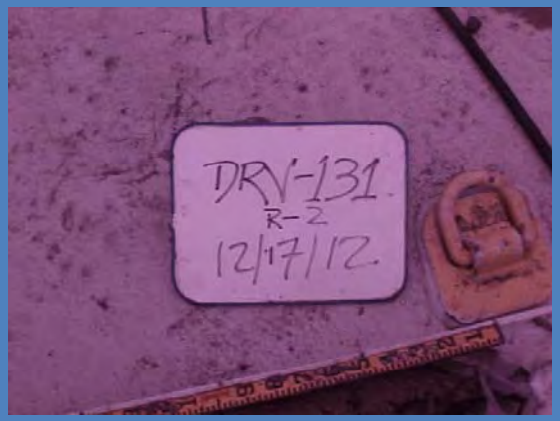
Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-131 R-1 & R-2



R-1: Photographs only (insufficient sample)

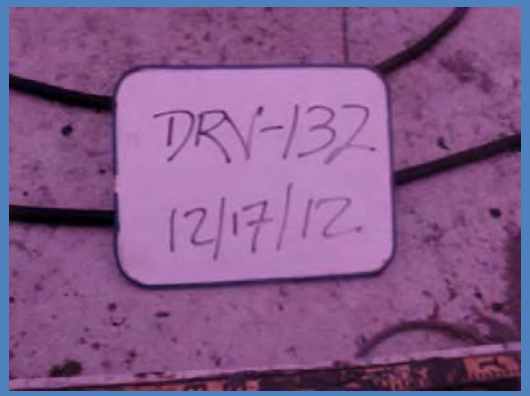


R-2

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

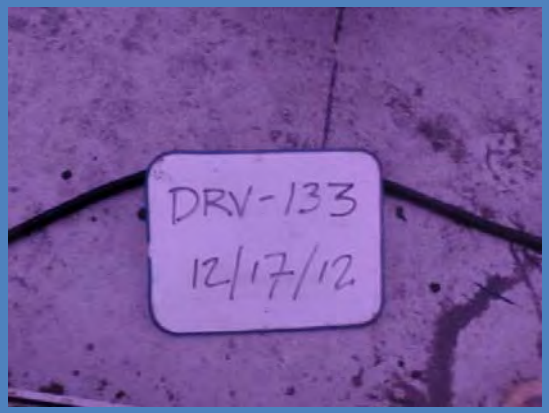
DRV-132

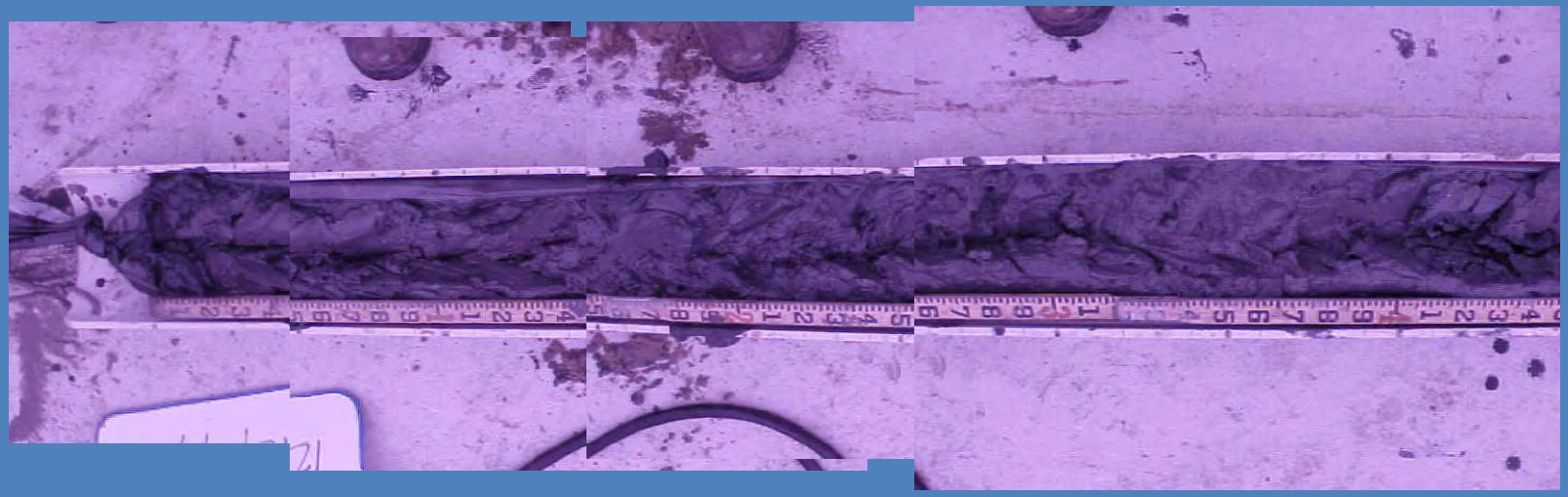

DRV-132
12/17/12.

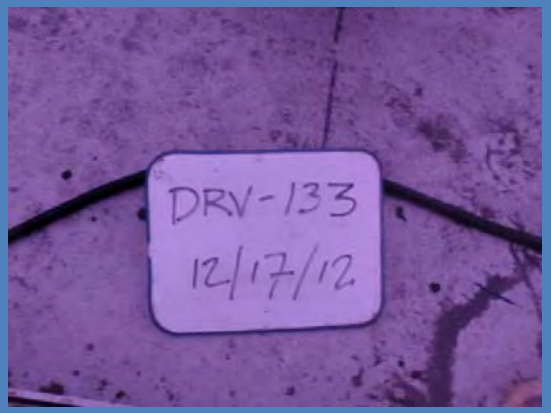
Delaware Main Channel Deepening Project Geotechnical

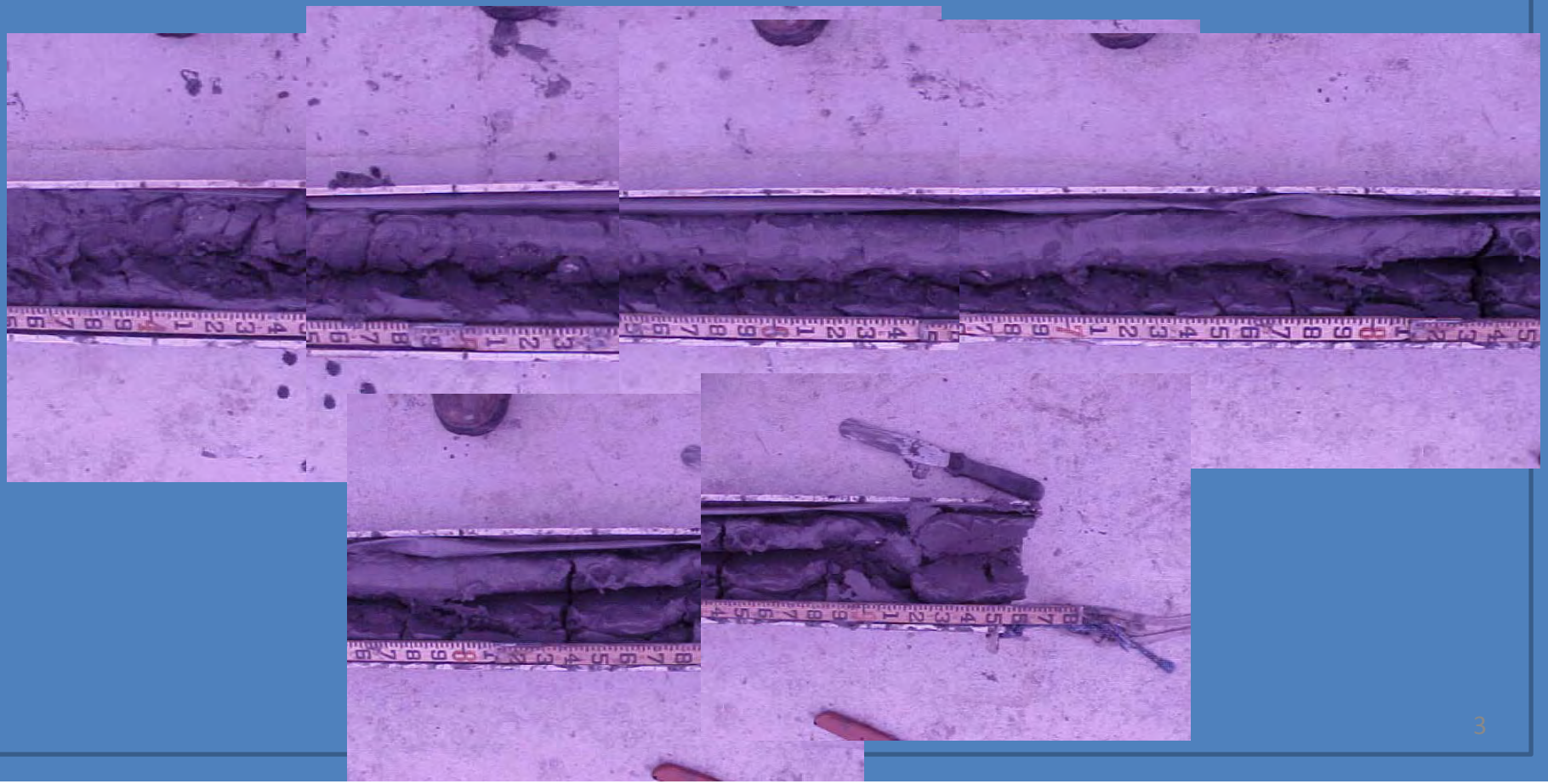
Sampling –Reach E

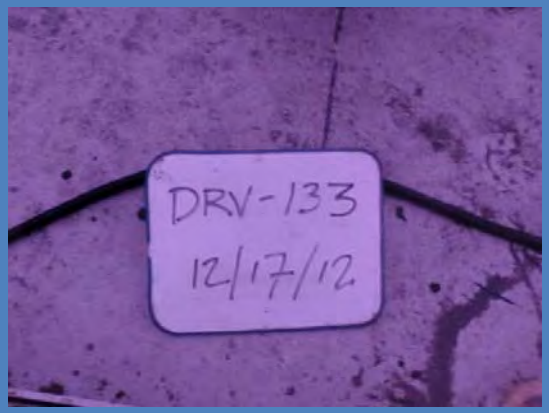
DRV-133


DRV-133
12/17/12




DRV-133
12/17/12

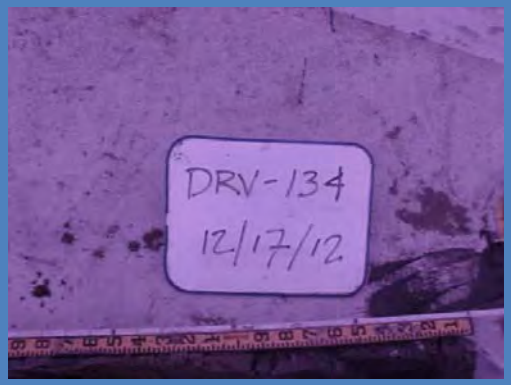



DRV-133
12/17/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-134

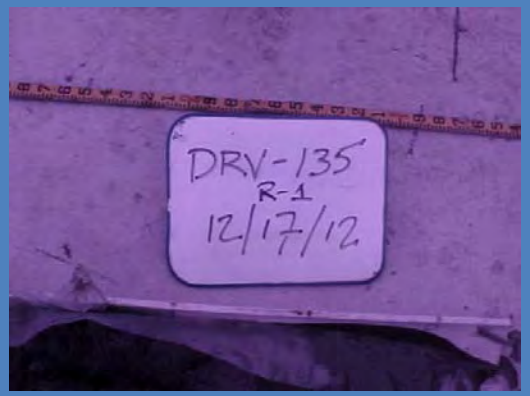

DRV-134
12/17/12

12/17/12

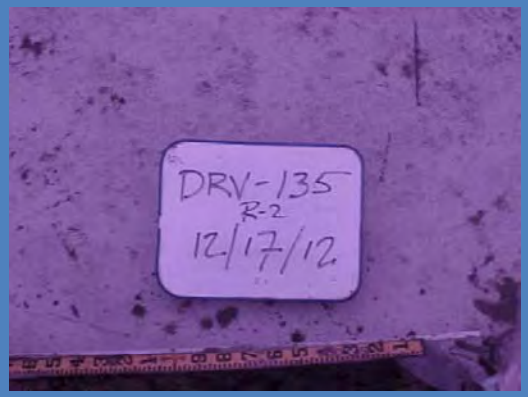
Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-135 R-1 & R-2



R-1: Photographs only (insufficient sample)



R-2

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-136 R-1 & R-2

R-1: 1.9 feet recovery of Gray Silty Clay (no photographs of R-1).
Photograph from R-2

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-137 R-1,R-2 & R-3

R-1: Photographs only (insufficient sample)
R-2: 0% recovery

R-3

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-138 R-1 & R-2

R-1: Photographs and composited 0-1.5 feet

R-2: composited 0-1.5feet with R-1

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-139

DRV-139
12/13/12

DRV-139
12/13/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-140

DRV-140
12/13/12

DRV-140
12/13/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-141

DRV-141
12/13/12

DRV-141
12/13/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-142

DRY-142
12/13/12

DRV-142
12/13/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-143 R-1& R-2

R-1: Photographs only (insufficient sample)

R-2

R-2

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-144

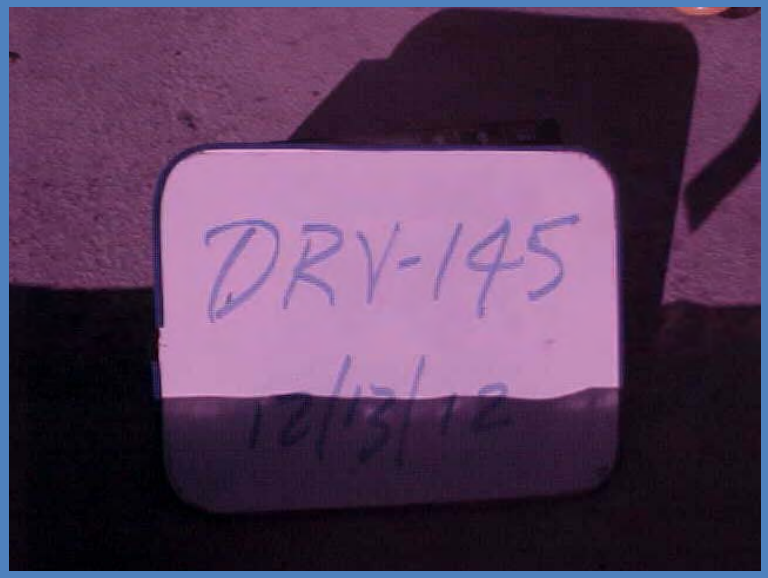
DRV-144
12/13/12

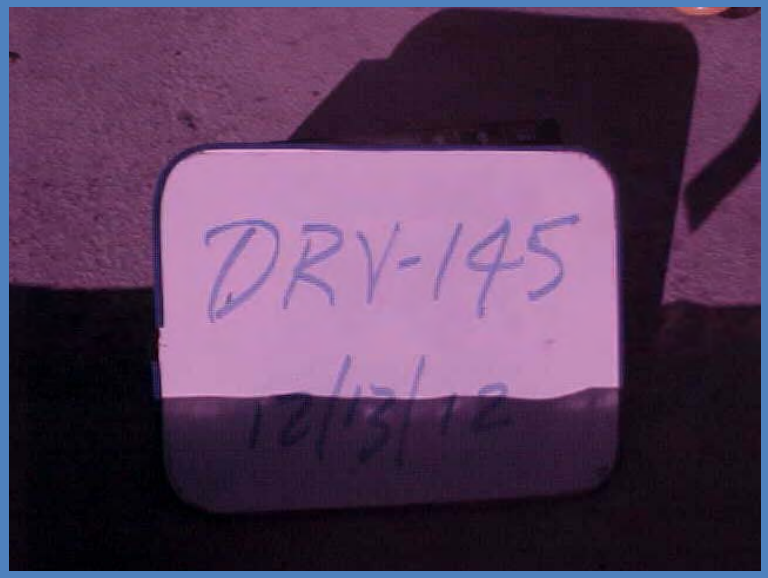
DRV-144
12/13/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-145


DRV-145
12/13/12


DRV-145
12/13/12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-146

DRV- 146

Surface

Bottom

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-147

DRV- 147

Surface

Bottom

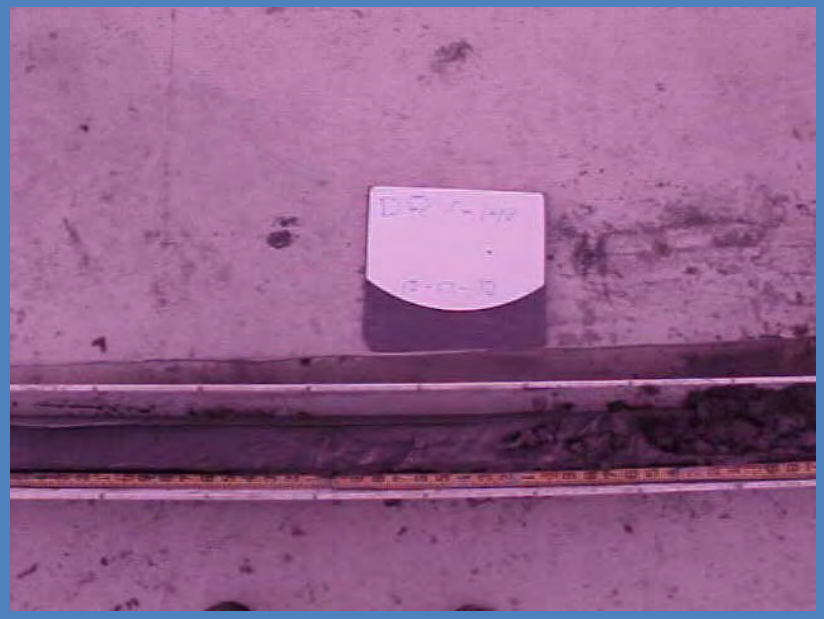
Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

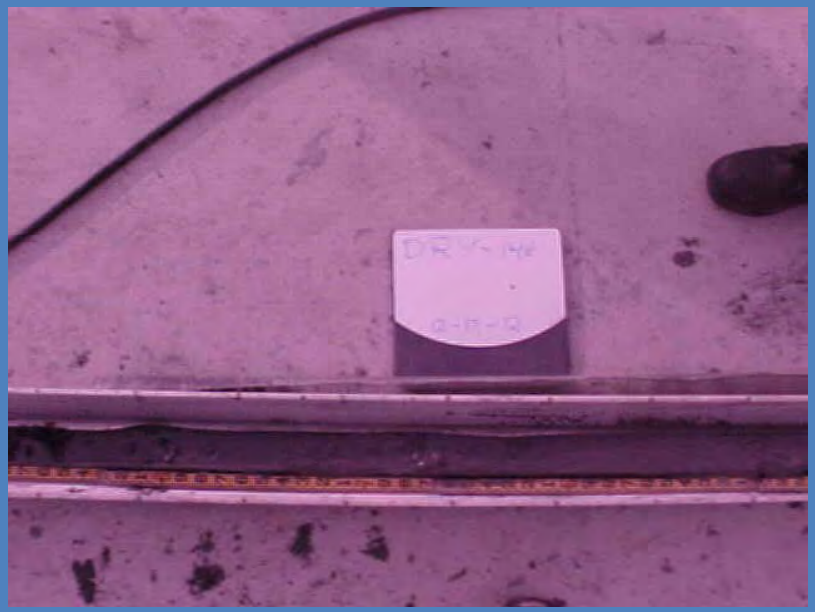
DRV-148

DRV- 148

Surface



Bottom

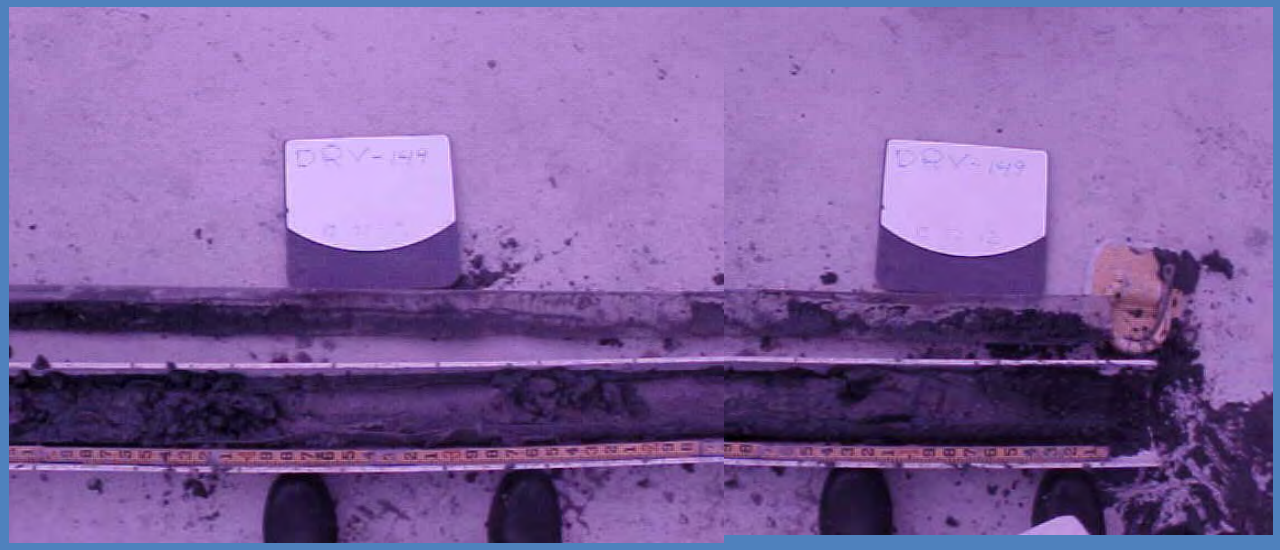


Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-149

DRV- 149



Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-150

DRV- 150

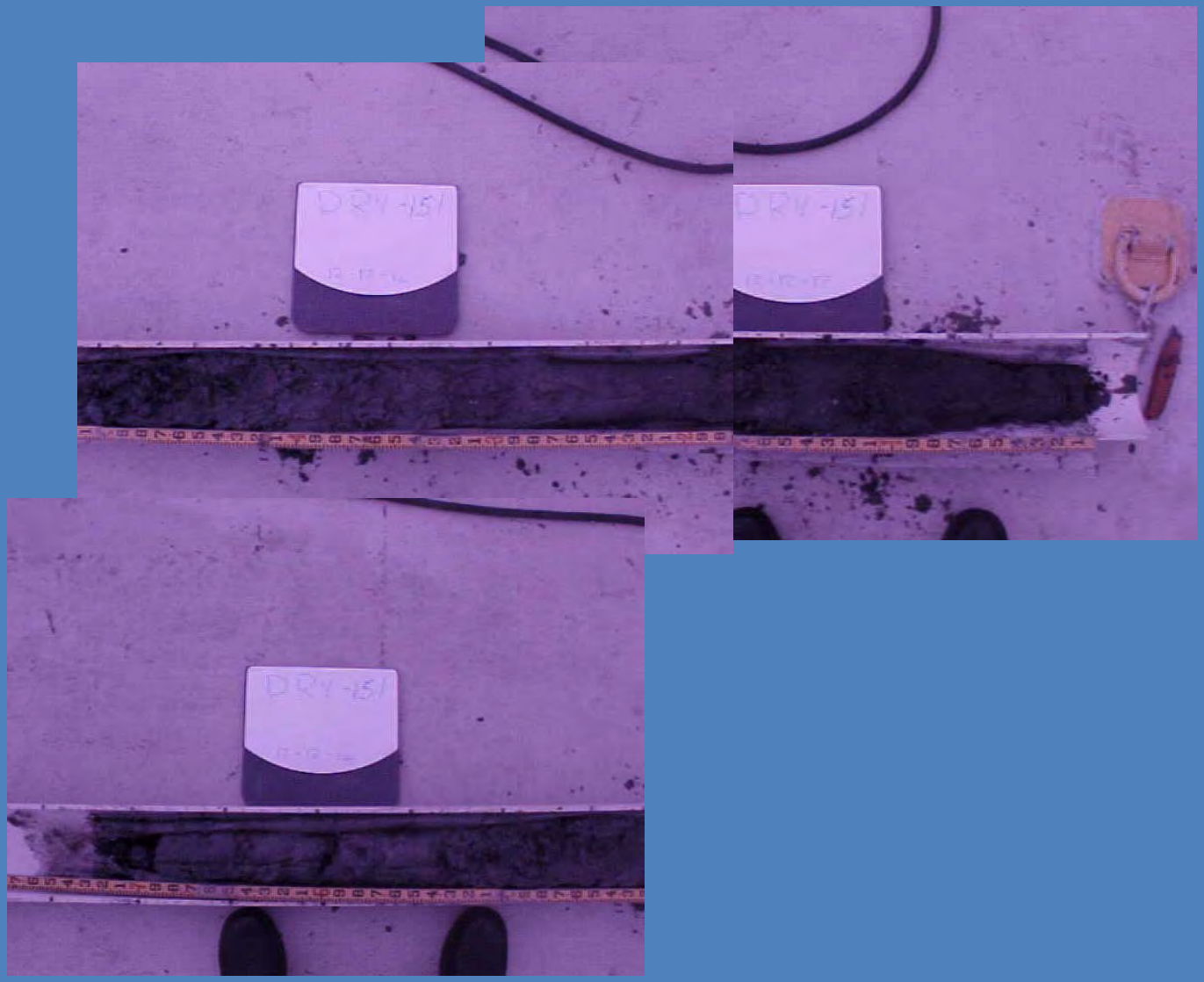
DRV- 150 continued

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-151

DRV- 151



Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

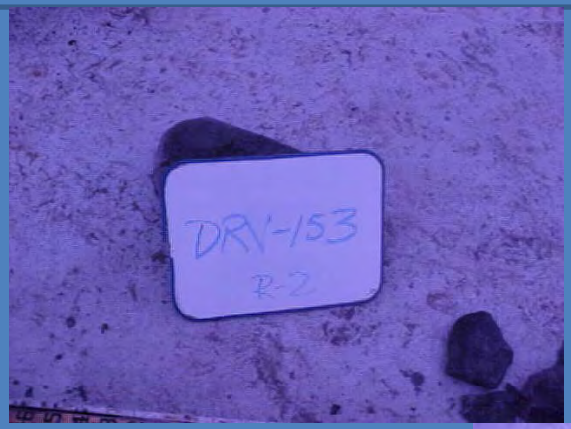
DRV-152

DRV- 152

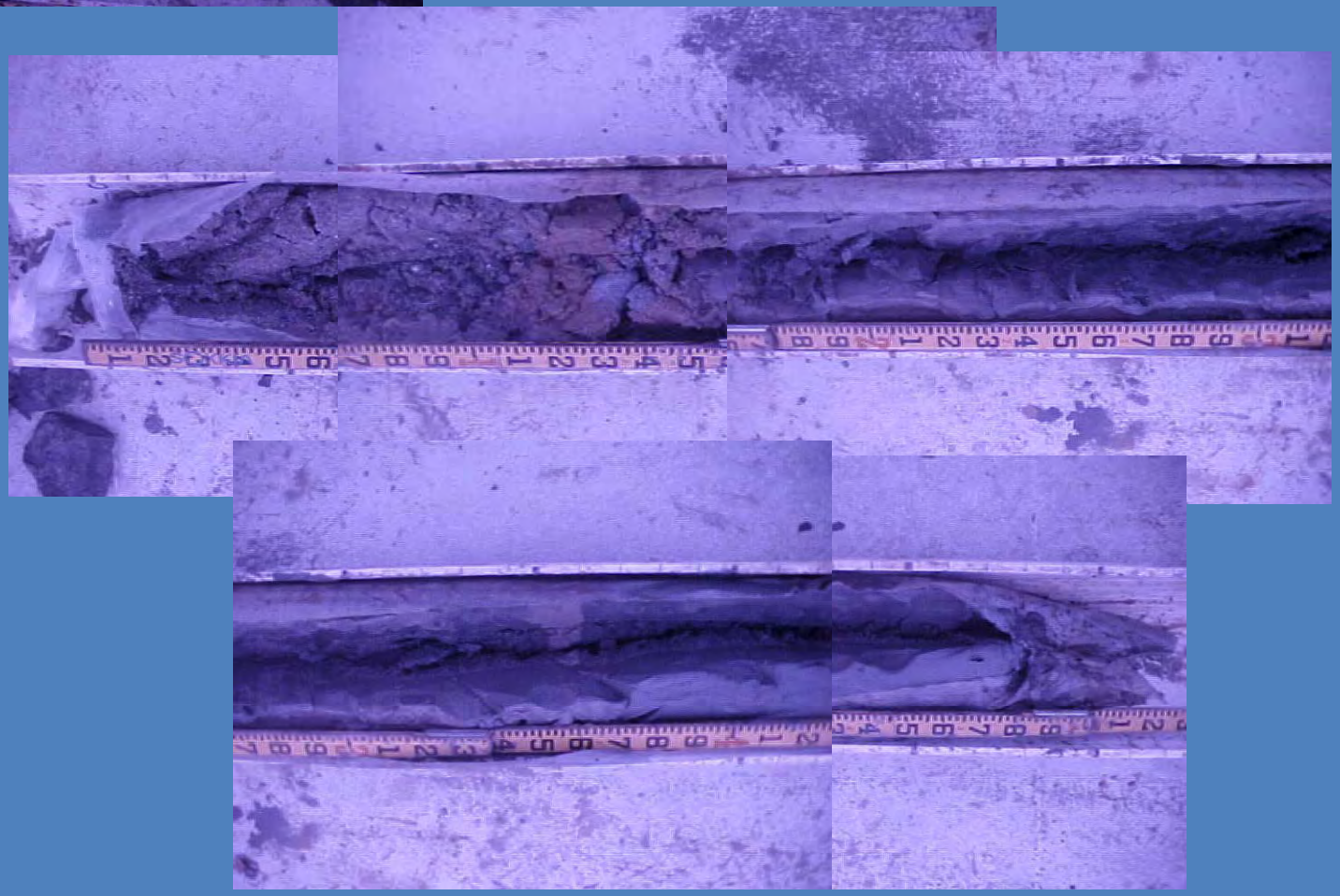
Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-153 R-1 & R-2



R-1: Lost core barrel and sample
R-2 photographs shown



Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-154 R-1, R-2 & R-3

DRV 154: R-1 0% recovery
DRV 154: R-2 Photographs only (insufficient sample)

R-3

R-3 continued

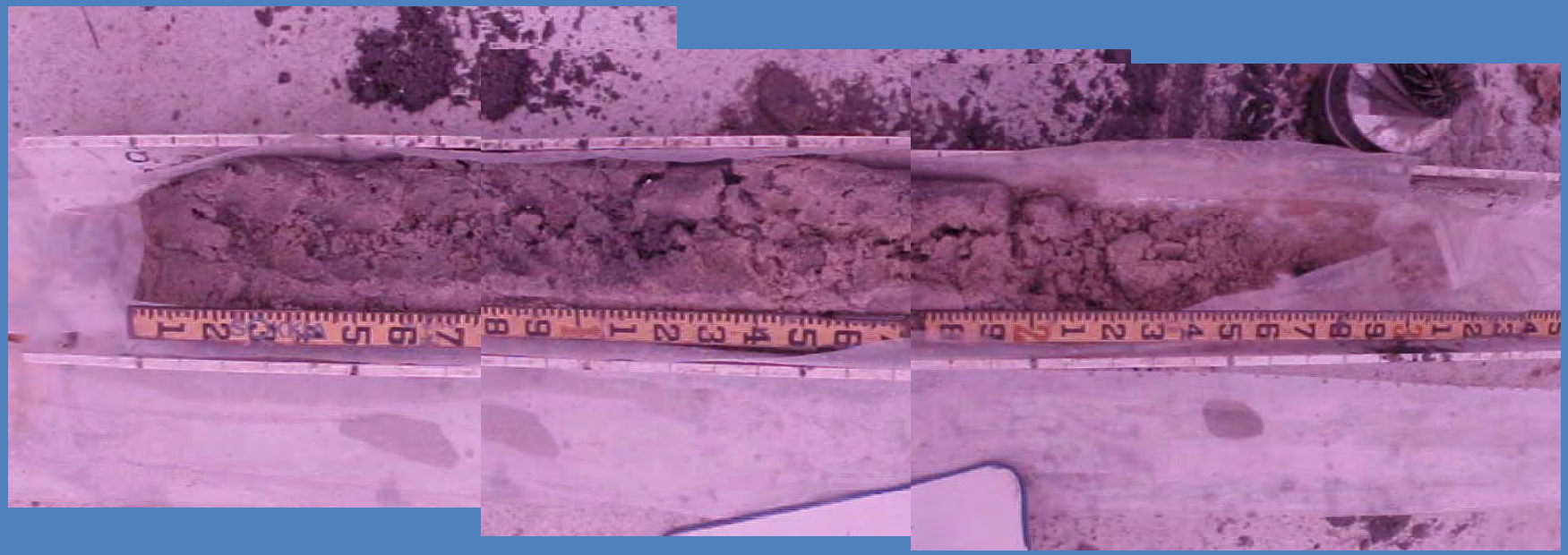
Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-155 R-1 & R-2

R-1: Photographs only (insufficient sample)

R-2



Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-156

DRV-156

DRV-156

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-157

DRV/57

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-158

DRV158

DRV158

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-159

DRV-159

DRV-159

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-160

DRV-160

DRV-160

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-161

DRV-161

DRV-161

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-162

D&V-162

D&V-162

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-163

D&V-163

D&V-163

D&V-163

D&V-163

D&V-163

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-164

DRV-164

DRV-164

DRV-164

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-165

DRV-165

DRV-165

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-166 R-1 & R-2

R-1: Photographs only
(insufficient sample)

R-2

R-2 Continued

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-167 R-1 & R-2

R-1: Photographs only (insufficient sample)

R-2

R-2

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-168

DRV-168
12-3-12
DRV-168
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-169

DRV-169
12-3-12
DRV-169
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-170

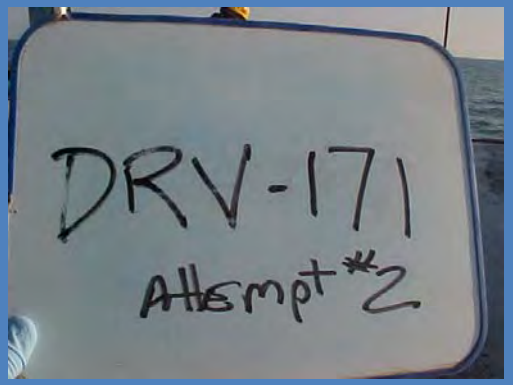
DRV-170

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-171 R-1 & R-2

R-1: Photographs only
(insufficient sample)



R-2

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-172

DRV-172

DRV-173

DRV-172

DRV-172

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-173

DRV-173
12-3-12
DRV-173
12-3-12
DRV-173
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-174

DRV-17
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-175

DRV-175
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-176

DVR-176
12-3-12
DVR-176
12-3-12
DVR-176
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-177

DVR - 177
12-3-12

DVR - 177
12-3-12

DVR - 177
12-3-12

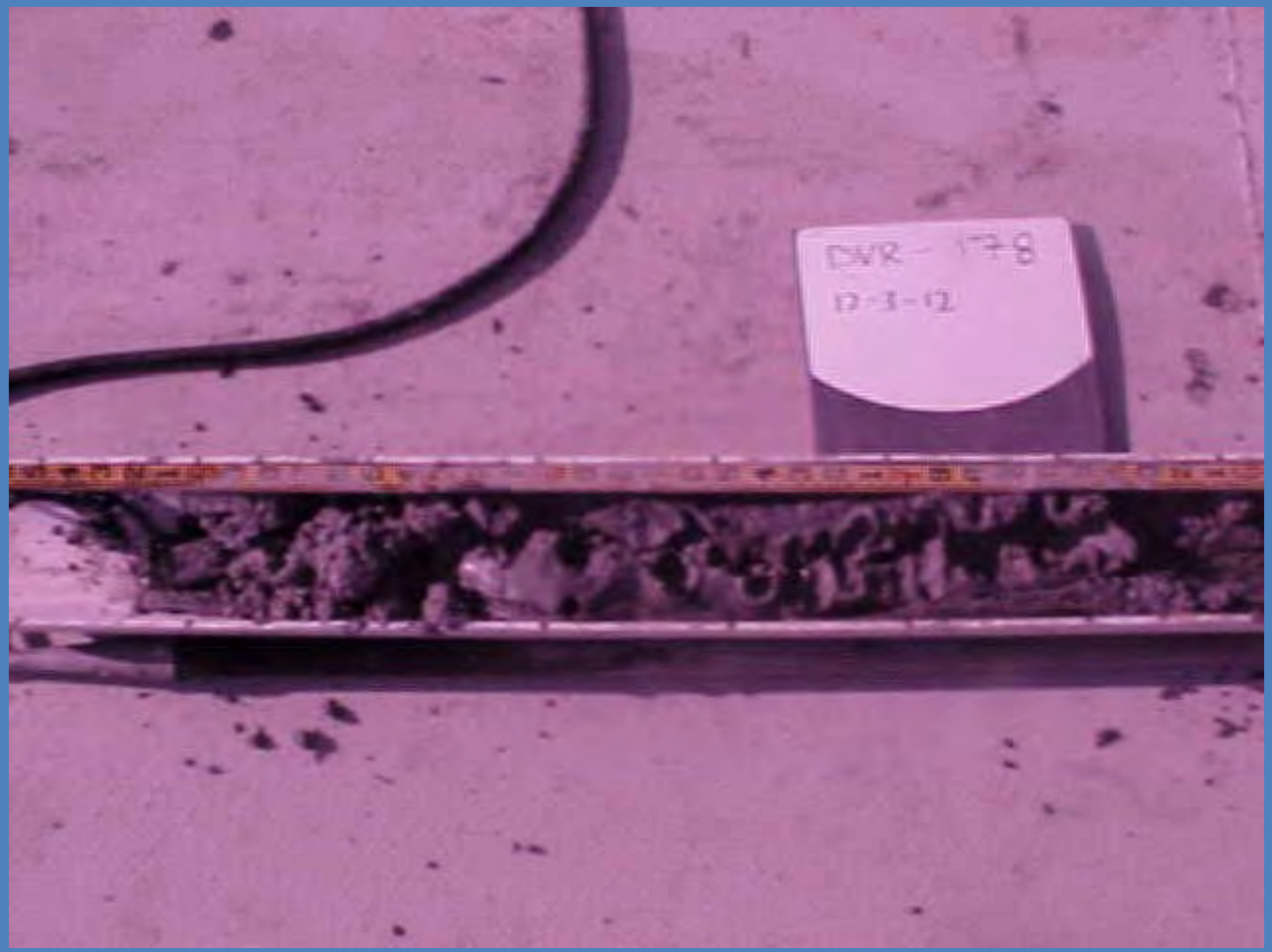
Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

DRV-178

DVR - 178
12-3-12

DVR - 178
12-3-12


DWR- 178
12-3-12

Delaware Main Channel Deepening Project Geotechnical

Sampling –Reach E

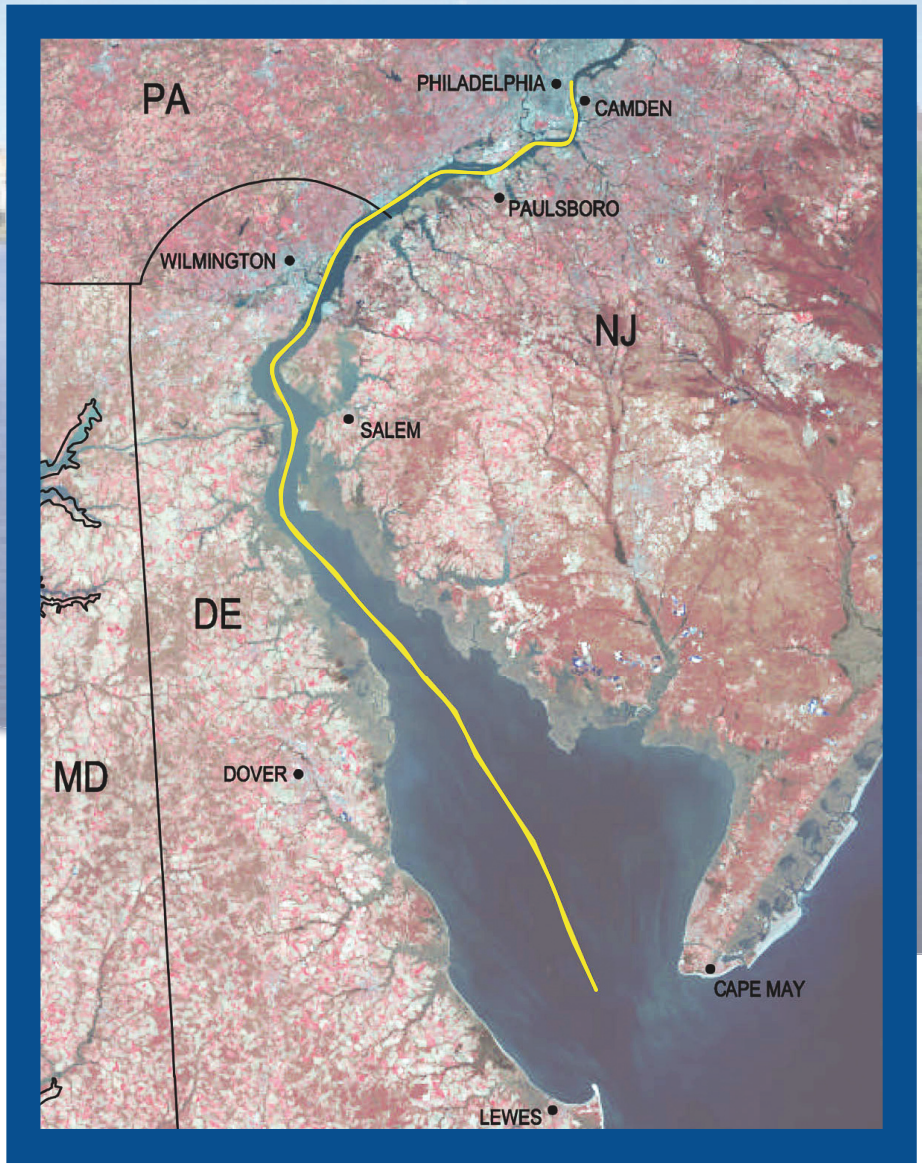
DRV-179

DVR 179
12-3-1
DVR-179
12-3-12

DVR 179
12-3-C
DVR 179
12-3-C

Gahagan & Bryant Associates, Inc. – October 2010

Delaware River Main Channel Deepening Project
Compiled Geotechnical Report
Final Report - October 2010



Prepared for:

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3460 North Delaware Avenue
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Prepared by:

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Suite 304
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SUMMARY

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info@gba-inc.com

USER GUIDE

This "Combined Geotechnical Database" serves as an easy-to-use and navigate reference guide comprised of eleven (11) different geotechnical reports prepared for the United State Army Corps of Engineers (USACE) and Delaware River Port Authority (DRPA). This report was compiled for the Philadelphia Regional Port Authority (PRPA) per the request of the Philadelphia District of Army Corps of Engineers, to provide a consolidated database containing geotechnical data and information from the early 1960's to the most recently published report and have the ability to include future data. This report has four (4) key features that allow the users to review and locate information contained in the reports. The key features are as follows:

- Description of all the technical reports contained in this database,
- Tables of all vibracores and test pits organized by both reach and report,
- "Bookmarks" for easy navigation throughout database, and
- Table of Contents with links to specific areas of interest.

To locate the "Bookmarks" tab, when the PDF is opened; in the left hand toolbar there is an icon with a page and a blue bookmark over the page. This "Bookmark" icon will allow the user to easily scan through the report and aid in navigation to specific points of interest throughout the report. The entire report is broken apart into main sections with various sub sections similar to chapters in a book.

To use the Table of Contents with links, the user will only have to scroll over the various sections on the Table of Contents page. When the user scrolls over a link the cursor will change from an arrow icon to a hand icon. The link will take the user to the specific area of interest in the report.

* Best viewed with Adobe Reader 9. This can be downloaded for free at: http://get.adobe.com/reader/.

BORINGS BY REACH

Reach	Name	Date	Location (NJ State Plane NAD 83)		Station
			Easting	Northing	
A-A	BST-1	Jan/Feb 2005	313854.00	403047.00	20+450
A-A	BST-2	Jan/Feb 2005	314442.00	402251.00	21+250
A-A	MC-1	Jan/Feb 2005	313094.00	402146.00	21+250
A-A	BST-3	Jan/Feb 2005	314081.00	401620.00	21+900
A-A	BST-4	Jan/Feb 2005	313562.00	400694.00	22+800
A-A	BST-5	Jan/Feb 2005	313547.00	399921.00	23+600
A-A	MC-2	Jan/Feb 2005	313529.00	399095.00	24+430
A-A	WC-1	August 23, 1995	313726.05	397975.23	25+540
A-A	MC-3	Jan/Feb 2005	313955.00	397599.00	26+000
A-A	MC-4	Jan/Feb 2005	314349.00	395522.00	28+135
A-A	MC-5	Jan/Feb 2005	315047.00	392987.00	30+800
A	MC-6	Jan/Feb 2005	314097.00	388688.00	35+200
A	MC-7	Jan/Feb 2005	313463.00	387242.00	36+800
A	WC-2	August 23, 1995	313565.25	386780.24	37+202
A	MC-8	Jan/Feb 2005	313127.00	384947.00	39+200
A	AF-1	November 4, 1992	311,726.14	384,378.35	40+172
A	WC-3	August 23, 1995	311713.93	384367.09	40+187
A	DSP-20	April 3, 1965	311524.58	382437.28	41+890
A	MC-9	Jan/Feb 2005	311313.00	382322.00	42+000
A	MC-10	Jan/Feb 2005	309362.00	382409.00	44+000
A	MC-11	Jan/Feb 2005	306934.00	382647.00	46+400
A	MC-12	Jan/Feb 2005	304293.00	382405.00	48+800
A	WC-4a	August 25, 1995	303492.97	382126.64	49+897
A	DRV-1	July 25, 1991	303307.87	382391.11	50+102
A	WC-4	August 23, 1995	303293.26	382418.54	50+119
A	DSP-19	April 2, 1965	303209.73	382785.70	50+230
A	WC-5	August 24, 1995	300857.40	381836.98	52+503
A	MC-13	Jan/Feb 2005	299769.00	382729.00	53+600
A	MC-14	Jan/Feb 2005	298339.00	382108.00	55+400
A	MC-15	Jan/Feb 2005	296455.00	381085.00	57+600
A	MC-16	Jan/Feb 2005	293189.00	379707.00	61+200
A	MC-17	Jan/Feb 2005	291781.00	378786.00	62+800
A	WC-6	August 24, 1995	290153.91	377200.56	65+100
A	DRV-2	July 25, 1991	290168.17	377131.64	65+128
A	MC-18	Jan/Feb 2005	289332.00	375847.00	65+200
A	MC-19	Jan/Feb 2005	288085.00	376172.00	67+600
A	DSP-17	April 2, 1965	287294.52	374704.06	68+880
A	WC-7	August 25, 1995	283945.51	374449.46	71+712
A	MC-20	Jan/Feb 2005	284403.00	373315.00	72+000
A	MC-21	Jan/Feb 2005	283457.00	372688.00	73+600
A	MC-22	Jan/Feb 2005	281373.00	371423.00	75+600
A	DSP-16	April 1, 1965	280535.78	372046.63	76+210
A	I-1	November 4, 1992	278,019.97	371,375.90	78+806

BORINGS BY REACH

Reach	Name	Date	Location (NJ State Plane NAD 83) Easting	Northing	Station
A	WC-8	August 26, 1995	278016.81	371371.66	79+113
A	MC-23	Jan/Feb 2005	277054.00	370917.00	80+000
A	I-2	November 4, 1992	276,549.63	371,187.86	80+573
A	MC-24	Jan/Feb 2005	275447.00	370934.00	81+600
A	MC-25	Jan/Feb 2005	273119.00	370882.00	84+000
A	WC-9	August 26, 1995	270109.80	370734.06	86+992
A	DRV-3	July 26, 1991	270087.23	370739.32	87+014
A	MC-27	Jan/Feb 2005	268293.00	371095.00	88+800
B	MC-28	Jan/Feb 2005	264257.00	371233.00	92+800
B	MC-29	Jan/Feb 2005	261468.00	370762.00	95+600
B	MC-30	Jan/Feb 2005	260338.00	371342.00	96+800
B	CB-286	August 5, 2010	259967.00	371303.00	97+149
B	CB-285	August 5, 1996	259698.00	370927.00	97+404
B	CB-284	August 3, 1996	259167.00	371297.00	97+948
B	CB-283	August 3, 1996	257907.00	370753.00	99+254
B	WC-10	August 26, 1995	258143.85	370151.62	99+293
B	J-2	November 5, 1992	258,130.27	370,095.20	99+329
B	CB-282	August 2, 1996	255528.00	369843.00	101+795
B	CB-281	August 2, 1996	253851.00	369002.00	103+670
B	CB-279	August 1, 1996	253424.00	368491.00	104+273
B	WC-11	August 27, 1995	253525.71	367698.76	104+515
B	CB-278	August 1, 1996	253295.00	368025.00	104+674
B	CB-277	July 29, 1996	252249.00	367909.00	105+562
B	CB-276	July 29, 1996	252296.00	367285.00	105+917
B	CB-275	July 30, 1996	250817.00	366807.00	107+369
B	CB-274	July 27, 1996	250470.00	366325.00	107+941
B	CB-273	July 26, 1996	250079.00	366052.00	108+417
B	CB-272	July 27, 1996	249963.00	365829.00	108+647
B	CB-271	July 26, 1996	249592.00	365947.00	108+862
B	CB-270	July 30, 1996	248389.00	364360.00	110+794
B	DRV-4	July 26, 1991	247209.08	363647.24	112+160
B	CB-269	July 25, 1996	246301.00	363336.00	113+063
B	WC-12	August 28, 1995	246982.23	362466.55	113+077
B	CB-268	August 6, 1996	246355.00	362521.00	113+532
B	CB-267	July 25, 1996	245738.00	362791.00	113+843
B	CB-266	July 25, 1996	245240.00	362410.00	114+470
B	CB-265	July 25, 1996	244559.00	361925.00	115+350
B	L-3	November 5, 1992	244,978.32	361,052.15	115+525
B	L-1	November 5, 1992	244,587.02	360,875.06	115+884
B	CB-264	August 6, 1996	243780.00	361406.00	116+286
B	L-2	November 5, 1992	244,245.11	360,617.61	116+310
B	CB-263	August 7, 1996	243184.00	361020.00	116+996
B	CB-262	August 7, 1996	242994.00	360060.00	117+667

BORINGS BY REACH

Reach	Name	Date	Location (NJ State Plane NAD 83) Easting	Northing	Station
B	CB-261	August 9, 1996	242420.00	360544.00	117+896
B	CB-260	August 12, 1996	242632.00	359833.00	118+094
B	CB-259	August 12, 1996	241902.00	360126.00	118+557
B	DRV-5	July 27, 1991	241728.96	359725.53	118+916
B	282	September 6, 1961	241323.57	359423.67	119+420
B	CB-258	August 14, 1996	241024.00	359658.00	119+550
B	DRV-6	July 19, 1991	235765.16	355992.04	125+952
B	CB-257	August 14, 1996	229476.00	352463.00	133+156
B	CB-256	August 8, 1996	225062.00	348939.00	138+767
B	CB-255	August 9, 1996	224613.00	349091.00	139+067
B	DRV-7	July 27, 1991	224606.74	348980.42	139+131
B	M-1	November 6, 1992	224,631.30	348,084.50	139+617
B	CB-254	August 8, 1996	224070.00	348834.00	139+663
B	DRP-12	June 9, 1965	224027.43	348399.56	139+930
B	WC-13	August 28, 1995	222529.91	346188.47	142+770
B	M-2	November 6, 1992	222,520.05	346,164.18	142+795
B	438	January 22, 1962	219603.94	344324.86	146+000
B	437	January 19, 1962	217276.01	341133.74	149+950
B	436	January 19, 1962	217973.63	340562.93	150+000
B	DRV-8	July 27, 1991	217517.61	340191.43	150+569
B	435	January 19, 1962	216846.12	339008.86	151+920
B	N-3	November 8, 1992	212,797.23	332,591.23	159+491
B	431	January 17, 1962	211699.50	333133.17	159+700
B	N-1	November 8, 1992	212,415.18	332,046.06	160+465
B	N-2	November 8, 1992	212,146.56	331,156.03	161+394
B	WC-14	August 28, 1995	212121.63	331160.84	161+397
B	DRV-9	July 19, 1991	210647.26	330025.71	162+919
B	DSP-9	March 29, 1965	207873.41	321347.44	172+030
B	DRV-10	July 28, 1991	207852.19	320696.87	172+657
B	O-1	November 8, 1992	203,530.12	308,724.15	185+374
B	WC-15	August 28, 1995	203479.86	308711.84	185+401
B	CB-280	August 2, 1996	253334.00	369694.00	Outside Channel
C	O-2	November 8, 1992	202,715.80	307,359.47	187+301
C	DFP 24	December 6, 1986	201550.29	304768.72	190+000
C	WC-16	August 29, 1995	198637.67	301944.30	194+050
C	DFP 25	December 6, 1986	198180.22	301075.13	195+000
C	DRV-11	July 28, 1991	197471.58	300678.81	195+770
C	WC-17	August 29, 1995	197455.98	300682.03	195+779
C	DSP-7	March 24, 1965	195991.56	299714.92	197+480
C	WC-18	August 29, 1995	194652.43	297544.54	199+986
C	DFP 26	December 6, 1986	194810.14	297381.54	200+000
C	DFP 31	December 9, 1986	191440.06	293687.96	205+000
C	DRV-54	June 19, 1905	190410.00	292690.00	206+431

BORINGS BY REACH

Reach	Name	Date	Location (NJ State Plane NAD 83) Easting	Northing	Station
C	DRV-53	June 19, 1905	189208.00	291132.00	208+393
C	DFP 32	December 10, 1986	188928.68	290564.58	209+000
C	PQ-1	November 8, 1992	189,361.94	290,119.06	209+657
C	WC-19	August 29, 1995	189332.78	290092.16	209+688
C	DFP 35	December 11, 1986	188657.00	289374.66	210+500
C	DRV-52	June 19, 1905	188061.00	289370.00	210+596
C	DFP 36	December 11, 1986	188427.51	287892.32	212+000
C	DRV-51	June 19, 1905	188140.00	287270.00	212+659
C	WC-20	August 30, 1995	189042.83	287313.87	213+107
C	PQ-2	November 8, 1992	189,018.01	287,298.51	213+111
C	DRV-50	June 19, 1905	188821.00	285462.00	214+692
C	DRV-49	June 19, 1905	189602.00	283554.00	216+751
C	DFP 43	December 13, 1986	189624.63	283289.63	217+000
C	DRV-48	June 19, 1905	190585.00	281844.00	218+716
C	DFP 44	December 13, 1986	190470.67	281477.39	219+000
C	DFP 45	December 13, 1986	190833.12	281646.60	219+000
C	DSP-5	March 23, 1965	190437.57	280579.05	219+800
C	DRV-47	June 19, 1905	191366.00	279936.00	220+775
C	DRV-46	June 19, 1905	192883.00	276720.00	224+331
C	DRV-45	June 19, 1905	193715.00	274912.00	226+321
C	DSP-4	March 23, 1965	195336.31	272756.98	228+960
C	DSP-3	March 22, 1965	194820.57	271545.04	229+840
C	DSP-2	March 22, 1965	195628.55	269648.82	231+900
C	WC-21	August 30, 1995	196174.28	269579.85	232+193
C	DRV-12	July 28, 1991	196179.20	269532.23	232+239
C	DSP-1	March 22, 1965	196426.83	268057.07	233+680
C	R-3	November 9, 1992	197,970.10	264,259.35	237+775
C	R-1	November 9, 1992	198,115.99	263,440.24	238+578
C	WC-22	August 30, 1995	198096.66	263409.20	239+302
C	459	January 17, 1963	198235.18	262956.40	239+700
C	461	January 22, 1963	197752.01	261035.32	241+680
C	463	January 16, 1963	197072.28	259190.85	243+640
C	DRV-44	June 19, 1905	196919.00	255678.00	247+061
C	DRV-43	June 19, 1905	196399.00	253783.00	249+026
C	DRV-42	June 19, 1905	195880.00	251889.00	250+990
C	DRV-41	June 19, 1905	195360.00	249894.00	253+051
	R-2	November 9, 1992	197,456.31	201,993.26	Inland!
D	DRV-40	June 19, 1905	194840.00	247999.00	255+016
D	DRV-39	June 19, 1905	194319.00	245904.00	257+174
D	WC-23	August 31, 1995	193901.19	245207.64	257+958
D	DRV-38	June 19, 1905	193920.00	244035.00	259+081
D	WC-24	August 31, 1995	192715.02	239008.58	264+245
D	WC-25	August 31, 1995	192202.94	233217.51	270+213

BORINGS BY REACH

Reach	Name	Date	Location (NJ State Plane NAD 83) Easting	Northing	Station
D	DRV-13	July 19, 1991	192187.83	233199.48	270+230
D	WC-26	August 31, 1995	193293.45	228972.98	274+527
D	T-1	November 9, 1992	193,263.78	228,959.02	274+539
D	WC-27	August 31, 1995	201946.05	217938.60	288+998
E	DRV-14	July 29, 1991	228968.33	188423.49	329+007
E	DRV-14	July 29, 1991	228968.33	188423.49	329+007
E	WC-28	August 30, 1995	228340.94	187769.24	329+083
E	DRV-85	August 16, 2004	244497.07	170028.99	353+074
E	DRV-58	March 17, 1999	244365.1	169317.1	353+522
E	DRV-86	August 16, 2004	244653.08	168799.79	354+100
E	DRV-59	March 17, 1999	245433.7	168911.8	354+532
E	DRV-15	July 29, 1991	245360.35	168004.65	355+164
E	DRV-87	August 16, 2004	246212.69	168166.53	355+606
E	DRV-60	March 17, 1999	246321.0	167364.6	356+279
E	DRV-88	August 16, 2004	246981.23	167315.34	356+753
E	DRV-61	March 17, 1999	246753.6	166456.8	357+247
E	DRV-62	March 17, 1999	247704.1	166290.9	357+999
E	DRV-63	March 17, 1999	247580.1	165526.1	358+491
E	DRV-64	March 17, 1999	248482.6	165037.4	359+463
E	DRV-16	July 19, 1991	256054.68	153338.16	373+240
E	DRV-68-R2	April 27, 2001	260020.89	152617.28	376+401
E	DRV-68	April 27, 2001	260031.90	152613.54	376+411
E	DRV-69	April 27, 2001	262635.19	149544.77	380+435
E	DRV-70	April 27, 2001	267384.25	141101.48	390+149
E	DRV-17	July 19, 1991	267028.53	140862.51	390+224
E	DRV-71	April 27, 2001	272958.36	129134.81	403+348
E	DRV-72	April 27, 2001	273824.08	125867.14	406+621
E	DRV-18	July 18, 1991	274783.04	125863.19	407+167
E	DRV-73	April 29, 2001	281652.66	115856.99	419+304
E	DRV-19	July 18, 1991	281772.02	114886.32	420+172
E	DRV-74	April 29, 2001	283487.05	112490.32	423+118
E	DRV-20	July 18, 1991	288375.65	104846.38	432+187
E	DRV-75	April 29, 2001	289014.55	105208.27	432+250
E	DRV-65	March 14, 1999	290222.3	103339.3	434+474
E	DRV-66	March 13, 1999	292506.5	100010.5	438+511
E	DRV-21	July 18, 1991	293282.86	98560.63	440+146
E	DRV-67	March 13, 1999	294196.4	97506.5	441+532
E	DRV-76	April 29, 2001	296732.81	93100.24	446+600
E	DRV-22	July 18, 1991	297853.97	91929.37	448+200
E	DRV-77	April 29, 2001	297984.99	90759.06	449+295
E	DRV-77-R2	April 29, 2001	298025.75	90774.60	449+297
E	DRV-30	8/29/1996	298164.00	90041.00	450+027
E	DRV-37	9/10/1996	302574.00	79240.00	451+693

BORINGS BY REACH

Reach	Name	Date	Location (NJ State Plane NAD 83)		Station
			Easting	Northing	
E	DRV-31	8/29/1996	299321.00	87881.00	452+466
E	DRV-32	8/29/1996	300489.00	85686.00	454+941
E	DRV-78	April 29, 2001	300727.30	84547.37	456+084
E	DRV-33	9/3/1996 & 9/4/1996	300985.00	84012.00	456+677
E	DRV-34	9/10/1996	301703.00	83110.00	457+786
E	DRV-35	9/10/1996	301915.00	81936.00	458+951
E	DRV-36	9/10/1996	302011.00	81046.00	459+810
E	DRV-23	July 17, 1991	302212.81	80670.96	460+233
E	DRV-79	April 26, 2001	302929.33	80027.07	461+103
E	DRV-80	April 26, 2001	303843.29	76192.38	464+995
E	DRV-24	July 17, 1991	306058.54	71483.00	470+194
E	DRV-81	April 26, 2001	308486.80	64884.20	477+219
E	DRV-25	July 17, 1991	310070.76	62333.99	480+182
E	DRV-82	April 26, 2001	310253.10	61346.63	481+164
E	DRV-26	July 16, 1991	317838.97	43872.89	500+211
E	DRV-83	April 25, 2001	320563.29	35764.50	508+744
E	DRV-27	June 14, 1991	321138.24	34468.63	510+161
E	DRV-84	April 25, 2001	321289.97	34273.33	510+339
E	DRV-84-R2	April 25, 2001	321280.89	34269.51	510+339
E	DRV-84-R3	April 25, 2001	321264.94	34280.48	510+383
E	DRV-28	July 15, 1991	327674.35	26489.85	519+961
E	DRV-29	June 14, 1991	331698.37	11712.65	535+228

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VIBRACORE/TEST PIT SOURCE SUMMATION

	DRPA - 2005	USACE - 2005	USACE - 2001	USACE - 1999
Report:	**Feasibility Assessment for Placement of Dredged Materials at the Philadelphia Naval Business Center and SouthPort**	**Geotechnical Investigation - Vibrational Coring in the Liston Range of the Delaware River Main Channel, Delaware**	**Report for Vibracoring and Analysis of Marine Sediments**	**Geotechnical Investigation - 1999 Vibracoring along Delaware River Port Mahon PED**
Report Status:	Draft Final Report	Final	Final	Final
Prepared By:	Weston Solutions, Inc.	Duffield Associates	SAIC (Science Applications International Corporation	Duffield Associates
Prepared For:	Delaware River Port Authority	USACE - Philadelphia	USACE - Philadelphia	USACE - Philadelphia
Date of Report:	June 30, 2005	January 2005	December 2001	September 1999
Geotech Company:	Aqua Survey, Inc.	Alpine Ocean Seismic Survey, Inc.	Alpine Ocean Seismic Survey, Inc.	Alpine Ocean Seismic Survey, Inc.
Date of Geotech Data:	Jan. 20, Feb. 9, 10, & 14, 2005	August 16, 2004	April 25 & 29, 2001	
Collection:	Vibracore	Vibracore	Vibracore	Vibracore
Device:	Rossfelder P-3 Vibracore	271 B Alpine Pneumatic Vibracore	271 B Alpine Pneumatic Vibracore	272 B Alpine Pneumatic Vibracore
Positioning:	Trimble Pro XRS DGPS	Trimble 4000SE DGPS	Trimble NT300D DGPS	Trimble 4000 DGPS
Relevant Core/Pit Locations:	30 (29)	4	17	10
Boring Naming Structure (Actual)	BST, MC	DRV	DRV	DRV
Borings Renamed	No	No	No	No
Comments:	Collected Core to below -47 ft MLLW	Collected Cores to a max 20ft below	Collected 20ft Sample at each Location	Collected Cores to a max 20ft below
Sampling/Testing:	Moisture Content (sub-samples)	Drilling Logs	Drilling Logs	Drilling Logs
	Grain Size Distribution (sub-samples)	Sieve Analysis	Sieve Analysis (top 10ft)	Sieve Analysis
	Column Settling (2 samples)	Penetration Graphs	Penetration Graphs	Penetration Graphs
Notes:				

VIBRACORE/TEST PIT SOURCE SUMMATION

	USACE - 1997	ROCK CORE - 1996	USACE - 1996	USACE - 1995
Report:	**Oakwood Beach, NJ Feasibility Study - Appendix B - Engineering Technical Appendix**	**Drill Holes (Core Borings) Delaware River, Claymont, DE to Essington, PA As-Drilled Locations**	**Delaware Deepening Geotechnical Data**	**Delaware River Vibracore Sample Collection**
Report Status:	Final	Memo	Unknown	Final
Prepared By:	USACE - Philadelphia	Vandemark & Lynch, Inc.		Woodward-Clyde Federal Services
Prepared For:	USACE - Philadelphia	USACE - Philadelphia	USACE - Philadelphia	USACE - Philadelphia
Date of Report:	April 1999	August 21, 1996	April 4, 2008	September 21, 1995
Geotech Company:	Unknown	Warren George Inc.		Alpine Ocean Seismic Survey, Inc.
Date of Geotech Data:	1997	July 25 - 27, 29 & 30 and Aug. 1 - 3, 5 - 9, 12 & 14	Aug. 29, Sep. 3, 4 & 10, 1996	
Collection:	Vibracore	Unknown	Vibacore	Vibracore
Device:	Unknown	Unknown	Unknown	273 B Alpine Pneumatic Vibracore
Positioning:	Unknown	Unknown	Unknown	Trimble 4000 DGPS
Relevant Core/Pit Locations:	17	33	8	28
Boring Naming Structure (Actual)	DRV	CB	DRV	DRV
Borings Renamed	No	No	No	Yes, WC*
Comments:				Collected 20ft Sample at each Location
Sampling/Testing:	Drilling Logs	Drilling Logs	Drilling Logs	Drilling Logs - Visual Characterization
	Sieve Analysis	Pulse Velocity (Saturated Sample)	Gradation Curves	Penetration Graphs
		Compression Test		
Notes:			*Missing Data Requested by GBA sent via email from Richard DePasquale (USACE) on 4/4/2008	* Borings were renamed using WC instead of DRV to avoid confusion, since another report used the same names and numbers

VIBRACORE/TEST PIT SOURCE SUMMATION

	USACE -1992	USACE - 1991	USACE - Test Pits
Report:	**Delaware River Comprehensive Navigation Study Chemical Analysis of Sediments**	**Delaware River Main Channel Deepening Project - Appendix C - Geotechnical Studies - Section C-3**	**Delaware River Main Channel Deepening Project - Appendix C - Geotechnical Studies - Section C-3**
Report Status:	Final	Final	Final
Prepared By:	The Greeley-Polhemus Group, Inc.	USACE - Philadelphia	USACE - Philadelphia
Prepared For:	USACE - Philadelphia	USACE - Philadelphia	USACE - Philadelphia
Date of Report:	February 1993	May 1996	May 1996
Geotech Company:	EXMAR	Ocean Survey, Inc	Unknown
Date of Geotech Data:	Nov. 4, 5, 6, 8 & 9, 1992	June-July, 1991	1961-3, 1965, & 1986
Collection:	Vibracore	Vibracore	Test Pit
Device:	EXMAR Vibracorer	Unknown	3/4 CY Clamshell Bucket
Positioning:	Motorola Mini-Range III	Unknown	?
Relevant Core/Pit Locations:	20	29	31
Boring Naming Structure (Actual)	Correspond to Bend Letters	DRV	DRV
Borings Renamed	No	No	Numeric, DFP, DRP, DSP
Comments:	Collected 20ft Sample at each Location		Various Test Pit Data from Various Series
Sampling/Testing:	Drilling Logs	Drilling Logs	Test Pit Log - Visual Description
	Grain Size Distribution	Gradation Curves	
Notes:	*Northings and Easting provided in report (Table 1) were not correct. Used Lat/Long provided and reconverted using Corpscon6 to obtain new Northings and Eastings.	*Technical Report HL-95-November 1995 - Prepared by WES	

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DRPA 2005 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
BST-1	Jan/Feb 2005	313854.00	403047.00	20+450	A-A
BST-2	Jan/Feb 2005	314442.00	402251.00	21+250	A-A
BST-3	Jan/Feb 2005	314081.00	401620.00	21+900	A-A
BST-4	Jan/Feb 2005	313562.00	400694.00	22+800	A-A
BST-5	Jan/Feb 2005	313547.00	399921.00	23+600	A-A
MC-1	Jan/Feb 2005	313094.00	402146.00	21+250	A-A
MC-2	Jan/Feb 2005	313529.00	399095.00	24+430	A-A
MC-3	Jan/Feb 2005	313955.00	397599.00	26+000	A-A
MC-4	Jan/Feb 2005	314349.00	395522.00	28+135	A-A
MC-5	Jan/Feb 2005	315047.00	392987.00	30+800	A-A
MC-6	Jan/Feb 2005	314097.00	388688.00	35+200	A
MC-7	Jan/Feb 2005	313463.00	387242.00	36+800	A
MC-8	Jan/Feb 2005	313127.00	384947.00	39+200	A
MC-9	Jan/Feb 2005	311313.00	382322.00	42+000	A
MC-10	Jan/Feb 2005	309362.00	382409.00	44+000	A
MC-11	Jan/Feb 2005	306934.00	382647.00	46+400	A
MC-12*	Jan/Feb 2005	304293.00	382405.00	48+800	A
MC-13	Jan/Feb 2005	299769.00	382729.00	53+600	A
MC-14	Jan/Feb 2005	298339.00	382108.00	55+400	A
MC-15	Jan/Feb 2005	296455.00	381085.00	57+600	A
MC-16	Jan/Feb 2005	293189.00	379707.00	61+200	A
MC-17	Jan/Feb 2005	291781.00	378786.00	62+800	A
MC-18	Jan/Feb 2005	289332.00	375847.00	65+200	A
MC-19	Jan/Feb 2005	288085.00	376172.00	67+600	A
MC-20	Jan/Feb 2005	284403.00	373315.00	72+000	A
MC-21	Jan/Feb 2005	283457.00	372688.00	73+600	A
MC-22*	Jan/Feb 2005	281373.00	371423.00	75+600	A
MC-23	Jan/Feb 2005	277054.00	370917.00	80+000	A
MC-24*	Jan/Feb 2005	275447.00	370934.00	81+600	A
MC-25*	Jan/Feb 2005	273119.00	370882.00	84+000	A
MC-27*	Jan/Feb 2005	268293.00	371095.00	88+800	A
MC-28	Jan/Feb 2005	264257.00	371233.00	92+800	B
MC-29	Jan/Feb 2005	261468.00	370762.00	95+600	B
MC-30	Jan/Feb 2005	260338.00	371342.00	96+800	B

* Based on Field Log Classification, not Sieve Analysis (as others)

USACE 2005 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
DRV-85	August 16, 2004	244497.07	170028.99	353+074	E
DRV-86	August 16, 2004	244653.08	168799.79	354+100	E
DRV-87	August 16, 2004	246212.69	168166.53	355+606	E
DRV-88	August 16, 2004	246981.23	167315.34	356+753	E

USACE 2001 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
DRV-68	April 27, 2001	260031.90	152613.54	376+411	E
DRV-68-R2	April 27, 2001	260020.89	152617.28	376+401	E
DRV-69	April 27, 2001	262635.19	149544.77	380+435	E
DRV-70	April 27, 2001	267384.25	141101.48	390+149	E
DRV-71	April 27, 2001	272958.36	129134.81	403+348	E
DRV-72	April 27, 2001	273824.08	125867.14	406+621	E
DRV-73	April 29, 2001	281652.66	115856.99	419+304	E
DRV-74	April 29, 2001	283487.05	112490.32	423+118	E
DRV-75	April 29, 2001	289014.55	105208.27	432+250	E
DRV-76	April 29, 2001	296732.81	93100.24	446+600	E
DRV-77	April 29, 2001	297984.99	90759.06	449+295	E
DRV-77-R2	April 29, 2001	298025.75	90774.60	449+297	E
DRV-78	April 29, 2001	300727.30	84547.37	456+084	E
DRV-79	April 26, 2001	302929.33	80027.07	461+103	E
DRV-80	April 26, 2001	303843.29	76192.38	464+995	E
DRV-81	April 26, 2001	308486.80	64884.20	477+219	E
DRV-82	April 26, 2001	310253.10	61346.63	481+164	E
DRV-83	April 25, 2001	320563.29	35764.50	508+744	E
DRV-84	April 25, 2001	321289.97	34273.33	510+339	E
DRV-84-R2	April 25, 2001	321280.89	34269.51	510+339	E
DRV-84-R3	April 25, 2001	321264.94	34280.48	510+383	E

USACE 1999 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
DRV-58	March 17, 1999	244365.10	169317.10	353+522	E
DRV-59	March 17, 1999	245433.70	168911.80	354+532	E
DRV-60	March 17, 1999	246321.00	167364.60	356+279	E
DRV-61	March 17, 1999	246753.60	166456.80	357+247	E
DRV-62	March 17, 1999	247704.10	166290.90	357+999	E
DRV-63	March 17, 1999	247580.10	165526.10	358+491	E
DRV-64	March 17, 1999	248482.60	165037.40	359+463	E
DRV-65	March 14, 1999	290222.30	103339.30	434+474	E
DRV-66	March 13, 1999	292506.50	100010.50	438+511	E
DRV-67	March 13, 1999	294196.40	97506.50	441+532	E

USACE 1997 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
DRV-38	1997	193920.00	244035.00	259+081	D
DRV-39	1997	194319.00	245904.00	257+174	D
DRV-40	1997	194840.00	247999.00	255+016	D
DRV-41	1997	195360.00	249894.00	253+051	C
DRV-42	1997	195880.00	251889.00	250+990	C
DRV-43	1997	196399.00	253783.00	249+026	C
DRV-44	1997	196919.00	255678.00	247+061	C
DRV-45	1997	193715.00	274912.00	226+321	C
DRV-46	1997	192883.00	276720.00	224+331	C
DRV-47	1997	191366.00	279936.00	220+775	C
DRV-48	1997	190585.00	281844.00	218+716	C
DRV-49	1997	189602.00	283554.00	216+751	C
DRV-50	1997	188821.00	285462.00	214+692	C
DRV-51	1997	188140.00	287270.00	212+659	C
DRV-52	1997	188061.00	289370.00	210+596	C
DRV-53	1997	189208.00	291132.00	208+393	C
DRV-54	1997	190410.00	292690.00	206+431	C

ROCK CORE 1996 SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
CB-254	August 8, 1996	224070.00	348834.00	139+663	B
CB-255	August 9, 1996	224613.00	349091.00	139+067	B
CB-256	August 8, 1996	225062.00	348939.00	138+767	B
CB-257	August 14, 1996	229476.00	352463.00	133+156	B
CB-258	August 14, 1996	241024.00	359658.00	119+550	B
CB-259	August 12, 1996	241902.00	360126.00	118+557	B
CB-260	August 12, 1996	242632.00	359833.00	118+094	B
CB-261	August 9, 1996	242420.00	360544.00	117+896	B
CB-262	August 7, 1996	242994.00	360060.00	117+667	B
CB-263	August 7, 1996	243184.00	361020.00	116+996	B
CB-264	August 6, 1996	243780.00	361406.00	116+286	B
CB-265	July 25, 1996	244559.00	361925.00	115+350	B
CB-266	July 25, 1996	245240.00	362410.00	114+470	B
CB-267	July 25, 1996	245738.00	362791.00	113+843	B
CB-268	August 6, 1996	246355.00	362521.00	113+532	B
CB-269	July 25, 1996	246301.00	363336.00	113+063	B
CB-270	July 30, 1996	248389.00	364360.00	110+794	B
CB-271	July 26, 1996	249592.00	365947.00	108+862	B
CB-272	July 27, 1996	249963.00	365829.00	108+647	B
CB-273	July 26, 1996	250079.00	366052.00	108+417	B
CB-274	July 27, 1996	250470.00	366325.00	107+941	B
CB-275	July 30, 1996	250817.00	366807.00	107+369	B
CB-276	July 29, 1996	252296.00	367285.00	105+917	B
CB-277	July 29, 1996	252249.00	367909.00	105+562	B
CB-278	August 1, 1996	253295.00	368025.00	104+674	B
CB-279	August 1, 1996	253424.00	368491.00	104+273	B
CB-280	August 2, 1996	253334.00	369694.00	Outside Channel	B
CB-281	August 2, 1996	253851.00	369002.00	103+670	B
CB-282	August 2, 1996	255528.00	369843.00	101+795	B
CB-283	August 3, 1996	257907.00	370753.00	99+254	B
CB-284	August 3, 1996	259167.00	371297.00	97+948	B
CB-285	August 5, 1996	259698.00	370927.00	97+404	B
CB-286	August 5, 2010	259967.00	371303.00	97+149	B

USACE 1996 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
DRV-30	August 29, 1996	298164.00	90041.00	450+027	E
DRV-31	August 29, 1996	299321.00	87881.00	452+466	E
DRV-32	August 29, 1996	300489.00	85686.00	454+941	E
DRV-33	September 3 & 4, 1996	300985.00	84012.00	456+677	E
DRV-34	September 10, 1996	301703.00	83110.00	457+786	E
DRV-35	September 10, 1996	301915.00	81936.00	458+951	E
DRV-36	September 10, 1996	302011.00	81046.00	459+810	E
DRV-37	September 10, 1996	302574.00	79240.00	451+693	E

USACE 1995 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
WC-1	August 23, 1995	313726.05	397975.23	25+540	A-A
WC-2	August 23, 1995	313565.25	386780.24	37+202	A
WC-3	August 23, 1995	311713.93	384367.09	40+187	A
WC-4	August 23, 1995	303293.26	382418.54	50+119	A
WC-4a	August 25, 1995	303492.97	382126.64	49+897	A
WC-5	August 24, 1995	300857.40	381836.98	52+503	A
WC-6	August 24, 1995	290153.91	377200.56	65+100	A
WC-7	August 25, 1995	283945.51	374449.46	71+712	A
WC-8	August 26, 1995	278016.81	371371.66	79+113	A
WC-9	August 26, 1995	270109.80	370734.06	86+992	A
WC-10	August 26, 1995	258143.85	370151.62	99+293	B
WC-11	August 27, 1995	253525.71	367698.76	104+515	B
WC-12	August 28, 1995	246982.23	362466.55	113+077	B
WC-13	August 28, 1995	222529.91	346188.47	142+770	B
WC-14	August 28, 1995	212121.63	331160.84	161+397	B
WC-15	August 28, 1995	203479.86	308711.84	185+401	B
WC-16	August 29, 1995	198637.67	301944.30	194+050	C
WC-17	August 29, 1995	197455.98	300682.03	195+779	C
WC-18	August 29, 1995	194652.43	297544.54	199+986	C
WC-19	August 29, 1995	189332.78	290092.16	209+688	C
WC-20	August 30, 1995	189042.83	287313.87	213+107	C
WC-21	August 30, 1995	196174.28	269579.85	232+193	C
WC-22	August 30, 1995	198096.66	263409.20	239+302	C
WC-23	August 31, 1995	193901.19	245207.64	257+958	D
WC-24	August 31, 1995	192715.02	239008.58	264+245	D
WC-25	August 31, 1995	192202.94	233217.51	270+213	D
WC-26	August 31, 1995	193293.45	228972.98	274+527	D
WC-27	August 31, 1995	201946.05	217938.60	288+998	D
WC-28	August 30, 1995	228340.94	187769.24	329+083	E

USACE 1992 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
AF-1	November 4, 1992	311,726.14	384,378.35	40+172	A
I-1	November 4, 1992	278,019.97	371,375.90	78+806	A
I-2	November 4, 1992	276,549.63	371,187.86	80+573	A
J-2	November 5, 1992	258,130.27	370,095.20	99+329	B
L-1	November 5, 1992	244,587.02	360,875.06	115+884	B
L-2	November 5, 1992	244,245.11	360,617.61	116+310	B
L-3	November 5, 1992	244,978.32	361,052.15	115+525	B
M-1	November 6, 1992	224,631.30	348,084.50	139+617	B
M-2	November 6, 1992	222,520.05	346,164.18	142+795	B
N-1	November 8, 1992	212,415.18	332,046.06	160+465	B
N-2	November 8, 1992	212,146.56	331,156.03	161+394	B
N-3	November 8, 1992	212,797.23	332,591.23	159+491	B
O-1	November 8, 1992	203,530.12	308,724.15	185+374	B
O-2	November 8, 1992	202,715.80	307,359.47	187+301	C
PQ-1	November 8, 1992	189,361.94	290,119.06	209+657	C
PQ-2	November 8, 1992	189,018.01	287,298.51	213+111	C
R-1	November 9, 1992	198,115.99	263,440.24	238+578	C
R-2	November 9, 1992	197,456.31	201,993.26	Inland!	
R-3	November 9, 1992	197,970.10	264,259.35	237+775	C
T-1	November 9, 1992	193,263.78	228,959.02	274+539	D

USACE 1991 VIBRACORE SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting	Northing		
DRV-1	July 25, 1991	303307.87	382391.11	50+102	A
DRV-2	July 25, 1991	290168.17	377131.64	65+128	A
DRV-3	July 26, 1991	270087.23	370739.32	87+014	A
DRV-4	July 26, 1991	247209.08	363647.24	112+160	B
DRV-5	July 27, 1991	241728.96	359725.53	118+916	B
DRV-6	July 19, 1991	235765.16	355992.04	125+952	B
DRV-7	July 27, 1991	224606.74	348980.42	139+131	B
DRV-8	July 27, 1991	217517.61	340191.43	150+569	B
DRV-9	July 19, 1991	210647.26	330025.71	162+919	B
DRV-10	July 28, 1991	207852.19	320696.87	172+657	B
DRV-11	July 28, 1991	197471.58	300678.81	195+770	C
DRV-12	July 28, 1991	196179.20	269532.23	232+239	C
DRV-13	July 19, 1991	192187.83	233199.48	270+230	D
DRV-14	July 29, 1991	228968.33	188423.49	329+007	E
DRV-15	July 29, 1991	245360.35	168004.65	355+164	E
DRV-16	July 19, 1991	256054.68	153338.16	373+240	E
DRV-17	July 19, 1991	267028.53	140862.51	390+224	E
DRV-18	July 18, 1991	274783.04	125863.19	407+167	E
DRV-19	July 18, 1991	281772.02	114886.32	420+172	E
DRV-20	July 18, 1991	288375.65	104846.38	432+187	E
DRV-21	July 18, 1991	293282.86	98560.63	440+146	E
DRV-22	July 18, 1991	297853.97	91929.37	448+200	E
DRV-23	July 17, 1991	302212.81	80670.96	460+233	E
DRV-24	July 17, 1991	306058.54	71483.00	470+194	E
DRV-25	July 17, 1991	310070.76	62333.99	480+182	E
DRV-26	July 16, 1991	317838.97	43872.89	500+211	E
DRV-27	June 14, 1991	321138.24	34468.63	510+161	E
DRV-28	July 15, 1991	327674.35	26489.85	519+961	E
DRV-29	June 14, 1991	331698.37	11712.65	535+228	E

USACE TEST PIT SUMMATION

Name	Date	Location (NJ State Plane NAD 83)		Station	Reach
		Easting*	Northing*		
282	September 6, 1961	241323.57	359423.67	119+420	B
431	January 17, 1962	211699.50	333133.17	159+700	B
435	January 19, 1962	216846.12	339008.86	151+920	B
436	January 19, 1962	217973.63	340562.93	150+000	B
437	January 19, 1962	217276.01	341133.74	149+950	B
438	January 22, 1962	219603.94	344324.86	146+000	B
459	January 17, 1963	198235.18	262956.40	239+700	C
461	January 22, 1963	197752.01	261035.32	241+680	C
463	January 16, 1963	197072.28	259190.85	243+640	C
DFP 24	December 6, 1986	201550.29	304768.72	190+000	C
DFP 25	December 6, 1986	198180.22	301075.13	195+000	C
DFP 26	December 6, 1986	194810.14	297381.54	200+000	C
DFP 31	December 9, 1986	191440.06	293687.96	205+000	C
DFP 32	December 10, 1986	188928.68	290564.58	209+000	C
DFP 35	December 11, 1986	188657.00	289374.66	210+500	C
DFP 36	December 11, 1986	188427.51	287892.32	212+000	C
DFP 43	December 13, 1986	189624.63	283289.63	217+000	C
DFP 44	December 13, 1986	190470.67	281477.39	219+000	C
DFP 45	December 13, 1986	190833.12	281646.60	219+000	C
DRP-12	June 9, 1965	224027.43	348399.56	139+930	B
DSP-1	March 22, 1965	196426.83	268057.07	233+680	C
DSP-2	March 22, 1965	195628.55	269648.82	231+900	C
DSP-3	March 22, 1965	194820.57	271545.04	229+840	C
DSP-4	March 23, 1965	195336.31	272756.98	228+960	C
DSP-5	March 23, 1965	190437.57	280579.05	219+800	C
DSP-7	March 24, 1965	195991.56	299714.92	197+480	C
DSP-9	March 29, 1965	207873.41	321347.44	172+030	B
DSP-16	April 1, 1965	280535.78	372046.63	76+210	A
DSP-17	April 2, 1965	287294.52	374704.06	68+880	A
DSP-19	April 2, 1965	303209.73	382785.70	50+230	A
DSP-20	April 3, 1965	311524.58	382437.28	41+890	A

REPORT COVERS

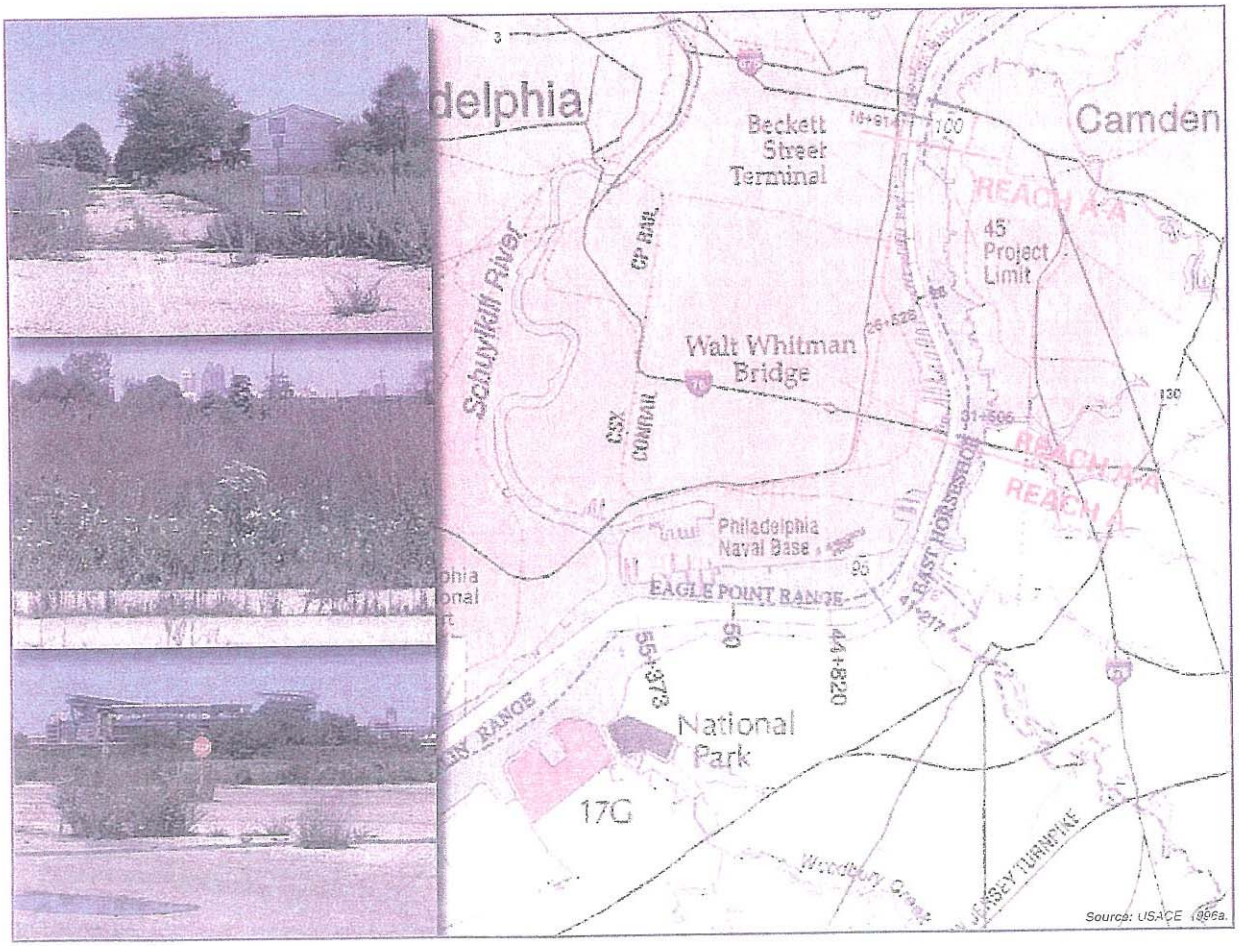
Delaware River Port Authority
of Pennsylvania and New Jersey

DRPA - 2005

DRAFT FINAL REPORT

Feasibility Assessment for Placement of Dredged Materials at the Philadelphia Naval Business Center and SouthPort

Philadelphia, Pennsylvania



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WESTON SOLUTIONS

30 June 2005

Prepared for:
Delaware River Port Authority
Camden, New Jersey

Prepared by:
Weston Solutions, Inc.
West Chester, Pennsylvania

04P-1208

DUFFIELD ASSOCIATES

USACE - 2005

GEOTECHNICAL INVESTIGATION

VIBRATIONAL CORING IN THE LISTON RANGE OF THE DELAWARE RIVER MAIN CHANNEL, DELAWARE

USACE Contract No. DACW61-01-D-0004
Task Order 027, Modification No. 01

January 2005

Prepared for:

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Project No. 57395GB.02

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FINAL

USACE -2001

REPORT FOR VIBRACORING AND ANALYSIS OF MARINE SEDIMENTS

DELAWARE RIVER MAIN CHANNEL, DELAWARE

Prepared for

US Army Corps of Engineers®

PHILADELPHIA DISTRICT

CONTRACT No. DACW61-00-D-0007
TASK ORDER No. 0008

December 2001

DUFFIELD
ASSOCIATES

USACE - 1999

GEOTECHNICAL INVESTIGATION

1999 VIBROCORING
ALONG THE DELAWARE RIVER
PORT MAHON PED

DAI W.O. 3769.GI
USACE Contract No. DACW-61-98-D-0008
Task Order 8

September 1999

Prepared for:

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US Army Corps of Engineers
Philadelphia District

Delaware Bay Coastline
Delaware & New Jersey

USACE - 1997

Oakwood Beach, NJ
Feasibility Study

FINAL
APPENDIX B

ENGINEERING TECHNICAL APPENDIX

April 1999

VANDEMARK
& LYNCH, INC.
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August 21, 1996

ROCK CORE -1996

Mr. Lowell Babb
WARREN GEORGE, INC.
Foot of Jersey Avenue
P.O. Box 413
Jersey City, NJ 07303

RE: DRILL HOLES (CORE BORINGS)
DELAWARE RIVER, CLAYMONT, DE TO ESSINGTON, PA
AS-DRILLED LOCATIONS

Dear Mr. Babb:

The following list of core borings were field located between July 25, 1996 through August 14, 1996.

Horizontal positions are based on New Jersey State - Zone 2900 coordinate system and reduced depths are at river bottom, referenced to mean low water datum.

Boring Number	Plan Position *	Actual Position	Reduced Depth
269	N. 363337.470 E. 246305.640	N. 363336 E. 246301	-45.2
267	N. 362789.190 E. 245738.550	N. 362791 E. 245738	-41.6
266	N. 362407.910 E. 245243.340	N. 362410 E. 245240	-45.4
265	N. 361927.160 E. 244561.000	N. 361925 E. 244559	-45.5
271	N. 365943.810 E. 249591.390	N. 365947 E. 249592	-45.5
273	N. 366052.160 E. 250080.090	N. 366052 E. 250079	-44.6
272	N. 365829.72 E. 249963.95	N. 365829 E. 249963	-44.0

TRANSMITTAL OF SAD LABORATORY REPORT(S)

TO: Commander,US Army Corps of Engineers Philadelphia District ATTN: Steve Krajnik (CENAP-EN-D) 100 Penn Square East Hecht Building Philadelphia, PA 19107	FROM: Director (CESAS-EN-L) SAD Laboratory USACE 611 South Cobb Drive Marietta, GA 30060-3112
PROJECT: Deleware River Channel Deepening	REQN NO: CENAP-EN-97-912 W.O. NO: 8158

SUBJECT: Rock Core Testing

1. Enclosed are the results of the tests performed on the 2 inch diameter rock cores received 24 Jan 97.

2. This completes the work requested on this requisition. If you need further assistance, please contact Mr. Jack Ford or Mr. Lewis Miles at 770/919-5272 or me at 770/919-3990.

SUBMITTED BY:	SIGNATURE	DATE:
WILLIAM L. TISON, P. E. Director, SAD Laboratory		15 APR 1997

USACE - 1996

DRV 30 → 37 BORING LOGS & GRADATION CURVES
@ PHILA. DISTRICT H.C. 4/3/08

DRV 3 → 57 N/E & ELEVATIONS 4/4/08 EMAIL

DELAWARE DEEPENING GEOTECHNICAL DATA

USACE -1995

DELAWARE RIVER VIBROCORE SAMPLE COLLECTION

CONTRACT: DACW61-95-D-0005

DELIVERY ORDER 1

Prepared for:
U.S. Army Corps of Engineers
Philadelphia District
100 Penn Square East
Philadelphia, Pennsylvania 19107

Woodward-Clyde

Prepared By:
Woodward-Clyde Federal Services
201 Willowbrook Boulevard
Wayne, New Jersey 07470

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USACE - 1992

DACW61-91-D-0009
Task Order 0017

Prepared for
U.S. Army Corps of Engineers
Philadelphia District
Philadelphia, PA

Final Report:

DELAWARE RIVER COMPREHENSIVE NAVIGATION STUDY CHEMICAL ANALYSIS OF SEDIMENTS

February 1993

The Greeley-Polhemus Group, Inc.
105 South High Street
West Chester, Pennsylvania 19382
(215) 692-2224

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USACE - 1991

US Army Corps
of Engineers
Philadelphia District

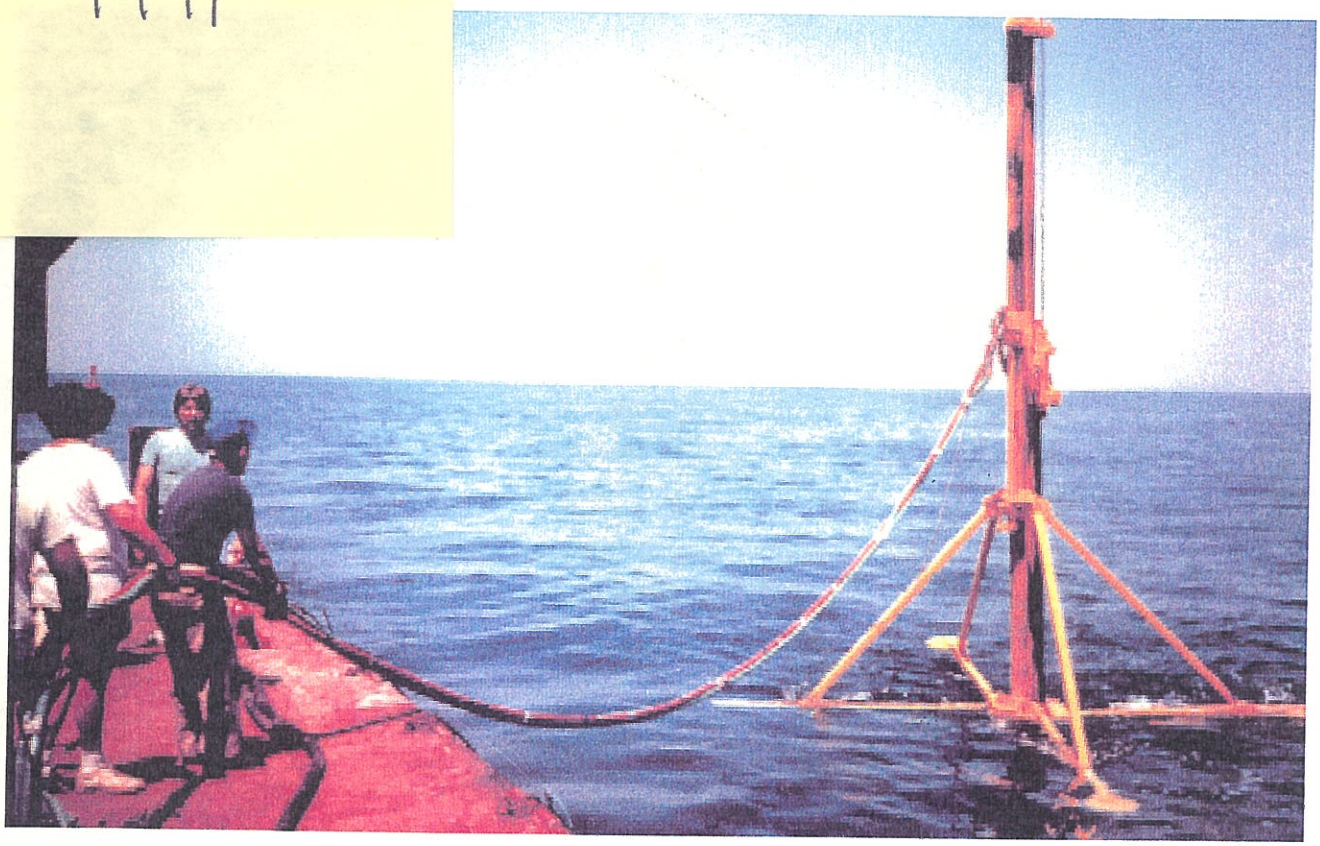
Philadelphia District
North Atlantic Division

Delaware River Main Channel Deepening Project

Appendix C

USACE-
1991

Geotechnical Studies



May 1996

528

USACE - TEST PITS

US Army Corps of Engineers
Philadelphia District

Philadelphia District
North Atlantic Division

Delaware River Main Channel Deepening Project

Appendix C

USACE-
TEST
PITS

Geotechnical Studies

May 1996

REACH A-A

Sampling Logs

Lat.
Long.
≈25m E of Plan

Log of Vibrocore No. DRV-1

SURFACE ELEVATION _____ LOCATION Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth ≈47	
		loose, Black, F. sand, some Silt	
5		Med Dense, Gray, F-M Sand	
10		Med. Dense, Gray + Dk gray F-M Sand	
15		Med dense, gray + Dk gray F-M sand	
		Bottom 1'5" no recovery	
20		Recovery 18'7" / 20' — 20' Bottom of Core	

Completion Depth 20' Feet Water Depth ≈47 Feet Date 8/23/95

Project Name Delaware Vibrocore Project Number R95500

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Gradation Curves & Sieve Analysis

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050034 **Sample ID:** BST-1 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.22 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.42 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.82 %
Percent Fine Sand (> 75 µm < 425 µm)	84.41 %
Percent (by difference) Silt/Clay, plus analytical loss	14.13 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050034 **Sample ID:** BST-1 **Date:** 3/02-09/05

Total dry sand mortered + container	117.374	g
Container tare	12.631	g
Total dry sample wt.	104.7430	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.864	g
Container tare	12.631	g
Gravel >4.75 mm	0.2330	g (B)

Percent > 4.75 mm = 0.22

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.069	g
Container tare	12.631	g
Sand > 2.0 mm <4.75 mm	0.4380	g (C)

Percent < 4.75 mm > 2.0 mm = 0.42

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	175.7810	g
Container tare	174.9259	g
Dry medium sand >425 µm <2.0 mm	0.8551	g (D)

Percent > 425 µm < 2.0 mm = 0.82

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	92.8096	g
Container tare	4.3920	g
Dry fine sand >75 µm <425 µm	88.4176	g (E)

Percent > 75 µm < 425 µm = 84.41

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050036 **Sample ID:** BST-2 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.04 %
Percent Medium Sand (> 425 µm < 2.0 mm)	2.96 %
Percent Fine Sand (> 75 µm < 425 µm)	22.11 %
Percent (by difference) Silt/Clay, plus analytical loss	74.90 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050036 **Sample ID:** BST-2 **Date:** 3/02-09/05

Total dry sand mortered + container	117.559	g
Container tare	12.776	g
Total dry sample wt.	104.7830	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.776	g
Container tare	12.776	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.818	g
Container tare	12.776	g
Sand > 2.0 mm <4.75 mm	0.0420	g (C)

Percent < 4.75 mm > 2.0 mm = 0.04

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	175.7281	g
Container tare	172.6304	g
Dry medium sand >425 µm <2.0 mm	3.0977	g (D)

Percent > 425 µm < 2.0 mm = 2.96

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	199.2380	g
Container tare	176.0724	g
Dry fine sand >75 µm <425 µm	23.1656	g (E)

Percent > 75 µm < 425 µm = 22.11

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050037 **Sample ID:** BST-3 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	4.81 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	4.27 %
Percent Medium Sand (> 425 µm < 2.0 mm)	13.29 %
Percent Fine Sand (> 75 µm < 425 µm)	64.04 %
Percent (by difference) Silt/Clay, plus analytical loss	13.59 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050037	Sample ID:	BST-3	Date:	3/02-09/05

Total dry sand mortered + container	114.268	g
Container tare	12.668	g
Total dry sample wt.	101.6000	g (A)

 # 4 sieve
(Gravel)

Dry gravel >4.75 mm + container	17.550	g
Container tare	12.668	g
Gravel >4.75 mm	4.8820	g (B)

Percent > 4.75 mm = 4.81

 # 10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	17.010	g
Container tare	12.668	g
Sand > 2.0 mm <4.75 mm	4.3420	g (C)

Percent < 4.75 mm > 2.0 mm = 4.27

 # 40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	184.8849	g
Container tare	171.3800	g
Dry medium sand >425 µm <2.0 mm	13.5049	g (D)

Percent > 425 µm < 2.0 mm = 13.29

 # 200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	68.6528	g
Container tare	3.5871	g
Dry fine sand >75 µm <425 µm	65.0657	g (E)

Percent > 75 µm < 425 µm = 64.04

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050038 **Sample ID:** BST-4 **Date:** 3/02-09/05

Total dry sand mortered + container	115.117	g
Container tare	12.595	g
Total dry sample wt.	102.5220	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	14.879	g
Container tare	12.595	g
Gravel >4.75 mm	2.2840	g (B)

Percent > 4.75 mm = 2.23

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.367	g
Container tare	12.595	g
Sand > 2.0 mm <4.75 mm	0.7720	g (C)

Percent < 4.75 mm > 2.0 mm = 0.75

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	181.6760	g
Container tare	171.7069	g
Dry medium sand >425 µm <2.0 mm	9.9691	g (D)

Percent > 425 µm < 2.0 mm = 9.72

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	50.8607	g
Container tare	3.8377	g
Dry fine sand >75 µm <425 µm	47.0230	g (E)

Percent > 75 µm < 425 µm = 45.87

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050039 **Sample ID:** BST-5 **Date:** 3/02-09/05

Total dry sand mortered + container	112.396	g
Container tare	12.700	g
Total dry sample wt.	99.6960	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.700	g
Container tare	12.700	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.435	g
Container tare	12.700	g
Sand > 2.0 mm <4.75 mm	0.7350	g (C)

Percent < 4.75 mm > 2.0 mm = 0.74

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	187.0648	g
Container tare	177.7139	g
Dry medium sand >425 µm <2.0 mm	9.3509	g (D)

Percent > 425 µm < 2.0 mm = 9.38

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	54.5275	g
Container tare	3.7511	g
Dry fine sand >75 µm <425 µm	50.7764	g (E)

Percent > 75 µm < 425 µm = 50.93

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050035 **Sample ID:** MC-1 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.54 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.93 %
Percent Medium Sand (> 425 µm < 2.0 mm)	22.50 %
Percent Fine Sand (> 75 µm < 425 µm)	69.07 %
Percent (by difference) Silt/Clay, plus analytical loss	6.95 %

13

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

nt: Weston | ASI Job #: 25-016 | Balance: Sart./Mett.

ple # : 20050035 | Sample ID: MC-1 | Date: 3/02-09/05

Total dry sand mortered + container	117.095	g
Container tare	12.786	g
Total dry sample wt.	104.3090	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	13.354	g
Container tare	12.786	g
Gravel >4.75 mm	0.5680	g (B)

Percent > 4.75 mm = 0.54

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.758	g
Container tare	12.786	g
Sand > 2.0 mm <4.75 mm	0.9720	g (C)

Percent < 4.75 mm > 2.0 mm = 0.93

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	26.8431	g
Container tare	3.3694	g
Dry medium sand >425 µm <2.0 mm	23.4737	g (D)

Percent > 425 µm < 2.0 mm = 22.50

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	75.9060	g
Container tare	3.8614	g
Dry fine sand >75 µm <425 µm	72.0446	g (E)

Percent > 75 µm < 425 µm = 69.07

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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B-1

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050126 **Sample ID:** MC-2 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.19 %
Percent Medium Sand (> 425 µm < 2.0 mm)	46.64 %
Percent Fine Sand (> 75 µm < 425 µm)	52.08 %
Percent (by difference) Silt/Clay, plus analytical loss	1.09 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050126 **Sample ID:** MC-2 **Date:** 3/02-09/05

Total dry sand mortered + container	114.691	g
Container tare	12.519	g
Total dry sample wt.	102.1720	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.519	g
Container tare	12.519	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.713	g
Container tare	12.519	g
Sand > 2.0 mm <4.75 mm	0.1940	g (C)

Percent < 4.75 mm > 2.0 mm = 0.19

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	51.4600	g
Container tare	3.8065	g
Dry medium sand >425 µm <2.0 mm	47.6535	g (D)

Percent > 425 µm < 2.0 mm = 46.64

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	58.1535	g
Container tare	4.9450	g
Dry fine sand >75 µm <425 µm	53.2085	g (E)

Percent > 75 µm < 425 µm = 52.08

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: SH

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston | ASI Job #: 25-016 | Balance: Sart./Mett.

Sample # : 20050127 | Sample ID: MC-3 | Date: 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.83 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.71 %
Percent Medium Sand (> 425 µm < 2.0 mm)	12.99 %
Percent Fine Sand (> 75 µm < 425 µm)	82.93 %
Percent (by difference) Silt/Clay, plus analytical loss	2.54 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050127	Sample ID:	MC-3	Date:	3/02-09/05

Total dry sand mortered + container	113.223	g
Container tare	12.601	g
Total dry sample wt.	100.6220	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	13.437	g
Container tare	12.601	g
Gravel >4.75 mm	0.8360	g (B)

Percent > 4.75 mm = 0.83

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.314	g
Container tare	12.601	g
Sand > 2.0 mm <4.75 mm	0.7130	g (C)

Percent < 4.75 mm > 2.0 mm = 0.71

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	181.2788	g
Container tare	168.2062	g
Dry medium sand >425 µm <2.0 mm	13.0726	g (D)

Percent > 425 µm < 2.0 mm = 12.99

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	86.8453	g
Container tare	3.3963	g
Dry fine sand >75 µm <425 µm	83.4490	g (E)

Percent > 75 µm < 425 µm = 82.93

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: [illegible]

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050128 **Sample ID:** MC-4 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.00 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.17 %
Percent Fine Sand (> 75 µm < 425 µm)	20.44 %
Percent (by difference) Silt/Clay, plus analytical loss	79.39 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050128 **Sample ID:** MC-4 **Date:** 3/02-09/05

Total dry sand mortered + container	103.708	g
Container tare	12.642	g
Total dry sample wt.	91.0660	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.642	g
Container tare	12.642	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.642	g
Container tare	12.642	g
Sand > 2.0 mm <4.75 mm	0.0000	g (C)

Percent < 4.75 mm > 2.0 mm = 0.00

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	167.6073	g
Container tare	167.4560	g
Dry medium sand >425 µm <2.0 mm	0.1513	g (D)

Percent > 425 µm < 2.0 mm = 0.17

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	191.6332	g
Container tare	173.0200	g
Dry fine sand >75 µm <425 µm	18.6132	g (E)

Percent > 75 µm < 425 µm = 20.44

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050129 **Sample ID:** MC-5 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.00 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.03 %
Percent Fine Sand (> 75 µm < 425 µm)	10.40 %
Percent (by difference) Silt/Clay, plus analytical loss	89.57 %

17

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050129 **Sample ID:** MC-5 **Date:** 3/02-09/05

Total dry sand mortered + container	108.867	g
Container tare	12.700	g
Total dry sample wt.	96.1670	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.700	g
Container tare	12.700	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.700	g
Container tare	12.700	g
Sand > 2.0 mm <4.75 mm	0.0000	g (C)

Percent < 4.75 mm > 2.0 mm = 0.00

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	153.4675	g
Container tare	153.4360	g
Dry medium sand >425 µm <2.0 mm	0.0315	g (D)

Percent > 425 µm < 2.0 mm = 0.03

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	180.8310	g
Container tare	170.8290	g
Dry fine sand >75 µm <425 µm	10.0020	g (E)

Percent > 75 µm < 425 µm = 10.40

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

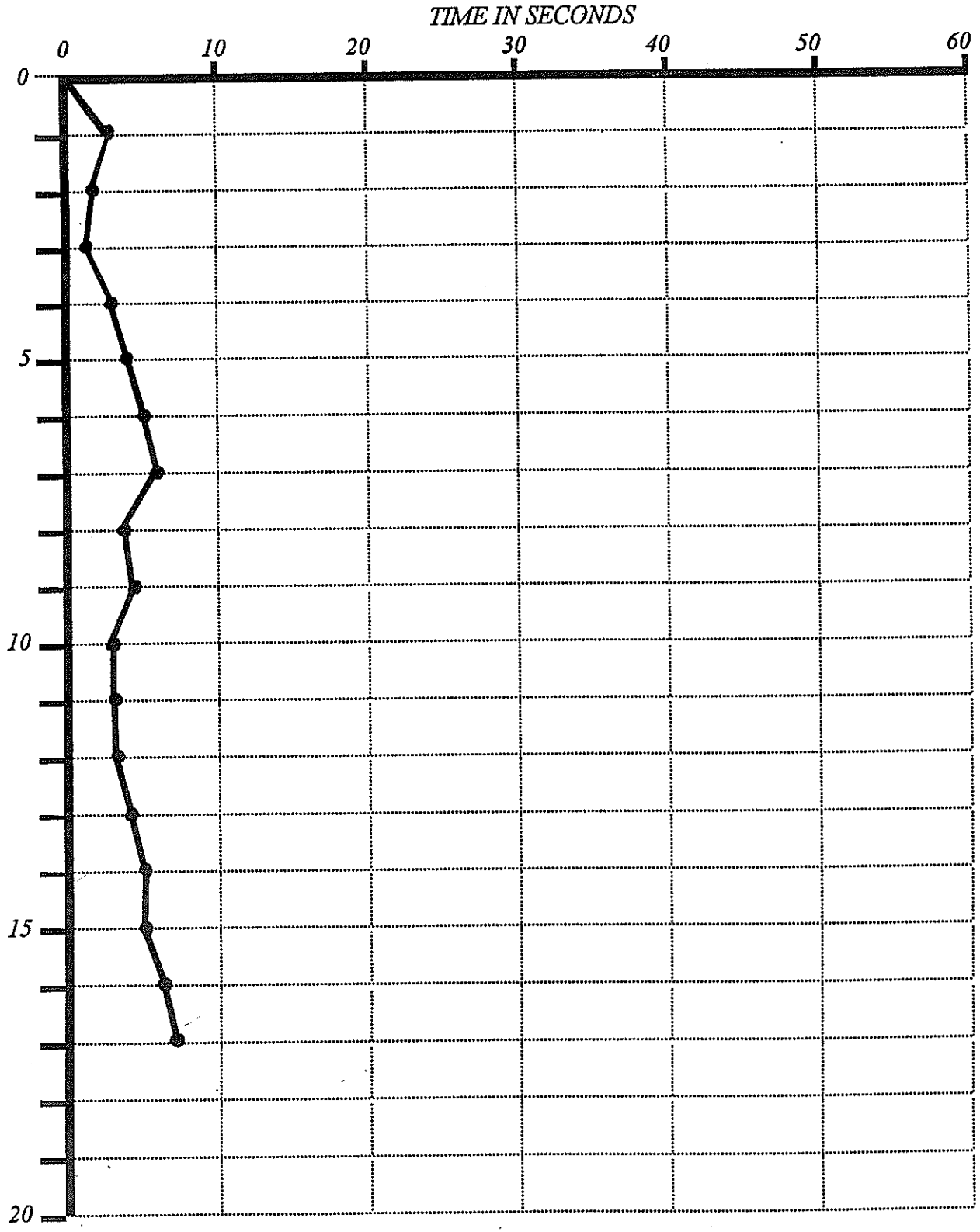
Initials: MA

C:\Norvell/Calc-for/Sand-range

Penetration Graphs

PENETRATION GRAPH

CORE NO. DRV-1 R4 *LOCATION: LATITUDE* N 39° 55' 27.460" *LONGITUDE* W 075° 08' 10.062"
DATE: 8/23/95 *START TIME:* 1244 *STOP TIME:* 1246
WATER DEPTH MEASURED 47.0' *CORRECTED MLW* 43.4'
Total Penetration 17.0' Total Recovery 18.6'



Percent Moisture

AQUA SURVEY, INC.
PERCENT MOISTURE & HYDROSCOPIC CORRECTION FACTOR BENCHSHEET

Balance: Sartorious/ Mettler

Calibration: (YES) NO

Client: Weston Tetra Tech

Drying Oven: ~~QL Model 40~~ Fisher

Temperature: 105 °C

Job #: 25-016

	Sample #	A	B	C	D	E	F	G	H	I	% Moisture*	HMCF**
MC-1	20050035	1.5900	34.1244		27.3098	27.3095						
MC-2	20050126	0.9618	33.4258		28.2407	28.2407						
MC-3	0127	0.9590	37.8335		30.2280	30.2280						
MC-4	0128	0.9568	19.5785		9.2061	9.2016						
MC 5	0129	1.5871	27.7795		14.7868	14.7861						
MC 6	0130	1.5770	28.3726		19.3003	19.2989						
MC 7	0131	1.5768	31.5315		20.2876	20.2876						
MC 8	0132	1.5995	* 37.1533		29.5608	29.5608						
MC 9	0133	1.5804	* 27.1496		17.7545	17.7544						
MC 10	0134	1.5794	38.4155		30.0349	30.0349						
MC 11	0135	1.5892	21.0285		12.5379	12.5379						
MC 13	0137	1.5788	29.8313		24.0218	24.0218						
MC 14	0138	1.5854	36.1297		30.3499	30.3372						
MC 15	0139	1.5775	32.9060		20.3121	20.2936						
MC 16	0140	1.5830	24.4185		15.4998	15.4963						
MC 17	0141	1.5946	33.2445		19.4093	19.4092						
MC 18	0142	1.5859	28.2875		17.5682	17.5659						
MC 19	0143	1.5960	42.5852		32.0062	31.9837						
MC 20	0144	1.5741	22.4090		18.4596	18.4580						
MC 21	0145	1.5749	22.4944		19.3477	19.3345						
MC 23	0177	0.9597	25.8078		13.8295	13.8273						
MC 28	0181	0.9604	23.4112		15.0865	15.0831						
DUP	D 0181	0.9601	22.2264		14.2333	14.2295						
TRP	T 0181	0.9564	20.3978		13.1332	13.1292						
	Initials/ Date	AH 2/24/5			AH 2/25/5	AH 2/26/5						

A= Empty Pan (g)
B= Wet Sample + Pan (g)
C= Air Dry Sample + Pan (g)
D= First Oven Dry Sample + Pan (g)
E= Second Oven Dry Sample + Pan (g)

* pebbles not included

* % moisture = $\frac{\text{B- Final oven dry wt.}}{\text{B-A}}$ X100

** HMCF= (Final oven dry wt.- A)/ (C-A)

If oven dried sample is not ± 0.05g or at a constant weight after second oven dry, return samples to oven and use F, G, H, and I until requirement is met.

AQUA SURVEY, INC.
PERCENT MOISTURE & HYDROSCOPIC CORRECTION FACTOR BENCHSHEET

Balance: Sartorious/ Mettler

Calibration: YES NO

Client: Weston Tetra Tech

Drying Oven: QL Model 40

Temperature: 105 °C

Job #: 25-016

	Sample #	A	B	C	D	E	F	G	H	I	% Moisture*	HMCF**
MC29	20050.182	0.9673	28.5801	22.4746		22.4715						
MC30	0183	0.9638	34.5660	29.3631		29.3600						
BST-1	0034	0.9628	36.6281	27.4659		27.4580						
BST-2	0036	0.9626	25.5181	14.1159		14.1095						
BST-3	0037	0.9630	36.3274	28.9347		28.9347						
BST-4	0038	0.9594	30.3427	21.6606		21.6517						
BST-5	0039	0.9573	31.8319	22.8052		22.8004						
	Initials/ Date	MA 2/24/15			MA 2/25/15	MA 2/28/15						

A= Empty Pan (g)
B= Wet Sample + Pan (g)
C= Air Dry Sample + Pan (g)
D= First Oven Dry Sample + Pan (g)
E= Second Oven Dry Sample + Pan (g)

* % moisture = $\frac{\text{B- Final oven dry wt.}}{\text{B-A}}$ X100

** HMCF= (Final oven dry wt.- A)/ (C-A)

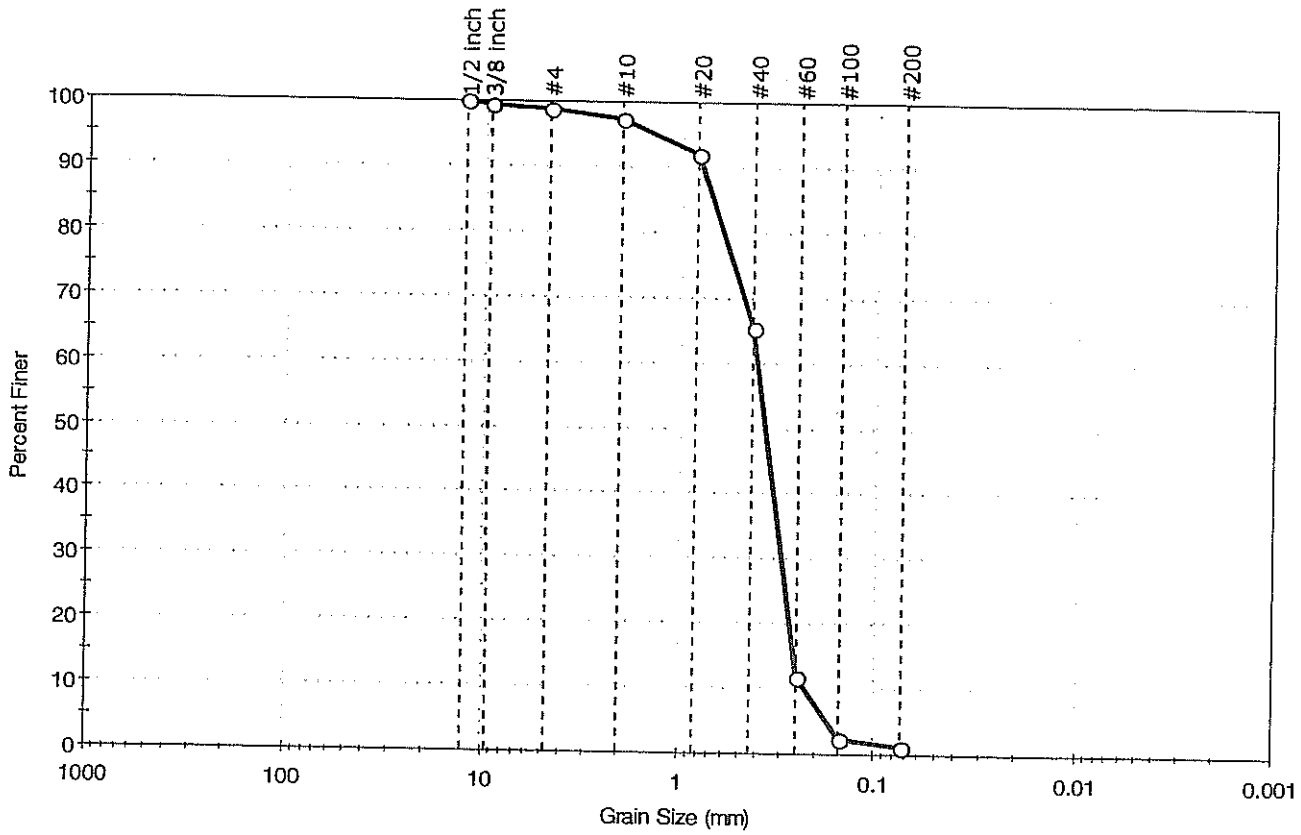
If oven dried sample is not ± 0.05g or at a constant weight after second oven dry, return samples to oven and use F, G, H, and I until requirement is met.

Column Settling

GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project:	Delaware River Port Authority		
Location:	PA-NJ	Project No:	GTX-5775
Boring ID: ---	Sample Type: bucket	Tested By:	ahp
Sample ID: SAND SP	Test Date: 03/14/05	Checked By:	jdt
Depth : ---	Test Id: 67215		
Sample Description:	Moist, dark grayish brown sand		
Sample Comment:	---		
Test Comment:	---		

Particle Size Analysis - ASTM D 422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.2	97.7	1.1

Sieve Name	Sieve Size (mm)	Percent Finer	Spec. Percent	Complies
1/2 inch	12.70	100		
3/8 inch	9.51	99		
#4	4.75	99		
#10	2.00	97		
#20	0.84	92		
#40	0.42	66		
#60	0.25	12		
#100	0.15	2		
#200	0.074	1		

Coefficients

D_{85} = 0.7031 mm D_{30} = 0.2990 mm
D_{60} = 0.4021 mm D_{15} = 0.2579 mm
D_{50} = 0.3643 mm D_{10} = 0.2264 mm
C_u = 1.776 C_c = 0.222

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

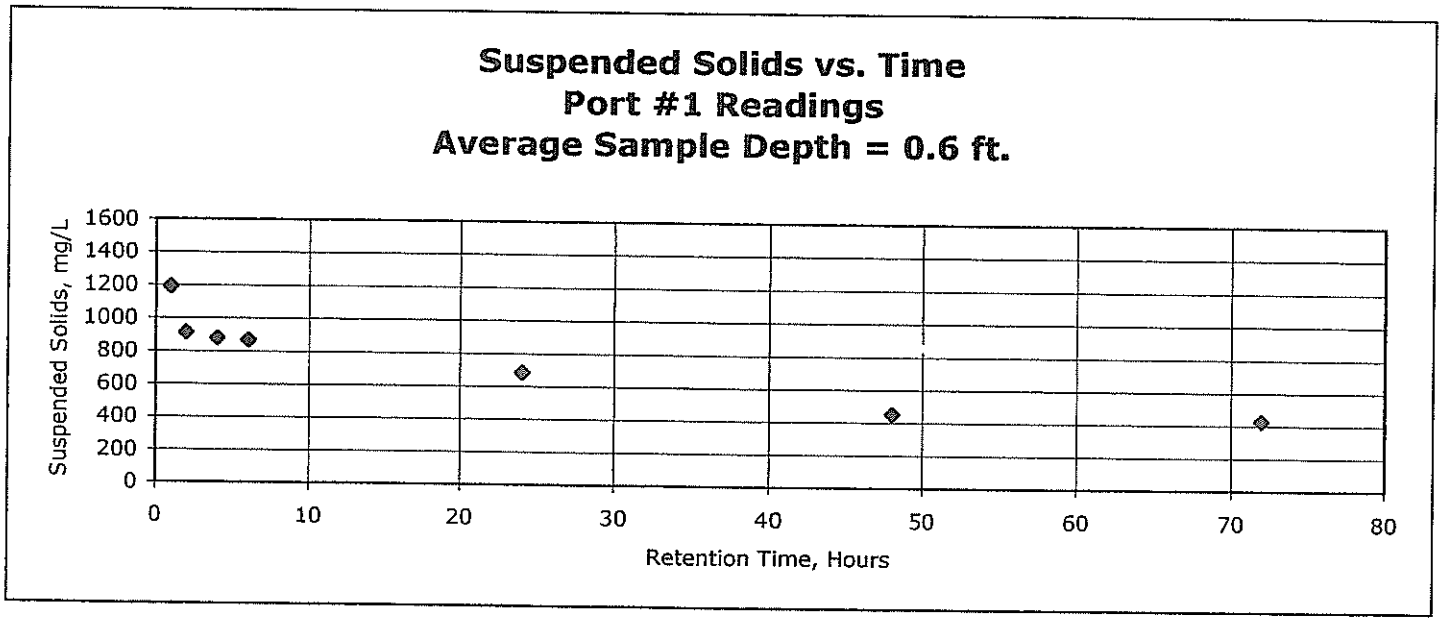
Column Settling Test

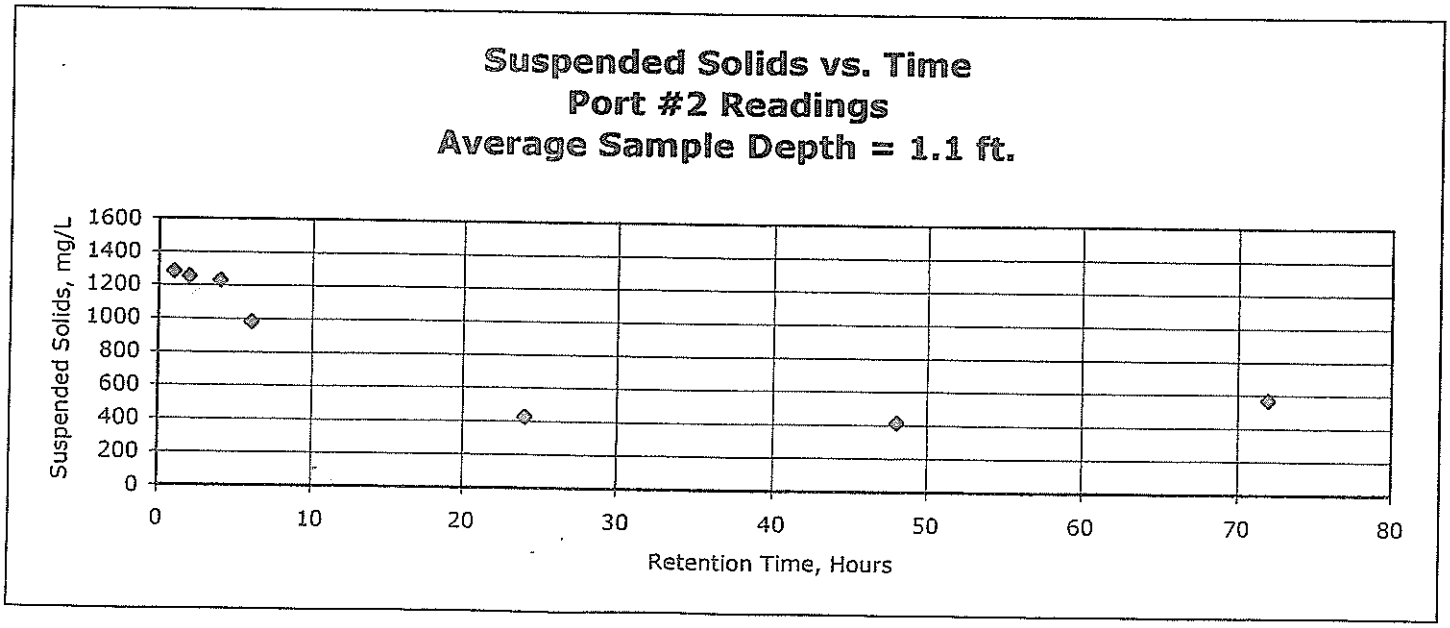
Time, hours	Depth of Sample Extraction, feet	Solids, grams	Volume of water, ml	Suspended Solids, mg/mL or g/L	Suspended Solids, mg/L
1	0.69	0.05	42.03	1.2	1190
1	1.19	0.05	39.06	1.3	1280
1	1.69	0.04	42.53	0.9	941
1	2.19	0.04	41.09	1.0	973
1	2.69	0.05	40.81	1.2	1225
1	3.19	0.05	48.24	1.0	1036
1	3.69	0.05	43.46	1.2	1150
2	0.67	0.04	43.91	0.9	911
2	1.17	0.05	39.96	1.3	1251
2	1.67	0.05	53.53	0.9	934
2	2.17	0.05	46.75	1.1	1070
2	2.67	0.05	43.74	1.1	1143
2	3.17	0.05	52.96	0.9	944
2	3.67	0.05	55.08	0.9	908
4	0.65	0.04	45.56	0.9	878
4	1.15	0.05	40.68	1.2	1229
4	1.65	0.04	40.62	1.0	985
4	2.15	0.05	44.39	1.1	1126
4	2.65	0.05	45.35	1.1	1103
4	3.15	0.04	45.63	0.9	877
4	3.65	0.04	44.22	0.9	905
6	0.63	0.04	46.09	0.9	868
6	1.13	0.05	50.91	1.0	982
6	1.63	0.05	48.96	1.0	1021
6	2.13	0.05	52.94	0.9	944
6	2.63	0.04	50.06	0.8	799
6	3.13	0.04	50.46	0.8	793
6	3.63	0.04	49.74	0.8	804
24	0.59	0.03	43.85	0.7	684
24	1.09	0.02	46.9	0.4	426
24	1.59	0.02	42.93	0.5	466
24	2.09	0.03	45.73	0.7	656
24	2.59	0.02	45.25	0.4	442
24	3.09	0.02	52.58	0.4	380
24	3.59	0.02	43.95	0.5	455
48	0.54	0.02	44.2	0.5	452
48	1.04	0.02	48.46	0.4	413
48	1.54	0.02	49.14	0.4	407
48	2.04	0.03	49.07	0.6	611
48	2.54	0.01	50.15	0.2	199
48	3.04	0.01	47.51	0.2	210
48	3.54	0.03	51.51	0.6	582
72	0.53	0.02	46.77	0.4	428
72	1.03	0.03	52.89	0.6	567
72	1.53	0.02	54.66	0.4	366
72	2.03	0.04	60.48	0.7	661
72	2.53	0.02	53.07	0.4	377
72	3.03	0.01	51.33	0.2	195
72	3.53	0.03	48.78	0.6	615

GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test





GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
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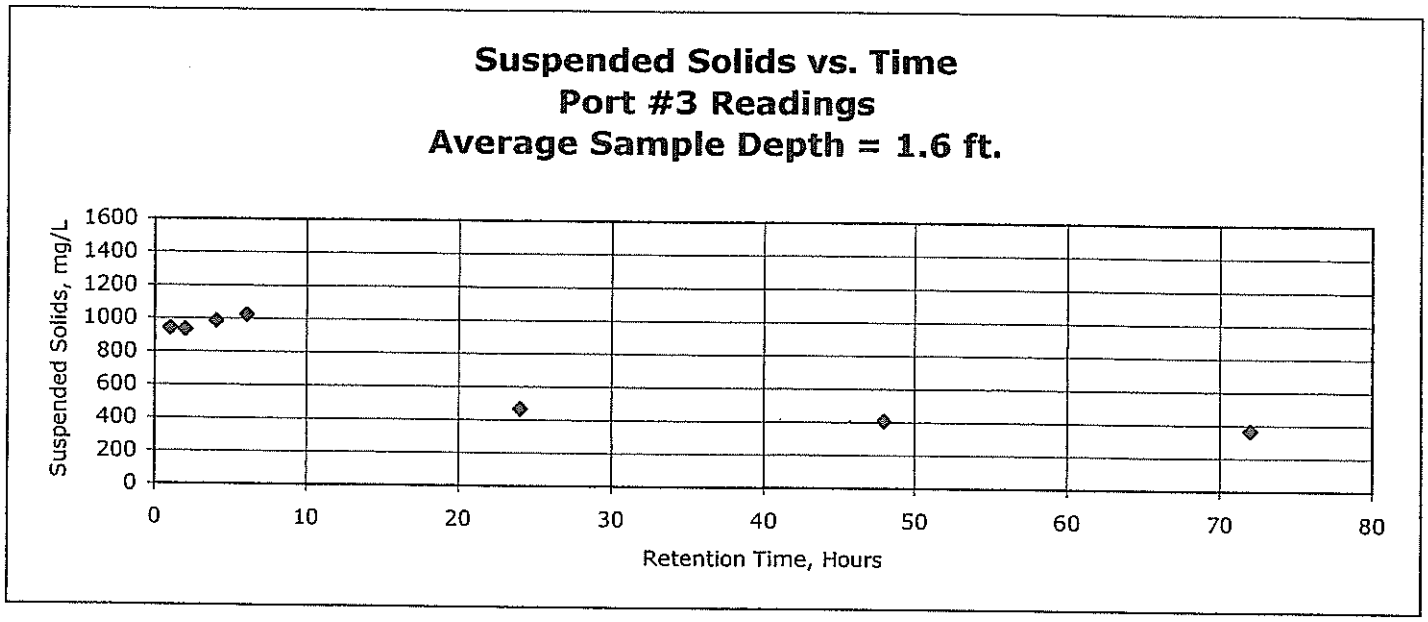
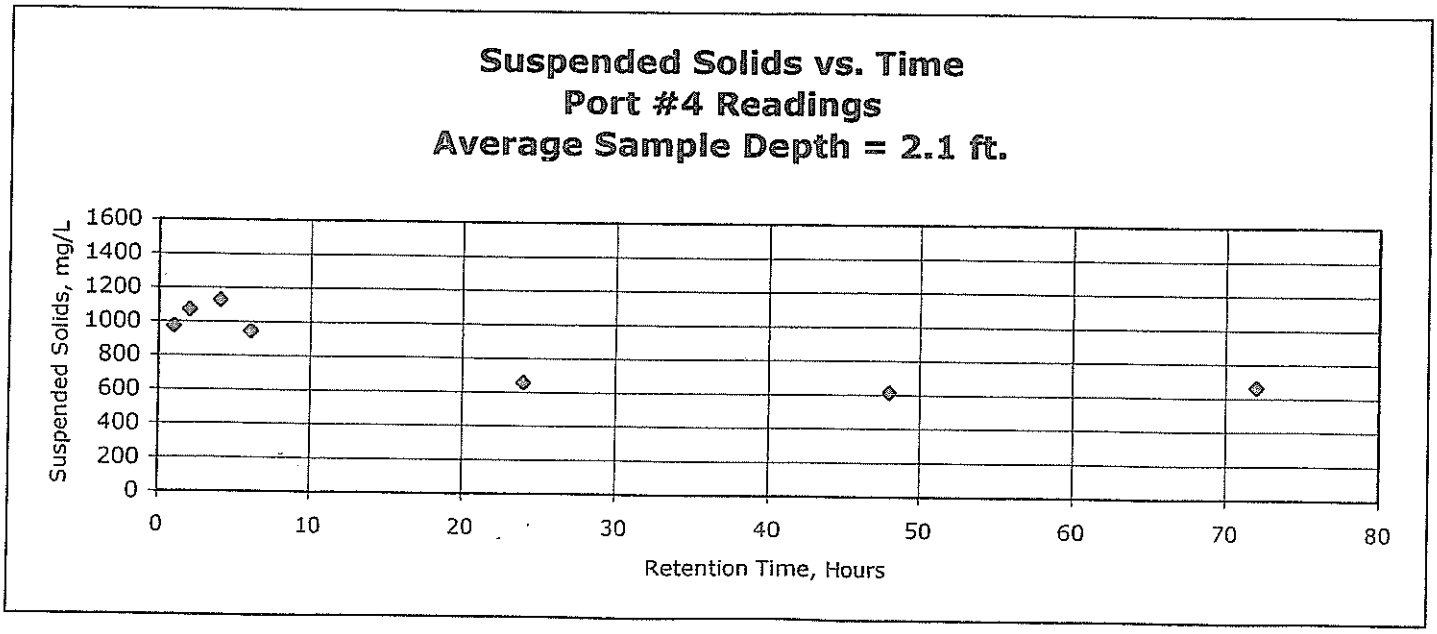
Column Settling Test





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Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
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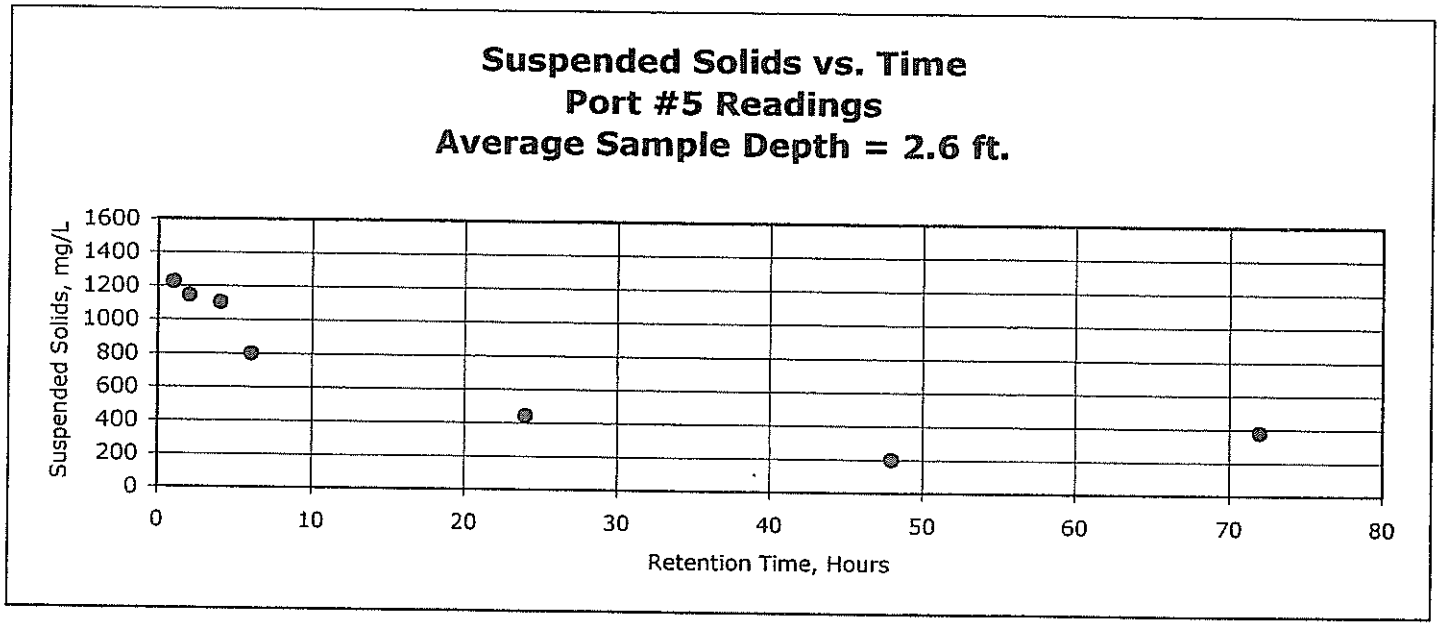
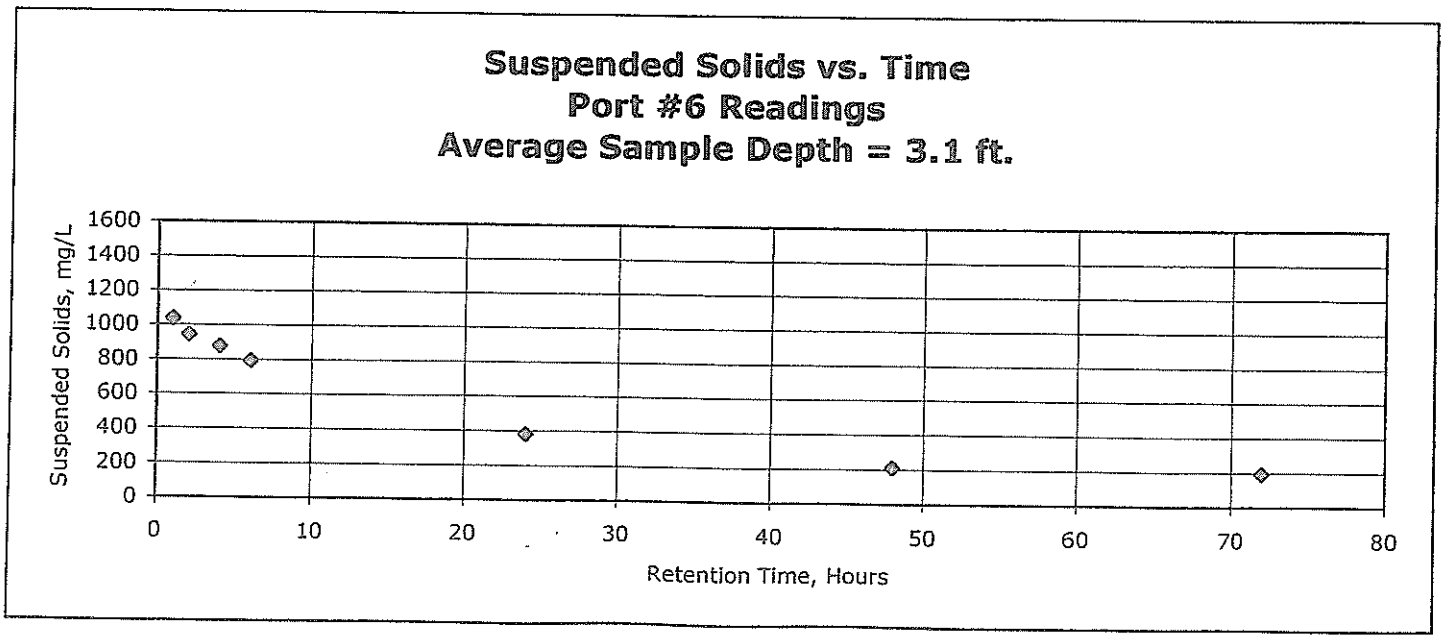
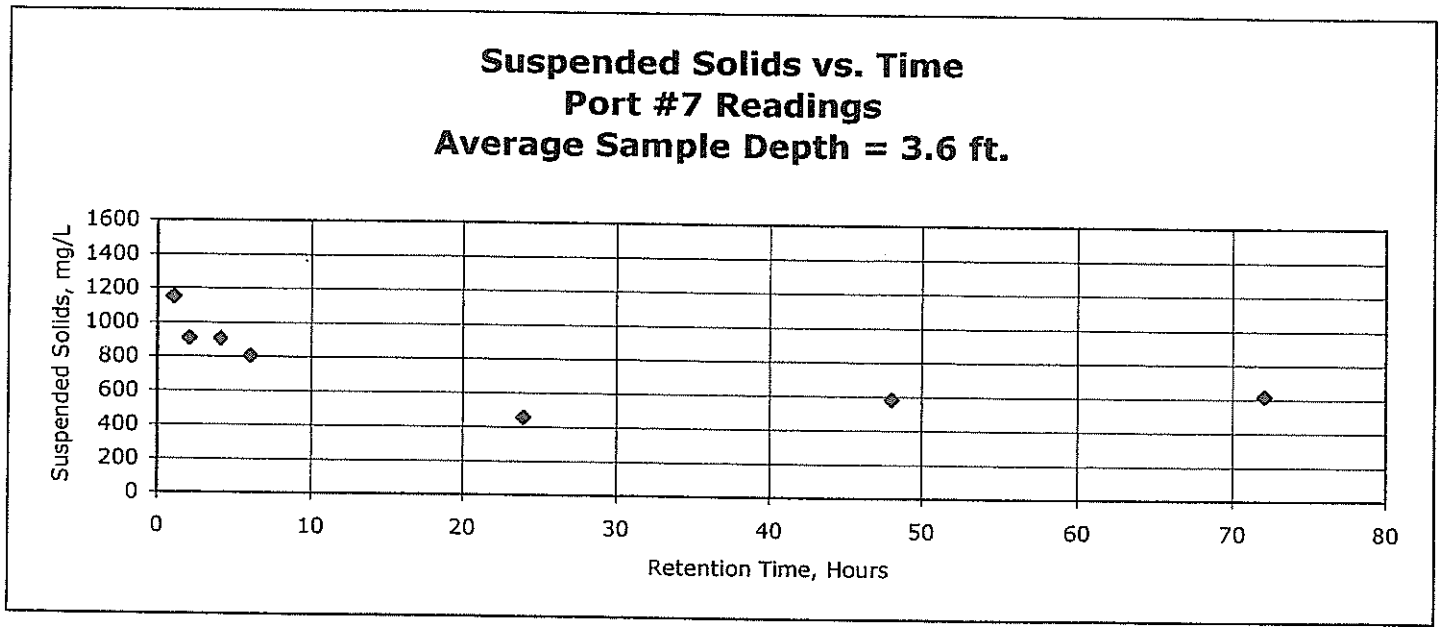




GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

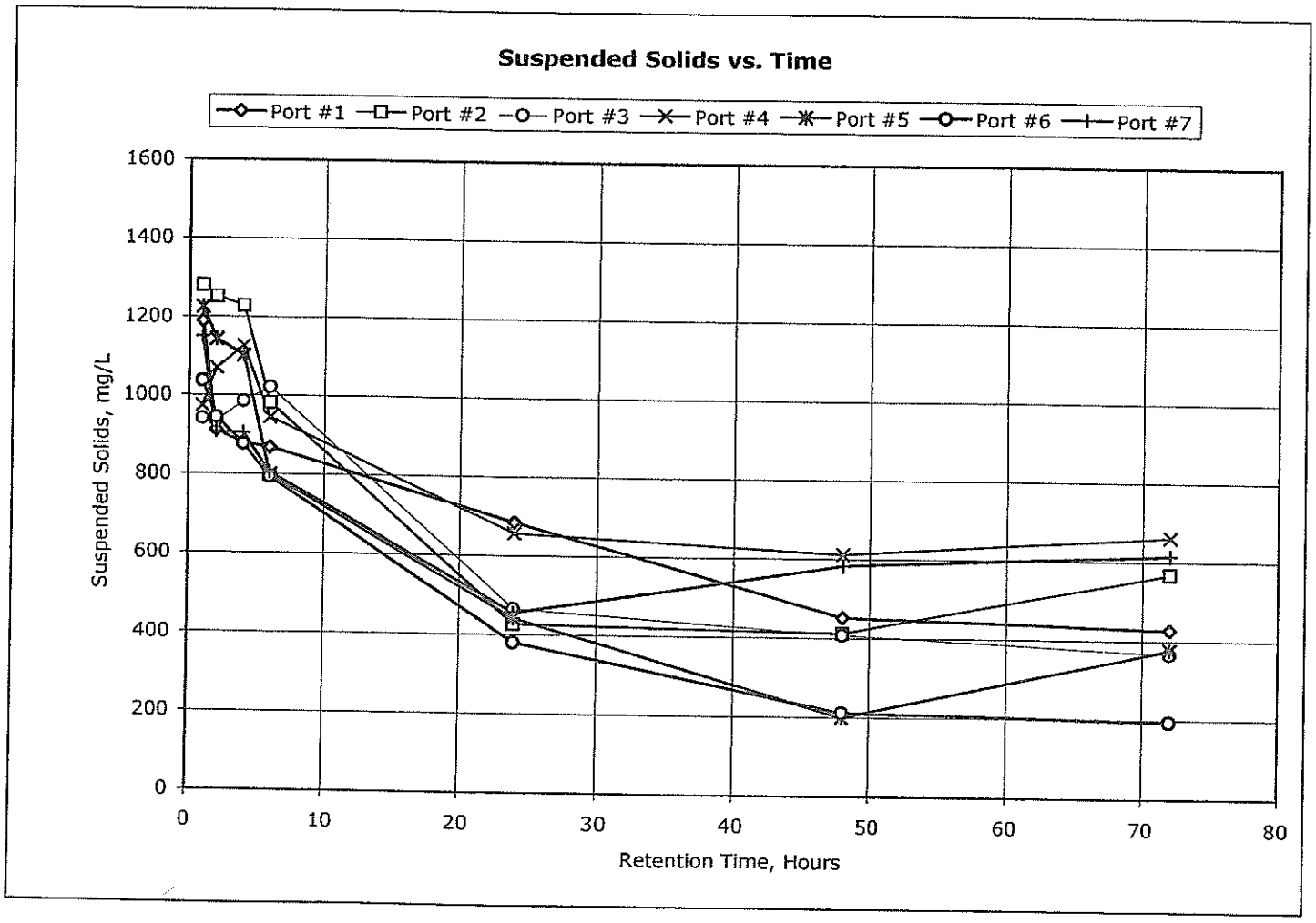
Column Settling Test



GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test

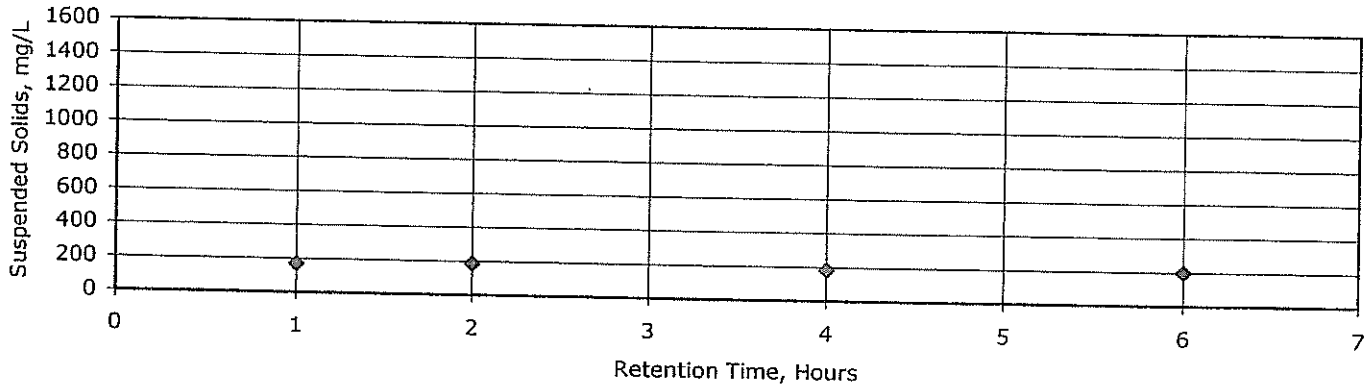


Port #	Average Sample Depth, ft
1	0.6
2	1.1
3	1.6
4	2.1
5	2.6
6	3.1
7	3.6

GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/29-03/31/05	Checked By:	jdt
Sample ID:	SAND SM		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

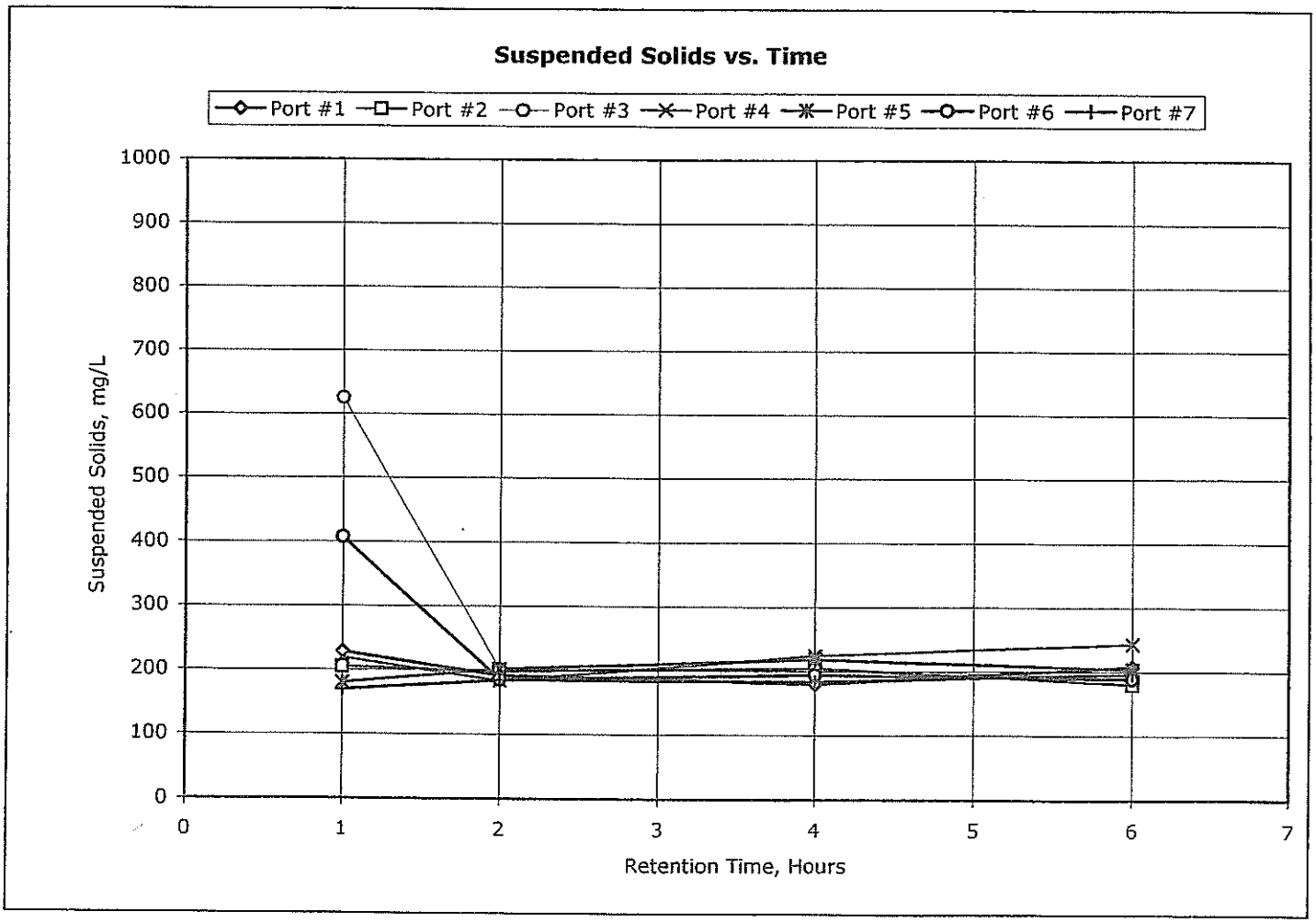
Column Settling Test



GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/29-03/31/05	Checked By:	jdt
Sample ID:	SAND SM		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test



Port #	Average Sample Depth, ft
1	0.7
2	1.2
3	1.7
4	2.2
5	2.7
6	3.2
7	3.7

GeoTesting
express

WARRANTY and LIABILITY

GeoTesting Express (GTX) warrants that all tests it performs are run in general accordance with the specified test procedures and accepted industry practice. GTX will correct or repeat any test that does not comply with this warranty. GTX has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

GTX may report engineering parameters that require us to interpret the test data. Such parameters are determined using accepted engineering procedures. However, GTX does not warrant that these parameters accurately reflect the true engineering properties of the *in situ* material. Responsibility for interpretation and use of the test data and these parameters for engineering and/or construction purposes rests solely with the user and not with GTX or any of its employees.

GTX's liability will be limited to correcting or repeating a test which fails our warranty. GTX's liability for damages to the Purchaser of testing services for any cause whatsoever shall be limited to the amount GTX received for the testing services. GTX will not be liable for any damages, or for any lost benefits or other consequential damages resulting from the use of these test results, even if GTX has been advised of the possibility of such damages. GTX will not be responsible for any liability of the Purchaser to any third party.

Commonly Used Symbols

A	pore pressure parameter for $\Delta\sigma_1 - \Delta\sigma_3$
B	pore pressure parameter for $\Delta\sigma_3$
CIU	isotropically consolidated undrained triaxial shear test
CR	compression ratio for one dimensional consolidation
C_c	coefficient of curvature, $(D_{30})^2 / (D_{10} \times D_{60})$
C_u	coefficient of uniformity, D_{60}/D_{10}
C_c	compression index for one dimensional consolidation
C_α	coefficient of secondary compression
c_v	coefficient of consolidation
c	cohesion intercept for total stresses
c'	cohesion intercept for effective stresses
D	diameter of specimen
D_{10}	diameter at which 10% of soil is finer
D_{15}	diameter at which 15% of soil is finer
D_{30}	diameter at which 30% of soil is finer
D_{50}	diameter at which 50% of soil is finer
D_{60}	diameter at which 60% of soil is finer
D_{85}	diameter at which 85% of soil is finer
d_{50}	displacement for 50% consolidation
d_{90}	displacement for 90% consolidation
d_{100}	displacement for 100% consolidation
E	Young's modulus
e	void ratio
e_c	void ratio after consolidation
e_o	initial void ratio
G	shear modulus
G_s	specific gravity of soil particles
H	height of specimen
PI	plasticity index
i	gradient
K_o	lateral stress ratio for one dimensional strain
k	permeability
LI	Liquidity Index
m_v	coefficient of volume change
n	porosity
PI	plasticity index
P_c	preconsolidation pressure
p	$(\sigma_1 + \sigma_3) / 2$, $(\sigma_v + \sigma_h) / 2$
p'	$(\sigma'_1 + \sigma'_3) / 2$, $(\sigma'_v + \sigma'_h) / 2$
p'_c	p' at consolidation
Q	quantity of flow
q	$(\sigma_1 - \sigma_3) / 2$
q_f	q at failure
q_o, q_i	initial q
q_c	q at consolidation
S	degree of saturation
SL	shrinkage limit
s_u	undrained shear strength
T	time factor for consolidation
T	temperature
t	time
U, UC	unconfined compression test
UU, Q	unconsolidated undrained triaxial test
u_a	pore gas pressure
u_e	excess pore water pressure
u, u_w	pore water pressure
V	total volume
V_g	volume of gas
V_s	volume of solids
V_v	volume of voids
V_w	volume of water
V_o	initial volume
v	velocity
W	total weight
W_s	weight of solids
W_w	weight of water
w	water content
w_c	water content at consolidation
w_f	final water content
w_l	liquid limit
w_n	natural water content
w_p	plastic limit
w_s	shrinkage limit
w_o, w_i	initial water content
α	slope of q_f versus p_f
α'	slope of q_f versus p_f'
γ_t	total unit weight
γ_d	dry unit weight
γ_s	unit weight of solids
γ_w	unit weight of water
ε	strain
ε_{vol}	volume strain
ε_h, ε_v	horizontal strain, vertical strain
μ	Poisson's ratio, also viscosity
σ	normal stress
σ'	effective normal stress
σ_c, σ'_c	consolidation stress in isotropic stress system
σ_h, σ'_h	horizontal normal stress
σ_v, σ'_v	vertical normal stress
σ_1	major principal stress
σ_2	intermediate principal stress
σ_3	minor principal stress
τ	shear stress
φ	friction angle based on total stresses
φ'	friction angle based on effective stresses
φ'_r	residual friction angle
φ_{ult}	φ for ultimate strength

REACH A

Sampling Logs

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N519516.07 E206686.48
BORING TYPE: Vibracore

BORING DATE: 11/04/92
START: 08:50
FINISH: 11:00
LOGGED: T.J. Koch
DATE: 11/04/92

ELEV. TOP OF HOLE: -39.5
ELEV. DATUM: Mean low water
WATER DEPTH: 39.5
SIGNATURE: [signature]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-39.5								
1									2nd day this hole Starting at 0.0' depth
2		0.0 - 19.5 Thickly laminated, greenish-grey, fine- to coarse-grained, micaceous, CLAYEY SAND interbedded with greenish-grey CLAY.				1	G		
3				1 (0.0 - 14.6)	6.2/14.6				Run 1 cored 0.0-14.6 recovered 6.2 Will jet to 6.0' before coring Run 2
4		Some beds of clay and sand are up to 0.4 ft. thick							
5									
6									Run 2 cored 6.0-19.5 (refusal) recovered 13.5'
7						1	G		
8				2 (6.0 - 19.5)	13.5/13.5				
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 19.5
TOTAL CORE RECOVERY: 100%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: AF-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N519516.07 E206686.48
BORING TYPE: Vibracore

BORING DATE: 11/04/92
START: 08:50
FINISH: 11:00
LOGGED: T.J. Koch
DATE: 11/04/92

ELEV. TOP OF HOLE: -39.5
ELEV. DATUM: Mean low water
WATER DEPTH: 39.5
SIGNATURE: TJ Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10									
11		0.25 ft. soft detrital layer w/ woody fragments at 11.0 ft							Geotech Samples (G) -- grab locations noted AF-1-G-2.5 AF-1-G-7.5 AF-1-G-12.5 AF-1-G-17.5
12						1	G		
13									Chem Sample (C) -- AF-1-C-0.0 composited over entire core
14									
15				2 (6.0 - 19.5)	13.5/13.5				
16									
17						1	G		
18									
19									
	59.0								refusal @ 19.5'
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 19.5
TOTAL CORE RECOVERY: 100%

RMC ENVIRONMENTAL SERVICES

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Lat.
Long. ≈ 11m SE of Plan

Log of Vibrocore No. DRV-2

SURFACE ELEVATION _____ LOCATION M Range

DEPTH, ft.	SAMPLES		DESCRIPTION	ELEVATION	
0			Water Depth ≈ 48' → No Recovery 0 - 14"		
			loose dark gray Fine Sand, silt and F-Cs Gravel		
5			Firm, Dark Gray, Clay		
10			Med. Dense, Dk gray, F-M Sand		
15			Med. Dense, Dk gray, F-M sand		
			No Recovery 19'00" → 20'0"		
20			Recovery 17'10" / 20' — 20' Bottom of Core		

Completion Depth 20' Feet Water Depth ≈ 48' Feet Date 8/23/95
Project Name Delaware Vibrocore Project Number R95500

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Hole No. DRV-2

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT
Delaware River Comprehensive Study

2. LOCATION (Coordinates or Station)
39° 51' 59.70" 75° 13' 10.29"

3. DRILLING AGENCY
Buchart-Horn, Inc.

4. HOLE NO. (As shown on drawing title and file number) DRV-2

5. NAME OF DRILLER Ocean Survey, Inc.

6. DIRECTION OF HOLE
VERTICAL INCLINED _____ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN NA

8. DEPTH DRILLED INTO ROCK NA

9. TOTAL DEPTH OF HOLE 20 ft. (Assumed)

10. SIZE AND TYPE OF BIT Vibracore

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)

12. MANUFACTURER'S DESIGNATION OF DRILL
NA

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN NA; DISTURBED ; UNDISTURBED

14. TOTAL NUMBER CORE BOXES NA

15. ELEVATION GROUND WATER NA

16. DATE HOLE STARTED 07/25/91 COMPLETED 07/25/91

17. ELEVATION TOP OF HOLE -47.9 ft. NGVD

18. TOTAL CORE RECOVERY FOR BORING 16 ft.

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	.4		Grey silt			
	.9		Brown medium to fine sand			
	1		Grey silt, sandy layers >.01 inch thick			Sample 1 - 2.3 ft. Sample includes sandy layers
	2					
	.3		Grey fine to medium sand			Sample 2.3 - 4.4 ft.
	3					
	4					
	.4		Black sandy gravelly silt			
	5					
	.3		Grey clay with sandy gravel at 5 to 5.4, gravel layer at 6.6 to 6.8, 7.4 to 7.5			Sample 4.4 - 8.2 ft.
	6					
	7					
	8					
	.2		Sandy gravel, coarse to fine gravel			
	.8		Grey medium to fine sand, coarse fine scattered gravel finer gravel downward			Sample 8.8 to 10. 8 ft.
	9					
	10					
	11					
	12					
	.4		Silty sand grading to silt with sandy layers, layer of sand at 13.4 to 13.5, clay to 16 ft.			Sample 12.4 - 16 ft. Sample of silt
	13					
	14					
	15					
	16					Bottom of recovery
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study HOLE NO. DRV-2

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Log of Vibrocore No. DRV-3

Lat.
Long.
4m NE of Plan

SURFACE ELEVATION _____ LOCATION Bend AF

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth ≈49'	
		Firm Dk gray, Clay	
5		Firm, Dk gray clay	
10		Firm, Dk gray Clay tr. Silt	
15		Med. Dense, Gray F-M Sand,	
		Med Dense, Gray F-Cs Sand and Gravel	
20'		20' Bottom of core	
		recovery 20'/20'	
		Note: apparent moderate penetration resistance	

Completion Depth 20' Feet Water Depth ≈ 49' Feet Date 8/23/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

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Hole No. DRV-3

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 50' 54.85" 75° 17' 27.10"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-3	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/26/91 : COMPLETED 07/26/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -47.2 ft. NGVD
9. TOTAL DEPTH OF HOLE 19.5 ft.	18. TOTAL CORE RECOVERY FOR BORING 19.5 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Black sandy med. to fine gravel SP-			
	1		Brown sandy coarse to fine gravel with coarse to fine sand GP			
	2					12.5 ft., 11 - 20 ft. - Penetration Sample .6 - 5 ft.
	3					
	4					
	5					
	6					
	7		Light brown coarse fine gravel, trace of sand GW			V
	8		Brown medium to fine sand SP			Sample 7.9 - 9.1 ft.
	9		Brown coarse to fine gravel with sand, some small cobbles			
	10		GW			
	11					
	12					Sample 11 - 15 ft.
	13					
	14					
	15					
	16		Brown sandy coarse to fine gravel with coarse to fine sand SP			Sample 15.8 - 19.5 ft.
	17					
	18					
	19					19.5 ft. bottom of recovery

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-3

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Log of Vibrocore No. DRV-4

Lat.
Long.
7m SE of Plan
SURFACE ELEVATION _____ LOCATION West Horshoe Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** ≈ 15'	
		Med Dense, Gray to DK gray F-Cs Sand little silt + F. Grav	
5		Med Dense, Brn and Gray F-Cs Sand little silt, Tr. F. Grav	
10		Med Dense, DK Gray Fine Sand + silt.	
15		Firm, DK Gray Clay and Silt	
		Dense, DK Gray, F-Cs Sand, tr Cs Sand, Silt + F. Grav	
20		Rec 20'/20' -20' Bot. of Core	
		Note: Location on plotted chart indicates location on edge of channel and also right on Bouyo Actual visual location is Approx. 100m S of bouy in shoal, however, GPS location matches plan	

Completion Depth 20' Feet Water Depth ≈ 15' Feet Date 8/23/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Log of Vibrocore No. DRV-4A

Lat.
Long.
250m NE of plan DRV-4 SURFACE ELEVATION _____ LOCATION West Horseshoe Range

DEPTH, ft.	SAMPLES		DESCRIPTION	ELEVATION	
0			**Water Depth** 48'		
			lt. Gray, loose, F-Cs sand tr F. Grav		
5			Tan to lt. Gray F-Cs sand tr F. Grav.		
10			Tan; Med Dense, F-Cs sand and F. Grav		
			Tan Med Dense, F-Cs sand and F. Grav.		
15			12'6" / 15' recovery — Bottom of core -15'		

Completion Depth 15' Feet Water Depth 48' Feet Date 8/25/95
Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

WCC... 2

Log of Vibrocore No. DRV-5

Lat.
Long. 35 m N of plan

SURFACE ELEVATION _____ LOCATION Bend G

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** ≈14'	
		Med Dense, dk. gray F-Sand + Silt	
5		Med Dense DK gray F Sand + Silt	
10		Mod. Dense DK gray F. Sand + Silt	
15		Med. Dense, Gray to DK gray F-M sand, little silt	
		Med Dense, DK gray F sand + Silt	
20		Rec 18'/20' -20' Bot. of Core	
		Note: Apparent Moderate penetration resistance	

Completion Depth 20' Feet Water Depth ≈14' Feet Date 8/24/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.
13M NofPlan

Log of Vibrocore No. DRV-6

SURFACE ELEVATION _____ LOCATION Mifflin Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 44'	
		Loose, gray F-M sand and silt.	
5		Med Dense, Gray F sand	
10		Firm. Dk Gray Clay	
15		Firm Dark Gray Clay tr silt	
		Firm Dark Gray Clay	
20		-20' Bot. of Core	
		Recovery 18'/20'	
		Note: Apparent Moderate penetration resistance	

Completion Depth 20' Feet Water Depth 44' Feet Date 8/24/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.
300m N of plan

Log of Vibrocore No. DRV-7

SURFACE ELEVATION _____ LOCATION Bend H

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 25'	
		very soft, Dk gray clay.	
		Note: Previous try at plan coordinates recovered a tan F-M sand from 0-15' bottom in apparent tan decomp sandstone (see note below	
5		Black, Vs soft organicy clay	
10		Black, V. soft, organicy, clay	
15		Black, V. soft, organicy, clay	
		Black, V. soft, organicy clay	
20'		Recovery 17'/20' -20' Bot. of core	
		Note: Sample taken about 300m N of Plan (≈100m N of Bay) Previous try was at plan coordinates, however, in mid of channel. Plot and location description indicated location was in bend	

Completion Depth 20' Feet Water Depth 25' Feet Date 8/25/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.

Log of Vibrocore No. DRV-8

3m Sofplan

SURFACE ELEVATION _____ LOCATION Bend F

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 43'	
		Dark gray; soft clay, silt and F-M Sand	
5		Dark gray, soft, clay, silt + F-M sand	
10		DK gray soft clay	
15		DK gray soft clay	
		DK gray soft clay	
20		Rec 18'8" / 20' -20' Bot. of core	
		- Note: observed Easy to moderate penetration resistance.	

Completion Depth 20' Feet Water Depth 43' Feet Date 8/26/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.
10m E of plan

Log of Vibrocore No. DRV-9

SURFACE ELEVATION _____ LOCATION Tinicum Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 50'	
		Brn + lt. Gray F-CS sand and F-Grav tr Cs Grav (Dense)	
		- Note Apperant 30' of penet. (Penetrometer shows 17')	
		- Penetration appeared hard	
		- Trouble retrieving sample from casing	
		-use Jet pump + Cum-a-long	
5		Brn + lt. Gray F-cs sand and F-Grav tr Cs Grav. (Dense)	
10		Brn + lt Gray F-Cs sand + F-Grav, tr Cs Grav. (Dense)	
15		Brn + lt. Gray F-Cs sand + F-Grav, tr Cs Grav. (Dense)	
		Brn + lt. Gray F-Cs sand + F-Grav, tr Cs Grav (Dense)	
20		rec 19/20' -20' Bot of core	

Completion Depth 20' Feet Water Depth 50 Feet Date 8/26/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

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BORING/TEST PIT LOG

PROJECT Delaware River - Phila to Sea		FIELD BOOK 73	PAGE 8
Aquifer Studies		BY R.L	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSR-16

LOCATION Sta: 76+210 500' W of ℄

DATE MADE 4-1-65 BY CofE

PLANT USED DB#34

Water 46°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
						Water - 47.8
47						
50	30 Minutes 3/4 in. clam shell bucket	1			SM	Brn & dk-gry silty SAND, some small gravel
					OL	Dk-gry silty org CLAY, plastic, interbedded w/thin layers of fine sand
55		2				
60		3				same but more sandy layers
						Bottom of TP - 60.2'

NADP FORM 1104 (3-19)

DSR-16

333

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River - Philo to Sea	73	8
	BY R.L	DATE 4-3-65

☐ BORING ☒ TEST PIT — NO. DSP-17

LOCATION: Sta: 68+880 290' E of ℄

DATE MADE: 4-2-65 — BY: CoFE

PLANT USED: DB #34

Water 46°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
						Water - 41.6'
45 Minutes	3/4 cy clamshell bucket	1			OL SM	Gry silty fine SAND, culm, and layers of org. clayey SILT (41.6'-48.0')
		2			OL	Gry silty org. CLAY, fairly stiff, interbedded w/ lt. gry v. fine SAND (very thin layers) Ind. layers of CLAY ½" thick. (48.0'-51.4
		3			SP	Sand, fine to coarse, tr of gravel (51.4 - 59.0')
		4			ML Pt	Brn sandy SILT w/some peat + rotten wood, soft

NADP FORM 1101 (3-10)

DSP17

BORING/TEST PIT LOG

PROJECT Delaware River - Phila to Sea	FIELD BOOK 73	PAGE 9
Aquifer Studies	BY R.L.	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP19

LOCATION Sta: 50+230 310' W of ℄

DATE MADE 4-2-65 BY CoRE

PLANT USED DB#34

Water 46°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
						Water -47.8'
30 Minutes		1			OL	Gry org. silty CLAY, plastic, thinly interbedded w/ gry fine sand. Fairly firm (47.8'-49.3')
		2			GP	Gravel, sandy up to 1½" subangular to subrounded, loose (49.3'-54.0')
		3			SP	Sand fine to v. coarse w/ some pea gravel

45 — 50 — 55

Bottom of TP - 54.8'

517822 N
1778225 E

HADP FORM 1104 (3-19)

DSP19

335

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River Phila to Sea	73	10
Aquifer Studies.	BY R.L	DATE 4-6-65

☐ BORING ☒ TEST PIT NO. DSP20

LOCATION Sta 41+890 290' E of ℄

DATE MADE 4-3-65 BY CoFE

PLANT USED Derrickboat #37

Water 46°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
0						
40						Water -43.5
45	60 Minutes	1			QL & SM	Very thin veneer of brn f-med SAND underlain by interbedded org clayey org. SILT & v. fine silty SAND. (layers same thickness) (43.5-51.6)
50	3/4 cy clamshell bucket					
55		2			SM	Silty v. fine SAND, compact, interbedded w/ some dk-gry org. SILT (Predominantly silty SAND) (51.6'-60.1')
60		3				Bottom of TP - 60.1'

5175,00 N
206400 E

NADP FORM 1104 (3-19)

DSP20

RECORD OF BOREHOLE: I-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N506293.80 E173051.98
BORING TYPE: Vibracore

BORING DATE: 11/04/92
START: 15:53
FINISH: 17:25
LOGGED: T.J. Koch
DATE: 11/04/92

ELEV. TOP OF HOLE: -30.5
ELEV. DATUM: Mean low water
WATER DEPTH: 30.5
SIGNATURE: Thy. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-30.5	0.0 - 4.1 med. interbeds of grey to greenish-grey, mod. sorted,fine- to coarse grained SAND		1 (0.0 - 9.0)	5.9/9.0	2	G,C		Geotech Samples (G) -- grab locations noted in order: I-1-G-0.0 I-1-G-4.1 I-1-G-5.1 I-1-G-11.65 I-1-G-9.4
2									
3									
4		4.1 - 5.1 grey CLAY w/ v. thin silty laminations				2	G,C		
5		5.1 - 5.9 grey, med- to coarse-grained, mod. sorted SAND				2	G,C		Chem Samples (C) -- locations noted: I-1-C-0.0 I-1-C-4.1 I-1-C-5.1 I-1-C-9.4
6		(from bit sample -- core not recovered here) 5.9 - 9.0 SAND and GRAVEL gravel is rounded and rectangular, up to 4 cm diam.		2 (5.5 - 8.5)	2.0/3.0				
9		9.0 - 9.4 sandy SILT/silty SAND							3rd Run jetted to 8.0' penetration to 20.0' no recovery
0		greenish grey silty CLAY w/ few, v. thin silty laminations							

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 19.6
TOTAL CORE RECOVERY: 82.7%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: I-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N506293.80 E173051.98
BORING TYPE: Vibracore

BORING DATE: 11/04/92
START: 15:53
FINISH: 17:25
LOGGED: T.J. Koch
DATE: 11/04/92

ELEV. TOP OF HOLE: -30.5
ELEV. DATUM: Mean low water
WATER DEPTH: 30.5
SIGNATURE: Thy. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10									
11									
12		11.65 - 12.05 v. coarse SAND and GRAVEL, up to 5 cm diam., well rounded				1	G		
		12.05 - 17.3 greenish grey silty CLAY, as above							
13									
14									
15				4 (10.0 - 19.6)	8.3/9.6	2	G,C		
16									
17									
		no recovery past 17.3'							
18									
19									
	47.8								refusal @ 19.6'
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 19.6
TOTAL CORE RECOVERY: 82.7%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: I-2 PAGE 1 OF 2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N506067.87 E171587.63
BORING TYPE: Vibracore

BORING DATE: 11/04/92
START: 13:08
FINISH: 14:45
LOGGED: T.J. Koch
DATE: 11/04/92

ELEV. TOP OF HOLE: ~34.0
ELEV. DATUM: Mean low water
WATER DEPTH: 34.0
SIGNATURE: TJ Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	34.0	0.0 - 0.35 light brown, med- to coarse-grained SAND							
		0.35 - 7.90 greenish grey, thinly laminated silty CLAY and silty, v fine- to fine-grained SAND; some coarse pebbles up to 1 cm diam.		1 (0.0 - 11.6)	11.5/11.6	1	C		
3						1	G		Geotech Samples (G) -- grab locations noted in order: I-2-G-0.35 I-2-G-7.90 I-2-G-9.85
6									Chem Samples (C) -- locations noted: I-2-C-0.35 I-2-C-7.90 I-2-C-9.85
9		7.90 - 9.85 greenish grey clayey SILT				2	G,C		
10		(see next page)							

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 100.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: I-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N506067.87 E171587.63
BORING TYPE: Vibracore

BORING DATE: 11/04/92
START: 13:08
FINISH: 14:45
LOGGED: T.J. Koch
DATE: 11/04/92

ELEV. TOP OF HOLE: -34.0
ELEV. DATUM: Mean low water
WATER DEPTH: 34.0
SIGNATURE: Thy. Koch

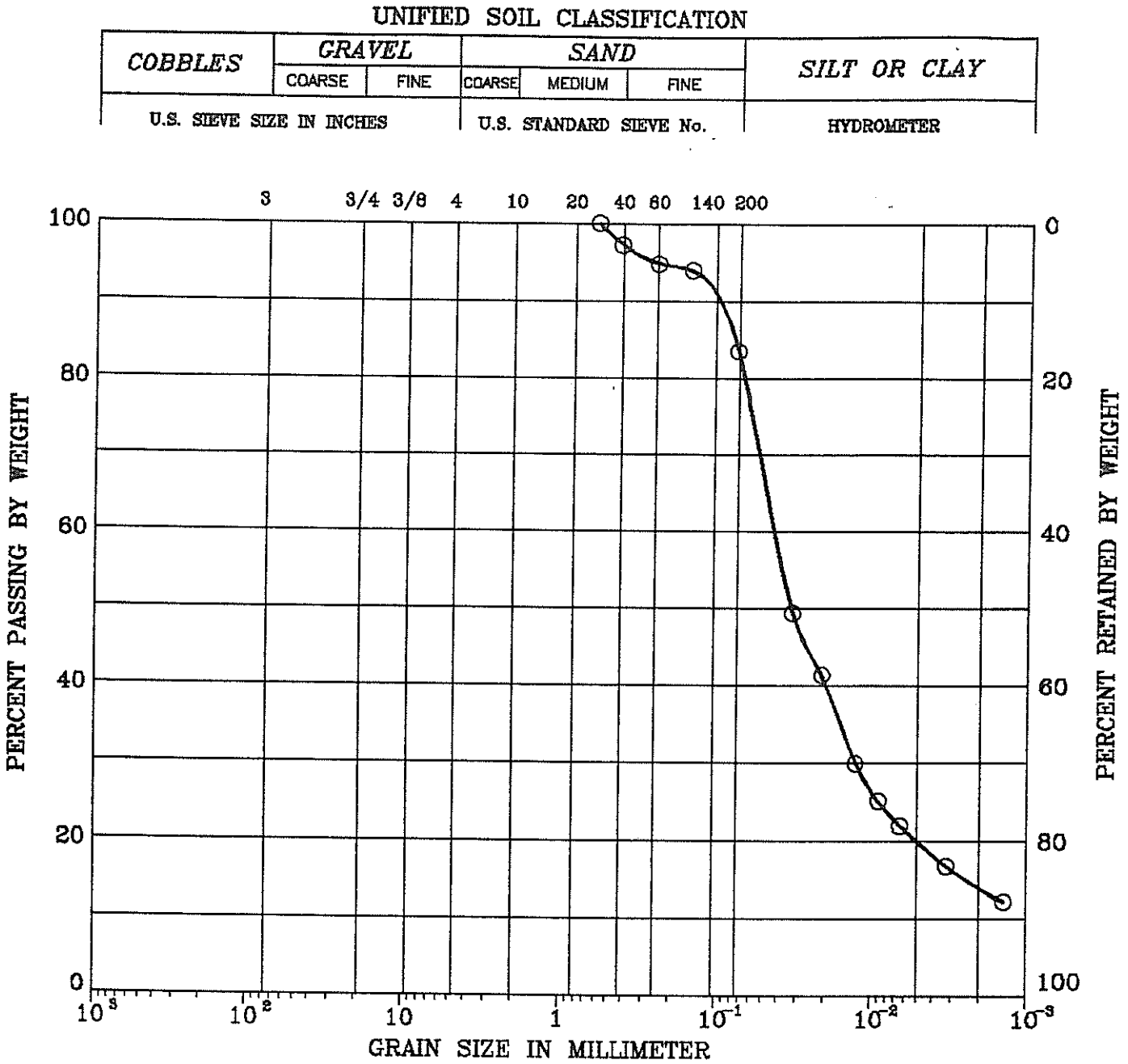
DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		9.85 - 20.0 greenish gey CLAY, slightly micaceous, w/ few, v. thin, silty laminations		1 (0.0 - 11.6)					
11									
12									
13						2	G,C		
14									
15				2 (11.0 - 20.0)	10.0/10.0				
16									
17									
18									
19									
20	54.0								

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 100.0%

RMC ENVIRONMENTAL SERVICES

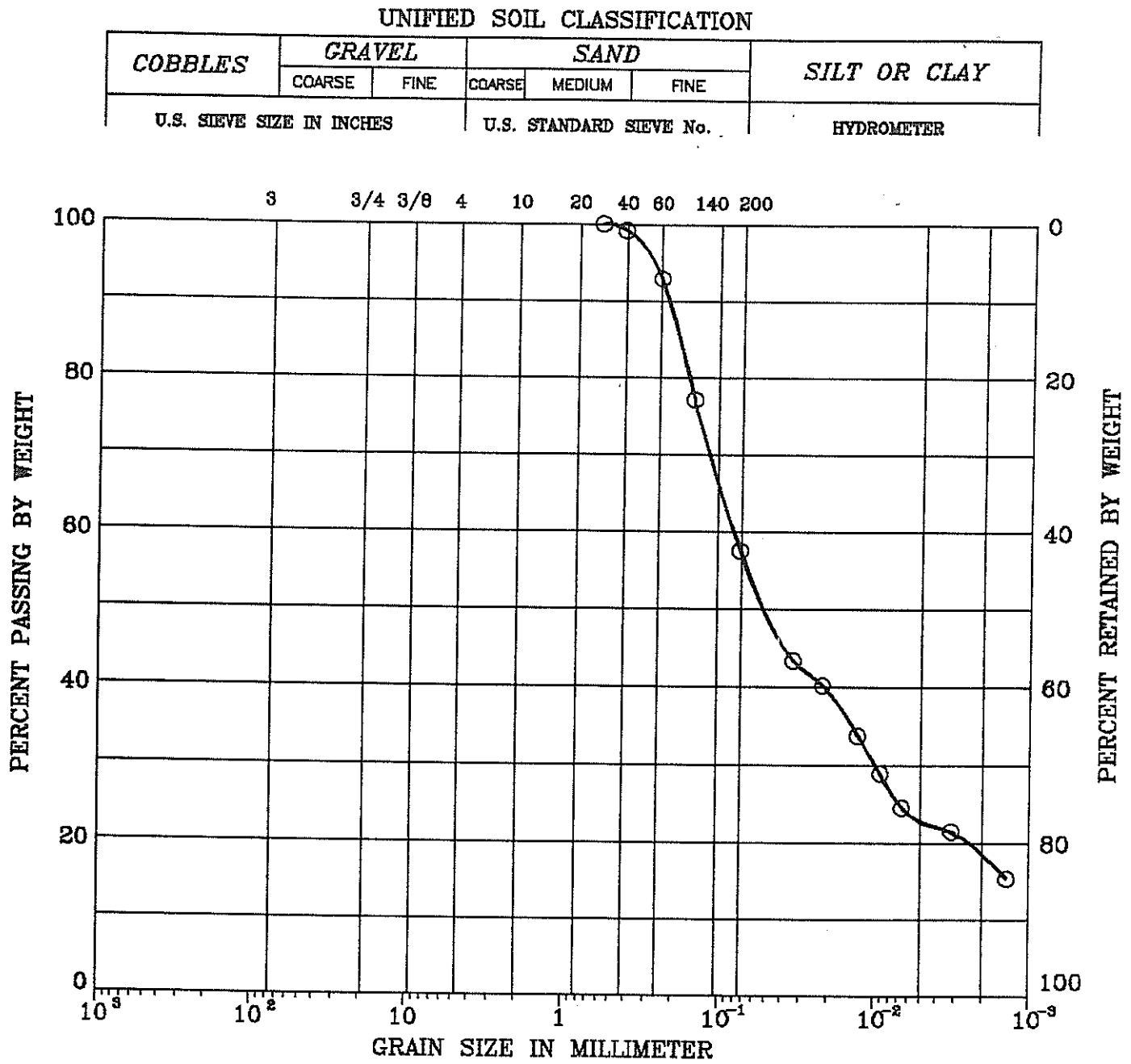
Gradation Curves & Sieve Analysis



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	AF1G-2.5		42	13	DARK GRAY ORGANIC SILT (OL)

Remark :

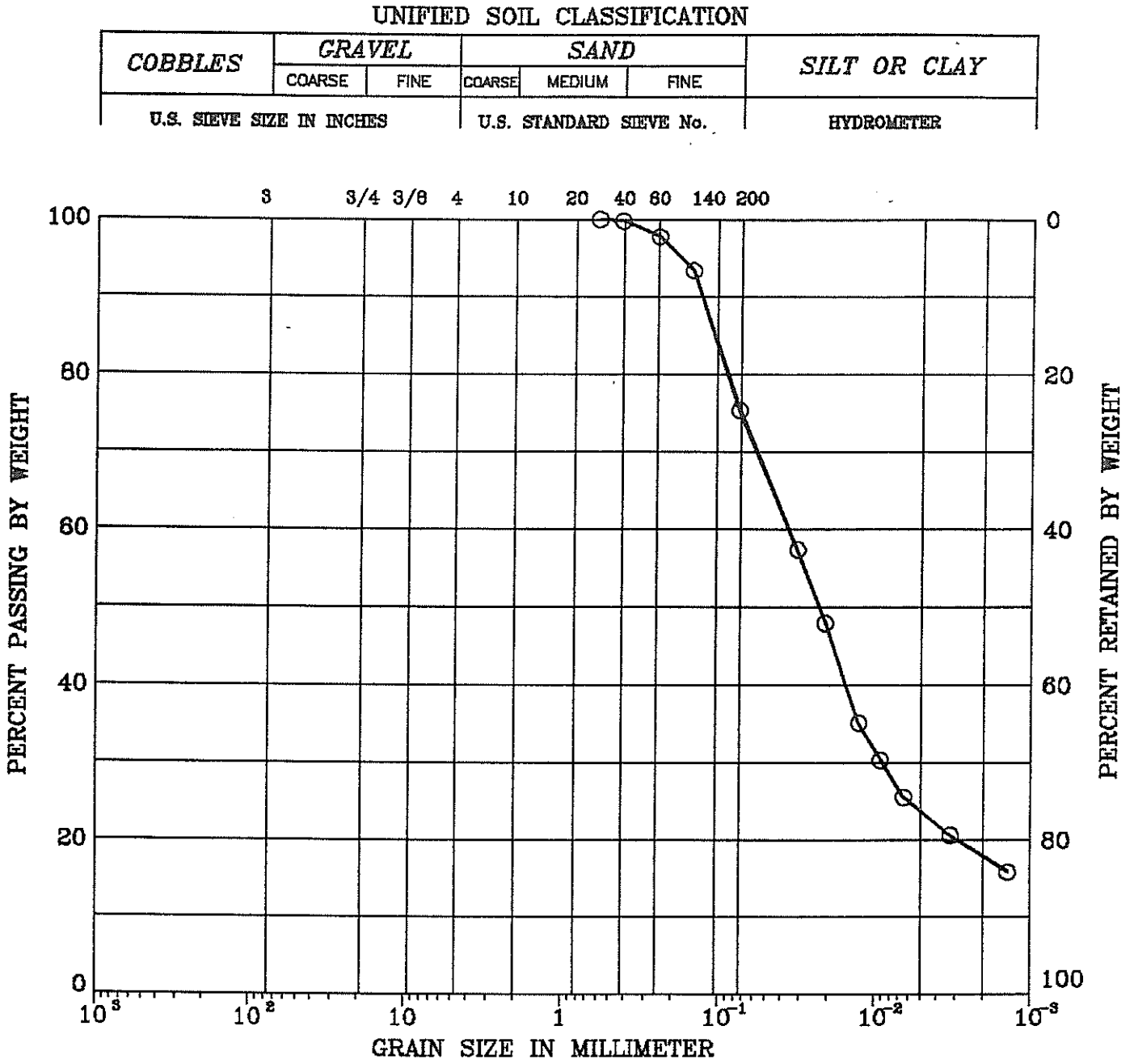
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	AF1G-7.5		34	12	GRAY ORGANIC CLAY (OL)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



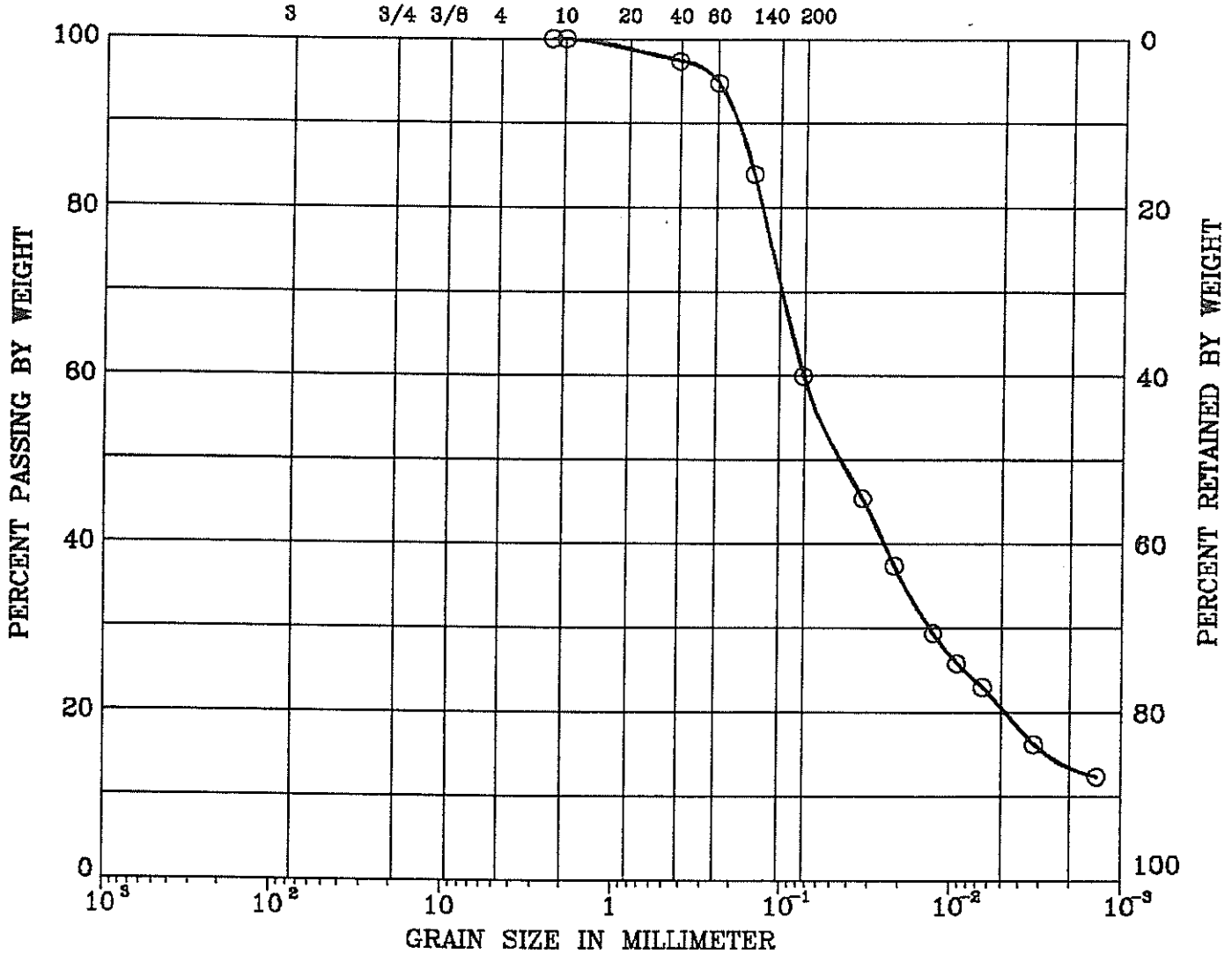
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	AF1G12.5		51	20	GRAY ORGANIC SILT (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

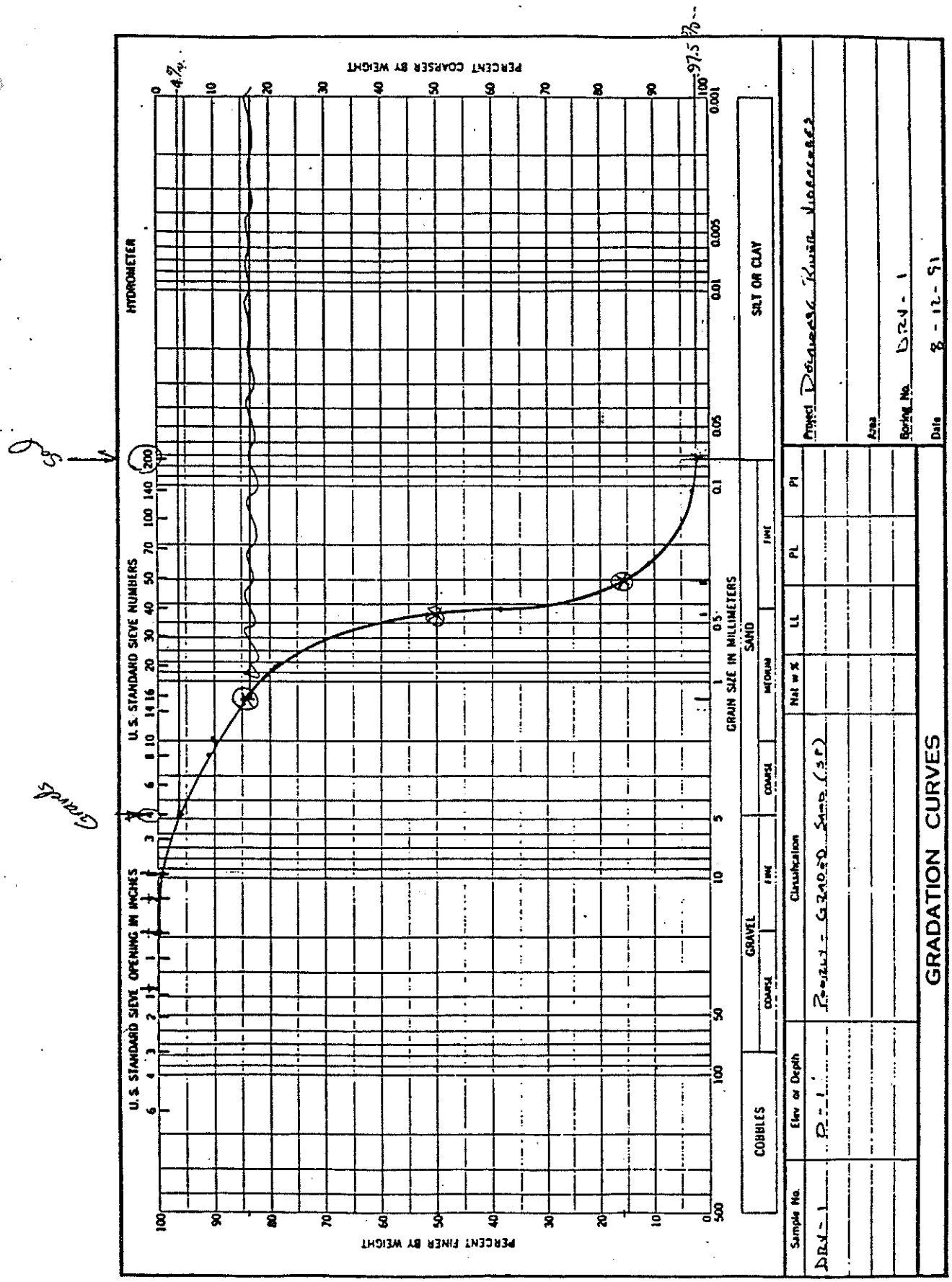
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER

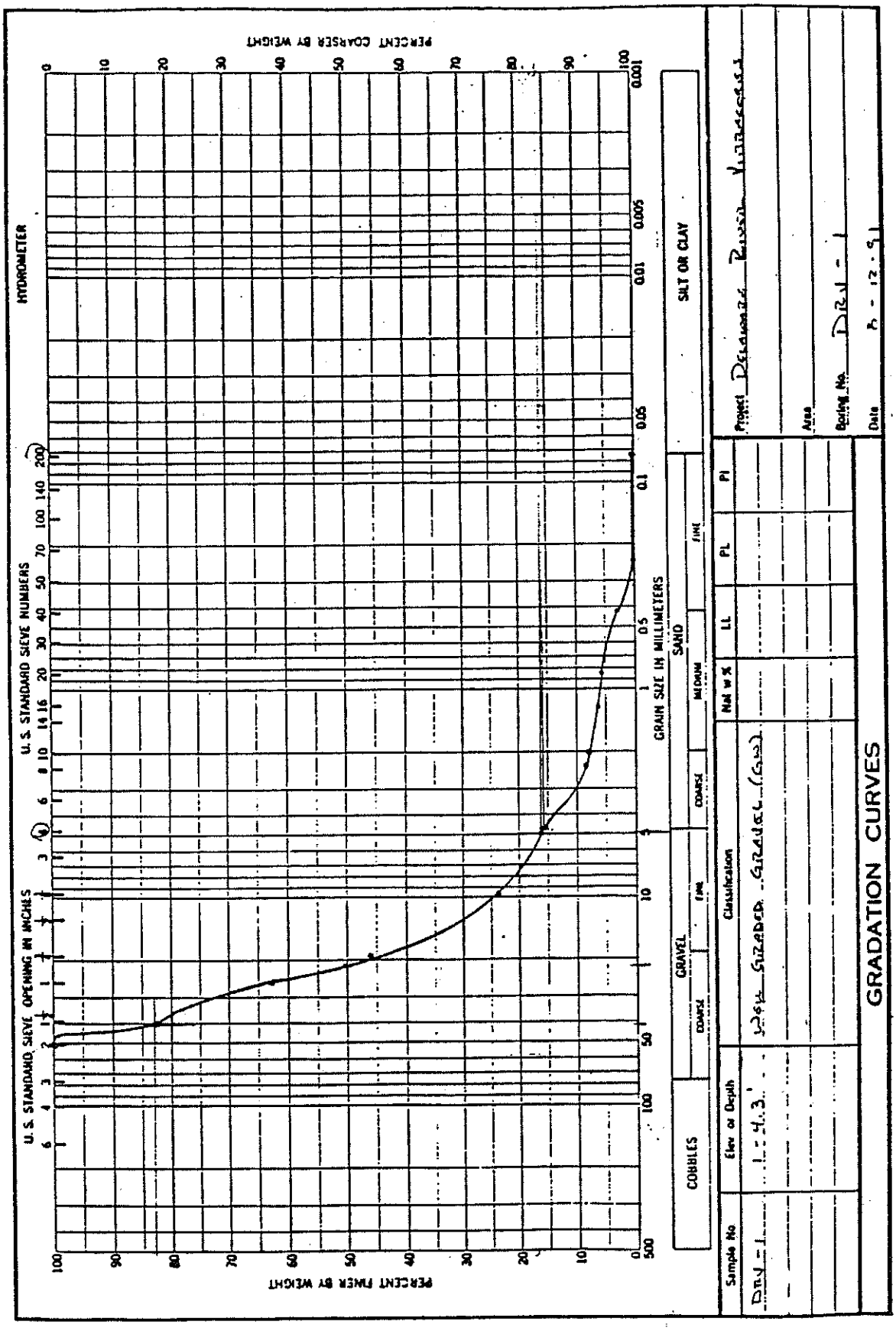


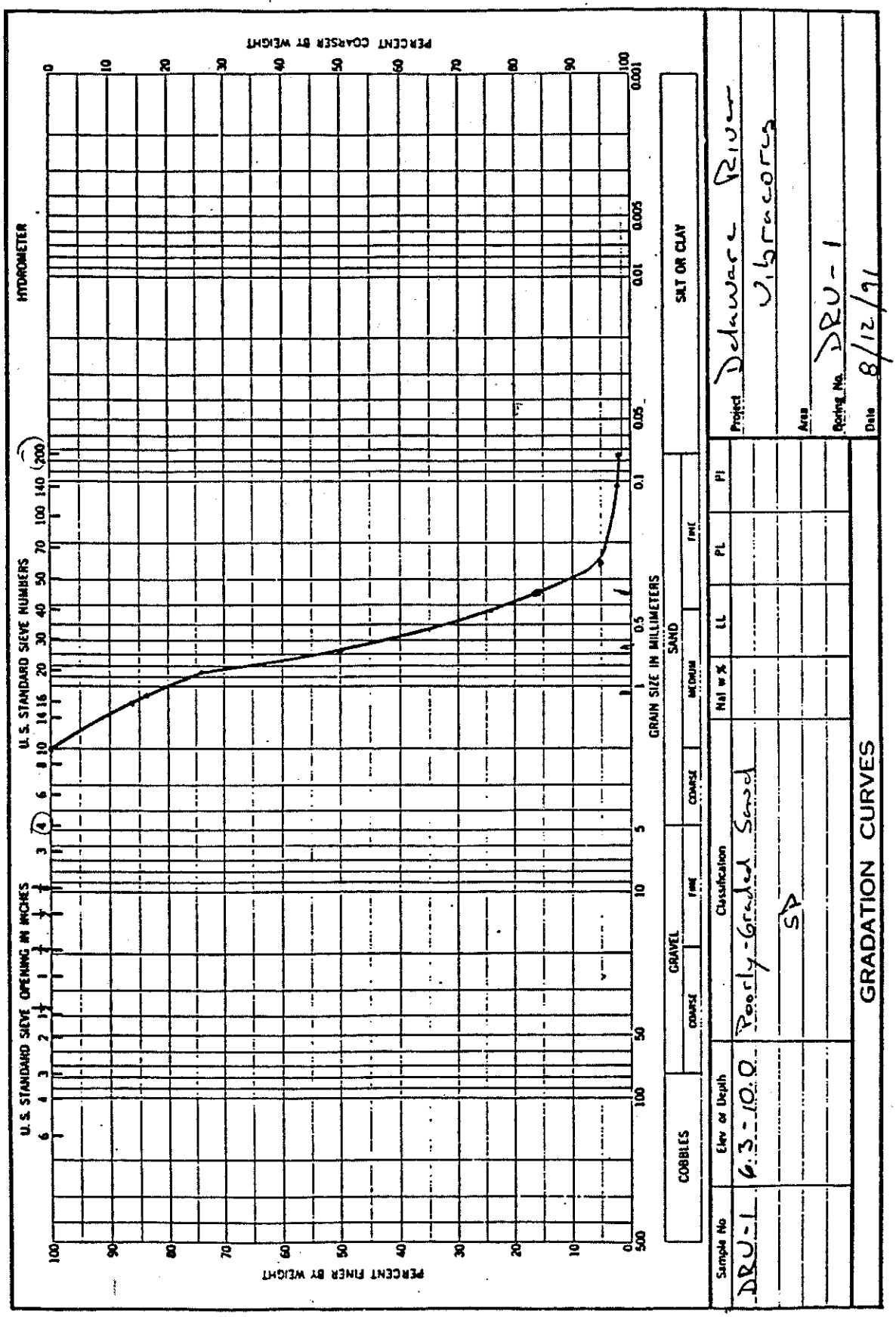
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	AF1G17.5		32	9	DARK GRAY ORGANIC CLAY (OL)

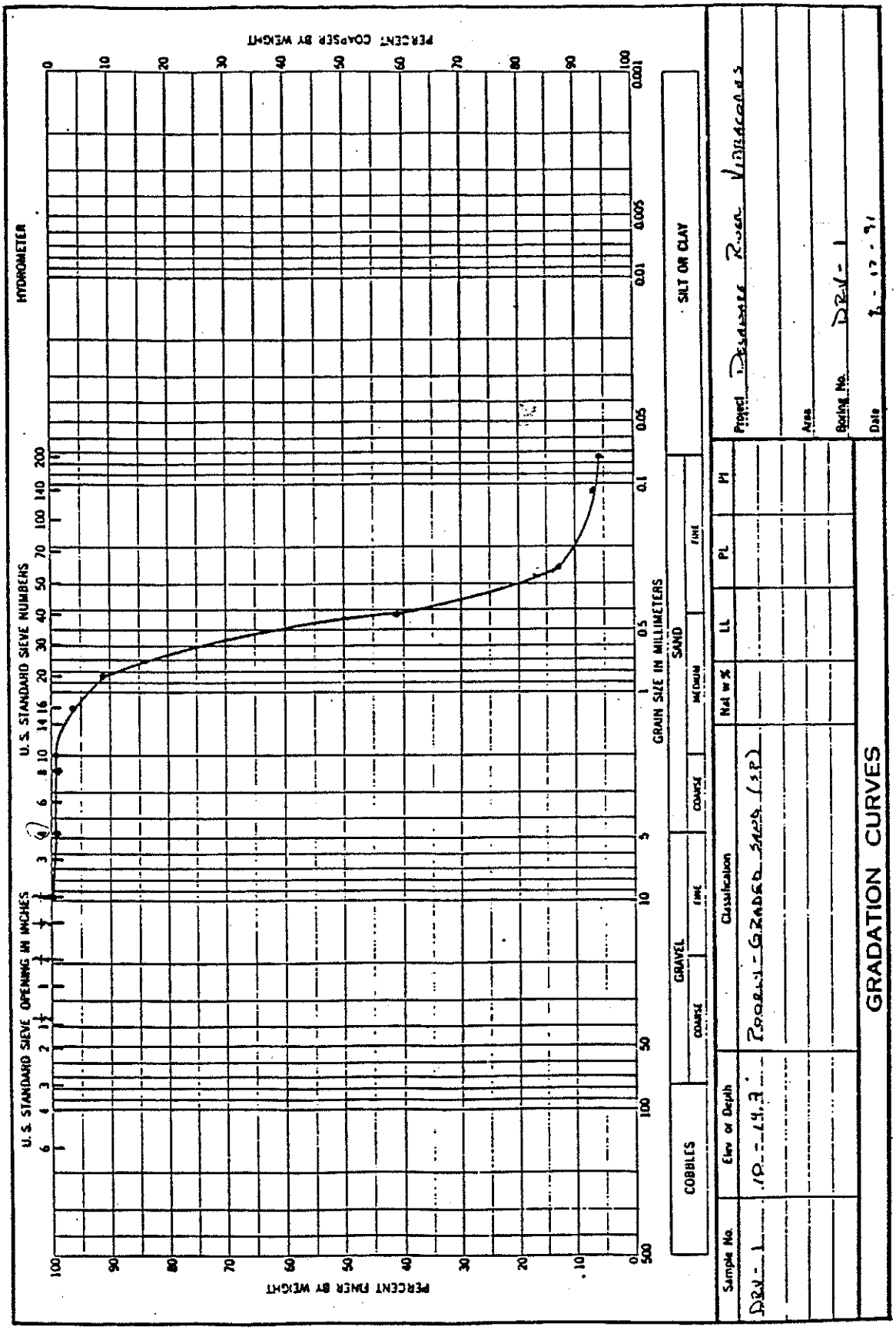
Remark :

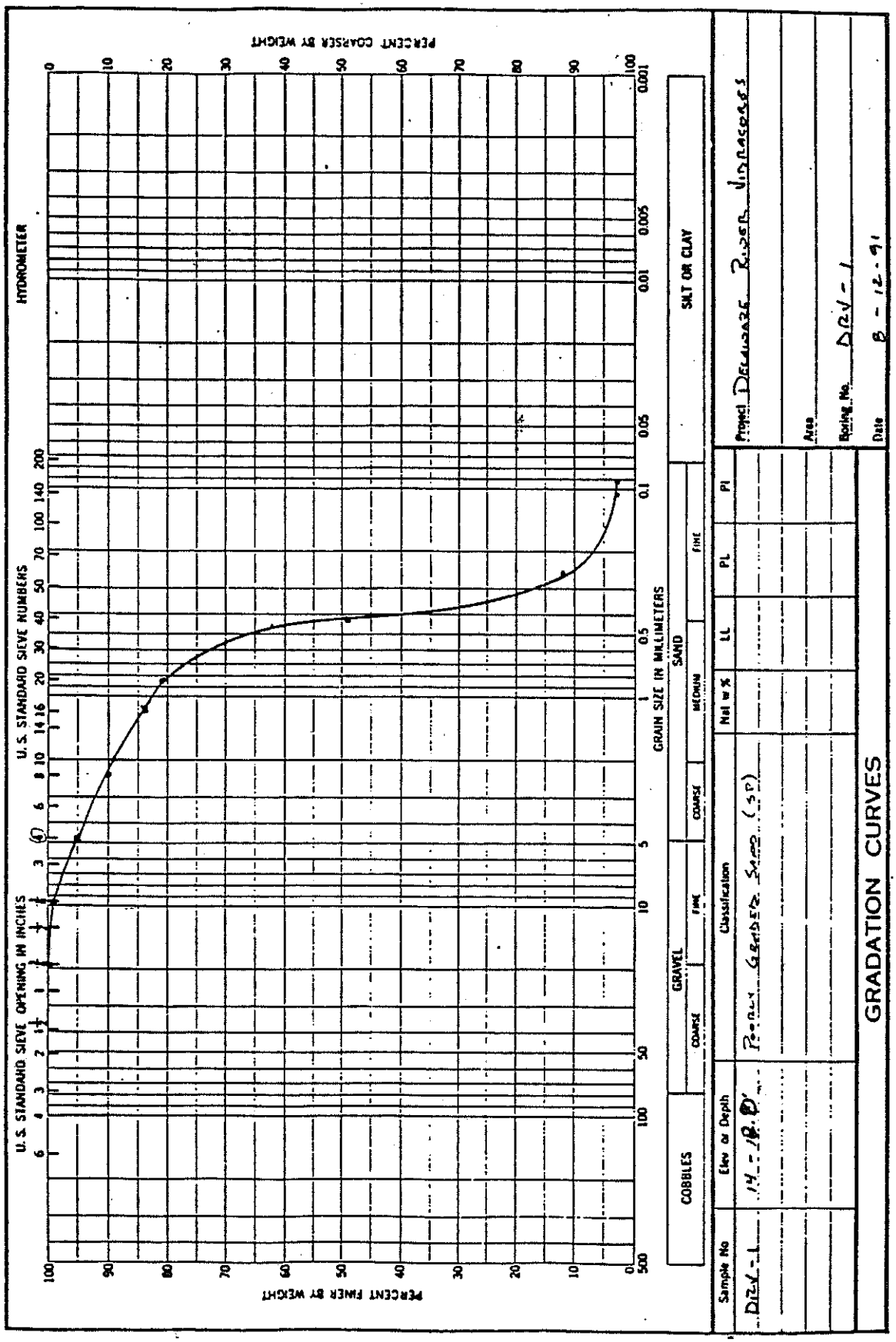
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

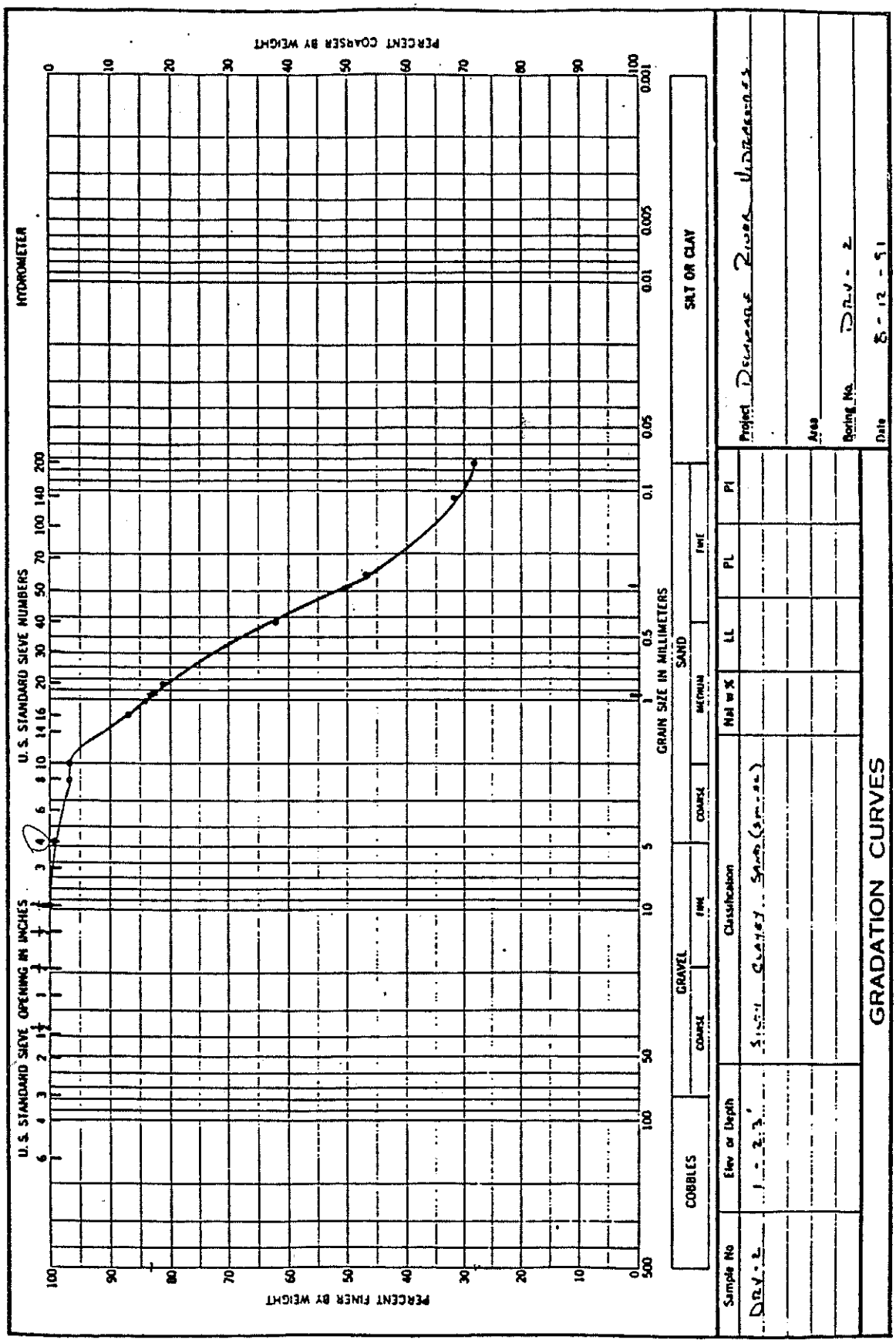

HYDROMETER
U.S. STANDARD SIEVE NUMBERS
U.S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087

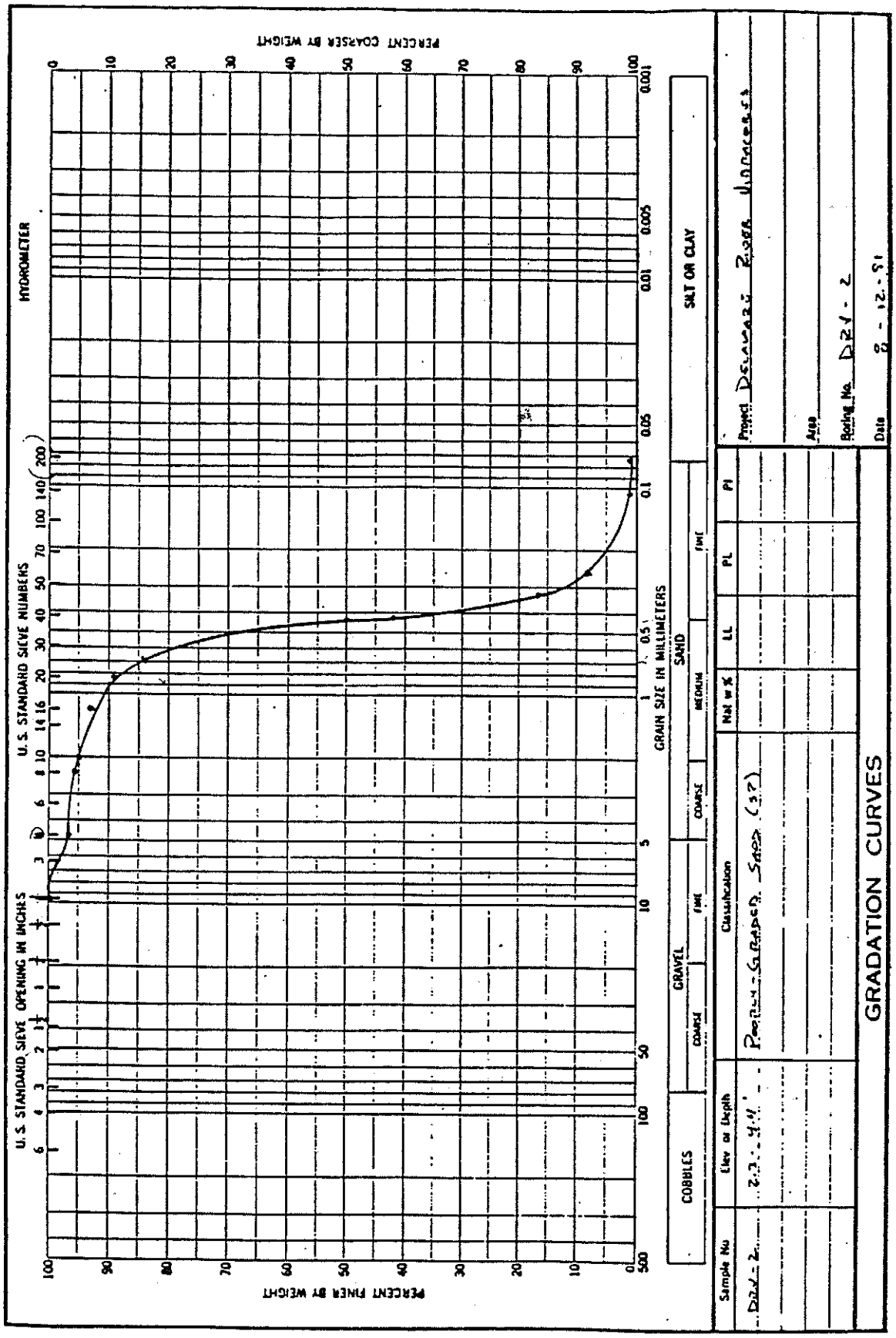

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087

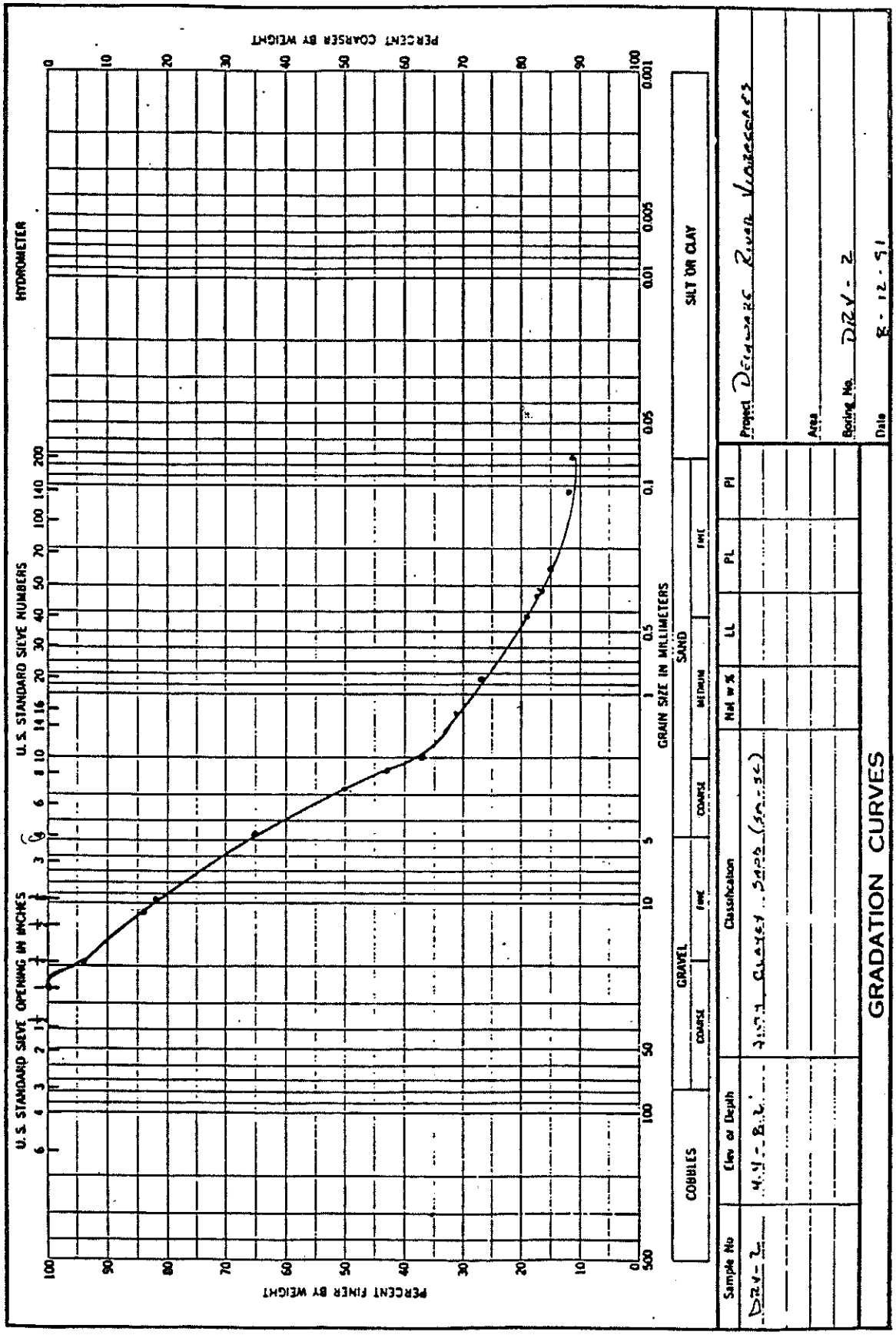

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Ubrecorus
Boring No. DRU-1
Date 8/12/91
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-1
6.3-10.0
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 83 2087

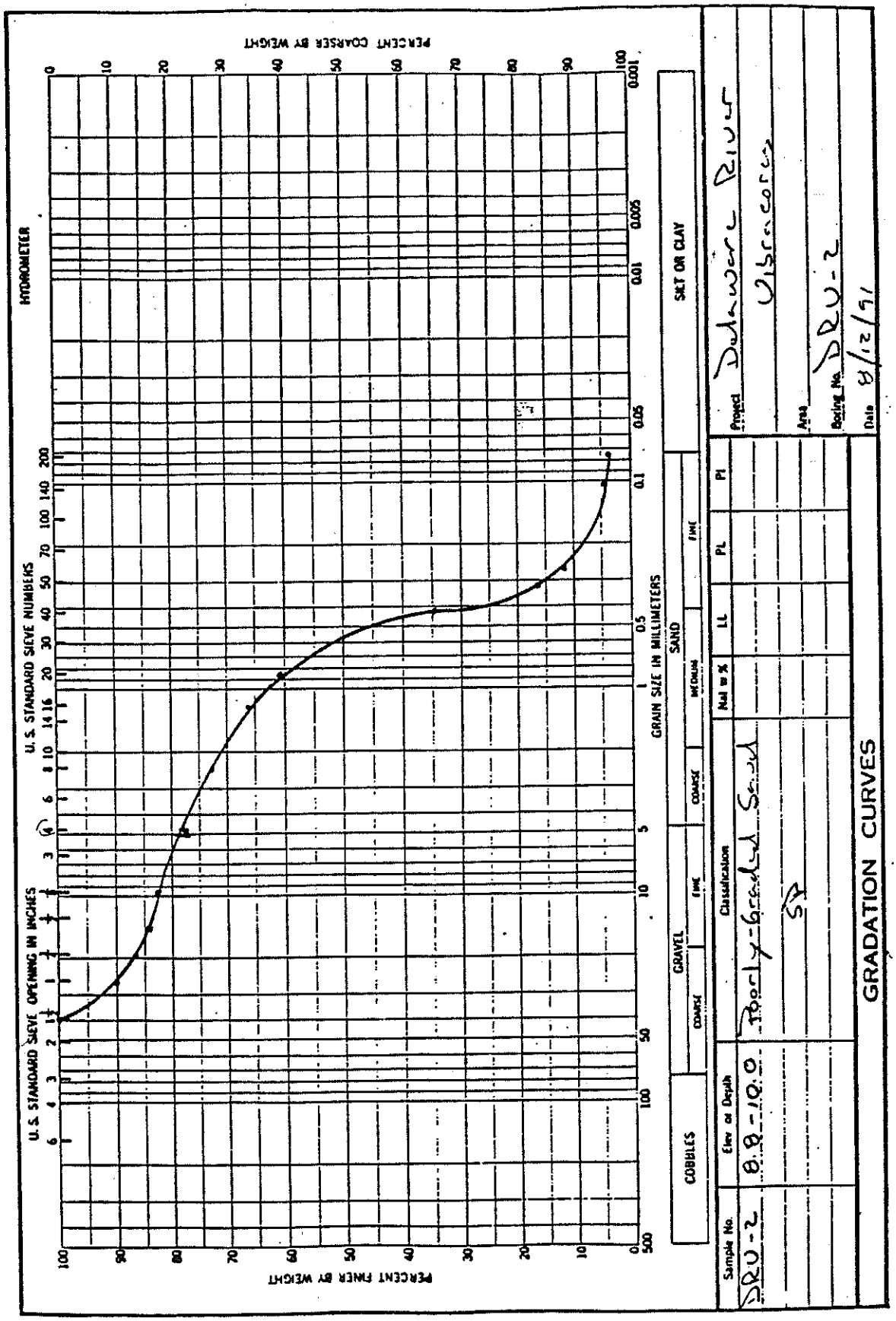

HYDROMETER
U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087

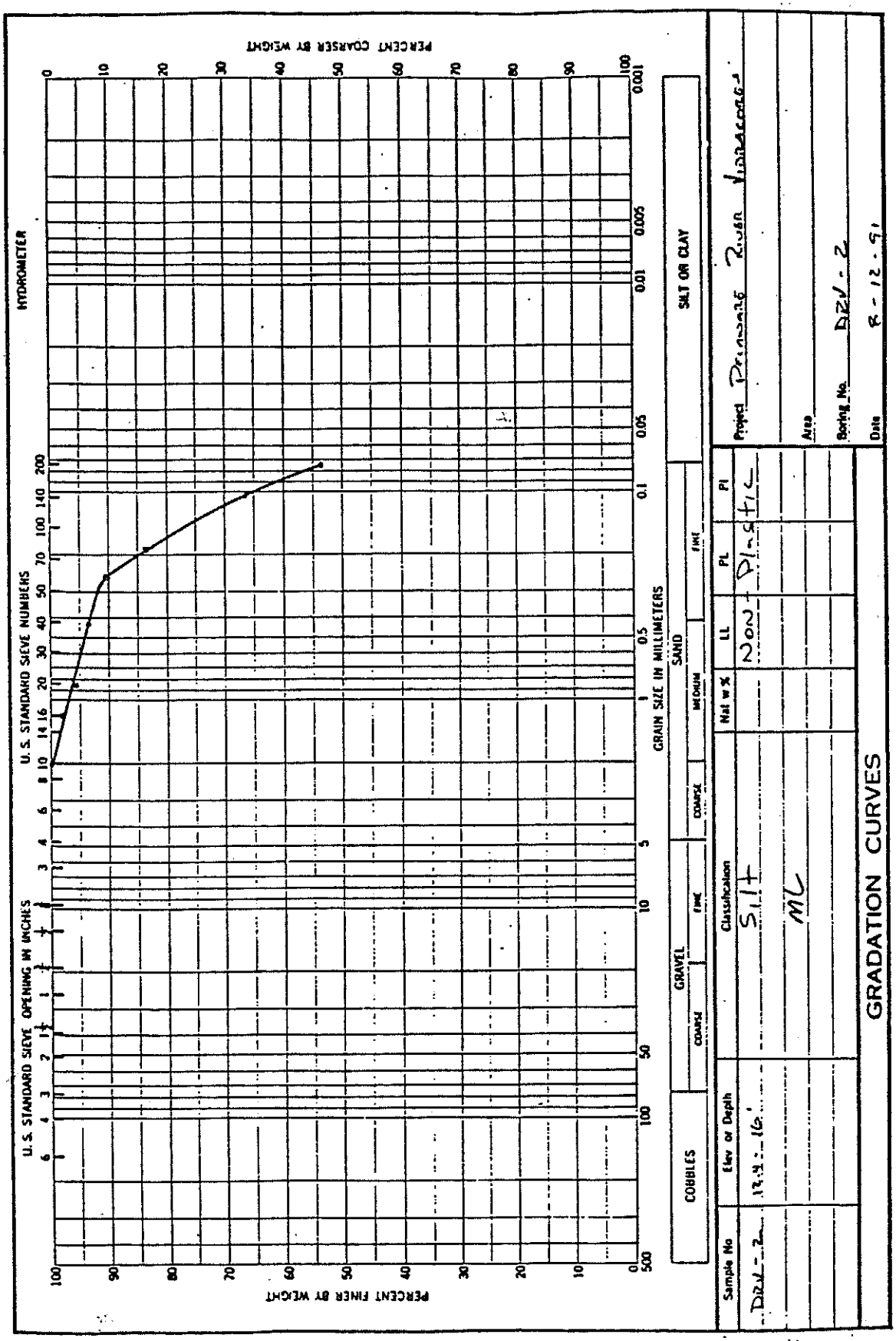

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Underpasses
Area
Boring No. DRV-1
Date 8-12-91
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-1
14-18.0'
Poorly Graded Sand (SP)
GRADATION CURVES
ENG FORM 1 MAY 63 2087

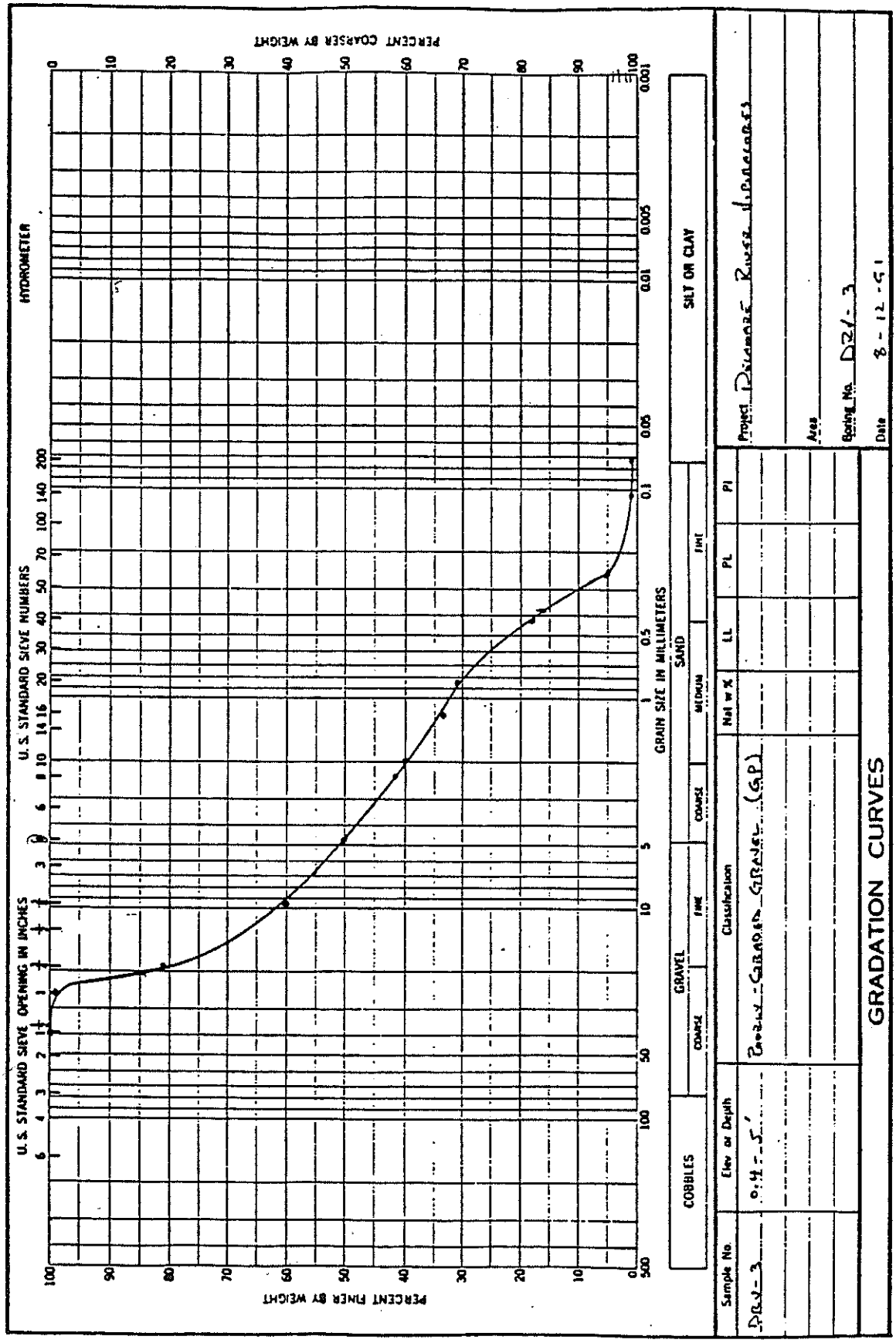

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Underpasses
Area
Boring No. DRV-2
Date 8-12-51
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-2
1-2.3'
Silty Clayey Sand (SM-SC)
GRADATION CURVES
ENG FORM 1 MAY 63 2087

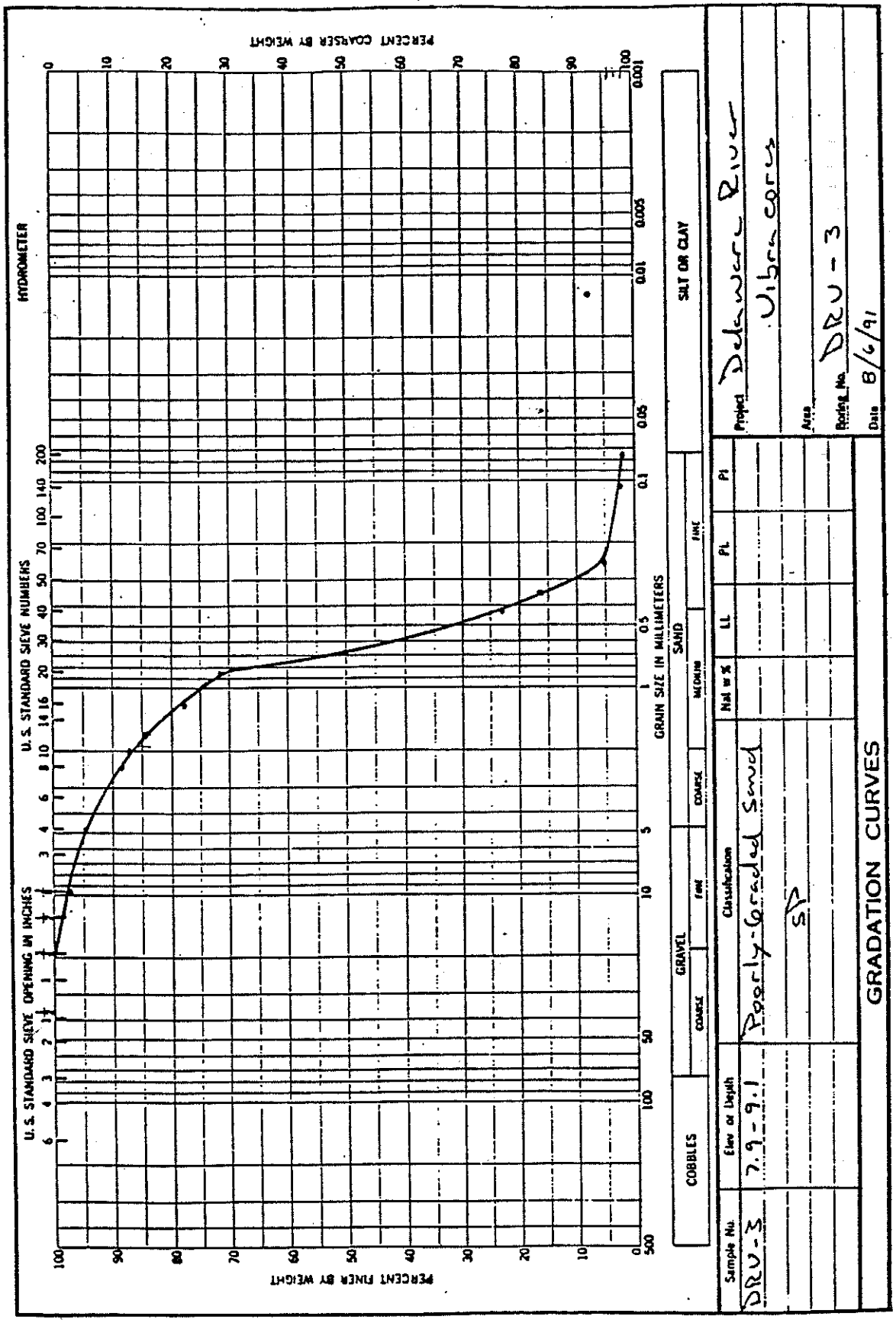

U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Dredging
Area
Boring No. D21-2
Date 8-12-81
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
D21-2
Poorly-Graded Sand (SP)
GRADATION CURVES
ENG FORM 1 MAY 63 2087

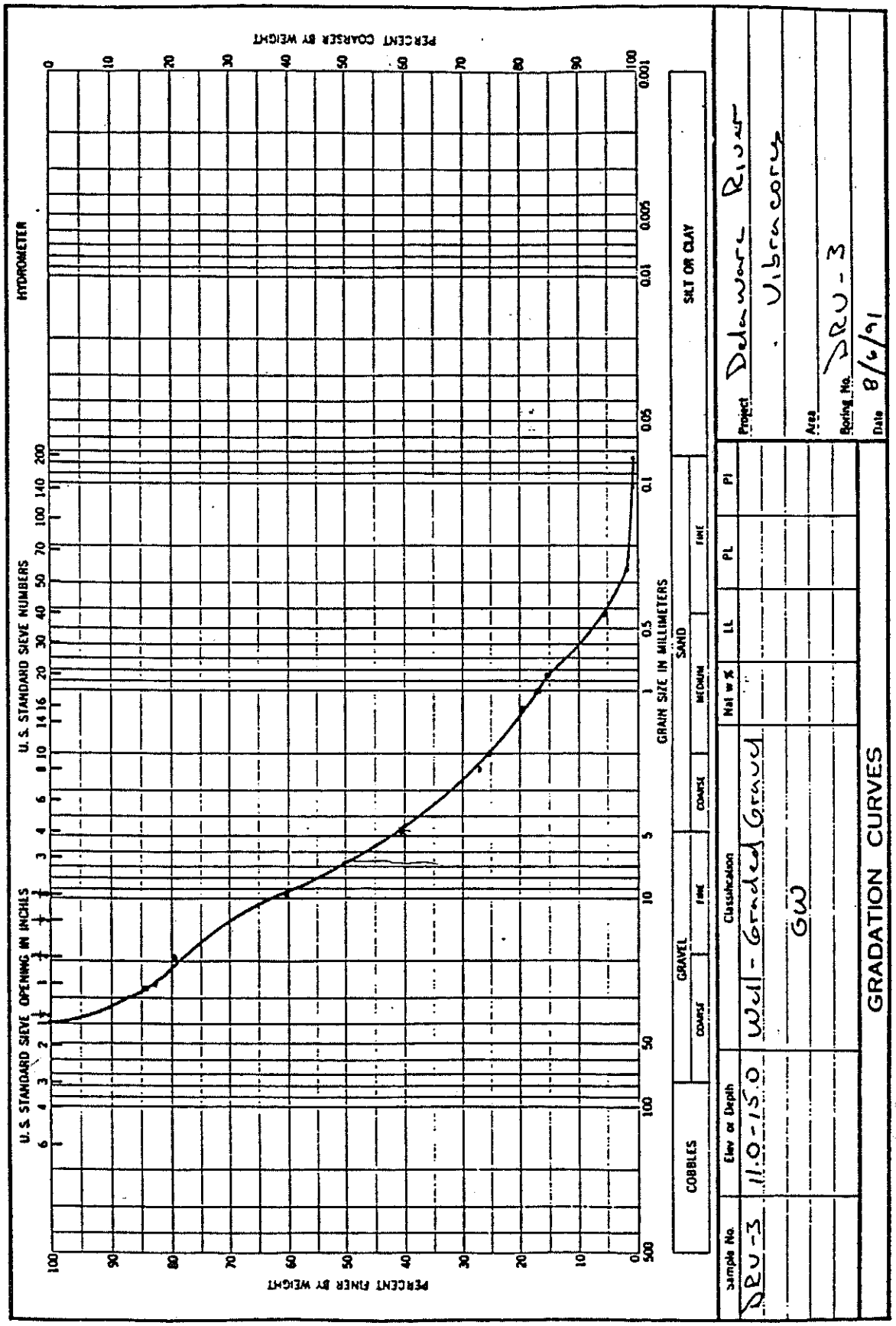

U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087

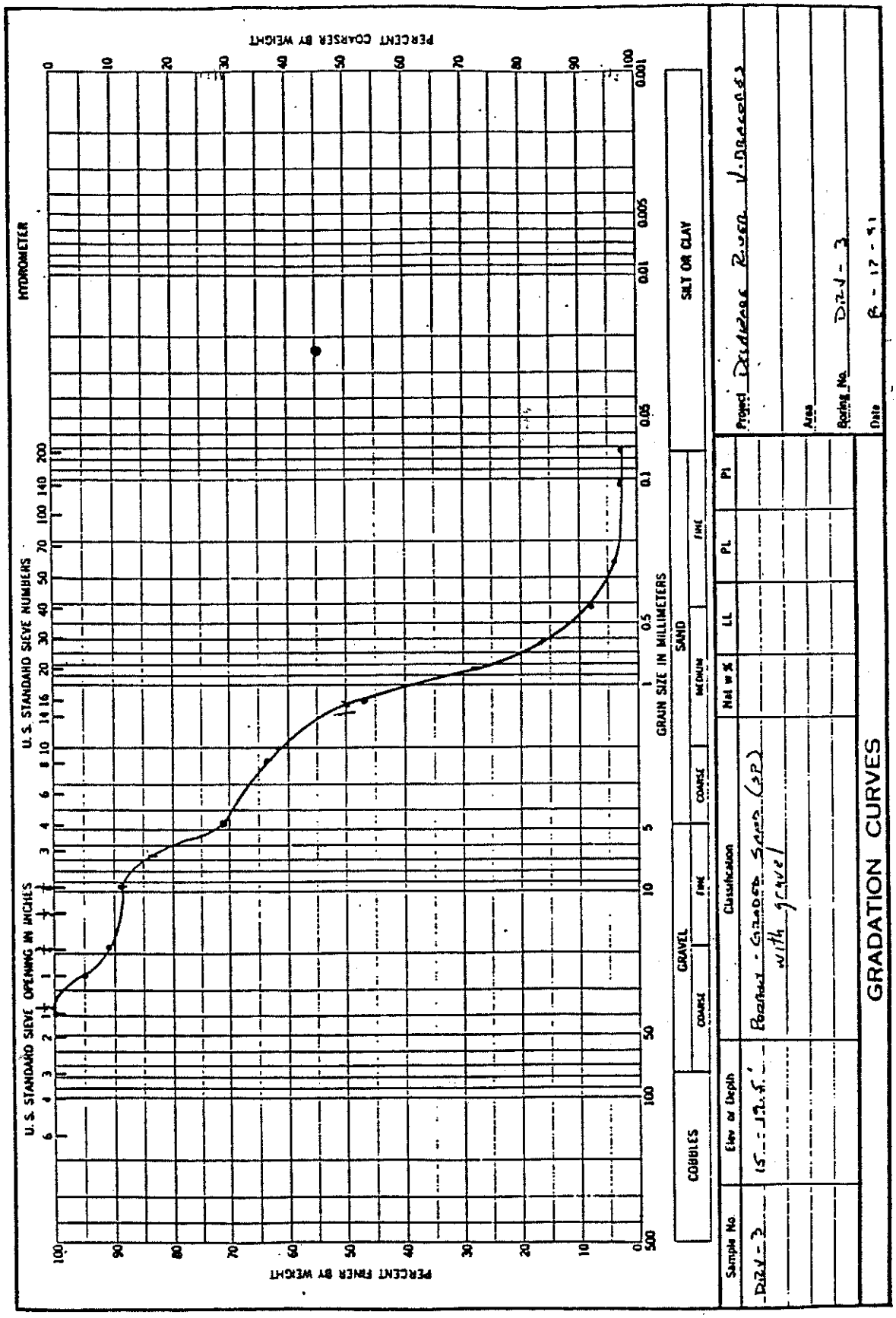

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Observers
Area
Boring No. DRU-2
Date 8/12/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-2
8.8-10.0
Poorly-graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 83 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Hydrology
Area
Boring No. DRV-2
Date 8-12-91
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-2
12.4 - 16'
Silt
ML
Non-Plastic
GRADATION CURVES
ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project Delaware River Hydrographics
Area
Boring No. DR1-3
Date 8-12-91
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project Delaware River
Area Urban cores
Boring No. DRU-3
Date 8/6/91
DRU-3
7.9-9.1
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 63 2087


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Ultracorre
Area
Boring No. DRU-3
Date 8/6/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-3
11.0-15.0
Well-Graded Gravel
GW
GRADATION CURVES
ENG FORM 1 MAY 83 2087


HYDROMETER
U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Indicators
Area
Boring No. DZJ-3
Date 8-17-91
Sample No
Elev or Depth
Classification
Nat W %
LL
PL
PI
DZJ-3
15'-17.5'
Poorly-Graded Sand (SP) with gravel
GRADATION CURVES
ENG FORM 1 MAY 83 2087

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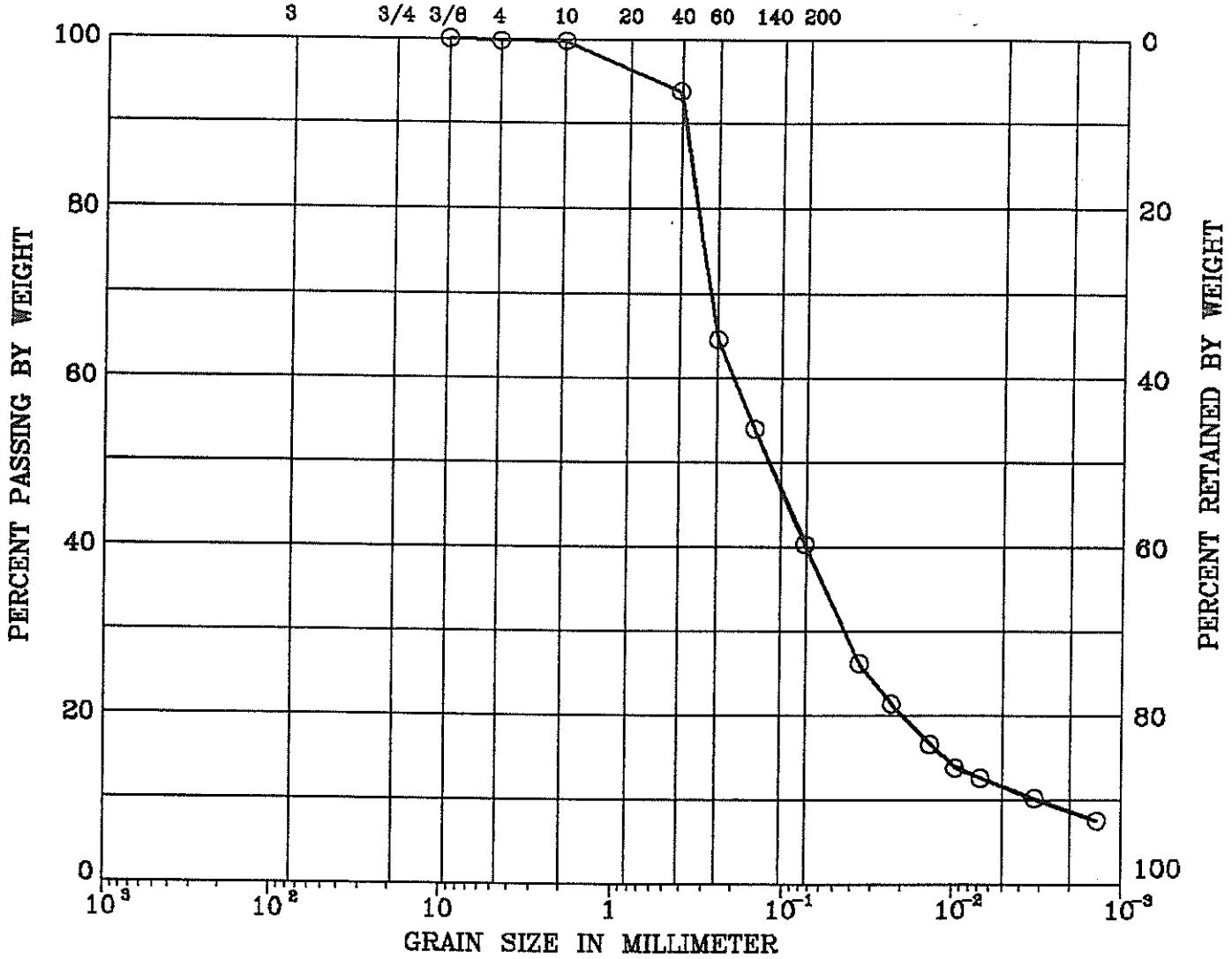
UNIFIED SOIL CLASSIFICATION

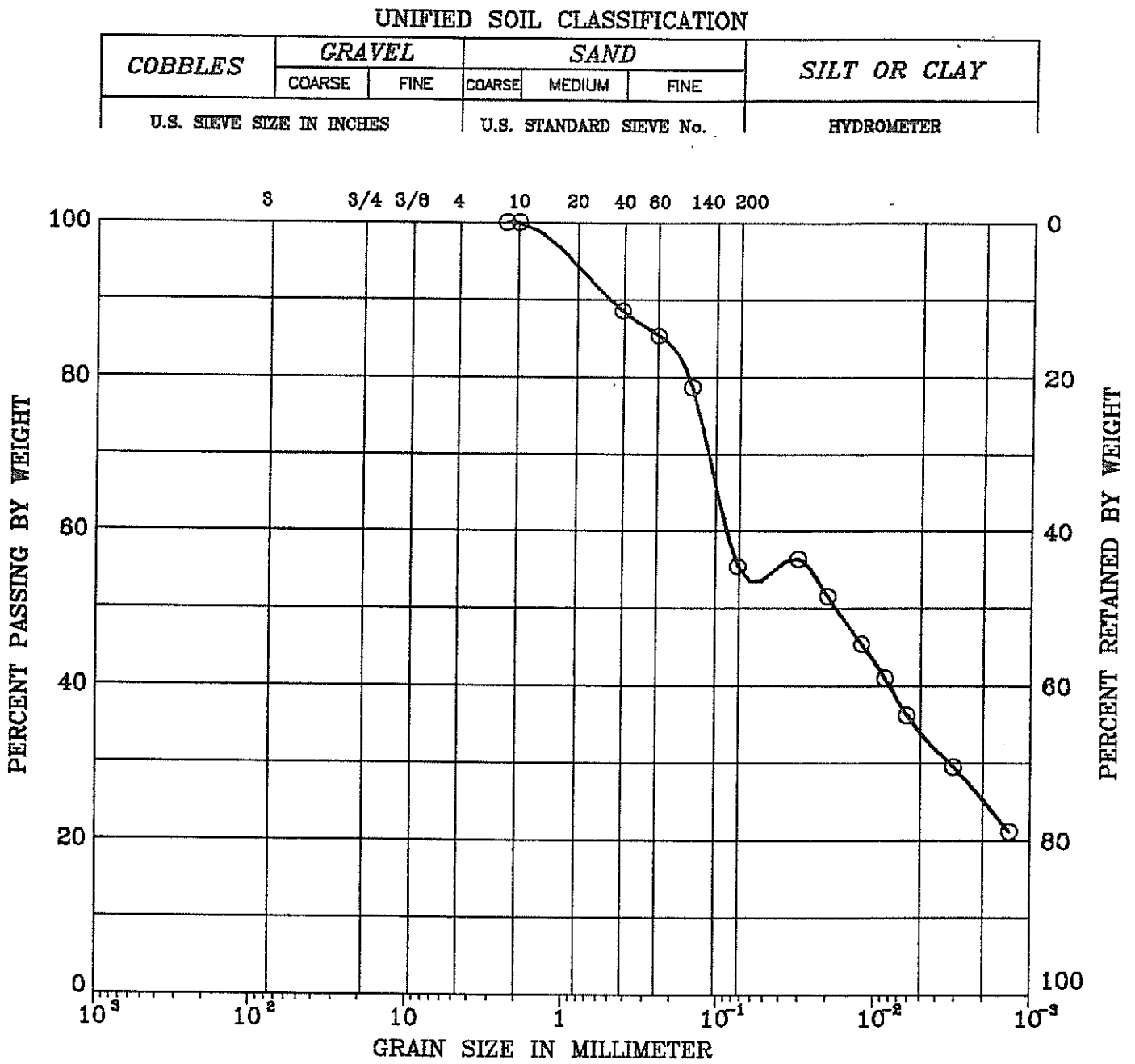
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	I1G-0.0		24	3	GRAY SILTY SAND (SM)

Remark :

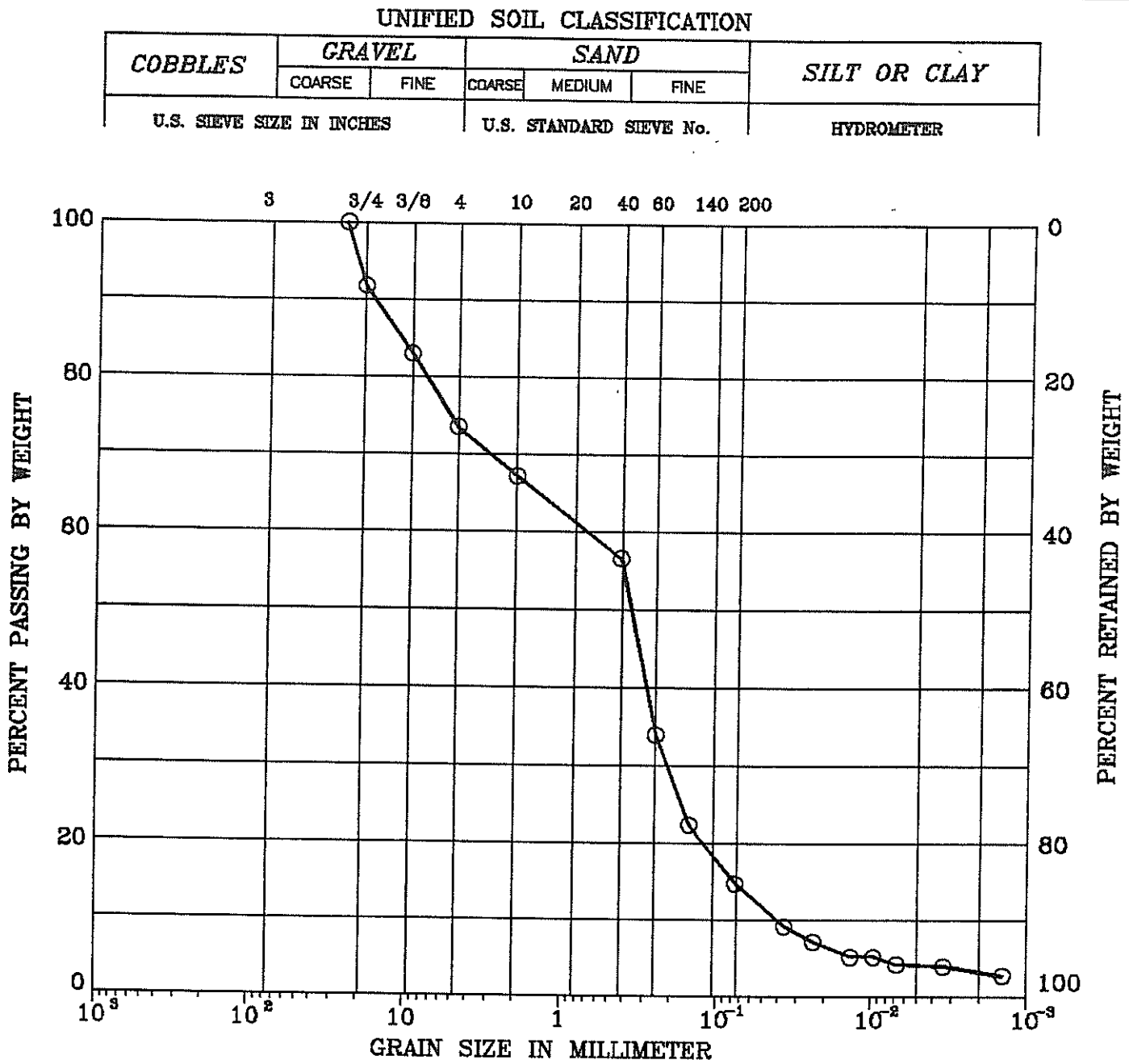
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	I1G-4.1		49	22	DARK GRAY ORGANIC CLAY (OL)

Remark : There is an error in recording sieve data.

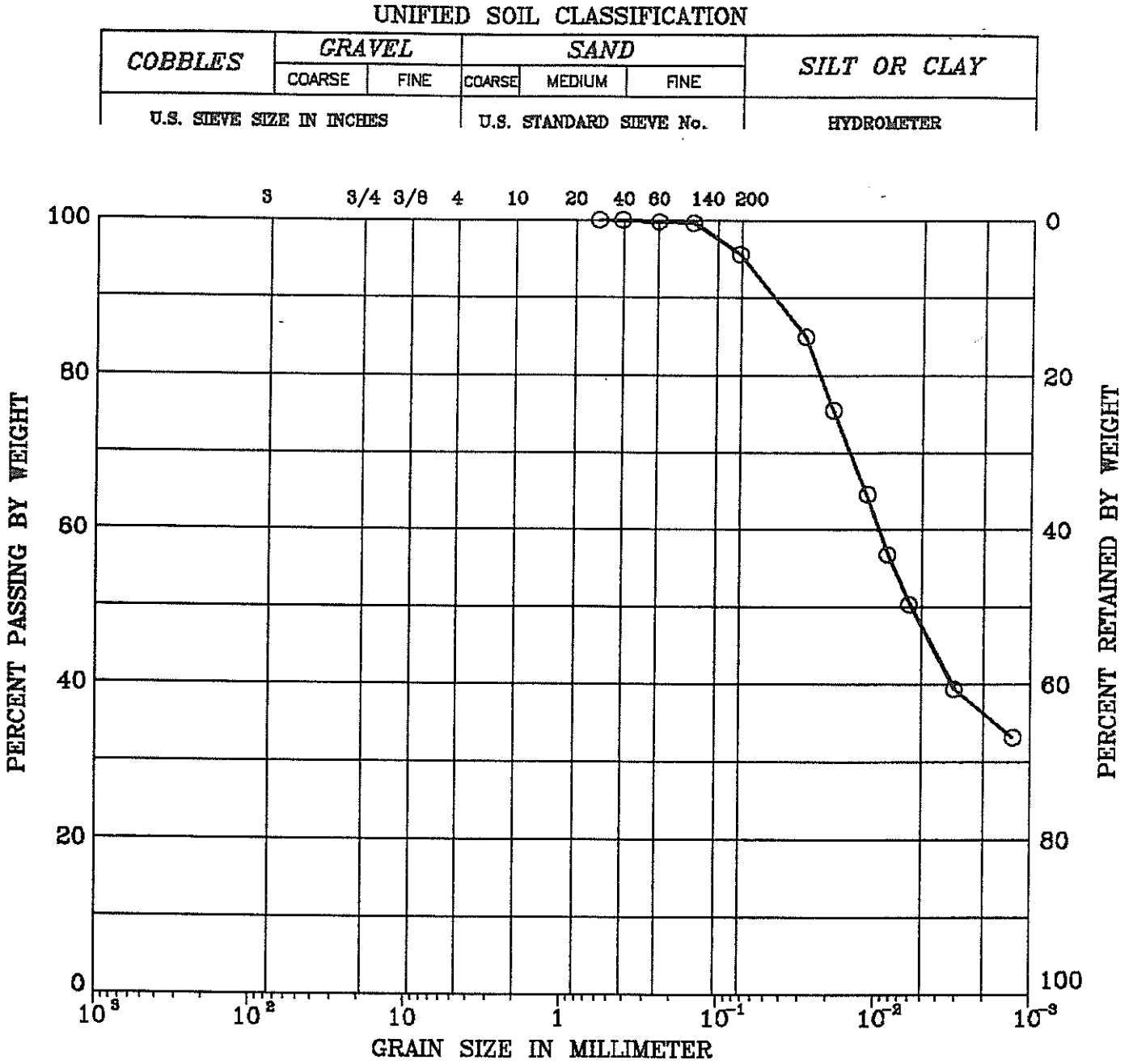
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	I1G-5.1				GRAY SILTY SAND (SM)

Remark :

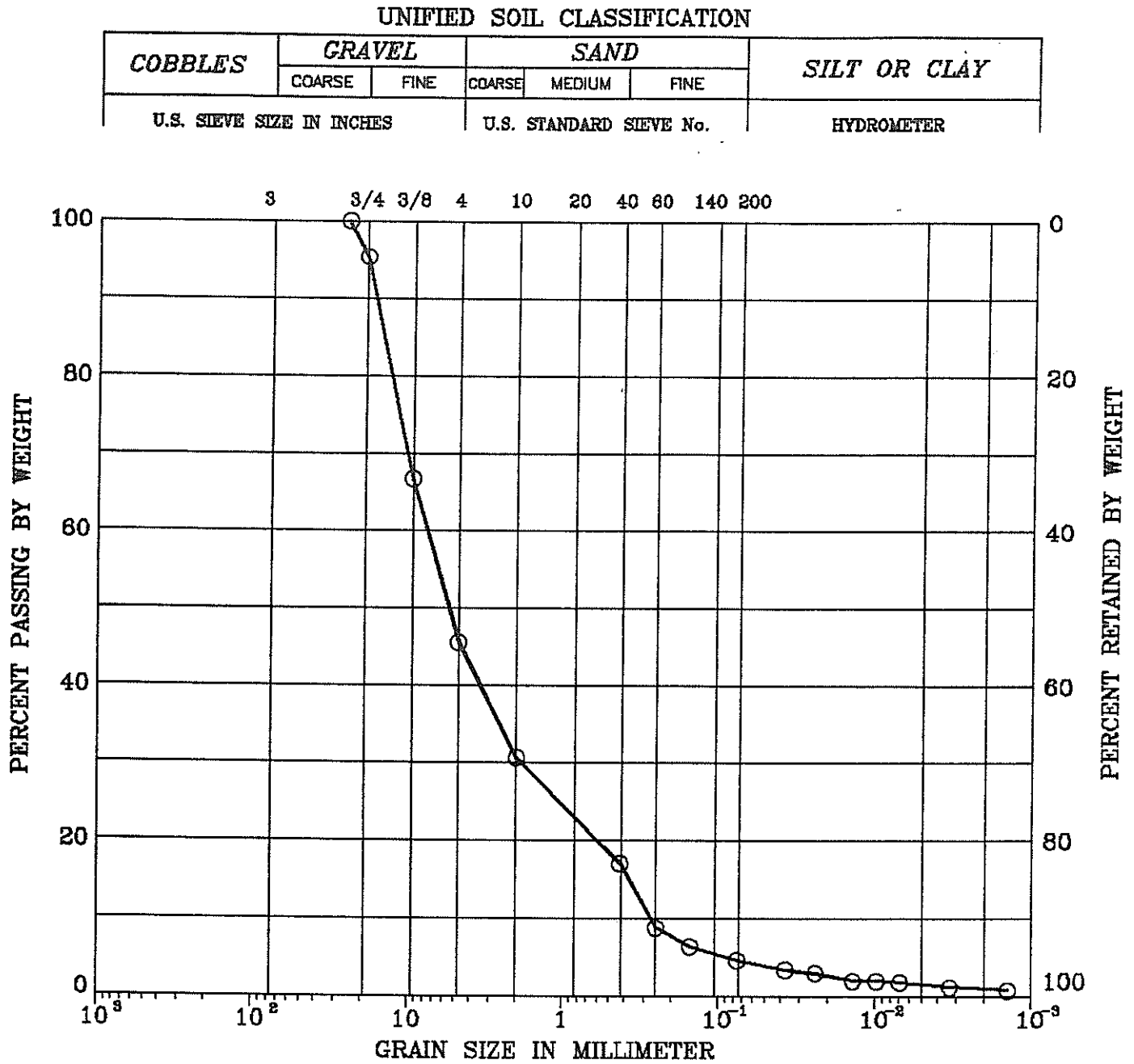
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	11G-9.4		68	34	GRAY ORGANIC SILT (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



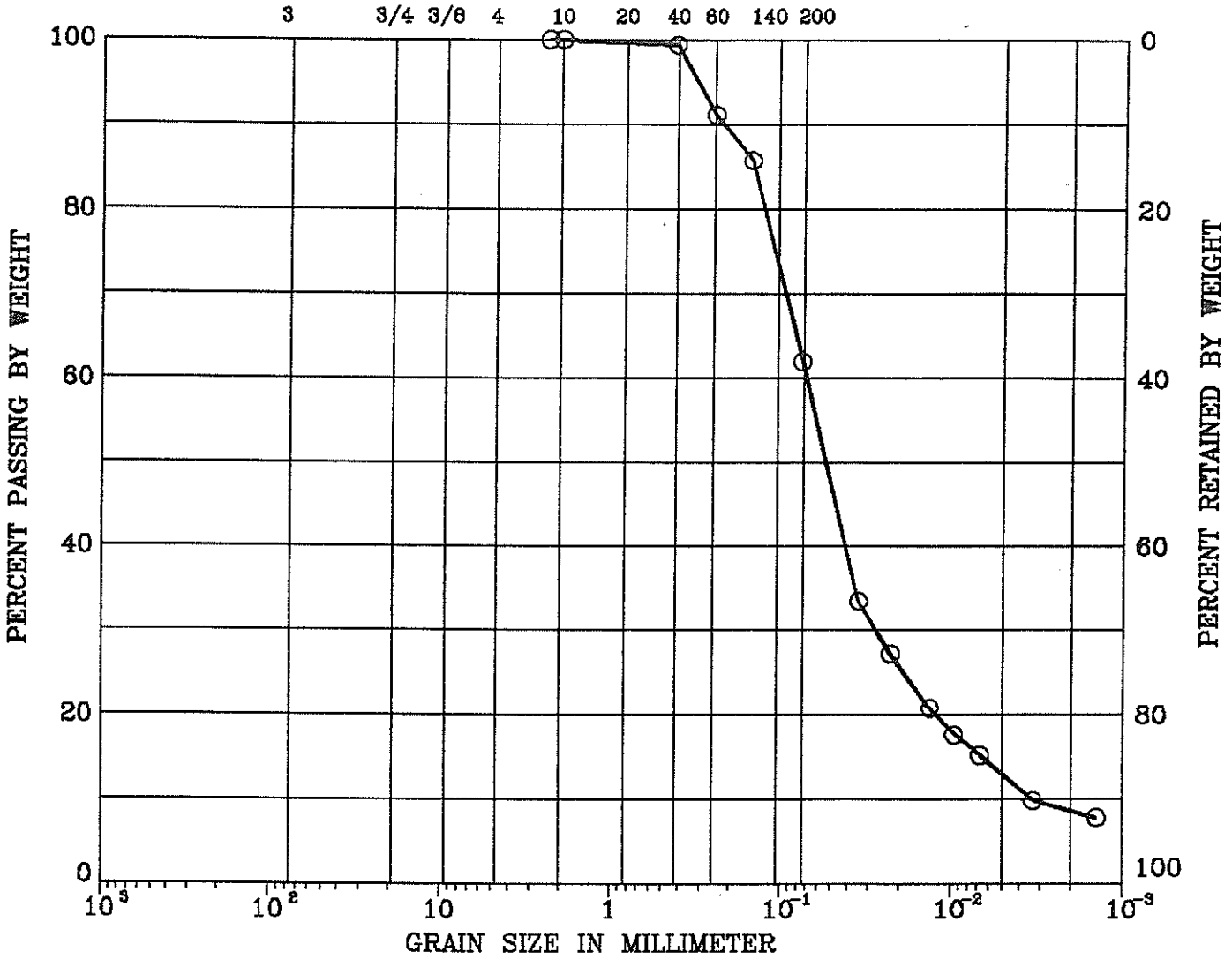
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	I1G11.65				GRAY WELL GRADED GRAVEL (GW)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

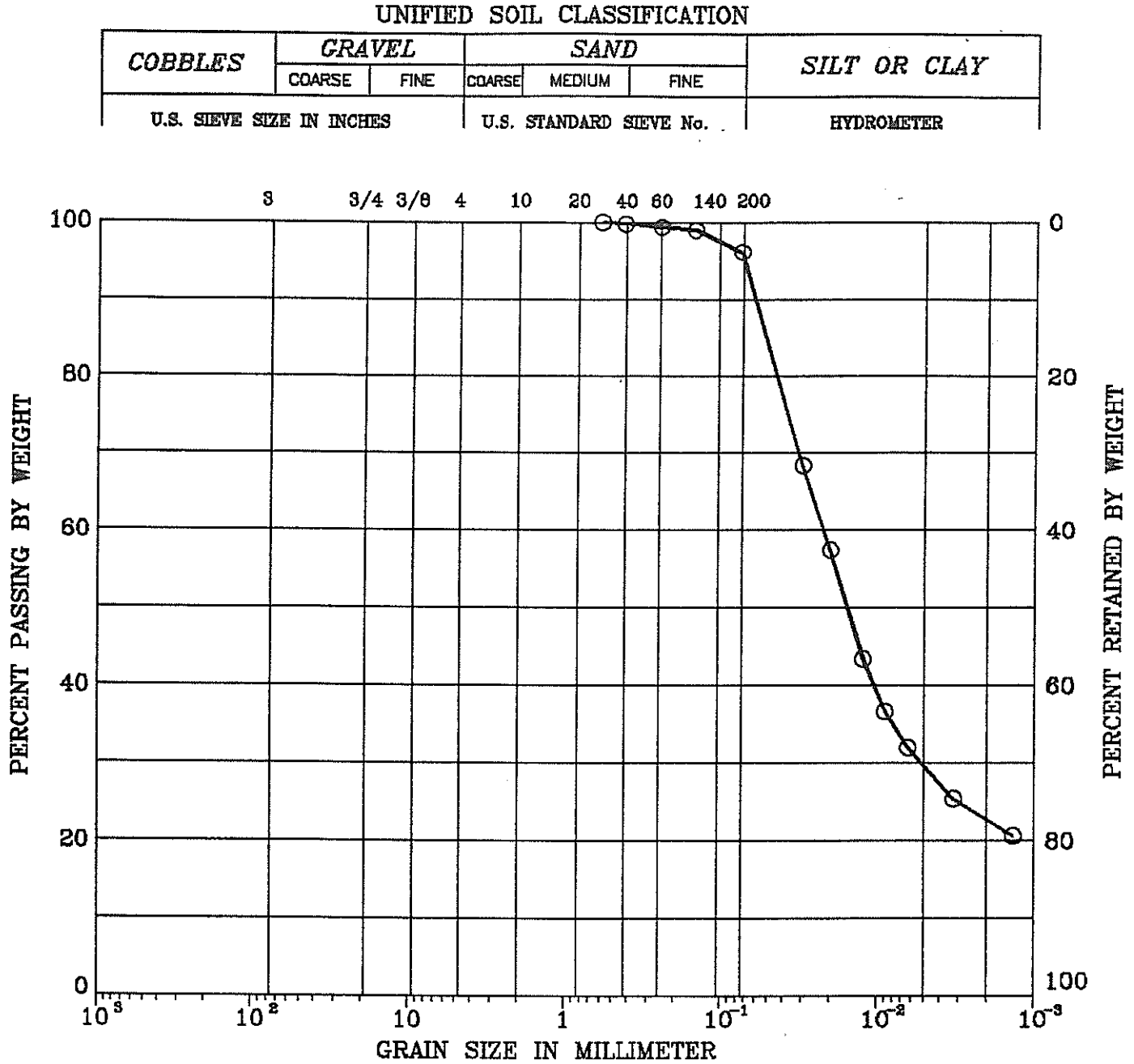
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	12G-0.35		30	5	GRAY ORGANIC SILT (OL)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



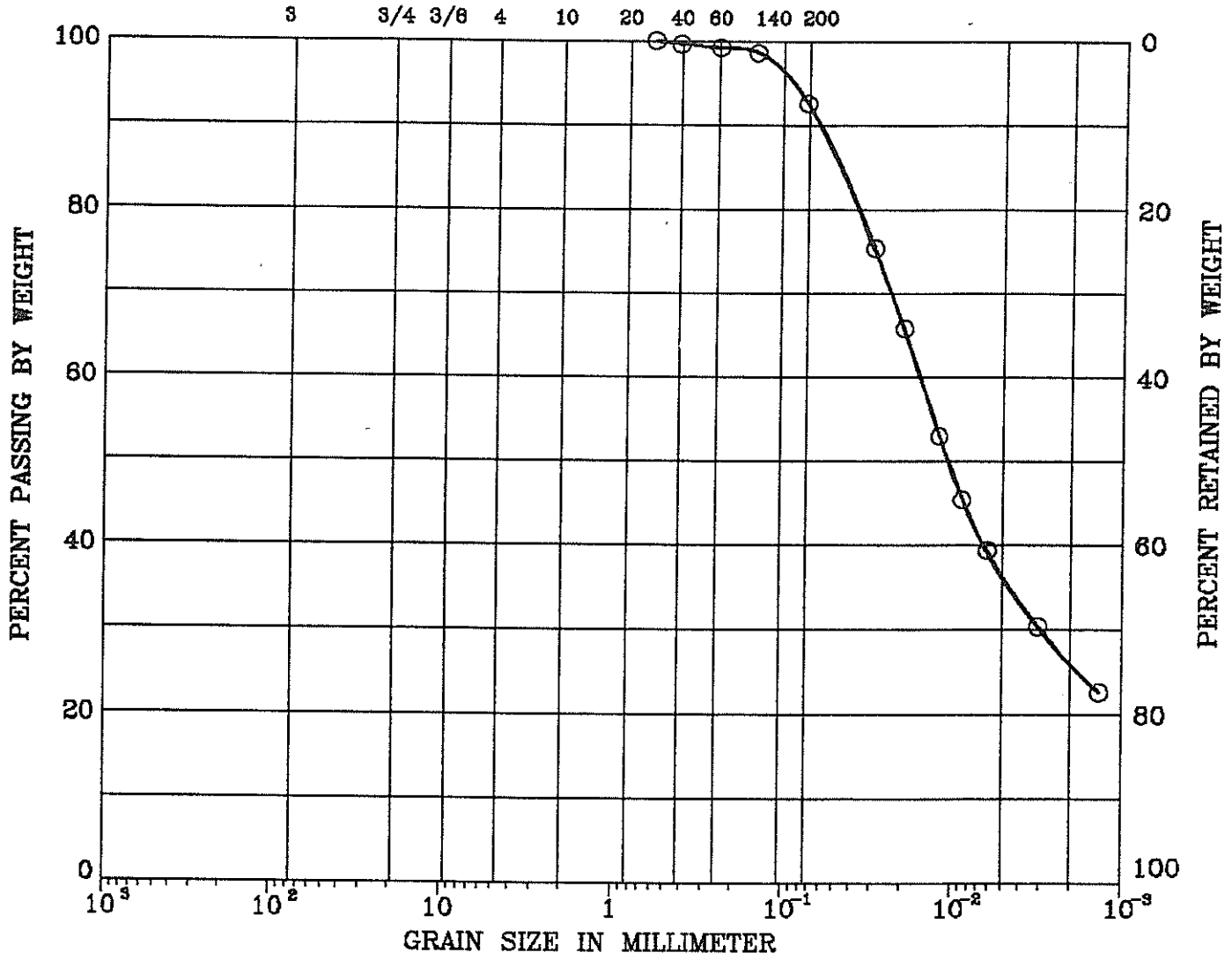
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	12G-7.90		61	25	GRAY ORGANIC SILT (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	I2G-9.85		53	24	GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050130 **Sample ID:** MC-6 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.16 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.36 %
Percent Medium Sand (> 425 µm < 2.0 mm)	2.44 %
Percent Fine Sand (> 75 µm < 425 µm)	47.37 %
Percent (by difference) Silt/Clay, plus analytical loss	49.67 %

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050130 **Sample ID:** MC-6 **Date:** 3/02-09/05

Total dry sand mortered + container	113.424	g
Container tare	12.694	g
Total dry sample wt.	100.7300	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.857	g
Container tare	12.694	g
Gravel >4.75 mm	0.1630	g (B)

Percent > 4.75 mm = 0.16

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.061	g
Container tare	12.694	g
Sand > 2.0 mm <4.75 mm	0.3670	g (C)

Percent < 4.75 mm > 2.0 mm = 0.36

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	167.3894	g
Container tare	164.9300	g
Dry medium sand >425 µm <2.0 mm	2.4594	g (D)

Percent > 425 µm < 2.0 mm = 2.44

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	51.1061	g
Container tare	3.3939	g
Dry fine sand >75 µm <425 µm	47.7122	g (E)

Percent > 75 µm < 425 µm = 47.37

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: SA

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050131 **Sample ID:** MC-7 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.00 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.62 %
Percent Fine Sand (> 75 µm < 425 µm)	37.38 %
Percent (by difference) Silt/Clay, plus analytical loss	62.00 %

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050131 **Sample ID:** MC-7 **Date:** 3/02-09/05

Total dry sand mortered + container	120.177	g
Container tare	12.616	g
Total dry sample wt.	107.5610	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.616	g
Container tare	12.616	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.616	g
Container tare	12.616	g
Sand > 2.0 mm <4.75 mm	0.0000	g (C)

Percent < 4.75 mm > 2.0 mm = 0.00

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	177.6098	g
Container tare	176.9393	g
Dry medium sand >425 µm <2.0 mm	0.6705	g (D)

Percent > 425 µm < 2.0 mm = 0.62

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	44.8474	g
Container tare	4.6405	g
Dry fine sand >75 µm <425 µm	40.2069	g (E)

Percent > 75 µm < 425 µm = 37.38

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: AA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston | ASI Job #: 25-016 | Balance: Sart./Mett.

Sample # : 20050132 | Sample ID: MC-8 | Date: 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	21.90 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	6.50 %
Percent Medium Sand (> 425 µm < 2.0 mm)	2.99 %
Percent Fine Sand (> 75 µm < 425 µm)	60.28 %
Percent (by difference) Silt/Clay, plus analytical loss	8.33 %

RF

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	**ASI Job #:**	25-016	**Balance:**	Sart./Mett.
Sample # :	20050132	**Sample ID:**	MC-8	**Date:**	3/02-09/05

Total dry sand mortered + container	119.575	g
Container tare	12.523	g
Total dry sample wt.	107.0520	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	35.971	g
Container tare	12.523	g
Gravel >4.75 mm	23.4480	g (B)

Percent > 4.75 mm = 21.90

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	19.477	g
Container tare	12.523	g
Sand > 2.0 mm <4.75 mm	6.9540	g (C)

Percent < 4.75 mm > 2.0 mm = 6.50

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	175.2173	g
Container tare	172.0210	g
Dry medium sand >425 µm <2.0 mm	3.1963	g (D)

Percent > 425 µm < 2.0 mm = 2.99

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	67.8324	g
Container tare	3.3007	g
Dry fine sand >75 µm <425 µm	64.5317	g (E)

Percent > 75 µm < 425 µm = 60.28

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MM

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050133 **Sample ID:** MC-9 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.92 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.52 %
Percent Medium Sand (> 425 µm < 2.0 mm)	2.53 %
Percent Fine Sand (> 75 µm < 425 µm)	14.96 %
Percent (by difference) Silt/Clay, plus analytical loss	81.07 %

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050133 **Sample ID:** MC-9 **Date:** 3/02-09/05

Total dry sand mortered + container	119.893	g
Container tare	12.625	g
Total dry sample wt.	107.2680	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	13.612	g
Container tare	12.625	g
Gravel >4.75 mm	0.9870	g (B)

Percent > 4.75 mm = 0.92

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.181	g
Container tare	12.625	g
Sand > 2.0 mm <4.75 mm	0.5560	g (C)

Percent < 4.75 mm > 2.0 mm = 0.52

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	174.4252	g
Container tare	171.7070	g
Dry medium sand >425 µm <2.0 mm	2.7182	g (D)

Percent > 425 µm < 2.0 mm = 2.53

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	193.0862	g
Container tare	177.0416	g
Dry fine sand >75 µm <425 µm	16.0446	g (E)

Percent > 75 µm < 425 µm = 14.96

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050134	Sample ID:	MC-10	Date:	3/02-09/05

Total dry sand mortered + container	118.758	g	
Container tare	12.701	g	
Total dry sample wt.	106.0570	g (A)	

 # 4 sieve (Gravel)

Dry gravel >4.75 mm + container	14.254	g	
Container tare	12.701	g	Percent > 4.75 mm = 1.46
Gravel >4.75 mm	1.5530	g (B)	

 # 10 sieve (Coarse sand)

Dry coarse sand >2.0 mm + container	13.837	g	
Container tare	12.701	g	Percent < 4.75 mm > 2.0 mm = 1.07
Sand > 2.0 mm <4.75 mm	1.1360	g (C)	

 # 40 sieve (Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	181.0675	g	
Container tare	172.0274	g	Percent > 425 µm < 2.0 mm = 8.52
Dry medium sand >425 µm <2.0 mm	9.0401	g (D)	

 # 200 sieve (Fine sand) *

Dry fine sand <425 µm >75 µm + container	93.1090	g	
Container tare	4.0256	g	Percent > 75 µm < 425 µm = 84.00
Dry fine sand >75 µm <425 µm	89.0834	g (E)	

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: LA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050135 **Sample ID:** MC-11 **Date:** 3/02-09/05

Total dry sand mortered + container	119.372	g
Container tare	12.596	g
Total dry sample wt.	106.7760	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.596	g
Container tare	12.596	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.596	g
Container tare	12.596	g
Sand > 2.0 mm <4.75 mm	0.0000	g (C)

Percent < 4.75 mm > 2.0 mm = 0.00

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	174.0226	g
Container tare	172.3796	g
Dry medium sand >425 µm <2.0 mm	1.6430	g (D)

Percent > 425 µm < 2.0 mm = 1.54

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	156.7132	g
Container tare	152.7613	g
Dry fine sand >75 µm <425 µm	3.9519	g (E)

Percent > 75 µm < 425 µm = 3.70

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: [illegible]

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050137 **Sample ID:** MC-13 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.38 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	2.01 %
Percent Medium Sand (> 425 µm < 2.0 mm)	44.60 %
Percent Fine Sand (> 75 µm < 425 µm)	51.11 %
Percent (by difference) Silt/Clay, plus analytical loss	1.89 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050137	Sample ID:	MC-13	Date:	3/02-09/05

Total dry sand mortered + container	116.601	g
Container tare	12.763	g
Total dry sample wt.	103.8380	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	13.161	g
Container tare	12.763	g
Gravel >4.75 mm	0.3980	g (B)

Percent > 4.75 mm = 0.38

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	14.855	g
Container tare	12.763	g
Sand > 2.0 mm <4.75 mm	2.0920	g (C)

Percent < 4.75 mm > 2.0 mm = 2.01

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	49.1050	g
Container tare	2.7921	g
Dry medium sand >425 µm <2.0 mm	46.3129	g (D)

Percent > 425 µm < 2.0 mm = 44.60

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	55.9960	g
Container tare	2.9283	g
Dry fine sand >75 µm <425 µm	53.0677	g (E)

Percent > 75 µm < 425 µm = 51.11

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: [illegible]

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050138 **Sample ID:** MC-14 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	7.06 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	5.82 %
Percent Medium Sand (> 425 µm < 2.0 mm)	51.52 %
Percent Fine Sand (> 75 µm < 425 µm)	30.04 %
Percent (by difference) Silt/Clay, plus analytical loss	5.56 %

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050138	Sample ID:	MC-14	Date:	3/02-09/05

Total dry sand mortered + container	119.602	g	
Container tare	12.611	g	
Total dry sample wt.	106.9910	g (A)	

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	20.163	g	
Container tare	12.611	g	Percent > 4.75 mm = 7.06
Gravel >4.75 mm	7.5520	g (B)	

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	18.838	g	
Container tare	12.611	g	Percent < 4.75 mm > 2.0 mm = 5.82
Sand > 2.0 mm <4.75 mm	6.2270	g (C)	

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	59.4281	g	
Container tare	4.3081	g	Percent > 425 µm < 2.0 mm = 51.52
Dry medium sand >425 µm <2.0 mm	55.1200	g (D)	

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	35.2762	g	
Container tare	3.1340	g	Percent > 75 µm < 425 µm = 30.04
Dry fine sand >75 µm <425 µm	32.1422	g (E)	

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: NB

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050139 **Sample ID:** MC-15 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	4.17 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.40 %
Percent Medium Sand (> 425 µm < 2.0 mm)	1.62 %
Percent Fine Sand (> 75 µm < 425 µm)	19.83 %
Percent (by difference) Silt/Clay, plus analytical loss	73.98 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050139 **Sample ID:** MC-15 **Date:** 3/02-09/05

Total dry sand mortered + container	115.936	g
Container tare	12.654	g
Total dry sample wt.	103.2820	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	16.959	g
Container tare	12.654	g
Gravel >4.75 mm	4.3050	g (B)

Percent > 4.75 mm = 4.17

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.072	g
Container tare	12.654	g
Sand > 2.0 mm <4.75 mm	0.4180	g (C)

Percent < 4.75 mm > 2.0 mm = 0.40

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	144.3033	g
Container tare	142.6340	g
Dry medium sand >425 µm <2.0 mm	1.6693	g (D)

Percent > 425 µm < 2.0 mm = 1.62

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	182.6350	g
Container tare	162.1570	g
Dry fine sand >75 µm <425 µm	20.4780	g (E)

Percent > 75 µm < 425 µm = 19.83

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050140 **Sample ID:** MC-16 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.22 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.28 %
Percent Fine Sand (> 75 µm < 425 µm)	18.40 %
Percent (by difference) Silt/Clay, plus analytical loss	81.11 %

RF

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050140 **Sample ID:** MC-16 **Date:** 3/02-09/05

Total dry sand mortered + container	115.556	g
Container tare	12.721	g
Total dry sample wt.	102.8350	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.721	g
Container tare	12.721	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.946	g
Container tare	12.721	g
Sand > 2.0 mm <4.75 mm	0.2250	g (C)

Percent < 4.75 mm > 2.0 mm = 0.22

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	163.6791	g
Container tare	163.3961	g
Dry medium sand >425 µm <2.0 mm	0.2830	g (D)

Percent > 425 µm < 2.0 mm = 0.28

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	196.5730	g
Container tare	177.6535	g
Dry fine sand >75 µm <425 µm	18.9195	g (E)

Percent > 75 µm < 425 µm = 18.40

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050141 **Sample ID:** MC-17 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.14 %
Percent Medium Sand (> 425 µm < 2.0 mm)	3.37 %
Percent Fine Sand (> 75 µm < 425 µm)	29.35 %
Percent (by difference) Silt/Clay, plus analytical loss	67.14 %

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	**ASI Job #:**	25-016	**Balance:**	Sart./Mett.
Sample # :	20050141	**Sample ID:**	MC-17	**Date:**	3/02-09/05

Total dry sand mortered + container	115.901	g
Container tare	12.683	g
Total dry sample wt.	103.2180	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.683	g	
Container tare	12.683	g	Percent > 4.75 mm = 0.00
Gravel >4.75 mm	0.0000	g (B)	

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.826	g	
Container tare	12.683	g	Percent < 4.75 mm > 2.0 mm = 0.14
Sand > 2.0 mm <4.75 mm	0.1430	g (C)	

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	172.7659	g	
Container tare	169.2880	g	Percent > 425 µm < 2.0 mm = 3.37
Dry medium sand >425 µm <2.0 mm	3.4779	g (D)	

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	182.4814	g	
Container tare	152.1865	g	Percent > 75 µm < 425 µm = 29.35
Dry fine sand >75 µm <425 µm	30.2949	g (E)	

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MS

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050142 **Sample ID:** MC-18 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.00 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.53 %
Percent Fine Sand (> 75 µm < 425 µm)	27.00 %
Percent (by difference) Silt/Clay, plus analytical loss	72.48 %

RF

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050142	Sample ID:	MC-18	Date:	3/02-09/05

Total dry sand mortered + container	116.101	g
Container tare	12.512	g
Total dry sample wt.	103.5890	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.512	g
Container tare	12.512	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.512	g
Container tare	12.512	g
Sand > 2.0 mm <4.75 mm	0.0000	g (C)

Percent < 4.75 mm > 2.0 mm = 0.00

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	177.0003	g
Container tare	176.4540	g
Dry medium sand >425 µm <2.0 mm	0.5463	g (D)

Percent > 425 µm < 2.0 mm = 0.53

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	31.3803	g
Container tare	3.4158	g
Dry fine sand >75 µm <425 µm	27.9645	g (E)

Percent > 75 µm < 425 µm = 27.00

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/2/05

Initials: MM

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston | ASI Job #: 25-016 | Balance: Sart./Mett.

Sample # : 20050143 | Sample ID: MC-19 | Date: 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.21 %
Percent Medium Sand (> 425 µm < 2.0 mm)	3.61 %
Percent Fine Sand (> 75 µm < 425 µm)	77.29 %
Percent (by difference) Silt/Clay, plus analytical loss	18.89 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050143 **Sample ID:** MC-19 **Date:** 3/02-09/05

Total dry sand mortered + container	111.589	g
Container tare	12.669	g
Total dry sample wt.	98.9200	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.669	g
Container tare	12.669	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.872	g
Container tare	12.669	g
Sand > 2.0 mm <4.75 mm	0.2030	g (C)

Percent < 4.75 mm > 2.0 mm = 0.21

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	175.2811	g
Container tare	171.7099	g
Dry medium sand >425 µm <2.0 mm	3.5712	g (D)

Percent > 425 µm < 2.0 mm = 3.61

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	80.0478	g
Container tare	3.5884	g
Dry fine sand >75 µm <425 µm	76.4594	g (E)

Percent > 75 µm < 425 µm = 77.29

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: SA

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050144 **Sample ID:** MC-20 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	3.95 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	2.00 %
Percent Medium Sand (> 425 µm < 2.0 mm)	3.25 %
Percent Fine Sand (> 75 µm < 425 µm)	27.59 %
Percent (by difference) Silt/Clay, plus analytical loss	63.21 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050144	Sample ID:	MC-20	Date:	3/02-09/05

Total dry sand mortered + container	108.064	g
Container tare	12.758	g
Total dry sample wt.	95.3060	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	16.524	g	
Container tare	12.758	g	Percent > 4.75 mm = 3.95
Gravel >4.75 mm	3.7660	g (B)	

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	14.662	g	
Container tare	12.758	g	Percent < 4.75 mm > 2.0 mm = 2.00
Sand > 2.0 mm <4.75 mm	1.9040	g (C)	

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	176.9295	g	
Container tare	173.8300	g	Percent > 425 µm < 2.0 mm = 3.25
Dry medium sand >425 µm <2.0 mm	3.0995	g (D)	

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	190.1892	g	
Container tare	163.8966	g	Percent > 75 µm < 425 µm = 27.59
Dry fine sand >75 µm <425 µm	26.2926	g (E)	

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: [illegible]

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050145 ~~20050175~~ ~~44~~ **Sample ID:** MC-21 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	7.54 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	3.02 %
Percent Medium Sand (> 425 µm < 2.0 mm)	10.76 %
Percent Fine Sand (> 75 µm < 425 µm)	31.56 %
Percent (by difference) Silt/Clay, plus analytical loss	47.12 %

R7

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client:	Weston	ASI Job #:	25-016	Balance:	Sart./Mett.
Sample # :	20050145 ~~20050175~~ AA	Sample ID:	MC-21	Date:	3/02-09/05

Total dry sand mortered + container	113.338	g
Container tare	12.677	g
Total dry sample wt.	100.6610	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	20.268	g
Container tare	12.677	g
Gravel >4.75 mm	7.5910	g (B)

Percent > 4.75 mm = 7.54

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	15.718	g
Container tare	12.677	g
Sand > 2.0 mm <4.75 mm	3.0410	g (C)

Percent < 4.75 mm > 2.0 mm = 3.02

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	181.6769	g
Container tare	170.8445	g
Dry medium sand >425 µm <2.0 mm	10.8324	g (D)

Percent > 425 µm < 2.0 mm = 10.76

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	201.5600	g
Container tare	169.7900	g
Dry fine sand >75 µm <425 µm	31.7700	g (E)

Percent > 75 µm < 425 µm = 31.56

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: AA

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston | ASI Job #: 25-016 | Balance: Sart./Mett.

Sample # : 20050177 | Sample ID: MC-23 | Date: 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	4.70 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	1.60 %
Percent Medium Sand (> 425 µm < 2.0 mm)	0.73 %
Percent Fine Sand (> 75 µm < 425 µm)	14.50 %
Percent (by difference) Silt/Clay, plus analytical loss	78.47 %

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AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050177 **Sample ID:** MC-23 **Date:** 3/02-09/05

Total dry sand mortered + container	113.679	g
Container tare	12.578	g
Total dry sample wt.	101.1010	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	17.333	g
Container tare	12.578	g
Gravel >4.75 mm	4.7550	g (B)

Percent > 4.75 mm = 4.70

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	14.194	g
Container tare	12.578	g
Sand > 2.0 mm <4.75 mm	1.6160	g (C)

Percent < 4.75 mm > 2.0 mm = 1.60

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	168.8095	g
Container tare	168.0703	g
Dry medium sand >425 µm <2.0 mm	0.7392	g (D)

Percent > 425 µm < 2.0 mm = 0.73

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	178.4669	g
Container tare	163.8054	g
Dry fine sand >75 µm <425 µm	14.6615	g (E)

Percent > 75 µm < 425 µm = 14.50

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

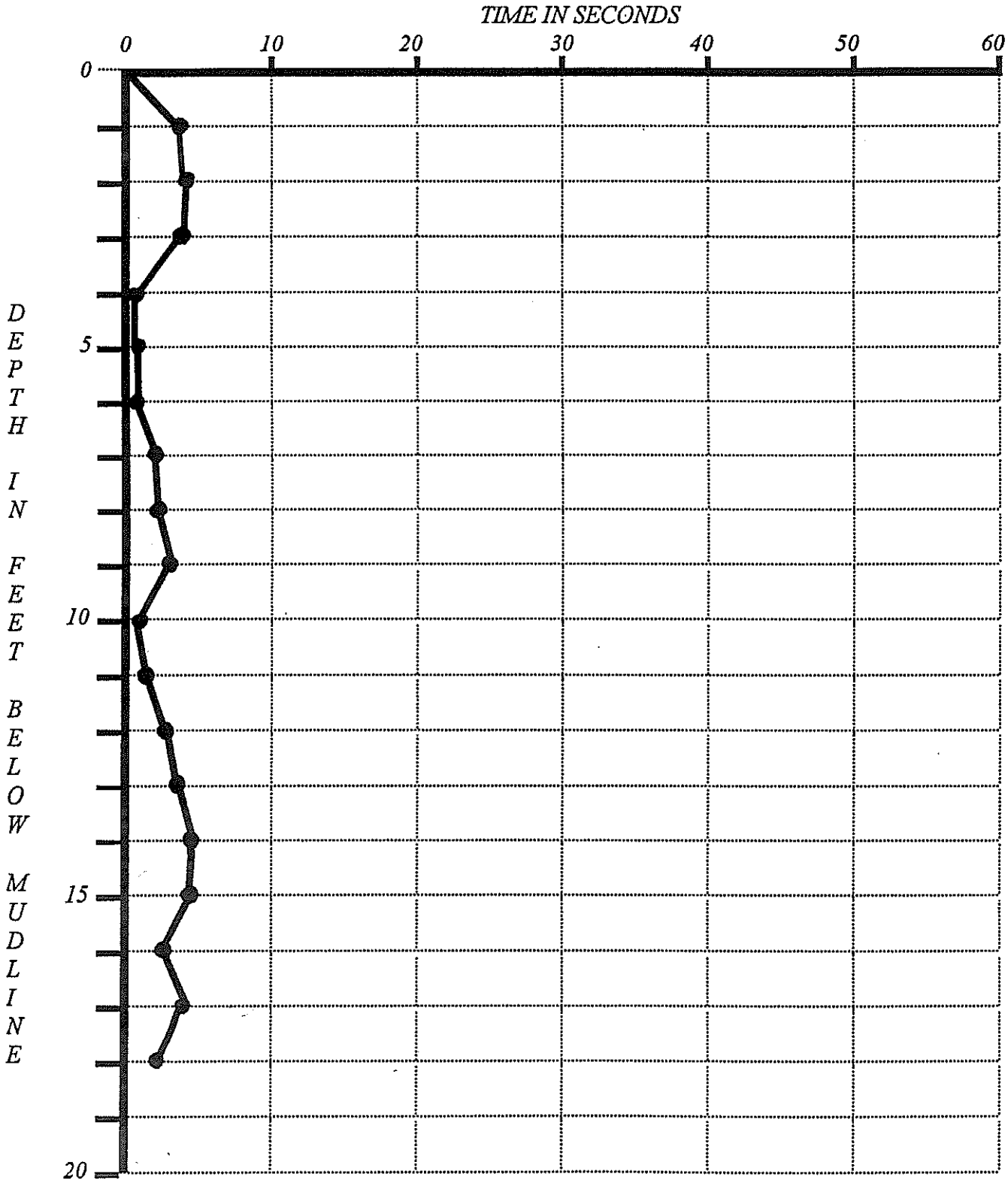
Initials: [illegible]

C:\Norvell/Calc-for/Sand-range

Penetration Graphs

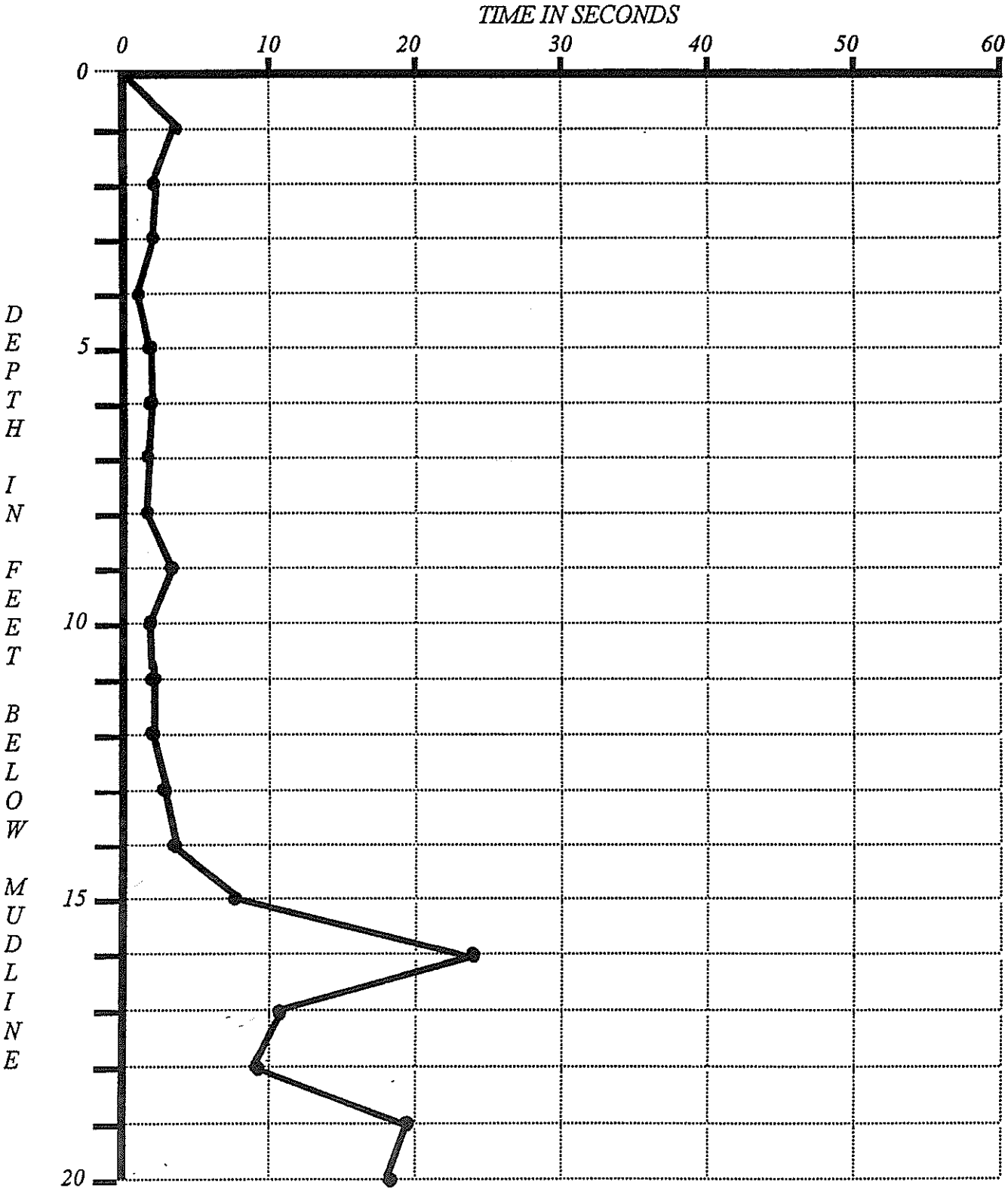
PENETRATION GRAPH

CORE NO. DRV-2 *LOCATION: LATITUDE* N 39° 53' 36.810" *LONGITUDE* W 075° 08' 11.099"
DATE: 8/23/95 *START TIME:* 1334 *STOP TIME:* 1337
WATER DEPTH MEASURED 50.0' *CORRECTED MLW* 46.5'
Total Penetration 18.0' Total Recovery 17. 8'



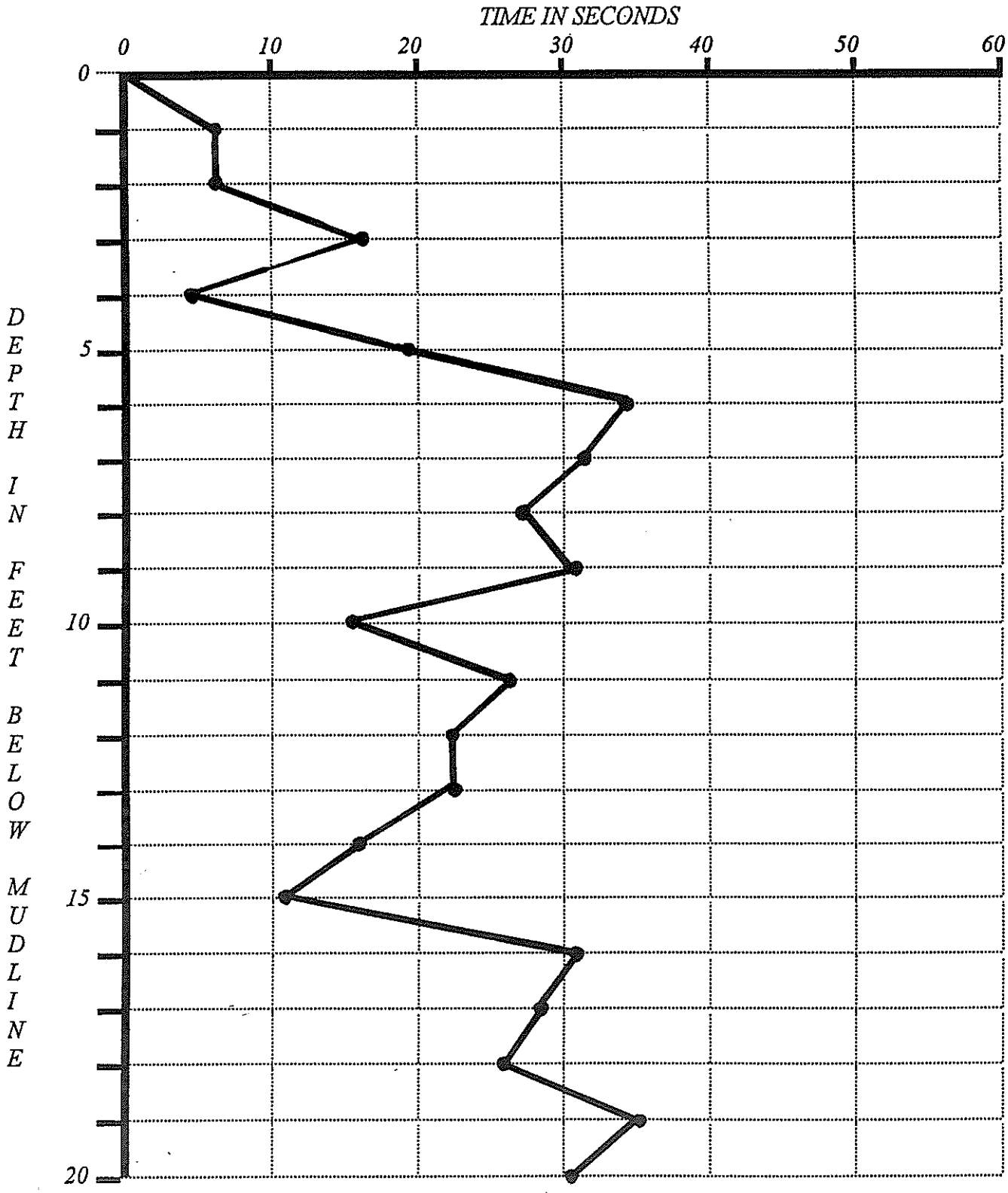
PENETRATION GRAPH

CORE NO. DRV-3 *LOCATION: LATITUDE* N 39° 53' 12.831'' *LONGITUDE* W 075° 08' 34.629"
DATE: 8/23/95 *START TIME:* 1419 *STOP TIME:* 1423
WATER DEPTH MEASURED 48..5' *CORRECTED MLW* 45.7'
Total Penetration 19.7' Total Recovery 20.0'



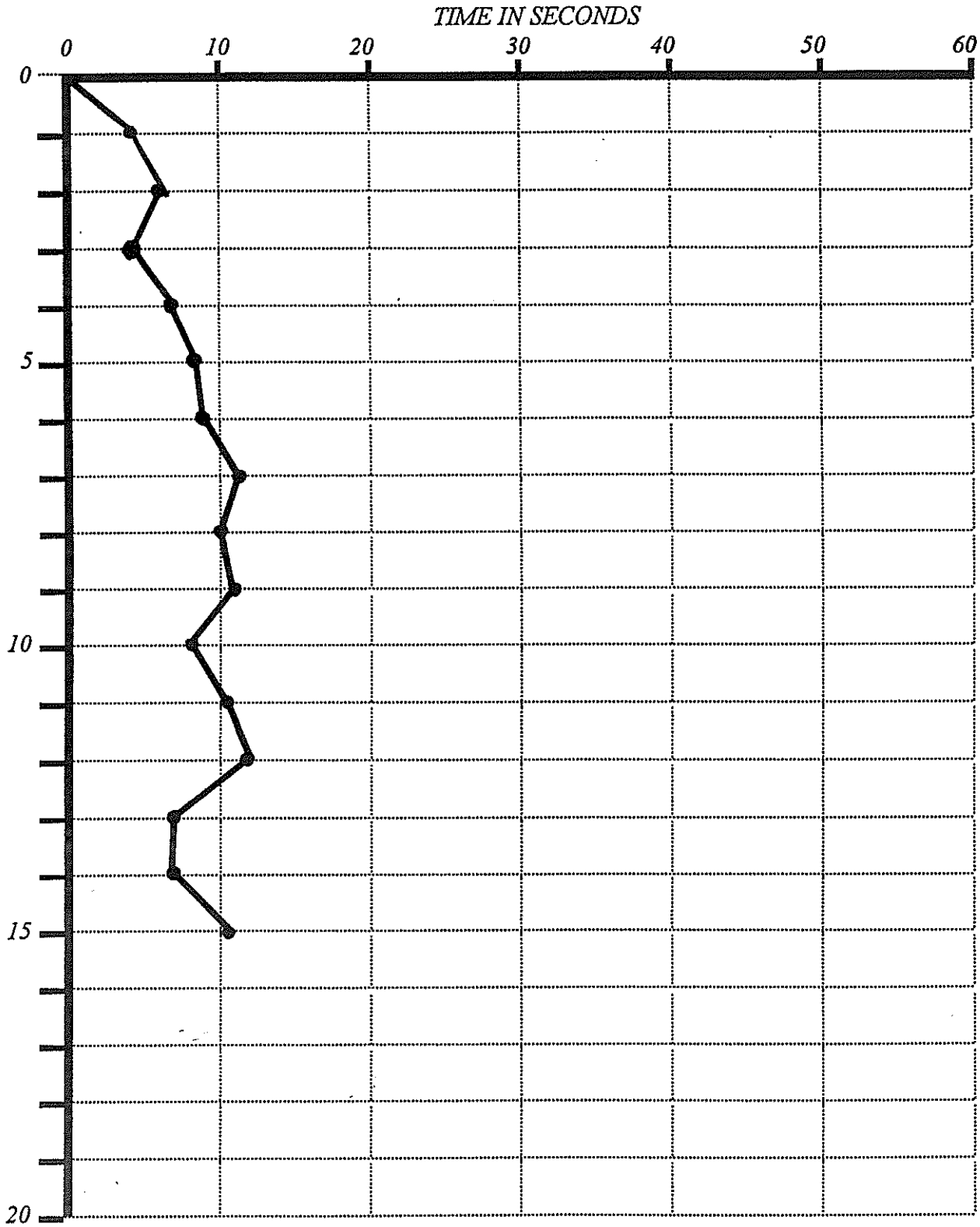
PENETRATION GRAPH

CORE NO. DRV-4 *LOCATION: LATITUDE* N 39° 52' 52.963'' *LONGITUDE* W 075° 10' 22.470"
DATE: 8/23/95 *START TIME:* 1517 *STOP TIME:* 1524
WATER DEPTH MEASURED 15.0' *CORRECTED MLW* 13.7'
Total Penetration 20.0' Total Recovery 20.0'



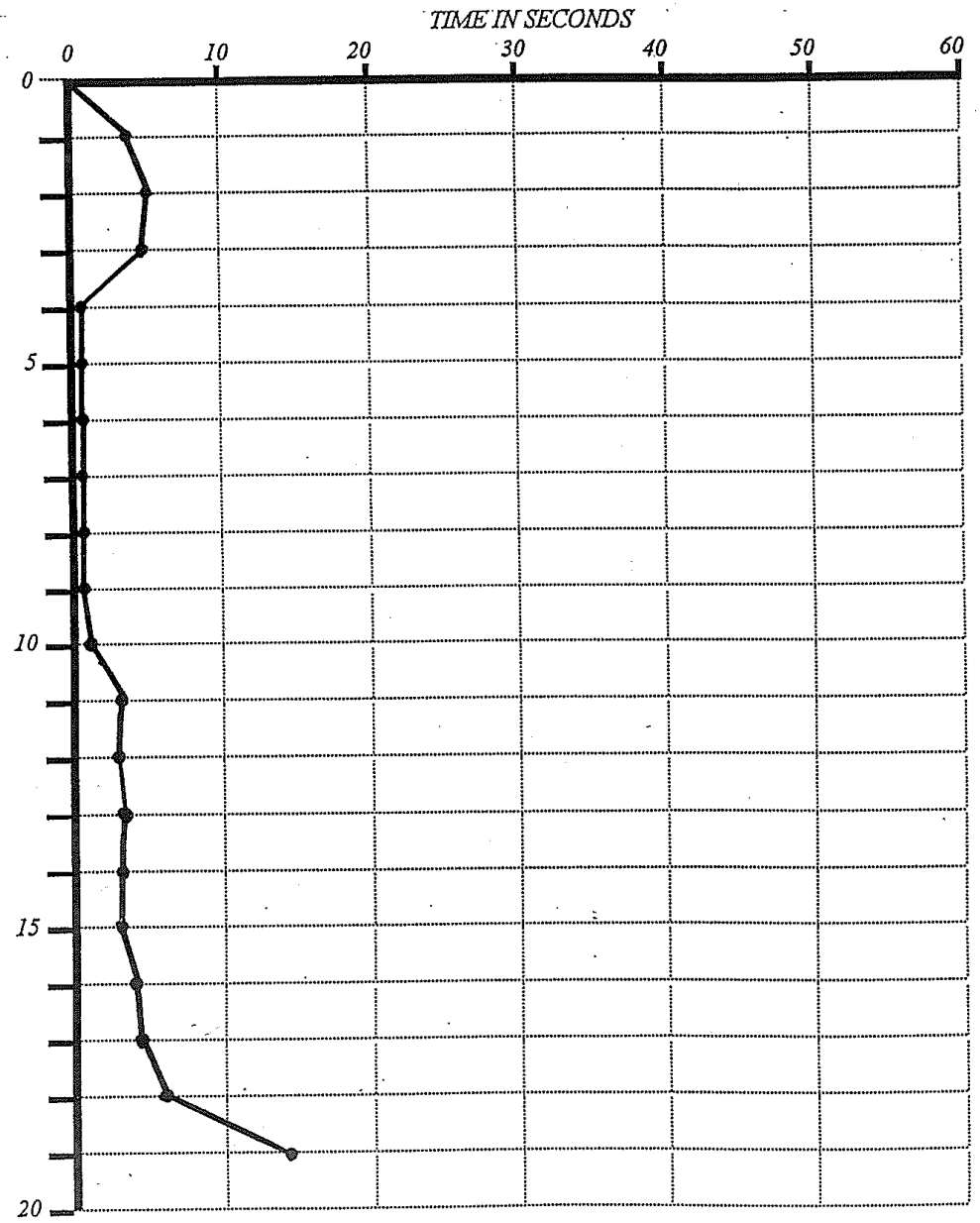
PENETRATION GRAPH

CORE NO. DRV-4A *LOCATION: LATITUDE* N 39° 52' 50.086'' *LONGITUDE* W 075° 10' 19.879"
DATE: 8/25/95 *START TIME:* 1554 *STOP TIME:* 1557
WATER DEPTH MEASURED 45.7' *CORRECTED MLW* 44.6'
Total Penetration 15.0' Total Recovery 14. 5'



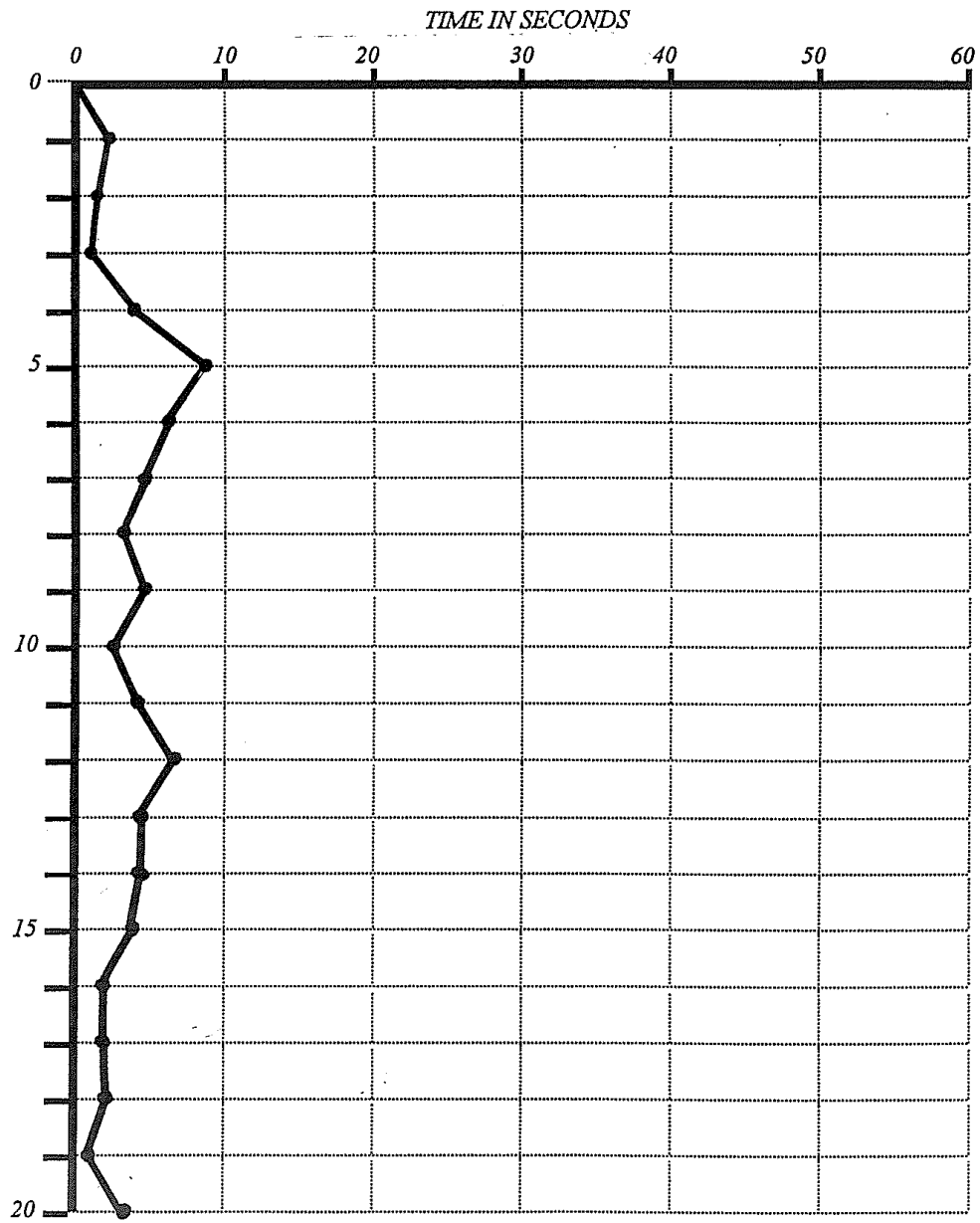
PENETRATION GRAPH

CORE NO. DRV-5 LOCATION: LATITUDE N 39° 52' 47.028" LONGITUDE W 075° 10' 53.658"
DATE: 8/24/95 START TIME: 0801 STOP TIME: 0804
WATER DEPTH MEASURED 14.0' CORRECTED MLW 15.4'
Total Penetration 19.0' Total Recovery 18.0'



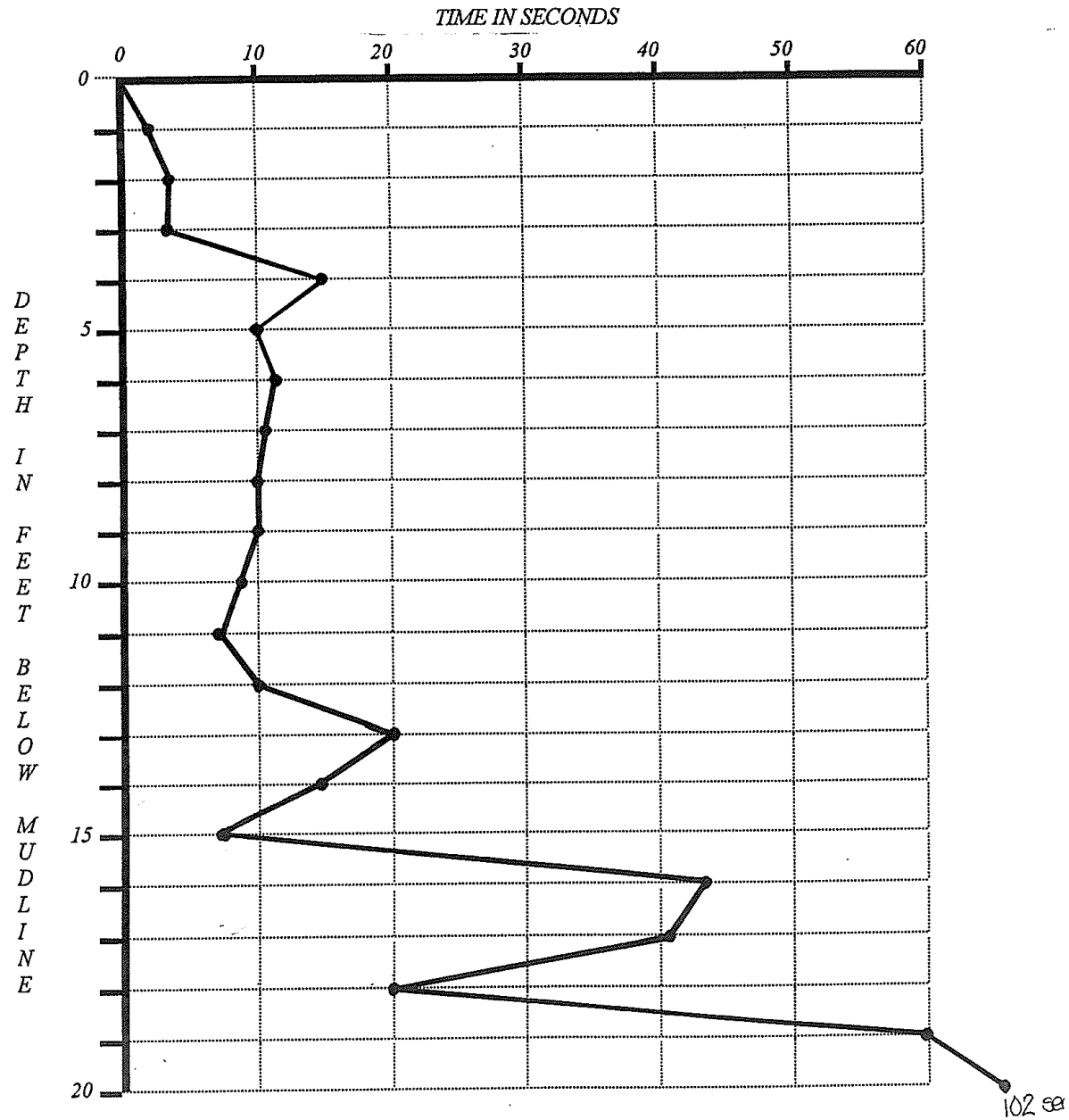
PENETRATION GRAPH

CORE NO. DRV-6 *LOCATION: LATITUDE* N 39° 52' 00.377" *LONGITUDE* W 075° 13' 10.479"
DATE: 8/24/95 *START TIME:* 0913 *STOP TIME:* 0918
WATER DEPTH MEASURED 43.0' *CORRECTED MLW* 42.5'
Total Penetration 20..0' Total Recovery 18.0'



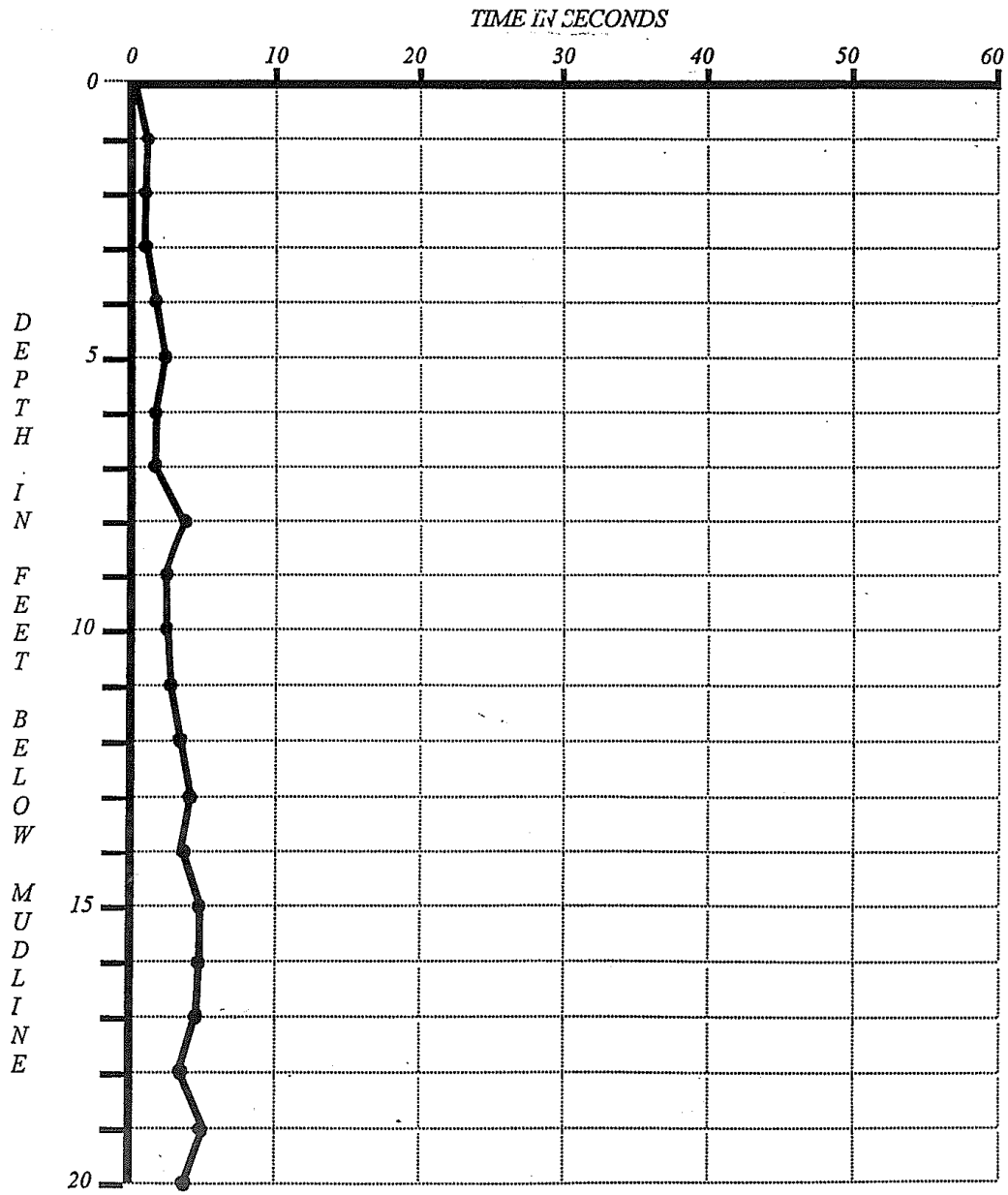
PENETRATION GRAPH

CORE NO. DRV-7 *LOCATION: LATITUDE* N 39° 51' 32.690" *LONGITUDE* W 075° 14' 29.810"
DATE: 8/25/95 *START TIME:* 1700 *STOP TIME:* 1703
WATER DEPTH MEASURED 25.0' *CORRECTED MLW* 24.0'
Total Penetration 20.0' Total Recovery 17.0'



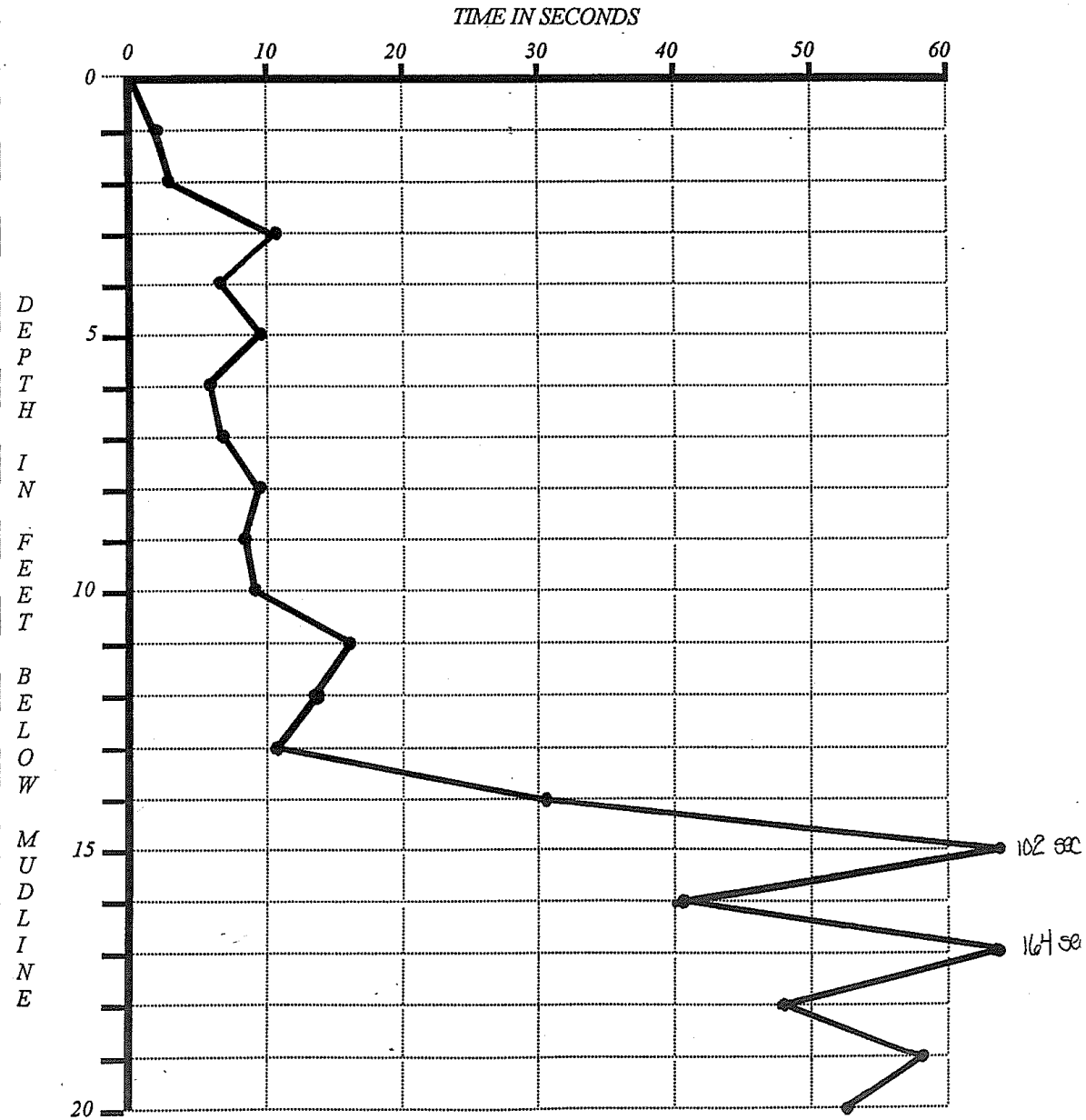
PENETRATION GRAPH

CORE NO. DRV-8A *LOCATION: LATITUDE* N 39° 51' 01.778" *LONGITUDE* W 075° 15' 45.499"
DATE: 8/26/95 *START TIME:* 0942 *STOP TIME:* 0944
WATER DEPTH MEASURED 43.0' *CORRECTED MLW* 43.5'
Total Penetration 20.0' Total Recovery 18.7'



PENETRATION GRAPH

CORE NO. DRV-9 *LOCATION: LATITUDE* N 39° 50' 54.799" *LONGITUDE* W 075° 17' 26.809"
DATE: 8/26/95 *START TIME:* 1017 *STOP TIME:* 1025
WATER DEPTH MEASURED 50.0' *CORRECTED MLW* 49.5'
Total Penetration 20.0' Total Recovery 19.0'



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Percent Moisture

AQUA SURVEY, INC.
PERCENT MOISTURE & HYDROSCOPIC CORRECTION FACTOR BENCHSHEET

Balance: Sartorious/ Mettler

Calibration: (YES) NO

Client: Weston Tetra Tech

Drying Oven: ~~QL Model 40~~ Fisher

Temperature: 105 °C

Job #: 25-016

	Sample #	A	B	C	D	E	F	G	H	I	% Moisture*	HMCF**
MC-1	20050035	1.5900	34.1244		27.3098	27.3095						
MC-2	20050126	0.9618	33.4258		28.2407	28.2407						
MC-3	0127	0.9590	37.8335		30.2280	30.2280						
MC-4	0128	0.9568	19.5785		9.2061	9.2016						
MC 5	0129	1.5871	27.7795		14.7868	14.7861						
MC 6	0130	1.5770	28.3726		19.3003	19.2989						
MC 7	0131	1.5768	31.5315		20.2876	20.2876						
MC 8	0132	1.5995	* 37.1533		29.5608	29.5608						
MC 9	0133	1.5804	* 27.1496		17.7545	17.7544						
MC 10	0134	1.5794	38.4155		30.0349	30.0349						
MC 11	0135	1.5892	21.0285		12.5379	12.5379						
MC 13	0137	1.5788	29.8313		24.0218	24.0218						
MC 14	0138	1.5854	36.1297		30.3499	30.3372						
MC 15	0139	1.5775	32.9060		20.3121	20.2936						
MC 16	0140	1.5830	24.4185		15.4998	15.4963						
MC 17	0141	1.5946	33.2445		19.4093	19.4092						
MC 18	0142	1.5859	28.2875		17.5682	17.5659						
MC 19	0143	1.5960	42.5852		32.0062	31.9837						
MC 20	0144	1.5741	22.4090		18.4596	18.4580						
MC 21	0145	1.5749	22.4944		19.3477	19.3345						
MC 23	0177	0.9597	25.8078		13.8295	13.8273						
MC 28	0181	0.9604	23.4112		15.0865	15.0831						
DUP	D 0181	0.9601	22.2264		14.2333	14.2295						
TRP	T 0181	0.9564	20.3978		13.1332	13.1292						
	Initials/ Date	AH 2/24/5			AH 2/25/5	AH 2/26/5						

A= Empty Pan (g)
B= Wet Sample + Pan (g)
C= Air Dry Sample + Pan (g)
D= First Oven Dry Sample + Pan (g)
E= Second Oven Dry Sample + Pan (g)

* pebbles not included

* % moisture = $\frac{\text{B- Final oven dry wt.}}{\text{B-A}}$ X100

** HMCF= (Final oven dry wt.- A)/ (C-A)

If oven dried sample is not ± 0.05g or at a constant weight after second oven dry, return samples to oven and use F, G, H, and I until requirement is met.

AQUA SURVEY, INC.
PERCENT MOISTURE & HYDROSCOPIC CORRECTION FACTOR BENCHSHEET

Balance: Sartorious/ Mettler

Calibration: YES NO

Client: Weston Tetra Tech

Drying Oven: QL Model 40

Temperature: 105 °C

Job #: 25-016

	Sample #	A	B	C	D	E	F	G	H	I	% Moisture*	HMCF**
MC29	20050.182	0.9673	28.5801	22.4746		22.4715						
MC30	0183	0.9638	34.5660	29.3631		29.3600						
BST-1	0034	0.9628	36.6281	27.4659		27.4580						
BST-2	0036	0.9626	25.5181	14.1159		14.1095						
BST-3	0037	0.9630	36.3274	28.9347		28.9347						
BST-4	0038	0.9594	30.3427	21.6606		21.6517						
BST-5	0039	0.9573	31.8319	22.8052		22.8004						
	Initials/ Date	MA 2/24/15			MA 2/25/15	MA 2/28/15						

A= Empty Pan (g)
B= Wet Sample + Pan (g)
C= Air Dry Sample + Pan (g)
D= First Oven Dry Sample + Pan (g)
E= Second Oven Dry Sample + Pan (g)

* % moisture = $\frac{\text{B- Final oven dry wt.}}{\text{B-A}}$ X100

** HMCF= (Final oven dry wt.- A)/ (C-A)

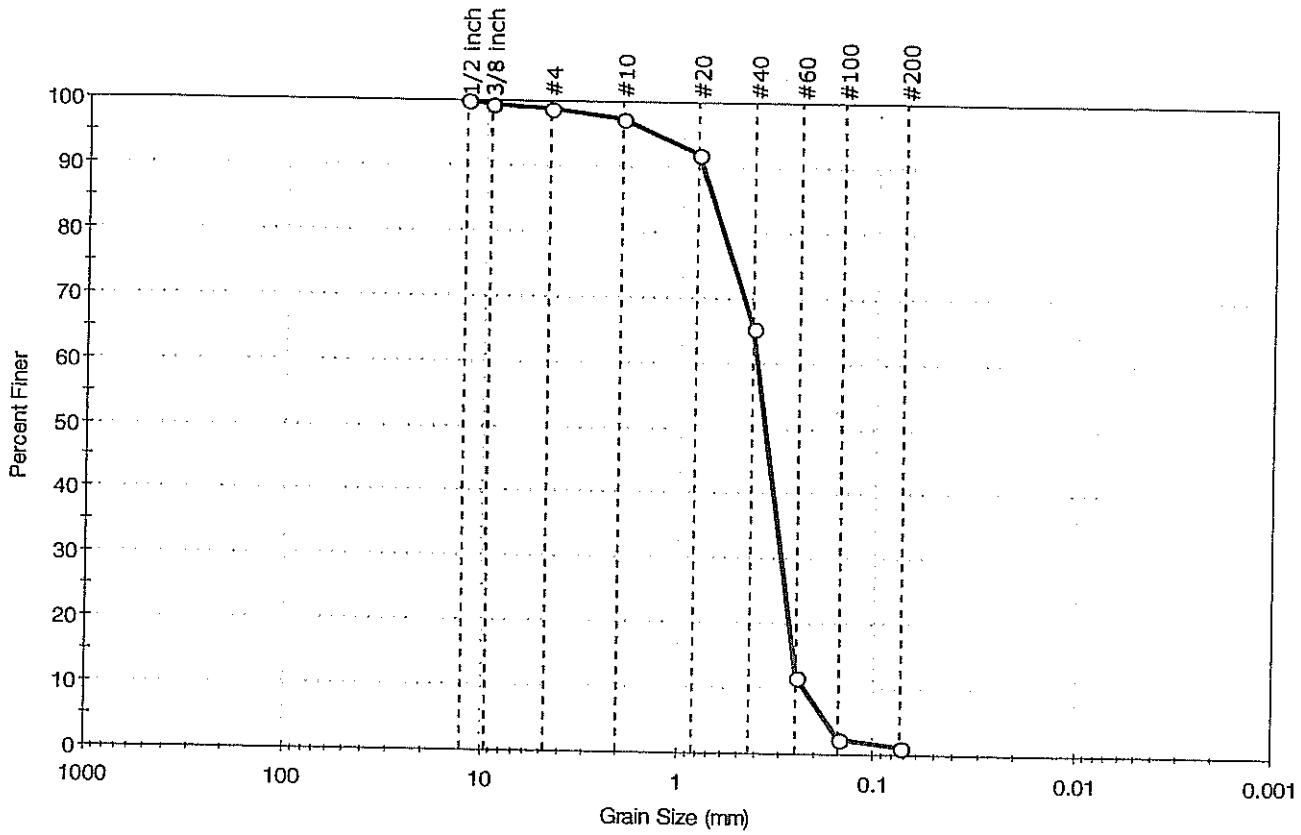
If oven dried sample is not ± 0.05g or at a constant weight after second oven dry, return samples to oven and use F, G, H, and I until requirement is met.

Column Settling

GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project:	Delaware River Port Authority		
Location:	PA-NJ	Project No:	GTX-5775
Boring ID: ---	Sample Type: bucket	Tested By:	ahp
Sample ID: SAND SP	Test Date: 03/14/05	Checked By:	jdt
Depth : ---	Test Id: 67215		
Sample Description:	Moist, dark grayish brown sand		
Sample Comment:	---		
Test Comment:	---		

Particle Size Analysis - ASTM D 422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	1.2	97.7	1.1

Sieve Name	Sieve Size (mm)	Percent Finer	Spec. Percent	Complies
1/2 inch	12.70	100		
3/8 inch	9.51	99		
#4	4.75	99		
#10	2.00	97		
#20	0.84	92		
#40	0.42	66		
#60	0.25	12		
#100	0.15	2		
#200	0.074	1		

Coefficients

D_{85} = 0.7031 mm D_{30} = 0.2990 mm
D_{60} = 0.4021 mm D_{15} = 0.2579 mm
D_{50} = 0.3643 mm D_{10} = 0.2264 mm
C_u = 1.776 C_c = 0.222

Classification

ASTM Poorly graded sand (SP)

AASHTO Fine Sand (A-3 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ROUNDED

Sand/Gravel Hardness : HARD

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GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

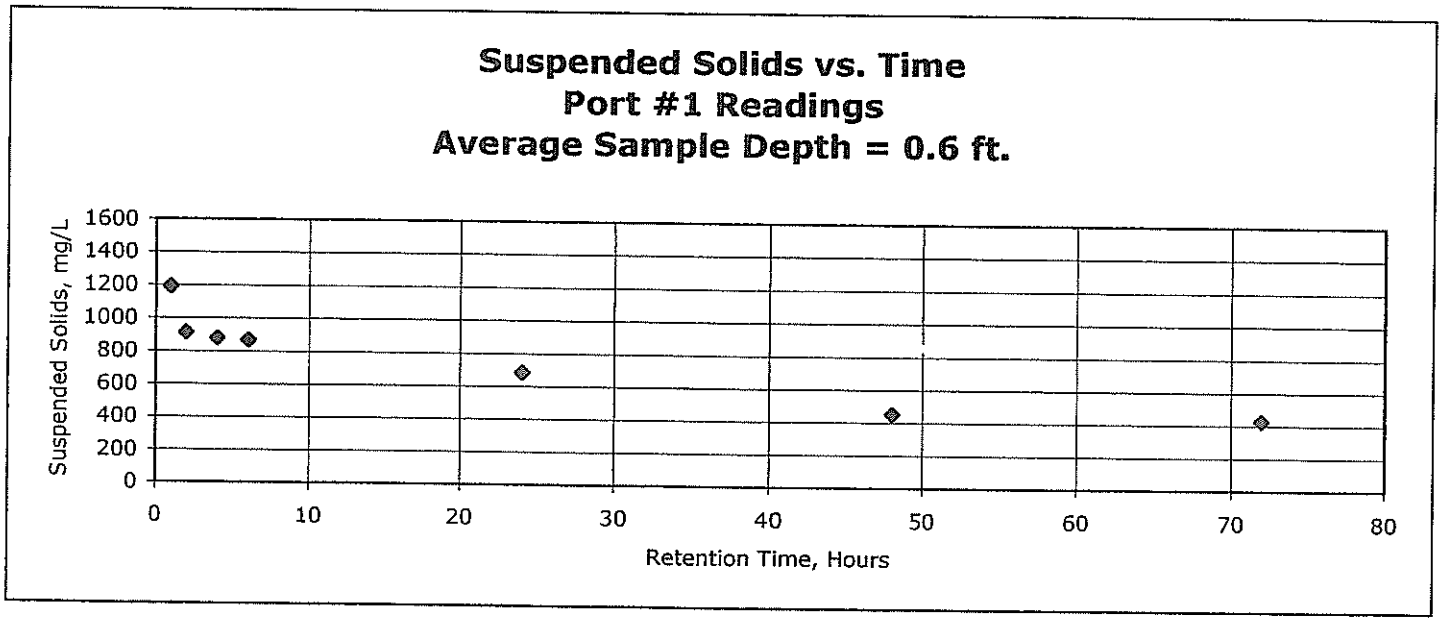
Column Settling Test

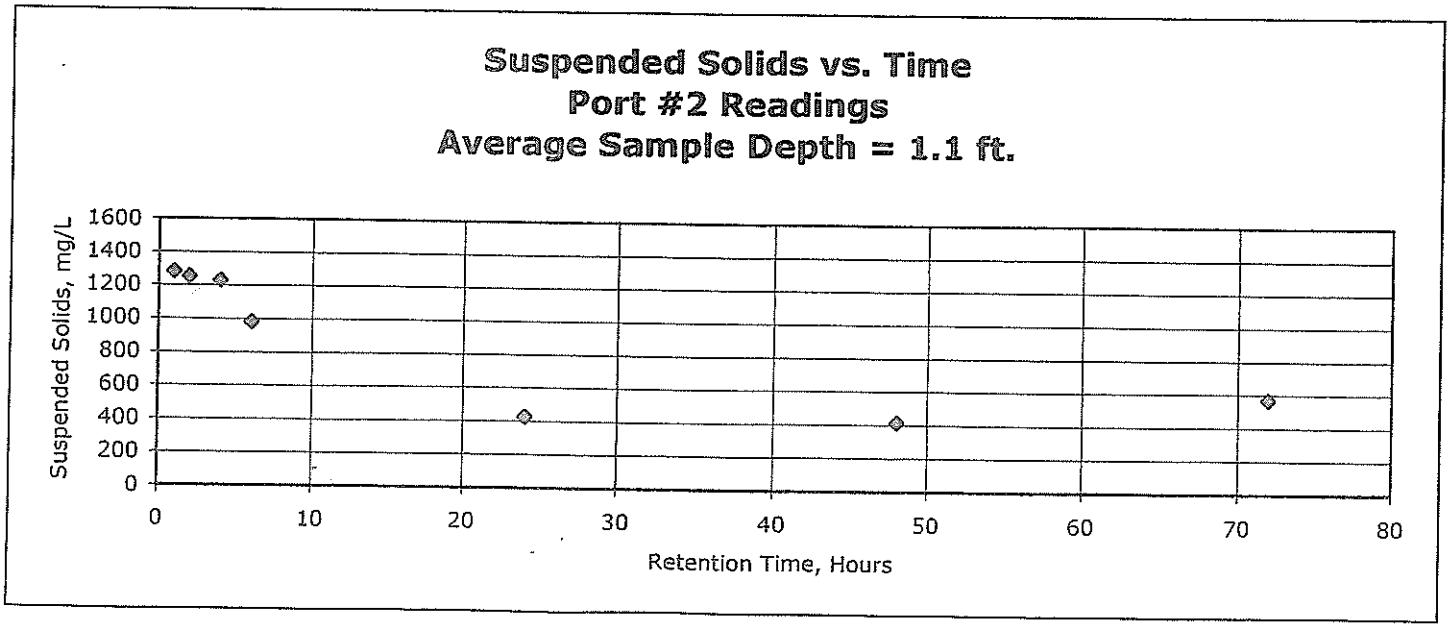
Time, hours	Depth of Sample Extraction, feet	Solids, grams	Volume of water, ml	Suspended Solids, mg/mL or g/L	Suspended Solids, mg/L
1	0.69	0.05	42.03	1.2	1190
1	1.19	0.05	39.06	1.3	1280
1	1.69	0.04	42.53	0.9	941
1	2.19	0.04	41.09	1.0	973
1	2.69	0.05	40.81	1.2	1225
1	3.19	0.05	48.24	1.0	1036
1	3.69	0.05	43.46	1.2	1150
2	0.67	0.04	43.91	0.9	911
2	1.17	0.05	39.96	1.3	1251
2	1.67	0.05	53.53	0.9	934
2	2.17	0.05	46.75	1.1	1070
2	2.67	0.05	43.74	1.1	1143
2	3.17	0.05	52.96	0.9	944
2	3.67	0.05	55.08	0.9	908
4	0.65	0.04	45.56	0.9	878
4	1.15	0.05	40.68	1.2	1229
4	1.65	0.04	40.62	1.0	985
4	2.15	0.05	44.39	1.1	1126
4	2.65	0.05	45.35	1.1	1103
4	3.15	0.04	45.63	0.9	877
4	3.65	0.04	44.22	0.9	905
6	0.63	0.04	46.09	0.9	868
6	1.13	0.05	50.91	1.0	982
6	1.63	0.05	48.96	1.0	1021
6	2.13	0.05	52.94	0.9	944
6	2.63	0.04	50.06	0.8	799
6	3.13	0.04	50.46	0.8	793
6	3.63	0.04	49.74	0.8	804
24	0.59	0.03	43.85	0.7	684
24	1.09	0.02	46.9	0.4	426
24	1.59	0.02	42.93	0.5	466
24	2.09	0.03	45.73	0.7	656
24	2.59	0.02	45.25	0.4	442
24	3.09	0.02	52.58	0.4	380
24	3.59	0.02	43.95	0.5	455
48	0.54	0.02	44.2	0.5	452
48	1.04	0.02	48.46	0.4	413
48	1.54	0.02	49.14	0.4	407
48	2.04	0.03	49.07	0.6	611
48	2.54	0.01	50.15	0.2	199
48	3.04	0.01	47.51	0.2	210
48	3.54	0.03	51.51	0.6	582
72	0.53	0.02	46.77	0.4	428
72	1.03	0.03	52.89	0.6	567
72	1.53	0.02	54.66	0.4	366
72	2.03	0.04	60.48	0.7	661
72	2.53	0.02	53.07	0.4	377
72	3.03	0.01	51.33	0.2	195
72	3.53	0.03	48.78	0.6	615

GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test

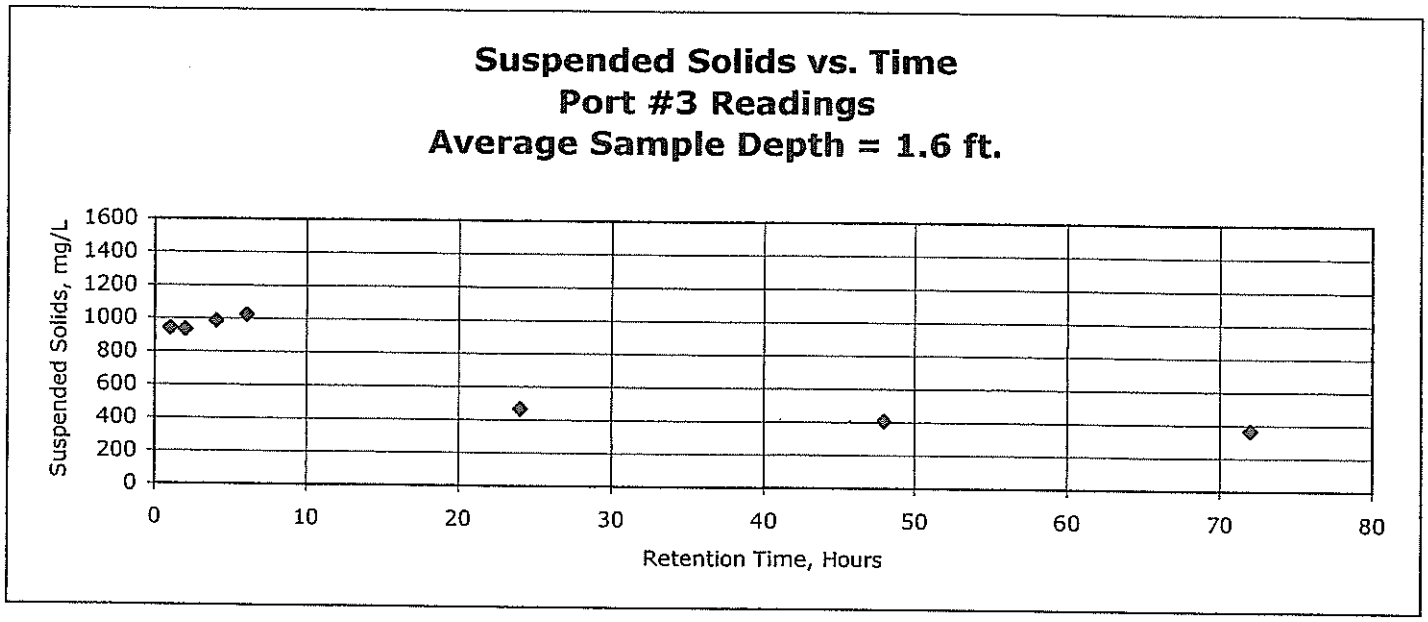


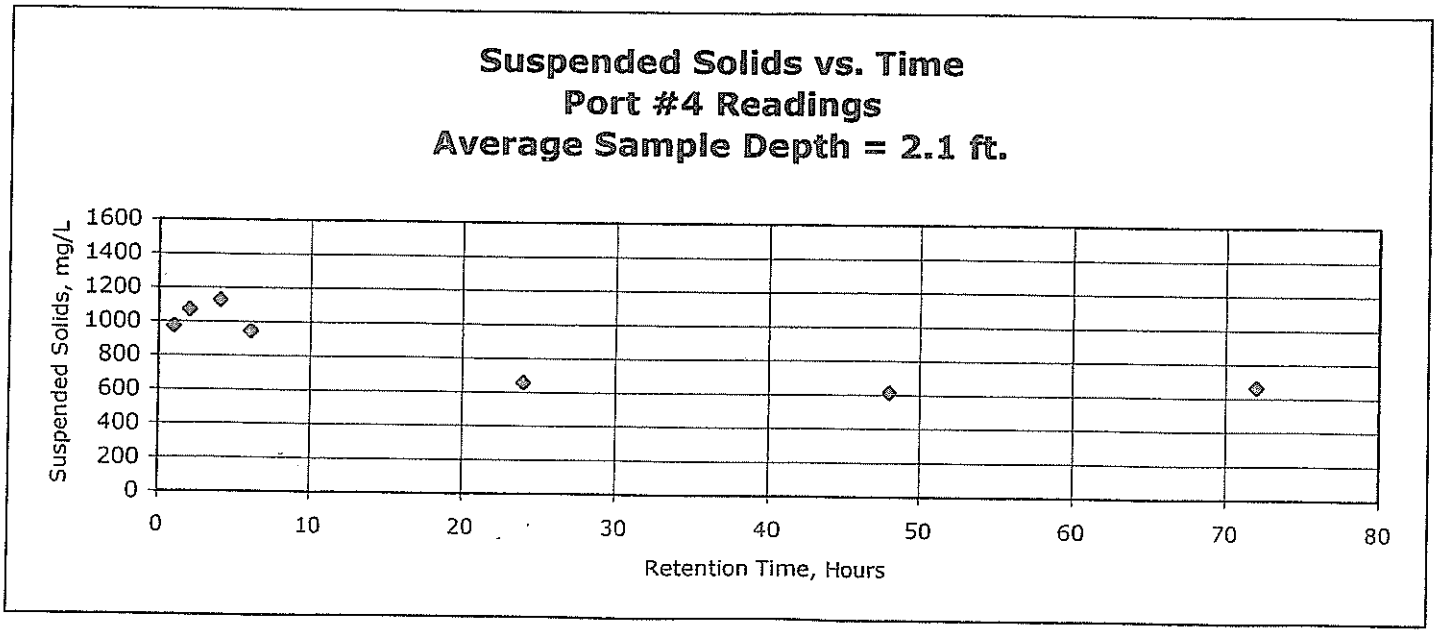


GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test

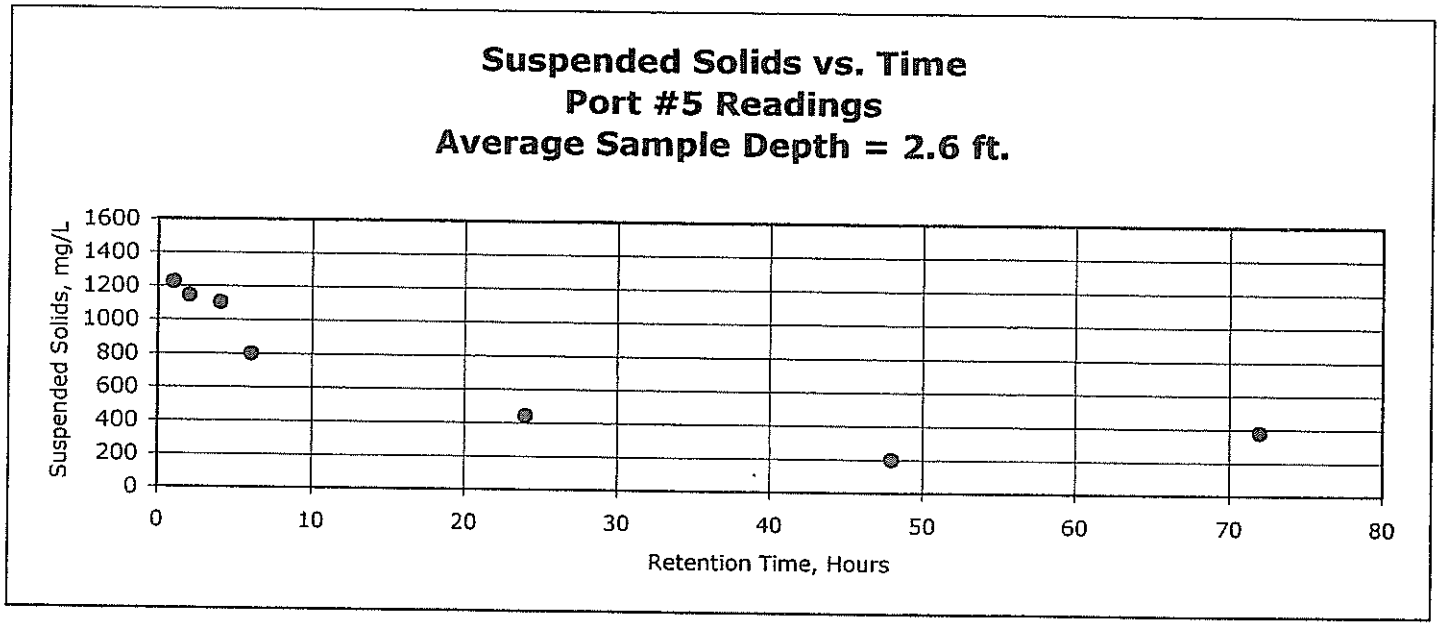


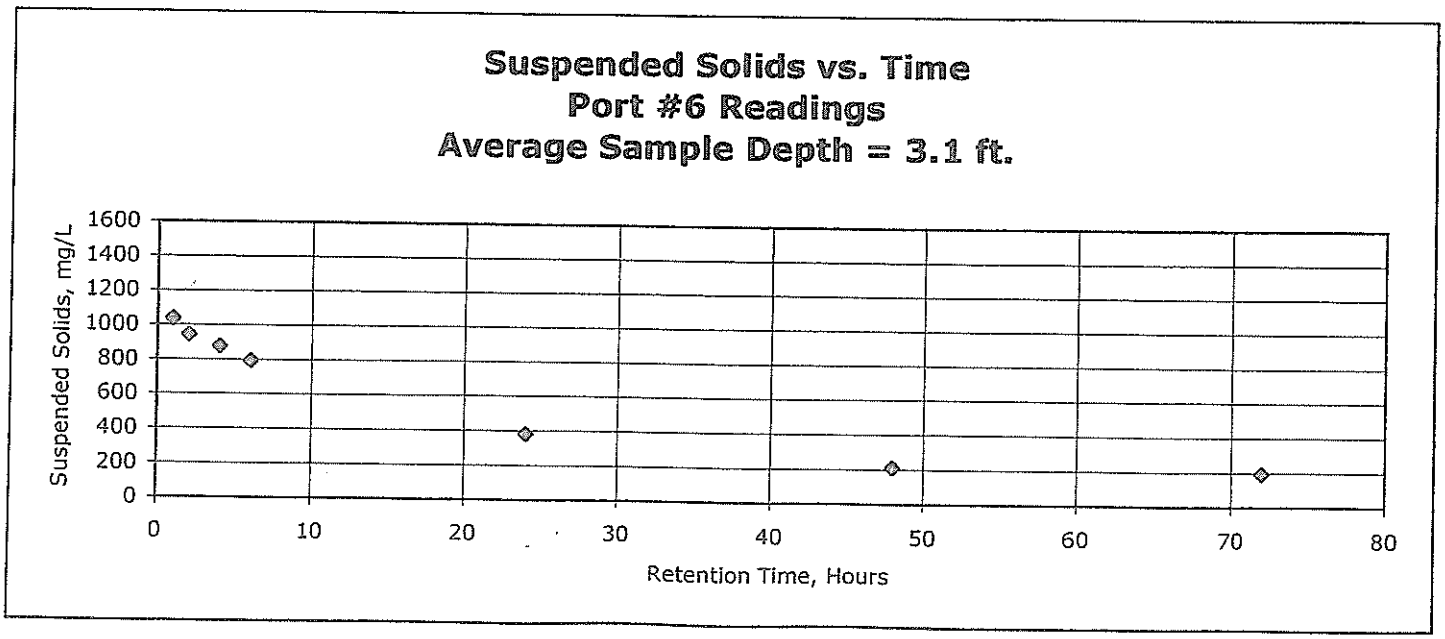


GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test

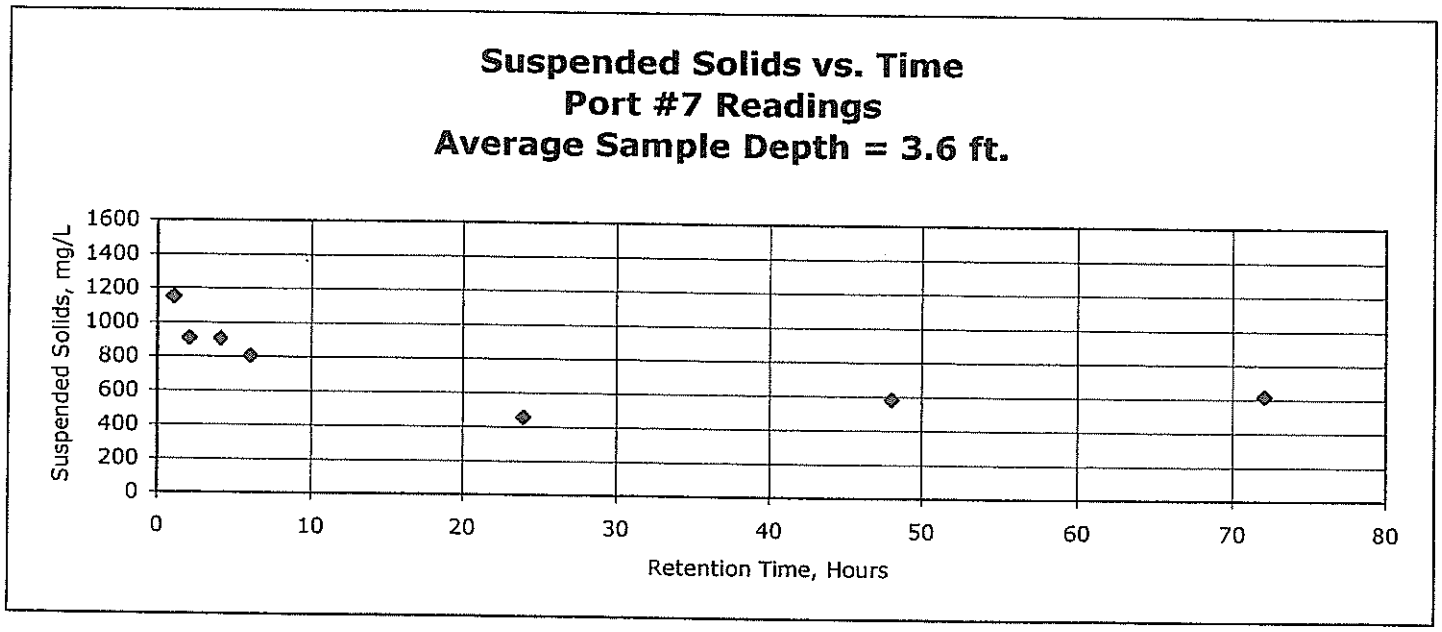




GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

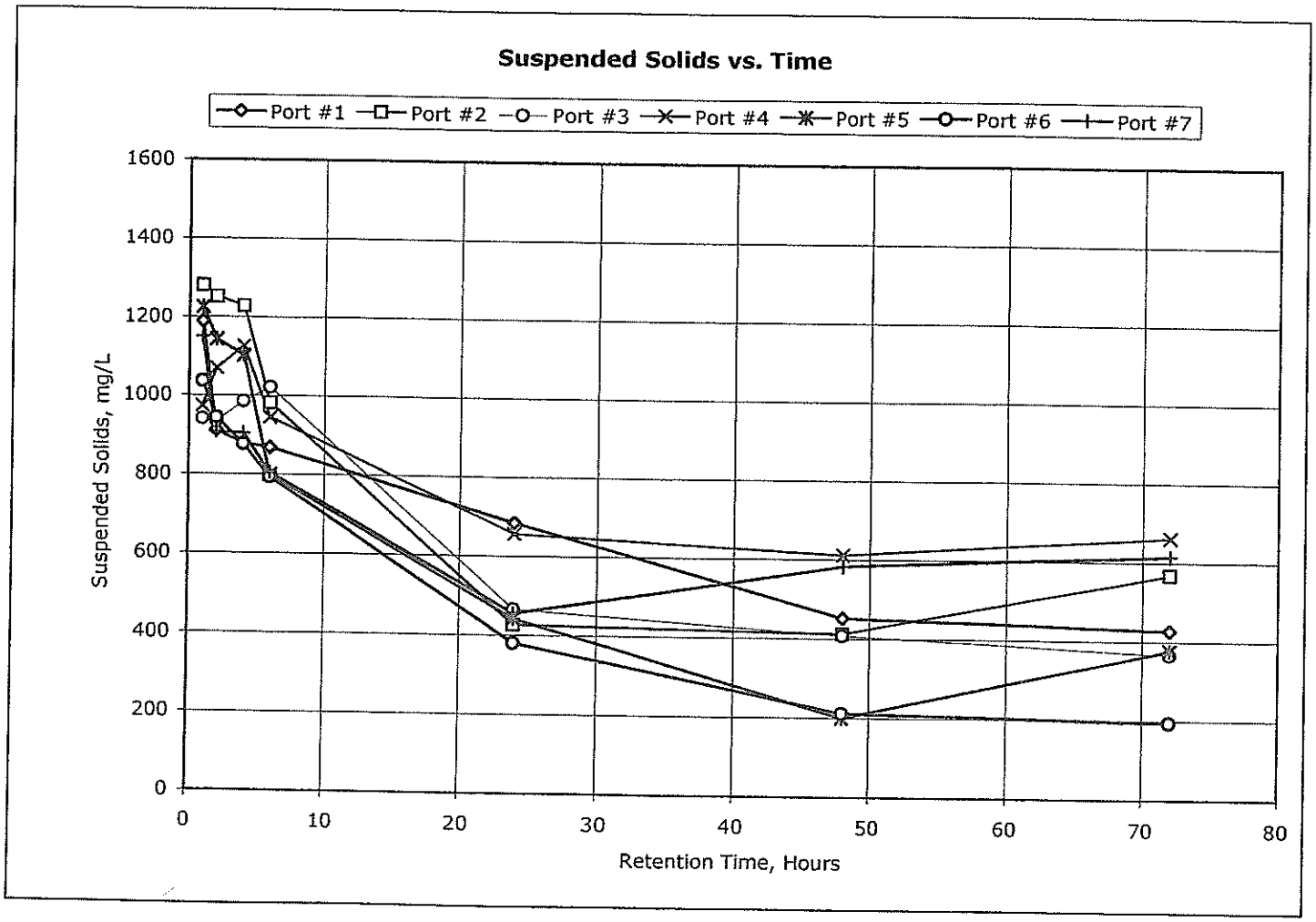
Column Settling Test



GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/22-03/25/05	Checked By:	jdt
Sample ID:	SAND SP		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test

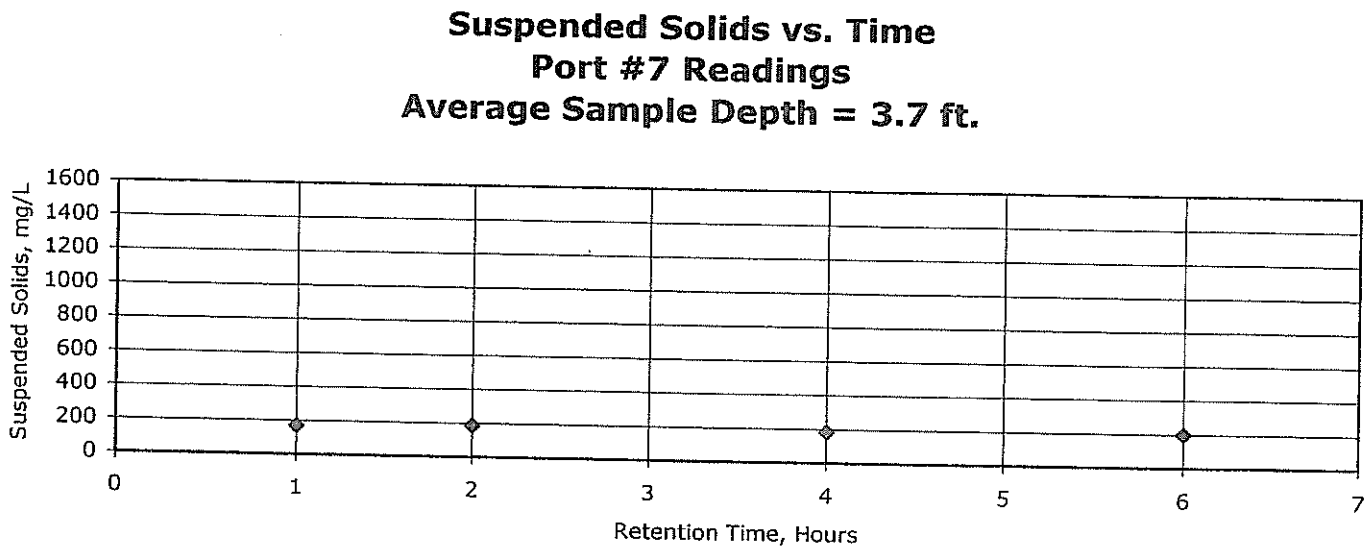


Port #	Average Sample Depth, ft
1	0.6
2	1.1
3	1.6
4	2.1
5	2.6
6	3.1
7	3.6

GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/29-03/31/05	Checked By:	jdt
Sample ID:	SAND SM		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

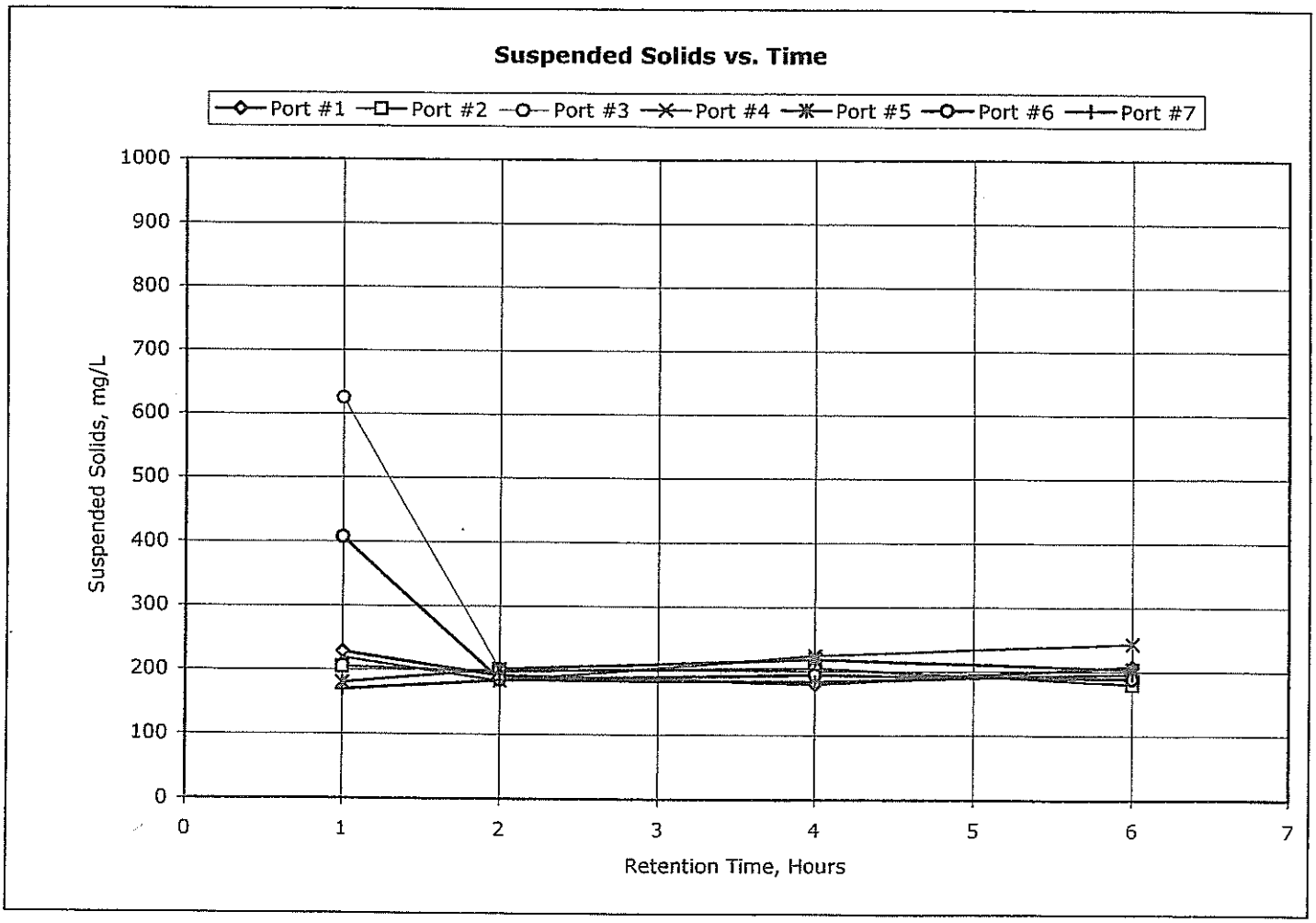
Column Settling Test



GeoTesting express

Client:	Tetra Tech FW, Inc.		
Project Name:	Delaware River Port Authority		
Project Location:	Pennsylvania-New Jersey		
GTX #:	5775	Tested By:	md
Test Date:	03/29-03/31/05	Checked By:	jdt
Sample ID:	SAND SM		
Preparation:	150 gram per Liter slurry prepared. Stirred by mechanical mixer to remove large clumps of material immediately prior to pouring into chamber. Initial height of slurry = 5.25 ft.		

Column Settling Test



Port #	Average Sample Depth, ft
1	0.7
2	1.2
3	1.7
4	2.2
5	2.7
6	3.2
7	3.7

GeoTesting
express

WARRANTY and LIABILITY

GeoTesting Express (GTX) warrants that all tests it performs are run in general accordance with the specified test procedures and accepted industry practice. GTX will correct or repeat any test that does not comply with this warranty. GTX has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

GTX may report engineering parameters that require us to interpret the test data. Such parameters are determined using accepted engineering procedures. However, GTX does not warrant that these parameters accurately reflect the true engineering properties of the *in situ* material. Responsibility for interpretation and use of the test data and these parameters for engineering and/or construction purposes rests solely with the user and not with GTX or any of its employees.

GTX's liability will be limited to correcting or repeating a test which fails our warranty. GTX's liability for damages to the Purchaser of testing services for any cause whatsoever shall be limited to the amount GTX received for the testing services. GTX will not be liable for any damages, or for any lost benefits or other consequential damages resulting from the use of these test results, even if GTX has been advised of the possibility of such damages. GTX will not be responsible for any liability of the Purchaser to any third party.

Commonly Used Symbols

A	pore pressure parameter for $\Delta\sigma_1 - \Delta\sigma_3$
B	pore pressure parameter for $\Delta\sigma_3$
CIU	isotropically consolidated undrained triaxial shear test
CR	compression ratio for one dimensional consolidation
C_c	coefficient of curvature, $(D_{30})^2 / (D_{10} \times D_{60})$
C_u	coefficient of uniformity, D_{60}/D_{10}
C_c	compression index for one dimensional consolidation
C_α	coefficient of secondary compression
c_v	coefficient of consolidation
c	cohesion intercept for total stresses
c'	cohesion intercept for effective stresses
D	diameter of specimen
D_{10}	diameter at which 10% of soil is finer
D_{15}	diameter at which 15% of soil is finer
D_{30}	diameter at which 30% of soil is finer
D_{50}	diameter at which 50% of soil is finer
D_{60}	diameter at which 60% of soil is finer
D_{85}	diameter at which 85% of soil is finer
d_{50}	displacement for 50% consolidation
d_{90}	displacement for 90% consolidation
d_{100}	displacement for 100% consolidation
E	Young's modulus
e	void ratio
e_c	void ratio after consolidation
e_o	initial void ratio
G	shear modulus
G_s	specific gravity of soil particles
H	height of specimen
PI	plasticity index
i	gradient
K_o	lateral stress ratio for one dimensional strain
k	permeability
LI	Liquidity Index
m_v	coefficient of volume change
n	porosity
PI	plasticity index
P_c	preconsolidation pressure
p	$(\sigma_1 + \sigma_3) / 2$, $(\sigma_v + \sigma_h) / 2$
p'	$(\sigma'_1 + \sigma'_3) / 2$, $(\sigma'_v + \sigma'_h) / 2$
p'_c	p' at consolidation
Q	quantity of flow
q	$(\sigma_1 - \sigma_3) / 2$
q_f	q at failure
q_o, q_i	initial q
q_c	q at consolidation
S	degree of saturation
SL	shrinkage limit
s_u	undrained shear strength
T	time factor for consolidation
T	temperature
t	time
U, UC	unconfined compression test
UU, Q	unconsolidated undrained triaxial test
u_a	pore gas pressure
u_e	excess pore water pressure
u, u_w	pore water pressure
V	total volume
V_g	volume of gas
V_s	volume of solids
V_v	volume of voids
V_w	volume of water
V_o	initial volume
v	velocity
W	total weight
W_s	weight of solids
W_w	weight of water
w	water content
w_c	water content at consolidation
w_f	final water content
w_l	liquid limit
w_n	natural water content
w_p	plastic limit
w_s	shrinkage limit
w_o, w_i	initial water content
α	slope of q_f versus p_f
α'	slope of q_f versus p_f'
γ_t	total unit weight
γ_d	dry unit weight
γ_s	unit weight of solids
γ_w	unit weight of water
ε	strain
ε_{vol}	volume strain
ε_h, ε_v	horizontal strain, vertical strain
μ	Poisson's ratio, also viscosity
σ	normal stress
σ'	effective normal stress
σ_c, σ'_c	consolidation stress in isotropic stress system
σ_h, σ'_h	horizontal normal stress
σ_v, σ'_v	vertical normal stress
σ_1	major principal stress
σ_2	intermediate principal stress
σ_3	minor principal stress
τ	shear stress
φ	friction angle based on total stresses
φ'	friction angle based on effective stresses
φ'_r	residual friction angle
φ_{ult}	φ for ultimate strength

REACH B

Sampling Logs

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware R., Pk. 19 to 330	34	39
Sta. 119+420 On ℄	BY HARTZELL	DATE 9/6/61

BORING	TEST PIT (X)	NO. 282
LOCATION: Sta. 119+420 On ℄		136,150 E 493,870 N
DATE MADE: 9/6/61	BY: E.P.H.	
PLANT USED: DB #37		

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler w/ lb. hammer & in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
0						Water
45 Minutes	Clamshell bucket					River bottom, - 44.0'
44.0		#1				Organic SILT; decayed vegetation; some gravelly layers. (44.0' - 50.0')
46.0						
50.0		#2				Bottom of TP, - 50.0'

NADP FORM 1 SEP 60 1104 (3-19)

TP282

(33)

BORING/TEST PIT LOG

PROJECT Del. R., Phila. to Sea	FIELD BOOK TP20	PAGE —
159 + 700 240' W. ℄ Bellevue R.	BY Reardon	DATE 1/17/62

☐ BORING ☒ TEST PIT NO. 431

LOCATION Sta. 159+700 240' W. ℄

DATE MADE 1/17/62 BY Hired Labor

PLANT USED Derrickboat 37

Drilling/Excavating Time: 1 Hr. 48 Mins.

Type penetration: clamshell bucket

Sample No.

Blows/ft. on sampler w/ lb. hammer

Core barrel run no. and percent core recovery

Graphic legend

MATERIALS DESCRIPTION

0 — Water

River bottom, - 35.2'

35.2 — Dark gray SILT. (35.2 - 38.8)

38.8 — Reddish-gray, gravelly clayey SAND; some cobbles (38.8 - 40.8)

39.8

40.8 — Red sandy CLAY; some gravel & cobbles. (40.8 - 42.7)

41.8

42.7 — ~~Stiff, red & gray CLAY~~ (42.7 - 43.7)

44.2 — Red & gray CLAY with cobbles (43.7 - 44.2)

Bottom of hole, - 44.2'

106700 E
~~478~~340 N

NADP FORM 1 SEP 60 11034 (3-19)

TP 431

BORING/TEST PIT LOG

PROJECT Sa. R., Phila to Sea	FIELD BOOK TP 2C	PAGE —
Sta 151+920 455' E of ℄	BY Recraan	DATE 1/19/62

☐ BORING ☒ TEST PIT NO. 435

LOCATION Sta. 151+920 455' E. ℄

DATE MADE 1/19/62 BY Hired Labor

PLANT USED Derrickboat 37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
18 Mins.	Clamshell bucket	1, 2				

0 — Water

36.2 — River bottom, -36.2'

37.6 — Soft, dark gray organic SILT & CLAY with occasional fine sandy layers. (36.2 - 50.3)

50.3 — Bottom of hole, -50.3'

111540 E
473548 N

NADP FORM 1 SEP 60 1104 (3-19)

TP435

BORING/TEST PIT LOG

PROJECT Del. R., Phila. to Sea	FIELD BOOK TP 20	PAGE — X
Sta 150+000 450' E ℄	BY Reorrior	DATE 1/19/62

☐ BORING ☒ TEST PIT NO. 436

LOCATION Sta. 150+000 450' E. ℄

DATE MADE 1/19/62 BY Hired Labor

PLANT USED Derrickboat 37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
0						
						Water
36.8	16 Minutes Clamshell bucket					River bottom, - 36.8'
39.0		1				Soft, dark gray organic SILT and CLAY with occasional fine sandy layers. (36.8 - 46.3)
						Mat'l becomes stiffer @ 45.0'
46.3		2				Bottom of hole, - 46.3'

112500 E
~~474~~800 N

NADP FORM 1104 (3-19)
1 SEP 60

TP 436

329

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Sa. R., Pn. 12 to Sea	TP 20	—
Sta. 149+950 450' W. ℄ Bellevue	BY Reardon	DATE 1/19/62

☐ BORING ☒ TEST PIT NO. 437

LOCATION: Sta. 149+950 450' W. ℄

DATE MADE: 1/19/62 BY: Hired Labor

PLANT USED: Derrickboat 37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
1 Hr. 8 Mins.	Clamshell bucket					0 — Water
						39.4 — River bottom, - 39.4'
		1				39.8 — Reddish sandy GRAVEL; Some indurated pieces; gravel rounded; some cobbles and occasional small boulder. (39.4-44.7)
		2				44.7 — Bottom of hole, - 44.7'

112240 E
475400 N.

NADP FORM 1 SEP 60 1104 (3-19)

TP.437

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Del. R. Fr. [illegible]	55	9
Sta. 146+000 450' W ℄ Belleville	BY Dept. [illegible]	DATE 1/22/62

☐ BORING ☒ TEST PIT — NO. 438

LOCATION: Sta. 146+000 450' W.℄

DATE MADE: 1/22/62 — BY: Hired Labor

PLANT USED: Derrickboat 37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler w/ lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0						Water
						River bottom, - 39.3'
39.3		1				Gray SAND & GRAVEL. (39.3-40.8)
40.8						Sandy GRAVEL with cobbles and small boulders; some reddish silt and clay. Small clay seam @ 42.6'. (40.8 - 45.0)
42.6		2				
45.0						Bottom of hole, - 45.0'

1 Hr. 05 Mins.

Clamshell bucket

114[illegible] E
47[illegible] N

NADP FORM 1104 (3-19)
1 SEP 60

TP438

330

VANDEMARK & LYNCH, INC.
ENGINEERS • PLANNERS • SURVEYORS

4305 MILLER RD./PO BOX 2047
WILMINGTON, DE 19899/(302) 764-7635

August 21, 1996

Mr. Lowell Babb
WARREN GEORGE, INC.
Foot of Jersey Avenue
P.O. Box 413
Jersey City, NJ 07303

RE: DRILL HOLES (CORE BORINGS)
DELAWARE RIVER, CLAYMONT, DE TO ESSINGTON, PA
AS-DRILLED LOCATIONS

Dear Mr. Babb:

The following list of core borings were field located between July 25, 1996 through August 14, 1996.

Horizontal positions are based on New Jersey State - Zone 2900 coordinate system and reduced depths are at river bottom, referenced to mean low water datum.

Boring Number	Plan Position *	Actual Position	Reduced Depth
269	N. 363337.470 E. 246305.640	N. 363336 E. 246301	-45.2
267	N. 362789.190 E. 245738.550	N. 362791 E. 245738	-41.6
266	N. 362407.910 E. 245243.340	N. 362410 E. 245240	-45.4
265	N. 361927.160 E. 244561.000	N. 361925 E. 244559	-45.5
271	N. 365943.810 E. 249591.390	N. 365947 E. 249592	-45.5
273	N. 366052.160 E. 250080.090	N. 366052 E. 250079	-44.6
272	N. 365829.72 E. 249963.95	N. 365829 E. 249963	-44.0

274	N. 366328.130 E. 250469.530	N. 366325 E. 250470	-43.2
277	N. 367907.380 E. 25248.640	N. 367909 E. 252249	-45.2
276	N. 367286.000 E. 252294.950	N. 367285 E. 252296	-44.0
275	N. 366805.280 E. 250816.090	N. 366807 E. 250817	-44.5
270	N. 364360.110 E. 248389.300	N. 364360 E. 248389	-44.8
278	N. 368023.090 E. 253293.450	N. 368025 E. 253295	-43.7
279	N. 368493.130 E. 253423.840	N. 368491 E. 253424	-43.7
280	N. 368698.340 E. 253335.080	N. 369694 E. 253334	-44.7
281	N. 369002.250 E. 253852.160	N. 369002 E. 253851	-44.2
282	N. 369842.750 E. 255526.410	N. 369843 E. 255528	-44.1
283	N. 370754.440 E. 257909.340	N. 370753 E. 257907	-44.4
284	N. 371295.56 E. 259166.62	N. 371297 E. 259167	-45.0
285	N. 370927.28 E. 259700.09	N. 370927 E. 259698	-46.2
286	N. 371302.34 E. 259967.87	N. 371303 E. 259967	-44.4
268	N. 362521.590 E. 246354.720	N. 362521 E. 246355	-43.6
264	N. 361406.130 E. 243780.520	N. 361406 E. 243780	-47.8
263	N. 361020.090 E. 243184.890	N. 361020 E. 243184	-47.3

262	N. 360060.940 E. 242995.480	N. 360060 E. 242994	-44.7
254	N. 348835.530 E. 224069.590	N. 348834 E. 224070	-43.4
256	N. 348938.880 E. 225062.090	N. 348939 E. 225062	-46.4
255	N. 349092.250 E. 224614.090	N. 349091 E. 224613	-41.6
261	N. 360544.060 E. 242420.410	N. 360544 E. 242420	-45.6
260	N. 359833.560 E. 242630.340	N. 359833 E. 242632	-44.7
259	N. 360124.880 E. 241902.360	N. 360126 E. 241902	-45.3
257	N. 352463.470 E. 229476.440	N. 352463 E. 229476	41.3
258	N. 359658.310 E. 241023.770	N. 359658 E. 241024	-47.1

* Plan positions supplied by the U.S. Army Corps of Engineers, Philadelphia District.

If you have any questions or wish to discuss this further, please feel free to contact us.

Thank you for selecting VanDemark & Lynch, Inc. We enjoy your business and would appreciate any suggestions on how we could improve our service to you.

Sincerely,

John S. Bianco

hn S. Bianco, P.L.S.
Hydrographic Survey Department

jbk9/warren.let

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-254
LINE & STA.
OFFSET

DEPTH _____ FT. ____ FT. CASING OUT DATE: _____
DEPTH _____ FT. ALL CASING OUT DATE: _____

DATE, START: 8-8-96
DATE, FINISH: 8-8-96

GROUND ELEVATION _____
GROUND WATER ELEVATION _____

CASING O.D. 5"-4" I.D. _____
SAMPLER O.D. _____ I.D. _____
DIAMOND BIT SIZE _____

WEIGHT OF HAMMER _____ LBS.
INSIDE LENGTH OF SAMPLER _____ IN.

HAMMER FALL
CASING _____ SAMPLER _____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 -12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
0											
40										0'-44'	WATER
			NO SAMPLES								
											ROCK, GNEISS, QUARTZ
50		R1	44'-49.2'	86%	REC						
10											
		R2	49.2'-52.9'	100	%	REC				52.9'	
											END OF HOLE 52.9'
60											
20											
70											
30											
80											
40											

Soil Engineer: _____ Driller: MIKE MCCARTHY

Drilling Inspector: _____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-255
LINE & STA.
OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____
DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 8-9-96
DATE, FINISH: 5"-4"

GROUND ELEVATION
GROUND WATER ELEVATION

CASING O.D. ____ I.D. ____
SAMPLER O.D. ____ I.D. ____
DIAMOND BIT SIZE

WEIGHT OF HAMMER ____ LBS.
INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL
CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-41.6'	WATER
										44.3'	OVERBURDEN SAND, GRAVEL
50											ROCK, GNEISS, QUARTZ
		R1	44.3'-54.8'	88%	REC					54.8'	
											END OF HOLE 54.8'
60											
70											
80											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-256
LINE & STA.
OFFSET

DEPTH _____ FT. ____ FT. CASING OUT DATE: _____
DEPTH _____ FT. ALL CASING OUT DATE: _____

DATE, START: 8-8-96
DATE, FINISH: 8-8-96

GROUND ELEVATION _____
GROUND WATER ELEVATION _____

CASING O.D. 5" I.D. _____
SAMPLER O.D. _____ I.D. _____
DIAMOND BIT SIZE _____

WEIGHT OF HAMMER _____ LBS.
INSIDE LENGTH OF SAMPLER _____ IN.

HAMMER FALL
CASING _____ SAMPLER _____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
0 / 40										0' –	
											WATER
										47.2'	
50											47.2' DEEPER THAN DREDGE ELEV. PROBE TO 47.2'
10											
60											
20											
70											
30											
80											
40											

Soil Engineer: _____ Driller: MIKE MCCARTHY

Drilling Inspector: _____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-257
LINE & STA.
OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____
DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 8-14-96
DATE, FINISH: 8-14-96

GROUND ELEVATION ____
GROUND WATER ELEVATION ____

CASING O.D. 5"-4" I.D. ____
SAMPLER O.D. ____ I.D. ____
DIAMOND BIT SIZE ____

WEIGHT OF HAMMER ____ LBS.
INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL
CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'- 41.3'	WATER
											BROWN MEDIUM FINE SAND AND GRAVEL
50										49.4'	
10											END OF HOLE 49.4'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1

LOCATION DELAWARE

HOLE NO. CB-258

LINE & STA.

OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____

DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 8-14-96

DATE, FINISH: 8-14-96

GROUND ELEVATION

GROUND WATER ELEVATION

CASING O.D. 5" I.D.

SAMPLER O.D. I.D.

DIAMOND BIT SIZE

WEIGHT OF HAMMER ____ LBS.

INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL

CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
0 / 40										0'-	
											WATER
										47.1'	
50 / 10											PROBE TO 47.1' 47.1' BELOW DREDGE LINE.
60 / 20											
70 / 30											
80 / 40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-259
LINE & STA.
OFFSET

DEPTH ____ FT ____ FT. CASING OUT DATE: ____
DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 8-12-96
DATE, FINISH: 8-12-96

GROUND ELEVATION ____
GROUND WATER ELEVATION ____

CASING O.D. 5"-4" I.D. ____
SAMPLER O.D. ____ I.D. ____
DIAMOND BIT SIZE 1 7/8"

WEIGHT OF HAMMER ____ LBS.
INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL
CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0' - 45.3'	WATER
											SOILS, SAND AND GRAVELS
										48'	
50											END OF HOLE 48'
10											
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-260
LINE & STA.
OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____
DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 8-12-96
DATE, FINISH: 8-12-96

GROUND ELEVATION ____
GROUND WATER ELEVATION ____

CASING O.D. 5"-4" I.D. ____
SAMPLER O.D. ____ I.D. ____
DIAMOND BIT SIZE 1 7/8"

WEIGHT OF HAMMER ____ LBS.
INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL
CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44.7'	
											SOILS, SAND AND
										46.2'	GRAVEL
50											
10											
		R1	46.2'-52.4'	16%	REC						
		R2	52.4'-53.7'	69%	REC						ROCK, GNEISS,
											QUARTZ
		R3	53.7'-55'	84%	REC					55'	
60											END OF HOLE 55'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
L. 96247	FOR: US ARMY CORP. OF ENGINEERS	LOCATION DELAWARE HOLE NO. CB-261 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-9-96 DATE, FINISH: 8-9-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE ____	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.6'	
											SOILS, SAND AND GRAVEL
50										50.3'	
10											
											END OF HOLE 50.3'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
DELAWARE RIVER		LOCATION DELAWARE
		HOLE NO. CB-262
		LINE & STA.
		OFFSET
L.96247	FOR: US ARMY CORP. OF ENGINEERS	

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____	DATE, START: 8-7-96	GROUND ELEVATION ____
DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, FINISH: 8-7-96	GROUND WATER ELEVATION ____

CASING O.D. 5"-4" I.D. ____	WEIGHT OF HAMMER ____ LBS.	HAMMER FALL
SAMPLER O.D. ____ I.D. ____	INSIDE LENGTH OF SAMPLER ____ IN.	CASING ____ SAMPLER ____
DIAMOND BIT SIZE 1 7/8"		

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44.7'	
50											ROCK, GNEISS, QUARTZ
10		R1	44.7'-51'	90%	REC						
		R2	51'-54'	96%	REC					54'	
											END OF HOLE 54'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L. 96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-263 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-7-96 DATE, FINISH: 8-7-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D ____ SAMPLER O.D. ____ I.D ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										47.3'	
50											
10											
											ROCK, GNIESS, QUARTZ
		R1	47.3'-55'	19%	REC					55'	
60											END OF HOLE 55'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-264 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-6-96 DATE, FINISH: 8-6-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										47.8'	
50											
10											OVERBURDEN SAND AND GRAVEL
										52.2'	
		R1	52.2'-54.8'	100 %		REC				54.8'	ROCK, GNEISS, QUARTZ
											END OF HOLE 54.8'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-265 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-25-96 DATE, FINISH: 7-25-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.5'	
											SOILS OVERBURDEN
										47.5'	
50											
10											
											ROCK, GNEISS, QUARTZ
		R1	47.5'-57.5'	30%	REC					57.5'	
60											
20											END OF HOLE 57.5'
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-266 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-25-96 DATE, FINISH: 7-25-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.4'	
											SOILS, SAND AND GRAVEL
50											
10										50'	
											ROCK, GNEISS, QUARTZ
		R1	50'-57.5'	23%	REC					57.5'	
60											
20											END OF HOLE 57.5'
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
DELAWARE RIVER		LOCATION DELAWARE
		HOLE NO. CB-267
		LINE & STA.
		OFFSET
L.96247	FOR: US ARMY CORP. OF ENGINEERS	

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____	DATE, START: 7-25-96	GROUND ELEVATION ____
DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, FINISH: 7-25-96	GROUND WATER ELEVATION ____

CASING O.D. 6"-4" I.D. ____	WEIGHT OF HAMMER ____ LBS.	HAMMER FALL
SAMPLER O.D. ____ I.D. ____	INSIDE LENGTH OF SAMPLER ____ IN.	CASING ____ SAMPLER ____
DIAMOND BIT SIZE 1 7/8"		

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.9'	
50											
-10											SOILS, OVERBURDEN SAND AND GRAVEL
										54.9'	
											ROCK, GNEISS
										56.9'	QUARTZ
		R1	54.9'-56.9'	72%	REC						
60											END OF HOLE 56.9'
-20											
70											
-30											
80											
-40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
DELAWARE RIVER		LOCATION DELAWARE
		HOLE NO. CB-268
		LINE & STA.
		OFFSET
L.96247	FOR: US ARMY CORP. OF ENGINEERS	

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____	DATE, START: 8-6-96	GROUND ELEVATION ____
DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, FINISH: 8-6-96	GROUND WATER ELEVATION ____

CASING O.D. 5"-4" I.D. ____	WEIGHT OF HAMMER ____ LBS.	HAMMER FALL
SAMPLER O.D. ____ I.D. ____	INSIDE LENGTH OF SAMPLER ____ IN.	CASING ____ SAMPLER ____
DIAMOND BIT SIZE 1 7/8"		

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0' - 43.6'	WATER
50											ROCK, GNEISS, QUARTZ
10											
		R1	43.6'-55'	60% REC						55'	
60											END OF HOLE 55'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
DELAWARE RIVER		LOCATION DELAWARE
		HOLE NO. CB-269
		LINE & STA.
		OFFSET
L.96247	FOR: US ARMY CORP. OF ENGINEERS	

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____	DATE, START: 7-25-96	GROUND ELEVATION ____
DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, FINISH: 7-25-96	GROUND WATER ELEVATION ____

CASING O.D. 6"-4" I.D. ____	WEIGHT OF HAMMER ____ LBS.	HAMMER FALL
SAMPLER O.D. ____ I.D. ____	INSIDE LENGTH OF SAMPLER ____ IN.	CASING ____ SAMPLER ____
DIAMOND BIT SIZE ____		

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.2'	
50											
10											OVERBURDEN SAND (ROLLER BTI 10')
										55.2'	
											END OF HOLE 55.2'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
DELAWARE RIVER		LOCATION DELAWARE
		HOLE NO. CB-270
		LINE & STA.
L. 96247	FOR: US ARMY CORP. OF ENGINEERS.	OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____	DATE, START: 7-30-96	GROUND ELEVATION ____
DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, FINISH: 7-30-96	GROUND WATER ELEVATION ____

CASING O.D. 6"-4" I.D. ____	WEIGHT OF HAMMER ____ LBS.	HAMMER FALL
SAMPLER O.D. ____ I.D. ____	INSIDE LENGTH OF SAMPLER ____ IN.	CASING ____ SAMPLER ____
DIAMOND BIT SIZE 1 7/8"		

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0' -	
											WATER
										44.4'	
50											
-10											ROCK, GNEISS, QUARTZ
		R1	44.4'-53.1'	13%	REC					53.1'	
											END OF HOLE 53.1'
60											
-20											
70											
-30											
80											
-40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
L.96247	FOR: US ARMY CORP. OF ENGNIEERS	LOCATION DELAWARE HOLE NO CB-271 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-26-96 DATE, FINISH: 7-26-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.5'	
50											
10											ROCK, GNEISS, QUARTZ
		R1	45.5'-57.5'	12%	REC					57.5'	
60											
20											END OF HOLE 57.5'
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L. 96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-272 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-27-96 DATE, FINISH: 7-27-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44'	
										46'	ROLLER BIT
50											
10											
											GNEISS AND QUARTZ
		R1	46'-56'	98%	REC					56'	
60											END OF HOLE 56'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: JOHN KLINGLER

Drilling Inspector: ____ Helper: GUS SURI

JOB LOCATION: DELAWARE RIVER	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
L.96247	FOR: US ARMY CORP. OF ENGINEERS	LOCATION DELAWARE HOLE NO. CB-273 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-26-96 DATE, FINISH: 7-26-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6' ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40 (0)										0'-	WATER
										44.6'	
50 (10)											ROCK, GNEISS, QUARTZ
		R1	44.6'-54.8'	43.	7%	REC				54.8'	
60 (20)											END OF HOLE 54.8'
70 (30)											
80 (40)											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-274 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-27-96 DATE, FINISH: 7-27-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'- 43.2'	WATER
50											
10											
											GNEISS
60		R1	54.6'-59.6'	5'	REC						
20											
											should be 55.2'
		R2	59.6'-66.6'	84%	REC					~~66.6'~~	
70											END OF HOLE 66.6'
30											
80											
40											

Soil Engineer: ____ Driller: JOHN KLINGLER

Drilling Inspector: ____ Helper: GUS SURI

JOB LOCATION:

DELAWARE RIVER

L. 96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-275
LINE & STA.
OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____
DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 7-30-96
DATE, FINISH: 7-30-96

GROUND ELEVATION ____
GROUND WATER ELEVATION ____

CASING O.D. 6"-4" I.D. ____
SAMPLER O.D. ____ I.D. ____
DIAMOND BIT SIZE 1 7/8"

WEIGHT OF HAMMER ____ LBS.
INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL
CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44.5'	
50											
10											ROCK, GNEISS,
		R1	44.5'-55'	71%	REC					55'	
60											END OF HOLE 55'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
L.96247	FOR: US ARMY CORP. OF ENGINEERS	LOCATION DELAWARE HOLE NO. CB-276 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-29-96 DATE, FINISH: 7-29-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 -12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44'	
		R1	44'-46.8'	74%	REC						
50											ROCK, GNEISS, QUARTZ
-10											
		R2	46.8'-53.9'	100	%	REC				53.9'	
											END OF HOLE 53.9'
60											
-20											
70											
-30											
80											
-40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-277 LINE & STA OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 7-29-96 DATE, FINISH: 7-29-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.2'	
50											
-10											ROCK, GNEISS, QUARTZ
		R1	45.2'-55.2'	18%	REC					55.2'	
60											END OF HOLE 55.2'
-20											
70											
-30											
80											
-40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L. 96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-278 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-1-96 DATE, FINISH: 8-1-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 6"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'- 43.7'	WATER
		R1	43.7'-46.3'	92%	REC						
50											ROCK, GNEISS, QUARTZ
10											
		R2	46.3'-53.7'	100 %		REC				53.7'	
											END OF HOLE 53.7'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER	WGI Warren George Inc. SUBSURFACE EXPLORATION	SHEET 1 OF 1
L.96247	FOR: US ARMY CORP. OF ENGINEERS	LOCATION DELAWARE HOLE NO. CB-279 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-1-96 DATE, FINISH: 8-1-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'- 43.7'	WATER
		R1	43.7'-46.7'	6%	REC						
50											ROCK, GNEISS, QUARTZ
10											
		R2	46.7'-55'	100 %	REC					55'	
60											END OF HOLE 55'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-280 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT CASING OUT DATE: ____ DEPTH ____ FT ALL CASING OUT DATE: ____	DATE, START: 8-2-96 DATE, FINISH: 8-2-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44.7'	
50											
10											ROCK, GNEISS, QUARTZ
		R1	44.7'-55'	80%	REC					55'	
60											END OF HOLE 55'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-281 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-2-96 DATE, FINISH: 8-2-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	WATER
										44.2'	
50											ROCK, GNEISS, QUARTZ
-10											
		R1	44.2'-55'	38%	REC					55'	
60											END OF HOLE 55'
-20											
70											
-30											
80											
-40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-282 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-2-96 DATE, FINISH: 8-2-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	WATER
										44.1'	
50											
10		R1	44.1'-51.9'	79%	REC						ROCK, GNEISS, QUARTZ
		R2	51.9'-53.4'	100	%	REC				53.4'	
											END OF HOLE 53.4'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-283 LINE & STA. OFFSET

DEPTH ____ FT ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-3-96 DATE, FINISH: 8-3-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0' -	
											WATER
										44.4'	
50											
10											ROCK
		R1	44.4'-54.4'	94.	6%	REC				54.4'	
60											END OF HOLE 54.4'
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: JOHN KLINGLER

Drilling Inspector: ____ Helper: GUS SURI

JOB LOCATION: DELAWARE RIVER L. 96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-284 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-3-96 DATE, FINISH: 8-3-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45'	
50											
10											ROCK
		R1	45'-55'	.4%	REC					55'	
											END OF HOLE 55'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: JOHN KLINGLER

Drilling Inspector: ____ Helper: GUS SURI

JOB LOCATION: DELAWARE RIVER L.96247	WGI Warren George Inc. SUBSURFACE EXPLORATION FOR: US ARMY CORP. OF ENGINEERS	SHEET 1 OF 1 LOCATION DELAWARE HOLE NO. CB-285 LINE & STA. OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____ DEPTH ____ FT. ALL CASING OUT DATE: ____	DATE, START: 8-5-96 DATE, FINISH: 8-5-96	GROUND ELEVATION ____ GROUND WATER ELEVATION ____
CASING O.D. 5"-4" I.D. ____ SAMPLER O.D. ____ I.D. ____ DIAMOND BIT SIZE 1 7/8"	WEIGHT OF HAMMER ____ LBS. INSIDE LENGTH OF SAMPLER ____ IN.	HAMMER FALL CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV. / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0 - 6	6 - 12	12 - 18	18 - 24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										45.9'	
50											
-10											ROCK, GNEISS, QUARTZ
		R1	45.9'-55'	53%	REC					55'	
60											END OF HOLE 55'
-20											
70											
-30											
80											
-40											

Soil Engineer ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

JOB LOCATION:

DELAWARE RIVER

L.96247

WGI Warren George Inc.

SUBSURFACE EXPLORATION

FOR: US ARMY CORP. OF ENGINEERS

SHEET 1 OF 1
LOCATION DELAWARE
HOLE NO. CB-286
LINE & STA.
OFFSET

DEPTH ____ FT. ____ FT. CASING OUT DATE: ____
DEPTH ____ FT. ALL CASING OUT DATE: ____

DATE, START: 8-5-96
DATE, FINISH: 8-5-96

GROUND ELEVATION
GROUND WATER ELEVATION

CASING O.D. 5"-4" I.D.
SAMPLER O.D. I.D.
DIAMOND BIT SIZE 1 7/8"

WEIGHT OF HAMMER ____ LBS.
INSIDE LENGTH OF SAMPLER ____ IN.

HAMMER FALL
CASING ____ SAMPLER ____

	CASING BLOWS PER FOOT	SAMPLE NUMBER	SAMPLE DEPTHS ELEV / FEET	SAMPLE RECOVERY	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	18-24	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL
40										0'-	
											WATER
										44.4'	
50											
10											ROCK, GNEISS QUARTZ
		R1	44.4'-54.6'	82%	REC					54.6'	
											END OF HOLE 54.6'
60											
20											
70											
30											
80											
40											

Soil Engineer: ____ Driller: MIKE MCCARTHY

Drilling Inspector: ____ Helper: JOHN KLINGLER

Delaware River Channel Deepening

Hole NO	Depth	No. of Pieces
CB-254	44.2'-45.8	2
CB-255	45.0'-45.4 & 45.5'-45.9'	2
CB-272	46.0' - 47.5'	2
CB-273	51.6' - 52.4'	1
CB-275	48' - 49'	1
CB-276	45.5' - 46.6'	1
CB-278	44.6' - 45.5'	2
CB-279	48.2' - 48.7'	2
CB-282	46.6' - 47.5'	2
CB-283	46.7 - 47.4'	1
CB-286	46' - 47'	?

Tests to be made:

1. Pulse velocity (Saturated sample)
2. Compression Test
3. Specific Gravity (SSD)

U.S. ARMY CORPS OF ENGINEERS
SOUTH ATLANTIC DIVISION LABORATORY
MARIETTA, GEORGIA

ROCK CORE TESTING

PROJECT	DELAWARE RIVER CHANNEL DEEPENING		
DISTRICT	PHILADELPHIA	REQUISITION NO.	CENAP-EN-97-912
CONTRACT NO.	------	WORK ORDER NO.	8158
DATE RECEIVED	24-Jan-97	DATE TESTED	5-Feb-97
DATE REPORTED	7-Feb-97	DATE REPORTED	7-Feb-97

TYPE SAMPLE	2 Inch Diameter Rock Cores
TESTED FOR	Unit Weight (RTH-109), Pulse Velocity (RTH-110), and Unconfined Compressive Strength (RTH-111)

Lab. No.	Hole No.	Depth (ft)[1]	Depth (ft)[2]	Unit Wt. (pcf)[3]	Pulse Velocity (in/s)[4]	UC Strength (psi)[5]
184/1320	CB-254	44.2-45.8	44.3-44.65	184.7	260700	24820
184/1321	CB-255	45.0-45.9	45.52-45.82	182.4	259100	28710
184/1322	CB-272	46.0-47.5	47.2-47.5	167.6	192000	11960
184/1323	CB-273	51.6-52.4	51.17-51.47	167.4	207800	5130
184/1324	CB-275	48-49	48.2-48.5	164.0	174700	8700
184/1325	CB-276	45.5-46.6	46.0-46.3	163.2	147400	7100
184/1326	CB-278	44.6-45.5	44.54-44.84	162.6	161500	14230
184/1327	CB-279	48.2-48.7	48.20-48.82	159.0	146500	7460
184/1328	CB-282	46.6-47.5	46.95-47.17	162.3	149300	8320
184/1329	CB-283	46.7-47.4	46.75-47.05	182.5	266100	14530
184/1330	CB-286	46-47	46.54-46.74	159.4	120000	3410

REMARKS	[1]Depths of as-received specimens. [2]Depths of specimens after cutting and preparing. [3]Determined using measurements and SSD weights. [4]Represents the pulse-propagation velocity of the compression wave. [5]Specimens tested in a saturated condition.		
TESTED BY	DA, LCM	CHECKED BY	
SAMPLED BY	UNKNOWN		

Page 1 of 1

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River	73	20
	BY R.G.L.	DATE 6-12-65

☐ BORING ☒ TEST PIT NO. DRP-12

LOCATION 139+930 165' Left

DATE MADE 6-9-65 BY Cole

PLANT USED DB #34

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
						Water - 41.2'
15		1				Sandy gravel w/ boulders 12 x 2 x 3" 48" x 24" x 24" and some cobbles. No fresh break noticed on boulders
						Bottom of TP - 43.3'

115763 E
432700 N

NADP FORM 1 SEP 60 1104 (3-19)

DRP-12

Hole No. DRV-4

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 49' 42.66" 75° 22' 19.54"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-4	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/26/91 : COMPLETED 07/26/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -45.9 ft. NGVD
9. TOTAL DEPTH OF HOLE 8 ft.	18. TOTAL CORE RECOVERY FOR BORING 6.75 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Cobbles with coarse to fine sandy gravel GP			8 ft. penetration
	.7					
	1		Brown silty fine sand SM-SC			Sample .7 to 2.6 ft.
	2					
	.6					
	3		Small cobbles with coarse to fine sandy gravel GP			
	4					
	.5					
	5		Saprolite of Chlorite-Albite micaceous shist Bedrock			
	6					
	.75					Bottom of recovery
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-4

Hole No. DRV-5

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 49.39' 3.37" 75° 23' 29.28"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-5	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/27/91 : COMPLETED 07/27/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -49.0 ft. NGVD
9. TOTAL DEPTH OF HOLE 40 ft.	18. TOTAL CORE RECOVERY FOR BORING 4.3 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Medium to fine dark grey sand SP			Sample 0.0 - 1.7 ft.
	1 .7		Grey silt SM			
	2 .1		Medium to fine dark grey sand becoming coarser with depth SP			
	3					
	4 .8		Cobbles GW			Bottom of recovery
			Gneiss Bedrock			
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study

HOLE NO. DRV-5

Hole No. DRV-6

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT: Delaware River Comprehensive Study
2. LOCATION (Coordinates or Station): 39° 48' 25.88" 75° 24' 45.22"
3. DRILLING AGENCY: Buchart-Horn, Inc.
4. HOLE NO. (As shown on drawing title and file number): DRV-6
5. NAME OF DRILLER: Ocean Survey, Inc.
6. DIRECTION OF HOLE: VERTICAL INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 19 ft.
10. SIZE AND TYPE OF BIT: Vibracore
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: NA
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 07/19/91; COMPLETED 07/19/91
17. ELEVATION TOP OF HOLE: +48.1 ft. NGVD
18. TOTAL CORE RECOVERY FOR BORING: 19 ft.
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		Grey clayey silt, trace of fine sand. Brown clay silt streaks. SM-SC		–	Sample 0 - 5 ft.
	2					
	3					
	4					
	5					
	6					
	7.1		Grey clay. SM-SC			Sample 7.1 - 10 ft.
	8					
	9					
	10					
	11					
	11.6		Red brown fine to medium sandy gravel with fine to medium sand. SP			Sample 11.6 - 15.0 ft.
	12					
	13					
	14		Coarse sand SP			
			Grey fine to medium ....sandy gravel - - - - - - -			
	15					
	16		Grading to brown coarse to fine sandy gravel with coarse to fine sand and scattered small cobbles. SP			Sample 11.6 - 9.5 ft.
	17					
	18					
	19					
	19.5					Bottom of recovery

PROJECT: Delaware River Comprehensive Study | HOLE NO. DRV-6

Hole No. DRV-7

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT
Delaware River Comprehensive Study

2. LOCATION (Coordinates or Station)
39°-47' 15.44" 75° 27' 07.24"

3. DRILLING AGENCY
Buchart-Horn, Inc.

4. HOLE NO. (As shown on drawing title and file number) DRV-7

5. NAME OF DRILLER Ocean Survey, Inc.

6. DIRECTION OF HOLE
VERTICAL INCLINED _____ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN NA

8. DEPTH DRILLED INTO ROCK NA

9. TOTAL DEPTH OF HOLE 3.25 ft.

10. SIZE AND TYPE OF BIT Vibracore

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)

12. MANUFACTURER'S DESIGNATION OF DRILL
NA

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED

14. TOTAL NUMBER CORE BOXES NA

15. ELEVATION GROUND WATER NA

16. DATE HOLE : STARTED 07/27/91 : COMPLETED 07/27/91

17. ELEVATION TOP OF HOLE -47.1 ft. NGVD

18. TOTAL CORE RECOVERY FOR BORING 3.25 ft.

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Coarse to medium gravelly sand, one cobble SP			
	1 .8		Sandy coarse to fine gravel with medium to fine sand SP			
	.3		Weathered schist, red 2.3 to 2.8 (iron), green 2.8 to 3.1 red 3.1 to 3.3, green 3.3 to 3.5, red 3.5 to 3.7 SM-SC			Sample 1.3 - 2.7 ft.
	2					
	3 .7		Saprolite of Chlorite schist	Bedrock		
	.25		Bottom of recovery 3.25 ft.			
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-7

Hole No. DRV-8

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 45' 47.83" 75° 28' 36.82"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-8	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
	14. TOTAL NUMBER CORE BOXES NA
5. NAME OF DRILLER Ocean Survey, Inc.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE : STARTED 07/27/91 : COMPLETED 07/27/91
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	17. ELEVATION TOP OF HOLE +48.2 ft. NGVD
7. THICKNESS OF OVERBURDEN NA	18. TOTAL CORE RECOVERY FOR BORING 19 ft.
8. DEPTH DRILLED INTO ROCK NA	19. SIGNATURE OF INSPECTOR
9. TOTAL DEPTH OF HOLE 20 ft.	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		Gray silty clay SM-SC			
	2					Sample 0 - 5 ft. Sand lenses in sample
	3					
	4					
	5					
	6		Fine sand lenses at 8 ft. SM-SC			
	7					Sample 5 - 10 ft. Sand lenses in sample
	8					
	9					
	10		Fine to medium sand lenses <0.5 inches in at 11.4 to 11.6 CL			
	11					
	12					Sample 10 - 15 ft.
	13					
	14					
	15		Coarse to fine sandy at 15.6 ft GM-GC			
	16					Sample 15 - 19 ft. Sample of sandy layer
	17					
	18					
	19					Bottom of recovery

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-8

Hole No. DRV-9

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

PROJECT
Delaware River Comprehensive Study

2. LOCATION (Coordinates or Station) 39° 44' 6.62 75° 30' 3.34"
3. DRILLING AGENCY Buchart-Horn, Inc.
4. HOLE NO. (As shown on drawing title and file number) DRV-9
5. NAME OF DRILLER Ocean Survey, Inc.
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN NA
8. DEPTH DRILLED INTO ROCK NA
9. TOTAL DEPTH OF HOLE 20 ft.
10. SIZE AND TYPE OF BIT Vibracore
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL NA
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
14. TOTAL NUMBER CORE BOXES NA
15. ELEVATION GROUND WATER NA
16. DATE HOLE : STARTED 07/19/91 : COMPLETED 07/19/91
17. ELEVATION TOP OF HOLE -49.9 ft. NGVD
18. TOTAL CORE RECOVERY FOR BORING 20 ft.
19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Grey silty clay, sand lenses SM-SC			
	1					Sample 0 - 5 ft.
	2 .3		Coarse sand layer			
	3					
	4					
	5 .5		ML			Sample 5.5 - 11 ft.
	6					
	8					
	9					
	10					
	11					
	12					
	13		SM-SC			Sample 12.3 - 16 ft.
	14					
	15					
	16					16.4 Bottom of recovery
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study HOLE NO. DRV-9

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Lat.
Long.
15m Nofplan

Log of Vibrocore No. DRV-10

SURFACE ELEVATION _____ LOCATION Bend J

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 47'	
		DK gray, med Dense, F-M sand tr silt	
5		DK gray, med dense, F-M sand tr silt	
10		DK gray, Firm clay	
15		DK gray, Firm, clay tr F-sand + silt	
20'		Rec. 16'/20' -20' Bot. of core	
		Note: Moderate penet. resistance throughout	

Completion Depth 20' Feet Water Depth 47' Feet Date 8/26/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

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Hole No. DRV-10

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 42' 34.12" 75° 30' 37.77"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-10	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED NA; UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE: STARTED 07/28/91; COMPLETED 07/28/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -48.2 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 20 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1, 2, 3 .1		Grey silty clay SM-SC Fine sand 3.1 ft, thin sand surface at 4.2 ft, 7.1, 7.6, 8.5, 9.2, 10.5, 11.3, 12.85, 13.1 coarse to medium sand at 0.2 to 0.3, 6.6, 7.9 to 7.8, 8.0 to 8.3			Sample 0 - 5 ft. Sand lenses in sample
	5, 6, 7, 8, 9, 10		Fine sand pocket at 9.2 to 9.3 Medium to fine sand at 10 ft., 11.1 to 11.4, 12.4 to 12.55 SM-SC			Sample 5 - 10 ft.
	11, 12 .4, 13 .5, 14		Interbedded fine sand and silty clay .05 sand, 1.5 silty organics in layers at 14.5, 14.75 and 14.9 SM-SC			Sample 13.3 - 15 ft.
	15, 16 .5		silty clay with sand surface - organics at 16.2ft SM-SC			
	.9		Medium to fine sand SP			
	17, 18, 19		Grey silt clay with sand lenses at 17.9 to 18.05, 18.55, 18.65, 19.35, 19.4 SM-SC Black organic at 19.7 to 19.9			

PROJECT Delaware River Comprehensive Study — HOLE NO. DRV-10

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Long. 14m S. of plan

Log of Vibrocore No. DRV-11

SURFACE ELEVATION _____ LOCATION Bend 15

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 40'	
		Dk Gray, Soft, Clay	
5		Dk Gray, Soft, clay	
10		Dk Gray, Soft-firm, clay little silt	
15		Dk Gray, Soft-firm clay little silt	
		Dk Gray, Soft-firm clay	
20		Recov. 20'/20' -20' Bot. of core	
		Note - apparent moderate penet. resistance	

Completion Depth 20' Feet Water Depth 40' Feet Date 8/27/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.
1007 m NE of plan

Log of Vibrocore No. DRV-12 - Run 3

SURFACE ELEVATION _____ LOCATION Bend L

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** ≈ 9 Dk Gray Soft Clay	
5		Dk Gray Soft clay	
10		Dk gray soft, clay	
15		Dk gray, soft clay	
20		Dk gray ~~soft clay~~ med. Dense F-M Sand, little silt Recovery 20'/20' -20' Bot of Core Note: Apparent ~~easy~~ moderate penetration throughout	

Completion Depth 20' Feet Water Depth 29 Feet Date 8/28/95

Project Name Delaware Vibrocore Project Number R95500

Lat.
Long.
7m N of plan

Log of Vibrocore No. DRV-13

SURFACE ELEVATION _____ LOCATION Bend M

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth 34'	
		DK Gray Soft Clay, little silt	
5		DK Gray Soft Clay	
10		DK Gray Soft clay	
15		DK Gray soft clay	
		DK Gray Soft Clay	
20		recov. 18'1" / 20' -20' Bot. of core	
		Note: Penetrm. resistance appeared moderate throughout	

Completion Depth 20' Feet Water Depth 34' Feet Date 8/28/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long. 6 M. W of Plan

Log of Vibrocore No. DRV-14

SURFACE ELEVATION _____ LOCATION Bend N

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 32'	
		Dk Gray Soft Clay	
5		Dk Gray Soft clay	
10		Dk Gray Soft clay	
15		Dk Gray, Soft clay	
20		Dk Gray Soft Clay	
		Recovery 19'/20' 20' Bot of Core	
		Note: Apparent - easy to mod. penetration resistance	

Completion Depth 20' Feet Water Depth 32' Feet Date 8/28/95

Project Name Delaware Vibrocore Project Number R95500

Lat.
Long.
11m NW of plan

Log of Vibrocore No. DRV-15

SURFACE ELEVATION _____ LOCATION Bend 0

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 43'	
		DK. Gray, soft Clay	
5		DK Gray, Soft Clay	
10		DK Gray, soft Clay	
15		DK Gray, Soft Clay little Silt	
		DK Gray Soft clay	
20		Recovery - 20'/20' -20' Bot. of Core	
		Note: Apparent moderate penetn. resistance	

Completion Depth 20 Feet Water Depth 43' Feet Date 8/28/95

Project Name Delaware Vibrocore Project Number R95500

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BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River - Phila to Sea	73	4
Aquifer Studies	BY R.L	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP-9

LOCATION Sta: 172+030 270' W of ℄

DATE MADE 3/29/65 BY CoPE

PLANT USED DB #37

Water 45°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler; lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
						Water - 35.2'
35						
		1				Dk-gry org. clayey SILT v. soft. Getting firmer @ 40.0'
40						
45						
		2			OL	same but firmer w/ thin layers of fine sand
50						
55	35 Minutes	3/4 cy clamshell bucket				
60		3				Bottom - 60.8

NADP FORM 1104 (3-19)
1 SEP 60

DSP 9

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N504852.37 E153181.64
BORING TYPE: Vibracore

BORING DATE: 11/05/92
START: 09:00
FINISH: 09:13
LOGGED: T.J. Koch
DATE: 11/05/92

ELEV. TOP OF HOLE: -35.5
ELEV. DATUM: Mean low water
WATER DEPTH: 35.5
SIGNATURE: T.J. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-35.5	0.0 - 9.9 greenish grey v. fine- to fine-grained silty SAND, micaceous, w/ few v. thin beds or laminae of clay and silty clay, w/ sand and gravel bed as noted		1 (0.0 - 20.0)	17.7/20.0	2	C,G		Geotech Samples (G) -- grab locations noted in order: J-2-G-0.0 J-2-G-9.9 Chem Samples (C) -- locations noted: in order: J-2-C-0.0 J-2-C-9.9
3									
6									
7		7.6 - 7.9 coarse SAND + GRAVEL, up to 4 cm diam., w/ silt and clay silty SAND (as above)							v. slow penetration from 7.5 - 8.0
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: J-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N504852.37 E153181.64
BORING TYPE: Vibracore

BORING DATE: 11/05/92
START: 09:00
FINISH: 09:13
LOGGED: T.J. Koch
DATE: 11/05/92

ELEV. TOP OF HOLE: -35.5
ELEV. DATUM: Mean low water
WATER DEPTH: 35.5
SIGNATURE:

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		9.9 - 17.7 greenish grey to grey silty CLAY w/ sand as gravel bed as noted		1 (0.0 - 20.0)	17.7/20.0				
11									
12						2	C,G		
13									
14									
15									
16		15.8 - 15.95 v. poorly sorted SAND + GRAVEL (up to 1.5 cm diam.) w/ few shell fragments silty CLAY (as above)							
17									
18		no recovery past 17.7							
19									
20	55.5								

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: L-1 PAGE 1 OF 1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N495506.46 E139695.54
BORING TYPE: Vibracore

BORING DATE: 11/05/92
START: 10:53
FINISH: 13:00
LOGGED: T.J. Koch
DATE: 11/05/92

ELEV. TOP OF HOLE: -43.5
ELEV. DATUM: Mean low water
WATER DEPTH: 43.5
SIGNATURE: [signature]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-43.5	0.0 - 0.25 light brown, coarse SAND + GRAVEL							
		0.25 - 1.40 grey to blueish grey silty CLAY w/ laminae of med-grained sand				2	C,G		
		1.40 - 1.95 grey, med- to v coarse-grained silty SAND w/ gravel at base							
2		1.95 - 3.60 dk greyish brown, organic, clayey SILT w/ woody fragments		1 (0.0 - 7.5)	5.0/7.5	2	C,G		Geotech Samples (G) -- locations noted: in order: L-1-G-0.25 L-1-G-1.95 L-1-G-4.2*
3		3.6 - 3.9 dk grey to greenish grey silty CLAY							
4		3.9 - 4.2 light grey sandy SILT							
5		light brown SAND + GRAVEL, gravel well rounded and up to 10 cm diam.							Chem Samples (C) -- locations noted: in order: L-1-C-0.25 L-1-C-1.95 L-1-C-4.2*
6		(sample description based on bit sample and penetration rate)				2	C,G		
		no recovery 5.0 - 8.5 except bit sample		2 (6.0 - 8.5)	0.0/2.5				*sampled from bit Run 2 jetted to 6.0 before coring Run 2 -- no penetration Quit Hole after Run 2
	-52.0								
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 8.5
TOTAL CORE RECOVERY: 58.8%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: L-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N495024.99 E139466.09
BORING TYPE: Vibracore

BORING DATE: 11/06/92
START: 08:20
FINISH: 09:15
LOGGED: T.J. Koch
DATE: 11/06/92

ELEV. TOP OF HOLE: -37.5
ELEV. DATUM: Mean low water
WATER DEPTH: 37.5
SIGNATURE:

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-37.5	0.0 - 0.65 grey clayey SILT w/ some sand lenses		1 (0.0 - 2.5)	1.0/2.5	1	C		
1	-38.5	0.65 - 1.0 greyish brown SAND + GRAVEL, poorly sorted, up to 5 cm diam.							
2									Geotech Samples (G) -- none
3									
4									
5									Chem Samples (C) -- locations noted: in order: L-2-C-0.0
6									Run 2 -- no penetration Quit Hole after Run 2
7									
8									
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 2.5
TOTAL CORE RECOVERY: 40.0%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N495656.52 E139466.09
BORING TYPE: Vibracore

BORING DATE: 11/05/92
START: 14:53
FINISH: 15:30
LOGGED: T.J. Koch
DATE: 11/05/92

ELEV. TOP OF HOLE: -26.2
ELEV. DATUM: Mean low water
WATER DEPTH: 26.2
SIGNATURE: TJK

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-26.2	0.0 - 13.5 greenish grey silty CLAY w/ laminae of silt and fine-grained sand and thin beds of coarse sand as shown		2 (0.0 - 17.5)	13.5/17.5				
2						1	G		Geotech Samples (G) -- locations noted: in order: L-3-G-2.5 L-3-G-7.5 L-3-G-12.5
3									
4									
		coarse SAND							Chem Samples (C) -- composited over core length L-3-C-0.0
		silty CLAY (as above)							
6									
		coarse sand							
7		silty CLAY (as above)							
						1	G		
		coarse SAND							
		silty CLAY (as above)							Run 1 -- cored 0.0 - 16.5 (refusal) recovered 10.0'
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 17.5
TOTAL CORE RECOVERY: 77.1%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: L-3

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N495656.52 E139466.09
BORING TYPE: Vibracore

BORING DATE: 11/05/92
START: 14:53
FINISH: 15:30
LOGGED: T.J. Koch
DATE: 11/05/92

ELEV. TOP OF HOLE: -26.2
ELEV. DATUM: Mean low water
WATER DEPTH: 26.2
SIGNATURE: TJK

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)							
11									
12									
						1	G		
13									
		no recovery past 13.5 ft		2 (0.0 - 17.5)	13.5/17.5				
14									
15									
16									
17									
	43.7								
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 17.5
TOTAL CORE RECOVERY: 77.1%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N482593.90 E119819.69
BORING TYPE: Vibracore

BORING DATE: 11/06/92
START: 10:50
FINISH: 10:54
LOGGED: T.J. Koch
DATE: 11/06/92

M-1

ELEV. TOP OF HOLE: -22.5
ELEV. DATUM: Mean low water
WATER DEPTH: 22.5
SIGNATURE:

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-22.5	grey to dk greenish grey CLAY and silty clay w/ few thick laminae of v. fine- to med-grained sand (notably, at 1.5-1.7', 5.95', 8.05', 8.50',10-45-10.55', 11.60')		1 (0.0 - 20.0)	19.1/20.0				
1									
2						1	G		Geotech Samples (G) -- locations noted: in order: M-1-G-2.5 M-1-G-7.5 M-1-G-12.5 M-1-G-17.5
3		vertical stringer of coarse-grained SAND cutting CLAY							
4		CLAY (as above)							
5									Chem Samples (C) -- composited over core length M-1-C-0.0
6									
7						1	G		
8									
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 95.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: M-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N482593.90 E119819.69
BORING TYPE: Vibracore

BORING DATE: 11/06/92
START: 10:50
FINISH: 10:54
LOGGED: T.J. Koch
DATE: 11/06/92

ELEV. TOP OF HOLE: -22.5
ELEV. DATUM: Mean low water
WATER DEPTH: 22.5
SIGNATURE: TJK

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		CLAY (as above)		1 (0.0 – 20.0)	19.1/20.0				
11									
12						1	G		
13									
14									
15									
16									
17						1	G		
18									
19	41.6	no recovery past 19.1 ft.							
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 95.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: M-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N480636.24 E117730.99
BORING TYPE: Vibracore

BORING DATE: 11/06/92
START: 12:25
FINISH: 12:28
LOGGED: T.J. Koch
DATE: 11/06/92

ELEV. TOP OF HOLE: -34.0
ELEV. DATUM: Mean low water
WATER DEPTH: 34.0
SIGNATURE: TJK

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-34.0	0.0 - 14.9' grey to dk greenish grey silty CLAY, slightly micaceous, with thin laminations of vfine- to med-grained SAND		1 (0.0 - 20.0)	16.25/20.00				
1									
2						1	G		Geotech Samples (G) -- locations noted: in order: M-2-G-2.0 M-2-G-6.0 M-2-G-10.0 M-2-G-14.0
3									
4									
5									Chem Samples (C) -- composited over core length M-2-C-0.0
6						1	G		
7									
8									
9						1	G		
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 81.3%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: M-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N480636.24 E117730.99
BORING TYPE: Vibracore

BORING DATE: 11/06/92
START: 12:25
FINISH: 12:28
LOGGED: T.J. Koch
DATE: 11/06/92

ELEV. TOP OF HOLE: -34.0
ELEV. DATUM: Mean low water
WATER DEPTH: 34.0
SIGNATURE:

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)				1	G		
11									
12									
13									
14						1	G		
15		14.9 – 15.3' fine- to v. coarse-grained SAND		1 (0.0 – 20.0)	16.25/20.00				
		15.3 – 15.7' greenish grey CLAY							
16	-50.25	15.7 – 16.0' coarse- to v. coarse-grained silty SAND							
		16.0 – 16.25' greenish grey CLAY							
17		no recovery past 16.25 ft.							
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 81.3%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: N-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N466454.07 E139466.09
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 09:59
FINISH: 10:53
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -24.5
ELEV. DATUM: Mean low water
WATER DEPTH: 24.5
SIGNATURE: TJK

SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-24.5	0.0 - 15.9' grey to greenish grey silty CLAY, slightly micaceous, w/ v. thin laminations of sandy silt		1 (0.0 - 20.0)	18.5/20.0				Geotech Samples (G) -- locations noted: in order: N-1-G-4.0 N-1-G-8.0 N-1-G-12.0 N-1-G-16.0
3						1	G		
									Chem Samples (C) -- composited over core length N-1-C-0.0
6									
						1	G		
9		2mm organic layer @ 9.5'							
12									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 92.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: N-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N466454.07 E139466.09
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 09:59
FINISH: 10:53
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -24.5
ELEV. DATUM: Mean low water
WATER DEPTH: 24.5
SIGNATURE: TJK

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)		1 (0.0 - 20.0)	18.5/20.0				
11									
12						1	G		
13									
14									
15									
16		15.9 - 16.1' v. fine- to med-grained silty, clayey SAND, v. poorly sorted				1	G		
		silty CLAY (as above)							
17									
18									
	-43.0	no recovery past 18.5 ft							
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 92.5%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N465576.95 E107473.55
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 09:15
FINISH: 09:19
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -22.7
ELEV. DATUM: Mean low water
WATER DEPTH: 22.7
SIGNATURE: T.J. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-22.7	0.0 - 16.2' grey to dk greenish grey silty CLAY w/few thin beds of fine- to med-grained sand (where noted) and many thin laminae of poorly sorted fine-grained sand		1 (0.0 - 20.0)	16.2/20.0				wood @ 0.2', 0.8', 15.1'
3		2.8 - 3.05' greenish grey v. poorly sorted, v. fine- to med-grained silty SAND; one large cobble, 8 cm diam.				1	G		Geotech Samples (G) -- locations noted: in order: N-2-G-3.0 N-2-G-7.0 N-2-G-11.0 N-2-G-14.0
		silty CLAY (as above)							Chem Samples (C) -- composited over core length N-2-C-0.0
7						1	G		
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 81.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: N-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N465576.95 E107473.55
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 09:15
FINISH: 09:19
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -22.7
ELEV. DATUM: Mean low water
WATER DEPTH: 22.7
SIGNATURE: [illegible]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)		1 (0.0 - 20.0)	16.2/20.0				
11						1	G		
12		12.06 - 12.10 fine- to coarse-grained SAND silty CLAY (as above)							
13									
14						1	G		
15		15.2 - 15.4' fining-up, fine- to coarse-grained, well sorted SAND w/ basal gravel							
16	-38.9	silty CLAY (as above) 16.2' --- end of core recovery							
17									
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 81.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: N-3

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N467025.81 E108133.48
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 08:38
FINISH: 08:40
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -24.3
ELEV. DATUM: Mean low water
WATER DEPTH: 24.3
SIGNATURE:

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-24.3	0.0 - 16.4' grey to dk greenish grey silty CLAY w/ v. thin to thin laminations of v. fine-grained silty SAND and few thin (0.5cm) lenses of fine- to med-grained sand at 13.3', 14.8', and 16.6'		1 (0.0 - 20.0)	16.4/20.0				wood @ 0.2', 0.8', 15.1'
2						1	G		Geotech Samples (G) -- locations noted: in order: N-3-G-3.0 N-3-G-7.0 N-3-G-11.0 N-3-G-14.0
3		one cobble (10 cm diam.) in clay and organic matter matrix in top 0.0- 0.3'							
									Chem Samples (C) -- composited over core length N-3-C-0.0
6						1	G		
		one wood fragment @ 7.85'							
9									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 82.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: N-3

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N467025.81 E108133.48
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 08:38
FINISH: 08:40
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -24.3
ELEV. DATUM: Mean low water
WATER DEPTH: 24.3
SIGNATURE: [signature]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)		1 (0.0 – 20.0)	16.4/20.0	1	G		
11									
12									
13									
14						1	G		
15									
16	-40.7	16.4' -- core recovery ends							
17									
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 82.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: O-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N443122.60 E098939.45
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 12:25
FINISH: 12:27
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -39.2
ELEV. DATUM: Mean low water
WATER DEPTH: 39.2
SIGNATURE: T.J. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-39.2	0.0 - 17.7' grey to dk greenish grey silty CLAY w/ thin laminations of fine- to tom med-grained sand and v. thin beds of med- to coarse grained sand (and gravel) where noted							
2						1	G		Geotech Samples (G) -- locations noted: in order: O-1-G-2.5 O-1-G-7.5 O-1-G-12.0 O-1-G-16.0
3									
		4.2 - 4.5' med- to coarse-grained SAND w/ GRAVEL							
		silty CLAY (as above)		1 (0.0 - 20.0)	17.7/20.0				Chem Samples (C) -- composited over core length O-1-C-0.0
6						1	G		
9		organic matter (peat) @9.11-9.14' med- to coarse-grained SAND w/ gravel @9.40-9.45'							

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: O-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N443122.60 E098939.45
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 12:25
FINISH: 12:27
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -39.2
ELEV. DATUM: Mean low water
WATER DEPTH: 39.2
SIGNATURE: TJ Koch

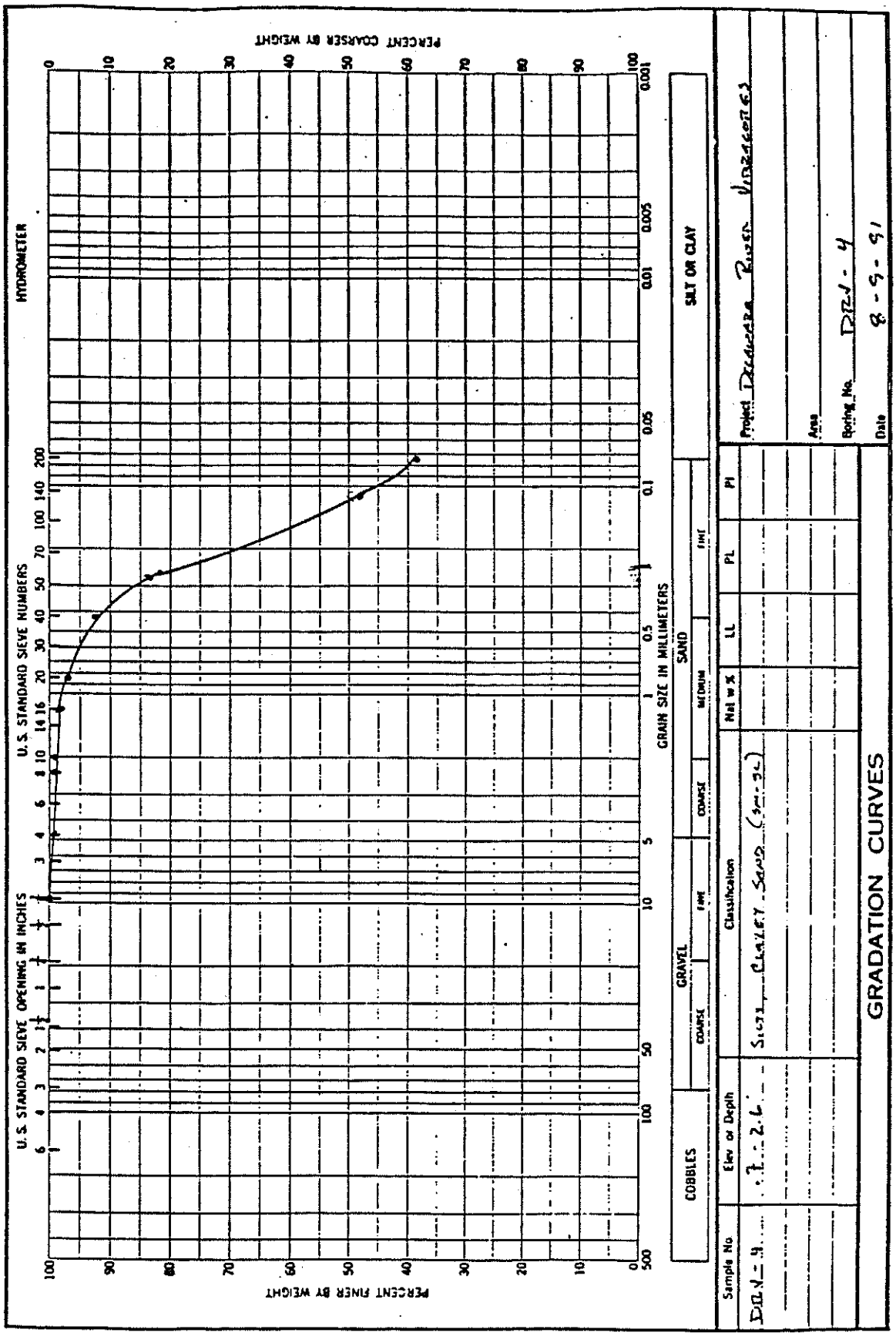
DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)		1 (0.0 - 20.0)	17.7/20.0				
11									
12						1	G		
13									
14									
15									
16						1	G		
17		17.1 - 17.3' med- to coarse-grained SAND w/ GRAVEL							
	-56.9	silty CLAY (as above)							
18		17.7' -- core recovery ends							
19									
20									

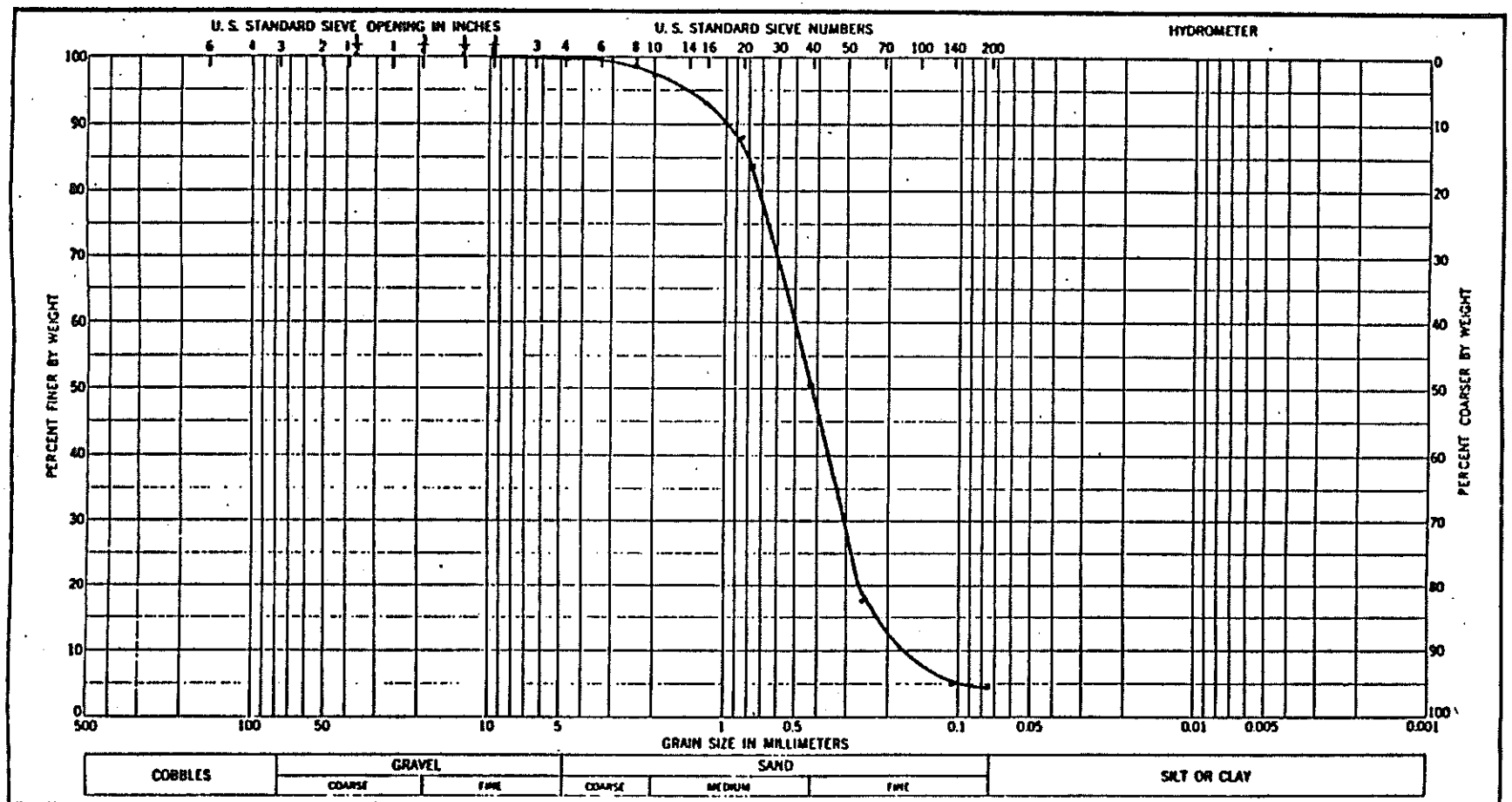
DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.5%

RMC ENVIRONMENTAL SERVICES

Gradation Curves & Sieve Analysis


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-5	0.0-1.7	Poorly-Graded Sand SP				

Project Delaware River Vibracores

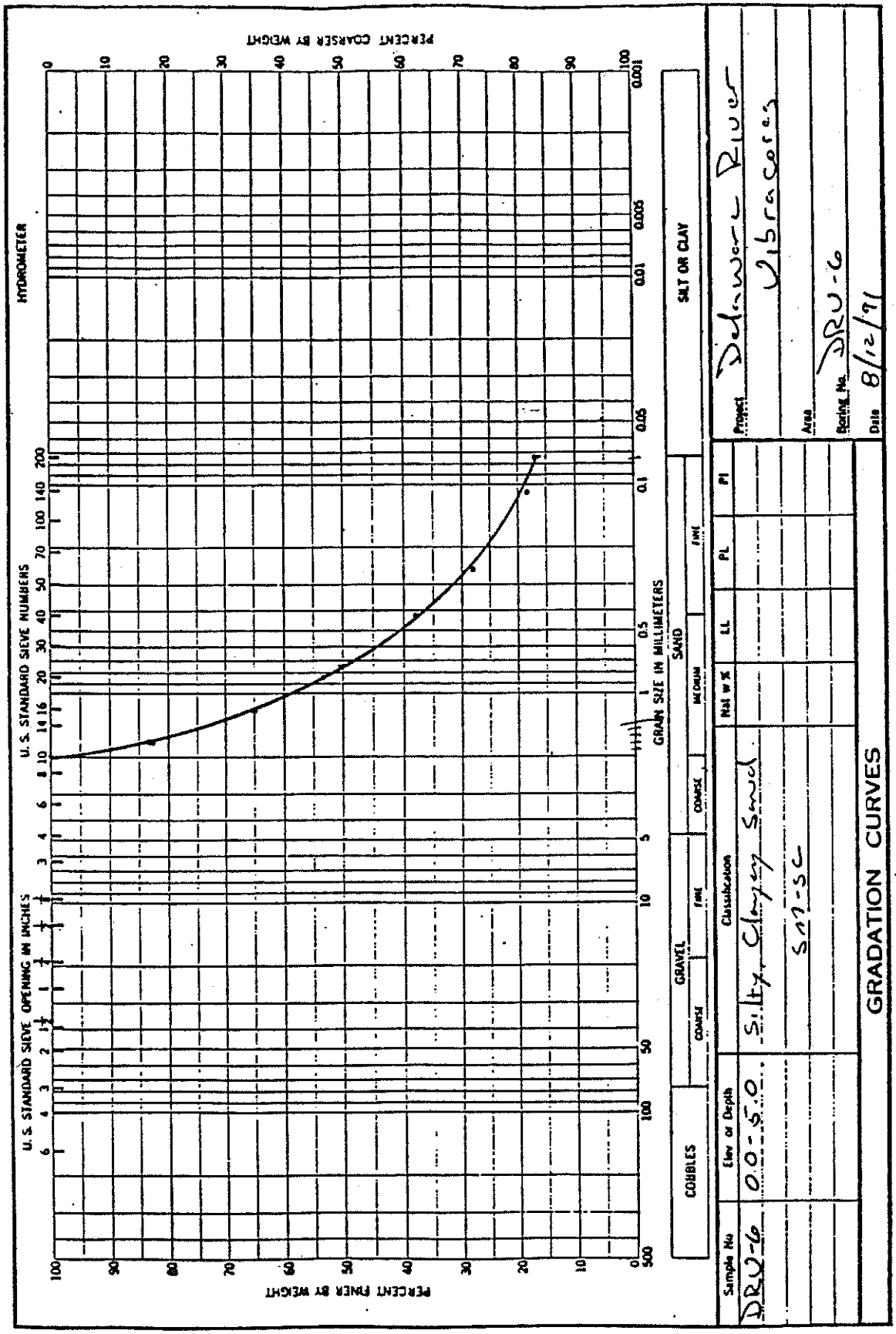
Area

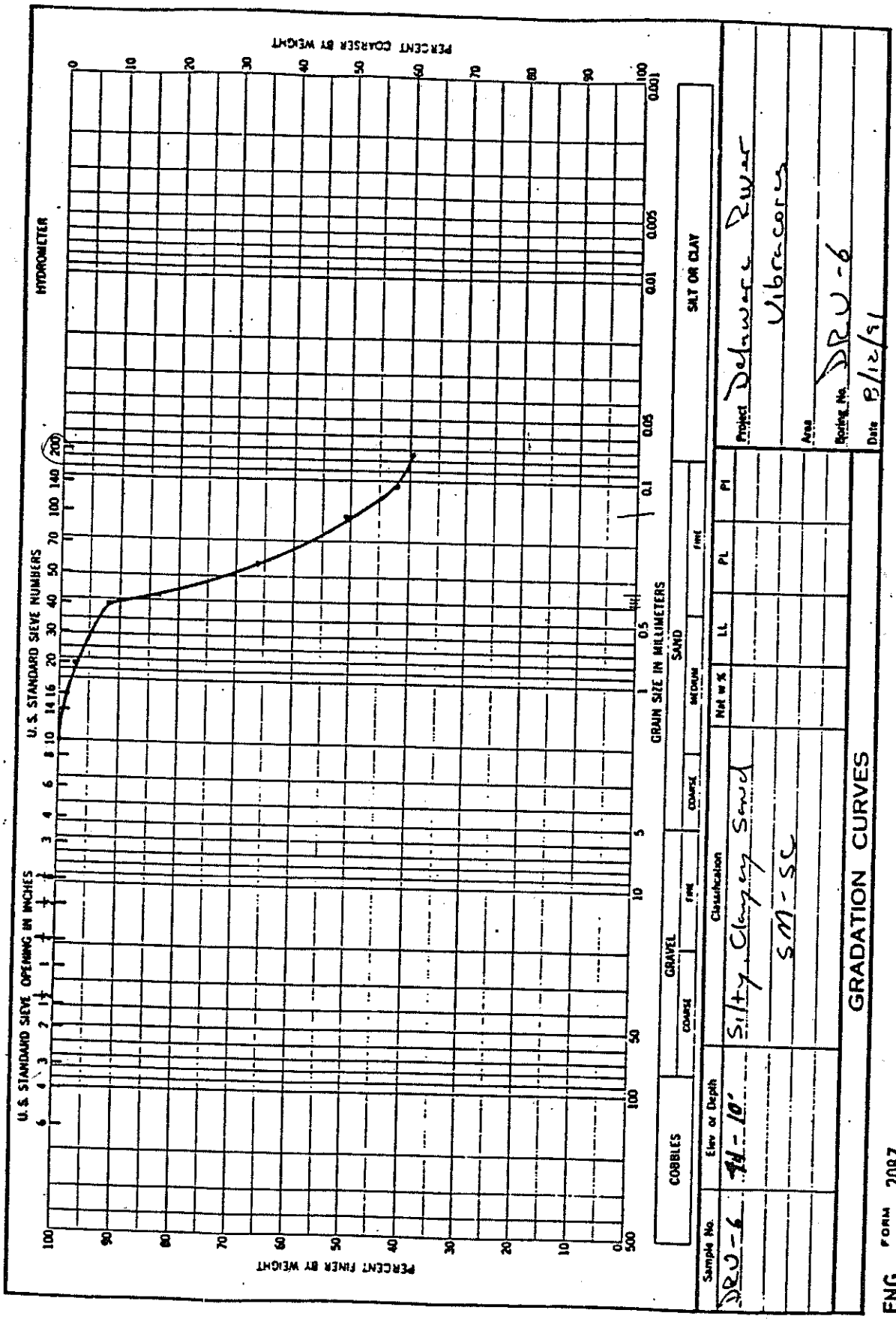
Boring No. DRU-5

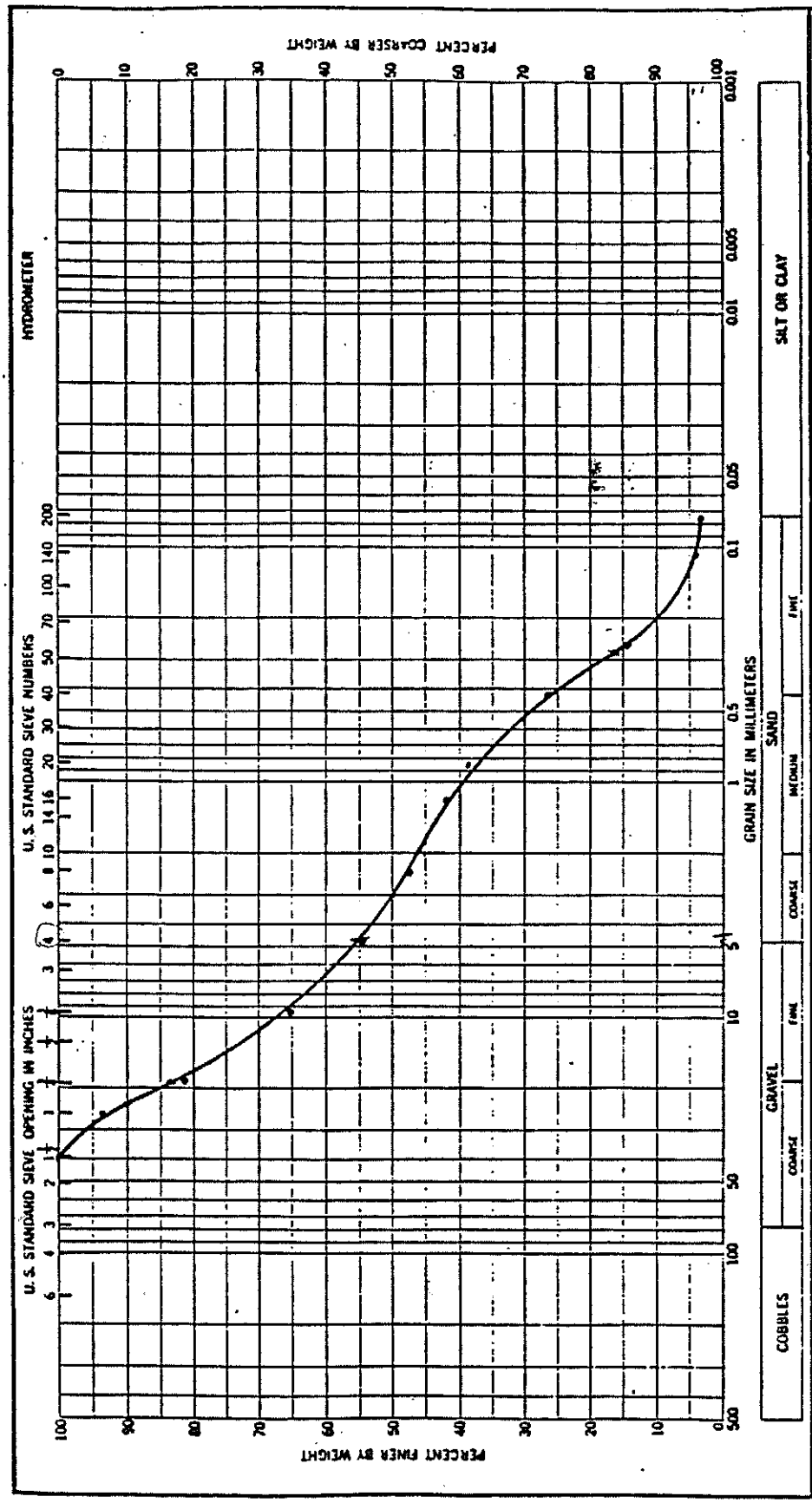
Date 8/6/91

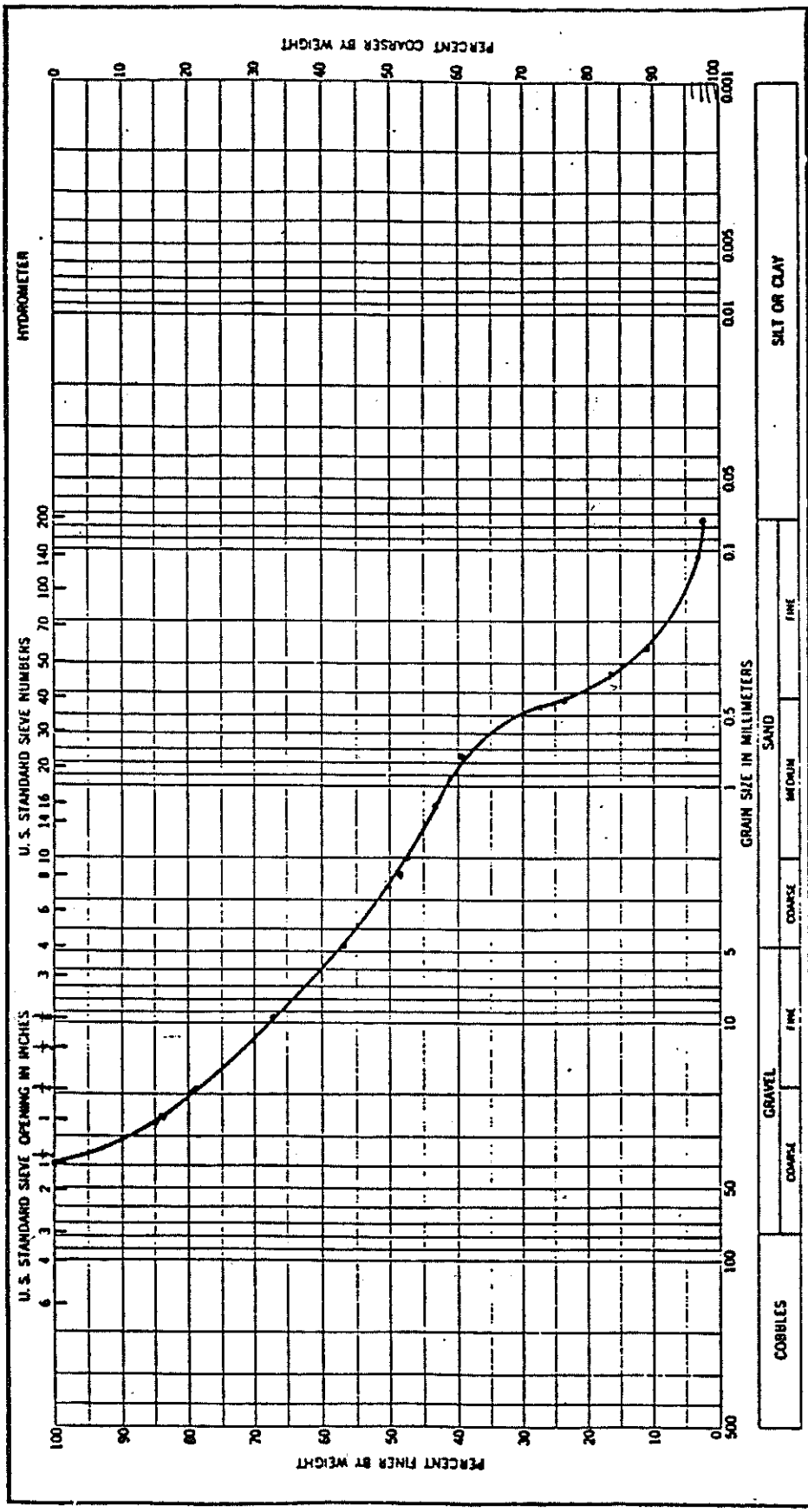
GRADATION CURVES

ENG FORM 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Ubrasers
Boring No. DRU-6
Date 8/12/91
Sample No. DRU-6
Elev or Depth 0.0-5.0
Classification Silty Clayey Sand
SM-SC
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Vibracore
Boring No. DRU-6
Date 8/12/91
Sample No. DRU-6
Elev or Depth 4'-10'
Classification Silty Clayey Sand
SM-SC
Nat w % LL PL PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Ulbrecorea
Boring No. DRU-6
Date 8/12/91
Sample No DRU-6
Elev or Depth 11.7-13.0
Classification Poorly-Graded Sand with gravel SP
Nat w % LL PL PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-6	11.6-19.5	Poorly-Graded Sand with gravel SP				

Project Delaware River

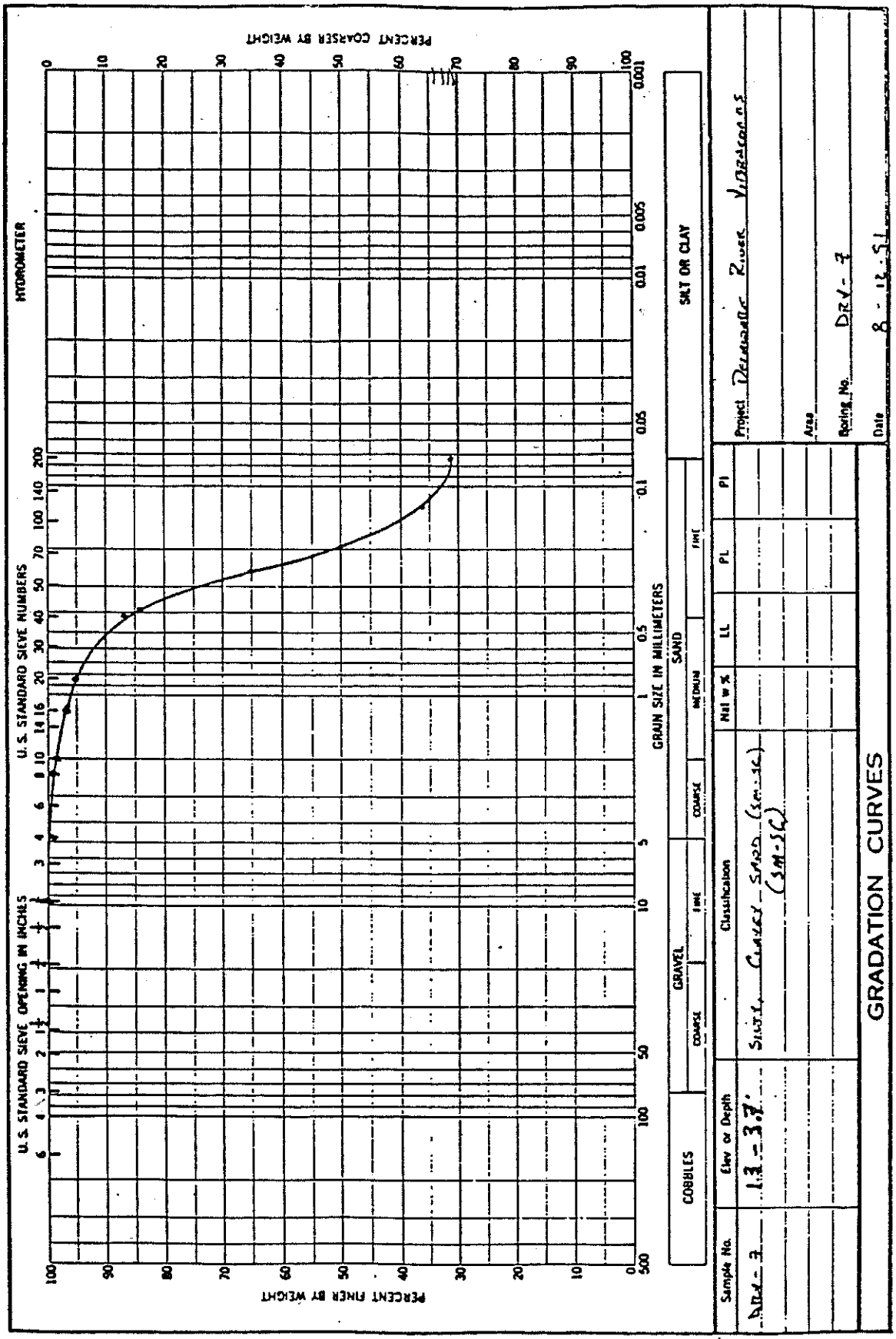
Area Ubrecorse

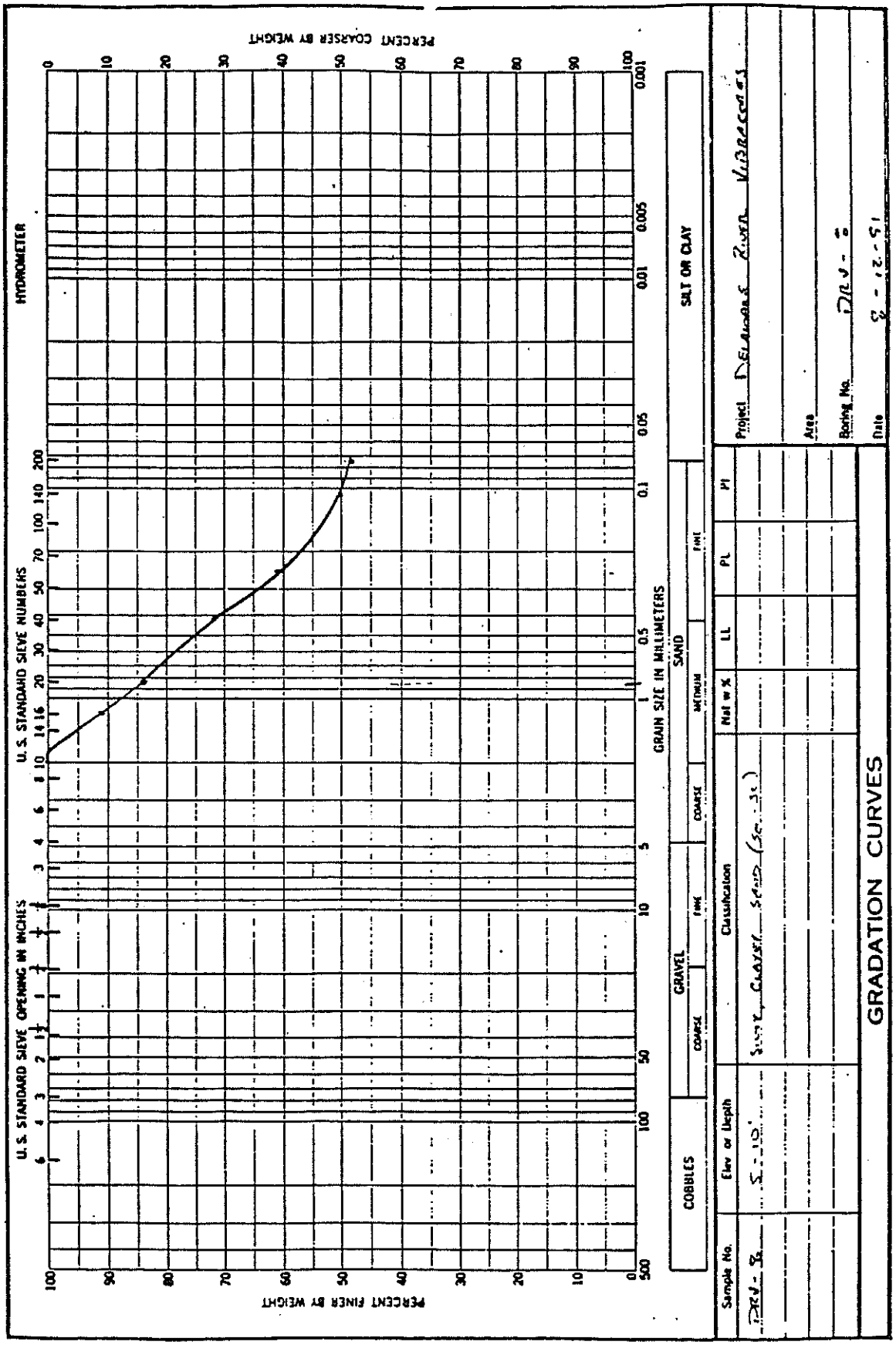
Boring No. DRU-6

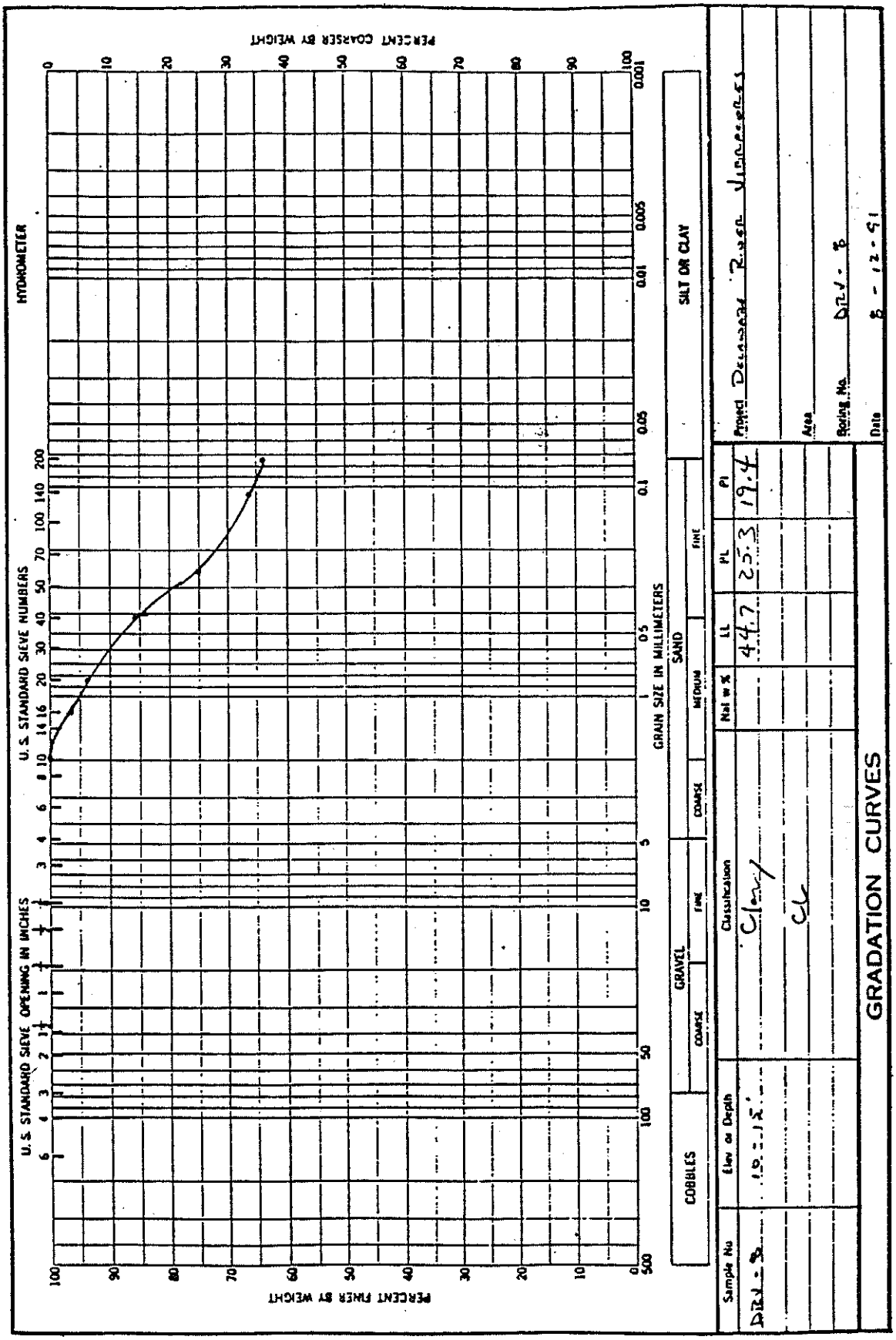
Date 8/6/91

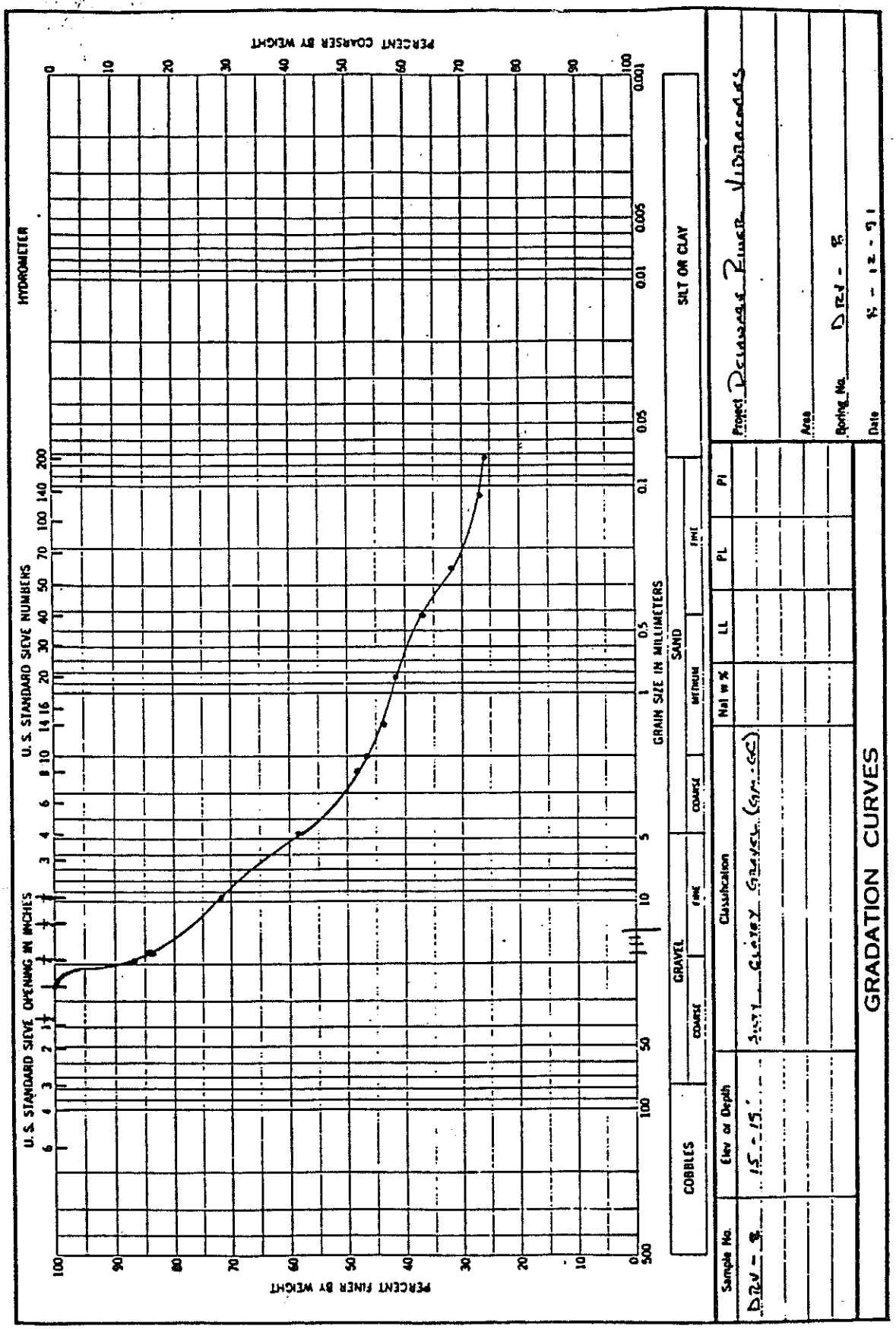
GRADATION CURVES

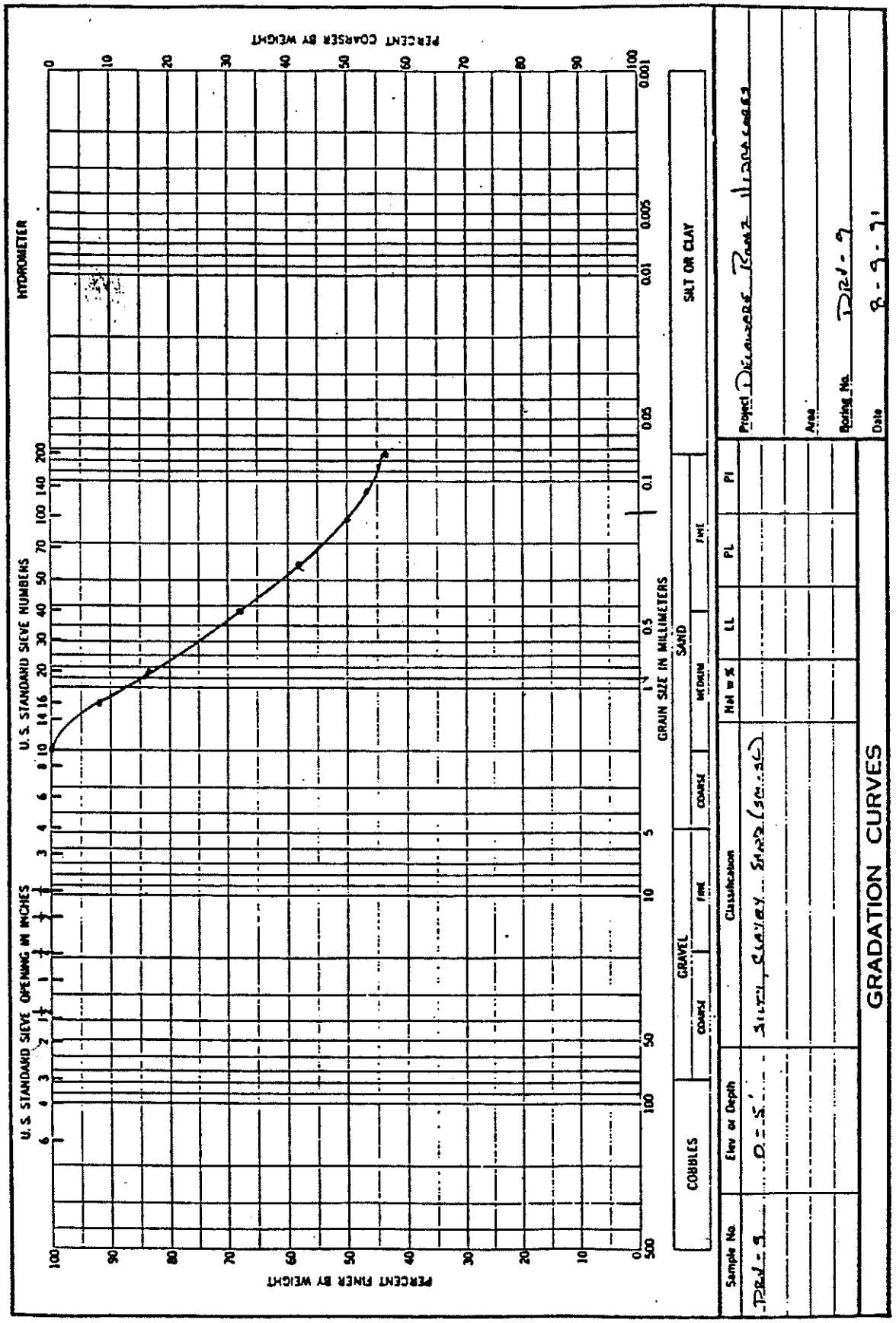
ENG FORM 1 MAY 83 2087

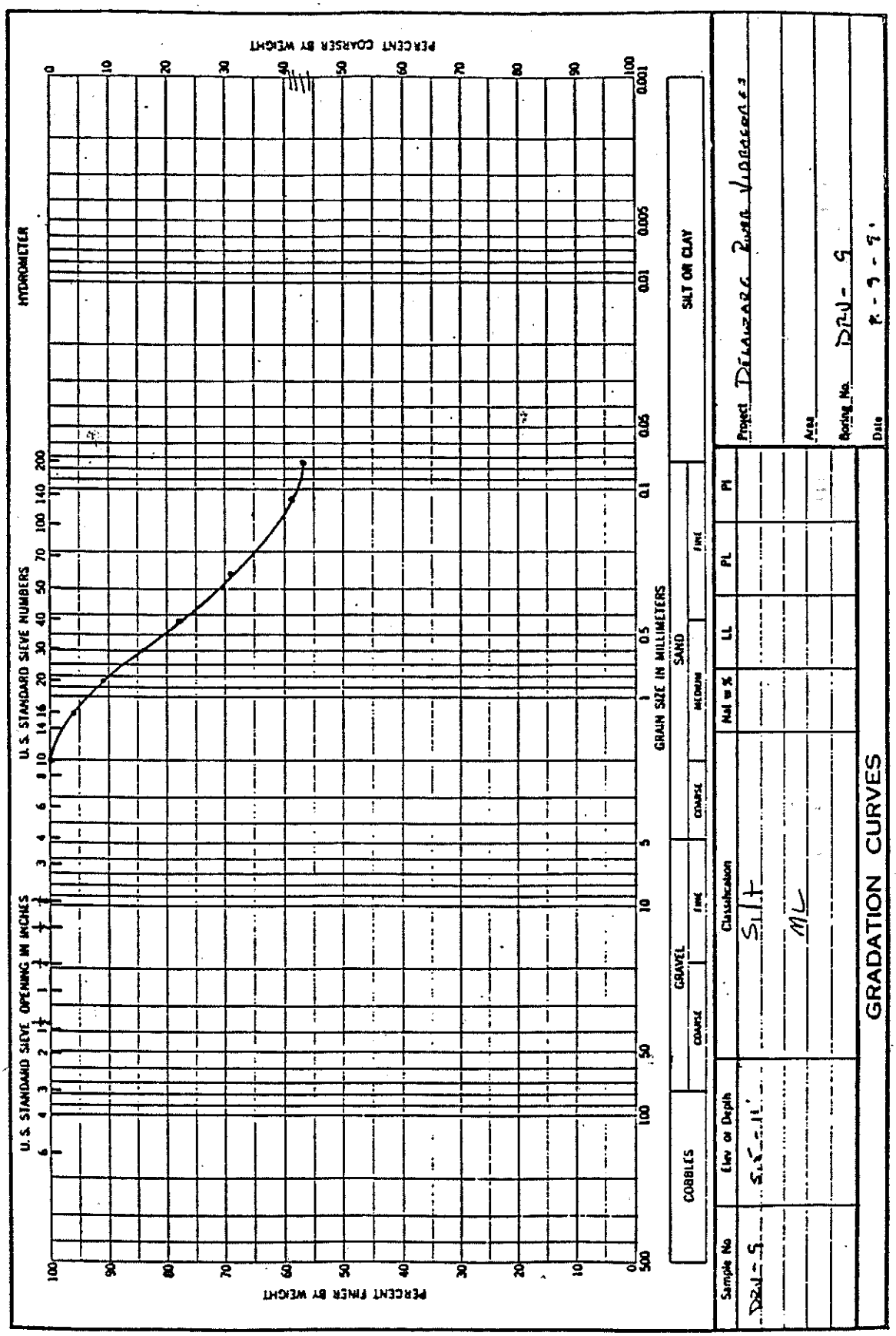

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Videscopes
Area
Boring No. DRV-3
Date 8-12-91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-3
1.3-3.7'
Silty Clayey Sand (SM-SC)
(SM-SC)
GRADATION CURVES
ENG FORM 1 MAY 83 2087


HYDROMETER
U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
GRAIN SIZE IN MILLIMETERS
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project Delaware River Viaducts
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Hydrographics
Area
Boring No. DTW - 8
Date 8 - 12 - 91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DTW - 8
15 - 15'
Silty Clayey Gravel (GM-GC)
GRADATION CURVES
ENG FORM 1 MAY 63 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087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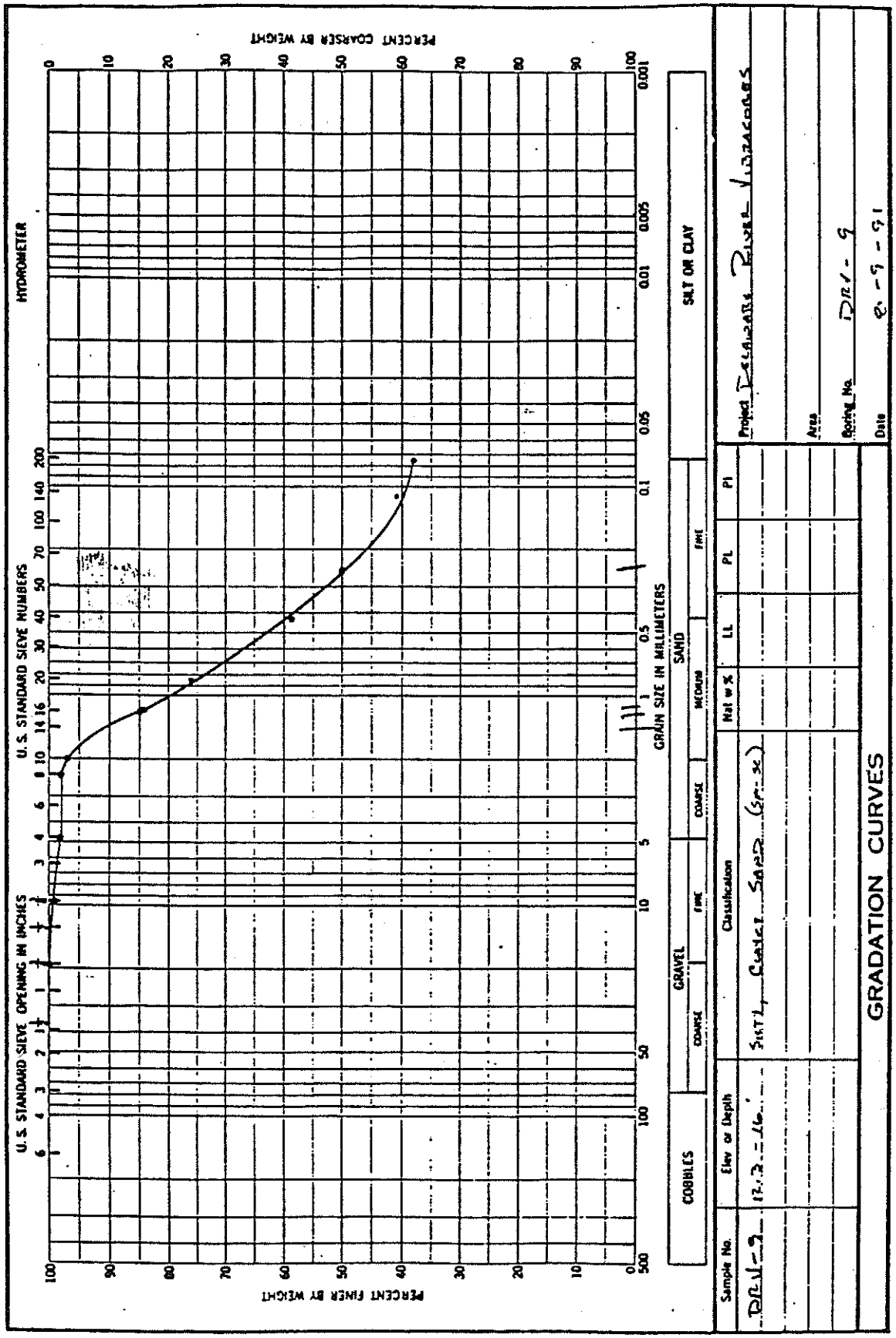
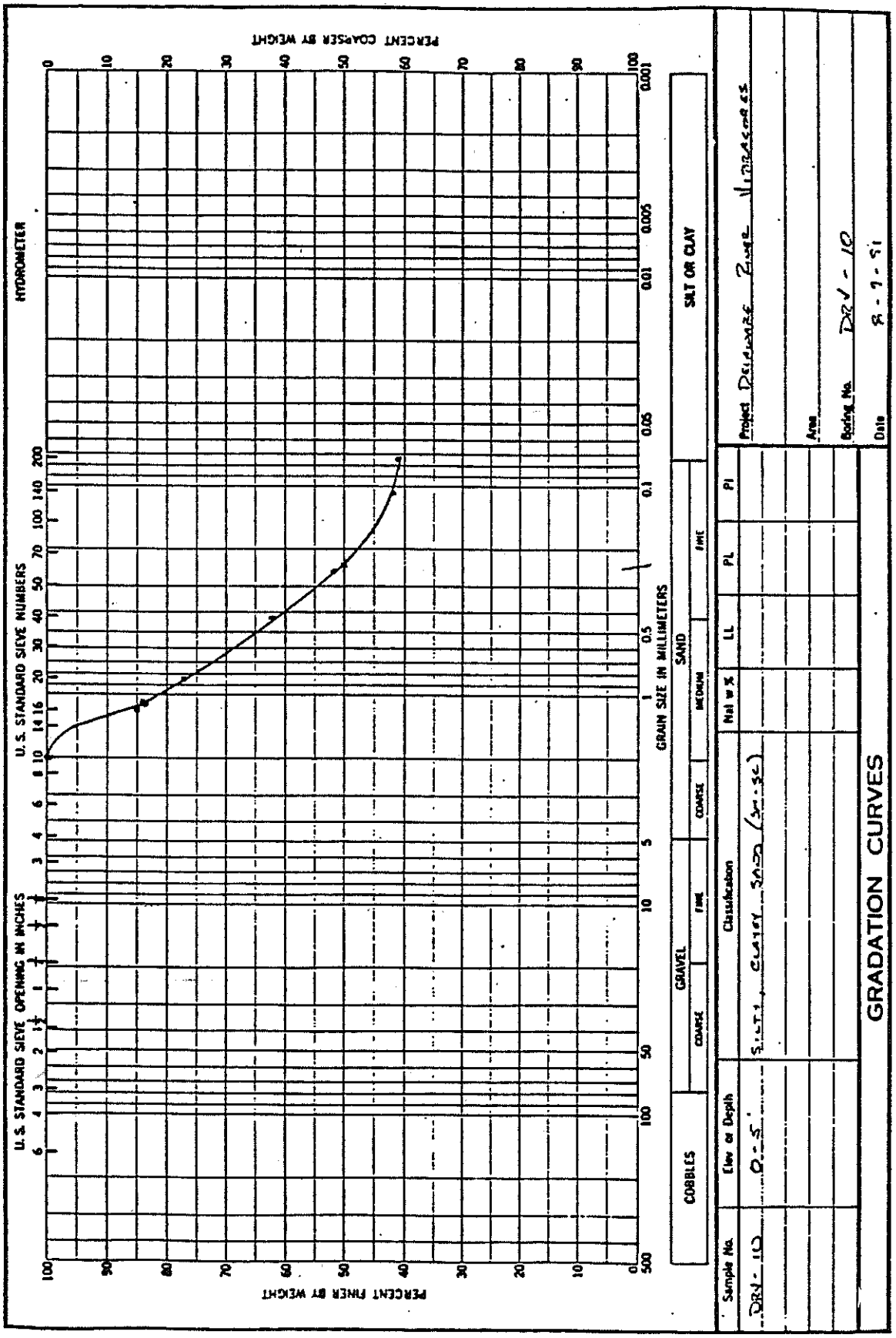
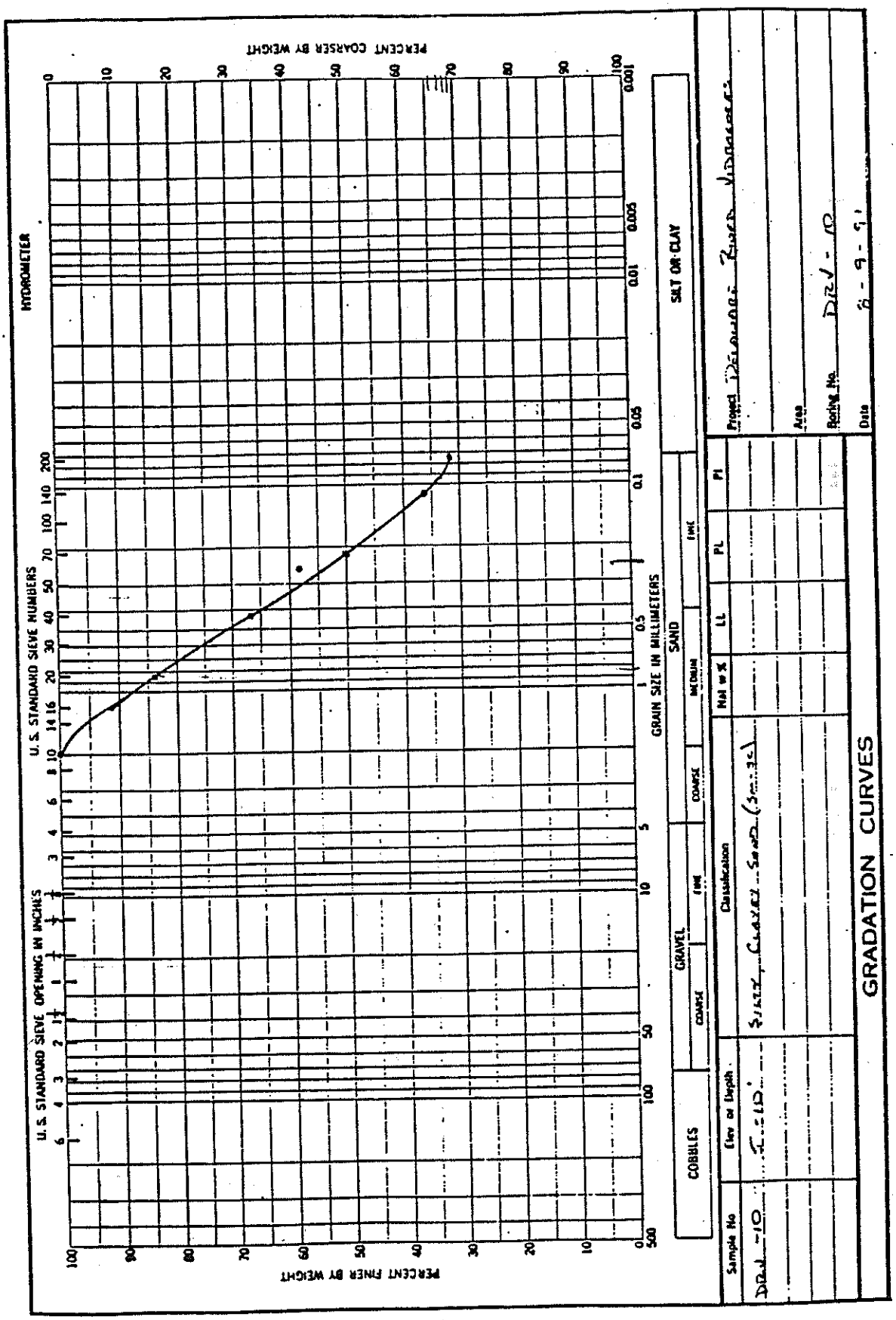
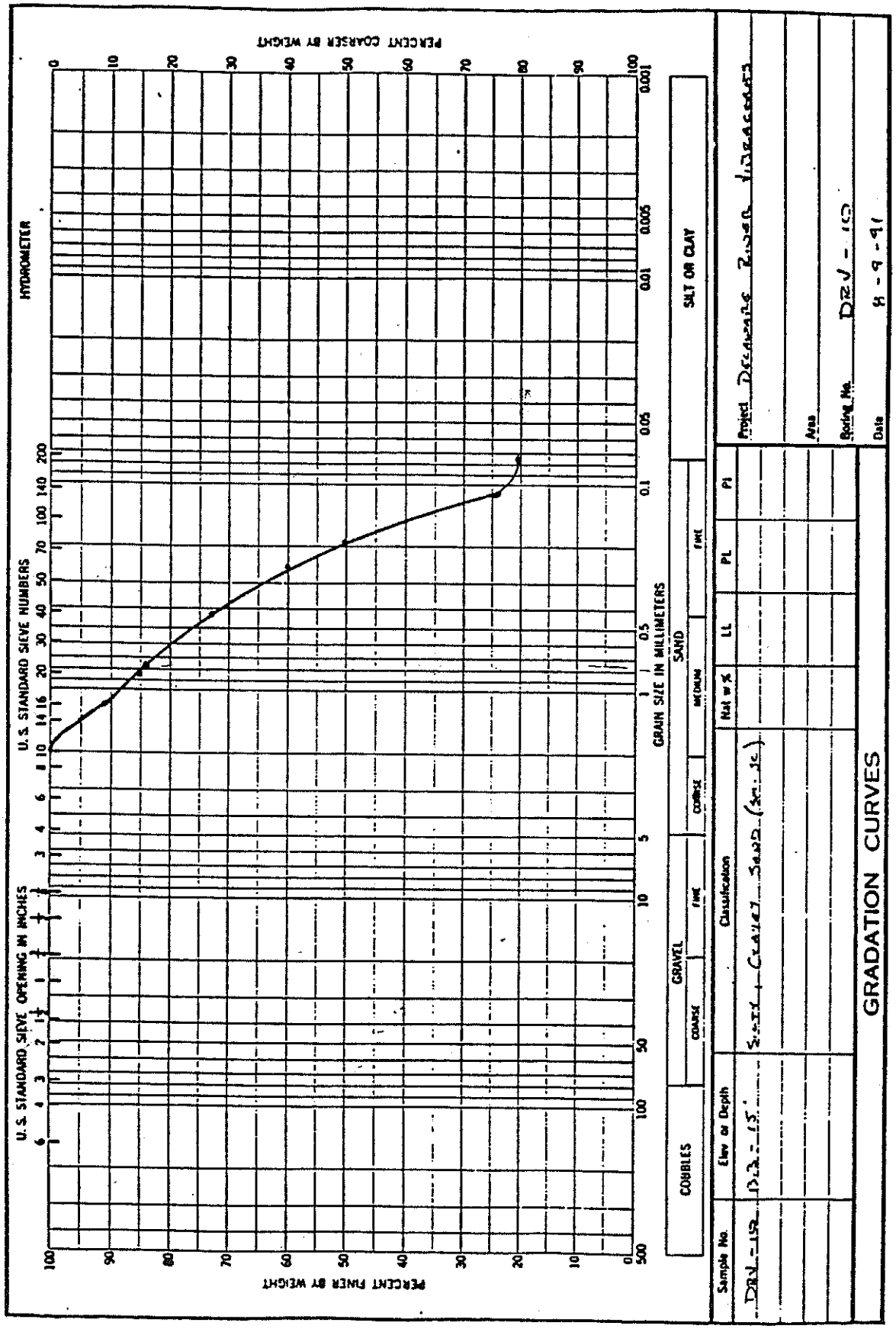
U.S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Widening
Area
Boring No. DRW-9
Date 8-9-9
Sample No
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRW-9
Silt
ML
GRADATION CURVES
ENG FORM 1 MAY 63 2087

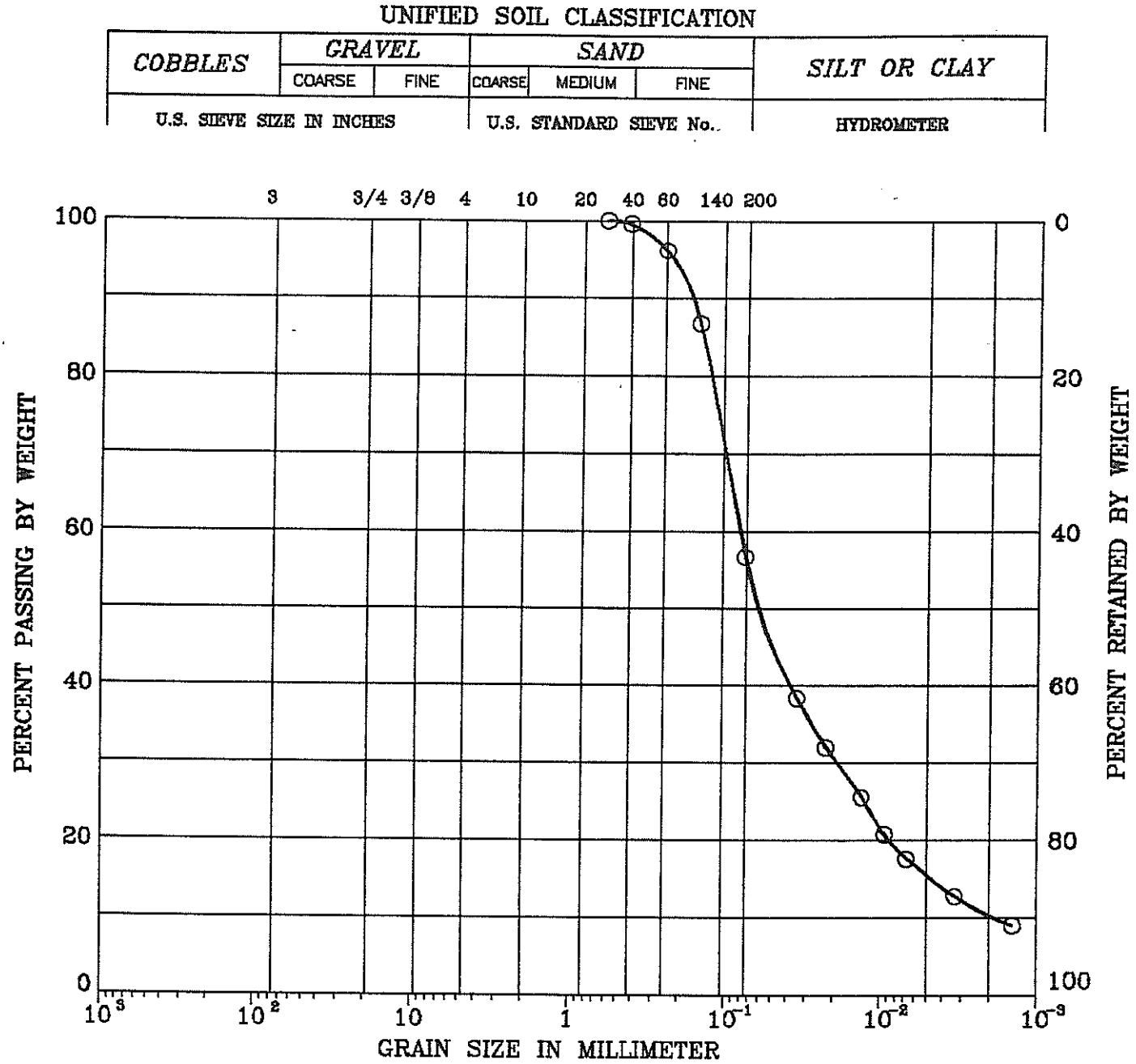
200


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Hydrocores
Area
Boring No. DR-9
Date 8-9-91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DR-9
12.2-16'
Silty Clayey Sand (SP-SC)
GRADATION CURVES
ENG FORM 1 MAY 63 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Ultrasonics
Area
Boring No. DRV - 10
Date 8 - 7 - 91
Sample No. DRV - 10
Elev or Depth 0-5'
Classification SILTY, CLAYEY SAND (SM-SC)
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 68 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087

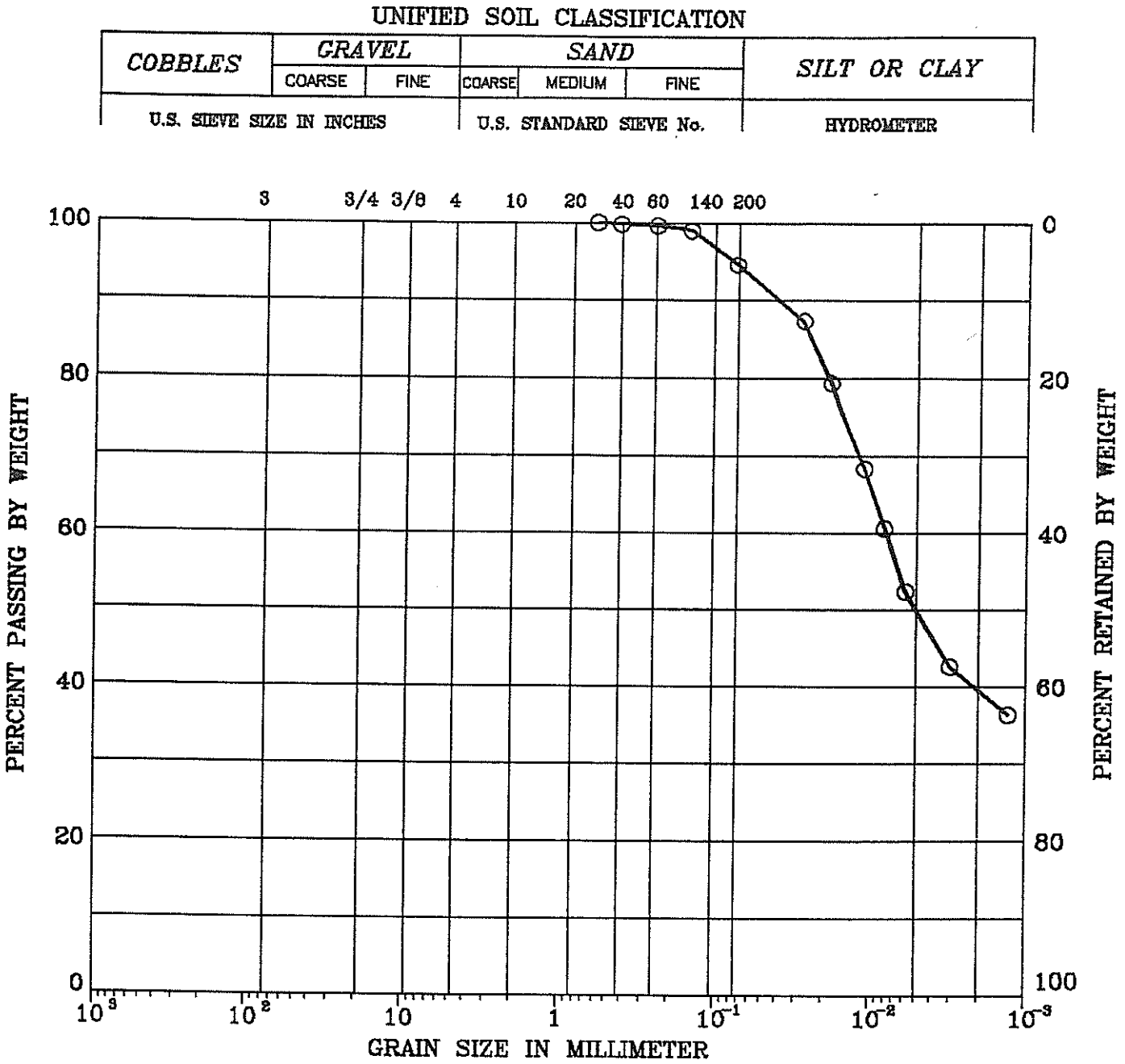

U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Dredging
Area
Boring No. DRV - 1C
Date 4-9-91
Sample No.
Elev or Depth
Classification
Nat w%
LL
PL
PI
DRV-1C
D.2.-1.5'
Silty Gravelly Sand (SM-SC)
GRADATION CURVES
ENG FORM 1 MAY 63 2087



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	J-2-G-00		36	12	GRAY ORGANIC CLAY (OL)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



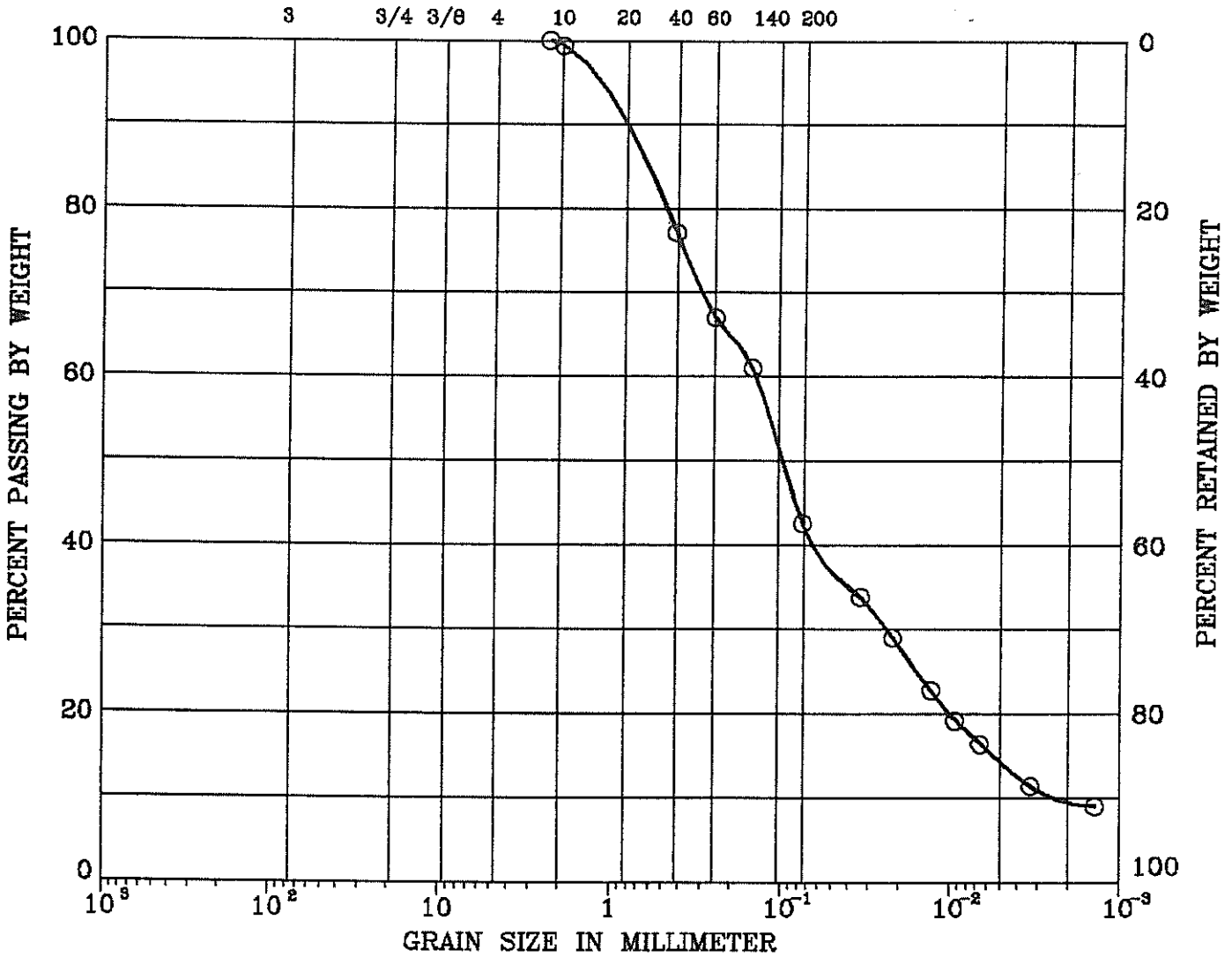
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	J2G-9.9		75	38	GRAY ORGANIC SILT (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

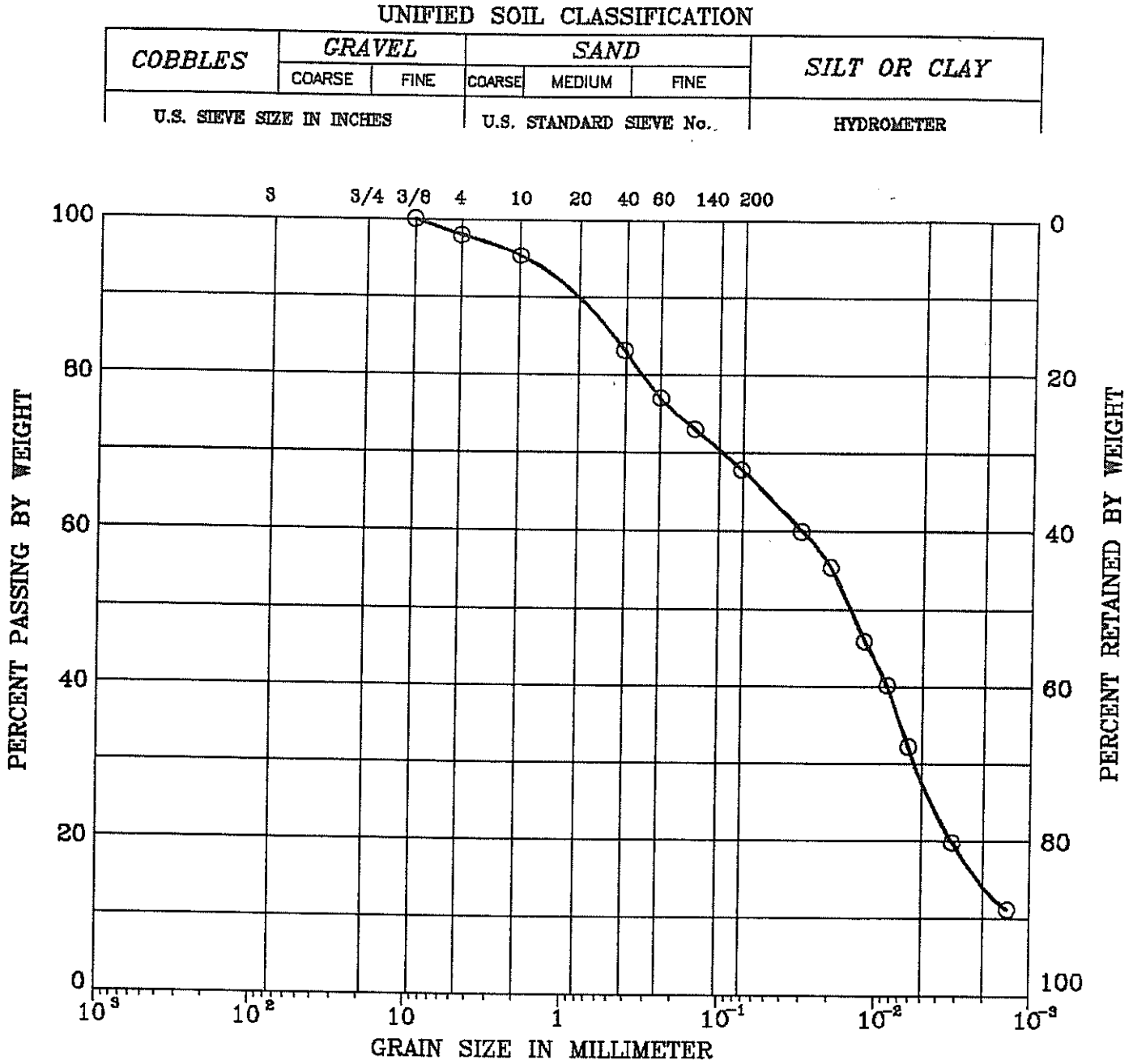
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	L1G-0.25		32	9	GRAY ORGANIC CLAYEY SAND (SC)

Remark :

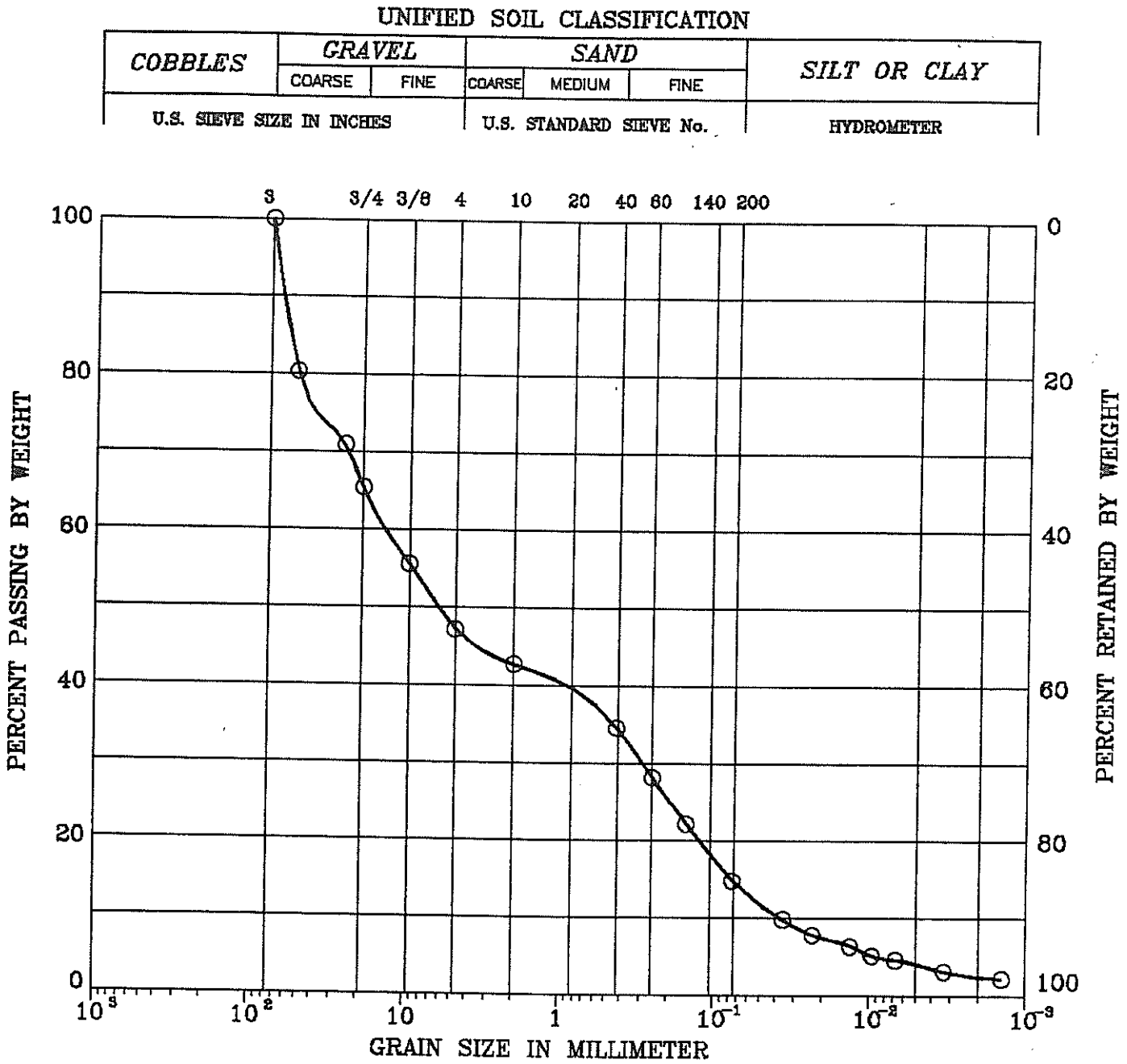
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	L1G-1.95		87	18	DARK GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



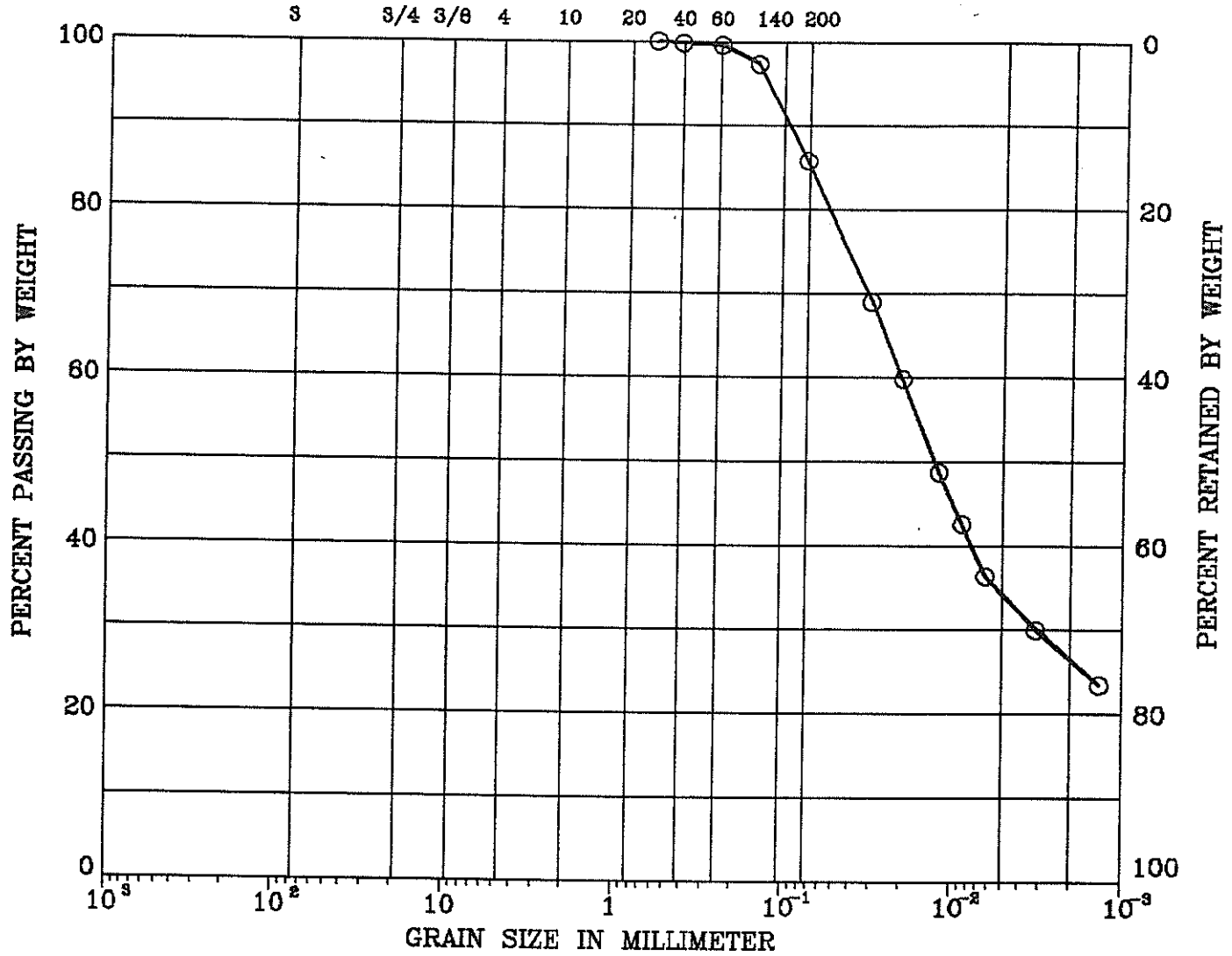
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	LIG-4.2				GRAY SILTY GRAVEL WITH SAND (GM)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

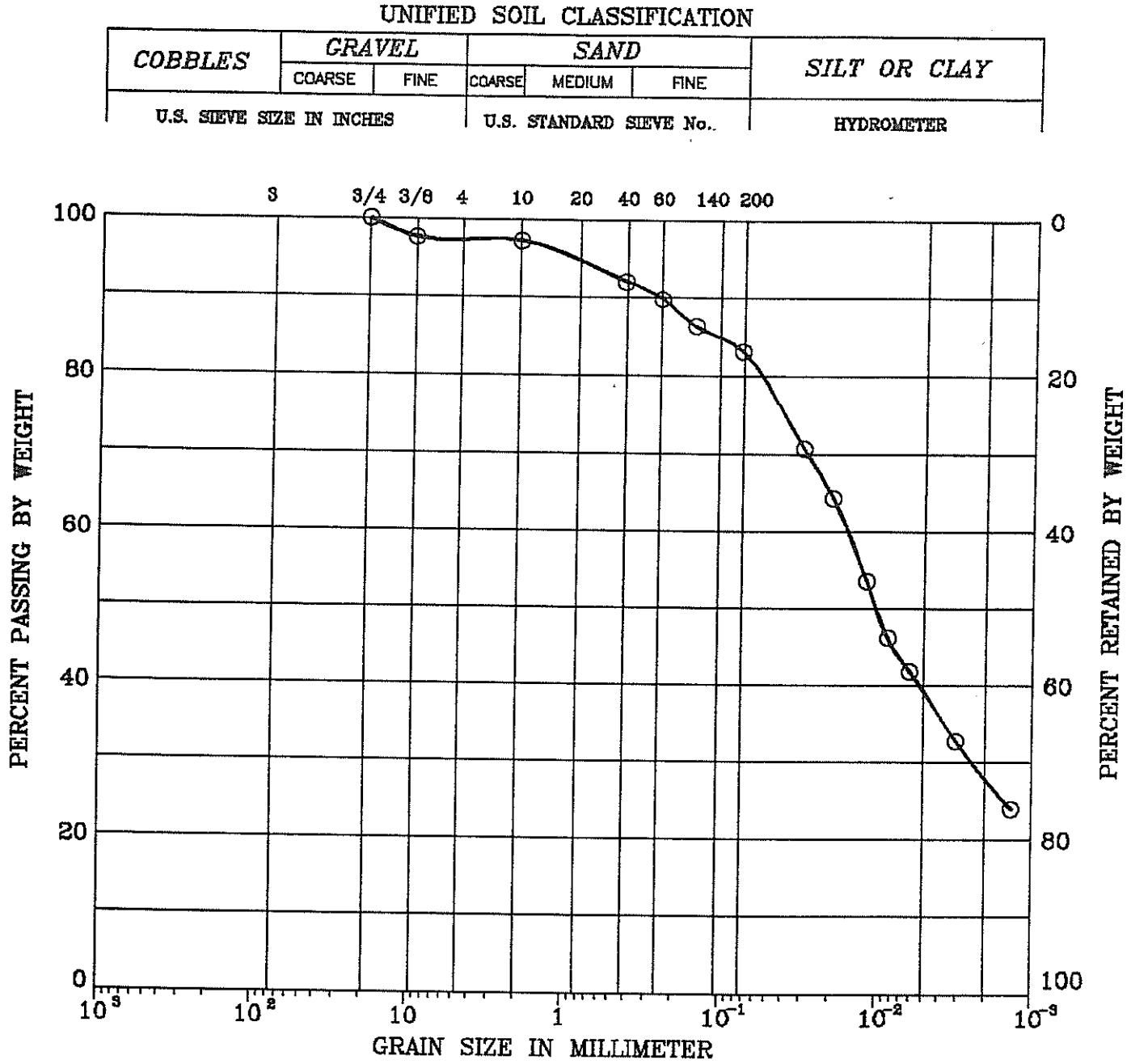
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	L3G-2.5		80	40	GRAY ORGANIC SILT (OH)

Remark :

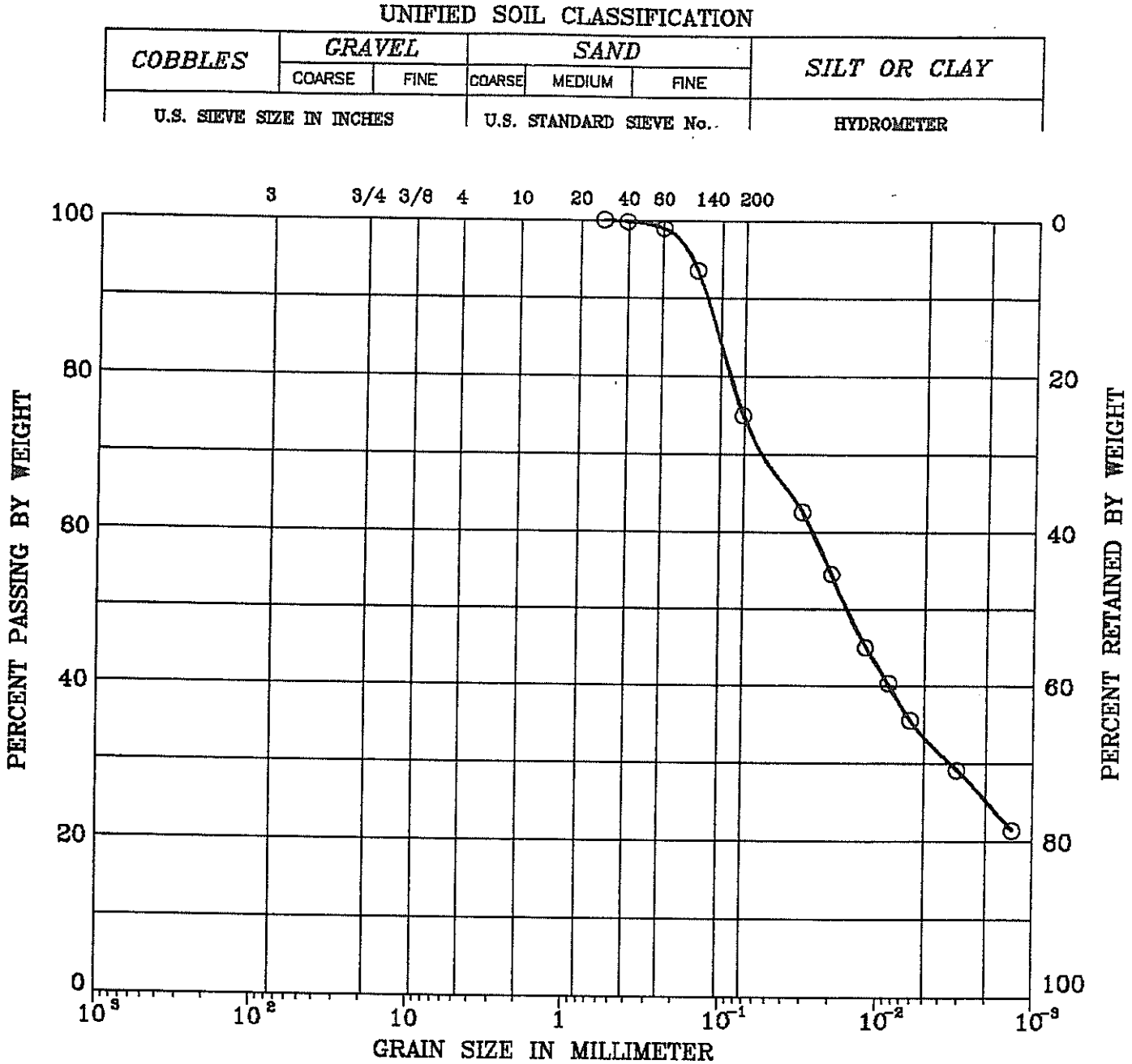
Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	L3G-7.5		62	29	GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



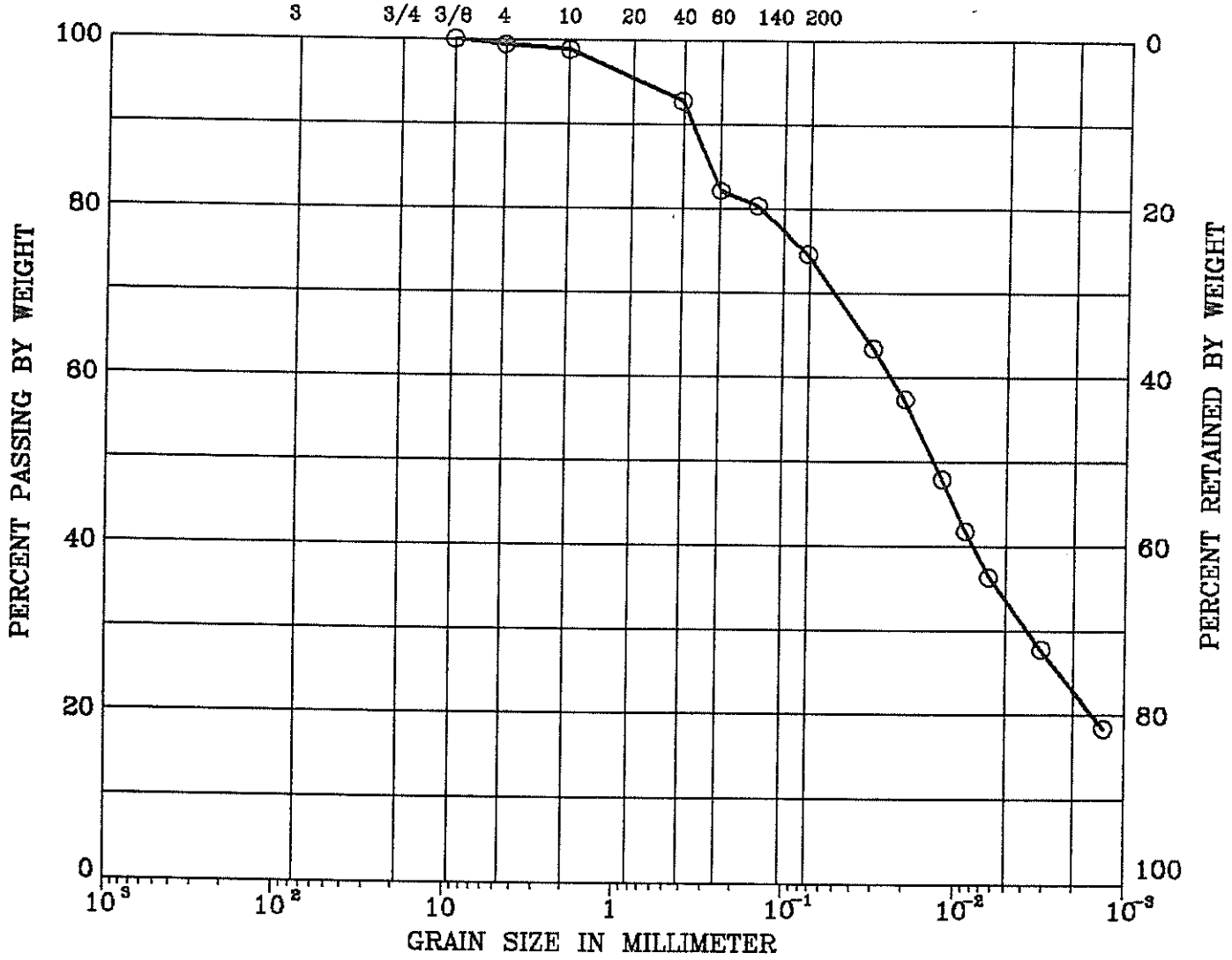
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	L3G-12.5		49	24	DARK GRAY ORGANIC CLAY (OL)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

UNIFIED SOIL CLASSIFICATION

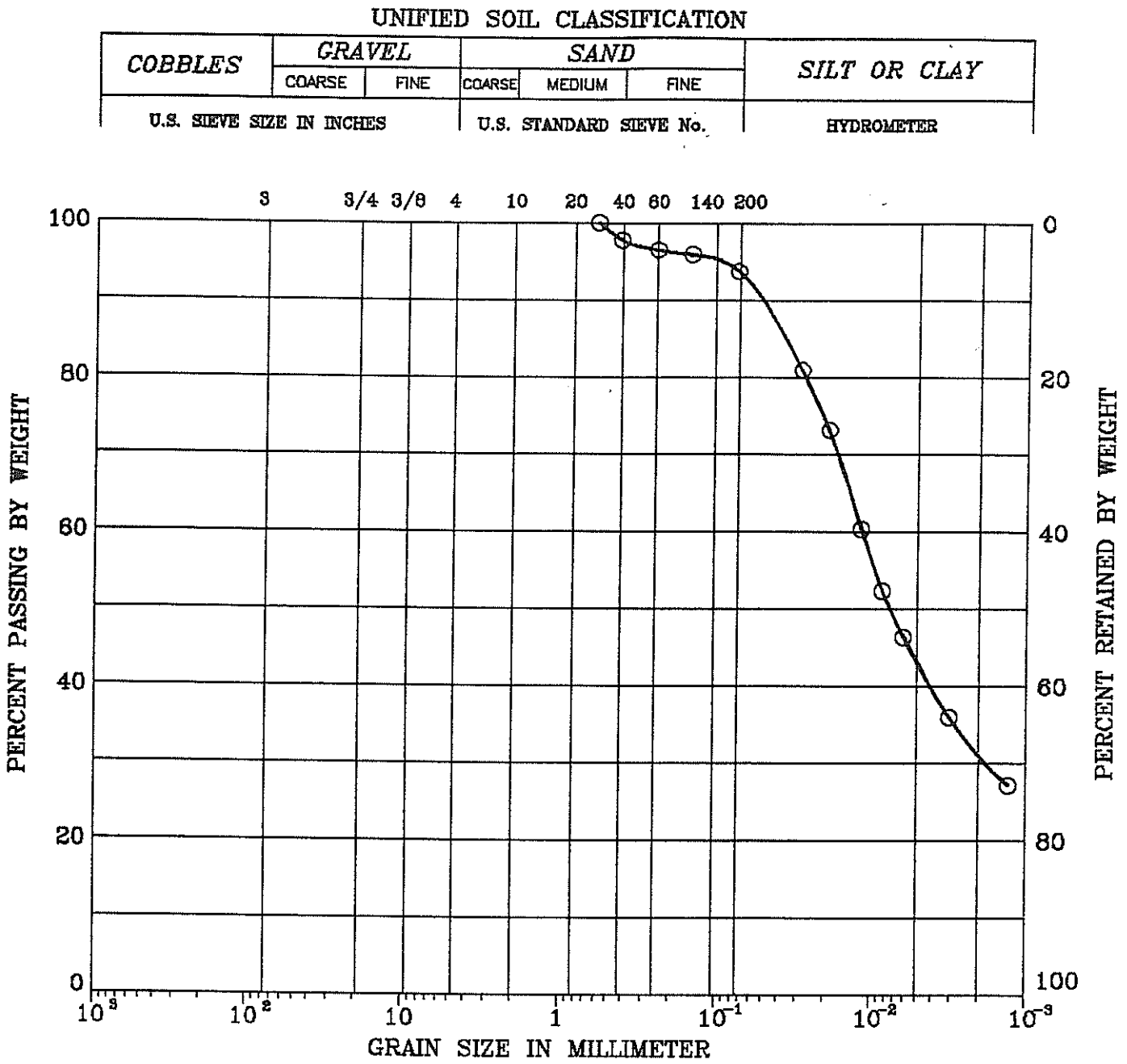
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	M1G-2.5		53	25	DARK GRAY ORGANIC CLAY (OH)

Remark :

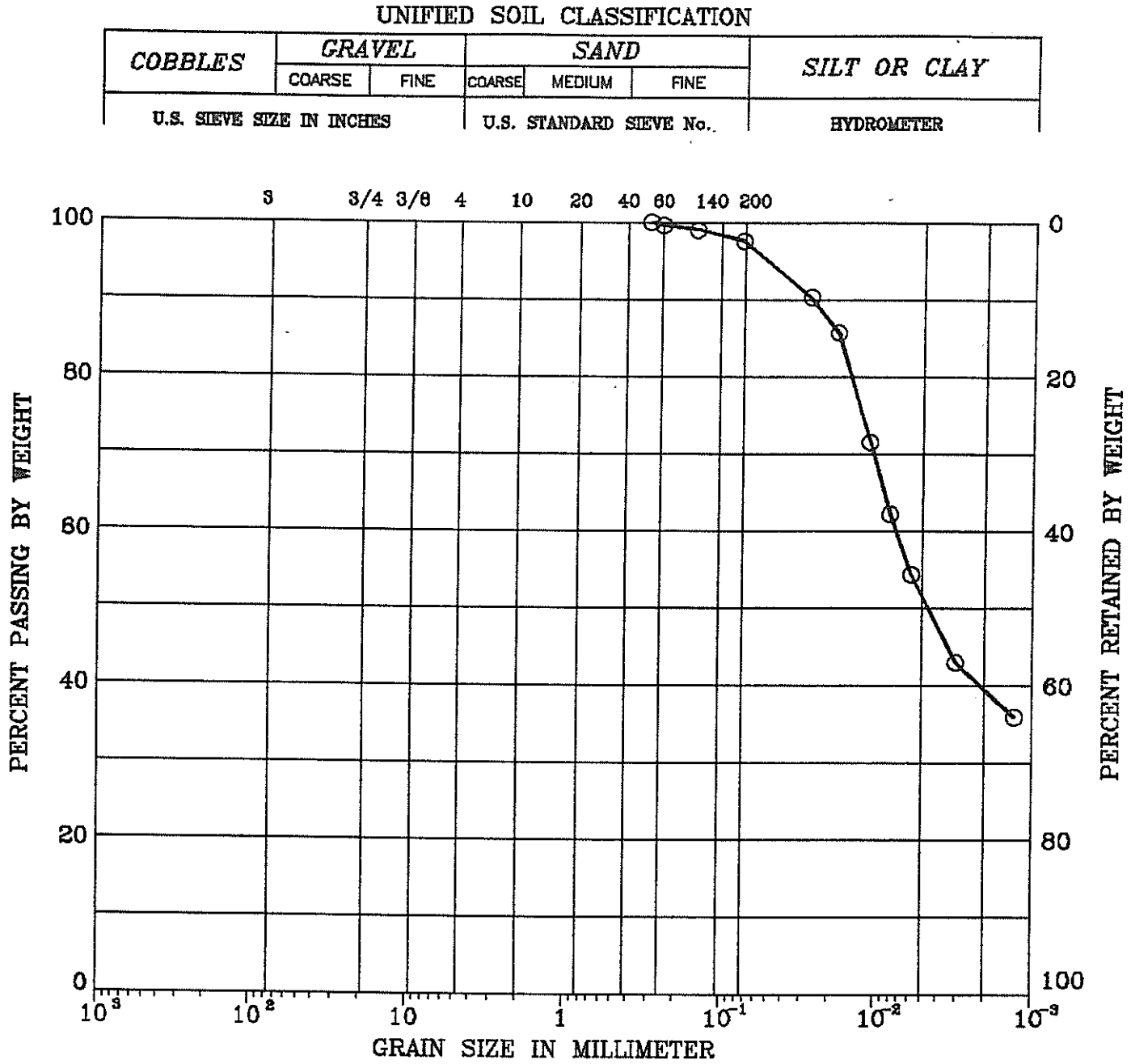
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	M1G-12.5		68	37	DARK GRAY ORGANIC CLAY (OH)

Remark :

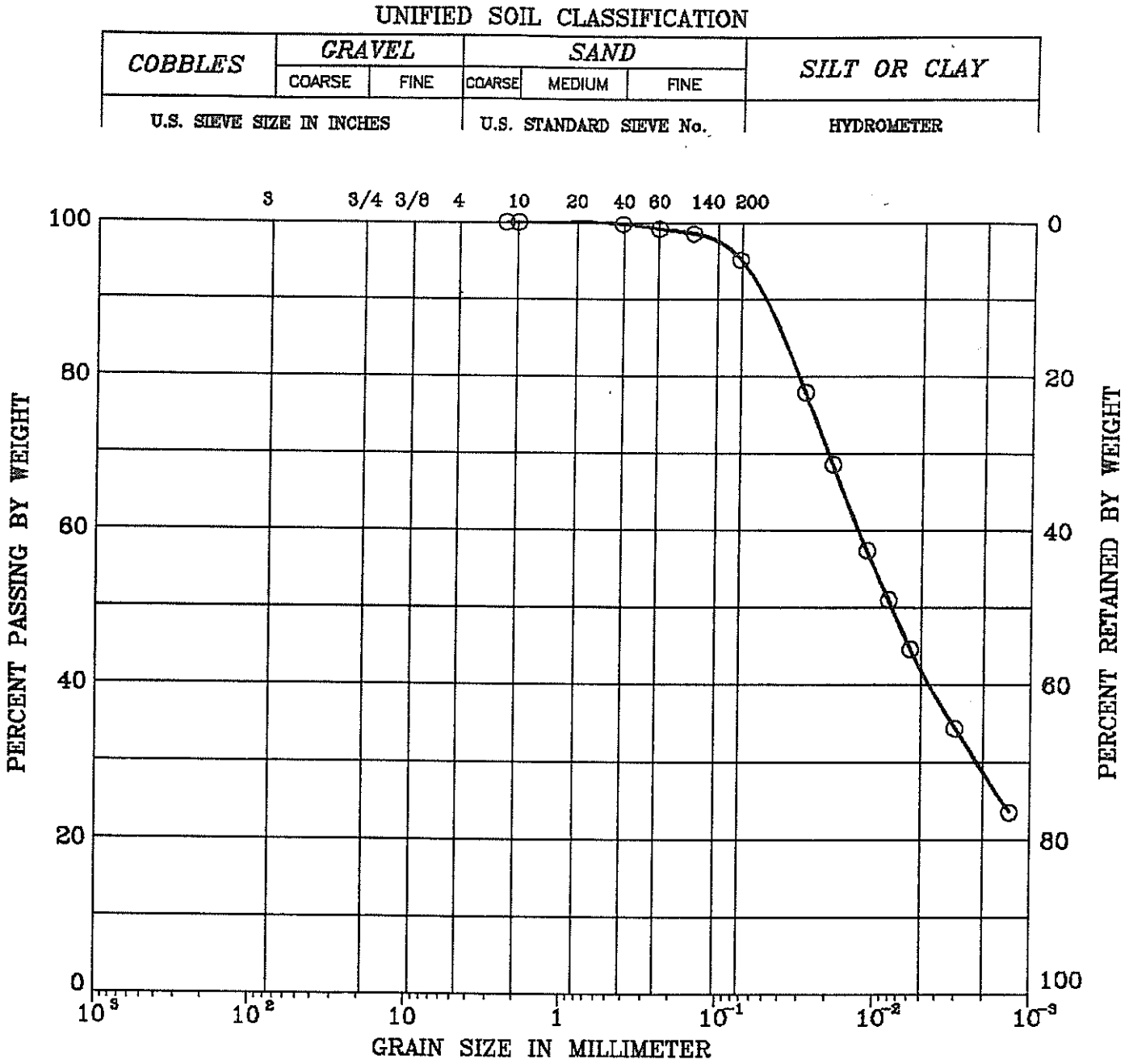
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	M1G-17.5		85	44	GRAY ORGANIC SILT (OH)

Remark :

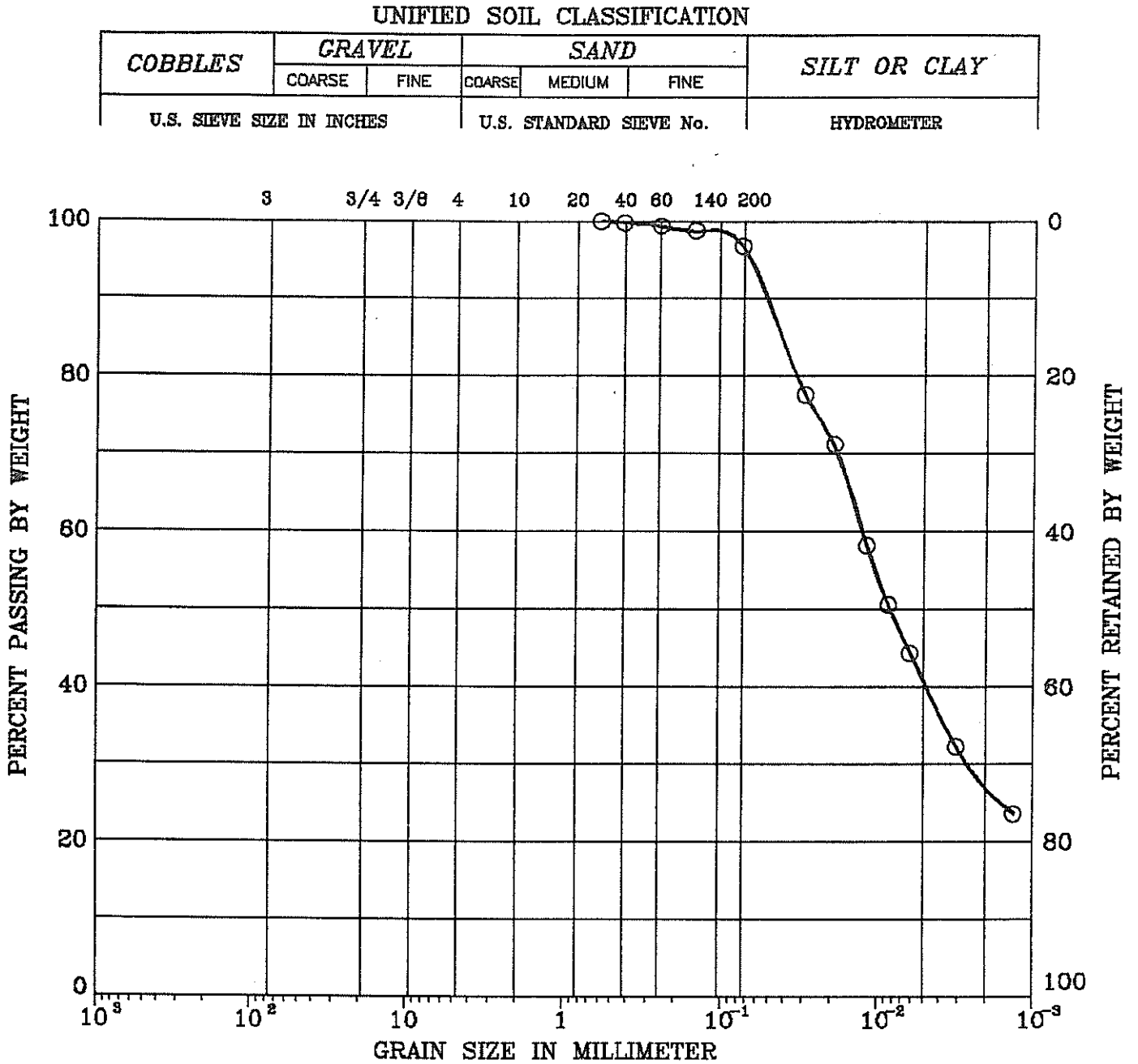
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	M-2-G-2		64	30	DARK GRAY ORGANIC CLAY (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92



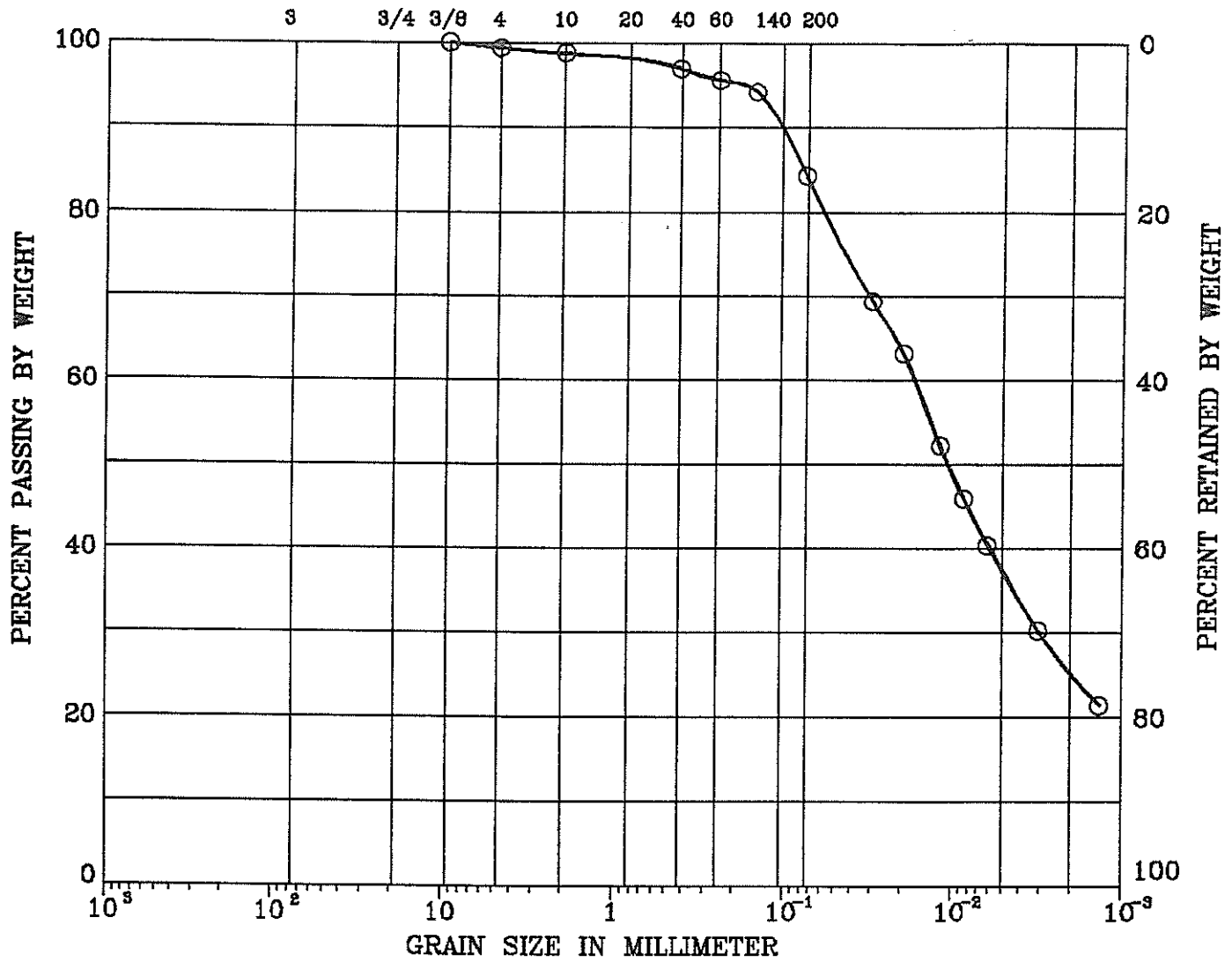
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	M-2-G-6		67	35	DARK GRAY ORGANIC CLAY (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92

UNIFIED SOIL CLASSIFICATION

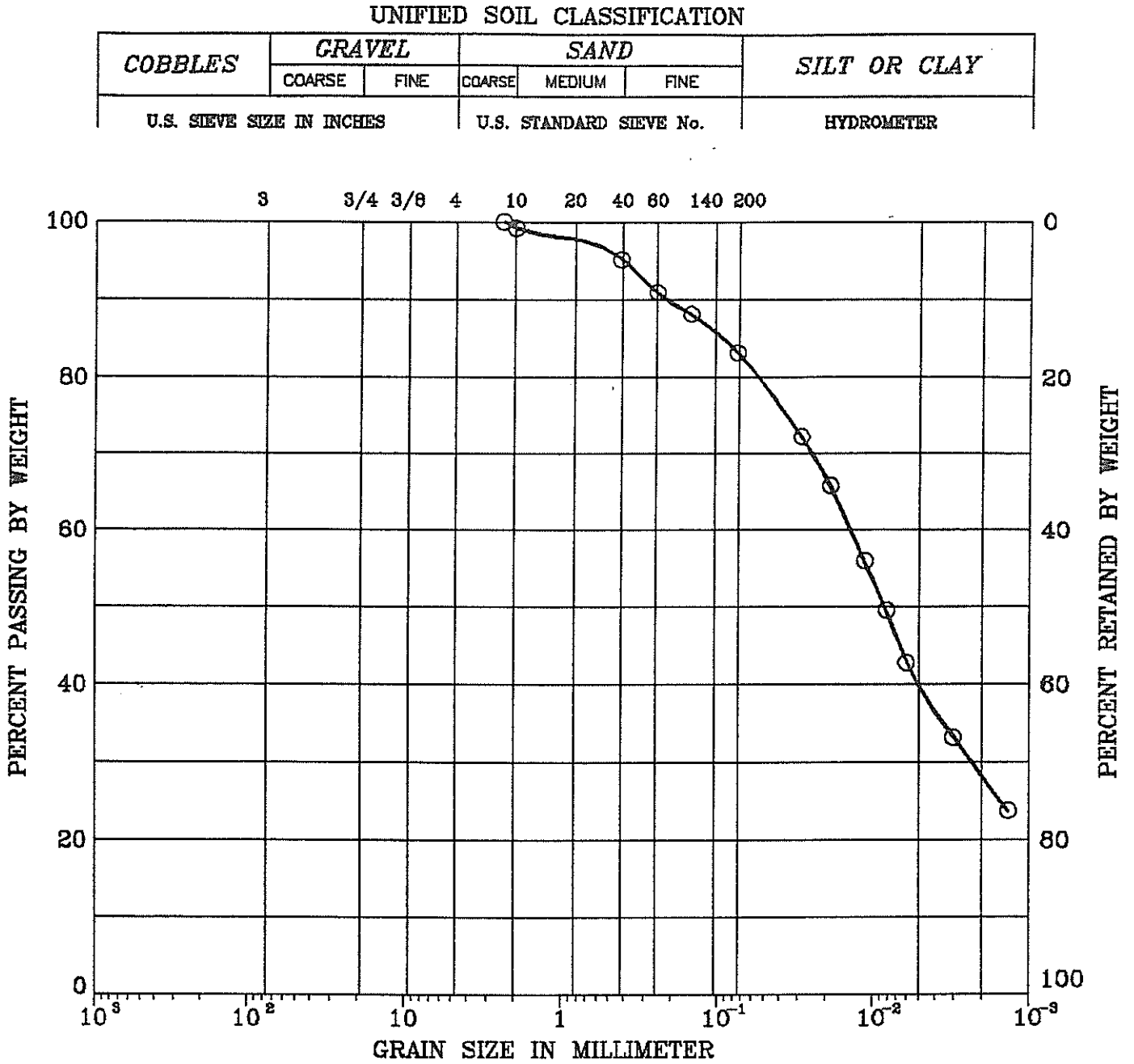
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	M-2-G-10		91	49	DARK GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	M-2-G-14		58	33	DARK GRAY ORGANIC CLAY (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050181 **Sample ID:** MC-28 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.90 %
Percent Medium Sand (> 425 µm < 2.0 mm)	1.66 %
Percent Fine Sand (> 75 µm < 425 µm)	8.46 %
Percent (by difference) Silt/Clay, plus analytical loss	88.97 %

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050181 **Sample ID:** MC-28 **Date:** 3/02-09/05

Total dry sand mortered + container	111.411	g
Container tare	12.703	g
Total dry sample wt.	98.7080	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.703	g
Container tare	12.703	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	13.596	g
Container tare	12.703	g
Sand > 2.0 mm <4.75 mm	0.8930	g (C)

Percent < 4.75 mm > 2.0 mm = 0.90

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	174.5405	g
Container tare	172.9007	g
Dry medium sand >425 µm <2.0 mm	1.6398	g (D)

Percent > 425 µm < 2.0 mm = 1.66

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	178.4984	g
Container tare	170.1475	g
Dry fine sand >75 µm <425 µm	8.3509	g (E)

Percent > 75 µm < 425 µm = 8.46

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MK

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston | ASI Job #: 25-016 | Balance: Sart./Mett.

Sample # : 20050182 | Sample ID: MC-29 | Date: 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.00 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	0.42 %
Percent Medium Sand (> 425 µm < 2.0 mm)	2.18 %
Percent Fine Sand (> 75 µm < 425 µm)	88.93 %
Percent (by difference) Silt/Clay, plus analytical loss	8.48 %

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050182 **Sample ID:** MC-29 **Date:** 3/02-09/05

Total dry sand mortered + container	113.221	g
Container tare	12.545	g
Total dry sample wt.	100.6760	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.545	g
Container tare	12.545	g
Gravel >4.75 mm	0.0000	g (B)

Percent > 4.75 mm = 0.00

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	12.963	g
Container tare	12.545	g
Sand > 2.0 mm <4.75 mm	0.4180	g (C)

Percent < 4.75 mm > 2.0 mm = 0.42

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	172.2404	g
Container tare	170.0444	g
Dry medium sand >425 µm <2.0 mm	2.1960	g (D)

Percent > 425 µm < 2.0 mm = 2.18

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	93.5355	g
Container tare	4.0060	g
Dry fine sand >75 µm <425 µm	89.5295	g (E)

Percent > 75 µm < 425 µm = 88.93

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: SW

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050183 **Sample ID:** MC-30 **Date:** 3/02-09/05

Grain Size Range	Percent in Range
Percent Gravel (> 4.75 mm)	0.12 %
Percent Coarse Sand (> 2.0 mm < 4.75 mm)	9.17 %
Percent Medium Sand (> 425 µm < 2.0 mm)	48.49 %
Percent Fine Sand (> 75 µm < 425 µm)	36.94 %
Percent (by difference) Silt/Clay, plus analytical loss	5.29 %

C:\Norvell/Calc-for/Sand-range

AQUA SURVEY, INC.
SAND RANGE GRAIN SIZE

Client: Weston **ASI Job #:** 25-016 **Balance:** Sart./Mett.

Sample # : 20050183 **Sample ID:** MC-30 **Date:** 3/02-09/05

Total dry sand mortered + container	117.744	g
Container tare	12.616	g
Total dry sample wt.	105.1280	g (A)

4 sieve
(Gravel)

Dry gravel >4.75 mm + container	12.747	g
Container tare	12.616	g
Gravel >4.75 mm	0.1310	g (B)

Percent > 4.75 mm = 0.12

10 sieve
(Coarse sand)

Dry coarse sand >2.0 mm + container	22.253	g
Container tare	12.616	g
Sand > 2.0 mm <4.75 mm	9.6370	g (C)

Percent < 4.75 mm > 2.0 mm = 9.17

40 sieve
(Medium sand) *

Dry medium sand <2.0 mm >425 µm + container	54.1712	g
Container tare	3.1980	g
Dry medium sand >425 µm <2.0 mm	50.9732	g (D)

Percent > 425 µm < 2.0 mm = 48.49

200 sieve
(Fine sand) *

Dry fine sand <425 µm >75 µm + container	201.3270	g
Container tare	162.4977	g
Dry fine sand >75 µm <425 µm	38.8293	g (E)

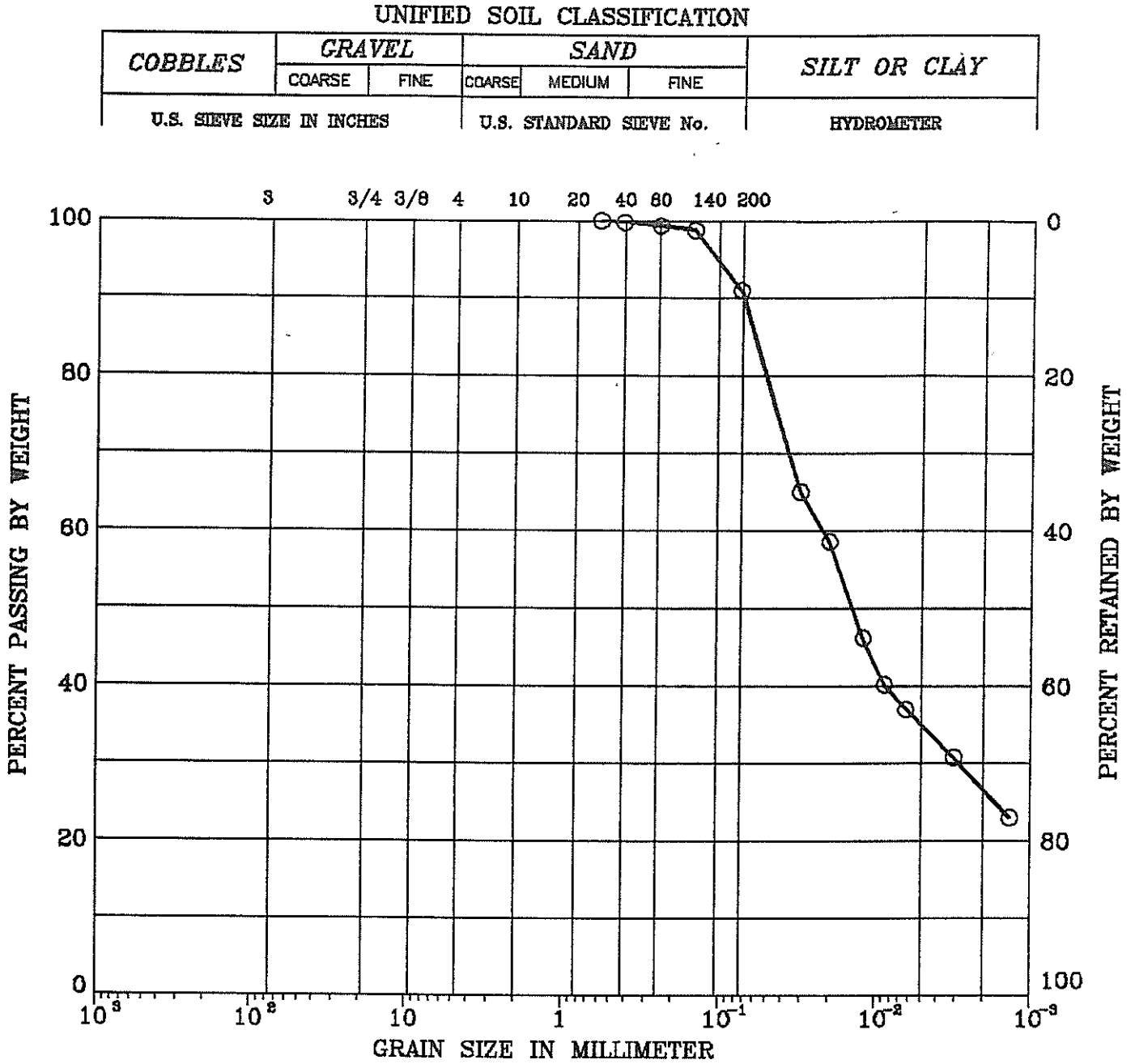
Percent > 75 µm < 425 µm = 36.94

* Washed through 200 sieve to remove clay and silt sizes

Date: 3/9/05

Initials: MM

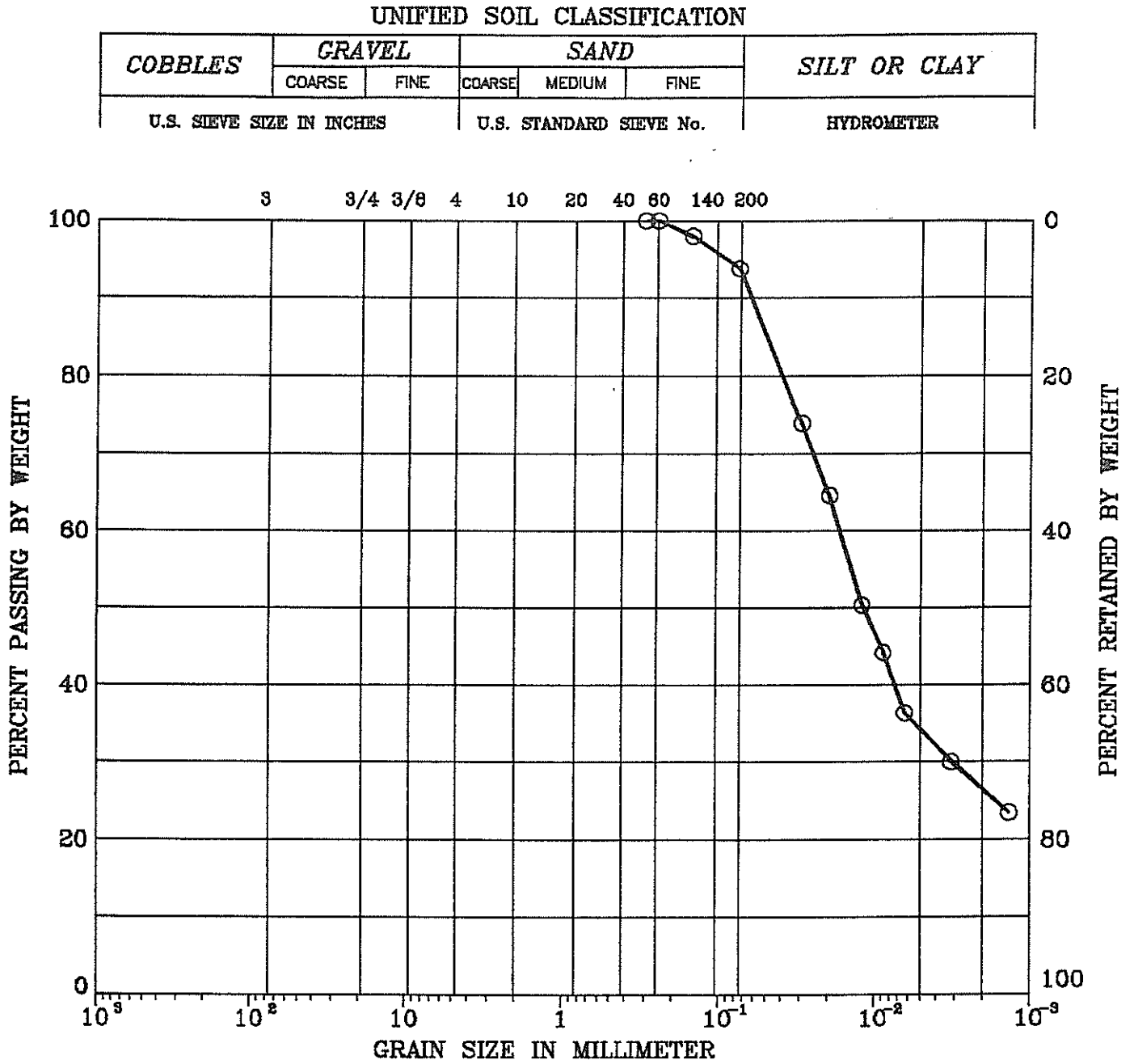
C:\Norvell/Calc-for/Sand-range



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N1G-4.0		84	48	GRAY ORGANIC CLAY (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



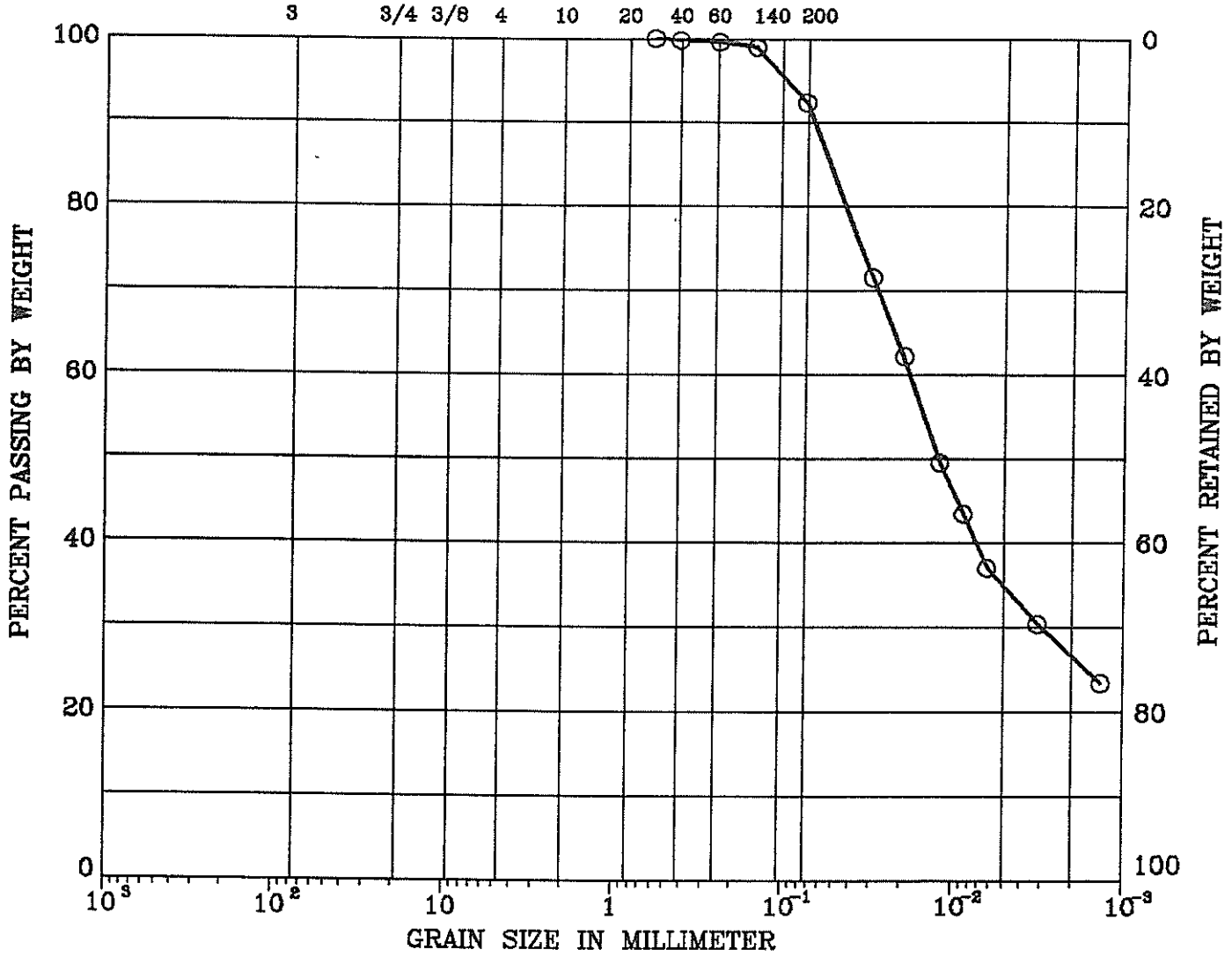
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N1G-8.0		85	52	GRAY ORGANIC CLAY (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

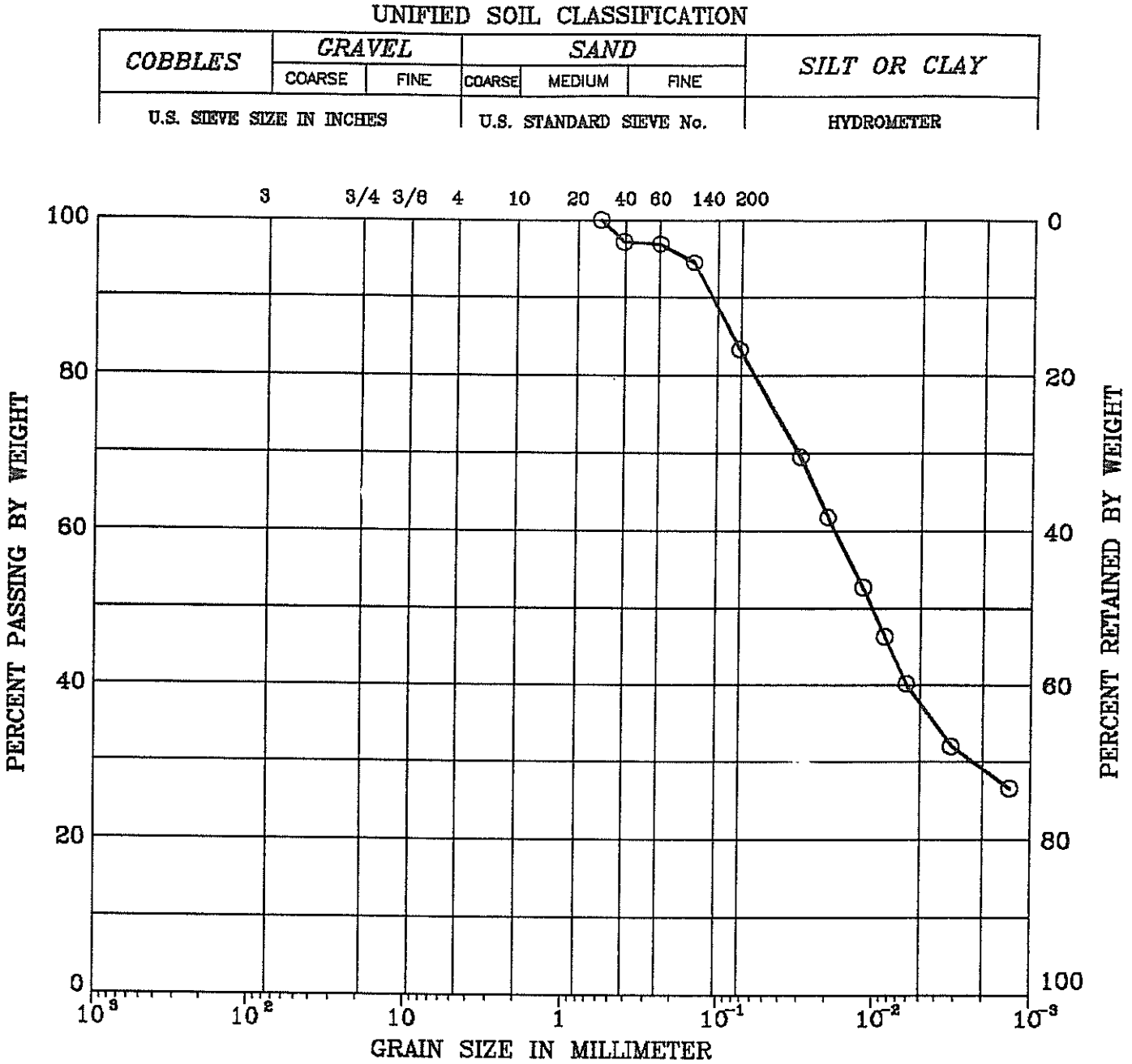
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N2G-7.0		81	46	GRAY ORGANIC CLAY (OH)

Remark :

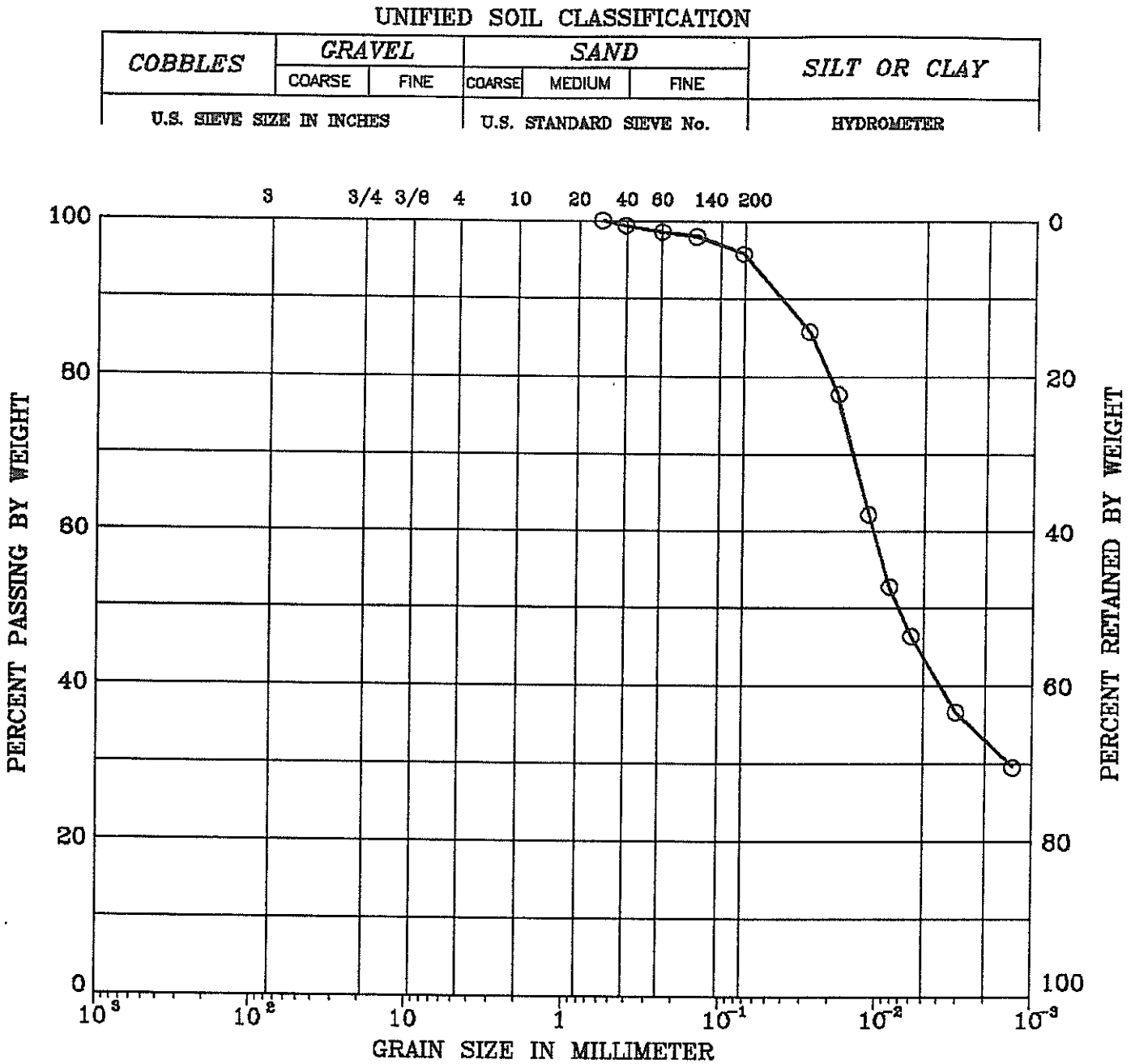
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N2G-11.0		85	45	GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



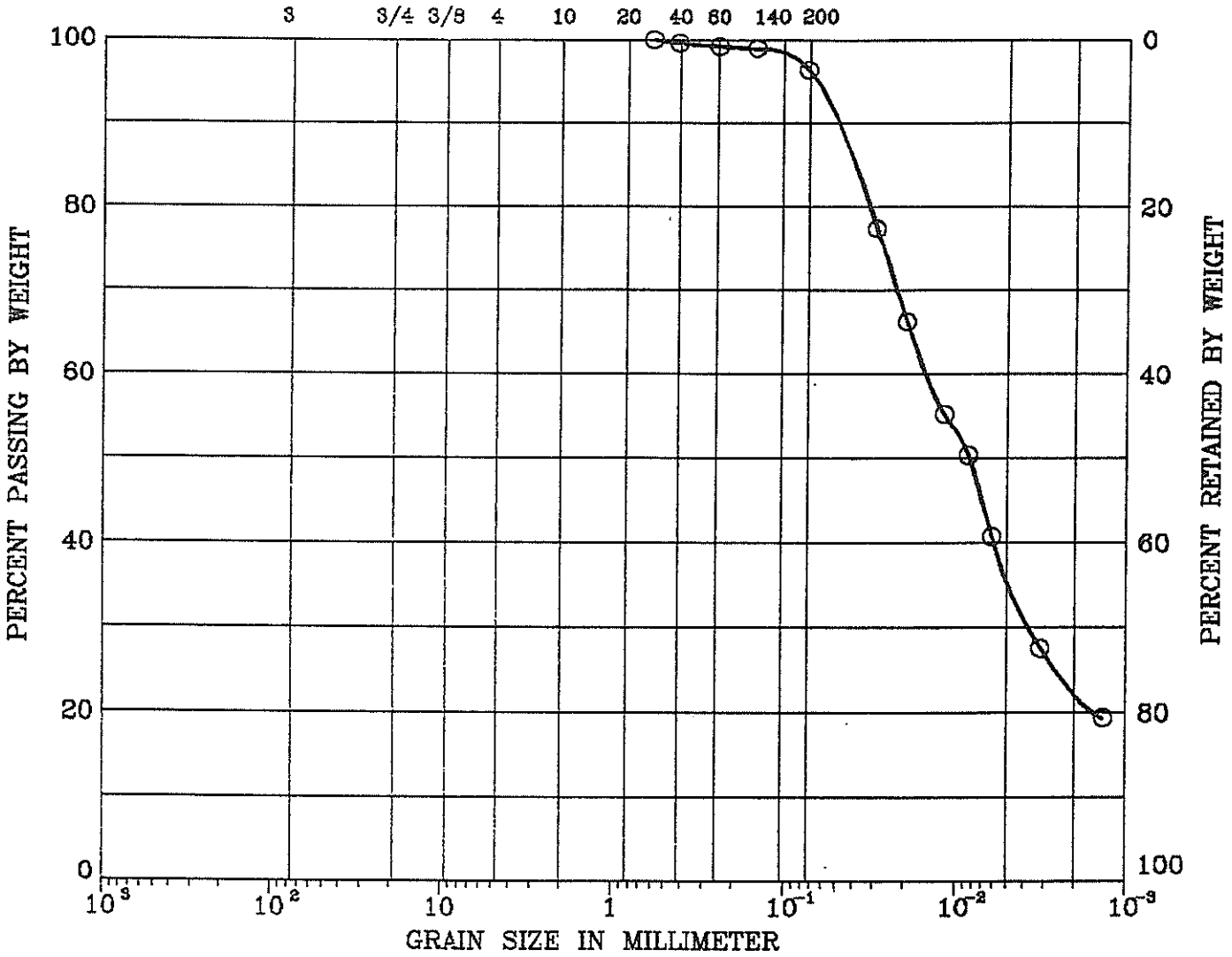
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N2G-14.0		88	43	GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



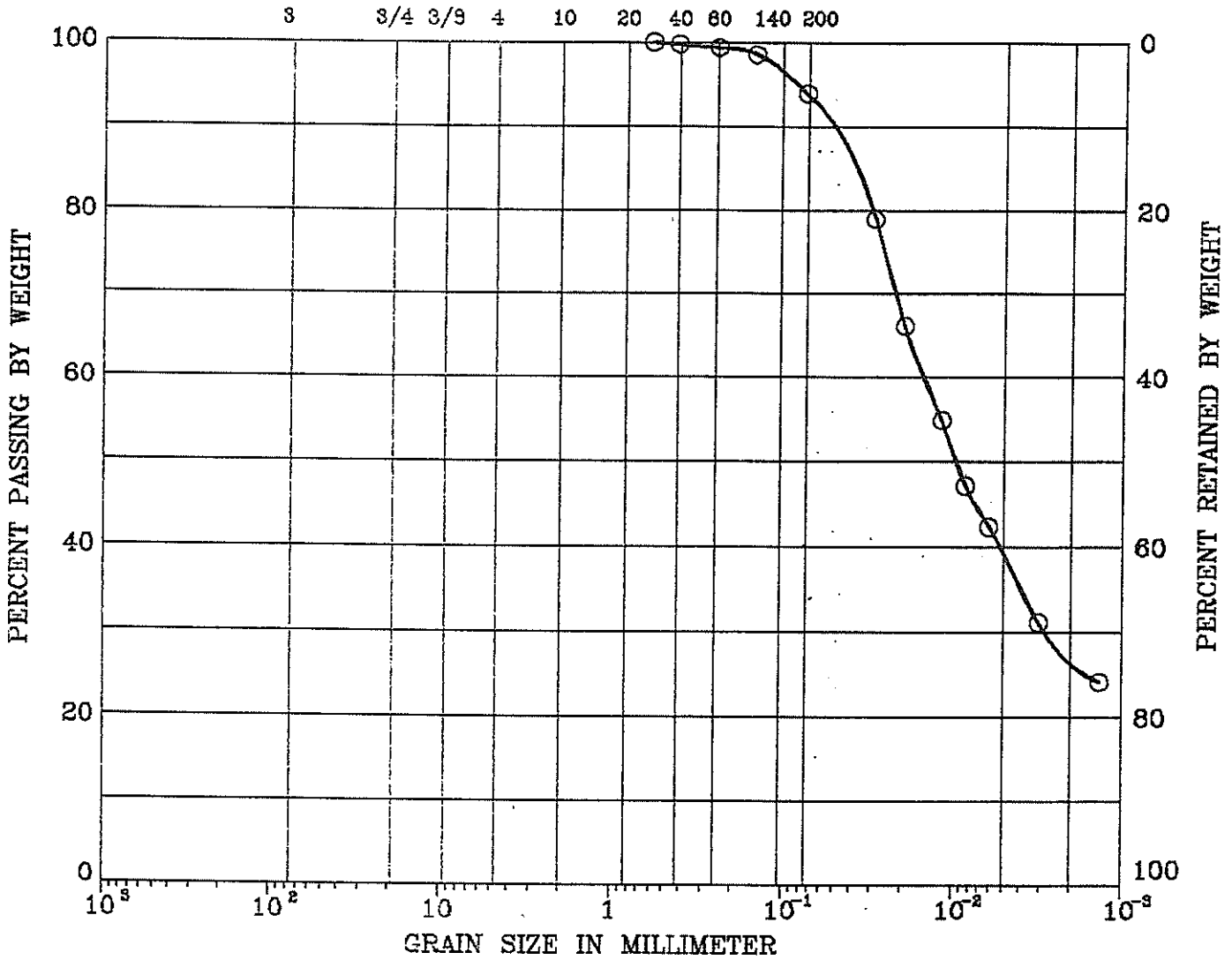
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N-3-G-3		60	27	DARK GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92

UNIFIED SOIL CLASSIFICATION

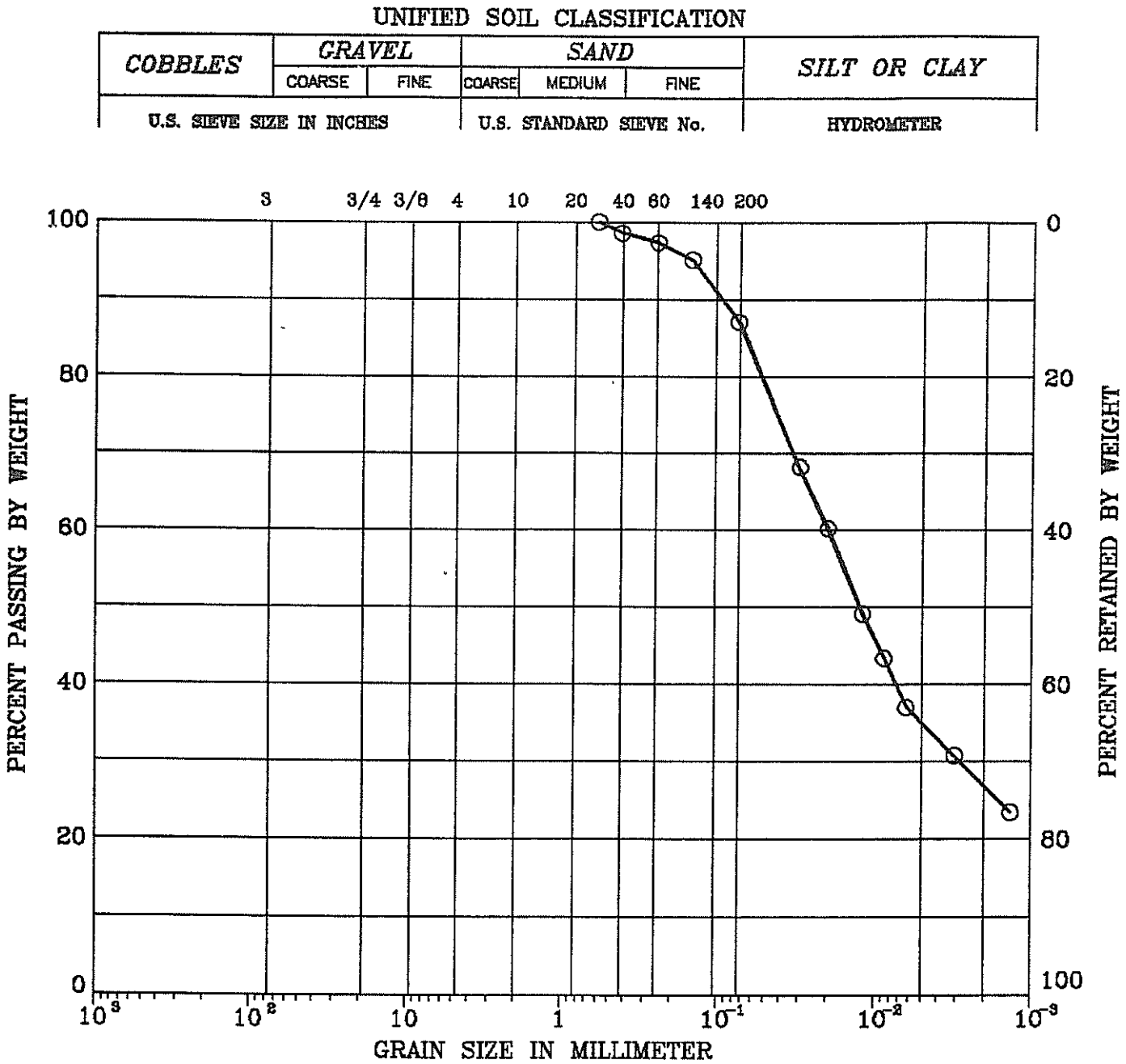
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	N-3-G-7		60	25	DARK GRAY ORGANIC SILT (OH)

Remark :

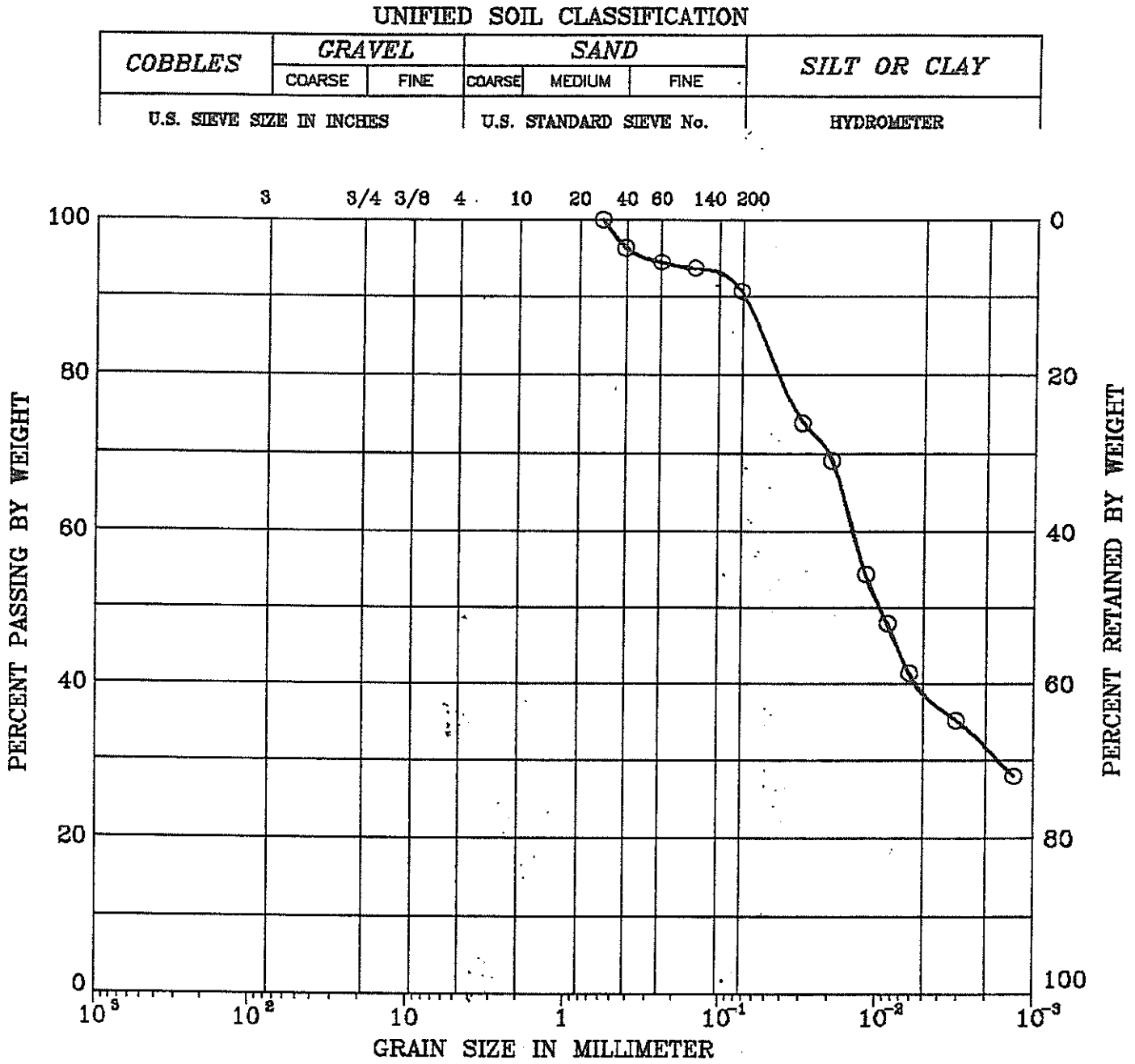
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N3G-11.0		78	38	GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



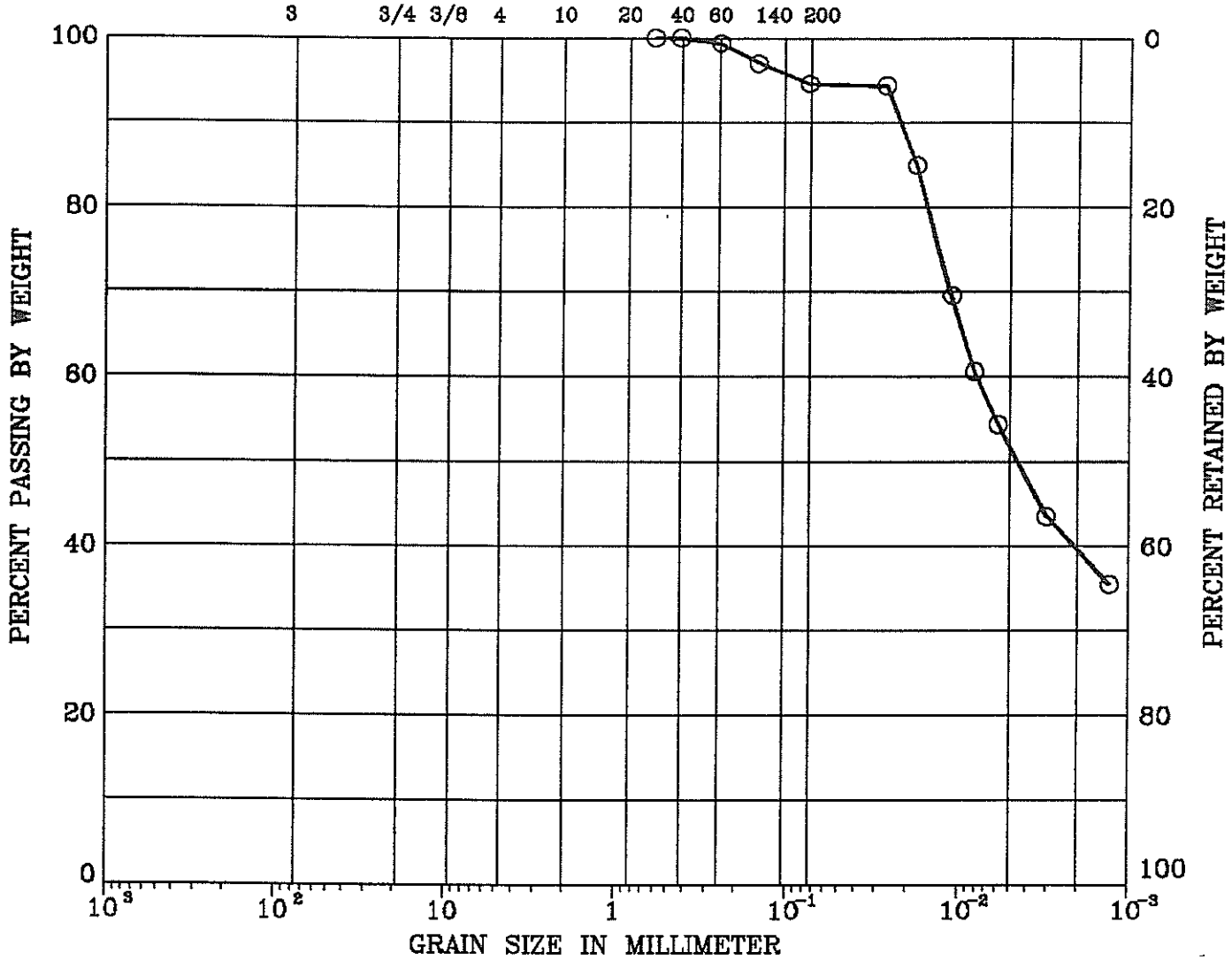
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	N-3-G-14		66	33	DARK GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92

UNIFIED SOIL CLASSIFICATION

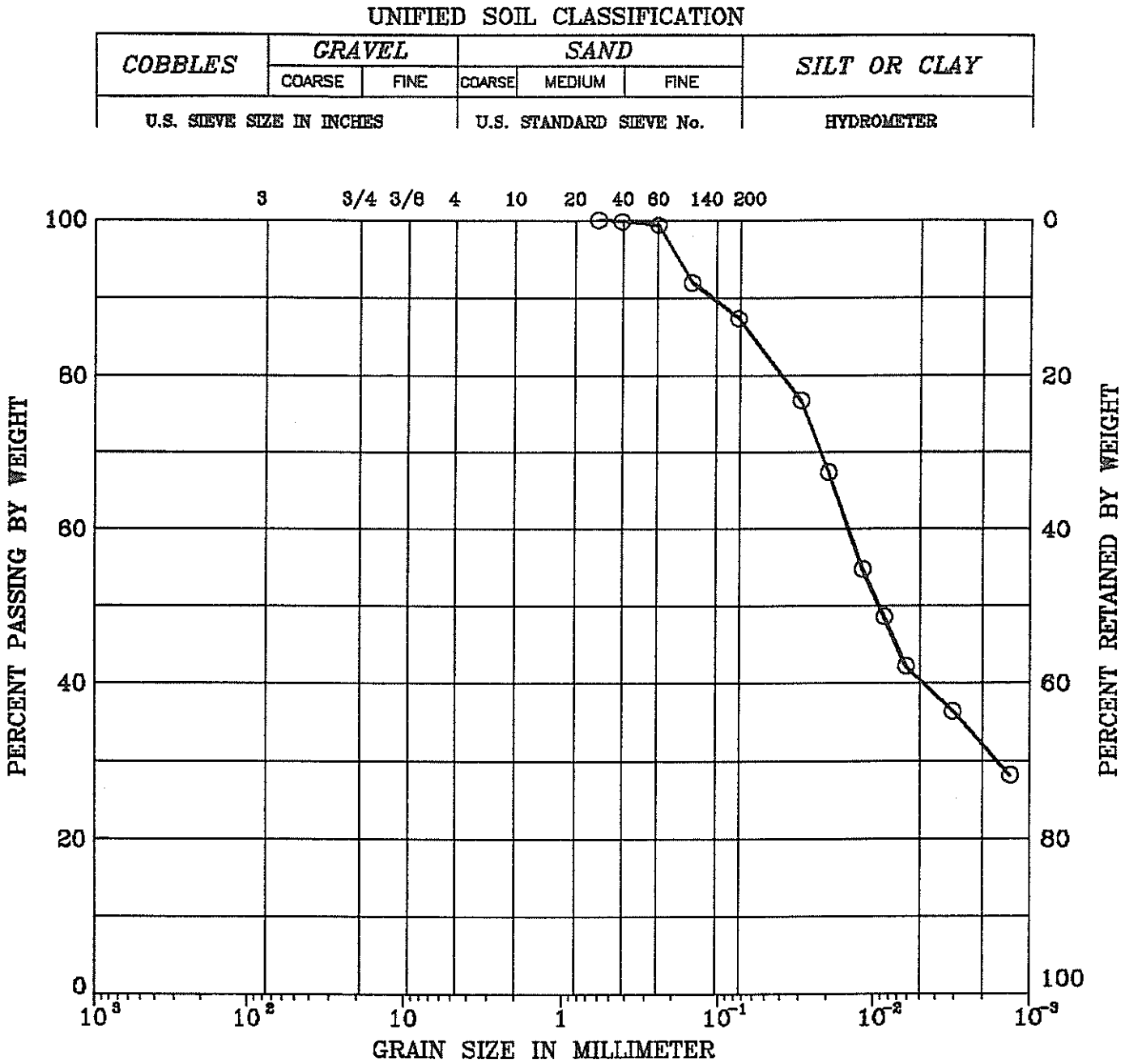
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	01G-2.5		102	52	GRAY ORGANIC CLAY (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



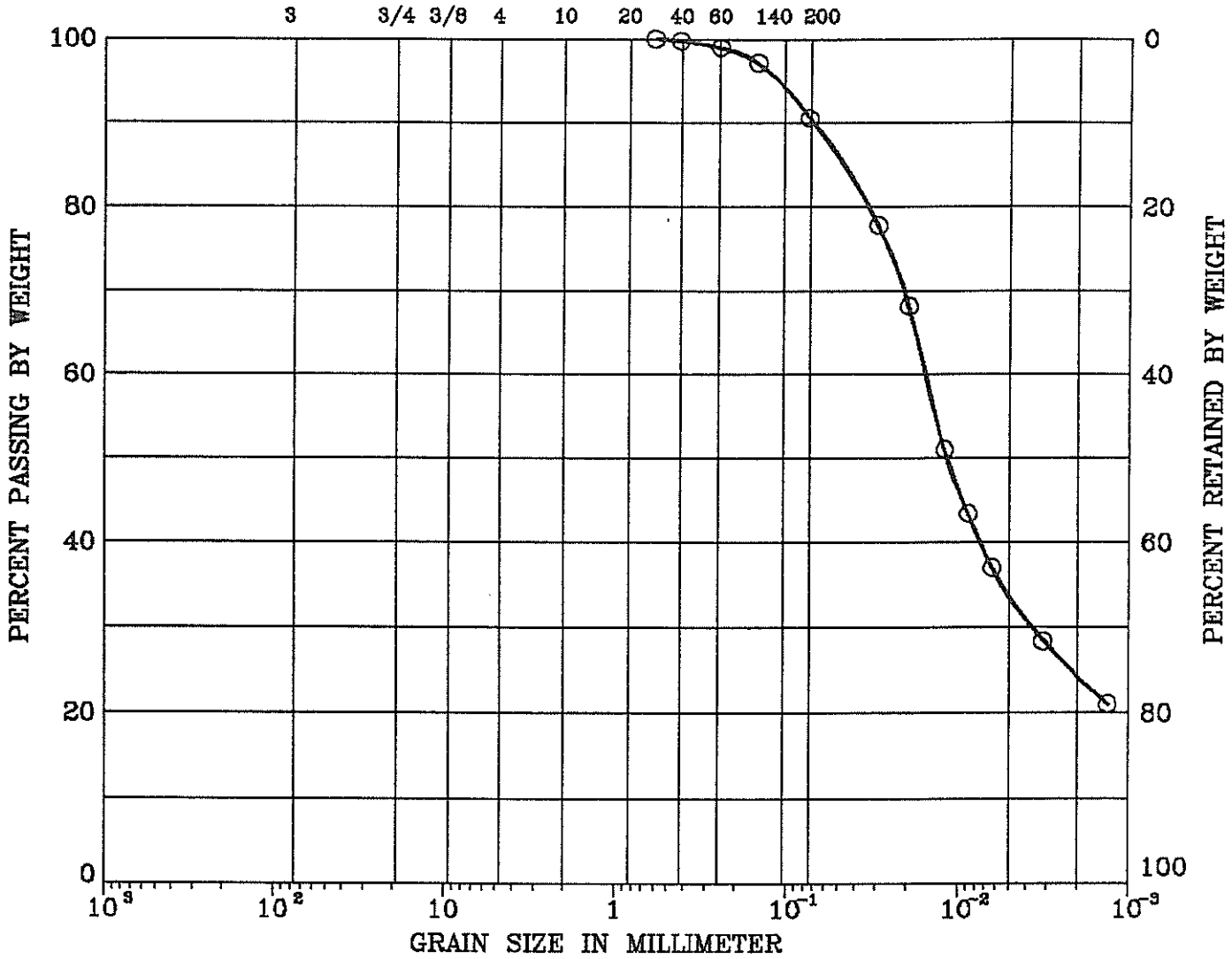
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	01G-7.5		76	38	GRAY ORGANIC SILT (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



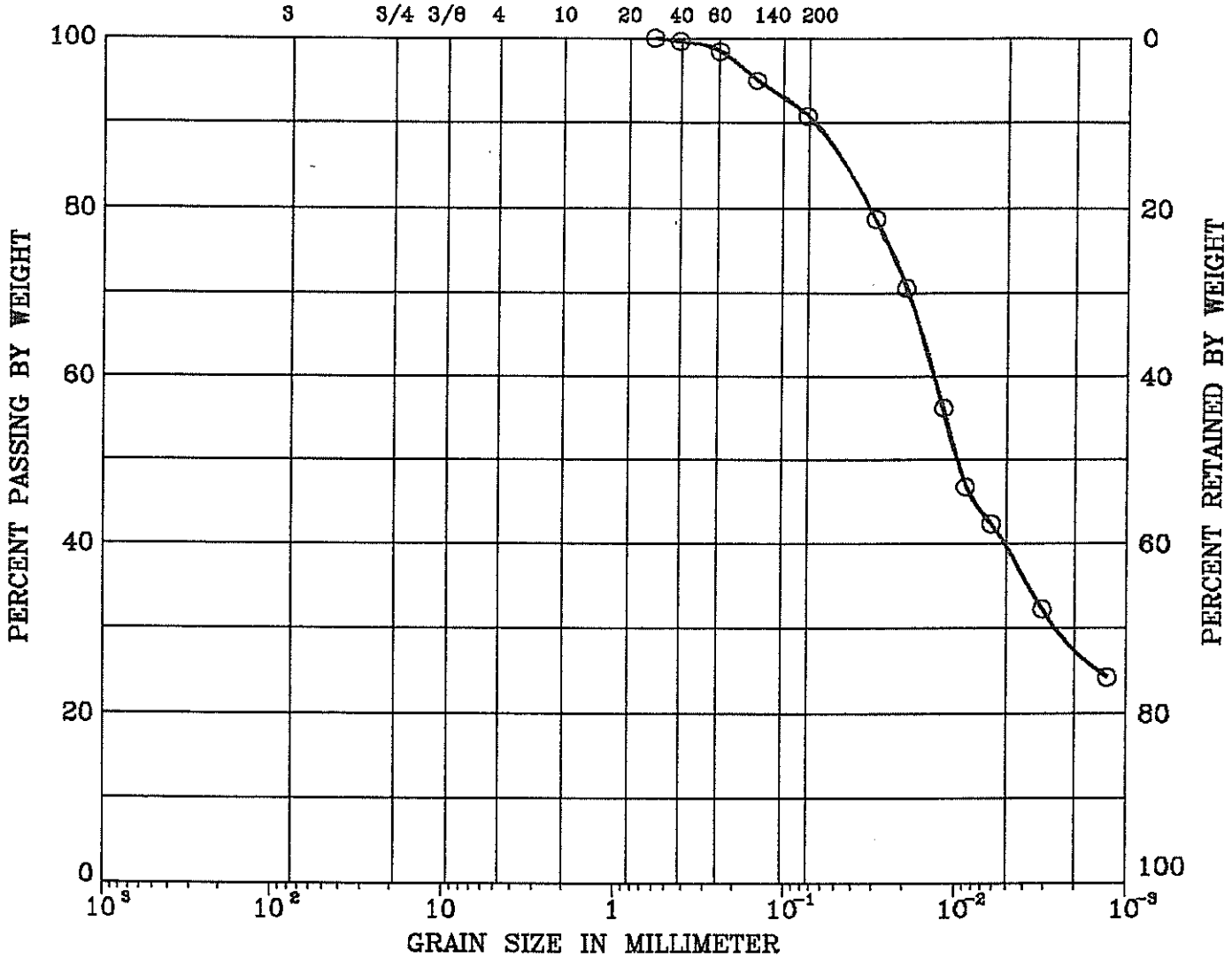
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	0-1-G-12		53	21	DARK GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	0-1-G-16		54	25	DARK GRAY ORGANIC CLAY (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92

Penetration Graphs

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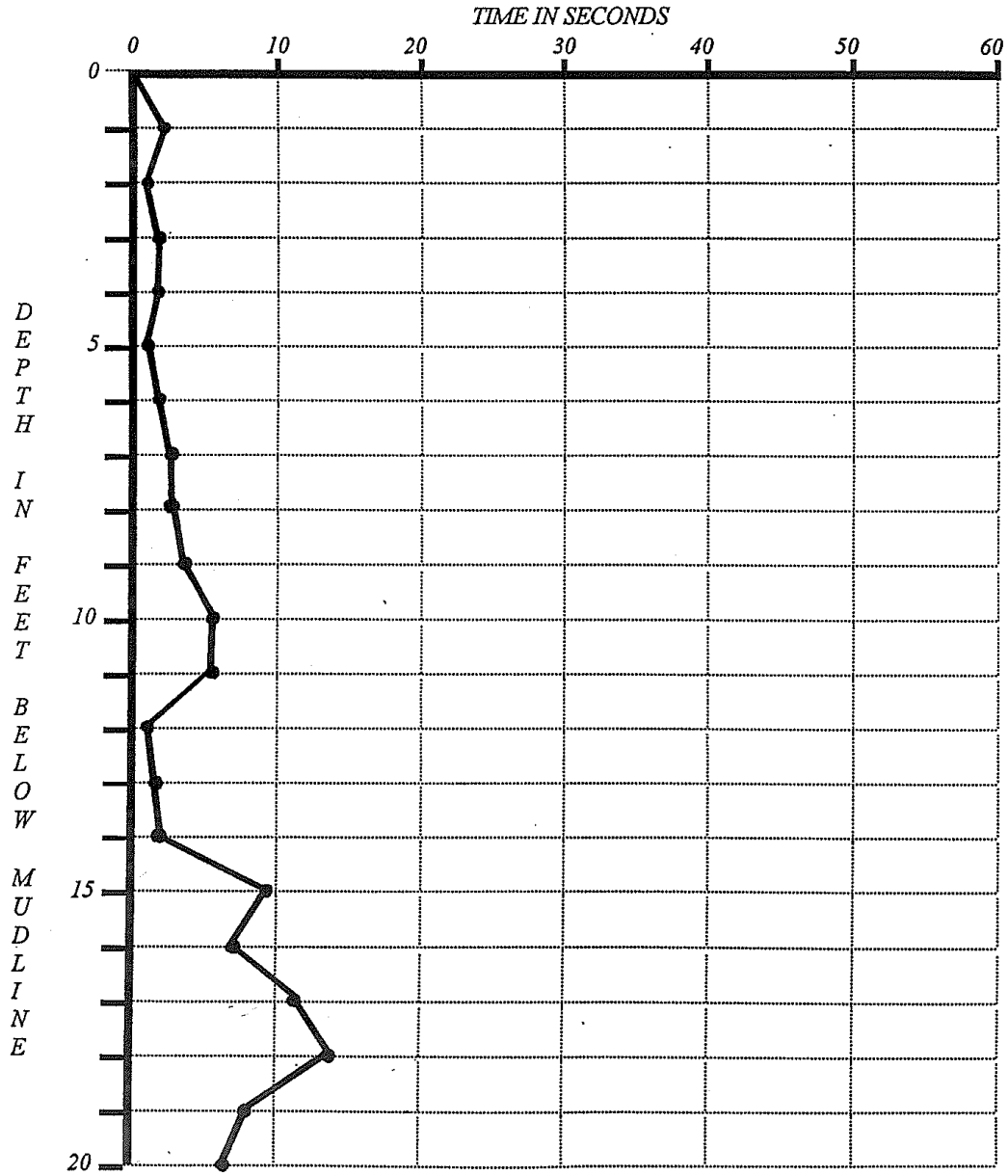
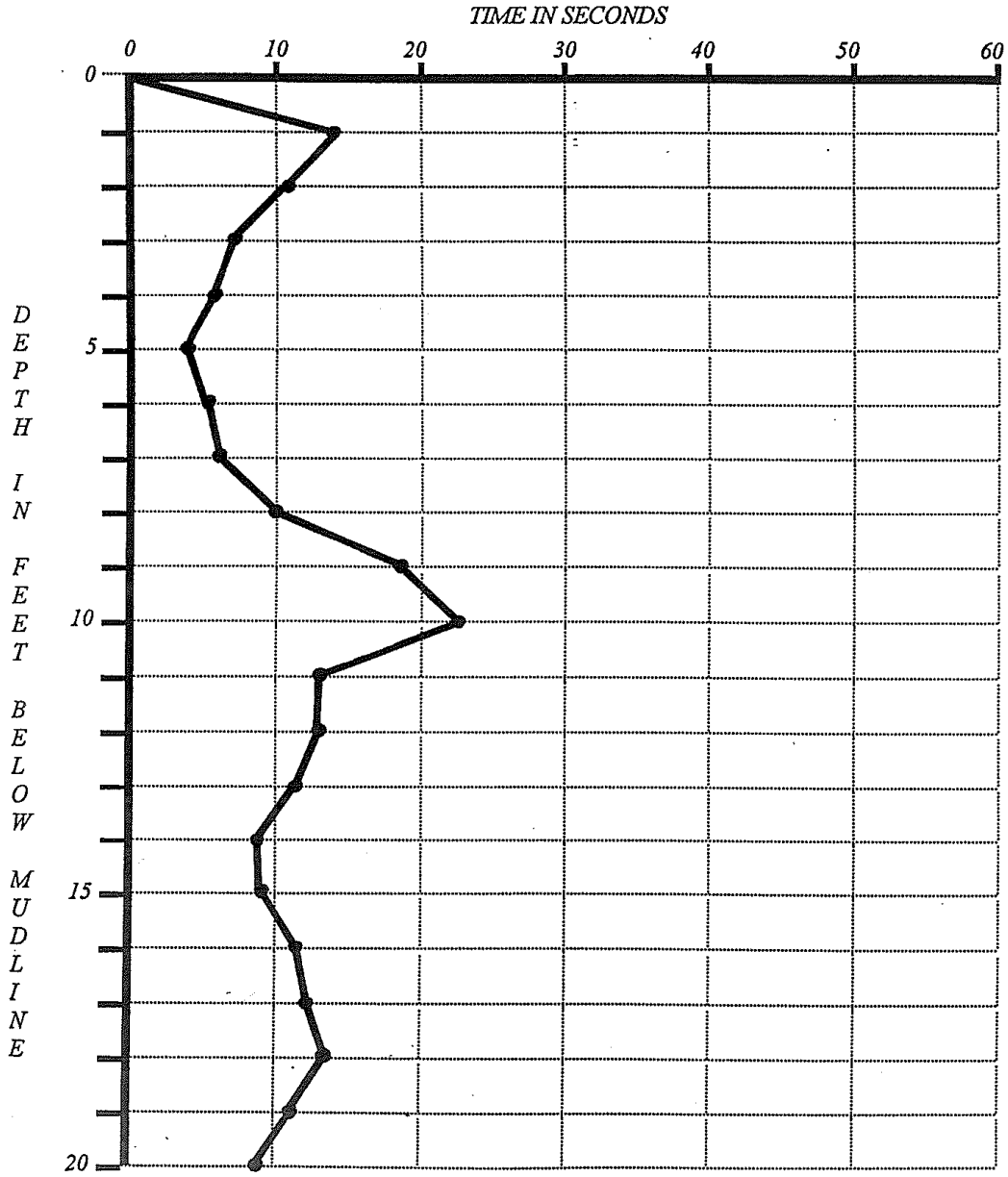
PENETRATION GRAPH

CORE NO. DRV-10 *LOCATION: LATITUDE* N 39° 50' 47.971" *LONGITUDE* W 075° 20' 00.160"
DATE: 8/26/95 *START TIME:* 1336 *STOP TIME:* 1338
WATER DEPTH MEASURED 47.0' *CORRECTED MLW* 42.7'
Total Penetration 20.0' Total Recovery 16.0'



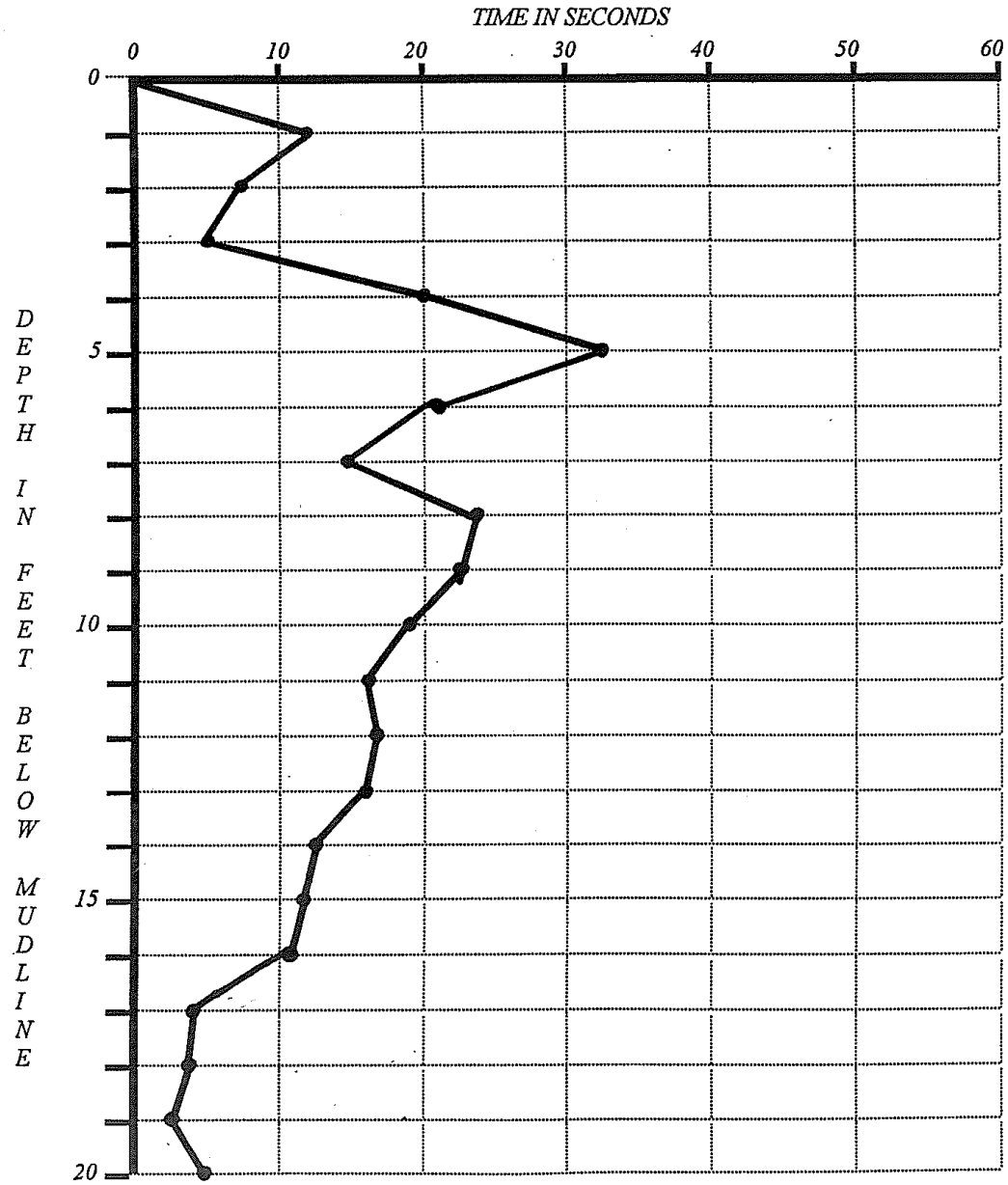
PENETRATION GRAPH

CORE NO. DRV-11 *LOCATION: LATITUDE* N 39° 50' 23.297" *LONGITUDE* W 075° 20' 59.069"
DATE: 8/27/95 *START TIME:* 1521 *STOP TIME:* 1524
WATER DEPTH MEASURED 40.0' *CORRECTED MLW* 36.5'
Total Penetration 20.0' Total Recovery 20.0'



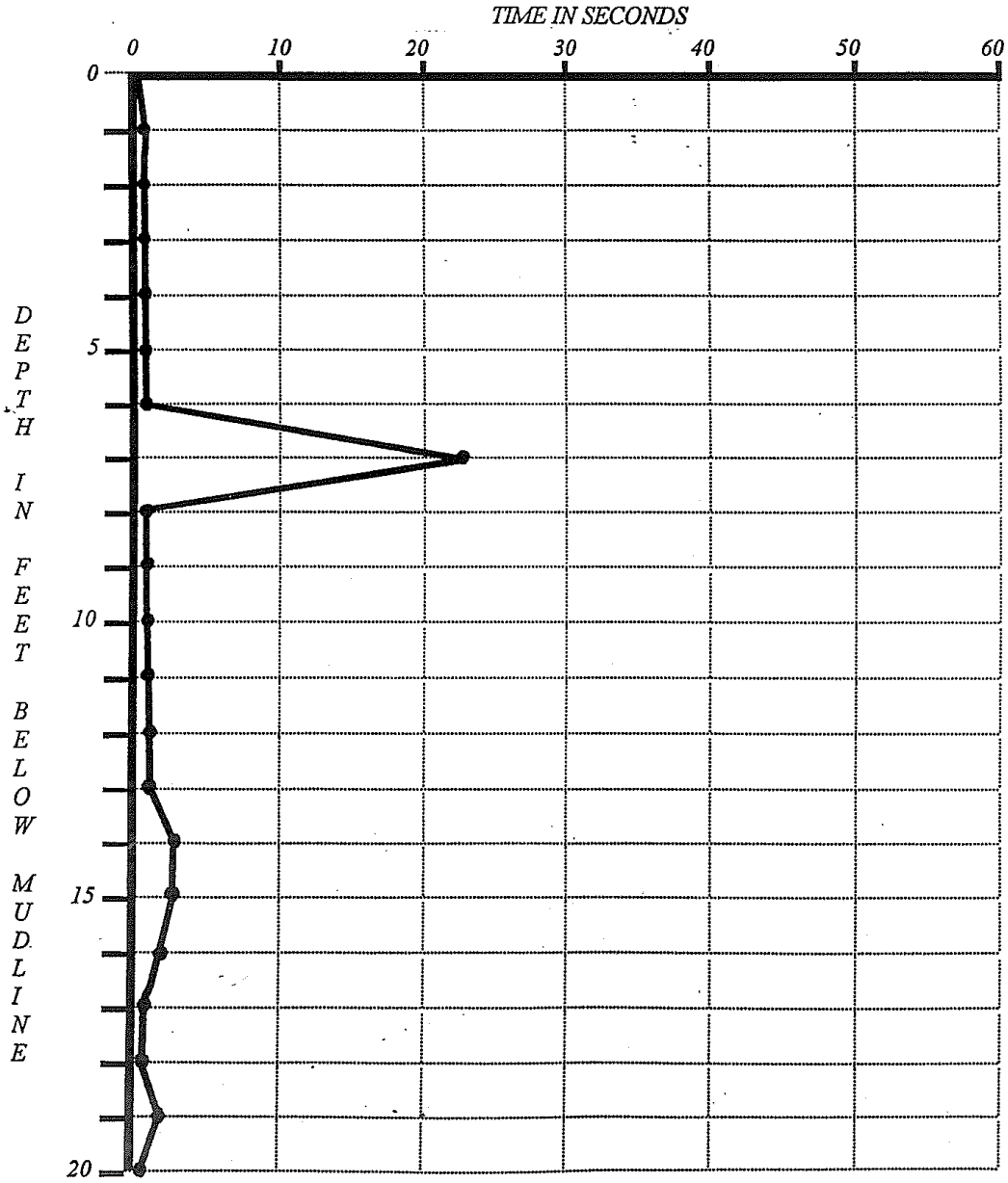
PENETRATION GRAPH

CORE NO. DRV-12 R3 *LOCATION: LATITUDE* N 39° 49' 30.966" *LONGITUDE* W 075° 22' 22.298"
DATE: 8/28/95 *START TIME:* 1453 *STOP TIME:* 1456
WATER DEPTH MEASURED 29.5' *CORRECTED MLW* 24.6'
Total Penetration 20.0' Total Recovery 20.0'



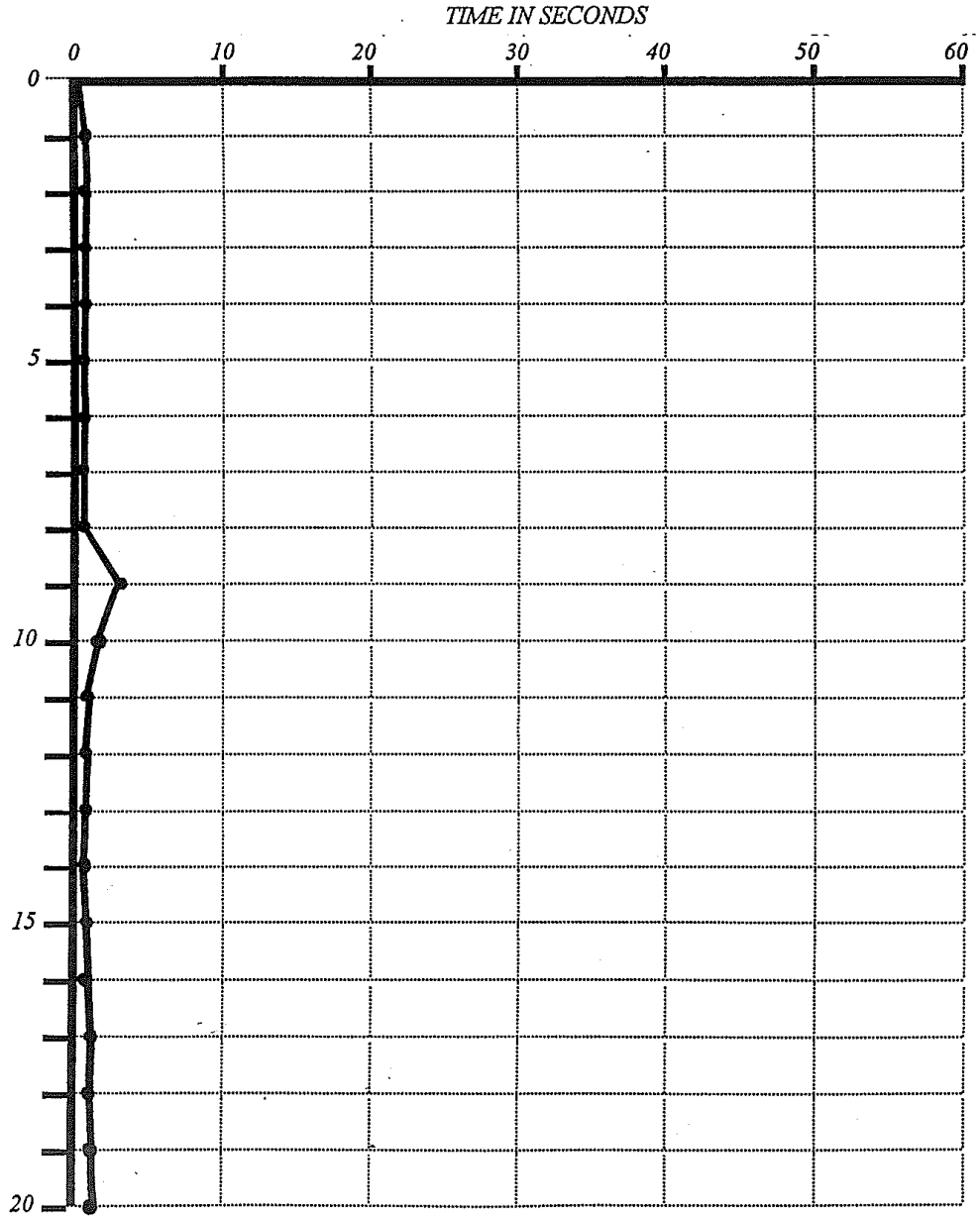
PENETRATION GRAPH

CORE NO. DRV-13 *LOCATION: LATITUDE* N 39° 46' 47.628" *LONGITUDE* W 075° 27' 33.455"
DATE: 8/28/95 *START TIME:* 1552 *STOP TIME:* 1555
WATER DEPTH MEASURED 34.0' *CORRECTED MLW* 29.7'
Total Penetration 20.0' Total Recovery 18.1'



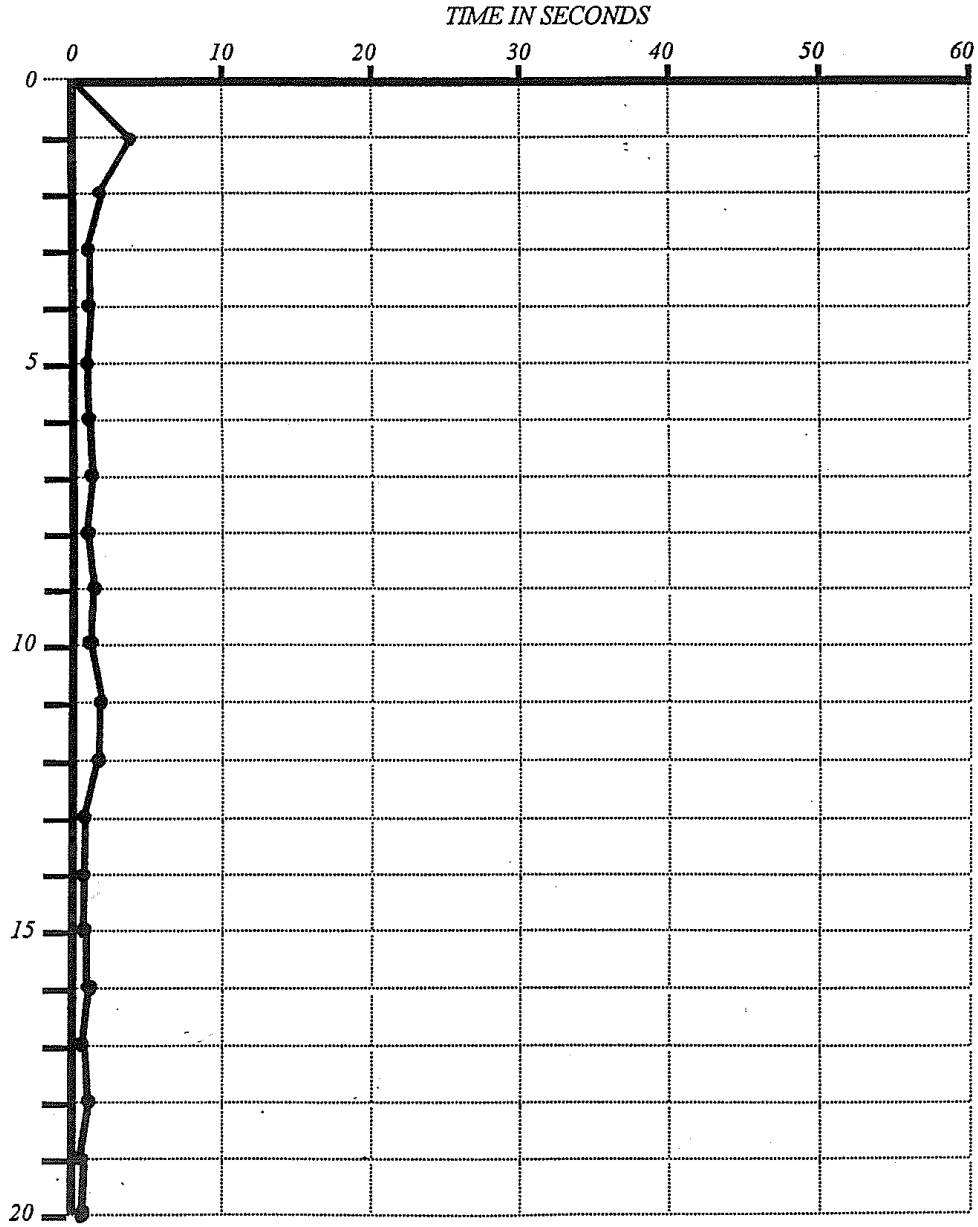
PENETRATION GRAPH

CORE NO. DRV-14 *LOCATION: LATITUDE* N 39° 44' 17.997" *LONGITUDE* W 075° 29' 44.634"
DATE: 8/28/95 *START TIME:* 1638 *STOP TIME:* 1640
WATER DEPTH MEASURED 34.0' *CORRECTED MLW* 29.7'
Total Penetration 20.0' Total Recovery 19.0'



PENETRATION GRAPH

CORE NO. DRV-15 *LOCATION: LATITUDE* N 39° 40' 35.194" *LONGITUDE* W 075° 31' 31.963"
DATE: 8/28/95 *START TIME:* 1714 *STOP TIME:* 1716
WATER DEPTH MEASURED 43.0' *CORRECTED MLW* 41.7'
Total Penetration 20.0' Total Recovery 20.0'



REACH C

Sampling Logs

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
DELAWARE R. - REEDY PT. ANCHORAGE	No. 43	45
REEDY ISLAND RANGE	BY J. KOSTURKO	DATE 1/17/63

☐ BORING ☒ TEST PIT NO. 459

LOCATION Sta. 239+700 700'W ℄

DATE MADE 1/17/63 BY J. KOSTURKO

PLANT USED Derrick Boat #37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler; lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0						Water
7 mins.	Clamshell bucket					BOTTOM SOUNDING, -40.6
40.6						
41.1		1			ML	Dark gray layered silt with some coarse sand. (-40.6 to 48.4)
48.4		2			GM	BOTTOM of PIT, -48.4 Dark grey layered silt and gray coarse sand & gravel. (Below - 48.4)

93,430 E 397,020 N

NADP FORM 1104 (3-19)

TS 459

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
DELAWARE R.- REEDY PT. ANCHORAGE	No. 43	49
REEDY ISLAND RANGE	BY J. KOSTURKO	DATE 1/22/63

☐ BORING ☒ TEST PIT NO. 461

LOCATION Sta. 241+680 640'W ℄

DATE MADE 1/22/63 BY J. KOSTURKO

PLANT USED DERRICK BOAT #37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler w/ lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0						
5 mins.	Clamshell bucket					Water
49						Bottom Sounding – 49.0
49.4					SP	Coarse gravel on river bed
50.4		1				Dark grey, med. firm silt with very fine sand. (49.4 to 52.5)
52.5		2			ML	
					OL	BOTTOM OF PIT – 52.5
						Dark gray, firmer silt with some layers of organic matter. (below – 52.5')

NADP FORM 1 SEP 60 1104 (3-19)

TP1.21

307

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
DELAWARE R. - REEDY POINT ANCHORAGE	No. 43	41
REEDY ISLAND RANGE	BY J. KOSTURKO	DATE 1/16/63

☐ BORING ☒ TEST PIT NO. 463

LOCATION: Sta. 293+640 790' W ℄

DATE MADE: 1/16/63 BY: J. KOSTURKO

PLANT USED: DERRICK BOAT #37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0						
5 mins	clamshell bucket					Water
						BOTTOM SOUNDING -50.7
50.7		1				Light grey, soft silt and brown, coarse, sand & greyish med. fine gravel (-50.7 to -54.7)
					GM	
54.7						BOTTOM of PIT, -54.7

92-39 3932 N

NADP FORM 1 SEP 60 1104 (3-19)

TP 462

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Wilmington Harbor South		1 OF 1
Delaware River - Philadelphia to Sea	BY DLT/SAK	DATE

☐ BORING ☒ TEST PIT NO. 24 DFP

LOCATION: STA 190+000/200E

DATE MADE: 12-6-86 BY: COE

PLANT USED: TITAN

MEAN LOW WATER (FT)	Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
0.0							Water
-46.5	18	Clamshell Bucket	1			ML	Dk grey silty CLAY w/occ. fine sand layers up to 2" thk (-46.5 to -56.6)
-56.6							Bottom of Test Pit -56.6

NADP FORM 1104 (3-10)

2-✓

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Wilmington Harbor South		1 OF 1
Delaware River - Philadelphia to Sea	BY DLT/SAK	DATE 12-16-86

☐ BORING ☒ TEST PIT NO. 25 DFP

LOCATION: STA 195+000/200'E

DATE MADE: 12-6-86 BY: COE

PLANT USED: TITAN

COE DELAWARE R. DATUM (FT)

Elevation (COE DELAWARE R. DATUM (FT))	Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0							Water
-44.5	19	Clamshell Bucket	1			CL	DK grey silty CLAY, med stiff. (-44.5 to -55.2)
-55.2							Bottom of Test Pit -55.2

NADP FORM 1104 (2-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Wilmington Harbor South		1 OF 1
Delaware River - Philadelphia to Sea	BY DLT/SAK	DATE 12-16-86

☐ BORING ☒ TEST PIT NO. 26 DFP

LOCATION: STA 200+000 / 200 E

DATE MADE: 12-6-86 BY: COE

PLANT USED: TITAN

COE L.L. AVAKE R. DATUM (FT)

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb.hammer w/ in.drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0						
minutes						Water
-42.8		1				Dk grey, soft, clayey SILT (-42.8 to -55.4)
27	Clam shell Bucket				ML	
-55.4		2			ML	Dk grey, soft, clayey SILT
						Bottom of Test Pit -55.4

NADP FORM 1104 (3-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Wilmington Harbor South		1 OF 1
Delaware River - Philadelphia to Sea	BY DLT/SAK	DATE 12-16-86

COE ELEVATION: [illegible] FT.

☐ BORING ☒ TEST PIT NO. 31 DFP

LOCATION: STA 205+000/200'E

DATE MADE: 12-9-86 BY: COE

PLANT USED: TITAN

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0						
minutes						
-44.4						Water
30	Bucket	1			OL	Soft, grey brown, organic SILT w/ Sand partings & some black organics. (-44.4 to -51.1)
-51.1						
1 hour and 3	Clamshell	2			SP & GP	C-f SAND & C-f GRAVEL w/ tr. black silt (-51.1 to -57.5) Note: Becomes sandier w/depth
-57.5		3			SP	C-f SAND, tr silt, scattered pieces of gr.
						Bottom of Test Pit -57.5

NADP FORM 1 SEP 60 1104 (3-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
WILMINGTON HARBOR (South)		1 OF 1
Delaware River (Phila to Sea)	BY SAK/DLT	DATE 12-15-86

☐ BORING ☒ TEST PIT NO. 32 OFP

LOCATION: Sta. 209+000 450' Ecld

DATE MADE: 12-10-86 BY: COE

PLANT USED: TITAN

COE DELAWARE R. DATUM (FT)

Elevation (FT)	Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb.hammer w/ in.drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0							Water
-45.6	2 hrs & 18 minutes	Clamshell Bucket	1			GP/GM	Brn. sandy GRAVEL w/tr Silt occ. small cobble (-45.6 to -50.5) Note: Becomes sandier w/depth below 50.5' (-50.5 to -55.7)
-55.7			2			SP	Red gray gravelly C-F SAND Bottom of Test = T -55.7

NAVD FORM 1104 (3-19)

PROJECT	FIELD BOOK	PAGE
Wilmington Hbr. South.		1 OF 1
Delaware River. (Phila to Sea)	BY SAK/DLT	DATE 12-15-86

COE DELAWARE R. DATUM (FT)

☐ BORING ☒ TEST PIT NO. 35 DFP

LOCATION: Sta: 210+500 400' E of ℄

DATE MADE: 12-11-86 BY: CDE

PLANT USED: Titan

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0						
minutes						Water -
-45.3		1			GP	silty, sandy GRAVEL, c-f, dk-gray. (-45.3 to -50.0)
-50.0	43 Clamshell Buckets				SP	SAND, c-f, gravelly, med. gray (-50.0 to -55.7)
-55.7		2				Bottom of Test Pit -55.7

NADP FORM 1 SEP 60 1104 (3-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Wilmington Hbr. South		1 OF 1
Delaware River (Phila. to Sea)	BY SAK/DLT	DATE 12-13-86

BORING ☒ TEST PIT NO. 36 DFP

LOCATION Sta. 212+000 400' E of ℄

DATE MADE 12-11-86 BY COE

PLANT USED TITAN

COE DELAWARE R. DATUM (FT)

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
0.0						Water.
minutes						
-45.5			1		SP	SAND & Gravel c-f, several cobbles (-45.5 to 46.5)
25					Pt	Peat, silty, clayey (-46.5 to -48.7)
-48.7			2			
15			3		SP	SAND, c-f, med. gry, w/some cobbles (-48.7' to -50.1)
-50.1						
-51.5			4		SM	SAND, silty, c-f, occ cobbles & boulder (-50.1 to -51.5)
55	Clamshell bucket				SM	SAND, silty, m-f, yel. brn w/ occ. gravel and cobbles (-51.5 to -56.5)
-55.0						
-56.5			5			Bottom of Test Pit - -56.5

NADP FORM 1104 (1-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
WILMINGTON HABOR SOUTH		1 OF 1
Delaware River (Phila to Sea)	BY DLT/SAK	DATE 12-15-86

JOE DELAWARE R.
DATUM (FT)

☐ BORING ☒ TEST PIT NO. 73 OF P

LOCATION: Sta. 217+000 200' W of ℄

DATE MADE: 12-13-86 BY: COE

PLANT USED: TITAN

Elevation	Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0	minutes						Water
-44.8	50	Clamshell Bkt.	1			GP GM	Brn. C-F GRAVEL w/some Sand & Trace of Silt Some Cobbles. Becomes sandier w/depth and occ. Cobbles & Boulder noted (-44.8 to -49.4)
-50			2			ML	Yellow brn. clayey SILT w/pkts of mod gry micaceous clayey Silt (-49.4 to -50.4)
-50.4							Bottom of Test Pit -50.4

Note: Difficult Digging 49.4 to bottom

NADP FORM 1104 (3-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
WILMINGTON HARBOR South		1 OF 1
Delaware River (Phila to Sea	BY DLT/SAK	DATE 12-15-86

☐ BORING ☒ TEST PIT NO. 44 DFP

LOCATION: Sta. 219+000 200' W of ℄

DATE MADE: 12-13-86 BY: COE

PLANT USED: TITAN

COE DELAWARE R. DATUM (FT)

Elevation	Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0	minutes						Water
-45.6	44	Clamshell Bucket	1			SP/SM	Brn, Silty, Sandy GRAVEL w/occ Cobble (45.6 to 46.4)
-46.4			2			ML	Gry brn CLayey SILT. Stiff. Difficult digging (-46.4 to -47.4)
						GP	Brn. C-F Sandy GRAVEL. Predominately coarse w/some Cobbles (-47.4 to 50.7)
-49.7			3				
-50.7							Bottom of Test Pit - 50.7

NAOP FORM 1104 (3-19)

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
WILMINGTON HARBOR SOUTH		1 OF 1
DELAWARE RIVER (Phila to Sea)	BY DLT/SAK	DATE 12-15-86

☐ BORING ☒ TEST PIT NO. 45 DFP

LOCATION Sta. 219+000 200' E of ℄

DATE MADE 12-13-86 BY COE

PLANT USED TITAN

COE DELAWARE R. DATUM (FT)

Elevation	Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
0.0	minutes						Water
-46.6	48	Clamshell Bucket	1			GP GM	Brn. C-F GRAVEL, predominately coarse w/some sand ± Tr. of Silt. Occ Cobble to 1/2
							Becomes sandier with depth and increase in Cobbles, silt becoming muddy brown (46.6 to 52.0)
-52.0						SP	Brn M-F SAND w/some gravel and few cobbles and Boulder. (52.0 to 55.1)
-55.1			2				Bottom of Test Pit -55.1

NADP FORM 1104 (5-79)

Hole No. DRV-11

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 39' 15.12" 75° 32' 47.60"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-11	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED NA; UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE: STARTED 07/28/91; COMPLETED 07/28/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -47.2 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 19 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Grey clayey silty sand SM-SC		—	
	1					
	2					Sample 0 - 5 ft.
	3					
	4					
	5					
	6		SM-SC			Sample 5 - 10 ft.
	7					
	8					
	9					
	.3		Sand lenses at 9.3 ft. (.01)			
	10					
	.6		Light color streak - 25° dip 10.25			
	11		SM-SC			
	.7		Fine sand 11.7, 12.3, 13.6, 14.0 at 25° dip			Sample 10 - 15 ft.
	12		few sandy faces at 25° dip			
	13					
	14					
			Medium to fine sand layer at 25° dip, 13.53 to 13.48, 16.05 to 16.07, 16.48 to 16.50			
	15		16.97 to 17.0, 18.23 to 18.26, 18.51 to 18.54			
	16		SM-SC			Sample 15 - 19 ft.
	17					
	18					
	19					19 ft. Bottom of recovery

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-11

Hole No. DRV-12

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 34' 07.17" 75° 32' 59.47"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-12	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/28/91 : COMPLETED 07/28/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -44.5 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 17.7 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		Grey clay to silt clay Organic layers .01 ft. at 2.5, 4.6, 5.95 to 6.0, 6.96 to 7.8 SM-SC			Sample 0 - 5 ft. Sand lenses in sample
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9		SM-SC			Sample 8.9 - 10 ft.
	10		Grey silt firm SM-SC			Sample 10 - 15 ft. Sandy lenses in sample
	11					
	12					
	13		Sand lense at 13.0 Sand layer at 13.75 Sand lenses occasional			
	14					
	15					
	16		ML			Sample 15 - 17 ft.
	17					
	18					17.7 ft. Bottom of recovery
	19					

PROJECT Delaware River Comprehensive Study

HOLE NO. DRV-12

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Log of Vibrocore No. DRV-16

Lat.
Long. 11m NW of plan

SURFACE ELEVATION _____ LOCATION Deepwater Pt. Range

DEPTH, ft.	SAMPLES		DESCRIPTION	ELEVATION	
0			Water Depth 45'		
			DK Gray soft clay		
5			DK Gray Soft clay		
10			DK Gray Soft clay		
15			DK Gray Soft clay tr F-M sand		
			DK Gray Soft clay · Note Dk gray F-M sand in core head		
20			Recovery 18.5/20' 20' Bot. of core		

Completion Depth 20' Feet Water Depth 45' Feet Date 8/29/95

Project Name Delaware Vibrocore Project Number R95500

Lat.
Long. 12m SE of plan

Log of Vibrocore No. DRV-17

SURFACE ELEVATION _____ LOCATION Deepwater Pt. Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 52 Dk Gray, Soft Clay	
5		Dk Gray Soft Clay	
10		Dk Gray Soft Clay	
15		Dk Gray Soft Clay, little F-M sand (lens).	
		Dk Gray, Soft Clay, little F-M sand (lens)	
20		Recovery 20'/20' Bot. of Core - 20' Note: apparent moderate penetn resistance.	

Completion Depth 20' Feet Water Depth 52' Feet Date 8/29/95

Project Name Delaware Vibrocore Project Number R95500

Lat.
Long.
2m S of plan

Log of Vibrocore No. DRV-18

SURFACE ELEVATION _____ LOCATION Deepwater Pt. Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 50'	
		DK Gray V. Soft clay	
5		DK Gray Soft clay	
10		DK Gray Soft clay	
15		DK Gray Soft-firm clay	
		DK Gray Soft-firm Clay	
20		Recovery 20'/20' 20'-Bot. of core	
		Note: apparent moderate penetn. resistance.	

Completion Depth 20' Feet Water Depth 50' Feet Date 8/29/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Log of Vibrocore No. DRY-19

Lat.
Long. 11m S of plan

SURFACE ELEVATION _____ LOCATION Bend PA

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 40'	
		Dk gray soft clay, little F-M sand	
5		Dk gray M. Dense, F-M sand little silt	
10		Gray to Dk Gray, M. Dense, F-CS sand, little silt & F-Grav	
15		Gray M. Dense F-CS sand little F Grav.	
		Gray ~~F-M~~ M. Dense F-M sand, tr Cs Sand	
20		Recovery 20'/20' 20'-Bot. of core	
		Note: Apparent Mod. penetr. resistance	

Completion Depth 20' Feet Water Depth 40' Feet Date 8/29/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Log of Vibrocore No. DRV-20

Lat.
Long.
10m E of plan

SURFACE ELEVATION _____ LOCATION Bend PQ

DEPTH, ft.	SAMPLES		DESCRIPTION	ELEVATION	
0			Water Depth 33'		
			DK Gray M. Dense F-M Sand - Some silt		
5			Gray M. Dense F-M sand - little silt		
10			Brown-Gray V. Dense, F-Cs sand some F-Cs gravel		
			Note Apparent heavy resistance to penetrn.		
15			Dk Gray firm Clay some silt		
			DK Gray Firm Clay some silt & F-Sand		
20			Recovery 20'/20' 20' Bot. of core		
			Note: Apparent mod. to heavy resistance to penetrn.		

Completion Depth 20' Feet Water Depth 38 Feet Date 8/30/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.
10m NW of plan

Log of Vibrocore No. DRV-21

SURFACE ELEVATION _____ LOCATION New Castle Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 44.5 DK Gray Soft Clay -tr. organics	
5		DK Gray Soft Clay tr organics	
10		DK Gray Soft Clay little F-M sand	
15		DK Gray Soft Clay	
20		DK Gray Soft clay Recovery 20'/20' -20' Bot. of Core Note: Apparent mod. penetr resistance	

Completion Depth 20' Feet Water Depth 44.5 Feet Date 8/30/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.
12 m Sof plan

Log of Vibrocore No. DRV-22

SURFACE ELEVATION _____ LOCATION Bend R

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 51′	
		DK Gray Soft Clay	
5		DK Gray Soft Clay	
10		DK Gray Soft Clay	
15		DK Gray Soft Clay	
		DK Grey Soft Clay	
20		Recovery 20′ Bot. of Core	
		Note: apparent moderate resistance to penetrn.	
		Note: Initial try at this location had only recovery of 4′5″/20′	

Completion Depth 20′ Feet Water Depth 51 Feet Date 8/30/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-41 REACH 1*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1340*
Boring Depth (ft): *0.0 - 15.20*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2		GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	SA - 2.4-3.0 12 sieve
	3			
	4			
	5			
	6		GRAY, (SP-SM), WITH A TRACE OF GRAVEL.	SA - 6.7.6.9 60 sieve
	7			
	8			
	9			
	10			
	11			
	12		GRAY, POORLY GRADED SAND (SP), WITH OCCASIONAL POCKETS OF GRAVEL.	SA - 11.8-12.1 30 sieve
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-41 REACH 2*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1340*
Boring Depth (ft): *11.6 - 18.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			SA - 13.4-13.7 35 sieve
	15		TAN & GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	16			SA - 16.0-16.3 35 sieve
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-42*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1341*
Boring Depth (ft): *0.0 - 17.50*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1		GRAY, POORLY GRADED SAND (SP).	SA - 1.0-1.3 40 sieve
	2			
	3			SA - 2.8-3.4 12 Sieve
	4		TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP).	
	5			
	6		GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	7			SA - 7.3-7.6 45 sieve
	8		TAN, POORLY GRADED SAND (SP).	
	9			
	10		GRAY, FAT CLAY (CH) AND CLAYEY SAND (SC).	
	11			SA - 11.1-11.3 NG
	12			
	13		GRAY, SILTY SAND (SM) CHANGING TO A POORLY GRADED SILTY SAND (SP-SM) WITH A TRACE OF GRAVEL SIZES.	
	14			
	15			
	16			SA - 15.6-15.9 NG
	17		GRAYISH TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-43 REACH 1*	
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1342*	
Boring Depth (ft): *0.0 - 12.40*	Depth:	Work order: *8303*	
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1		GRAY, POORLY GRADED SAND (SP), WITH POCKETS OF FAT CLAY (CH).	
	2			
	3			SA - 2.6-2.9 NG
	4			
	5			
	6		GRAY, FAT CLAY (CH), WITH POCKETS OF TAN POORLY GRADED SAND (SP) AT DEPTH 3.4-3.7 AND 10.6-10.7.	
	7			
	8			
	9			SA - 8.3-8.6 NG
	10			
	11			
	12		GRAYISH TAN, POORLY GRADED SAND (SP), WITH DECOMPOSED WOOD FRAGMENTS.	
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-43 REACH 2*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1342*
Boring Depth (ft): *10.30 - 20.00*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
-10				
	21			
	22			
	23			
	24			
	25			
-15				
	26			
	27			
	28			
	29			
	30			
-20				
	31			
	32			
	33			
	34			
	35			
-25				
	36			
	37			
	38			
	39			

Date: *12/02/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. 2 of 2

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-43 REACH 2*	
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1342*	
Boring Depth (ft): *10.3 - 20.00*	Depth:	Work order: *8303*	
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12		GRAY, FAT CLAY (CH).	
	13			SA - 12.6-12.9 NG
	14			
	15			
	16		GRAY & TAN, POORLY GRADED SILTY SAND (SP-SM).	
	17			SA - 16.5-16.8
	18		TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 18.0-18.8
	19			

Date: *12/05/97* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *2*

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-44*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1343*
Boring Depth (ft): *0.0 - 19.20*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			SA - 1.4-1.7 70 sieve
	3			
	4			
	5		GRAY & TAN, POORLY GRADED SAND (SP).	
	6			
	7			
	8			SA - 8.0-8.3 25 sieve
	9			
	10			
	11			
	12			SA - 12.0-12.7 18 sieve
	13			
	14		TAN & GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	15			
	16			
	17			SA - 16.4-16.9 8 sieve
	18			
	19		TAN, POORLY GRADED GRAVEL (GP), WITH SOME SAND SIZES.	

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-45*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1344*
Boring Depth (ft): *0.0 - 17.80*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3		GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	SA - 3.1-3.4 35 sieve
	4			
	5			
	6			
	7			
	8		TAN & GRAY, POORLY GRADED SAND (SP), WITH POCKETS OF CLAYEY SAND (SC).	
	9			SA - 8.6-8.9 60 sieve
	10			
	11			
	12			
	13		TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	14			SA - 14.0-14.6 25 sieve
	15			
	16			
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-46 REACH 1*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1345*
Boring Depth (ft): *0.0 - 14.10*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3		TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 2.7-3.3 20 sieve
	4			
	5			
	6			
	7			SA - 7.1-7.4 35 sieve
	8		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	9			
	10			
	11			
	12		TAN & GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 11.6-12.1 20 sieve
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-46 REACH 3*	
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1345*	
Boring Depth (ft): *11.6 - 16.90*	Depth:	Work order: *8303*	
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14		TAN & GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	
	15			SA - 14.9-15.4 7 sieve
	16			
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-47 REACH 1*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1346*
Boring Depth (ft): *0.0 - 15.90*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2		TAN & GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 1.8-2.3 8 sieve
	3			
	4		POCKET OF GRAY, POORLY GRADED SILTY SAND (SP-SM).	
	5			
	6			
	7			
	8			SA - 7.9-8.4 3 sieve
	9			
	10		TAN & GRAY, POORLY GRADED SAND (SP), WITH GRADING FROM GRAVELLY TO SOME GRAVEL SIZES.	
	11			
	12			
	13			SA - 12.9-13.5 8 sieve
	14			
	15			
	16			
	17			
	18			
	19			

Date: *12/05/97* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-47 REACH 2*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1346*
Boring Depth (ft): *0.0 - 5.00*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2		TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 2.2-2.6 3 sieve
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-48*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1347*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1		TAN, GRAVELLY POORLY GRADED SAND (SP).	
	2		GRAY, FAT CLAY (CH).	
	3			SA - 2.8-3.0 NG
	4		LAYERS & LENSES OF GRAY SILTY LEAN CLAY (CL) AND GRAY SILTY SAND (SM).	
	5			
	6			
	7			
	8			SA - 7.6-7.9 50 sieve
	9			
	10			
	11		TAN, POORLY GRADED SAND (SP).	
	12			
	13			
	14			SA - 13.4-13.8 40 sieve
	15			
	16			
	17			SA - 16.9-17.4 25 sieve
	18		TAN, POORLY GRADED SAND (SP), WITH A LITTLE TO SOME GRAVEL SIZES.	
	19			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-48*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1347*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			TAN & GRAY, FAT CLAY (CH).	
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-49*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1348*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			SA - 2.0-2.3 NG
	3			
	4			
	5			
	6		GRAY, SILTY FAT CLAY (CH), WITH A TRACE OF SAND SIZES.	
	7			SA - 7.0-7.3 NG
	8			
	9			
	10			
	11			
	12			
	13		GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 12.5-13.0
	14			
	15			
	16			
	17		GRAY, FAT CLAY (CH).	
	18			SA - 17.4-17.7
	19			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-49*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1348*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			GRAY, FAT CLAY (CH).	
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-50*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1349*
Boring Depth (ft): *0.0 - 20.20*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			SA - 2.7-3.0
	4			
	5			
	6			
	7			
	8			SA - 8.0-8.3
	9		LAYERS & LENSES OF DARK GRAY SILTY LEAN CLAY (CL) AND SILTY SAND (SM).	
	10			
	11			
	12			
	13			SA - 13.1-13.4
	14			
	15			
	16			
	17			
	18			
	19		GRAY, SILTY FAT CLAY (CH), WITH SOME SAND SIZES.	SA - 19.0-19.3

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-50*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1349*
Boring Depth (ft): *0.0 - 20.20*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			GRAY, SILTY FAT CLAY (CH), WITH SOME SAND SIZES.	
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-51*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1350*
Boring Depth (ft): *0.0 - 18.90*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			SA - 2.5-2.8
	4			
	5			
	6			
	7			
	8			SA - 8.2-8.4
	9		DARK GRAY, FAT CLAY (CH), WITH OCCASIONAL THIN LENSES OF ORGANIC MATTER AND SAND SIZES.	
	10			
	11			
	12			
	13			SA - 12.9-13.2
	14			
	15			
	16			
	17			SA - 16.7-17.0
	18			
	19			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-52*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1351*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2		TAN, GRAVELLY POORLY GRADED SAND (SP).	SA - 1.6-2.3
	3			
	4			
	5			
	6			
	7			
	8			SA - 7.9-8.2
	9		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	10			
	11			
	12			
	13			SA - 12.8-13.1
	14			
	15		GRAY, FAT CLAY (CH).	
	16		POCKET OF GRAY, SANDY FAT CLAY (CH).	SA - 15.5-15.9
	17			
	18		GRAY, FAT CLAY (CH).	SA - 17.6-17.9
	19			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-52*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1351*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			GRAY, FAT CLAY (CH).	
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-53*	
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1352*	
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*	
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			SA - 1.5-2.2
	3		TAN, POORLY GRADED SAND (SP), WITH A LITTLE TO SOME GRAVEL SIZES.	
	4			
	5			
	6			
	7			SA - 6.9-7.4
	8			
	9			
	10		TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	11			
	12			SA - 11.6-12.0
	13			
	14		GRAY, POORLY GRADED SAND (SP).	
	15			
	16		TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA - 15.8-16.5
	17			
	18			
	19		MOTTLED GRAY, RED, & TAN, FAT CLAY (CH), WITH A TRACE OF SAND SIZES.	SA - 18.7-19.0

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LABORATORY LOG AND SAMPLE DATUM

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-53*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1352*
Boring Depth (ft): *0.0 - 20.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			MOTTLED GRAY, RED, & TAN, FAT CLAY (CH), WITH A TRACE OF SAND SIZES.	
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-54*	
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1353*	
Boring Depth (ft): *0.0 - 19.30*	Depth:	Work order: *8303*	
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			SA - 2.0-2.3
	3		GRAY, FAT CLAY (CH), WITH LENSES OF TAN, POORLY GRADED SAND (SP).	
	4			
	5			
	6			
	7		GRAY, GRAVELLY POORLY GRADED SILTY SAND (SP-SM).	SA - 6.8-7.6
	8			
	9			
	10			
	11		TAN, POORLY GRADED SAND (SP), WITH A LITTLE TO SOME GRAVEL SIZES.	SA - 10.9-11.6
	12			
	13			
	14			
	15			
	16		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	17			SA - 16.6-16.9
	18		TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	19		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	

Date: *12/05/97* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *2*

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BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River; Philo to Sea	73	1
Aquifer Studies – New Castle Range	BY R.GL	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP1

LOCATION Sta: 233+680 480' W of ℄

DATE MADE 3-22-65 BY CofE

PLANT USED Derrickboat #34

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler w/ lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
						0
						Water -41.5'
		1			SM and OL	Silty fine to med SAND stratified w/dk-gry org. clayey SILT, some org. matter, soft (-41.5 to -45.3)
		2				Predominantly dk-gry clayey SILT w/ v. thin layers of gry v. fine SAND Getting firmer w/depth.
15 Minutes	3/4 cy clamshell bucket				OL	
		3				Bottom of TP - 60.8'

42120 N
92190 E

NADP FORM 1 SEP 60 1104 (3-19)

DSP-1

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BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River - Phila to Sea	73	1
Aquifer Studies - New Castle Range	BY R.L.	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP-2

LOCATION Sta. 231+900 530' W of ℄

DATE MADE 3-22-65 BY CofE

PLANT USED DB #34

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
						Water - 34.2
40 Minutes	3/4 cy Clamshell bucket	1			SM and OL	Silty fine to med SAND stratified w/ v. soft dk-gry organic SILT. (34.2 - 47.6)
		2			OL	Interlayered gry v. fine silty sand & dk-gry org. silty CLAY, slightly firm & plastic. Sandy layers v. thin. Getting firmer w/ depth. (-47.6 - 60.2')
		3				Bottom of TP - 60.2'

35 40 45 50 55 60

403940 N
71 20 E

NADP FORM 1 SEP 60 1104 (3-19)

DSP 2

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River Phila to Sea	73	2
Aquifer Studies - New Castle	BY R.L	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP3

LOCATION Sta. 229+840 460' W of ℄

DATE MADE 3-22-65 BY CoFE

PLANT USED DB #34

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
						Water - 39.6'
33						
40		1			SM and OL	Interbedded org. clayey SILT, dk-gry in color w/ fine sand, Some org. matter V. soft. (39.6' - 44.9')
45					OL	Dk-gry silty org. CLAY, fairly firm interbedded w/ v. thin layers of gry v. fine sand (44.9' - 60.1)
50	45 Minutes					
55	3/4 cy clamshell bucket					
60		2				Bottom of TP - 60.1'

≈ 25,580 N

90,490 E

NADP FORM 1 SEP 60 1104 (3-19)

DSP-3

BORING/TEST PIT LOG

PROJECT Delaware River - Philo to Sea	FIELD BOOK 73	PAGE 2
New Castle Lines	BY R.L	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP 4

LOCATION Sta. 2281960 520'E ℄

DATE MADE 3-23-65 BY CofE

PLANT USED DB #37

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - lb. hammer w/ in. drop	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
						Water - 37.6'
37						
40	3/4 cy clamshell bucket	1			SP	Brn med to coarse SAND (veneer) underlain by org. silty CLAY w/ thin layers of fine gry sand.
45	55 Minutes				OL	
		2				Same w/ occ sand layers
50		3			SP	Sand, gry, fine to med grained, hard & dense (50.3')
						Bottom of TP - 50.3'

NADP FORM 1 SEP 60 1104 (3-19)

DSP-4

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River Phila to Sea	73	3
Aquifer Studies	BY R.L	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP5

LOCATION Sta. 219+800 610' W of ℄

DATE MADE 3-23-65 BY C of E

PLANT USED DB #37

Water 44°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler w/ lb. hammer w/ in. drop	Core barrel run no. and percent core recovery	Graphic legend	MATERIALS DESCRIPTION
						Water -37.2
35 Min.		1			SP	Sand & GRAVEL, subrounded up to 1" in size w/ occ. cobbles. Some org. dk-gry silt
		2				Bottom of TP - 40.3'

37

40

NADP FORM 1 SEP 60 1104 (3-19)

DSP5

BORING/TEST PIT LOG

PROJECT	FIELD BOOK	PAGE
Delaware River - Phila to Sea	73	4
Deepwater - [illegible]	BY R.L	DATE 4-5-65

☐ BORING ☒ TEST PIT NO. DSP7

LOCATION Sta: 194+480 500' W of ℄

DATE MADE 3-24-65 BY CoPE

PLANT USED DB #34

Water 46°F

Drilling/Excavating Time	Type penetration	Sample No.	Blows/ft. on sampler - (Hammer w/ in. drop)	Core barrel run no. and percent core recovery.	Graphic legend	MATERIALS DESCRIPTION
						Water - 37.9'
38						
		1				
40					OL	Dk-gry org SILT very soft, some black layers of silt & clayey silt Tr of sand (37.9 - 42.5)
45						
50		2			OL	Dk-gry silty clay w/ v. thin layers of gry v. fine sand (42.5' - 60.9')
55						
60		3				Bottom of TP - 60.9'

30 Minutes

3/4 cy clamshell bucket.

NADP FORM 1 SEP 60 1104 (3-19)

DSP7

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N441723.63 E098210.97
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 13:10
FINISH: 13:59
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -29.7
ELEV. DATUM: Mean low water
WATER DEPTH: 29.7
SIGNATURE: TJ. K

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-29.7	0.0 - 0.20' sub angular gravel mixed w/ silty CLAY							
1		0.20 - 17.1' grey to dk greenish grey silty CLAY w/ v. thin to thin laminations of sand (especially from 2.0-2.9') and v. thin to thin beds of sand as noted							RUN 1: 0-20'; recov=12.5' RUN 2: 0-20'; recov=12.9'
		1.40 - 1.95' med- to coarse-grained silty SAND							
2		silty CLAY (as above)				1	G		
3									
4									
5				1 (0.0 - 20.0)	17.7/20.0				
6									
7						1	G		
									Geotech Samples (G) -- locations noted: in order: 0-2-G-2.5 0-2-G-7.5 0-2-G-11.0 0-2-G-15.0
									Chem Samples (C) -- composited over core length 0-2-C-0.0
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: O-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N441723.63 E098210.97
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 13:10
FINISH: 13:59
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -29.7
ELEV. DATUM: Mean low water
WATER DEPTH: 29.7
SIGNATURE: TJ Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)							
		10.55 - 10.60' med- to coarse-grained SAND							
11		silty CLAY (as above)							
12						1	G		
		12.62 - 12.73' med- to coarse-grained SAND							
13		silty CLAY (as above)							
14									
15		2-3mm bed of organic matter/wood @ 15.4'		1 (0.0 - 20.0)	17.7/20.0				
16						1	G		
17	46.8	16.8 - 16.9' fine- to med-grained SAND							
		silty CLAY (as above)							
		17.1' -- core recovery ends							
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.5%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N424375.13 E084990.55
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 15:05
FINISH: 16:17
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: ~28.2
ELEV. DATUM: Mean low water
WATER DEPTH: 28.2
SIGNATURE: TJ. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	~28.2	0.0 - 0.25' dk grey to black (oil stained?) silty CLAY							
1		0.25 - 1.4' dk greenish gey and black (oil stained?) med- to coarse-grained SAND w/ some clay				2	C,G		RUN 1: 0-20'; recov=9.7' RUN 2: 0-17'; recov=8.3' RUN 3 jetted 0-10', cored 10-20'; recov = 6.0'
2		1.4 - 8.15' greenish grey v. silty CLAY interbedded w/ v. thin (0.5-3.0 cm) beds of fine-grained SAND							
3									
4				1 (0.0 - 20.0)	9.7/20.0	2	C,G		Geotech Samples (G) -- locations noted: in order: PQ-1-G-0.25 PQ-1-G-1.40 PQ-1-G-8.15 PQ-1-G-10.0 PQ-1-G-12.4
5									
6									Chem Samples (C) -- locations noted: in order: PQ-1-C-0.25 PQ-1-C-1.40 PQ-1-C-8.15 PQ-1-C-10.0 PQ-1-C-12.4 PQ-1-C-15.5
7									
8		v. thin organic layer @ 7.95' and 8.15'							
9		8.15 - 10.0' fining-up, grey GRAVEL and fine- to coarse-grained SAND, mod. well sorted (missing core from 9.7 - 10.0)				2	C,G		
10									v. lg. gravel, 9.7-10.0' (stuck in bit)

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 78.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: PQ-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N424375.13 E084990.55
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 15:05
FINISH: 16:17
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -28.2
ELEV. DATUM: Mean low water
WATER DEPTH: 28.2
SIGNATURE: [signature]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		10.0 - 12.4' dk greenish grey silty CLAY interbedded w/ thin (1-4 cm) beds of poorly sorted, silty, v. fine- to med-grained SAND		3 (10.0 - 20.0)	6.0/10.0	2	C,G		
11									
12		12.4 - 15.5' GRAVEL + med- to v. coarse-grained SAND w/ v. thin clay interbeds from 12.4 - 13.3'; sand is fining-up, mod well sorted							
13						2	C,G		
14									
15		dk organic layer, 1.5 cm thick @15.3'							
	-43.9	15.5 - 16.0' v. poorly sorted sandy SILT w/ mod rounded, subspherical pebbles				1	C		not enough for G-sample, 15.5-16.0
16		no recovery past 16.0							
17									
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 78.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: PQ-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N421518.71 E084660.20
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 16:50
FINISH: 17:28
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -31.2
ELEV. DATUM: Mean low water
WATER DEPTH: 31.2
SIGNATURE: TJ.K

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-31.2	0.0 - 1.9' grey to greenish grey silty CLAY w/ some sand and gravel, turbated?		1 (0.0 - 17.5)	9.0/17.5	2	C,G		RUN 1: 0-17.5' (refusal; recov = 9.0' RUN 2: jetted to 10.0'; cored 10.0 - 20.0'; recov = 8.0'
2		1.9 - 5.1' fining-up, grey to greenish grey silty SAND grading into grey to greenish gray silty CLAY v. thin layers of organic matter @ 3.1', 4.7'				2	C,G		
5		5.1' - 10.0' fining-up, well sorted fine- to very coarse-grained SAND w/ basal GRAVEL 0.15' brown organic matter layer at 8.35'				2	C,G		Geotech Samples (G) -- locations noted: in order: PQ-2-G-0.0 PQ-2-G-1.9 PQ-2-G-5.1 PQ-2-G-10.0 PQ-2-G-13.7 PQ-2-G-17.5 Chem Samples (C) -- locations as noted: in order: PQ-2-C-0.0 PQ-2-C-1.9 PQ-2-C-5.1 PQ-2-C-10.0 PQ-2-C-13.7
10		9.0 - 10.0' GRAVEL (based on bit sample and penetration rate); no sample recovery							

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 85.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: PQ-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N421518.71 E624660.20
BORING TYPE: Vibracore

BORING DATE: 11/08/92
START: 16:50
FINISH: 17:28
LOGGED: T.J. Koch
DATE: 11/08/92

ELEV. TOP OF HOLE: -31.2
ELEV. DATUM: Mean low water
WATER DEPTH: 31.2
SIGNATURE: TJK

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		10.0- 13.7' coarse-grained SAND + GRAVEL interbedded w/ grey to greenish grey silty CLAY gravel at: 11.7 -12.0' 12.3- 12.6' 12.75 - 12.9' 13.25 - 13.35' 13.42 - 13.70'		2 (10.0 -20.0)	8.0/10.0	2	C,G		
11									
12									
13									
14		13.7 - 17.1' greenish grey silty CLAY w/ some black organic matter smearing				2	C,G		
15									
16									
17		17.1 - 17.5' brown to blackish brown soft, silty, clayey ORGANIC MATTER				2	C,G		
18	-49.2	17.5 - 18.0' fine- to coarse-grained SAND w/ some small gravel no core recovery past 18.0'				1	G		
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 85.0%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N397709.28 E093928.91
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 14:23
FINISH: 14:24
LOGGED: T.J. Koch
DATE: 11/09/92

R-1

ELEV. TOP OF HOLE: -44.3
ELEV. DATUM: Mean low water
WATER DEPTH: 44.3
SIGNATURE: [signature]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-44.5	0.0 - 16.35' grey silty CLAY w/ few, v. thin (1 mm) laminations of fine-grained sand		1 (0.0 - 20.0)	16.35/20.0				
1									
2									Geotech Samples (G) -- locations noted: in order: R-1-G-3.0 R-1-G-6.5 R-1-G-10.0 R-1-G-13.5
3						1	G		
4									Chem Samples (C) -- composited over core length R-1-C-0.0
5									
6						1	G		
7									
10						1	G		

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 81.8%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: R-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N397709.28 E093928.91
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 14:23
FINISH: 14:24
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -44.3
ELEV. DATUM: Mean low water
WATER DEPTH: 44.3
SIGNATURE: [illegible]

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)		1 (0.0 - 20.0)	16.35/20.0	1	G		
11									
12									
13						1	G		
14									
15									
16									
	60.9	16.35' -- core recovery ends includes 0.5 foot bit sample							
17									
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 81.8%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N396955.72 E093968.20
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 12:33
FINISH: 13:41
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -43.0
ELEV. DATUM: Mean low water
WATER DEPTH: 43.0
SIGNATURE: TJ. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-43.0	0.0 - 17.60' grey to greenish grey silty CLAY w/ few, v. thin (1-2 mm) beds of fine to med-grained sand							Run 1: cored 0-20'; recov = 10.2' Run 2: jetted 0-9'; cored 9-20'; recov = 5.6' Run 3: jetted 0-14'; cored 14-20'; recov = 2.0'
1									
2									
3		few pebbles (<1 cm) at 2.7', 13.1'				1	G		
4									
5				1 (0.0 - 20.0)	10.2/20.0				
6									Geotech Samples (G) -- locations noted: in order: R-2-G-3.0 R-2-G-7.0 R-2-G-11.0 R-2-G-15.0
7						1	G		
									Chem Samples (C) -- composited over core length R-2-C-0.0
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.0%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: R-2

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N396955.72 E093968.20
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 12:33
FINISH: 13:41
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -43.0
ELEV. DATUM: Mean low water
WATER DEPTH: 43.0
SIGNATURE:

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)							
11				2 (9.0 - 20.0)	5.6/11.0	1	G		
12									
13									
14									
15				3 (14.0 - 20.0)	2.0/6.0	1	G		
16									
17									
	60.6	17.60' -- core recovery ends							
18									
19									
20									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 88.0%

RMC ENVIRONMENTAL SERVICES

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N398522.14 E093780.64
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 10:33
FINISH: 11:15
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -43.2
ELEV. DATUM: Mean low water
WATER DEPTH: 43.2
SIGNATURE: TJ. Koch

DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
0	-43.2	0.0 - 15.3' grey to greenish grey silty CLAY w/ few, v. thin (1-2 mm) beds of fine to med-grained sand		1 (0.0 - 20.0)	15.3/20.0				Run 1: cored 0-20'; recov = 15.3' Run 2: cored 0-20'; recov = 14.6' Run 3: cored 0-20'; recov = 14.3'
1									
2						1	G		
3									
4									
5									Logged/Sampled Core from RUN 1
6									Geotech Samples (G) -- locations noted: in order: R-3-G-2.5 R-3-G-7.5 R-3-G-13.0
7						1	G		Chem Samples (C) -- composited over core length R-3-C-0.0
8									
9									
10									

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 76.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: R-3

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N398522.14 E093780.64
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 10:33
FINISH: 11:15
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -43.2
ELEV. DATUM: Mean low water
WATER DEPTH: 43.2
SIGNATURE: TJ Koch

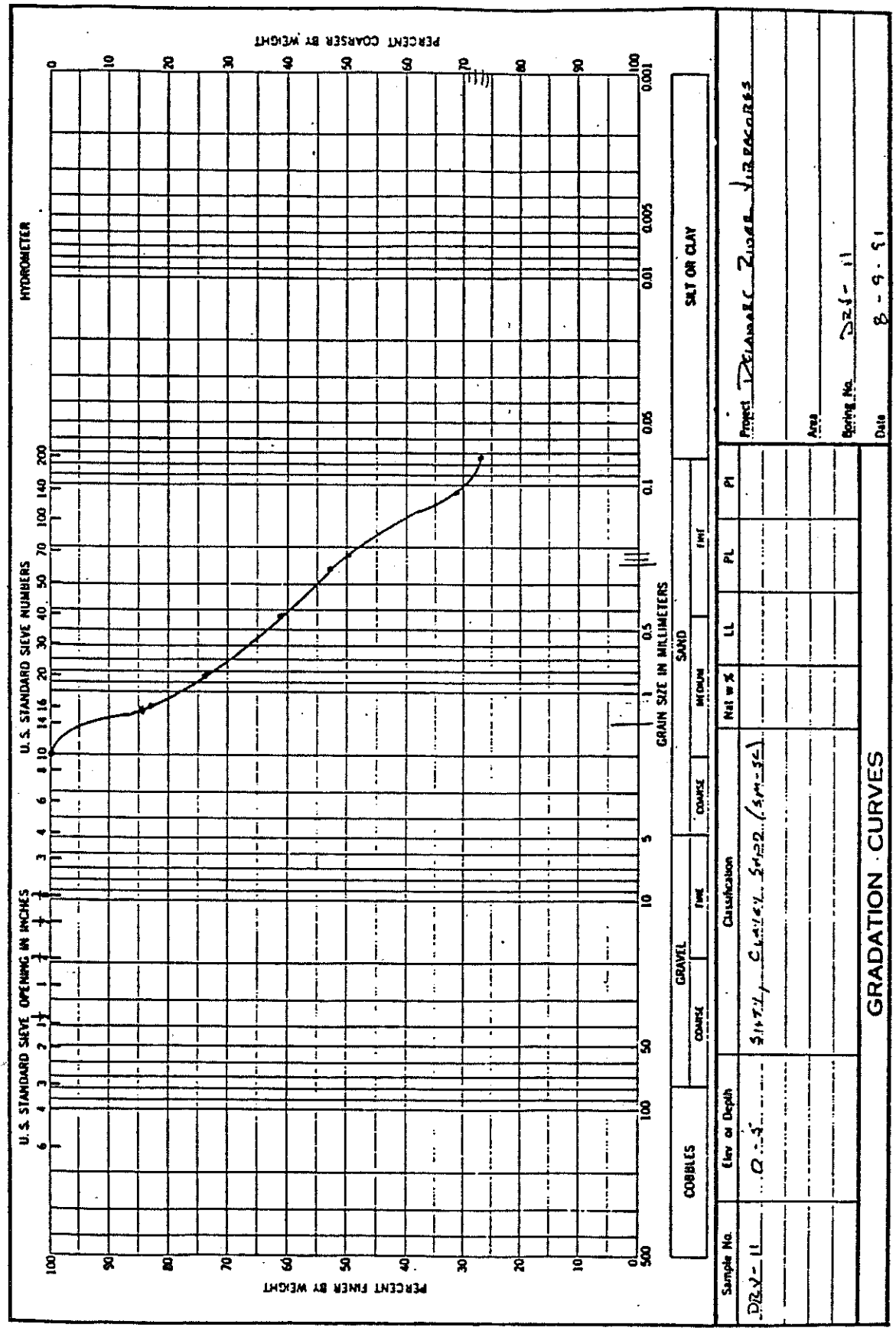
DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)							
11									
12									
13						1	G		
14									
15				1 (0.0 - 20.0)	15.3/20.0				
	-58.5	15.30' -- core recovery ends							
16									
17									
18									
19									
20									

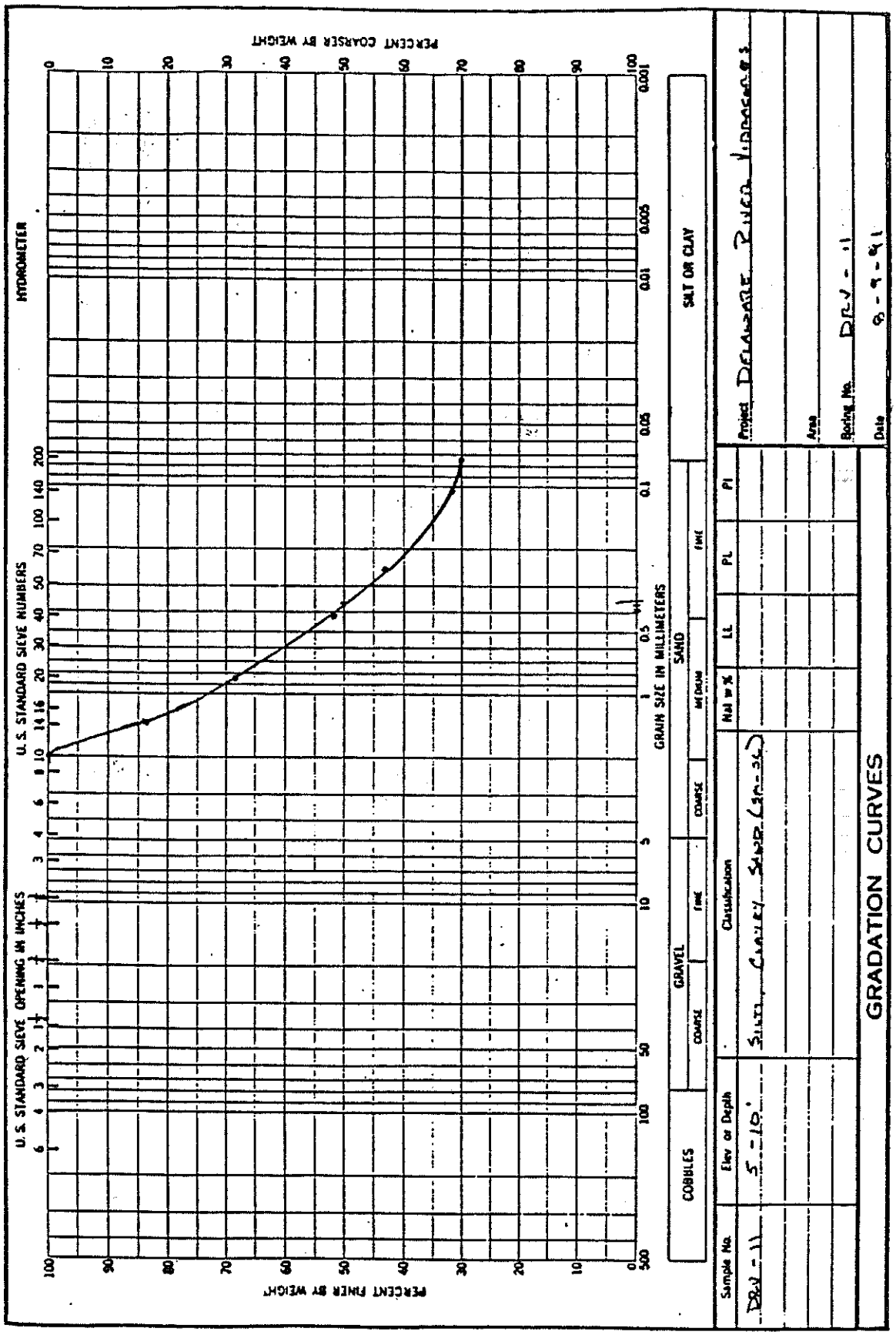
DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

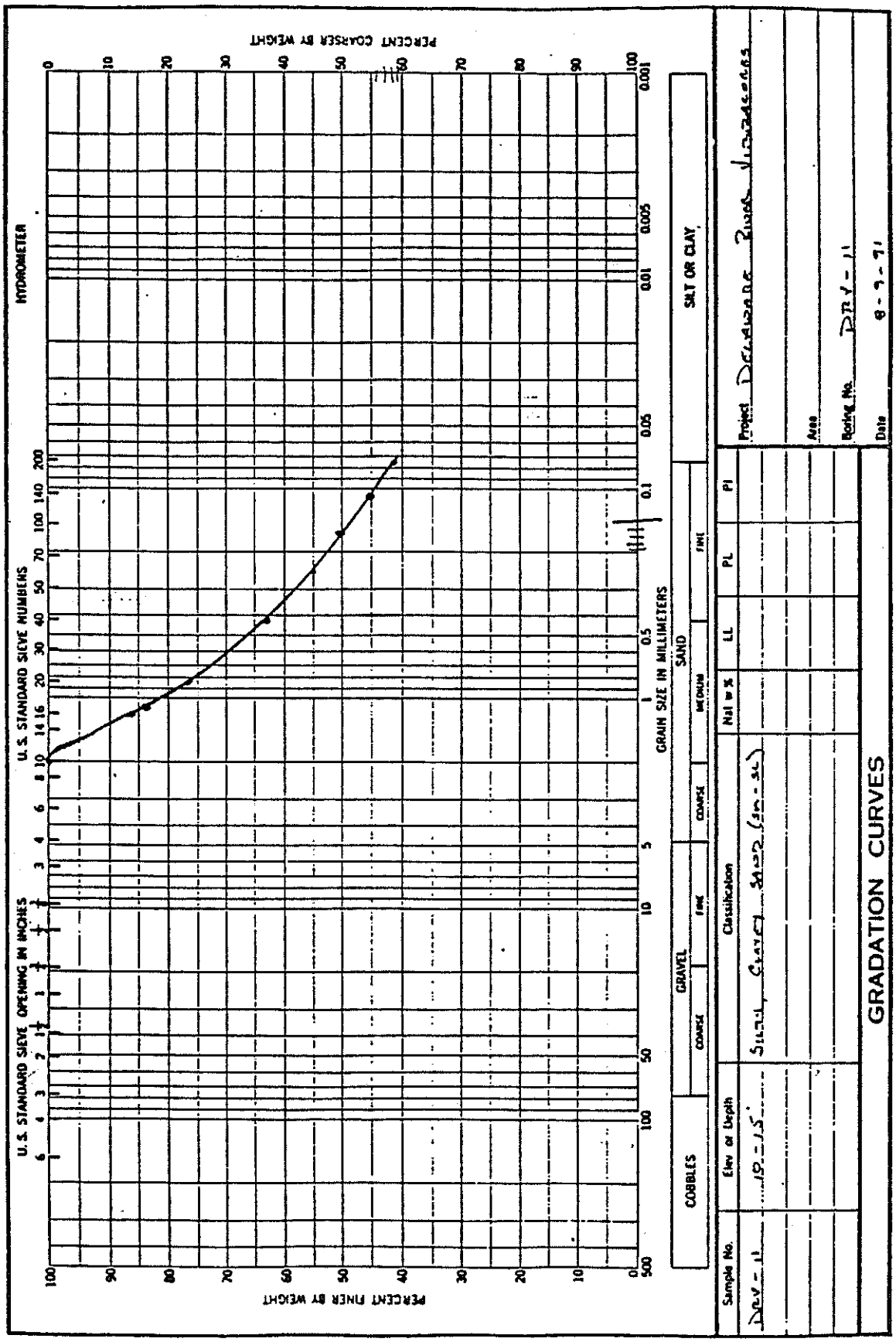
DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 76.5%

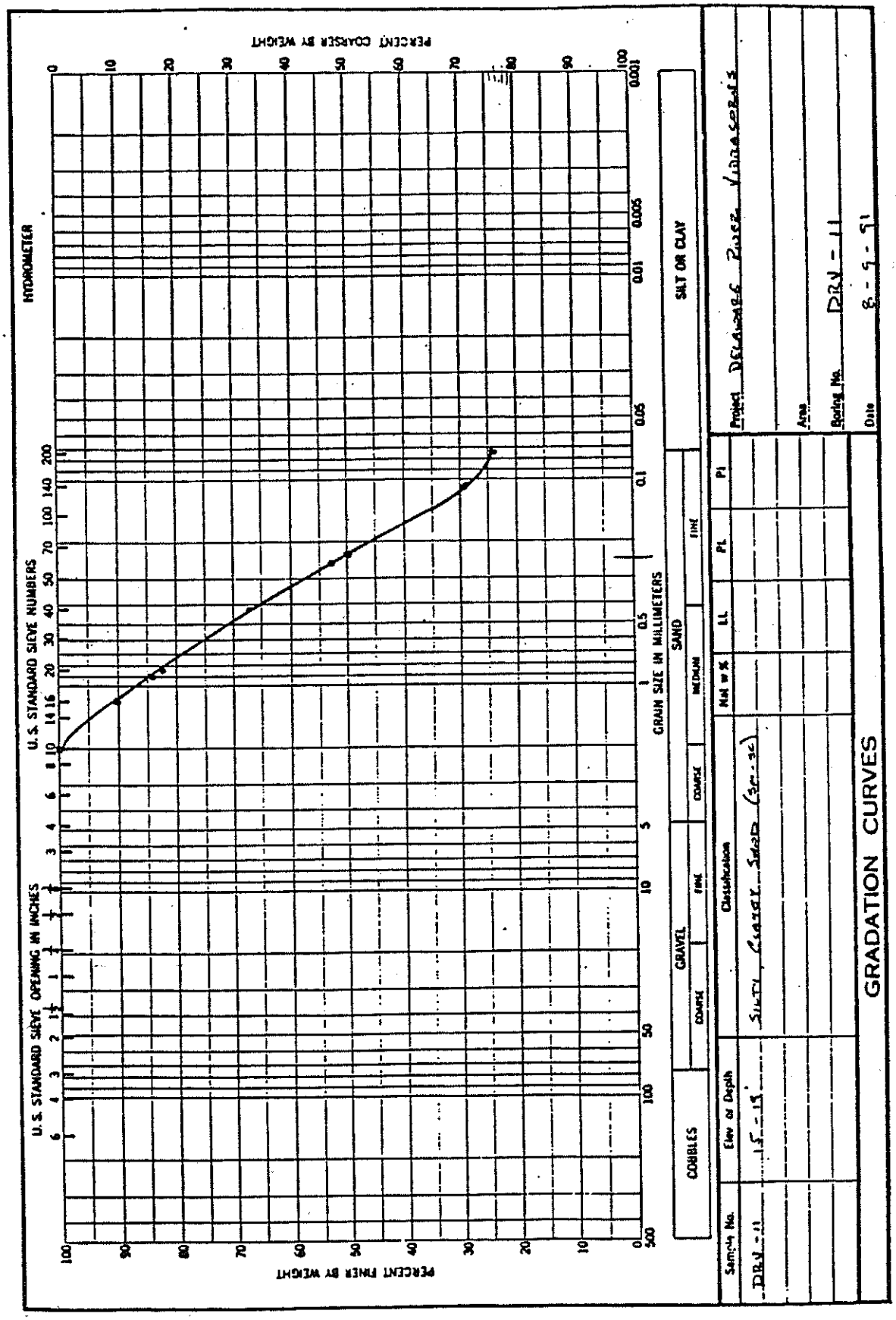
RMC ENVIRONMENTAL SERVICES

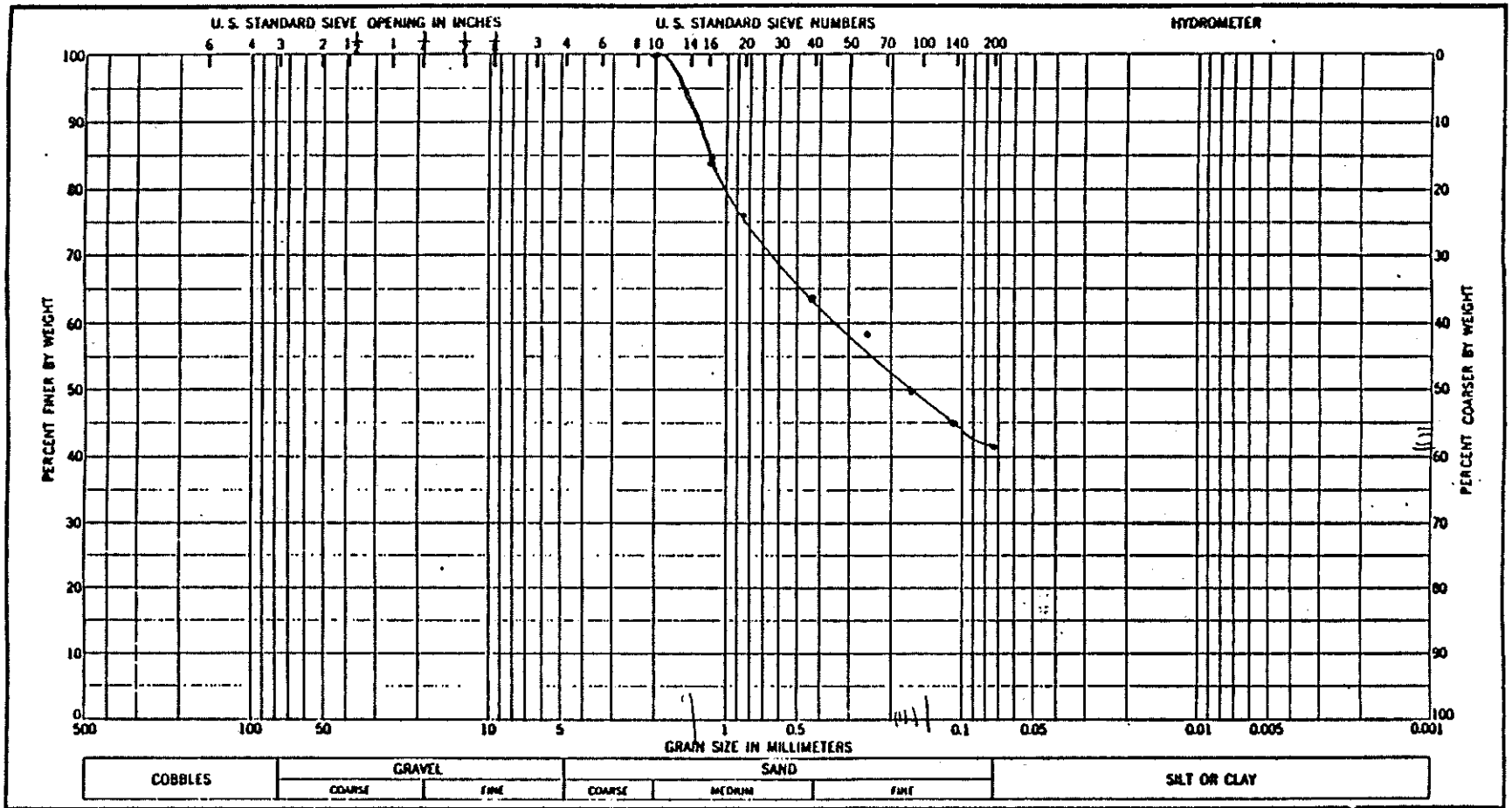
Gradation Curves & Sieve Analysis


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project DELAWARE RIVER HARBOR
Area
Boring No. DRJ - 11
Date 9-9-91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRJ - 11
5 - 10'
SILTY CLAYEY SAND (SC-SM)
GRADATION CURVES
ENG FORM 1 MAY 83 2087


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U.S. STANDARD SIEVE NUMBERS
U.S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project DELAWARE RIVER VIBRACORES
Area
Boring No. DRV-11
Date 8-9-91
Sample No. DRV-11
Elev or Depth 15-15'
Classification SILTY CLAYEY SAND (SC-SM)
Nat w % LL PL PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRV-12	0-5'	Silty, Clayey Sand (SM-SC)				

Project Delaware River Vibracores

Area

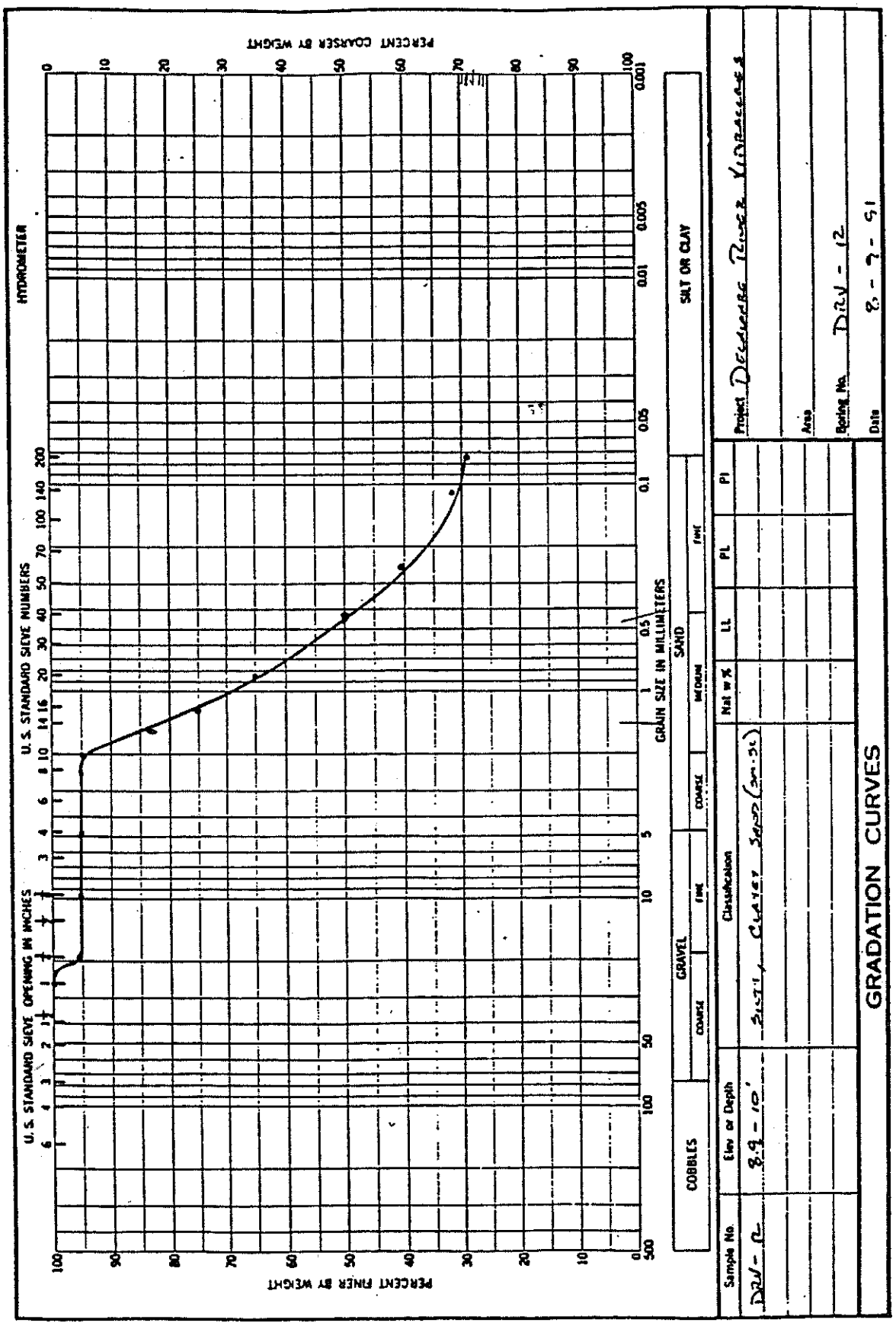
Boring No. DRV-12

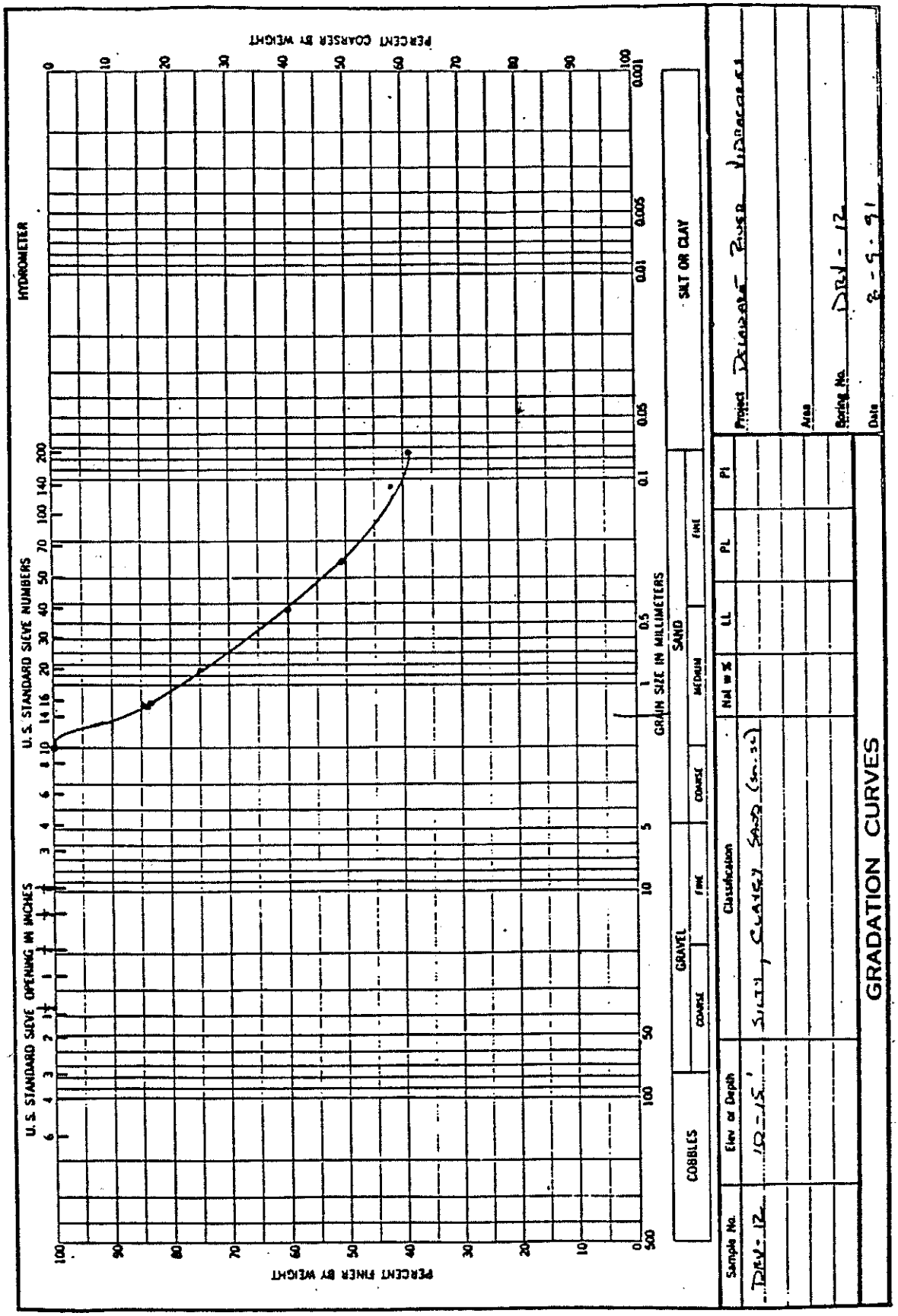
Date 8-9-91

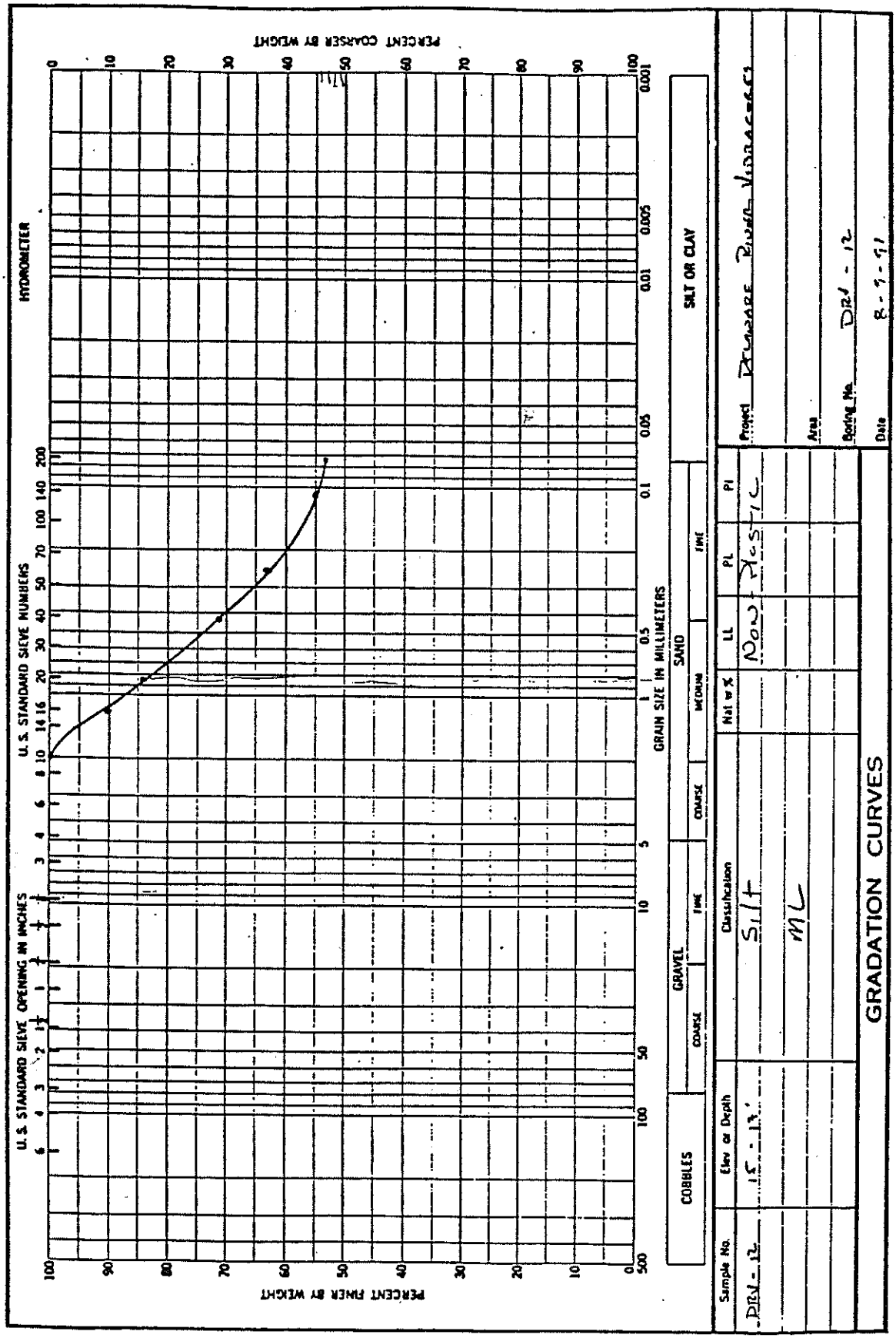
GRADATION CURVES

ENG FORM 1 MAY 63 2087

212

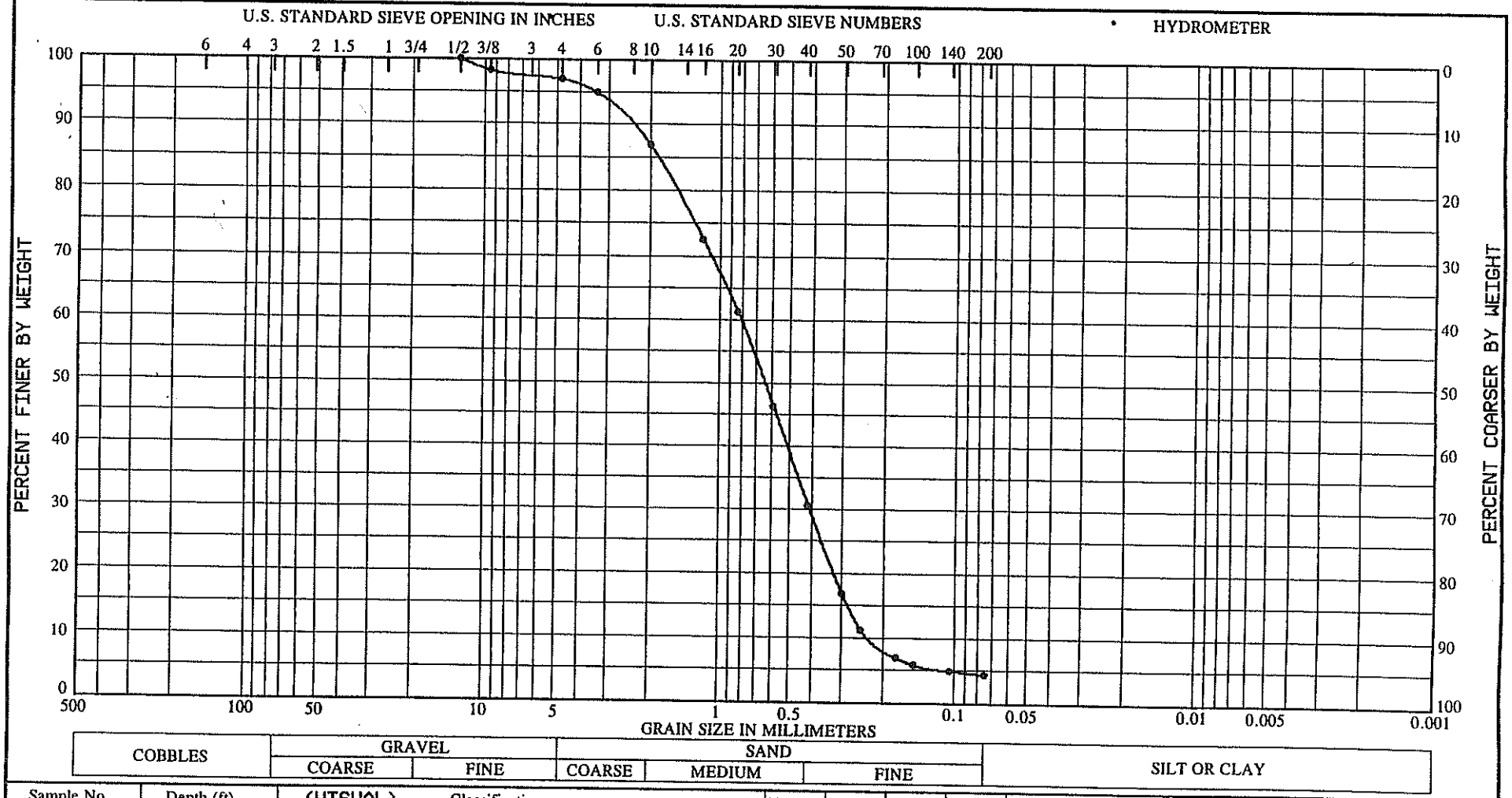

HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Dredging
Area
Boring No. DRV - 12
Date 8 - 7 - 91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV - 12
8.9 - 10'
Silty Clayey Sand (SM-SC)
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Hydraulics
Area
Boring No. DRV-12
Date 8-9-91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-12
10-15'
Silty, Clayey Sand (SM-SC)
GRADATION CURVES
ENG FORM 1 MAY 63 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM 1 MAY 63 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	11.8 - 12.1	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

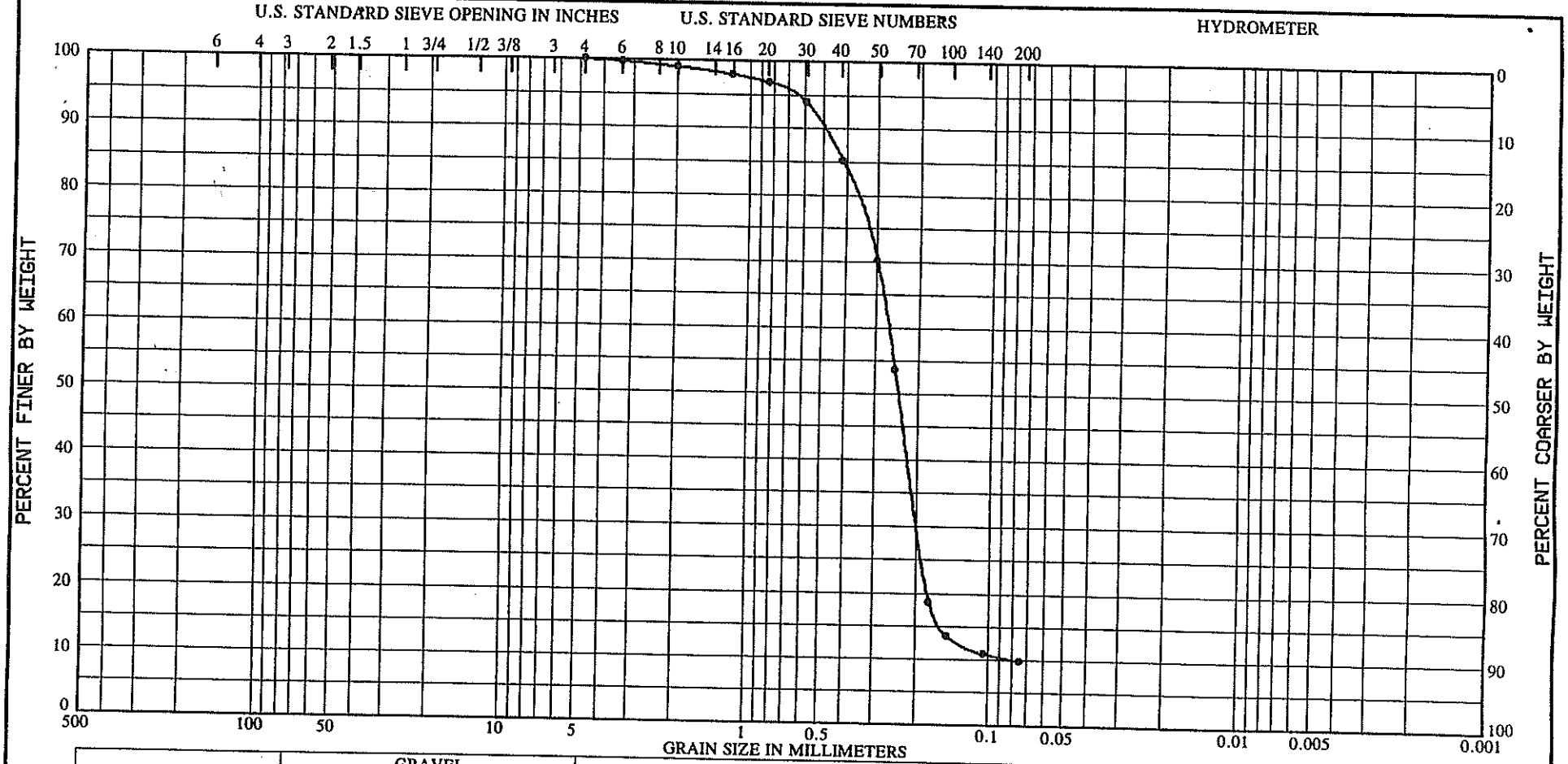
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1340
Hole No. DRV-41 REACH 1
Date 12/04/97

GRADATION CURVES

28

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	6.7 - 6.9	GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF MICA.				

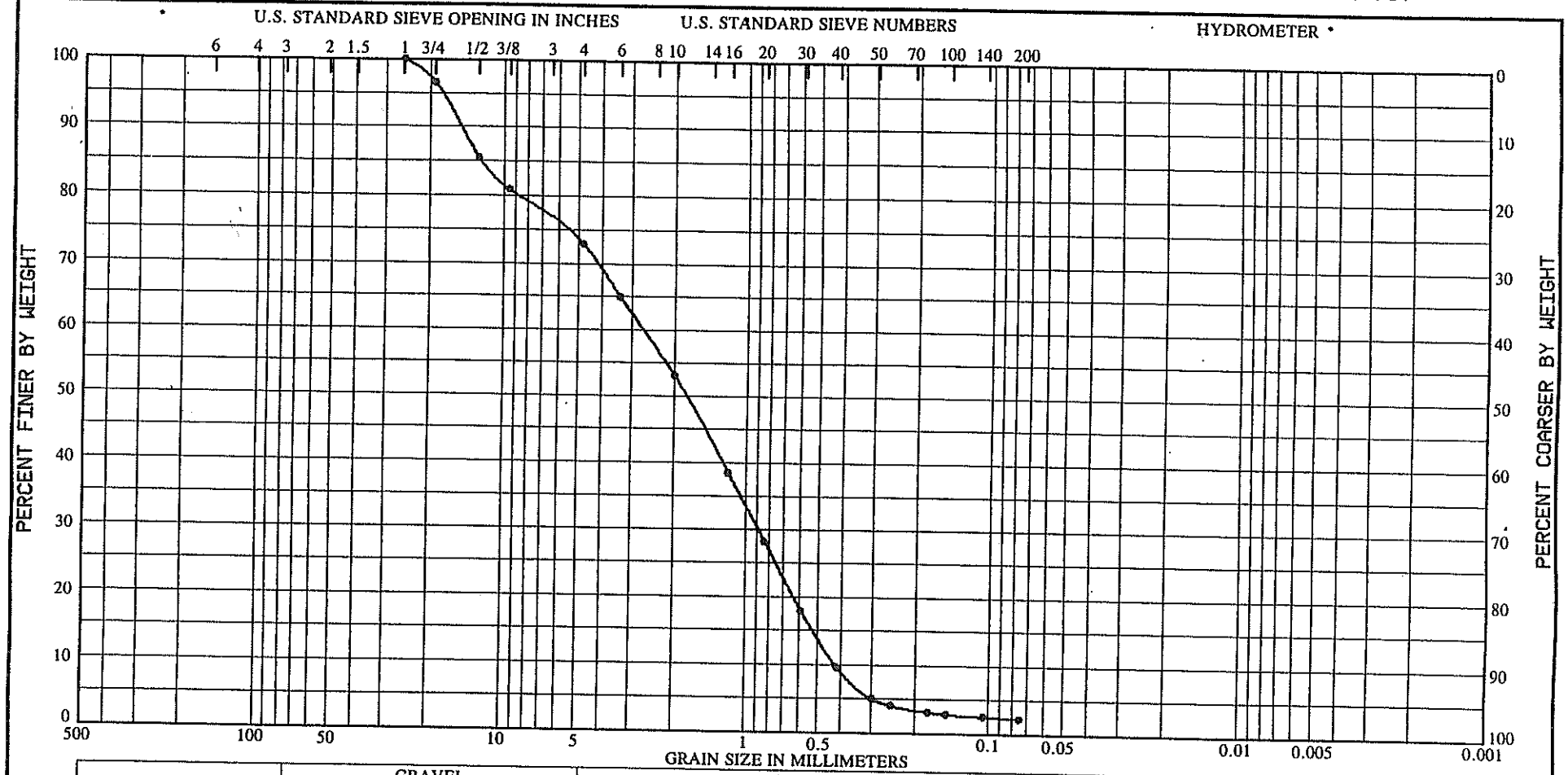
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1340
Hole No. DRV-41 REACH 1
Date 12/04/97

GRADATION CURVES

27

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.4 - 3.0	GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES, AND A TRACE OF MICA.				

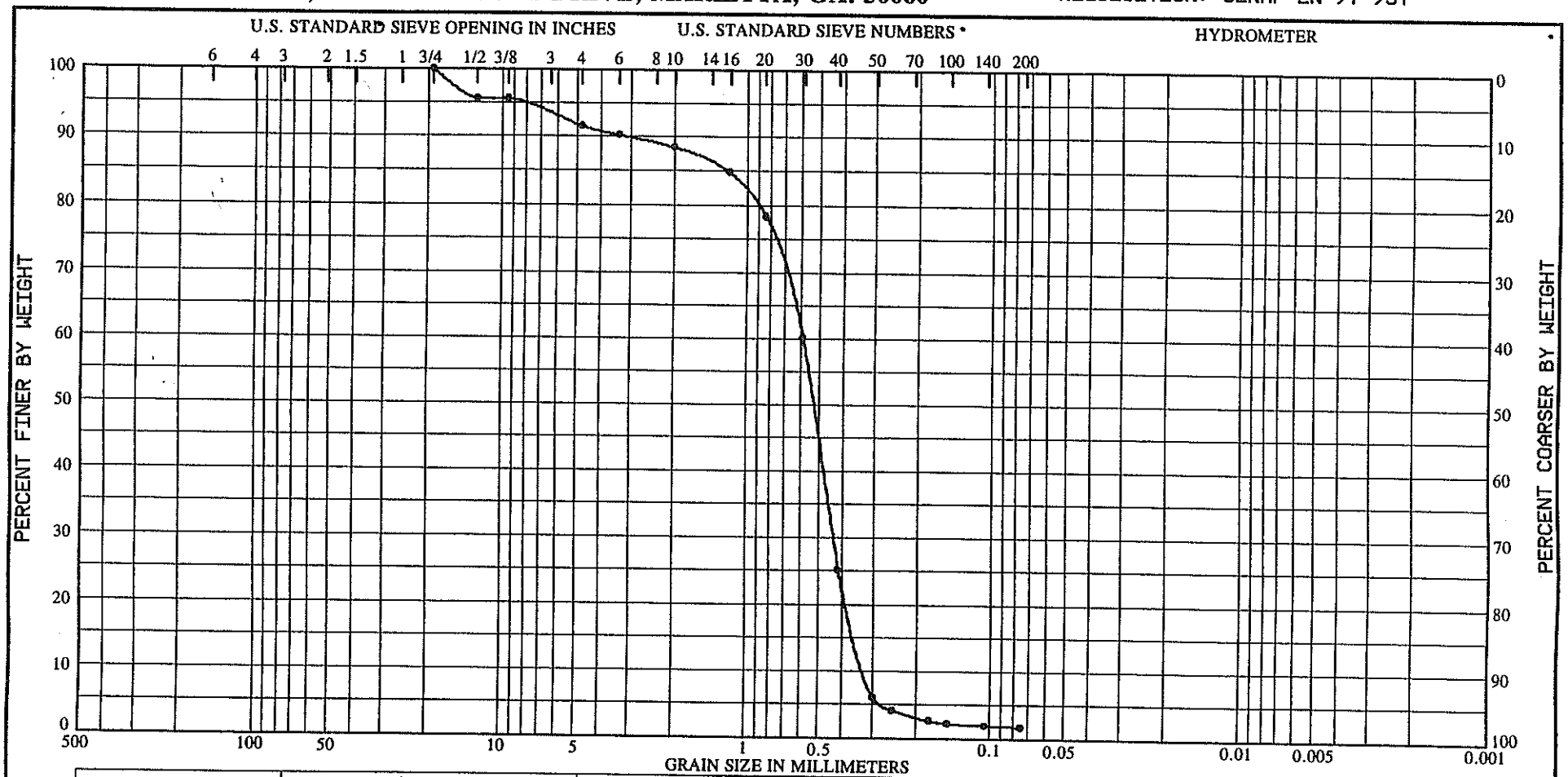
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1340
Hole No. DRV-41 REACH 1
Date 12/04/97

GRADATION CURVES

26

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.0 - 16.3	TAN & GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

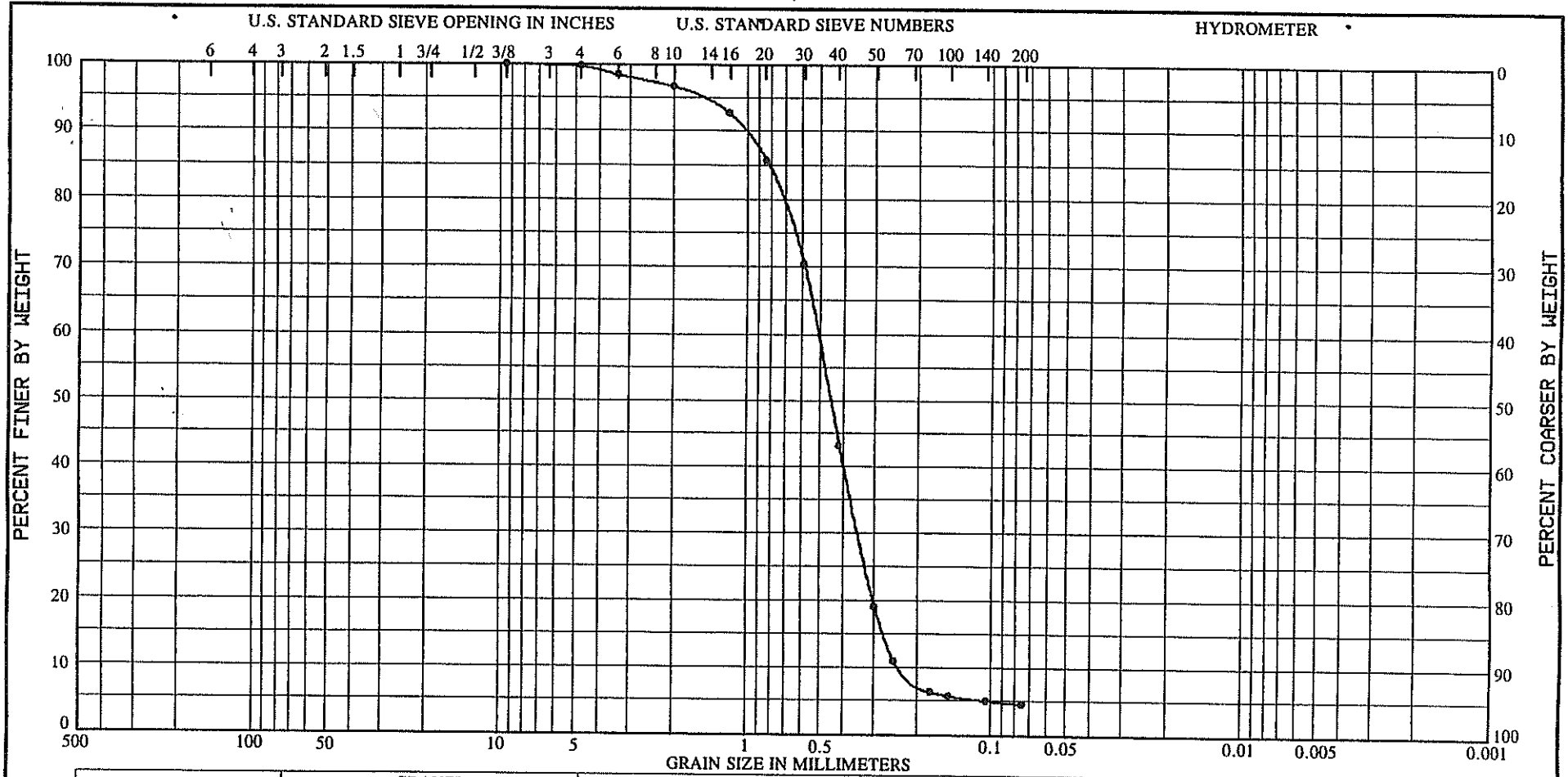
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1340
Hole No. DRV-41 REACH 2
Date 12/04/97

GRADATION CURVES

31

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	13.4 - 13.7	TAN & GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

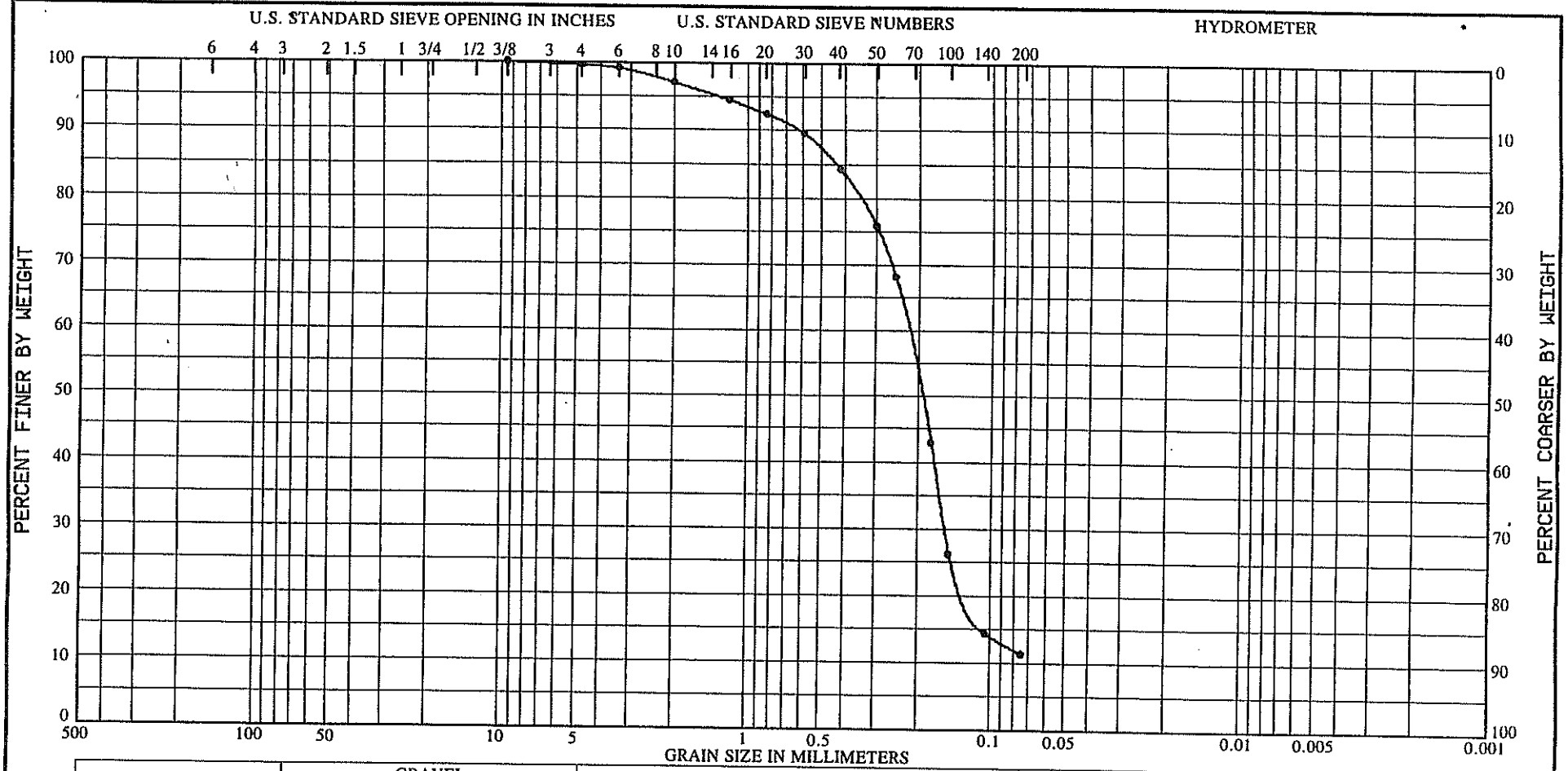
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1340
Hole No. DRV-41 REACH 2
Date 12/04/97

GRADATION CURVES

30

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	15.6 - 15.9	GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF MICA.				

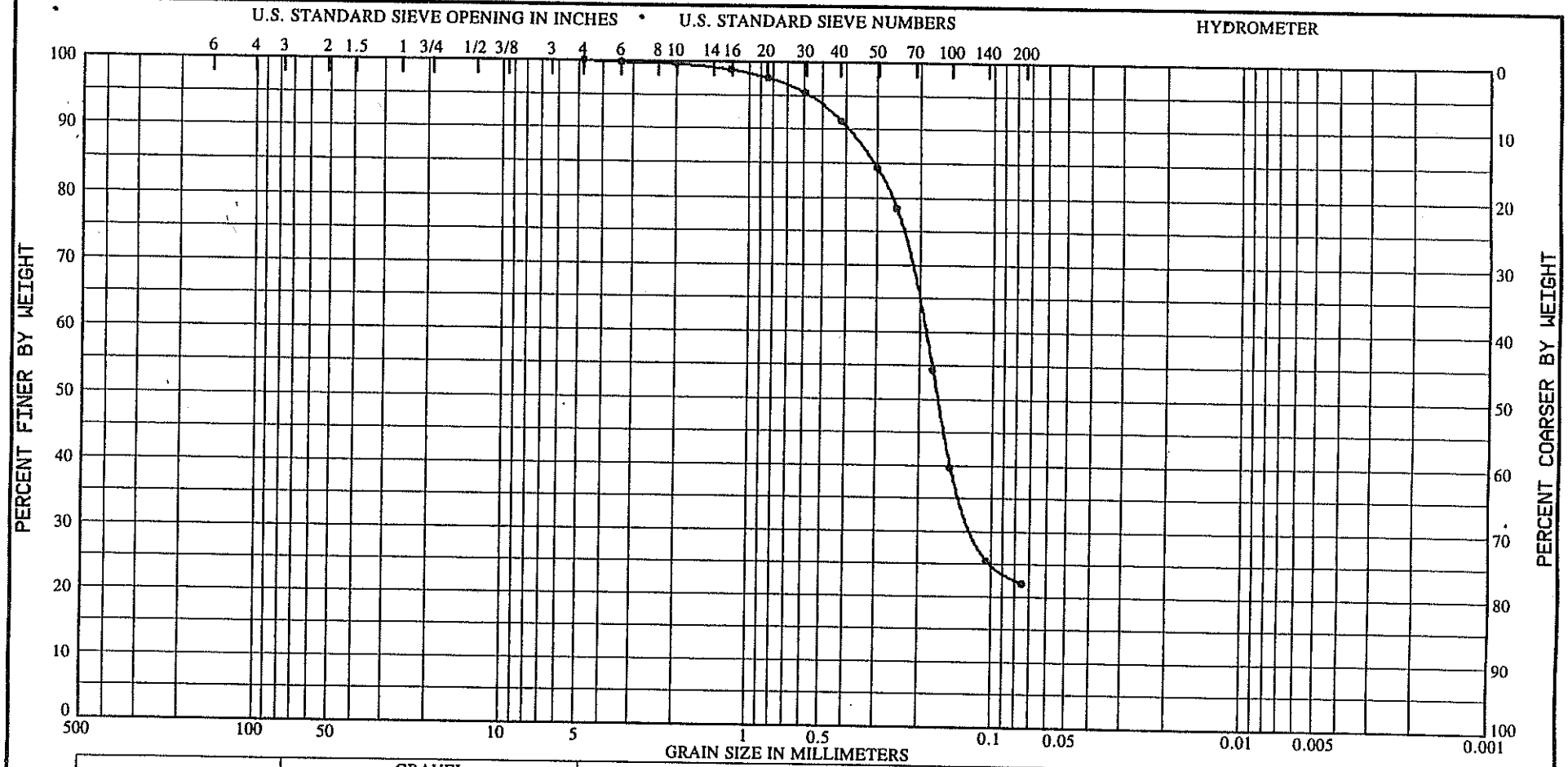
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1341
Hole No. DRV-42
Date 12/04/97

GRADATION CURVES

37

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	11.1 - 11.3	GRAY, SILTY SAND (SM), WITH A TRACE OF MICA.				

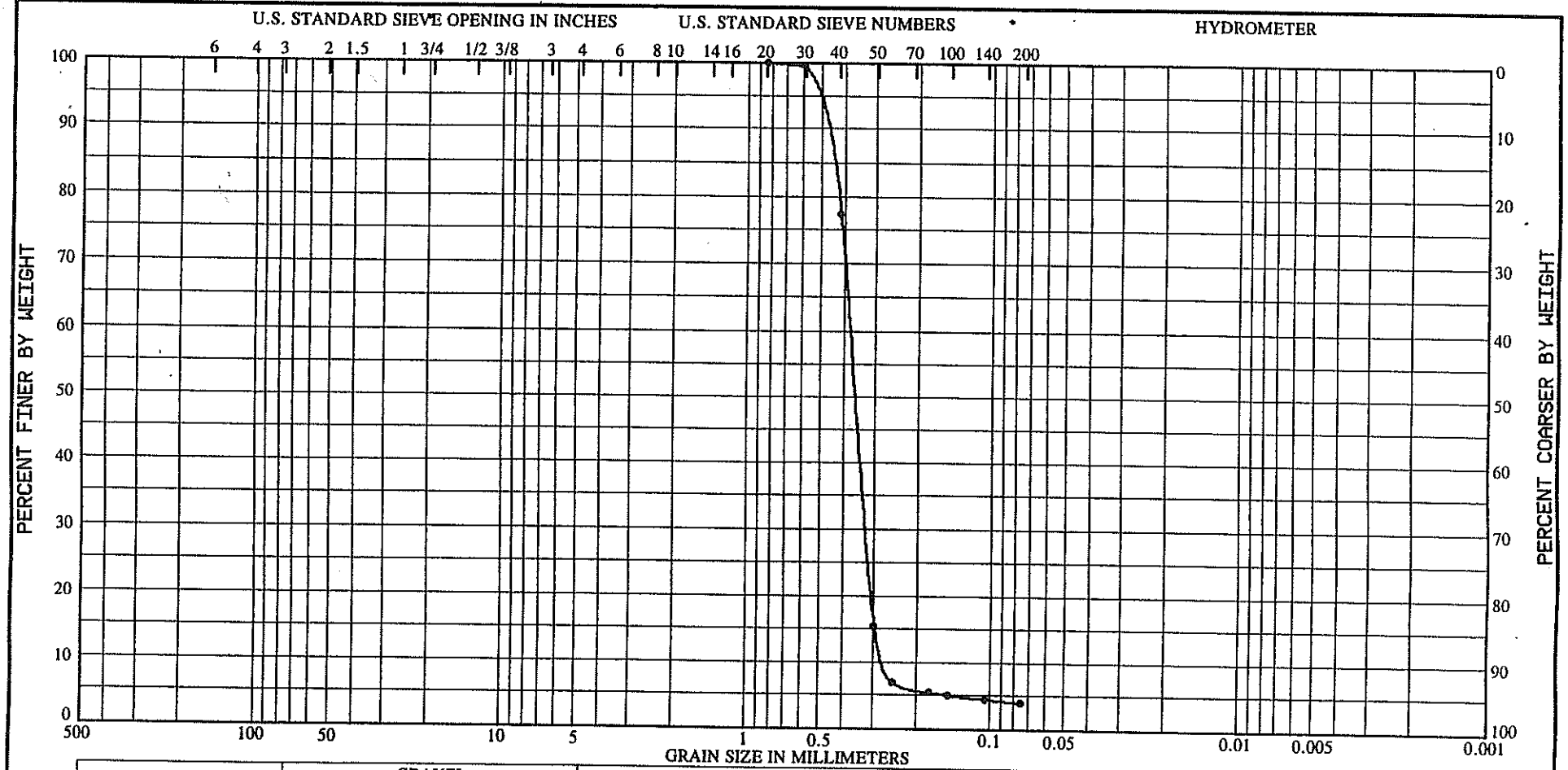
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1341
Hole No. DRV-42
Date 12/04/97

GRADATION CURVES

36

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	7.3 - 7.6	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

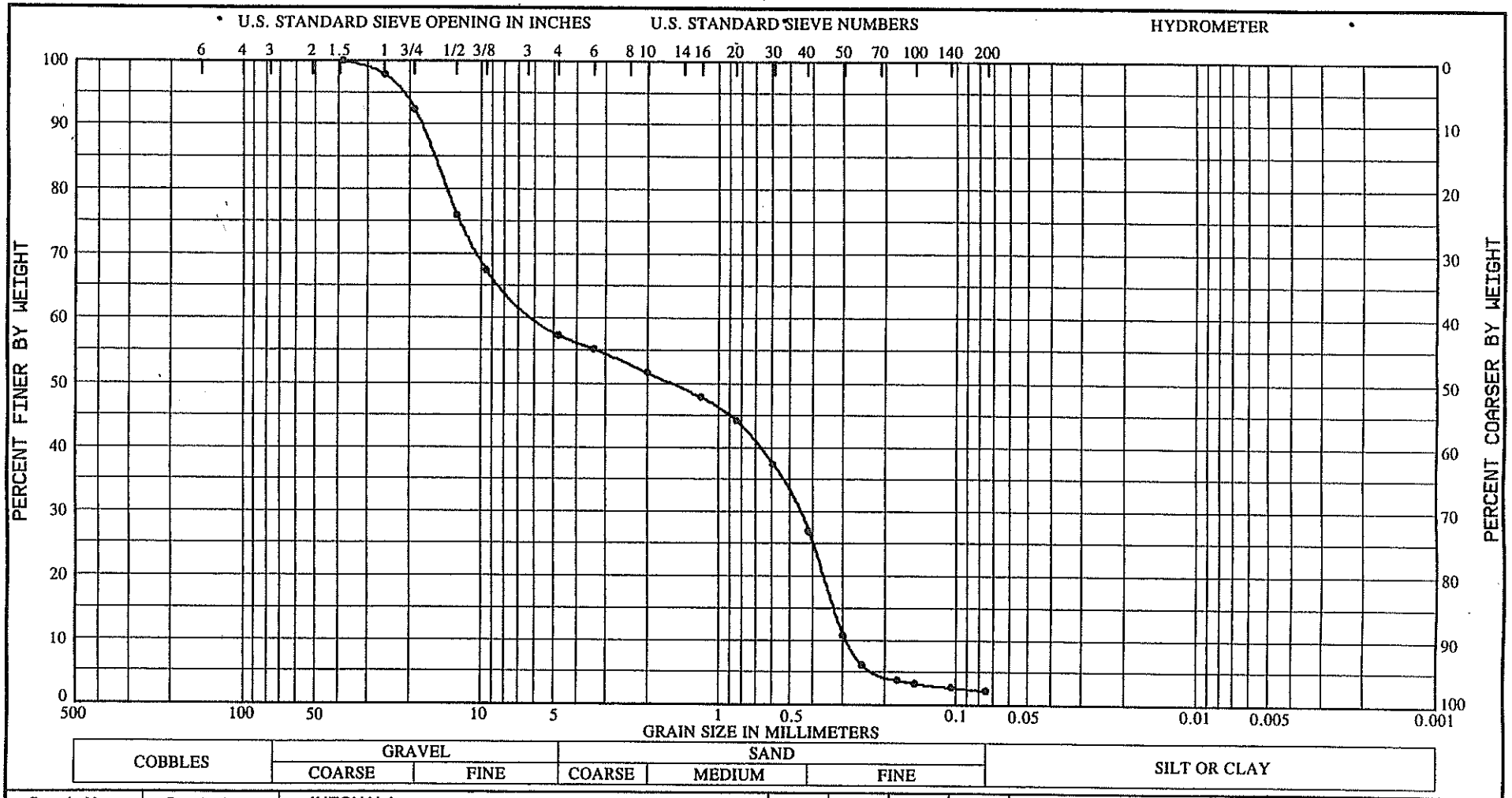
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1341
Hole No. DRV-42
Date 12/04/97

GRADATION CURVES

35

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.8 - 3.4	TAN & GRAY, GRAVELLY POORLY GRADED SAND				
		(SP), WITH A TRACE OF MICA.				

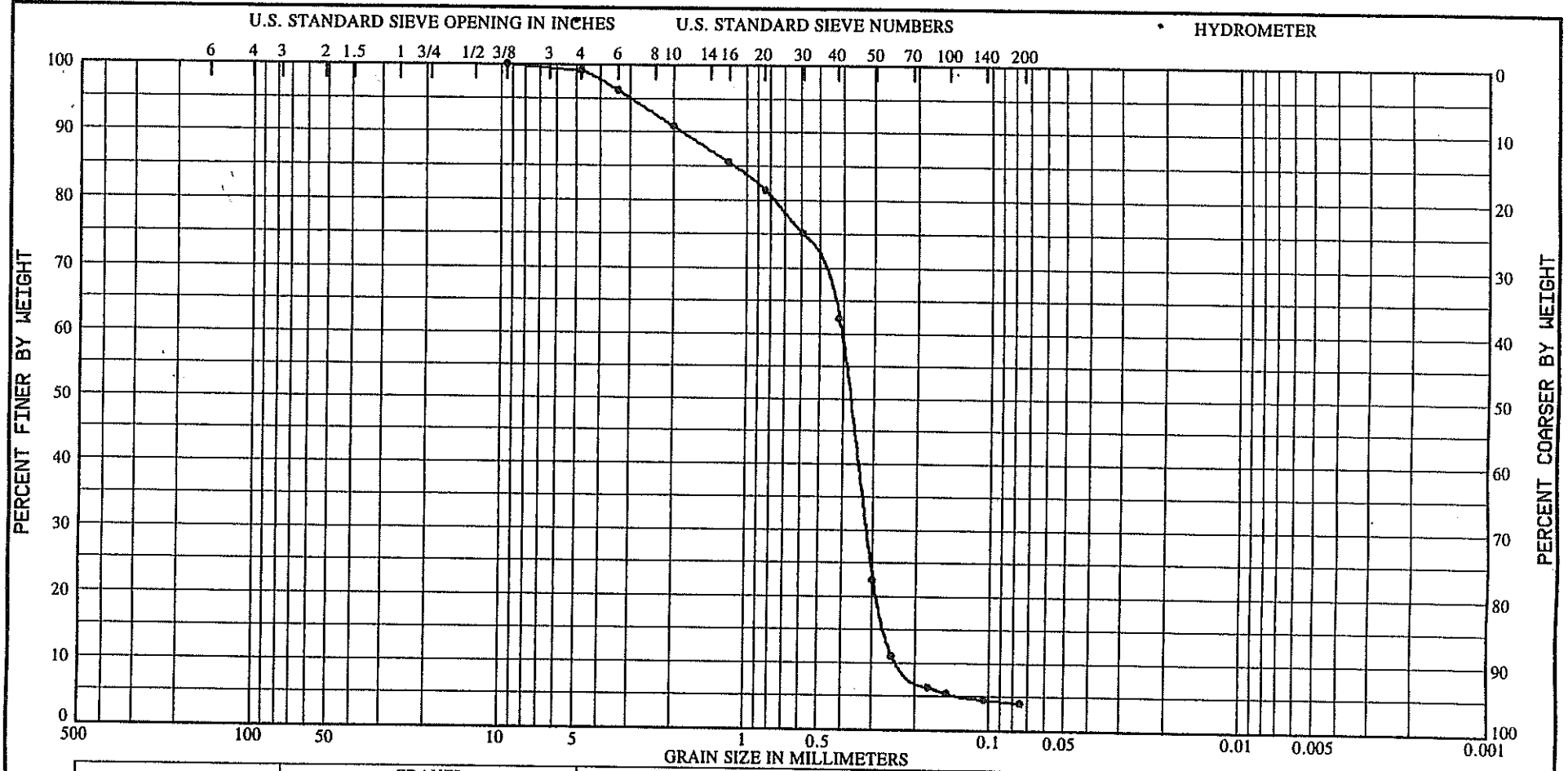
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1341
Hole No. DRV-42
Date 12/04/97

GRADATION CURVES

34

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.0 - 1.3	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

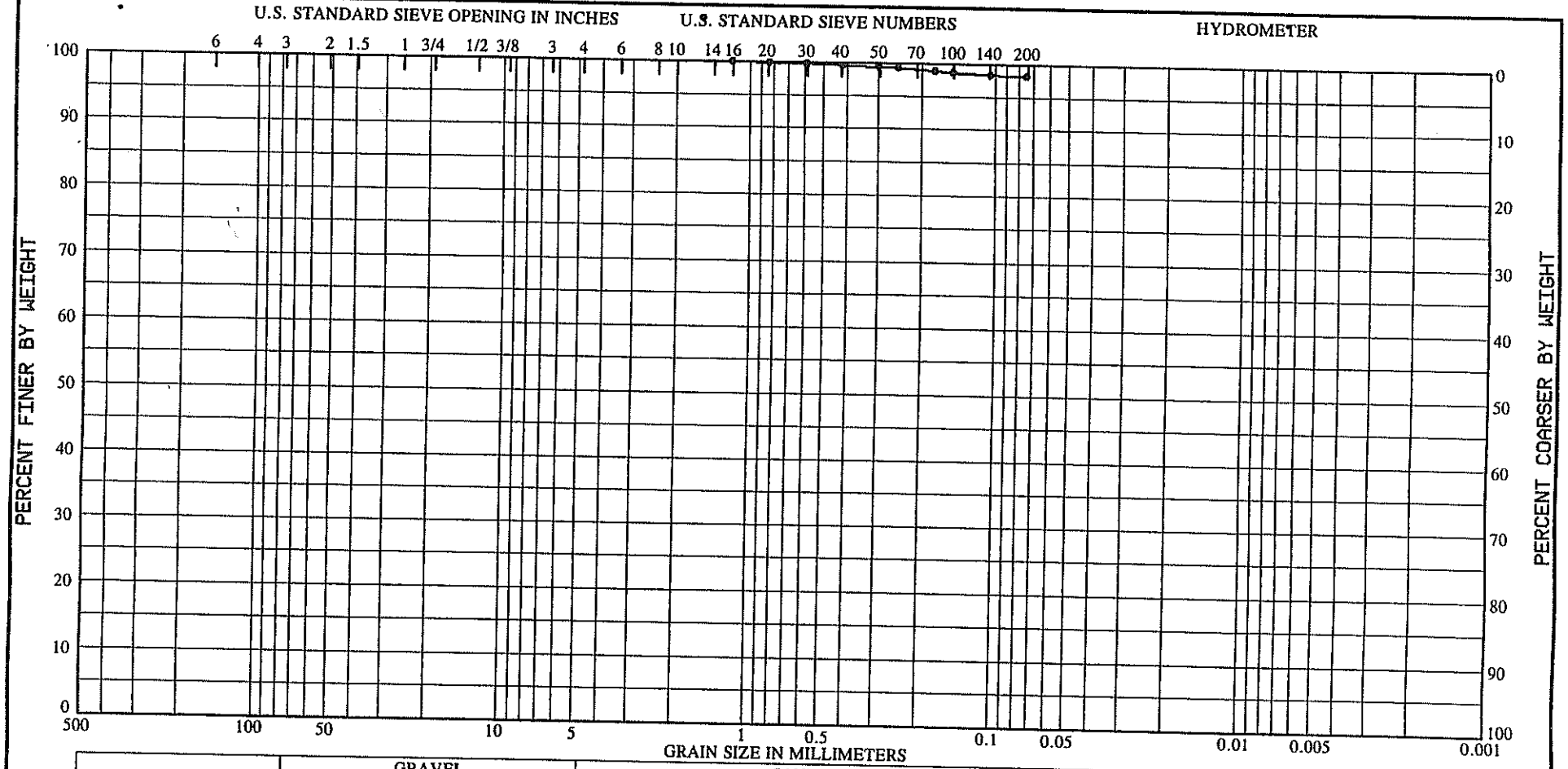
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1341
Hole No. DRV-42
Date 12/04/97

GRADATION CURVES

33

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	8.3 - 8.6	GRAY, FAT CLAY (CH), WITH A TRACE OF SAND SIZES AND MICA.				

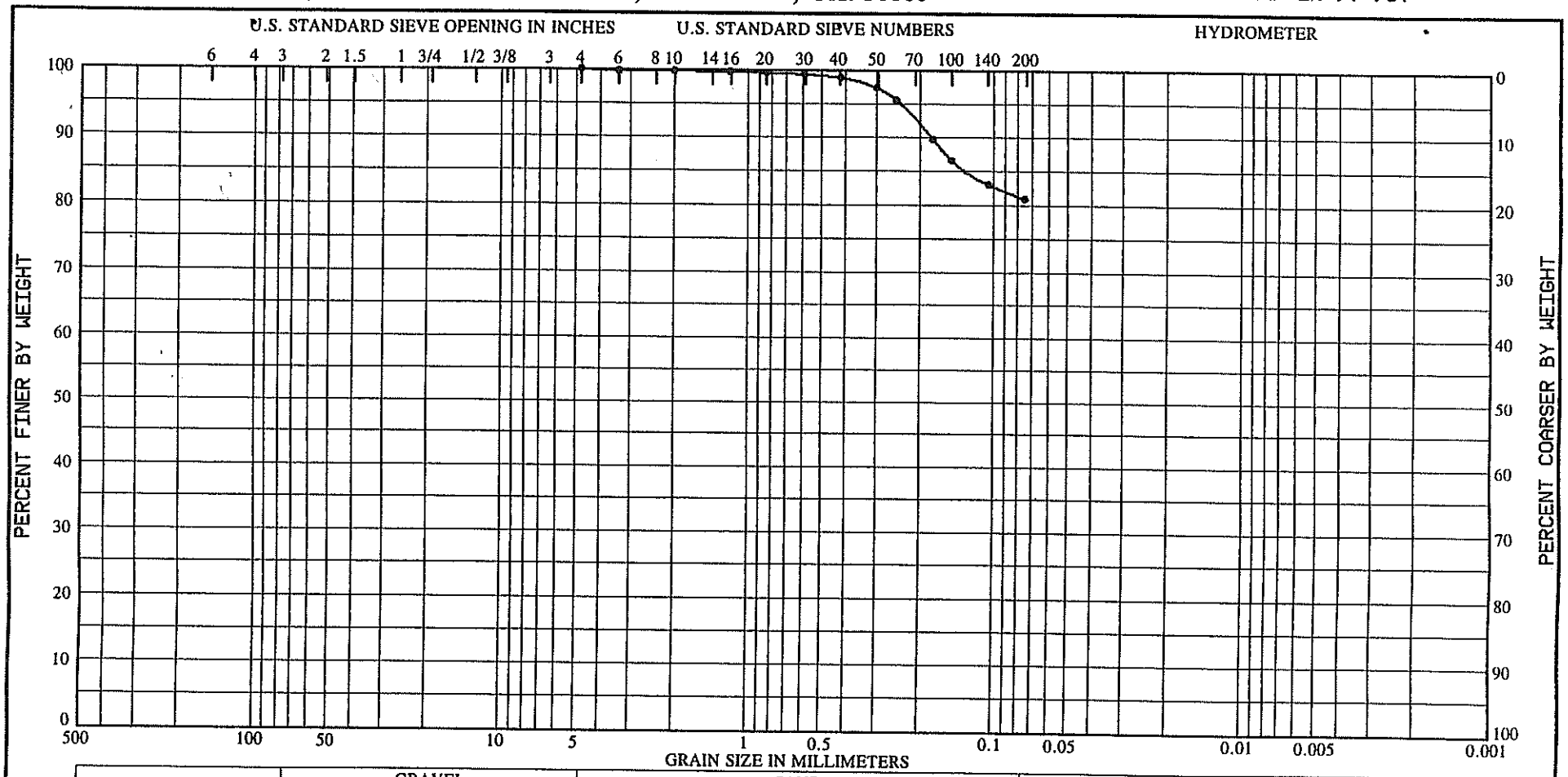
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1342
Hole No. DRV-43 REACH 1
Date 12/04/97

GRADATION CURVES

40

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.6 - 2.9	GRAY, FAT CLAY (CH), WITH A LITTLE SAND SIZES, AND A TRACE OF MICA.				

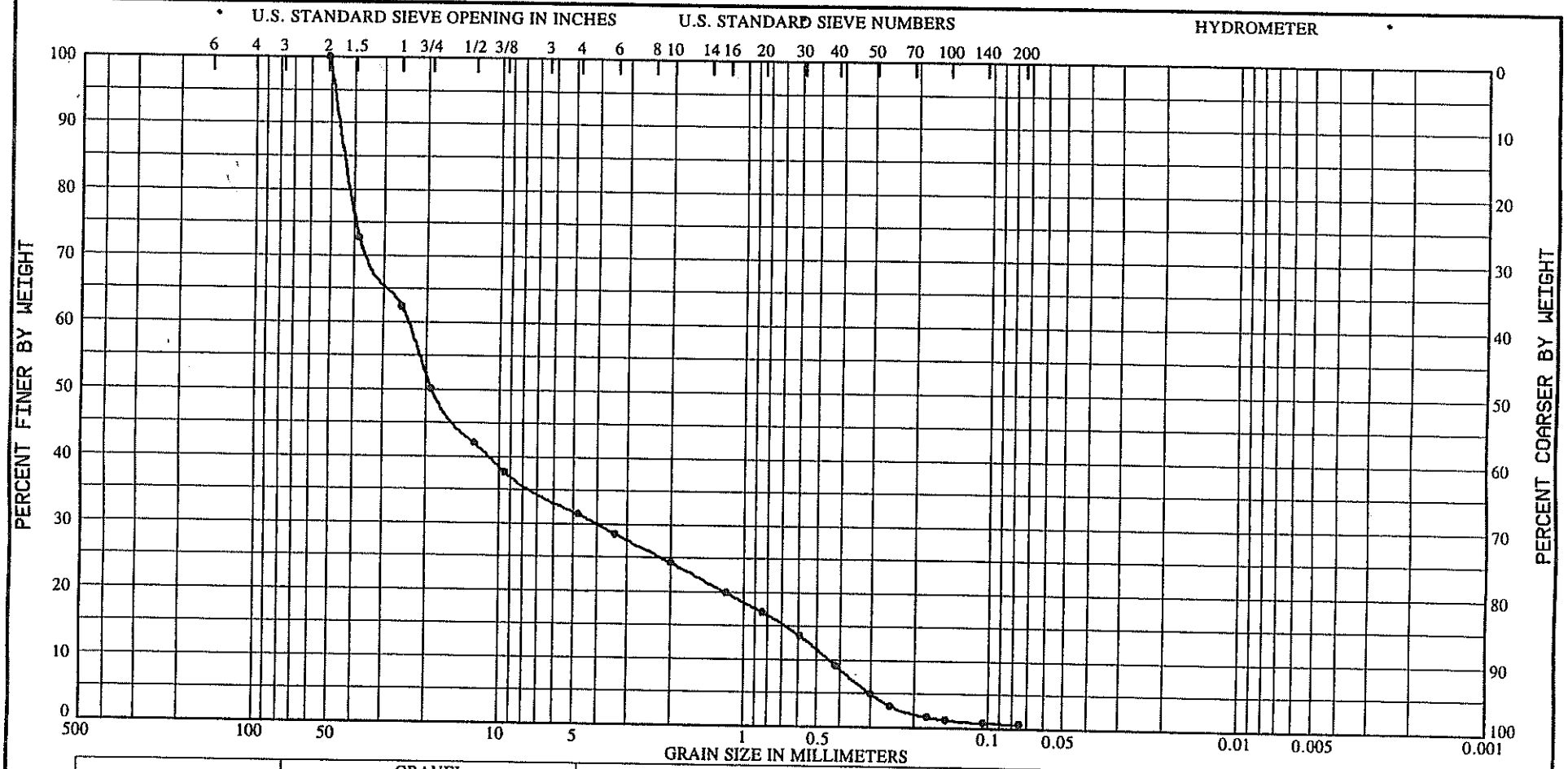
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1342
Hole No. DRV-43 REACH 1
Date 12/05/97

GRADATION CURVES

39

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	18.0 - 18.8	TAN, WELL-GRADED GRAVEL (GW), WITH SOME SAND SIZES.				

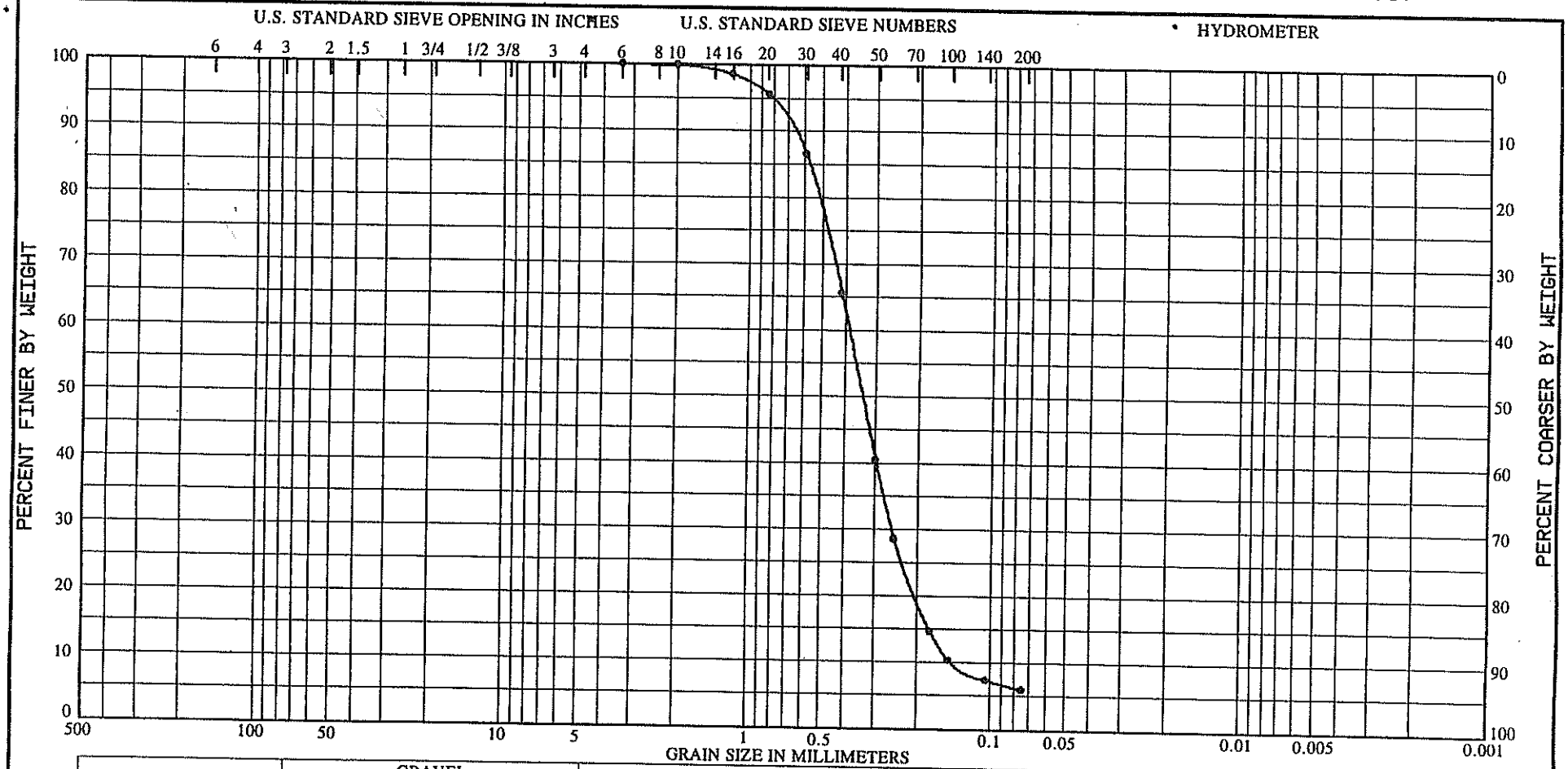
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1342
Hole No. DRV-43 REACH 2
Date 12/04/97

GRADATION CURVES

45

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

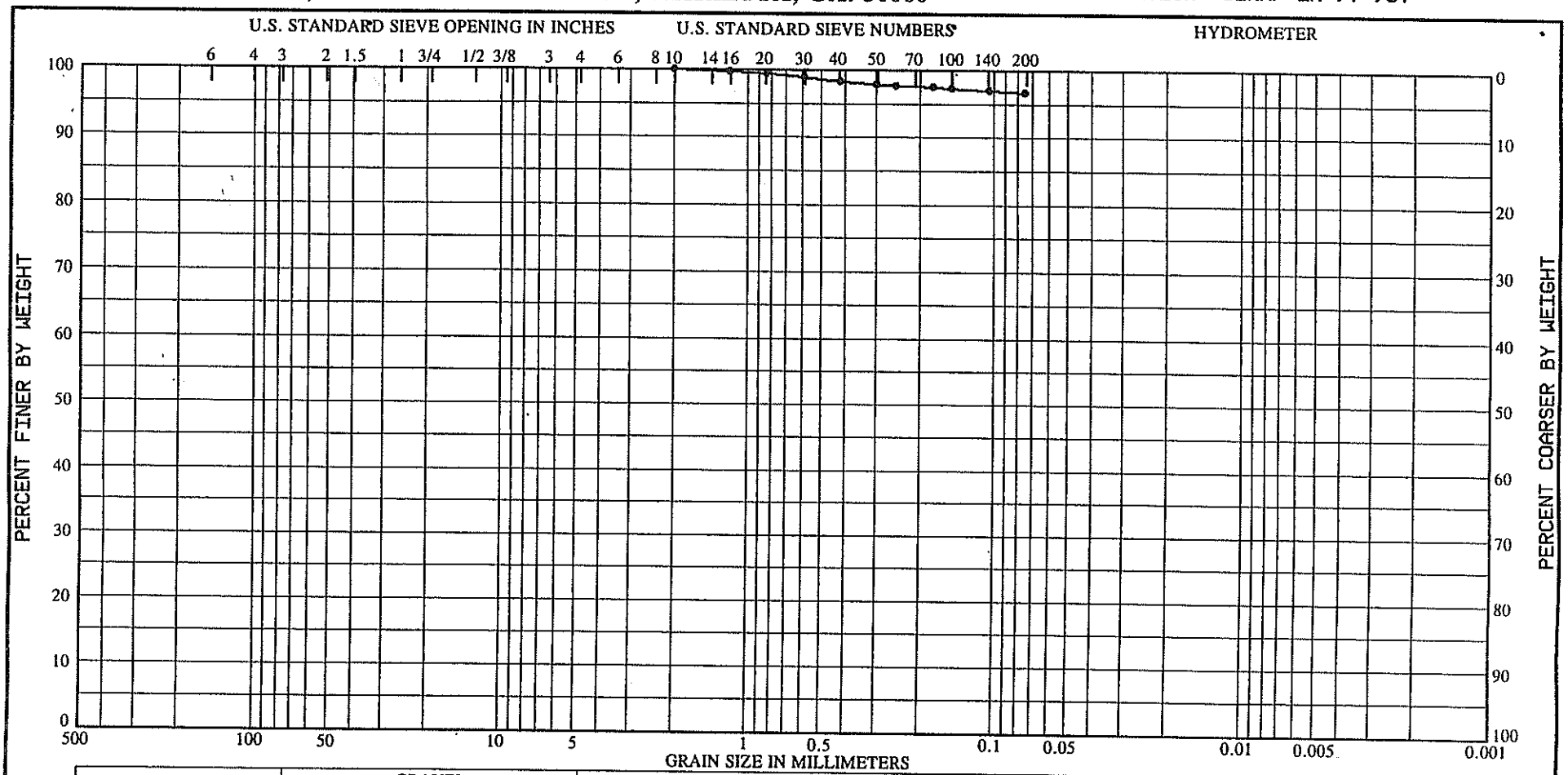
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.5 - 16.8	GRAY & TAN, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1342
Hole No. DRV-43 REACH 2
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

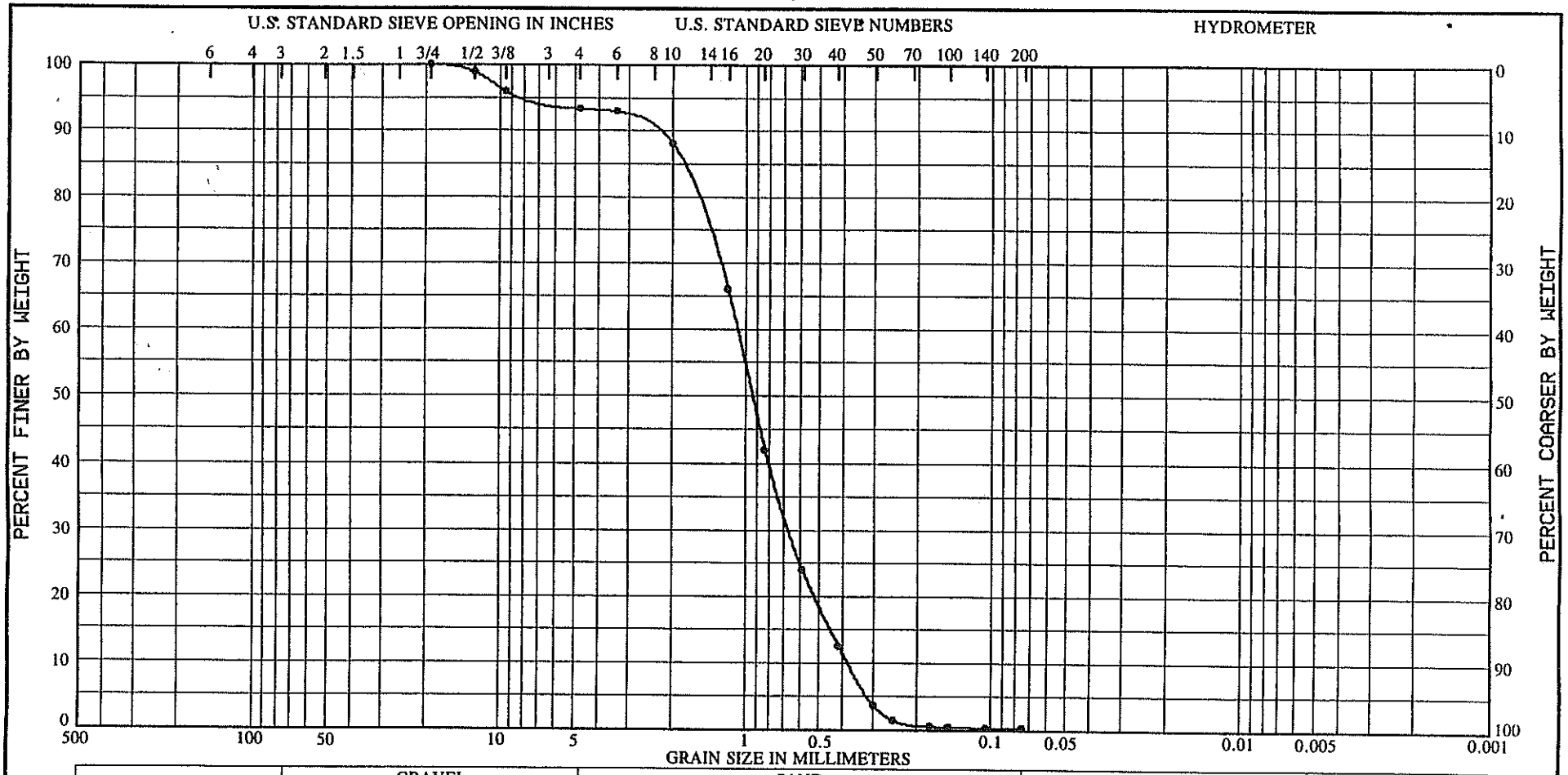
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.6 - 12.9	GRAY, FAT CLAY (CH), WITH A TRACE OF SAND SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1342
Hole No. DRV-43 REACH 2
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.0 - 12.7	TAN & GRAY, POORLY GRADED SAND (SP),				
		WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1343
Hole No. DRV-44
Date 12/04/97

GRADATION CURVES

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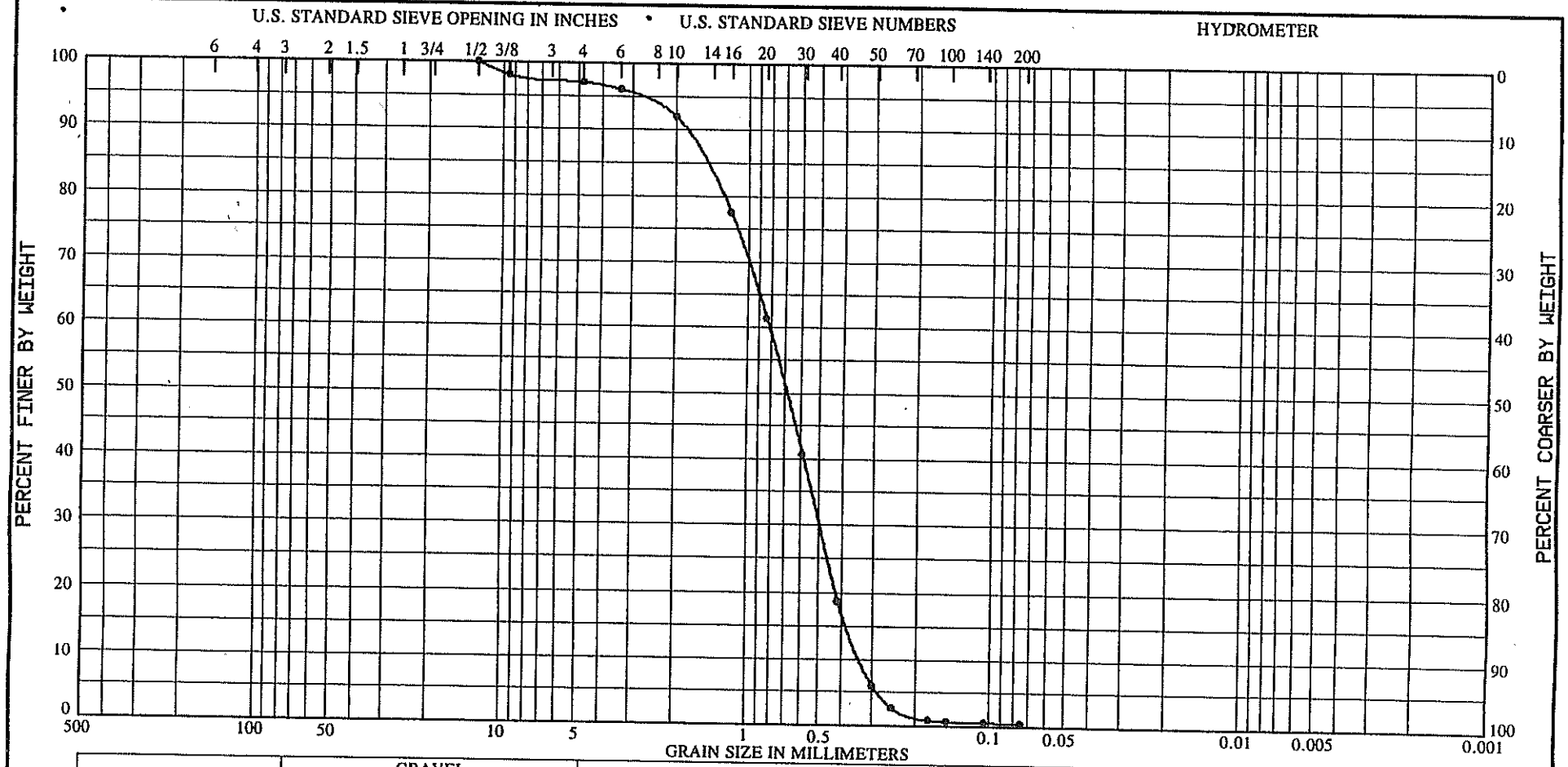
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	8.0 - 8.3	GRAY & TAN, POORLY GRADED SAND (SP),				
		WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1343
Hole No. DRV-44
Date 12/04/97

GRADATION CURVES

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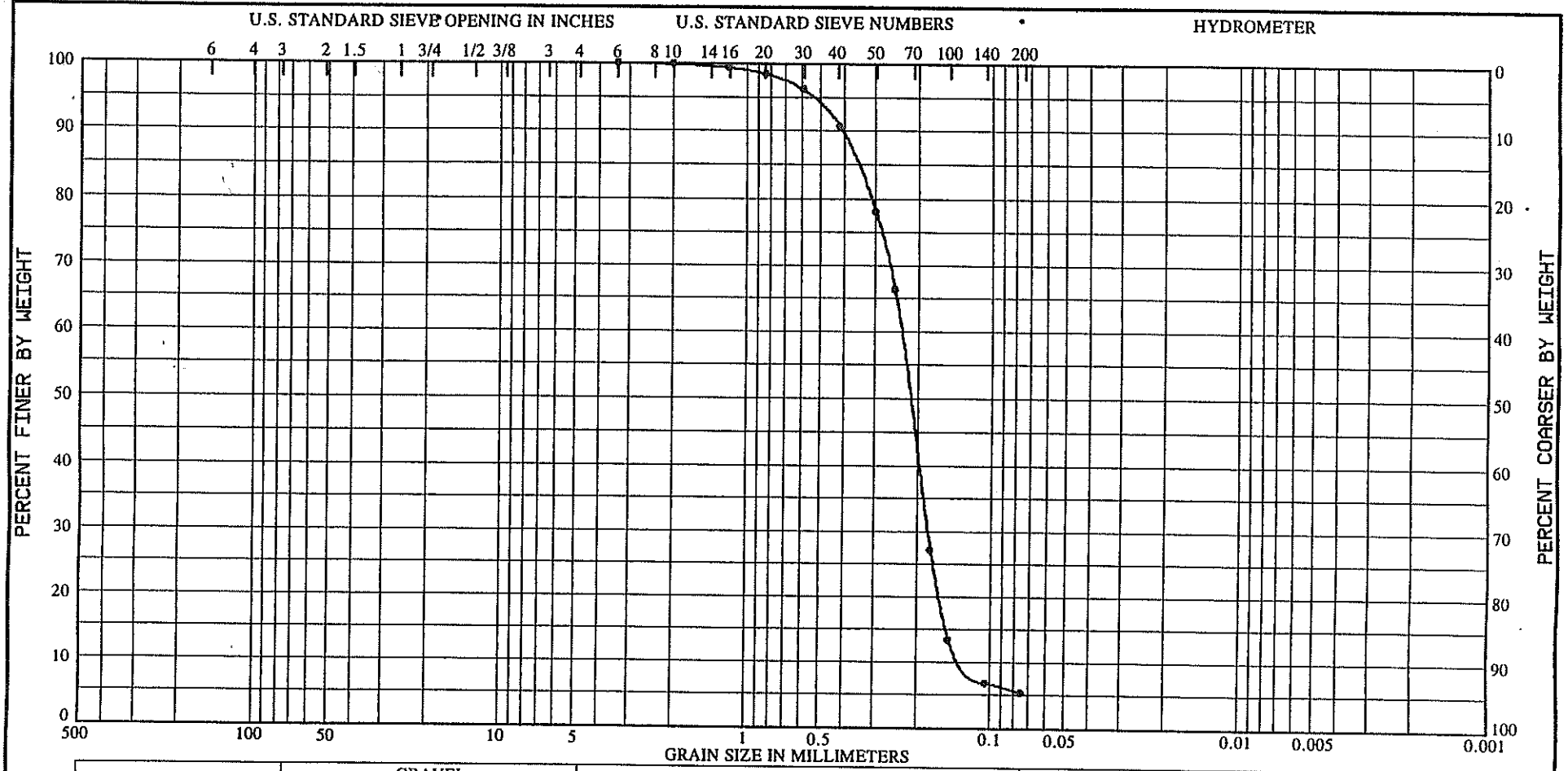
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

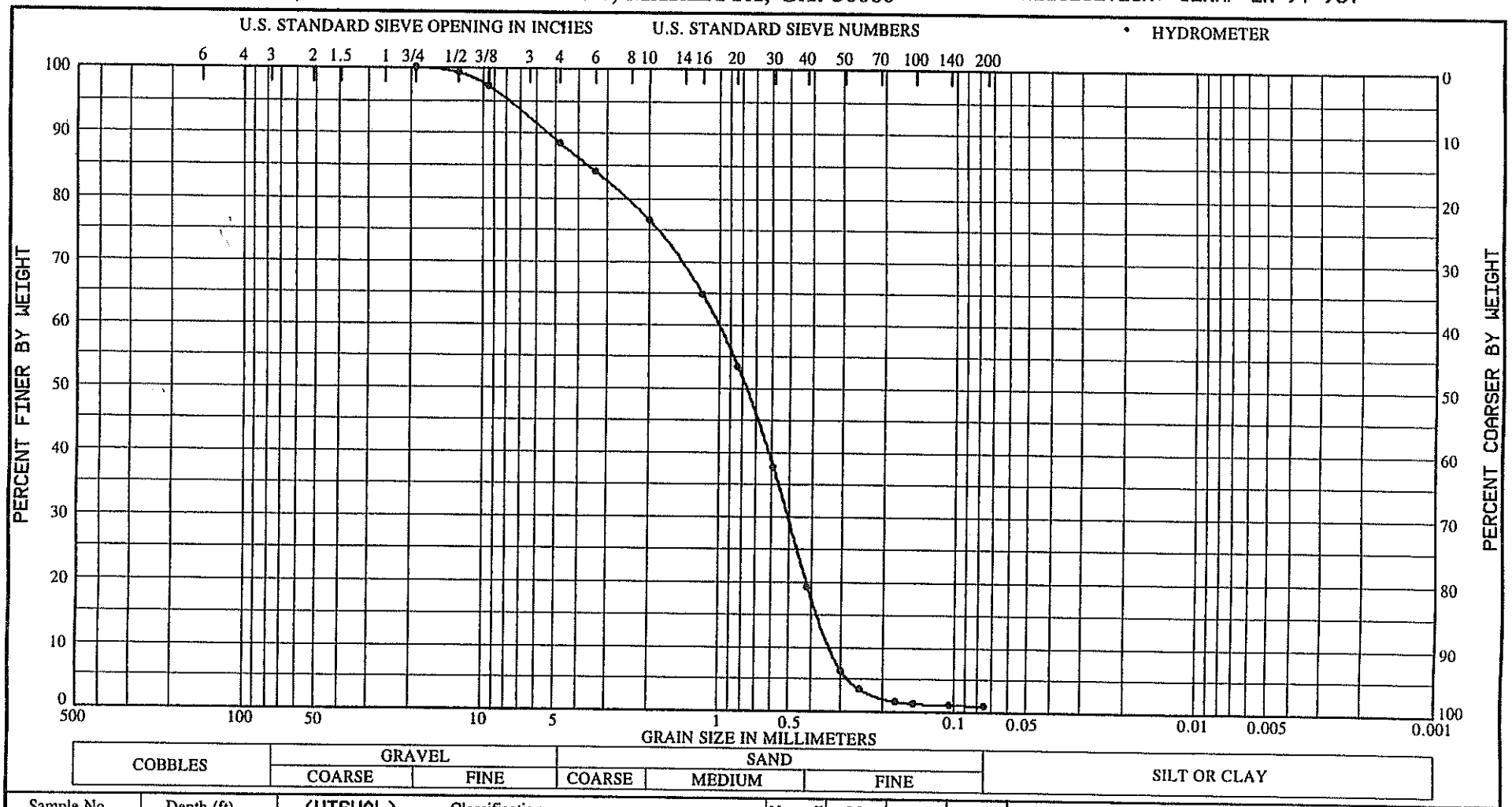
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.4 - 1.7	GRAY & TAN, POORLY GRADED SILTY SAND				
		(SP-SM), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1343
Hole No. DRV-44
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	14.0 - 14.6	TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1344
Hole No. DRV-45
Date 12/04/97

GRADATION CURVES

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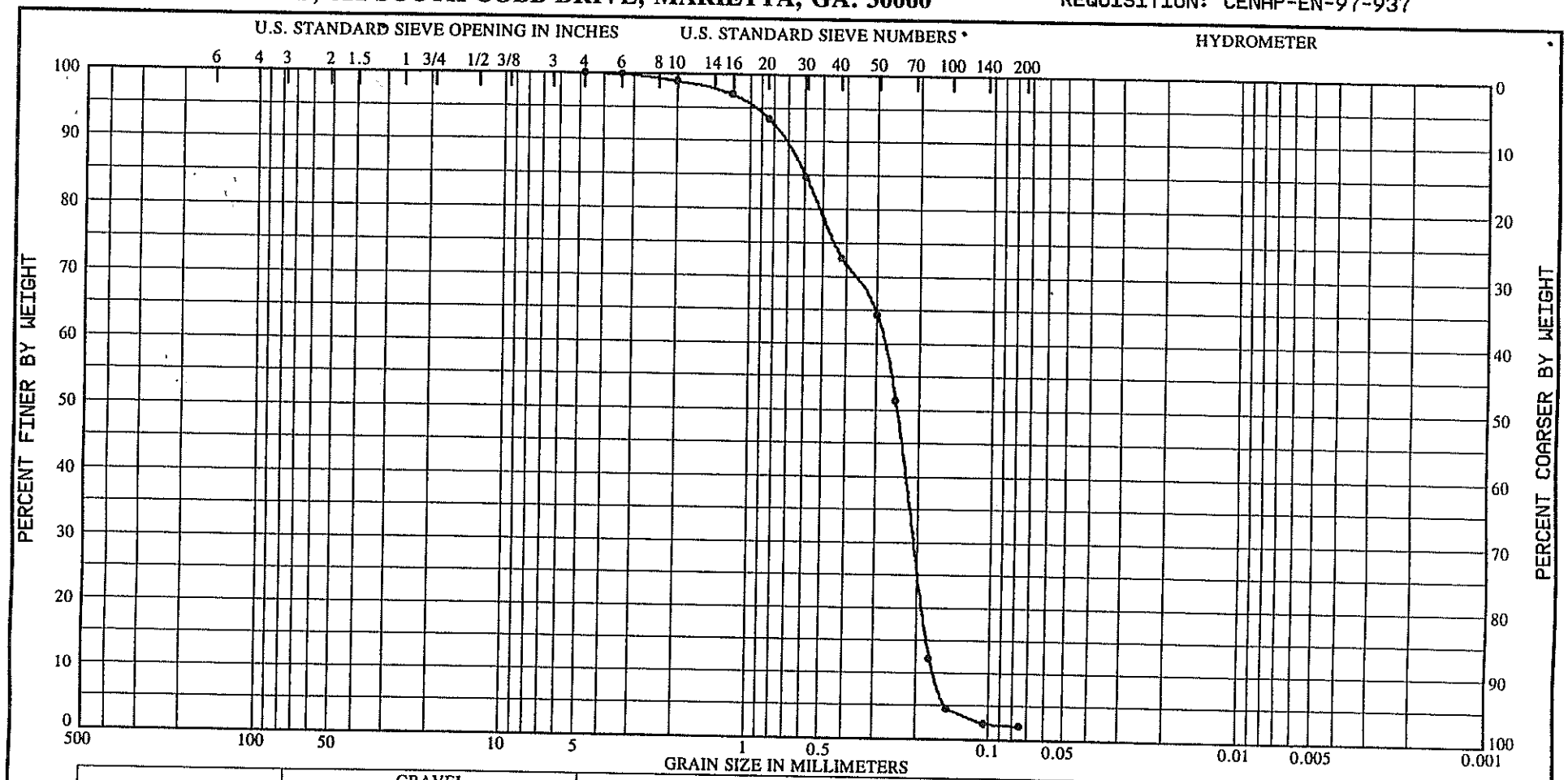
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

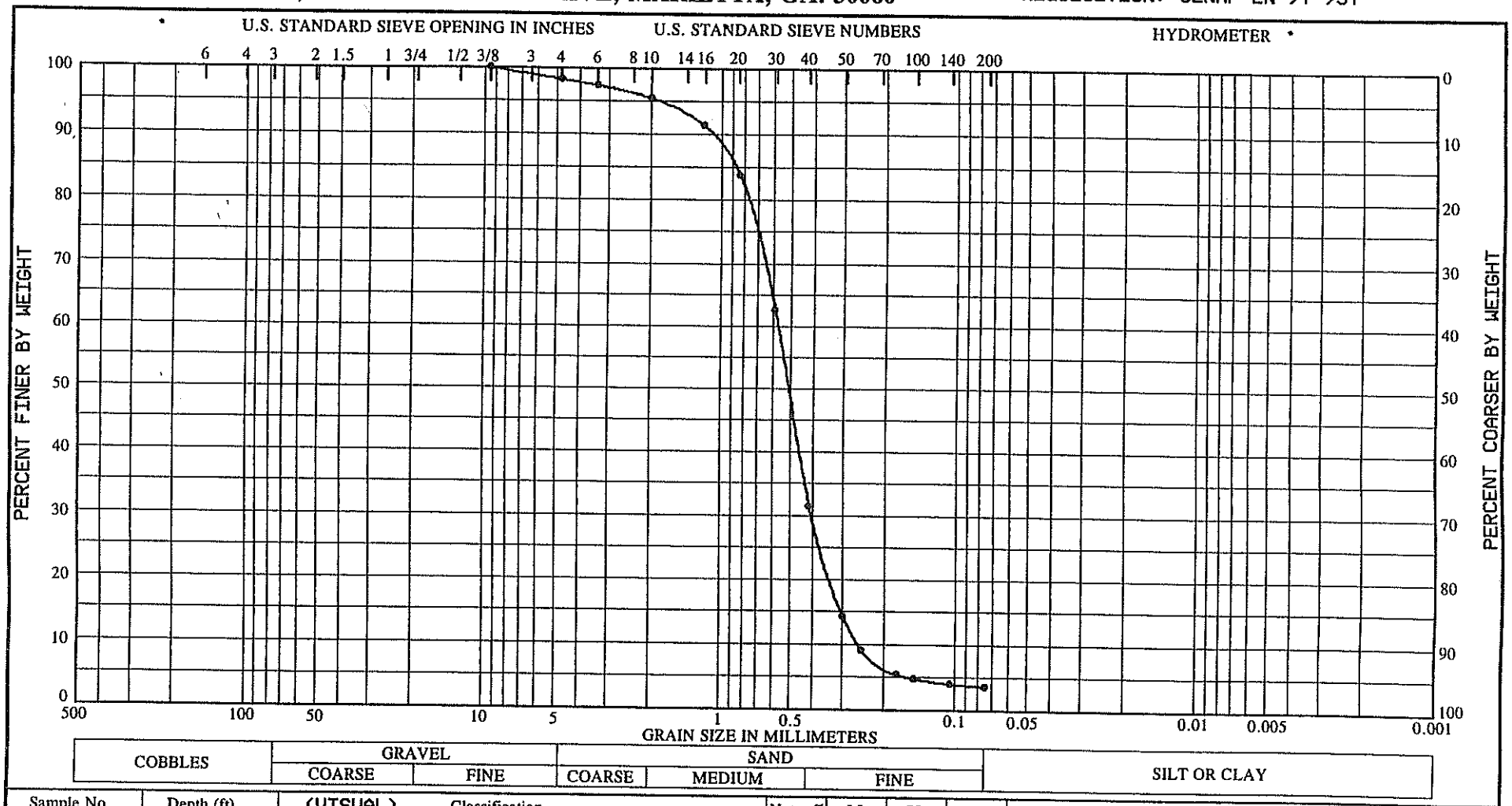
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	8.6 - 8.9	TAN & GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1344
Hole No. DRV-45
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	3.1 - 3.4	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1344
Hole No. DRV-45
Date 12/04/97

GRADATION CURVES

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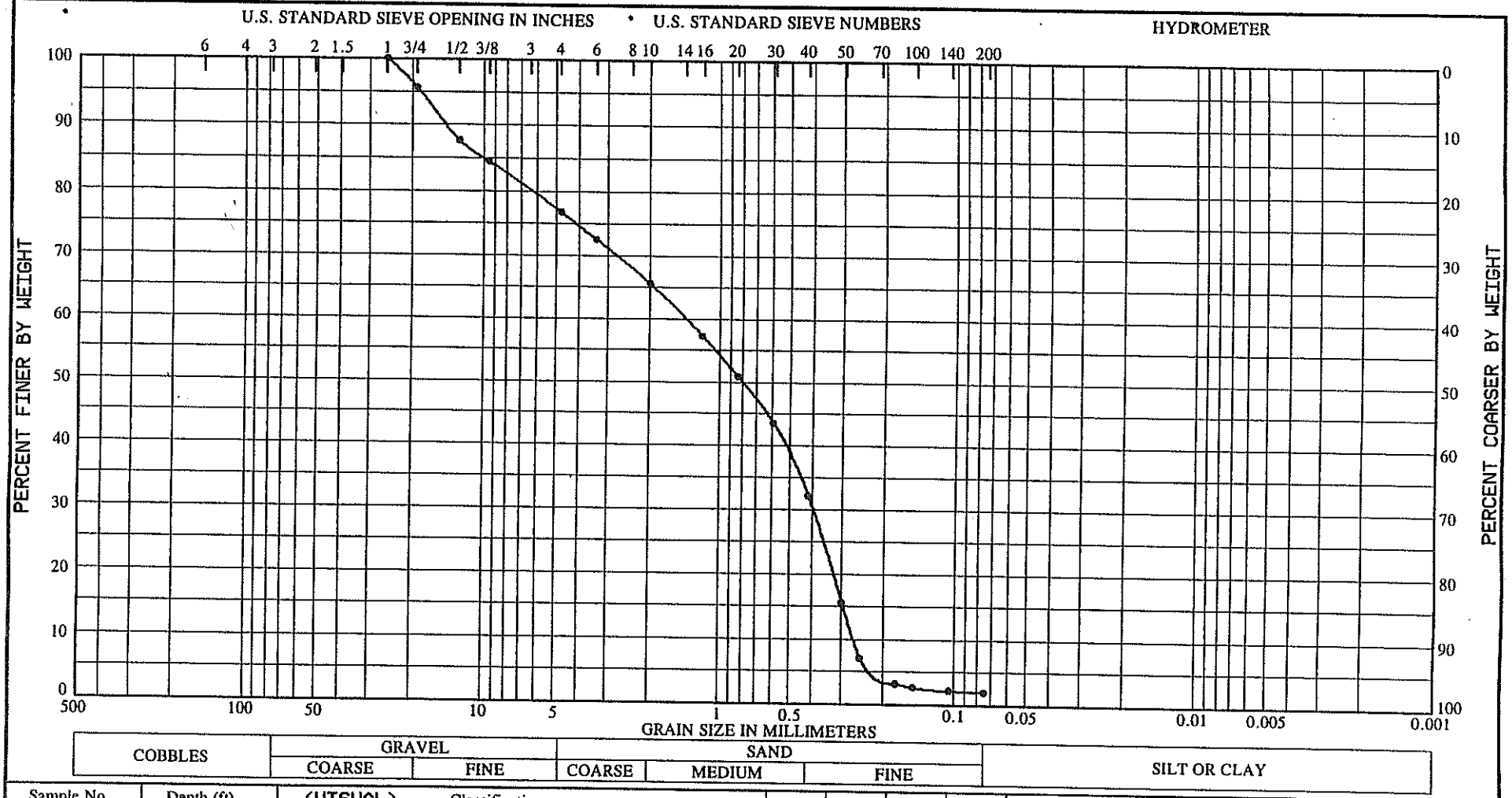
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	11.6 - 12.1	TAN & GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1345
Hole No. DRV-46 REACH 1
Date 12/04/97

GRADATION CURVES

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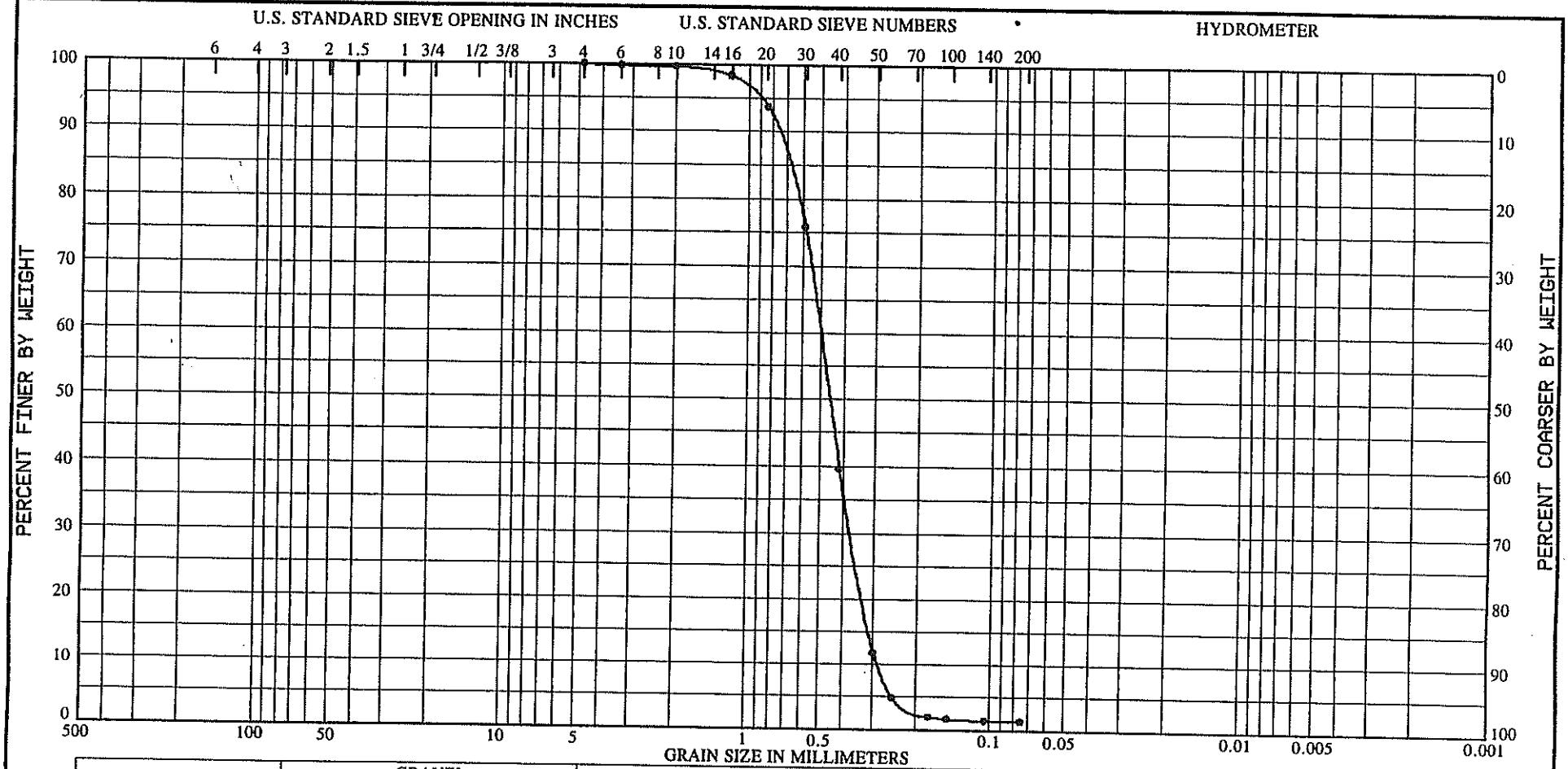
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

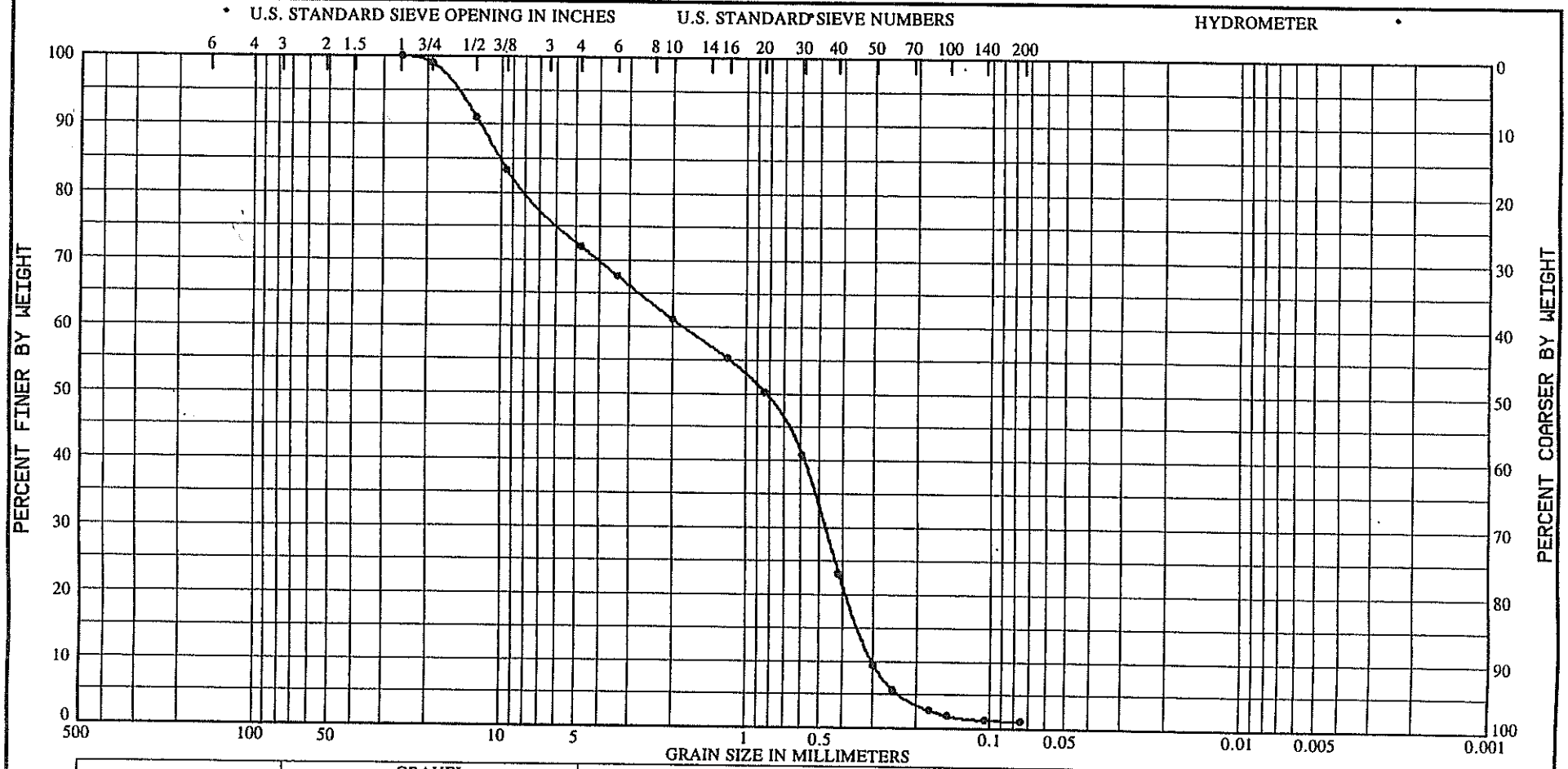
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	7.1 - 7.4	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1345
Hole No. DRV-46 REACH 1
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.7 - 3.3	TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1345
Hole No. DRV-46 REACH 1
Date 12/04/97

GRADATION CURVES

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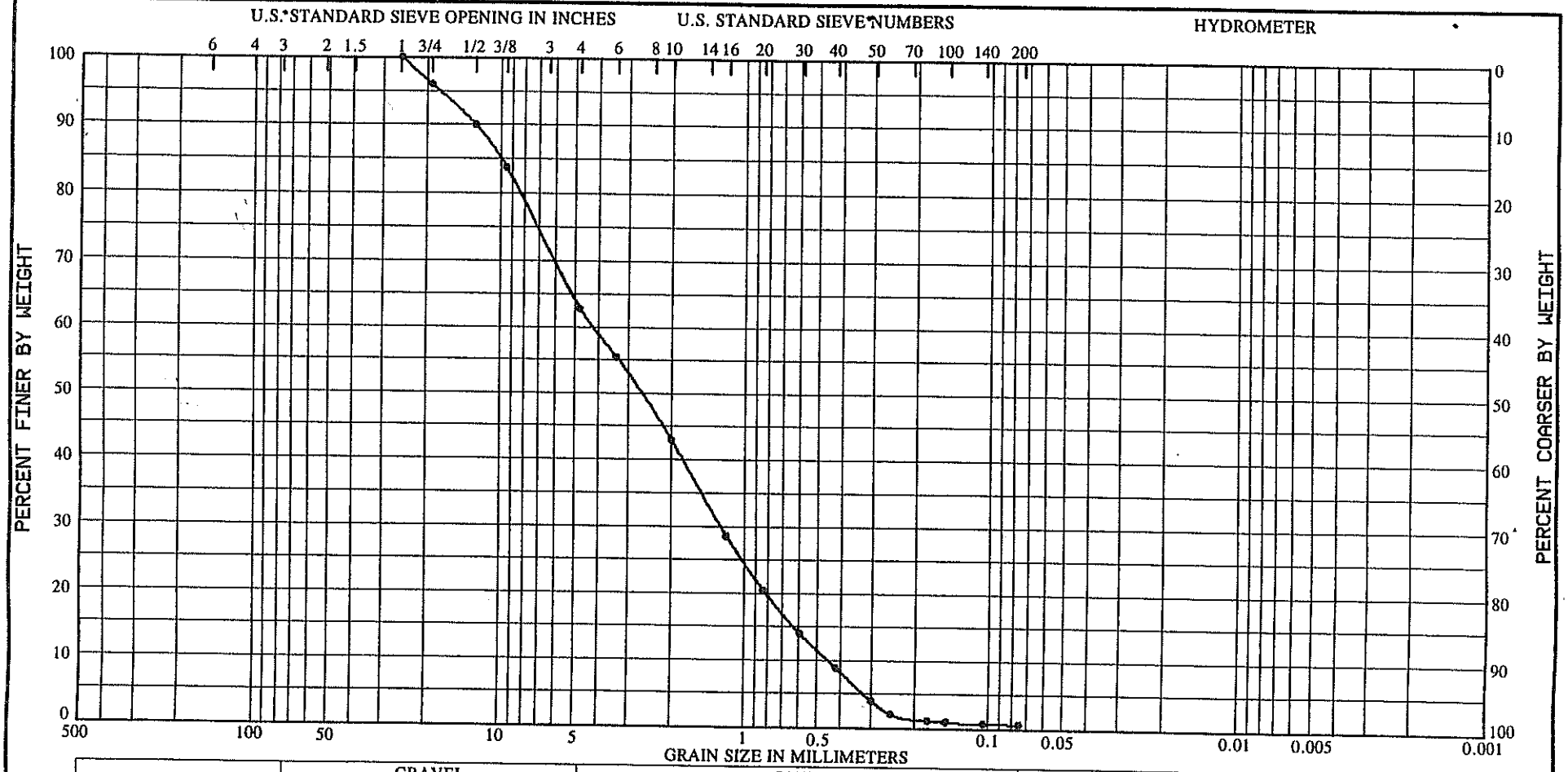
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

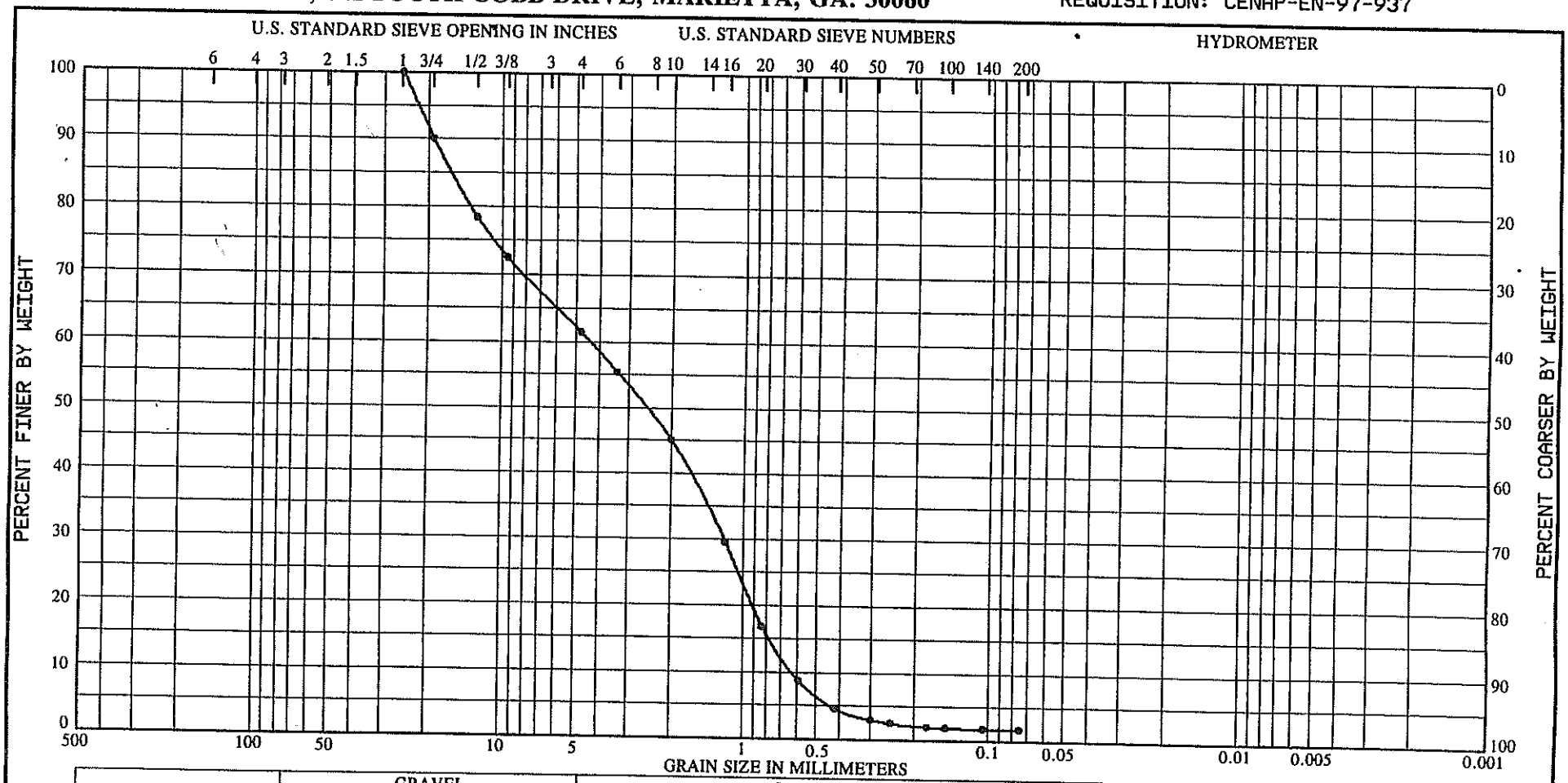
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	14.9 - 15.4	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1345
Hole No. DRV-46 REACH 3
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

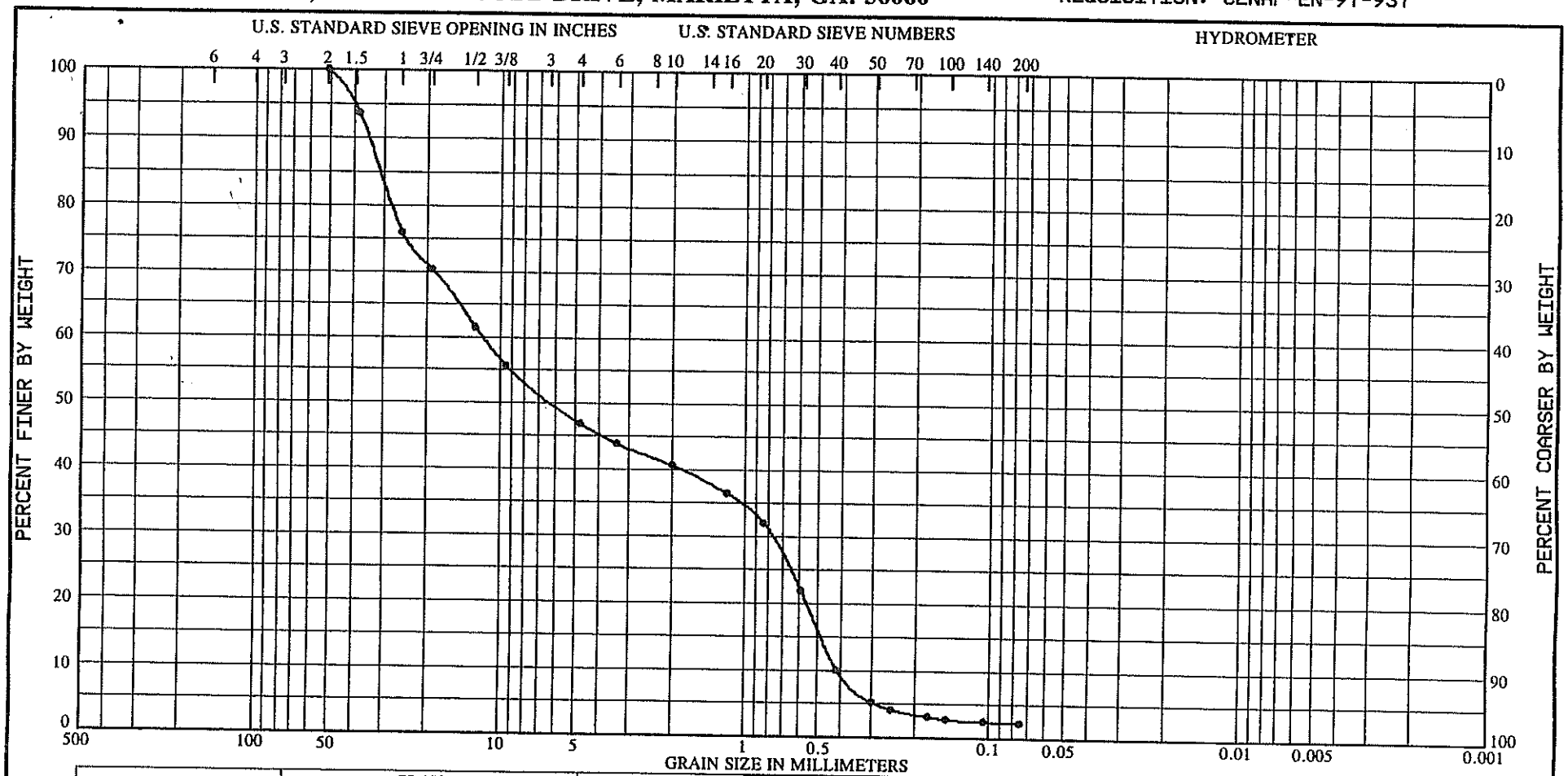
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.8 - 2.3	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1346
Hole No. DRV-47 REACH 1
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

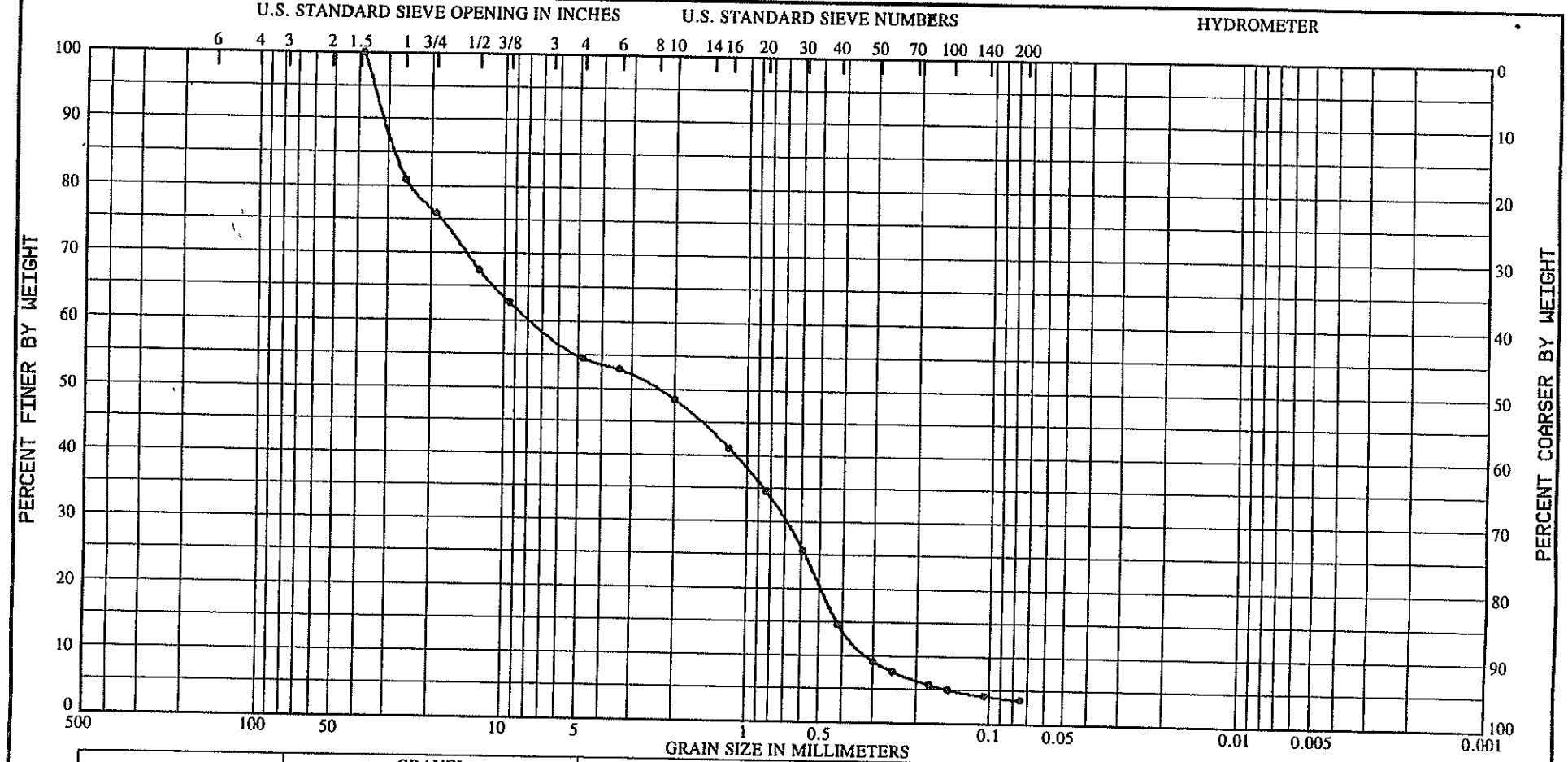
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	7.9 - 8.4	TAN & GRAY, SANDY POORLY GRADED GRAVEL (GP).				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1346
Hole No. DRV-47 REACH 1
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

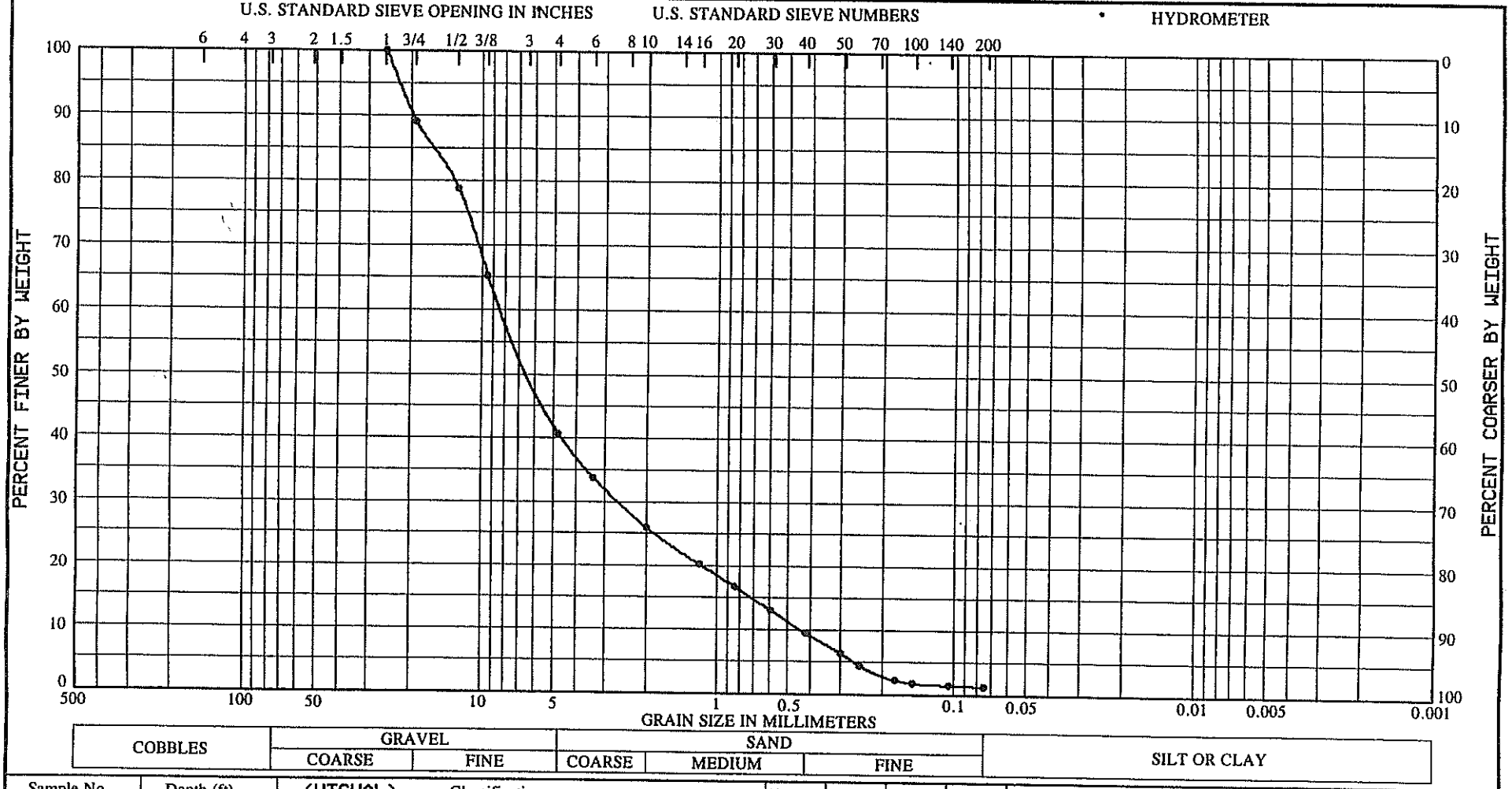
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.9 - 13.5	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1346
Hole No. DRV-47 REACH 1
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



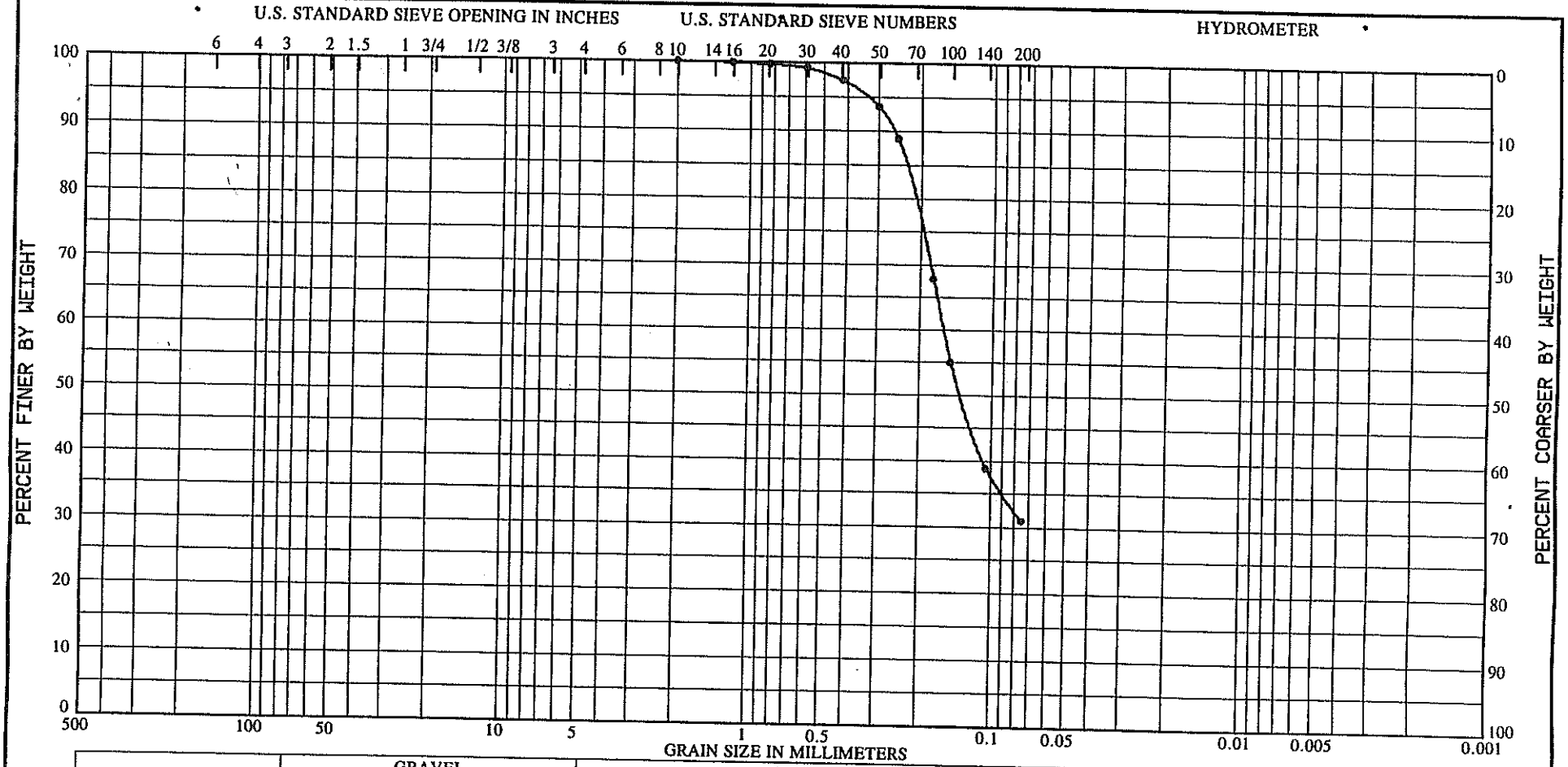
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.2 - 2.6	TAN, SANDY WELL-GRADED GRAVEL (GW), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1346
Hole No. DRV-47 REACH 2
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.8 - 3.0	GRAY, SILTY SAND (SM), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1347
Hole No. DRV-48
Date 12/04/97

GRADATION CURVES

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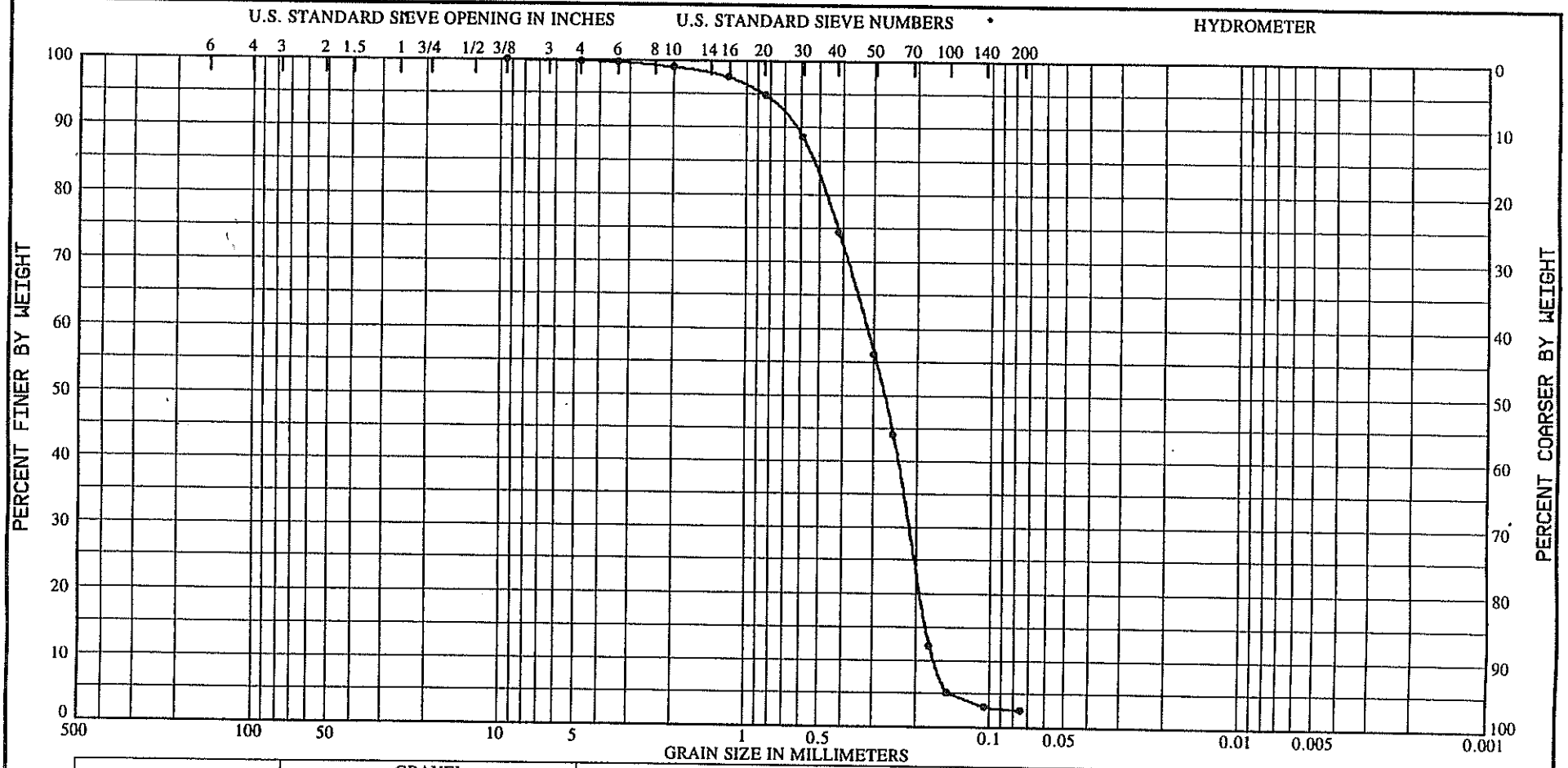
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

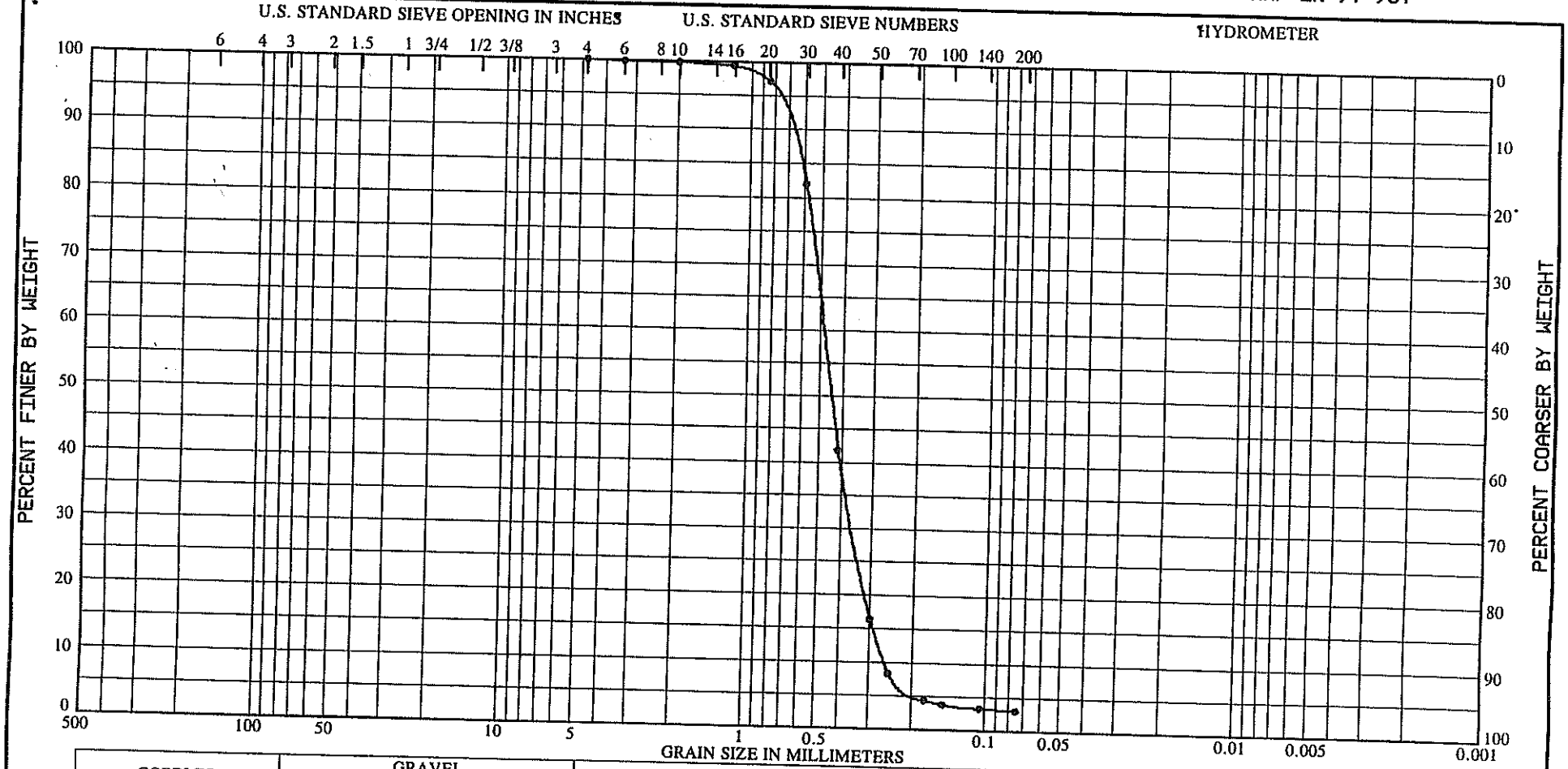
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	7.6 - 7.9	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1347
Hole No. DRV-48
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	13.4 - 13.8	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1347
Hole No. DRV-48
Date 12/04/97

GRADATION CURVES

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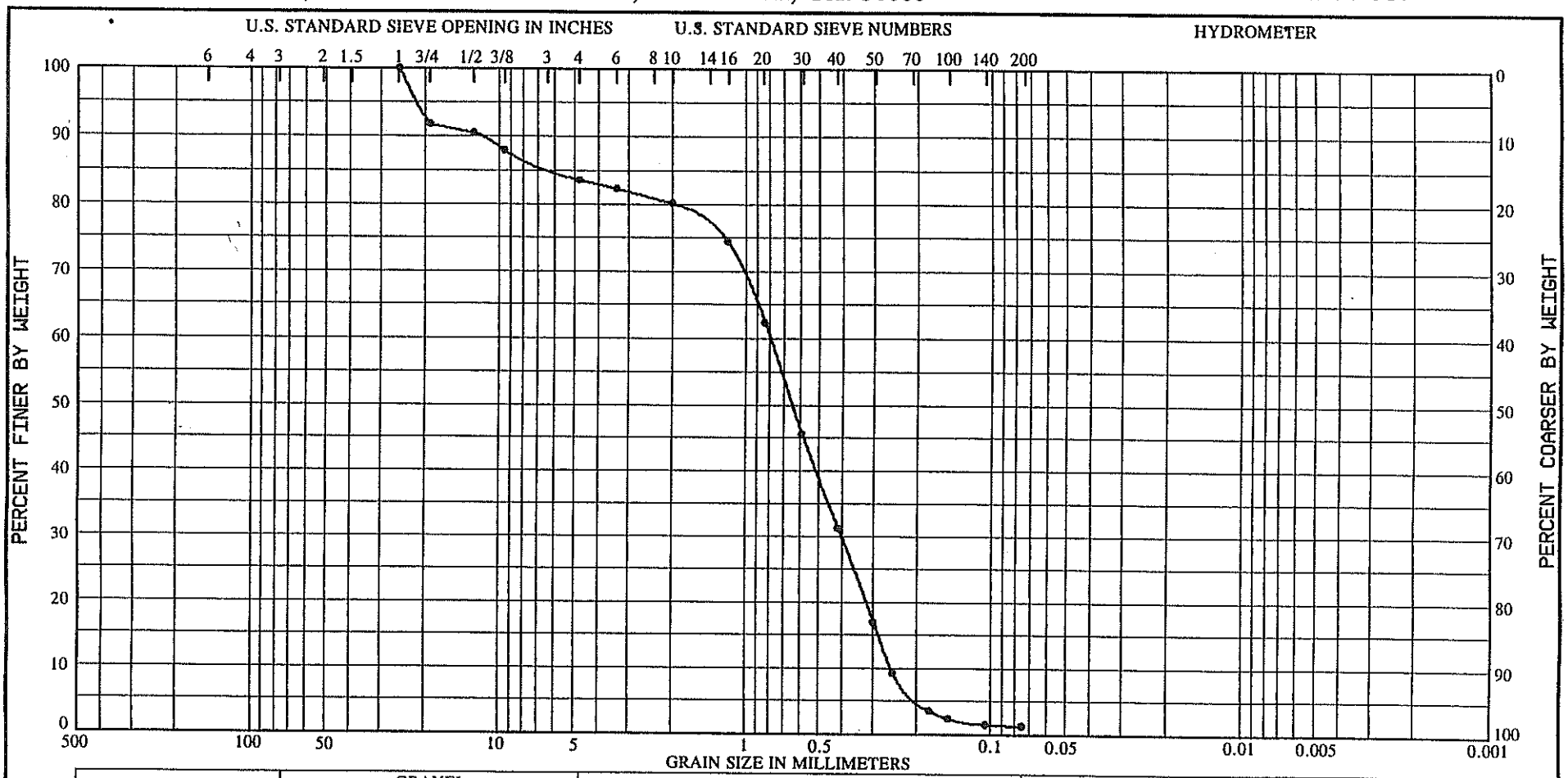
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



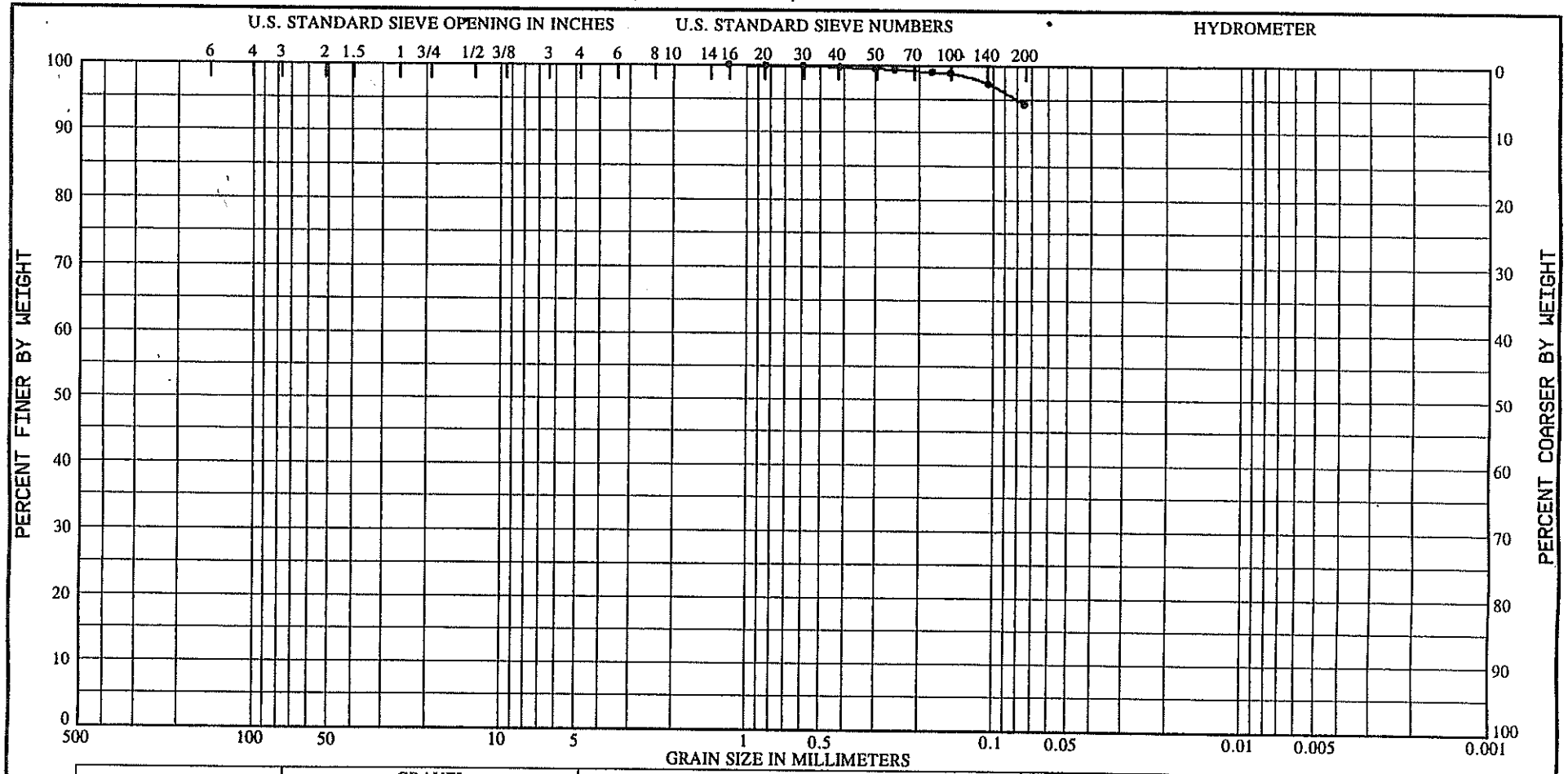
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.9 - 17.4	TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1347
Hole No. DRV-48
Date 12/05/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.0 - 2.3	GRAY, MICACEOUS SILTY FAT CLAY (CH), WITH A TRACE OF SAND SIZES AND ORGANIC MATTER.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1348
Hole No. DRV-49
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GRADATION CURVES

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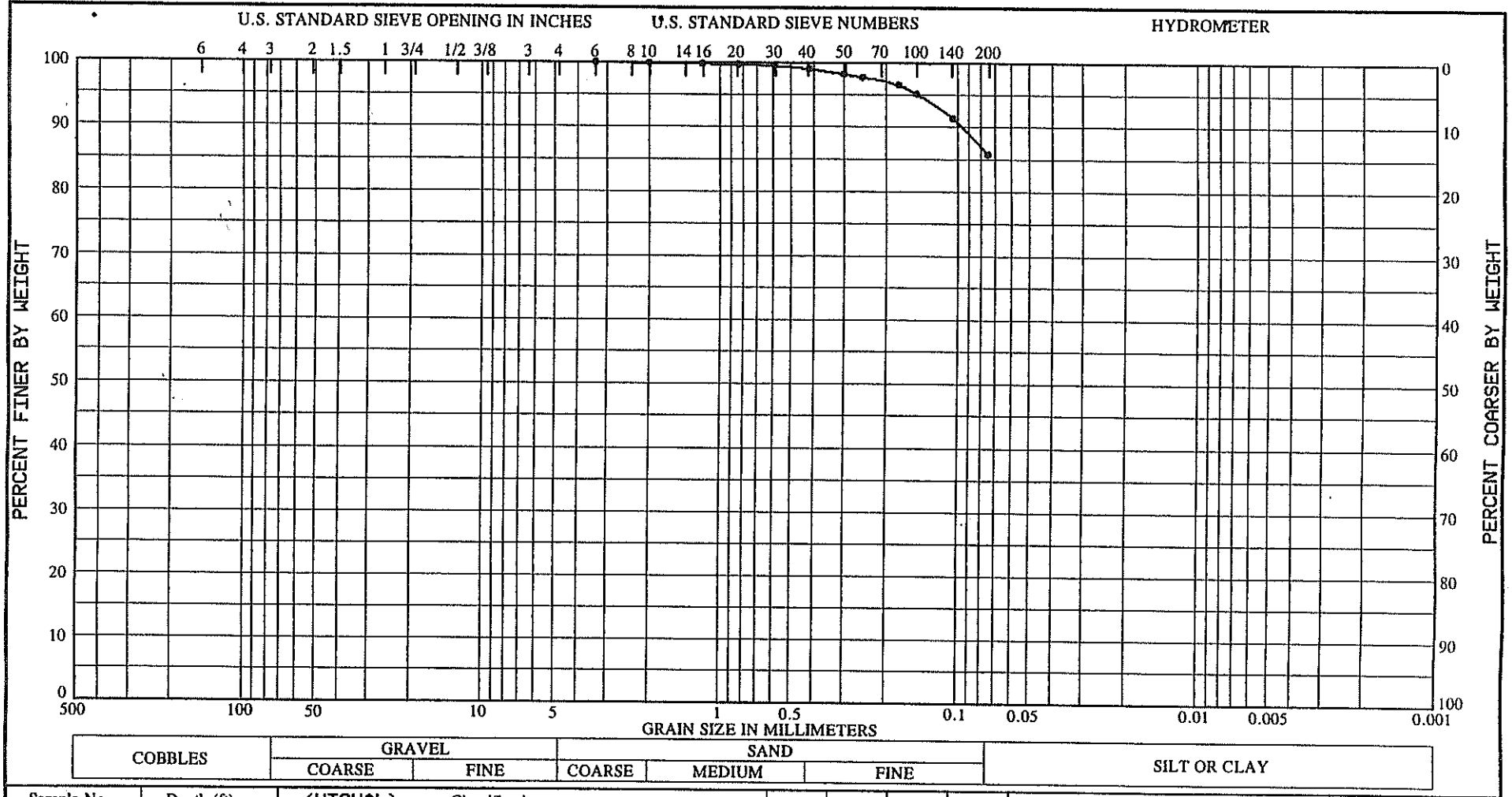
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	7.0 - 7.3	GRAY, MICACEOUS FAT CLAY (CH), WITH A LITTLE SAND SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1348
Hole No. DRV-49
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
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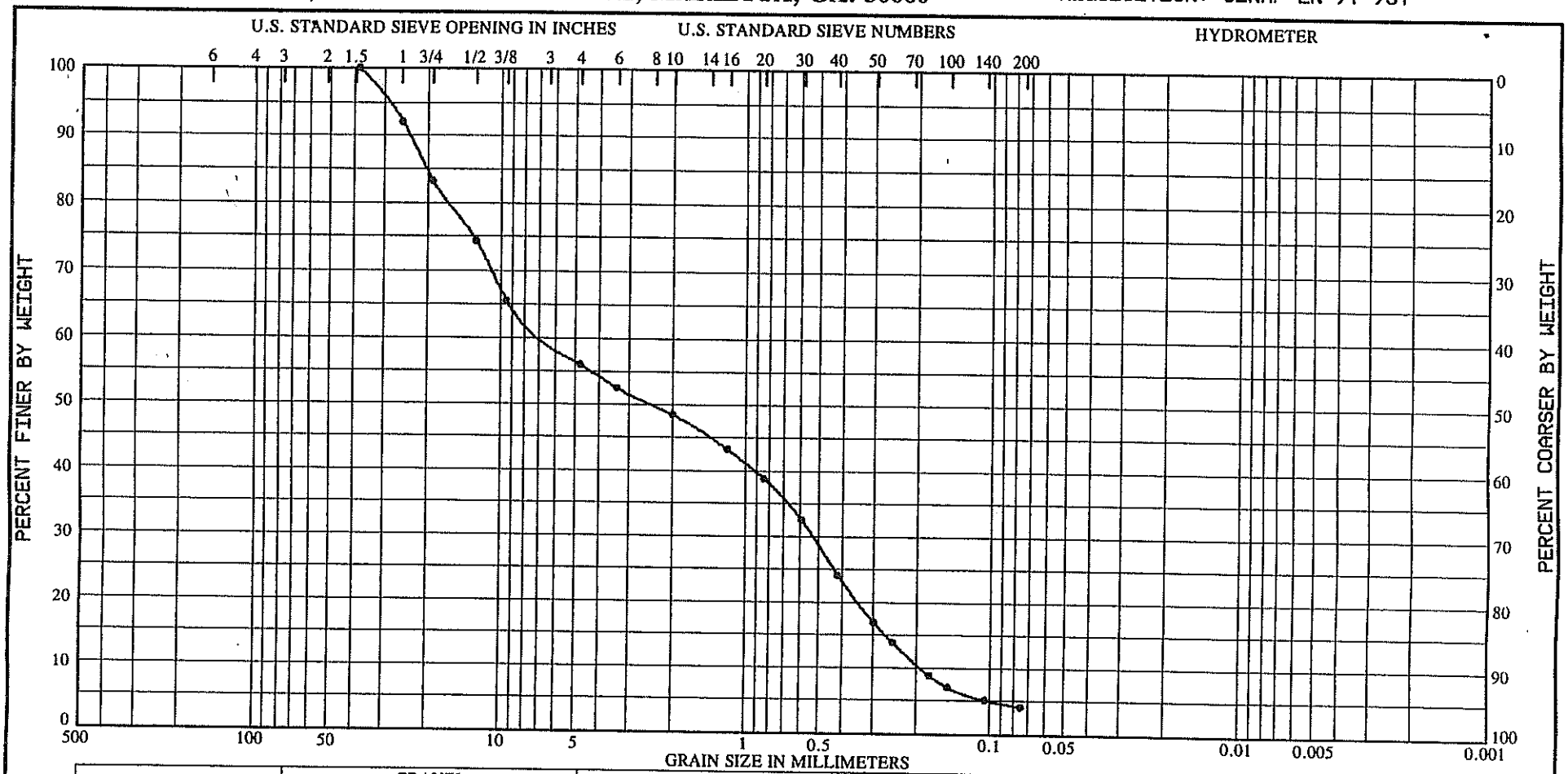

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.5 - 13.0	GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1348
Hole No. DRV-49
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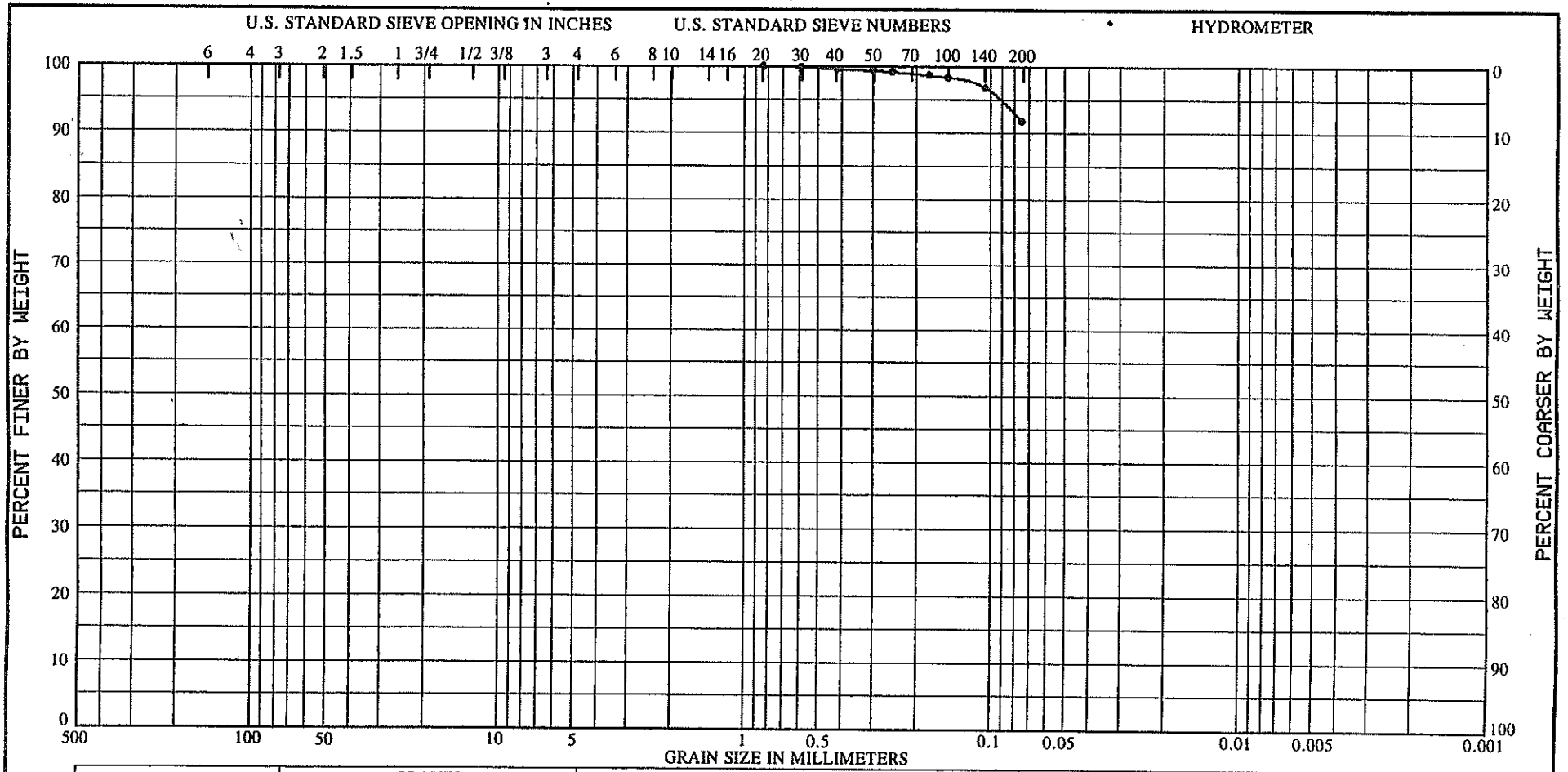
GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



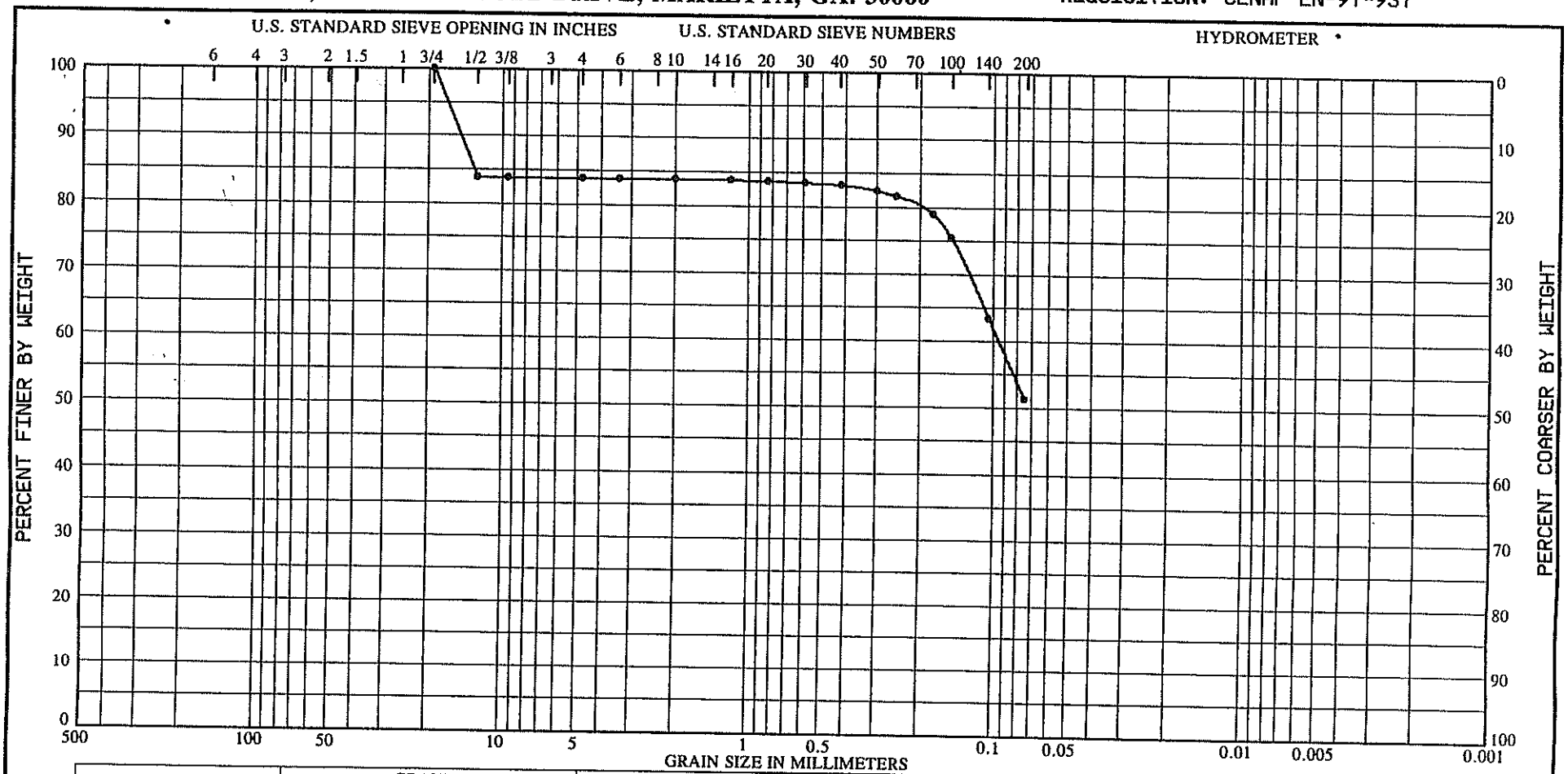
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	17.4 - 17.7	GRAY, MICACEOUS FAT CLAY (CH), WITH A TRACE OF SAND SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1348
Hole No. DRV-49
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

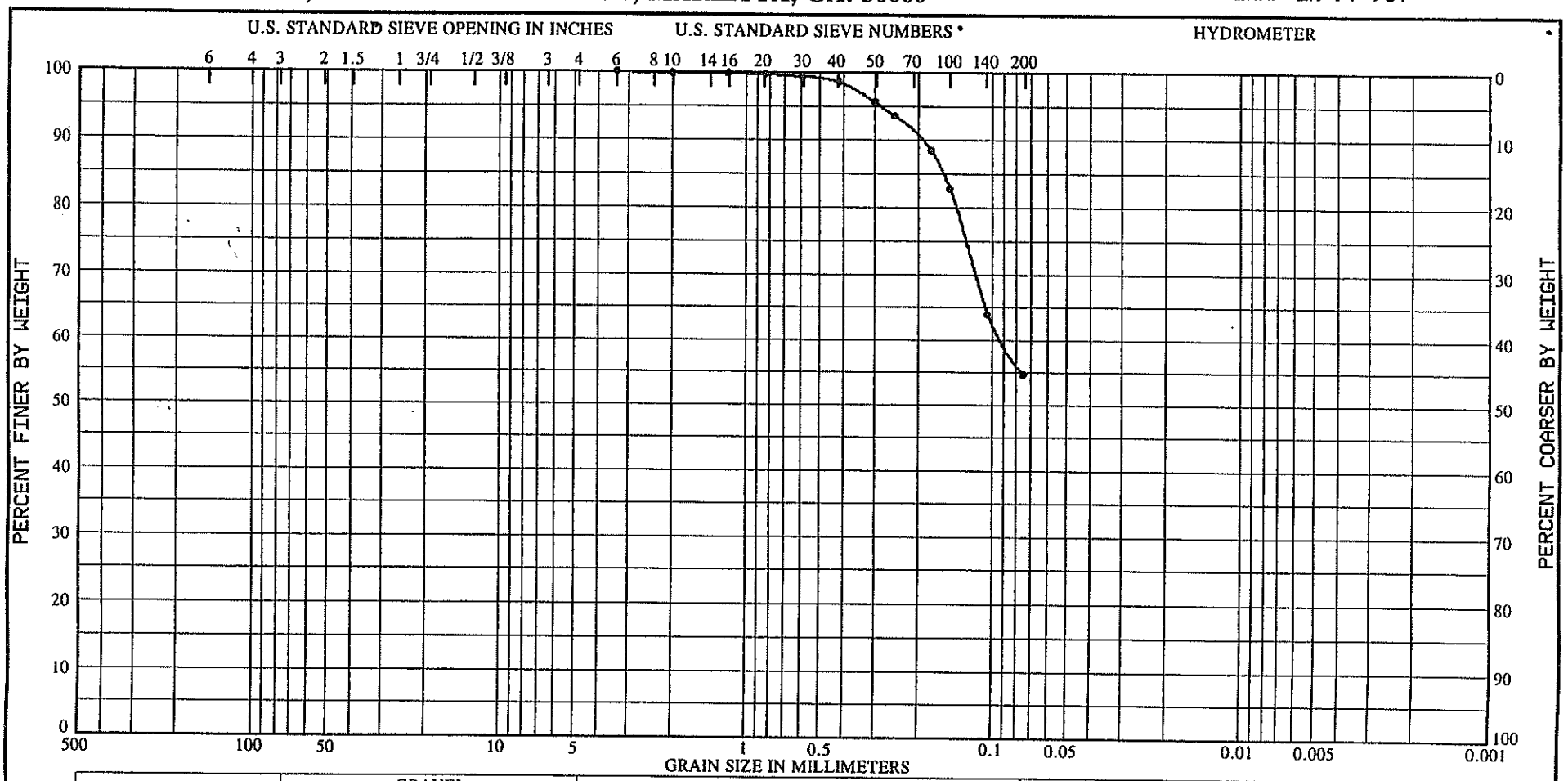
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.7 - 3.0	DARK GRAY, MICACEOUS SILTY LEAN CLAY (CL), WITH A LITTLE GRAVEL SIZES, AND SOME SAND SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1349
Hole No. DRV-50
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	8.0 - 8.3	DARK GRAY, SANDY SILTY LEAN CLAY (CL),				
		WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1349
Hole No. DRV-50
Date 12/04/97

GRADATION CURVES

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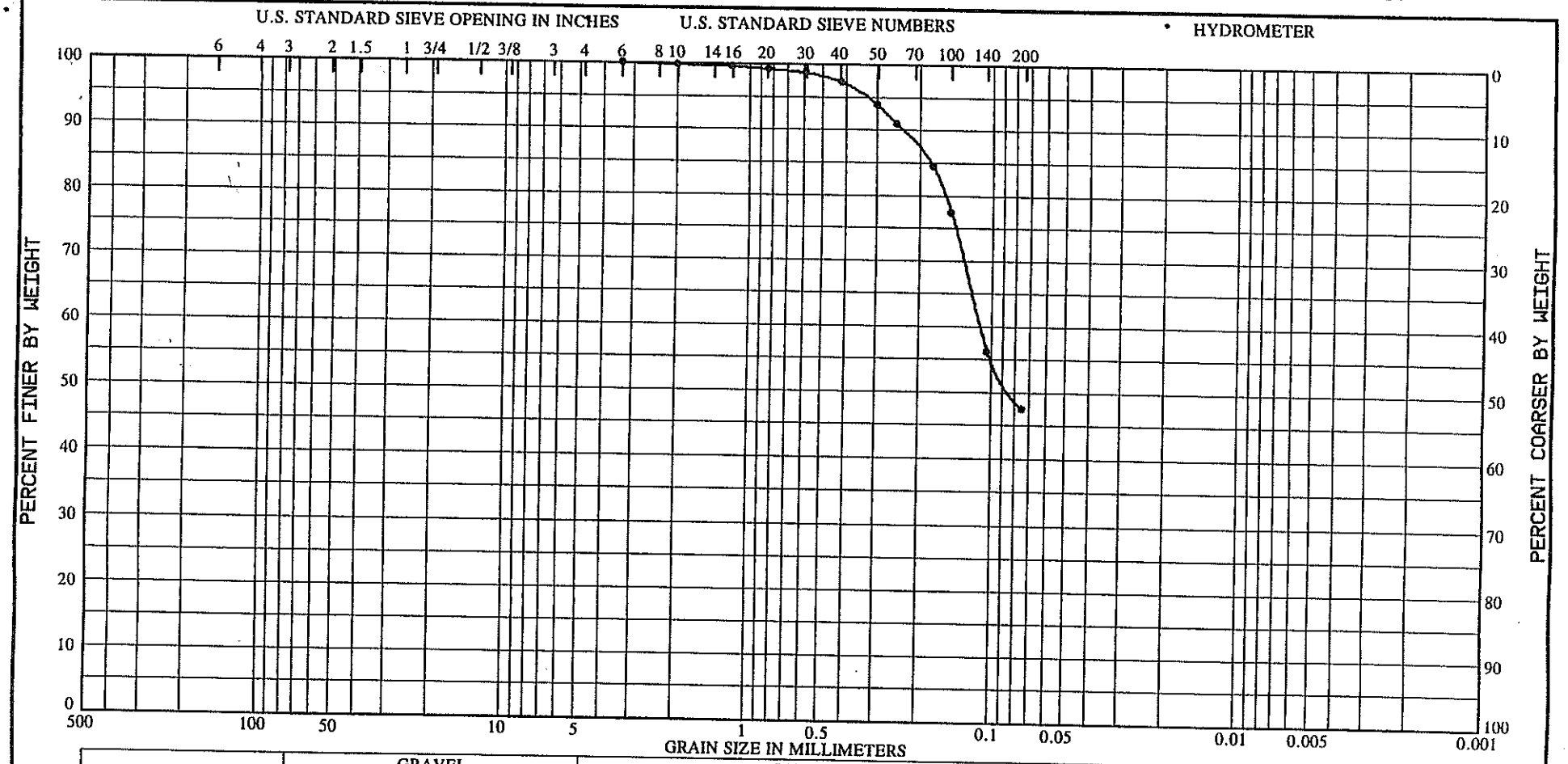
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

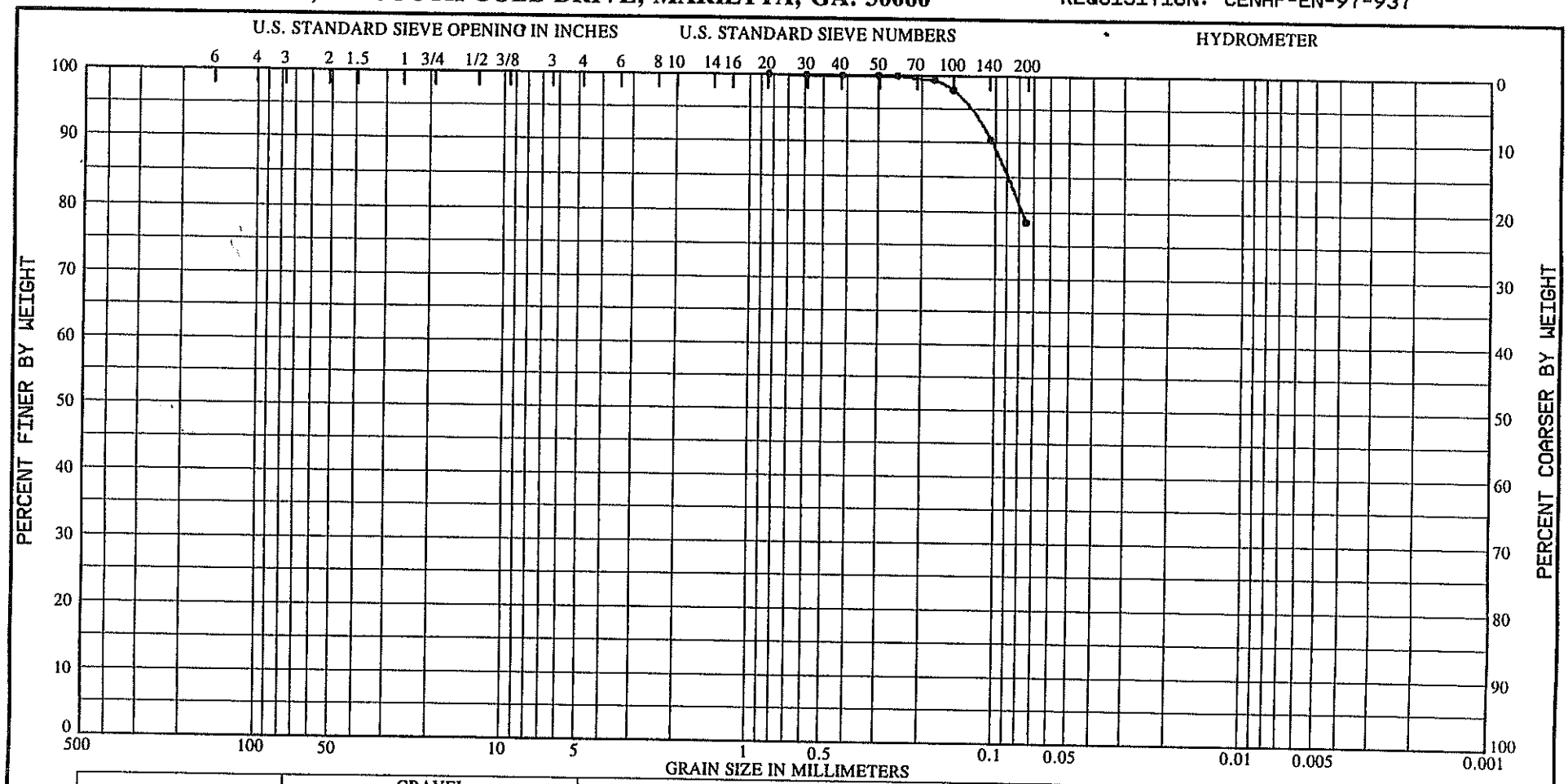
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	13.1 - 13.4	DARK GRAY, SILTY CLAYEY SAND (SC), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1349
Hole No. DRV-50
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	19.0 - 19.3	GRAY, SILTY FAT CLAY (CH), WITH SOME SAND SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1349
Hole No. DRV-50
Date 12/05/97

GRADATION CURVES

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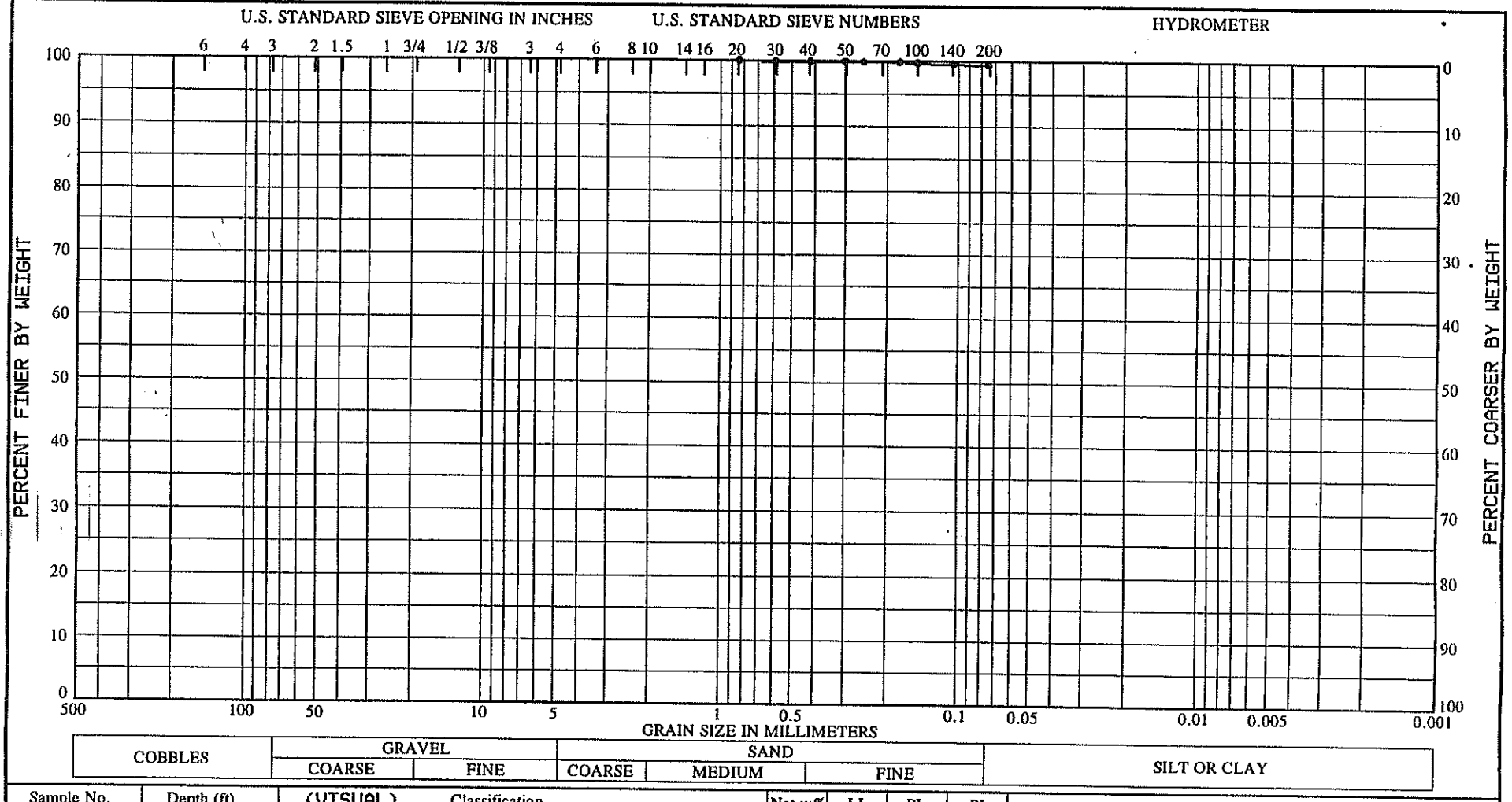
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.5 - 2.8	DARK GRAY, FAT CLAY (CH).				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1350
Hole No. DRV-51
Date 12/05/97

GRADATION CURVES

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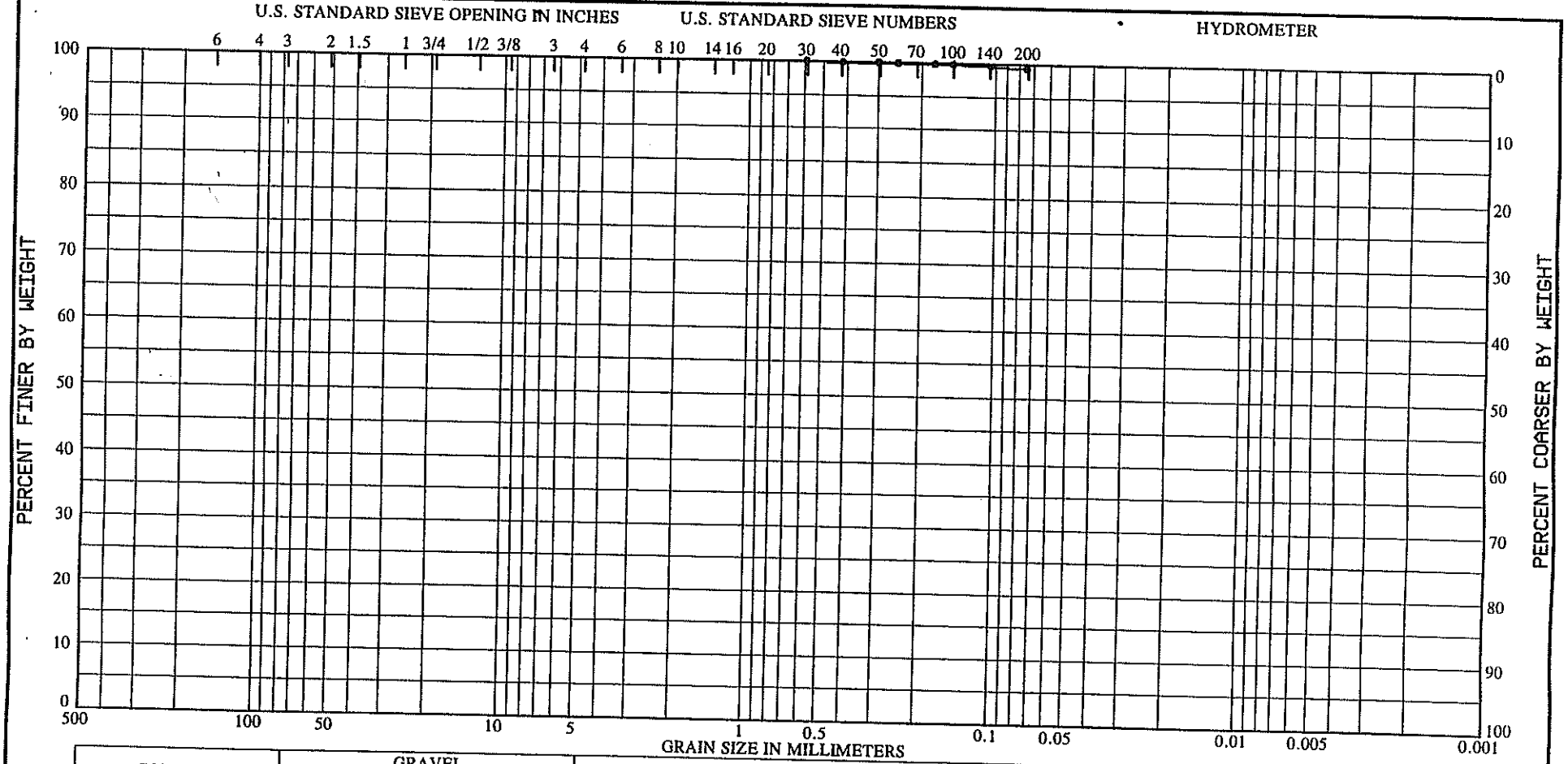
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	8.2 - 8.4	DARK GRAY, FAT CLAY (CH).				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1350
Hole No. DRV-51
Date 12/05/97

GRADATION CURVES

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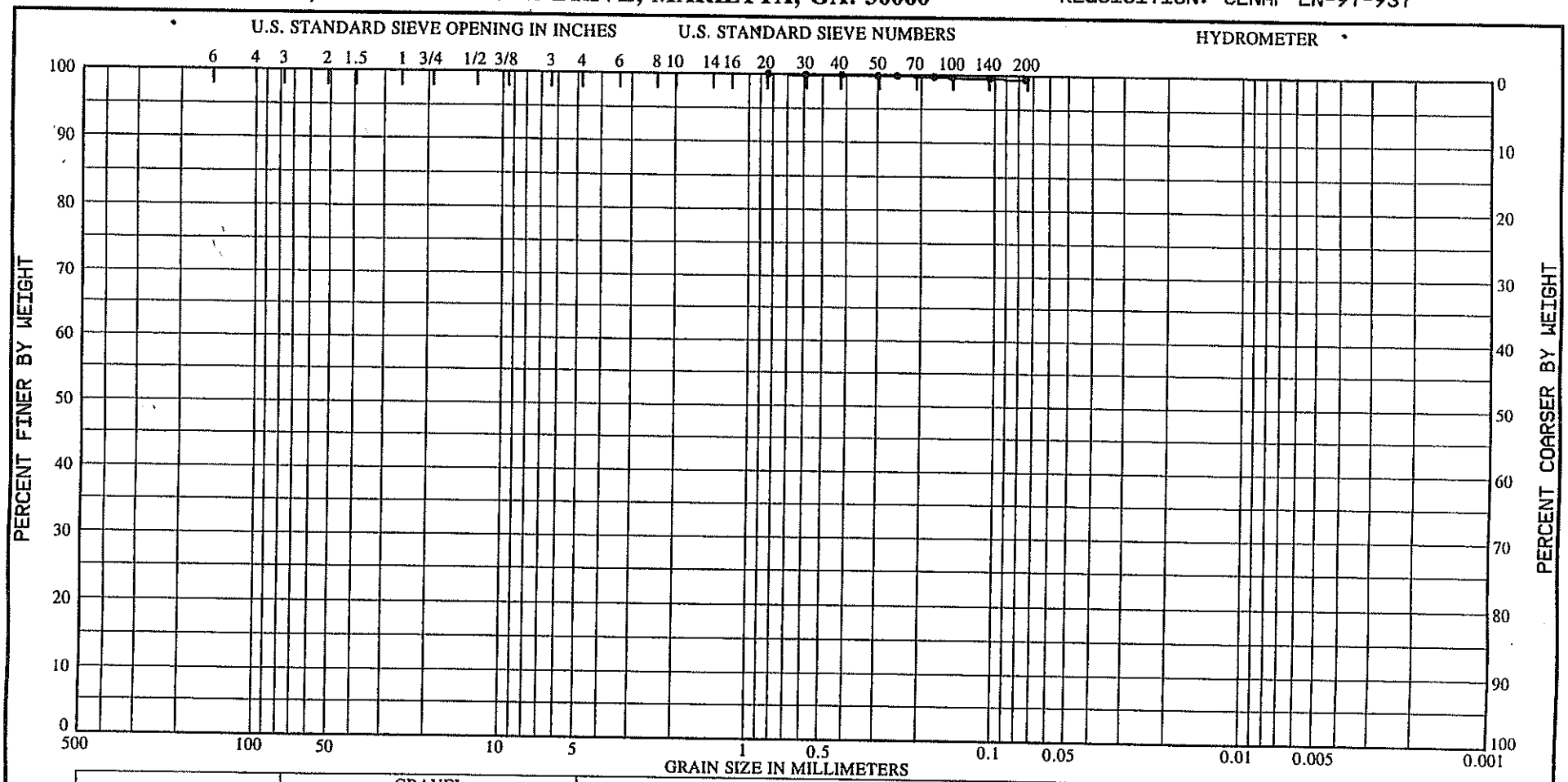
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



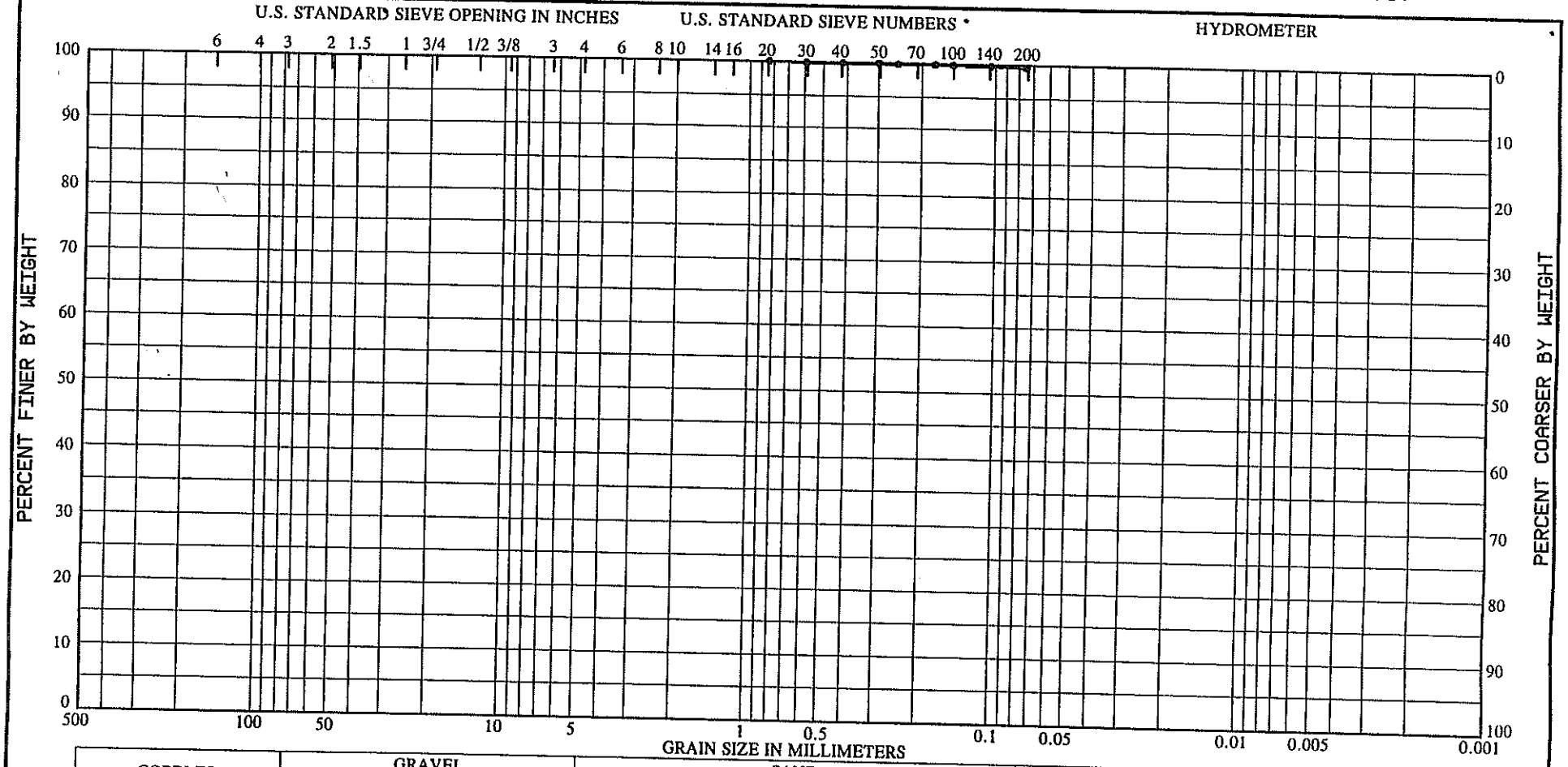
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.9 - 13.2	DARK GRAY, FAT CLAY (CH).				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1350
Hole No. DRV-51
Date 12/05/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

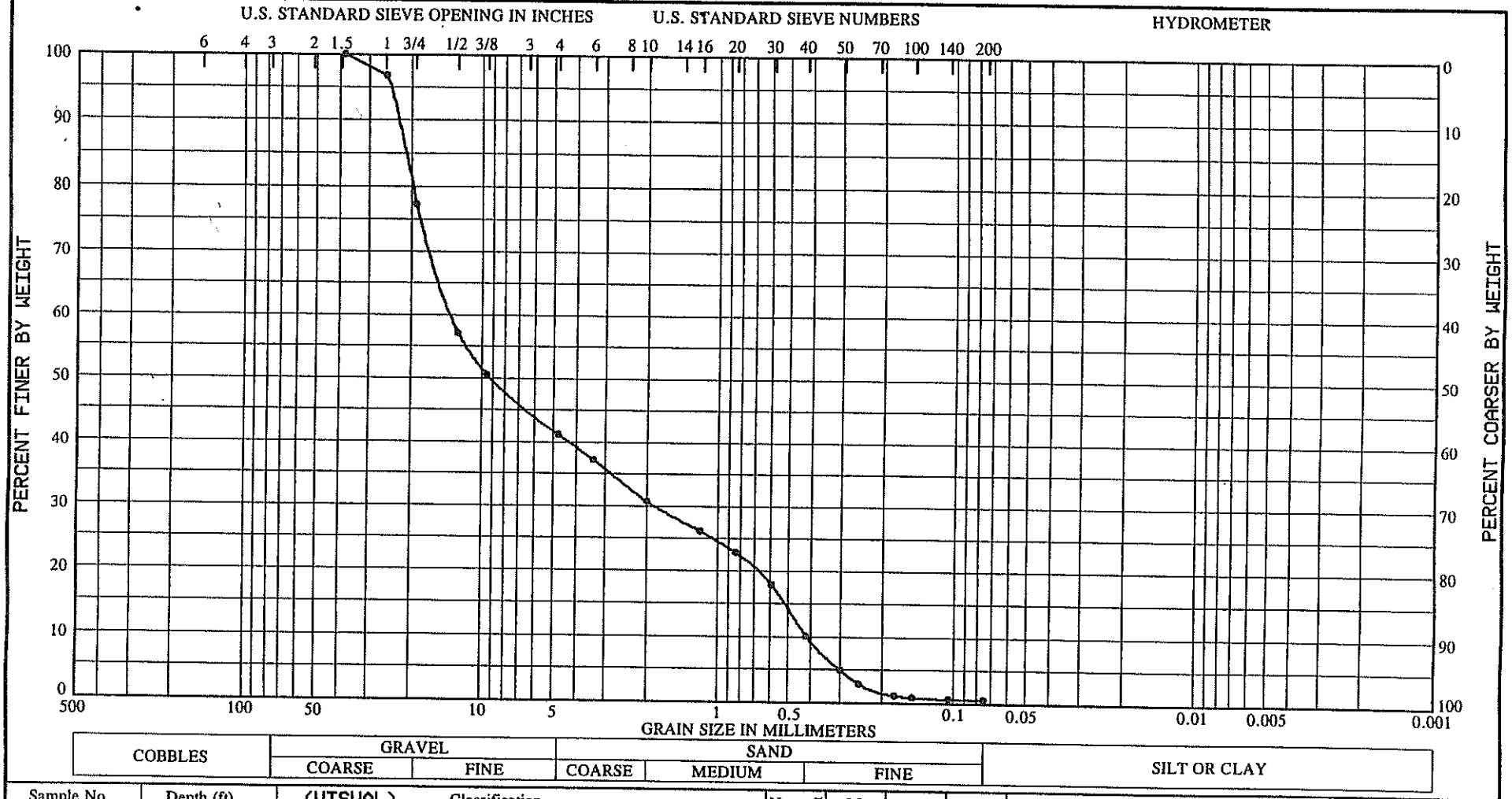
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.7 - 17.0	DARK GRAY, FAT CLAY (CH).				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1350
Hole No. DRV-51
Date 12/05/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

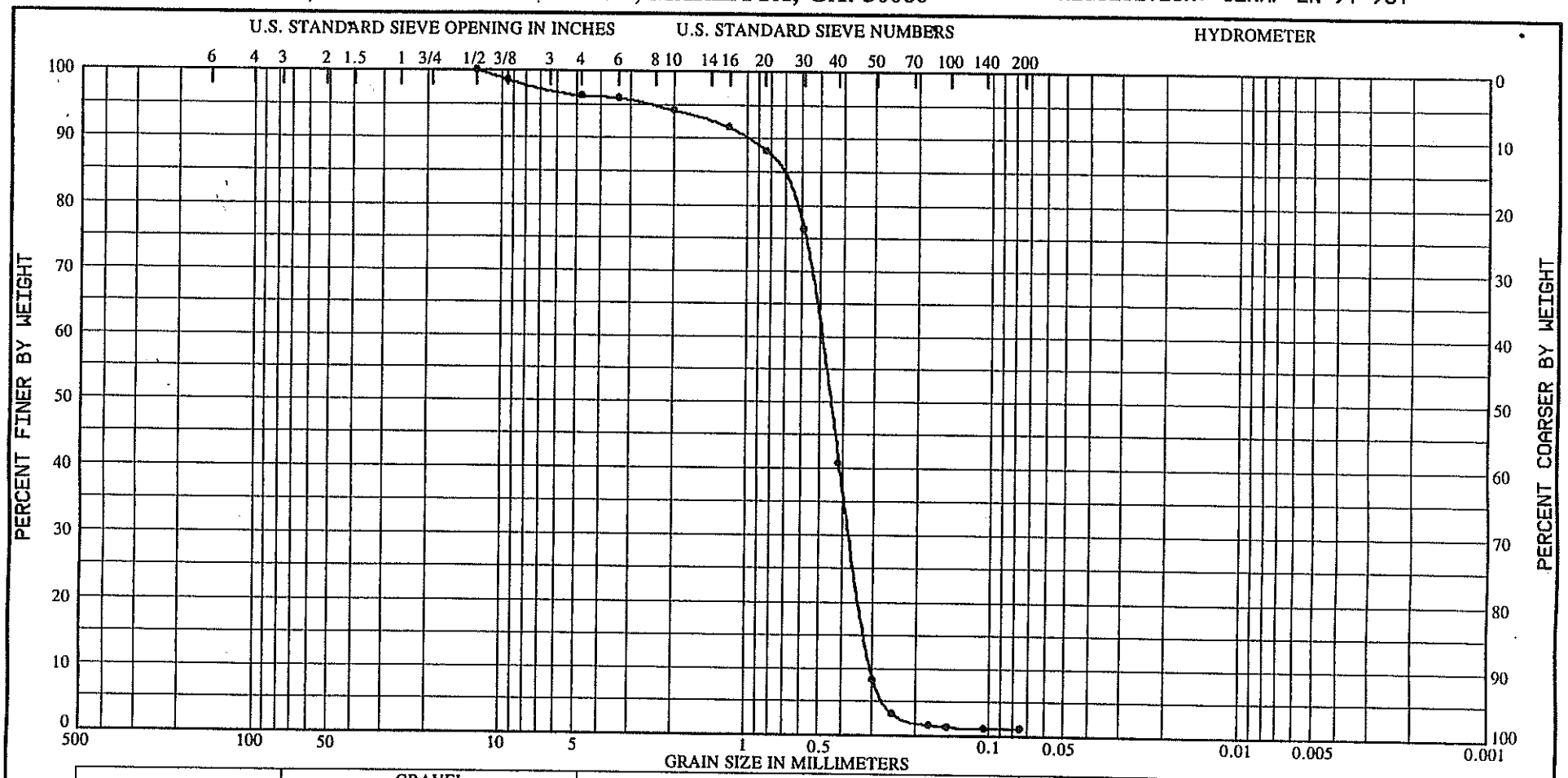
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.6 - 2.3	TAN, SANDY POORLY GRADED GRAVEL (GP),				
		WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1351
Hole No. DRV-52
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	7.9 - 8.2	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1351
Hole No. DRV-52
Date 12/04/97

GRADATION CURVES

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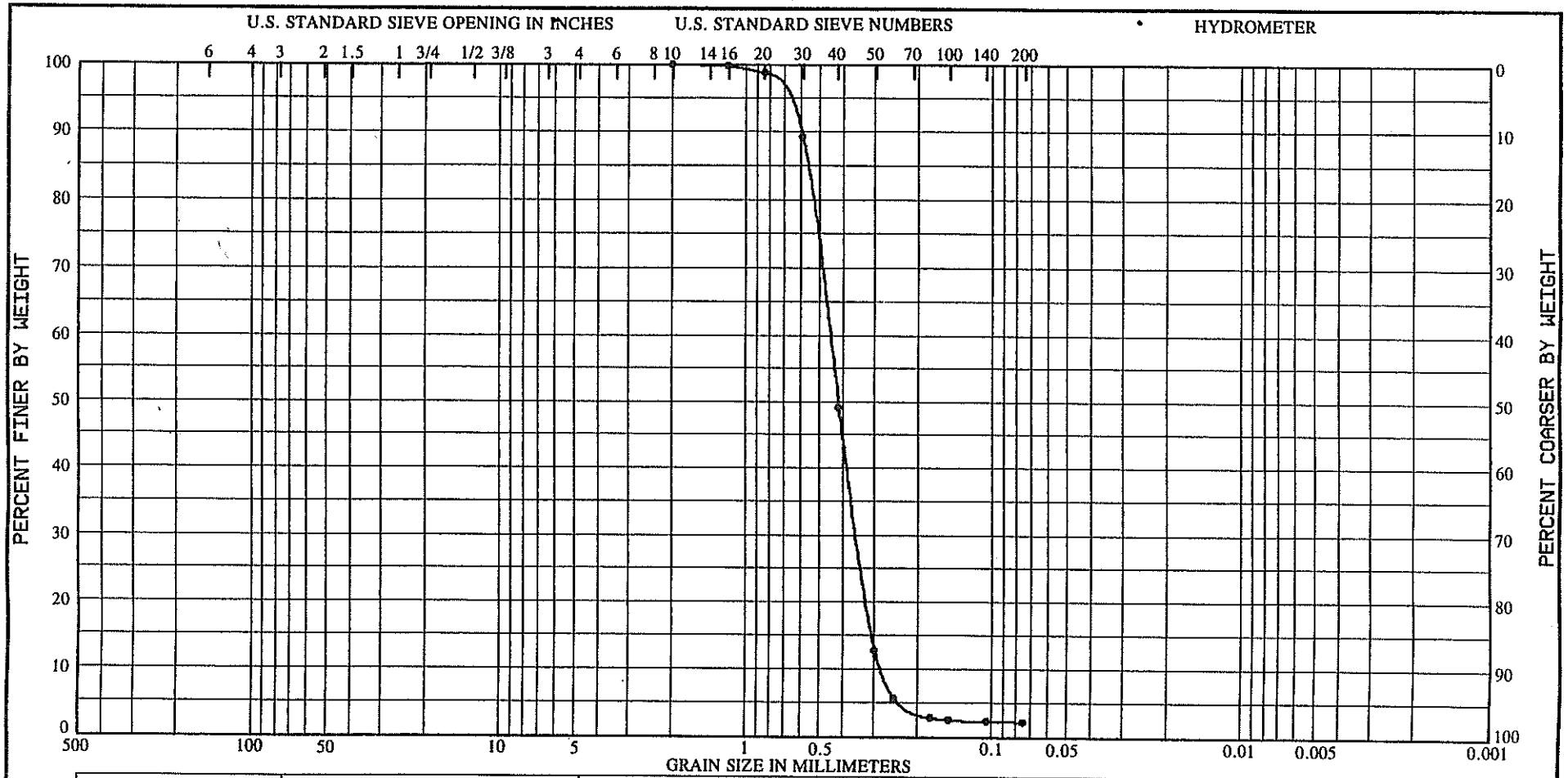
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.8 - 13.1	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1351
Hole No. DRV-52
Date 12/04/97

GRADATION CURVES

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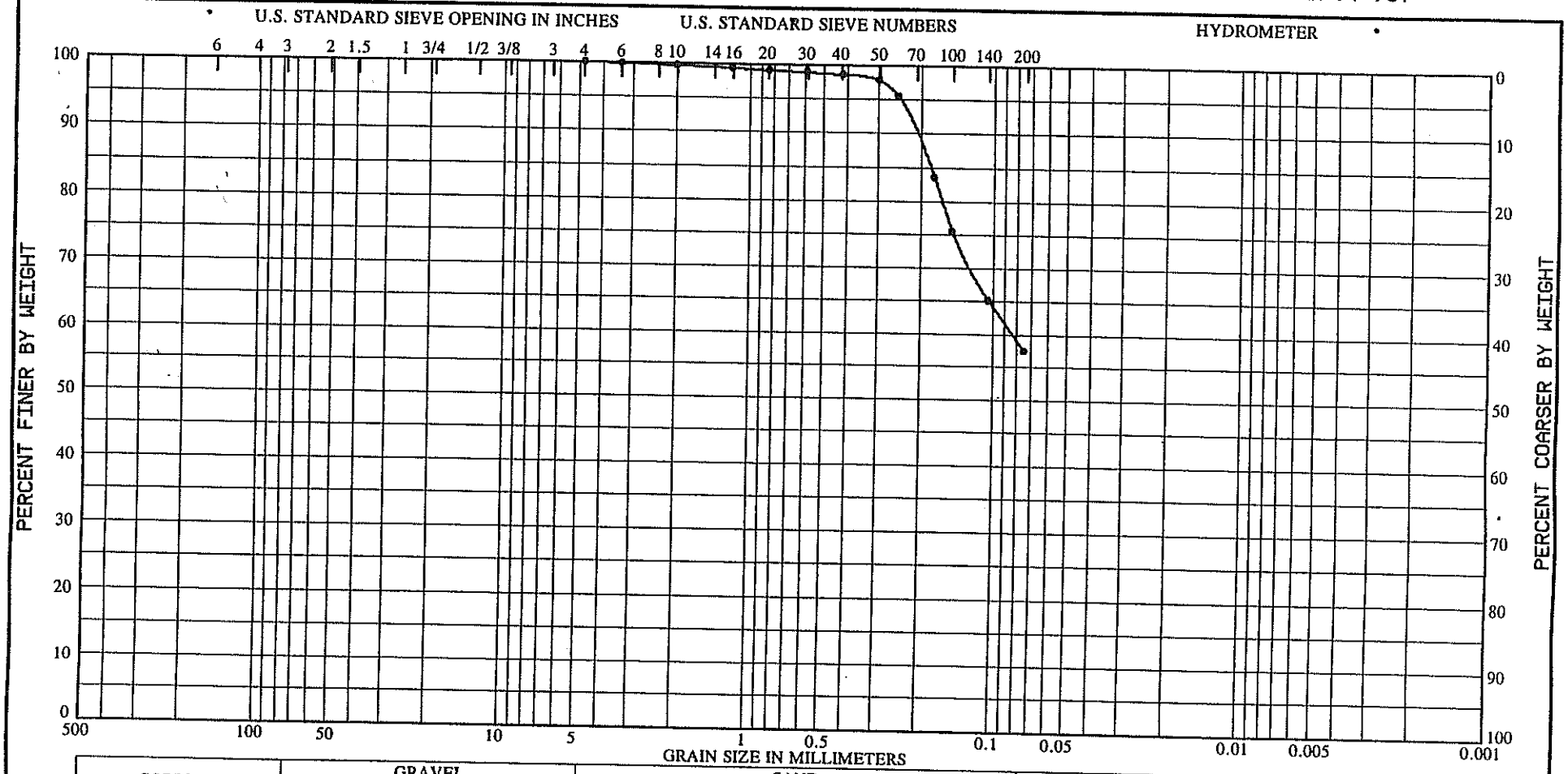
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	15.5 - 15.9	GRAY, SANDY FAT CLAY (CH), WITH A TRACE OF MICA AND ORGANIC MATTER.				

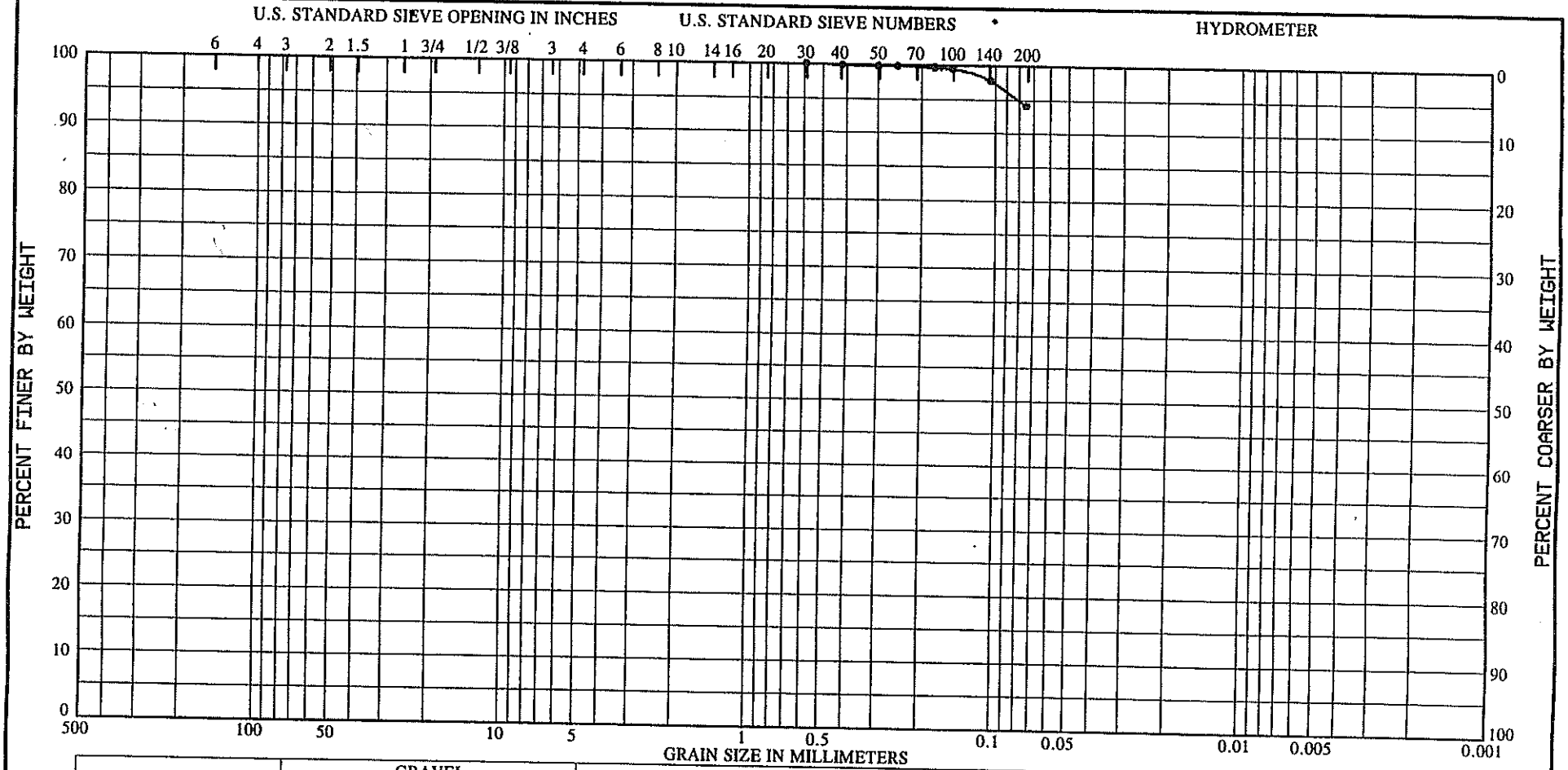
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1351
Hole No. DRV-52
Date 12/04/97

GRADATION CURVES

95

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

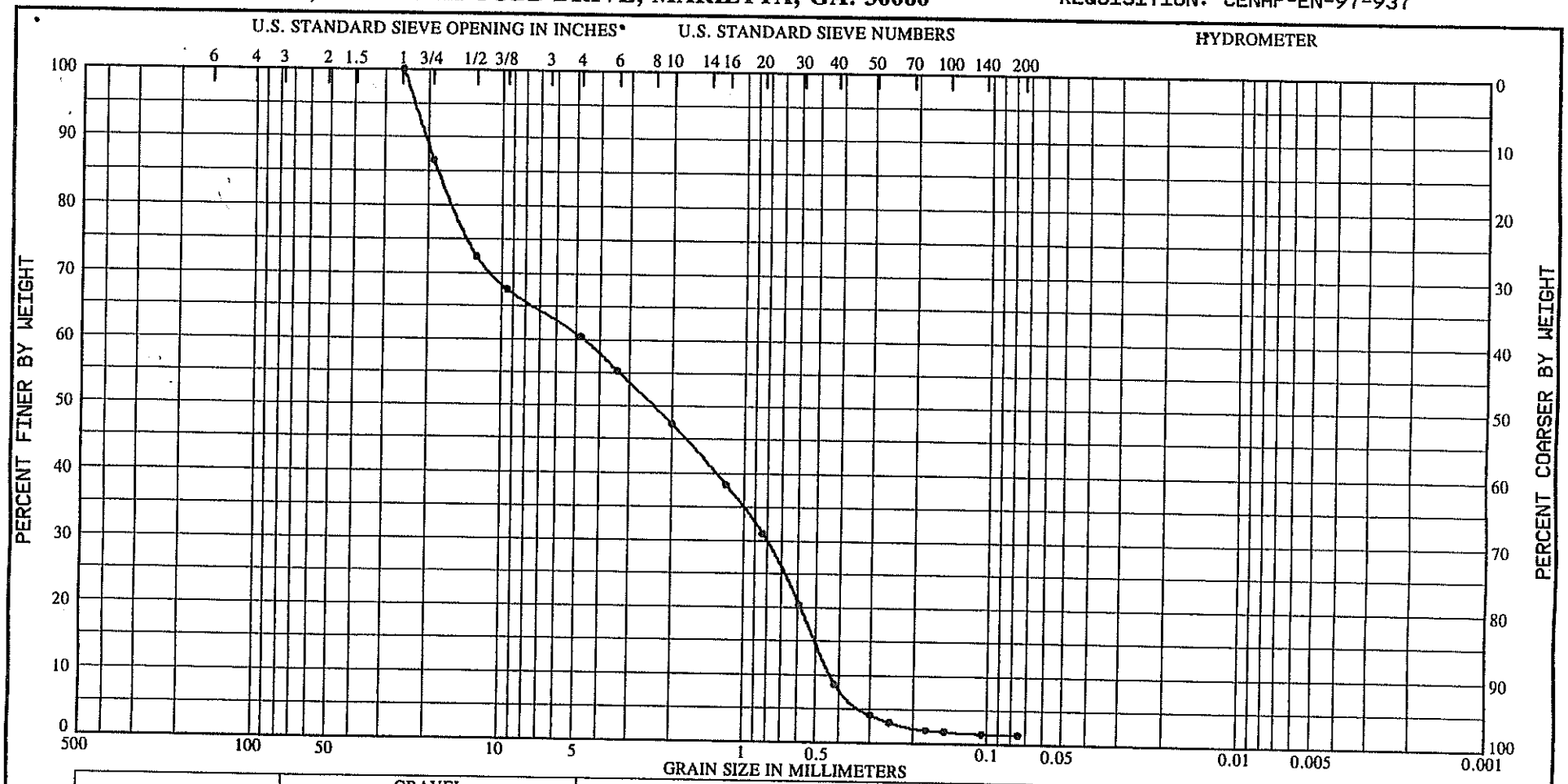
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	17.6 - 17.9	GRAY, FAT CLAY (CH), WITH A TRACE OF SAND SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1351
Hole No. DRV-52
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

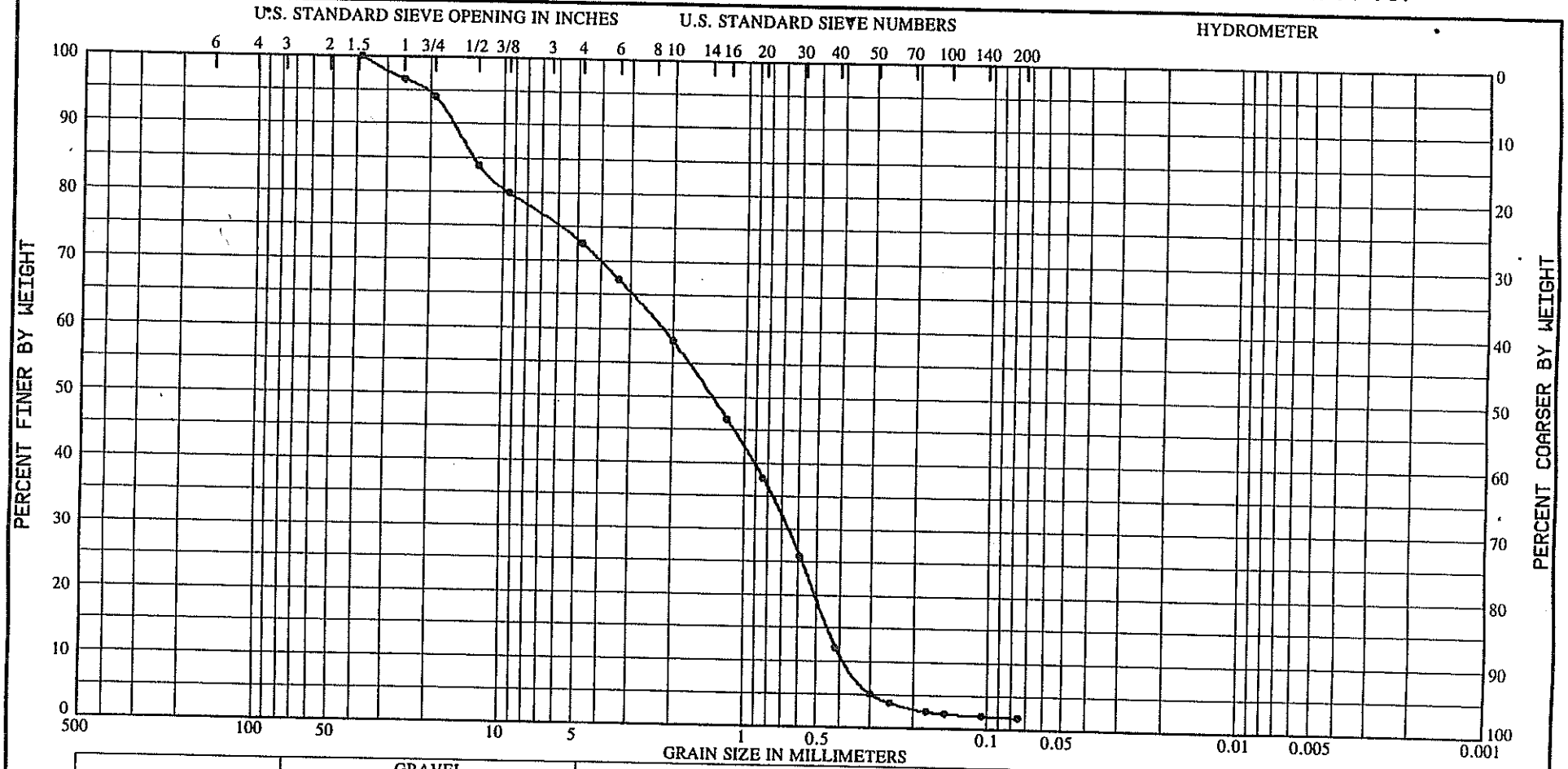
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.5 - 2.2	TAN, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1352
Hole No. DRV-53
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	6.9 - 7.4	TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1352
Hole No. DRV-53
Date 12/04/97

GRADATION CURVES

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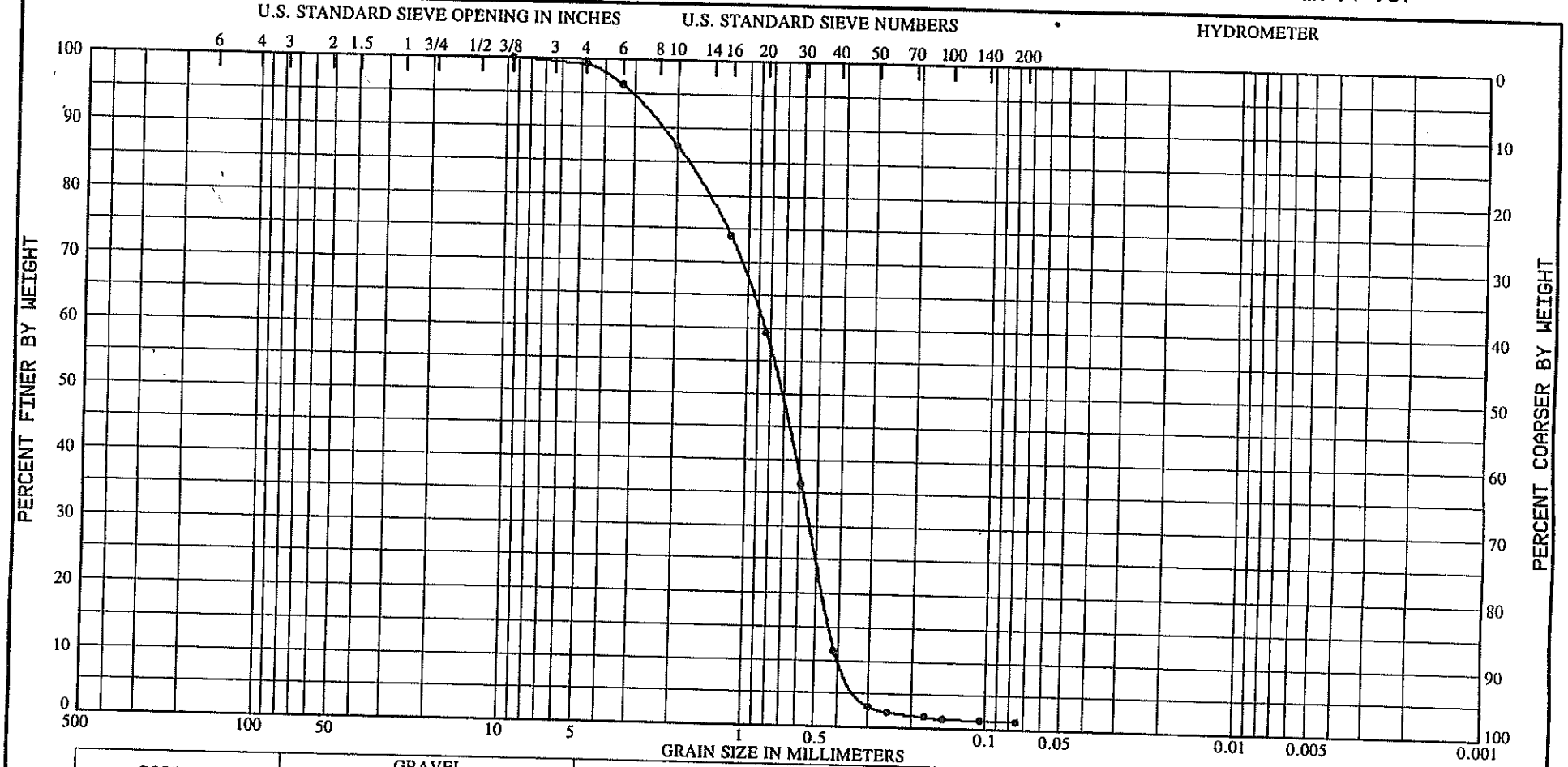
DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

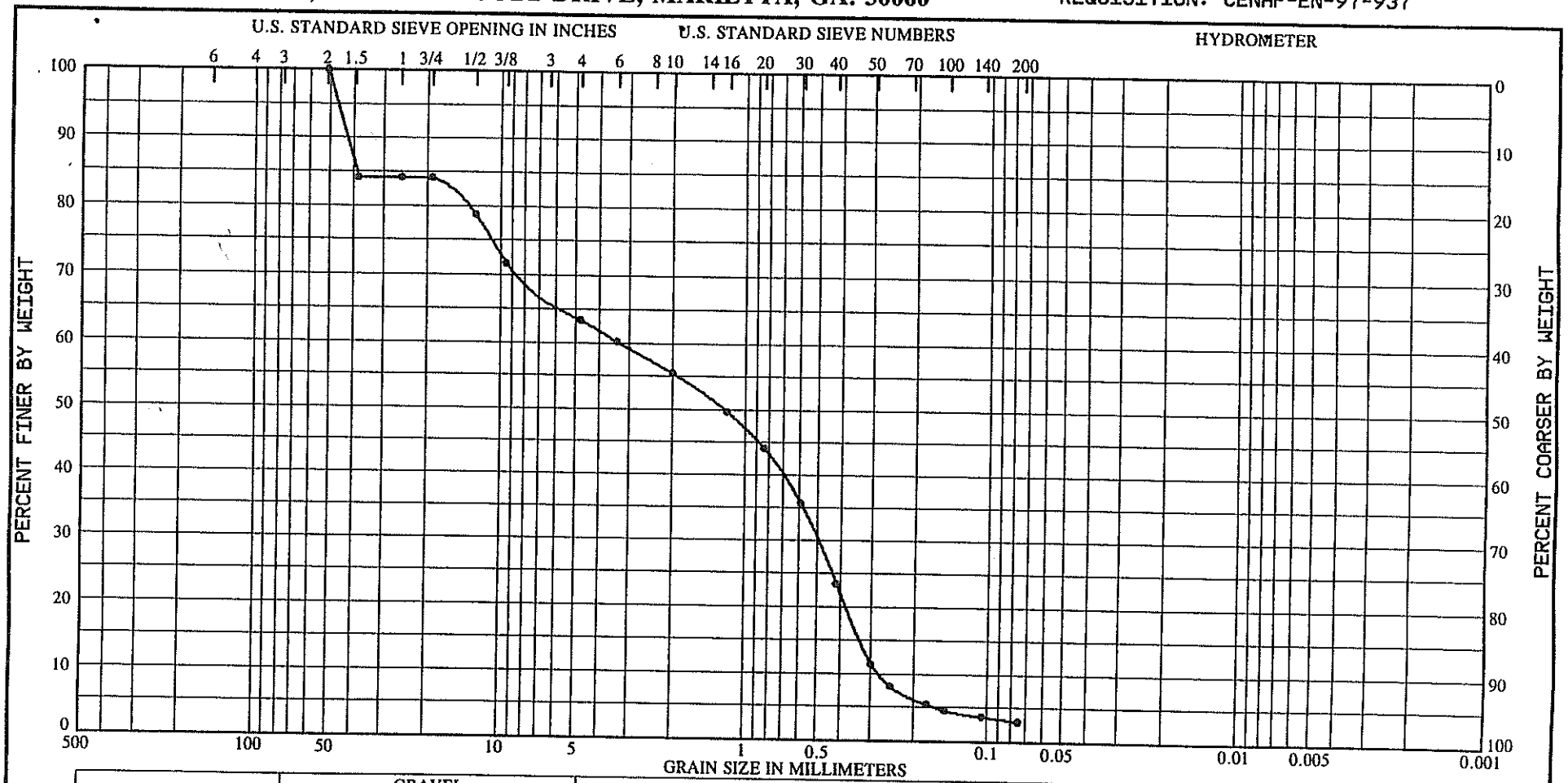
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	11.6 - 12.0	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1352
Hole No. DRV-53
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	15.8 - 16.5	TAN, GRAVELLY POORLY GRADED SAND (SP).				

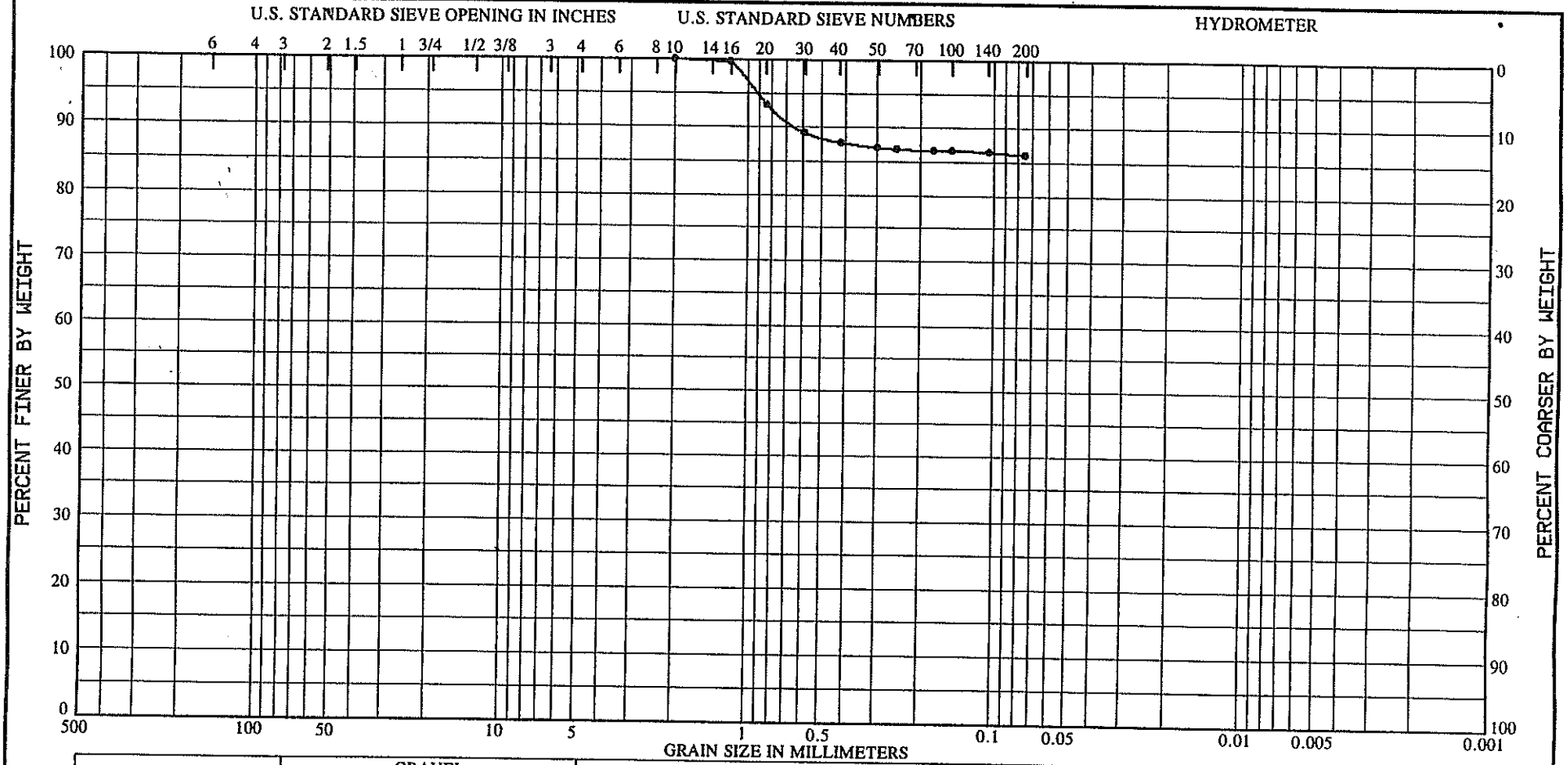
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1352
Hole No. DRV-53
Date 12/04/97

GRADATION CURVES

102

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	18.7 - 19.0	GRAY, RED & TAN, FAT CLAY (CH), WITH A LITTLE SAND SIZES.				

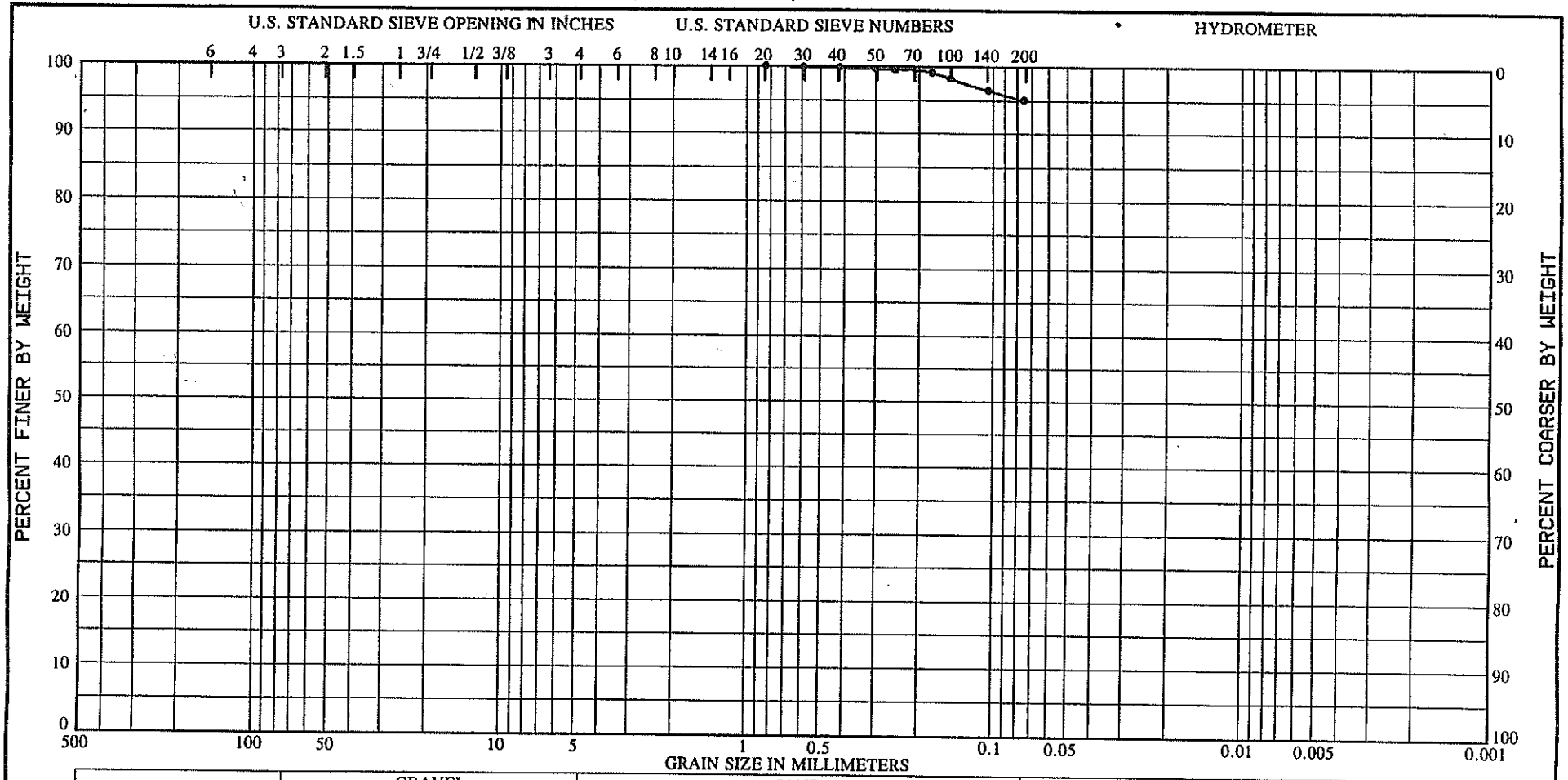
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1352
Hole No. DRV-53
Date 12/04/97

GRADATION CURVES

C3

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.0 - 2.3	GRAY, FAT CLAY (CH), WITH A TRACE OF SAND SIZES AND MICA.				

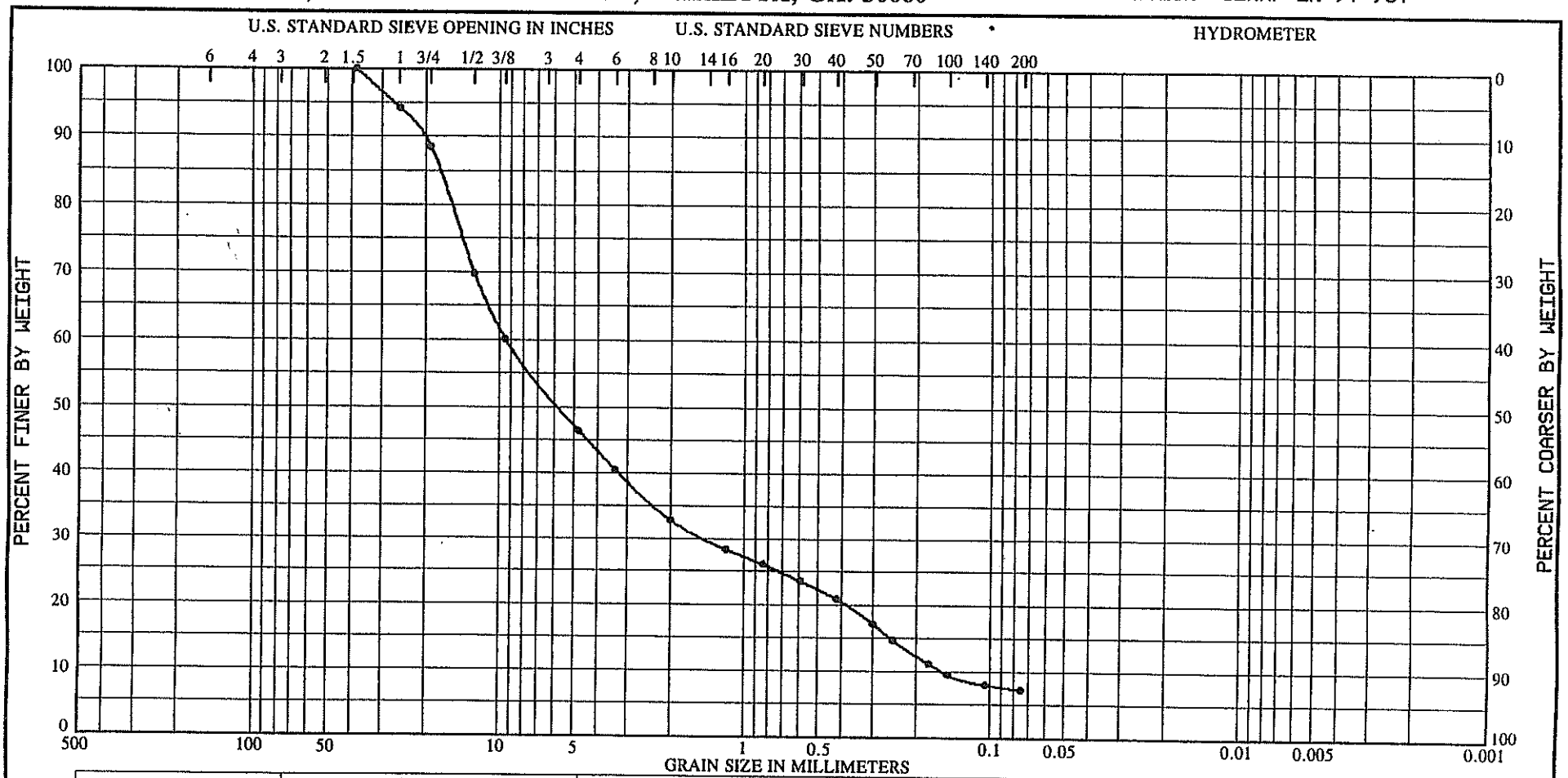
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1353
Hole No. DRV-54
Date 12/04/97

GRADATION CURVES

105

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	6.8 - 7.6	GRAY, SANDY POORLY GRADED SILTY GRAVEL (GP-GM), WITH A TRACE OF MICA.				

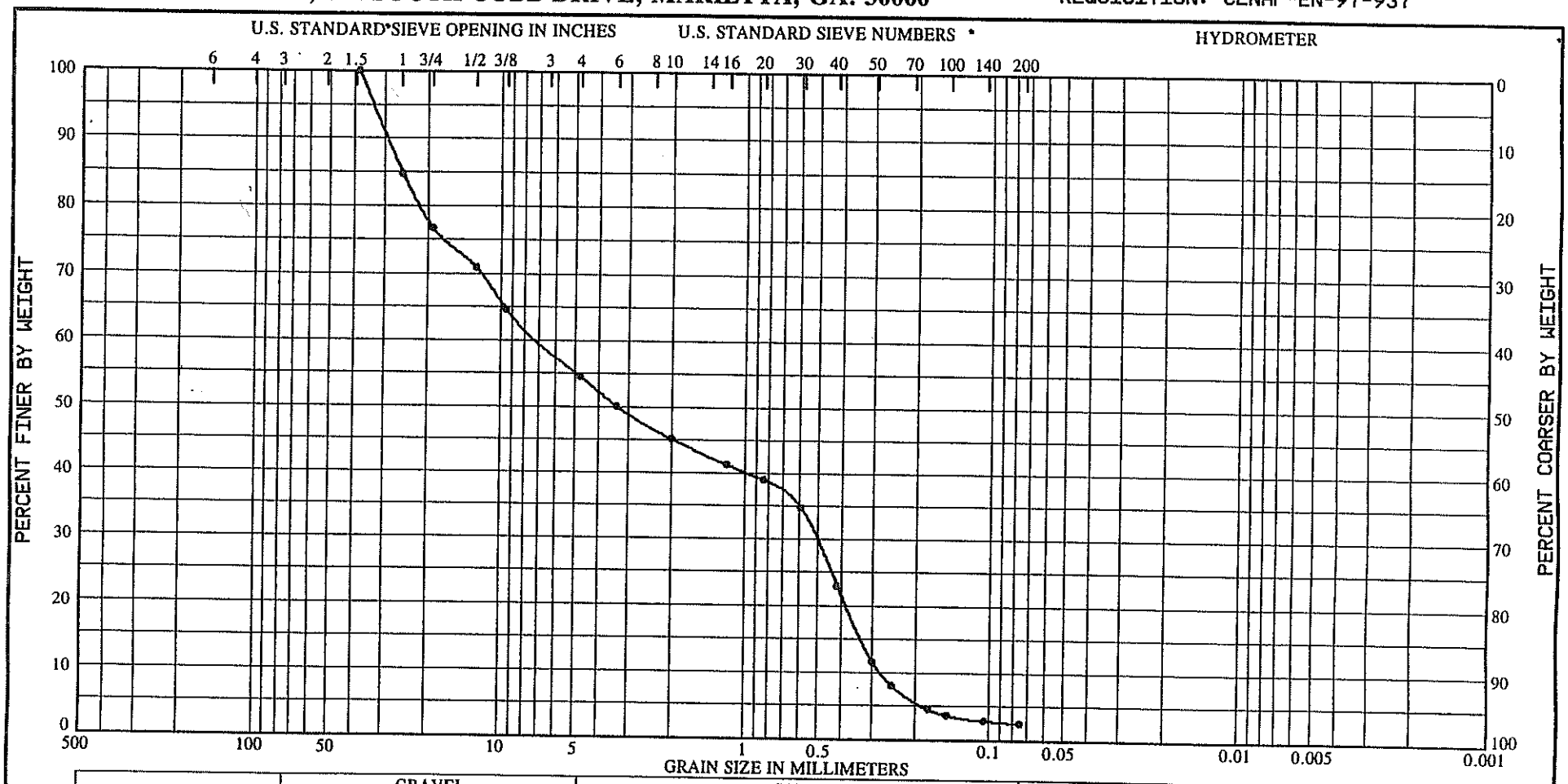
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1353
Hole No. DRV-54
Date 12/05/97

GRADATION CURVES

106

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	10.9 - 11.6	TAN, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

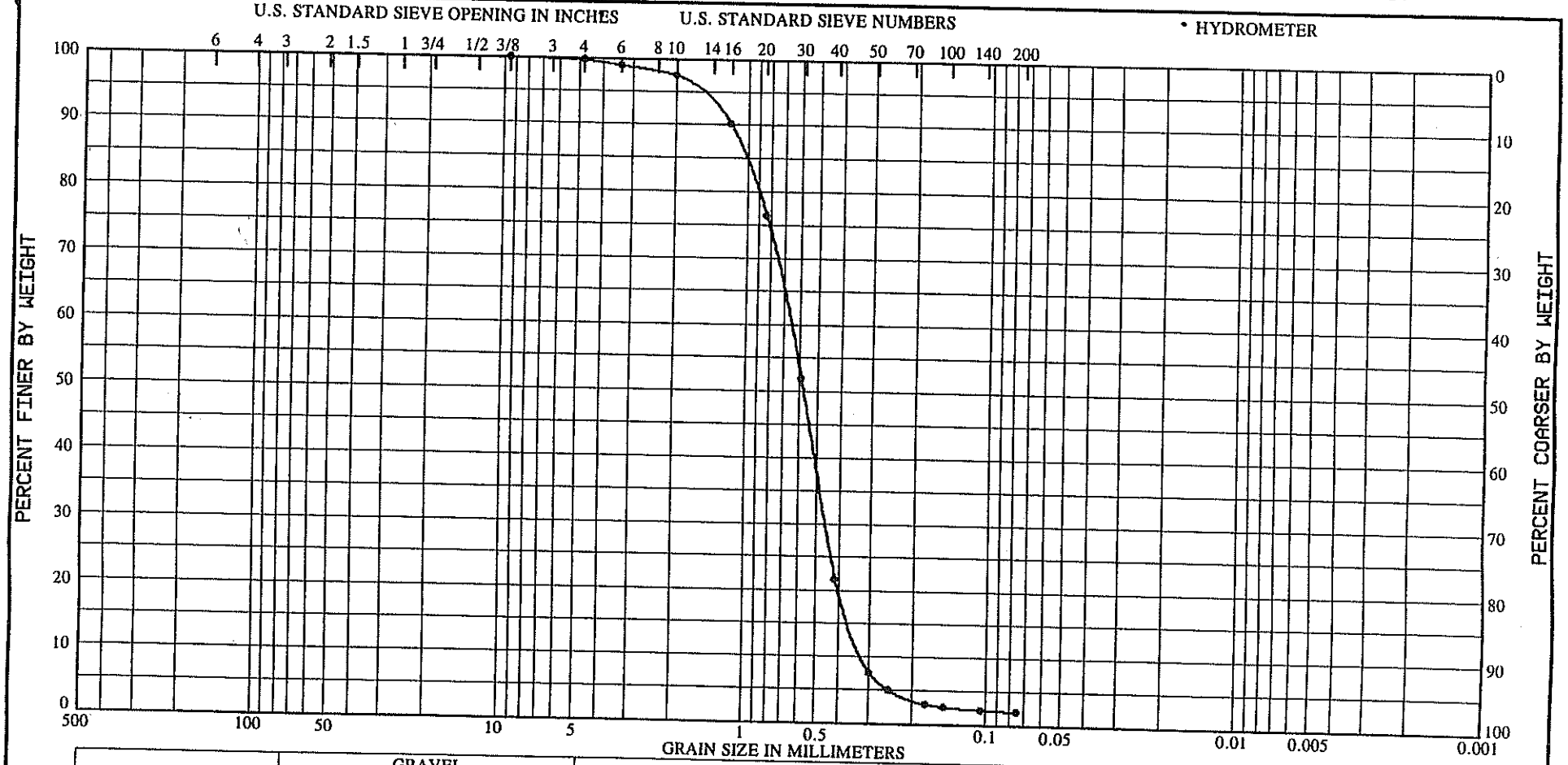
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1353
Hole No. DRV-54
Date 12/04/97

GRADATION CURVES

107

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.6 - 16.9	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

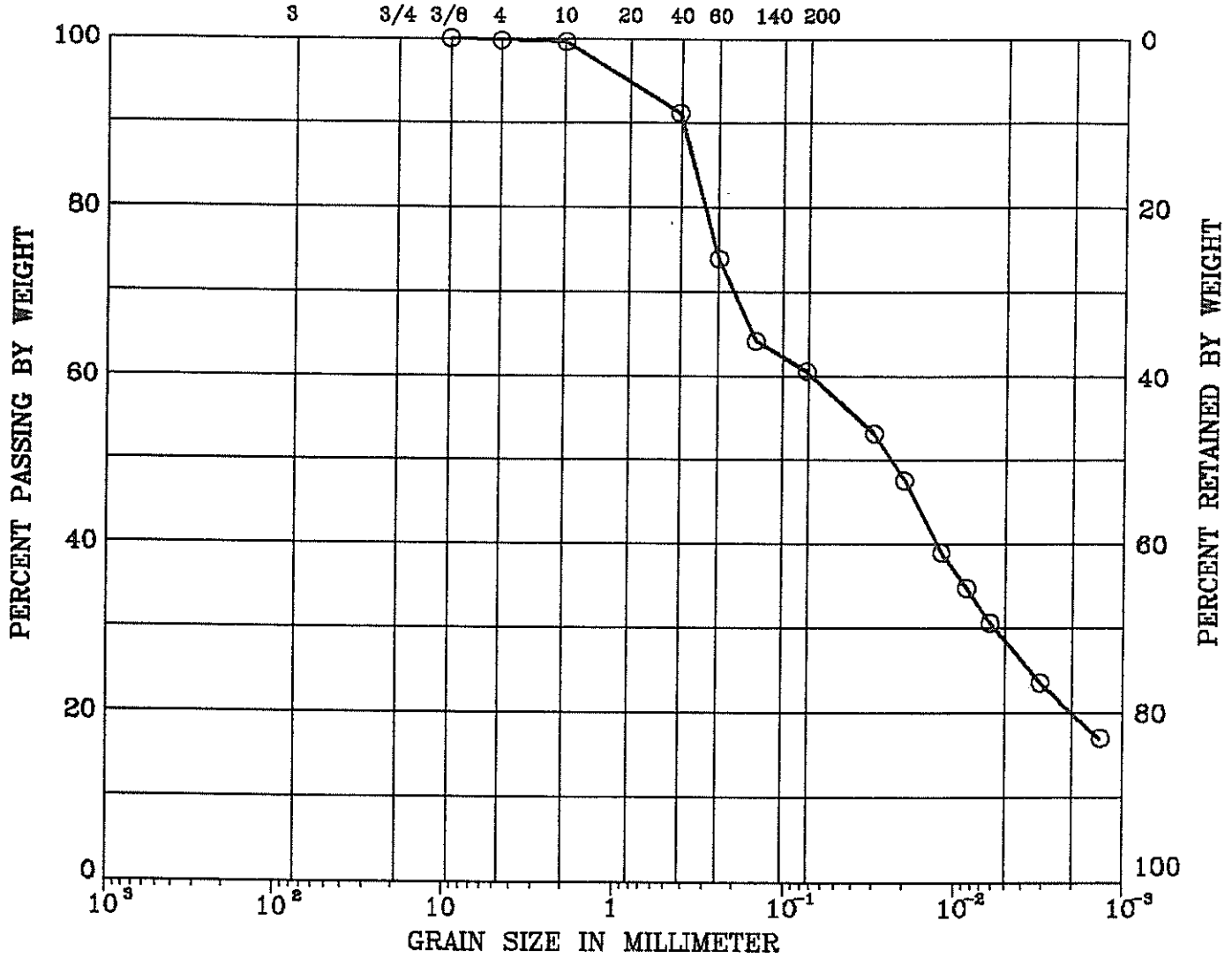
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1353
Hole No. DRV-54
Date 12/04/97

GRADATION CURVES

163

UNIFIED SOIL CLASSIFICATION

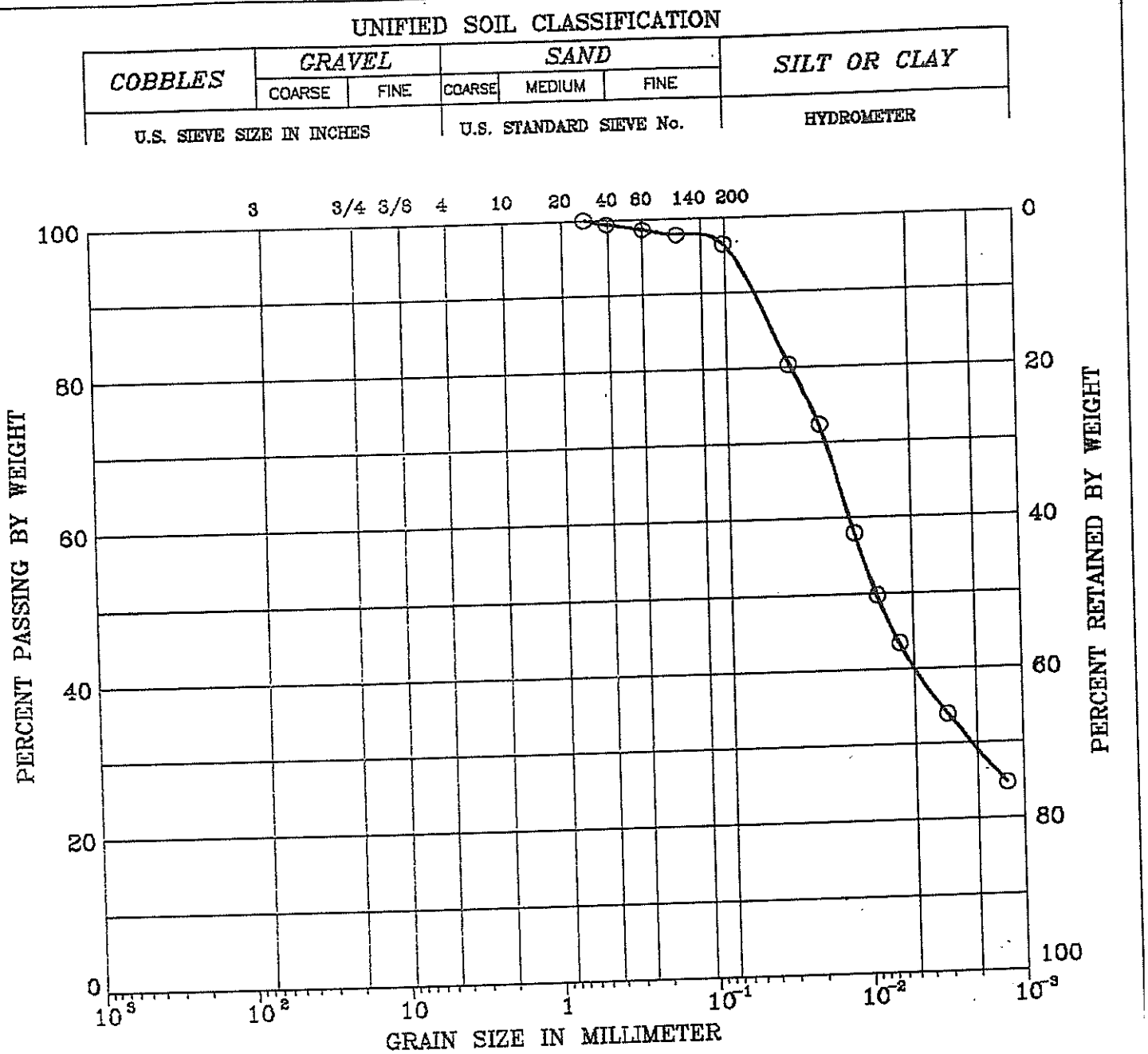
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	02G-2.5		45	22	DARK GRAY ORGANIC CLAY (OL)

Remark :

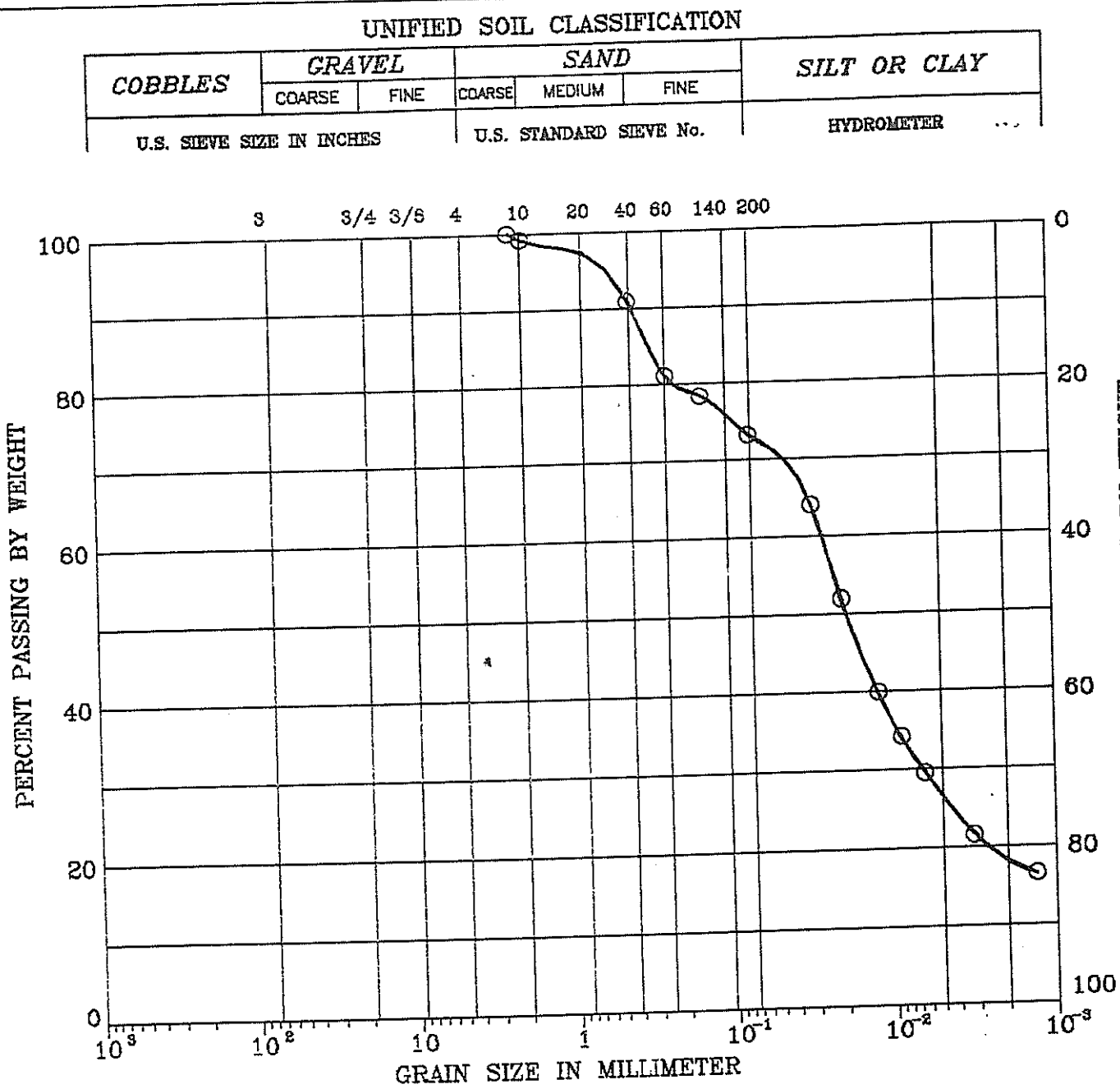
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	02-G-7.5		64	29	DARK GRAY ORGANIC SILT (OH)

Remark :

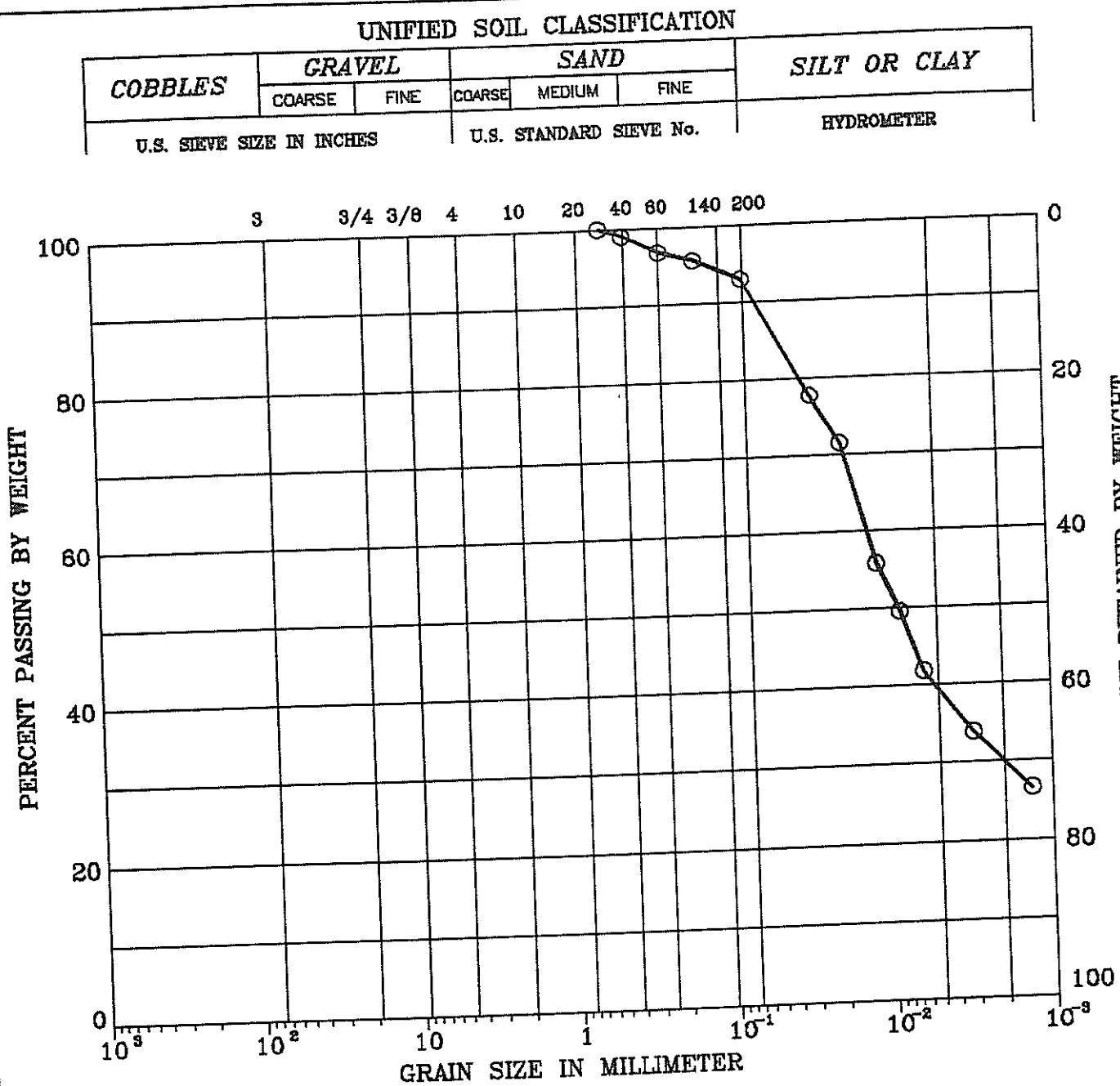
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	02-G-11		46	20	DARK GRAY ORGANIC CLAY (OL)

Remark :

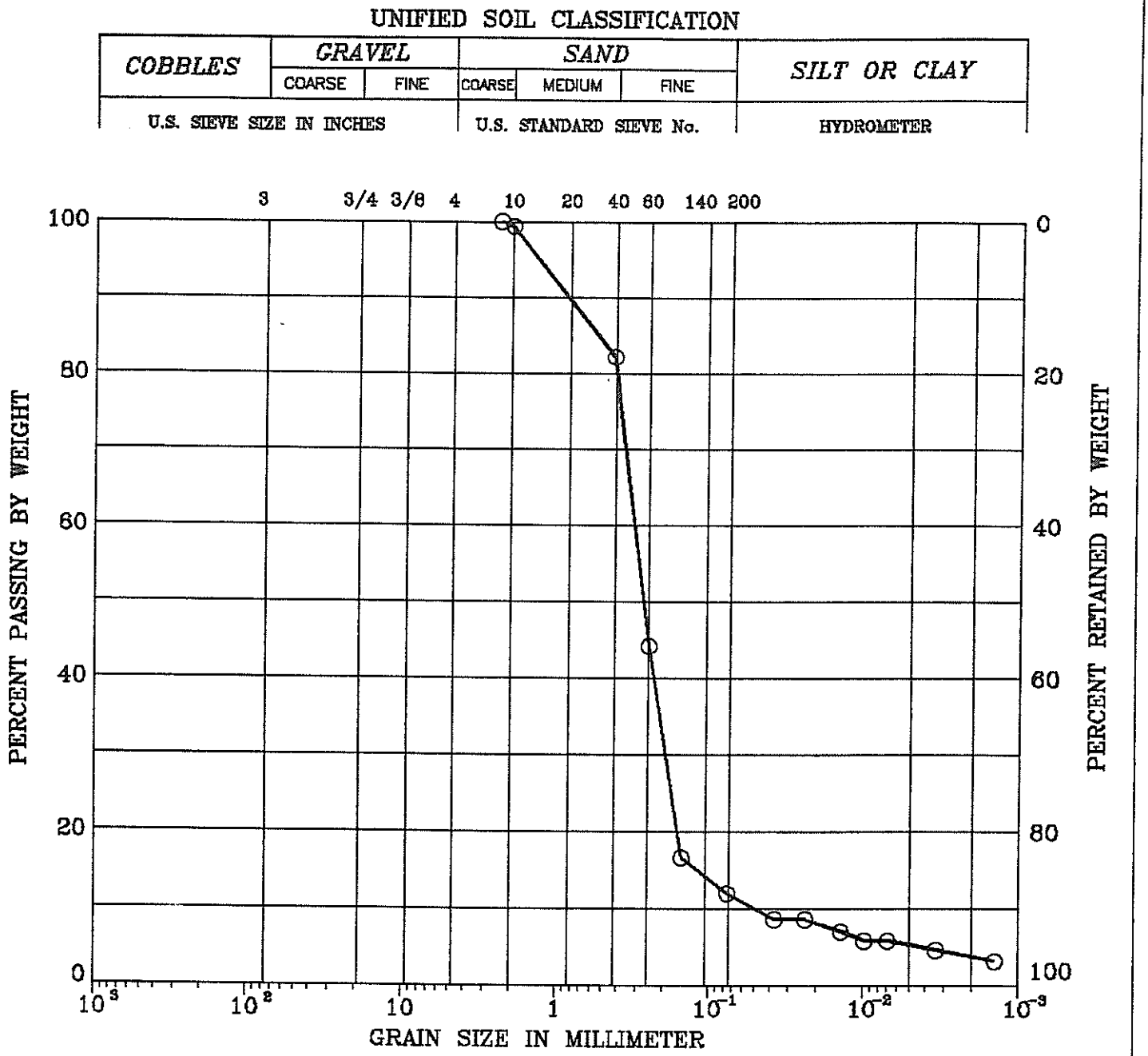
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	02G-15.5		78	34	GRAY ORGANIC SILT (OH)

Remark :

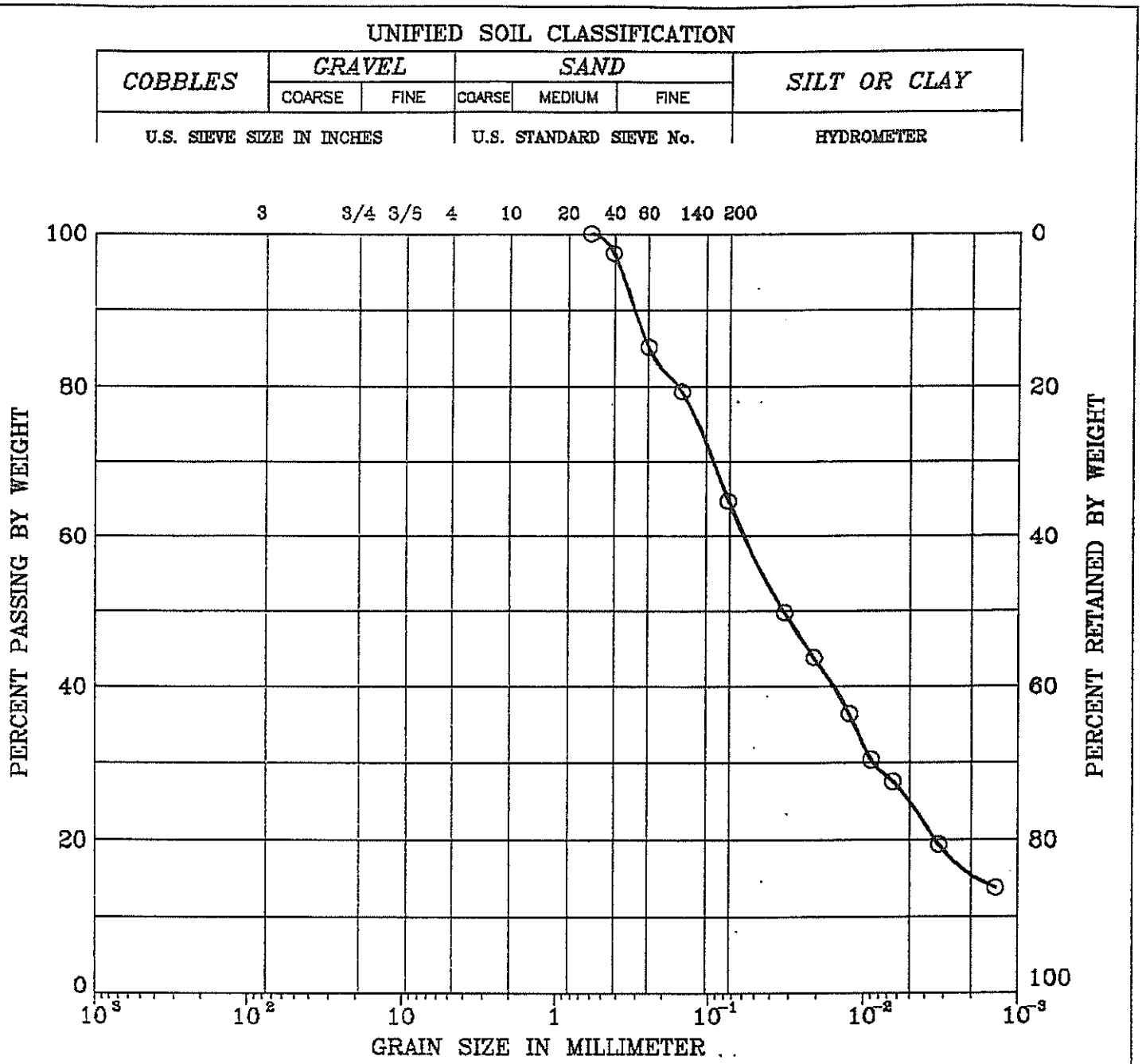
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	PQ1G-.25				GRAY WELL-GRADED SAND (SW)

Remark :

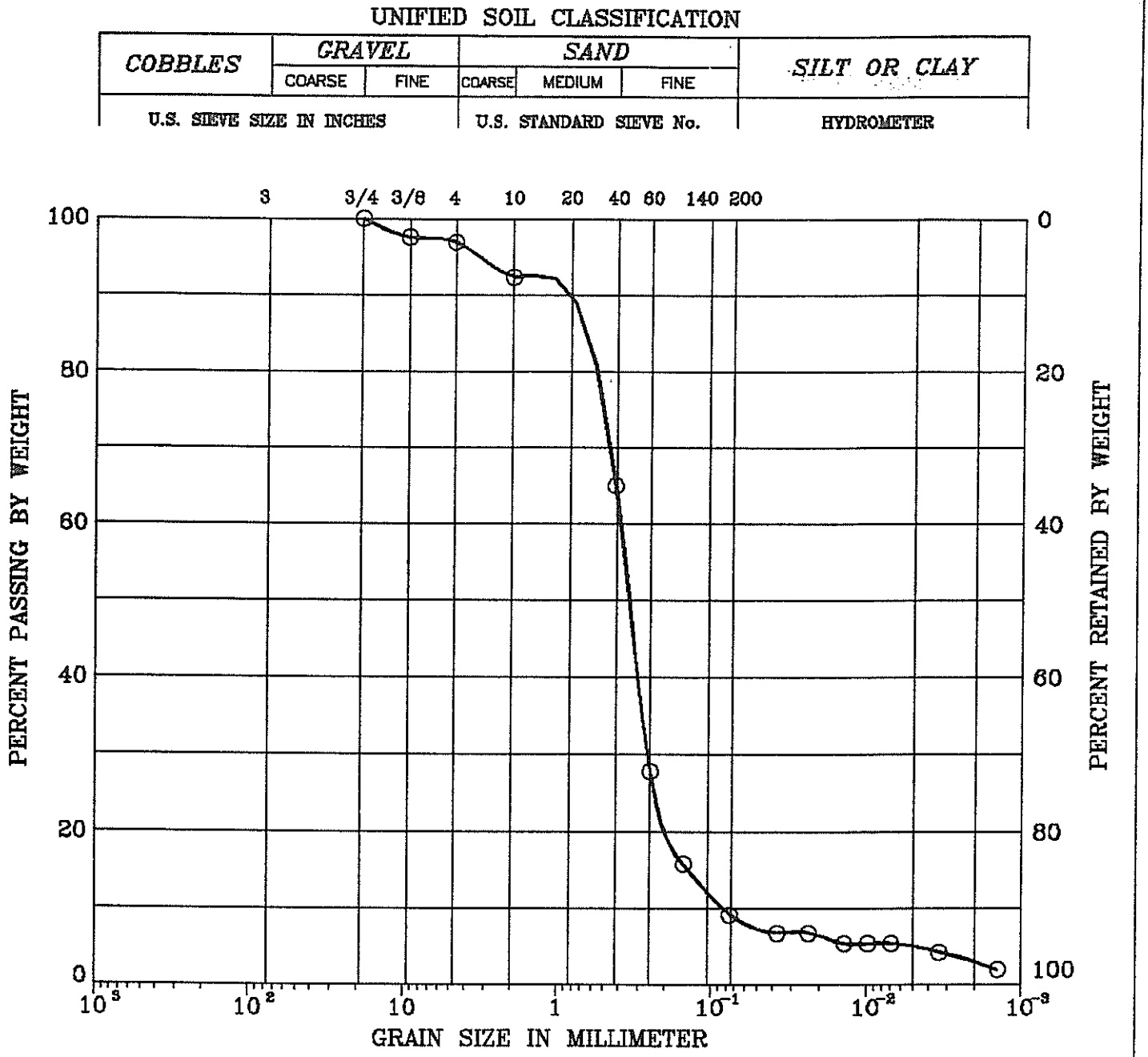
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	PQ1G-1.4		40	14	DARK GRAY ORGANIC SILT (OL)

Remark :

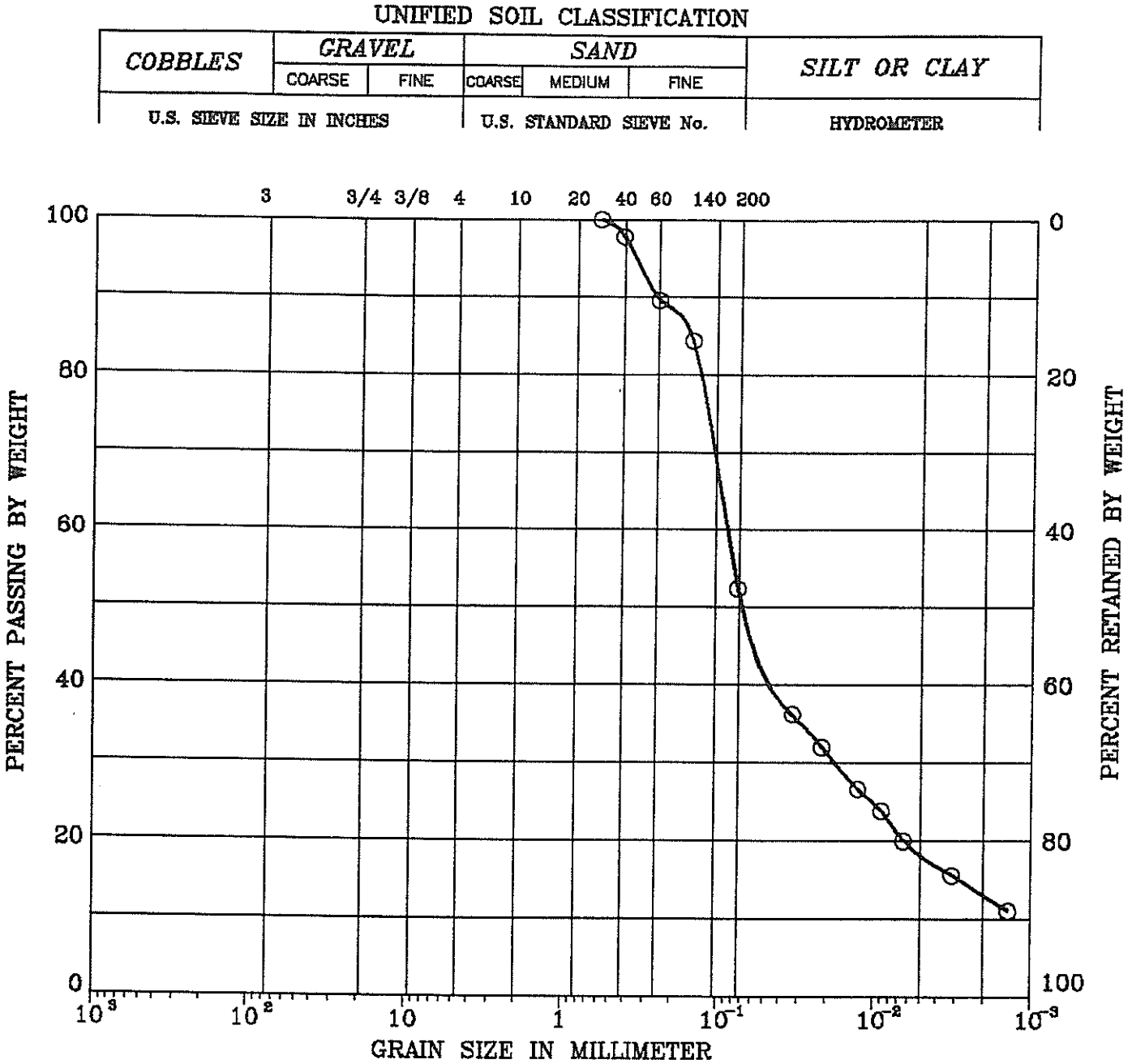
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/16/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	PQ1G8.15				GRAY POORLY-GRADED SAND (SP)

Remark :

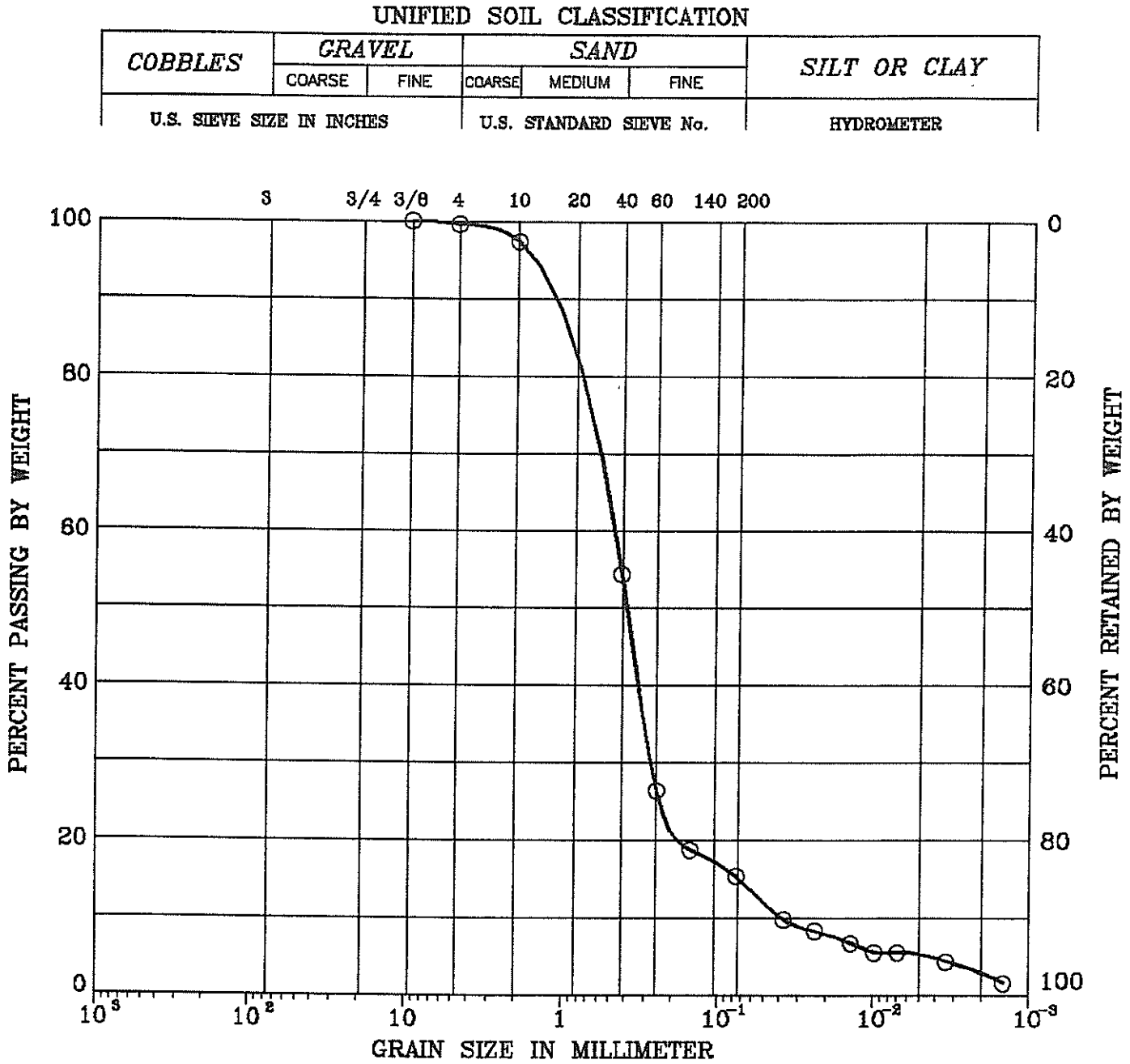
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	PQ1-G-10		38	10	DARK GRAY ORGANIC SILT(OL)

Remark :

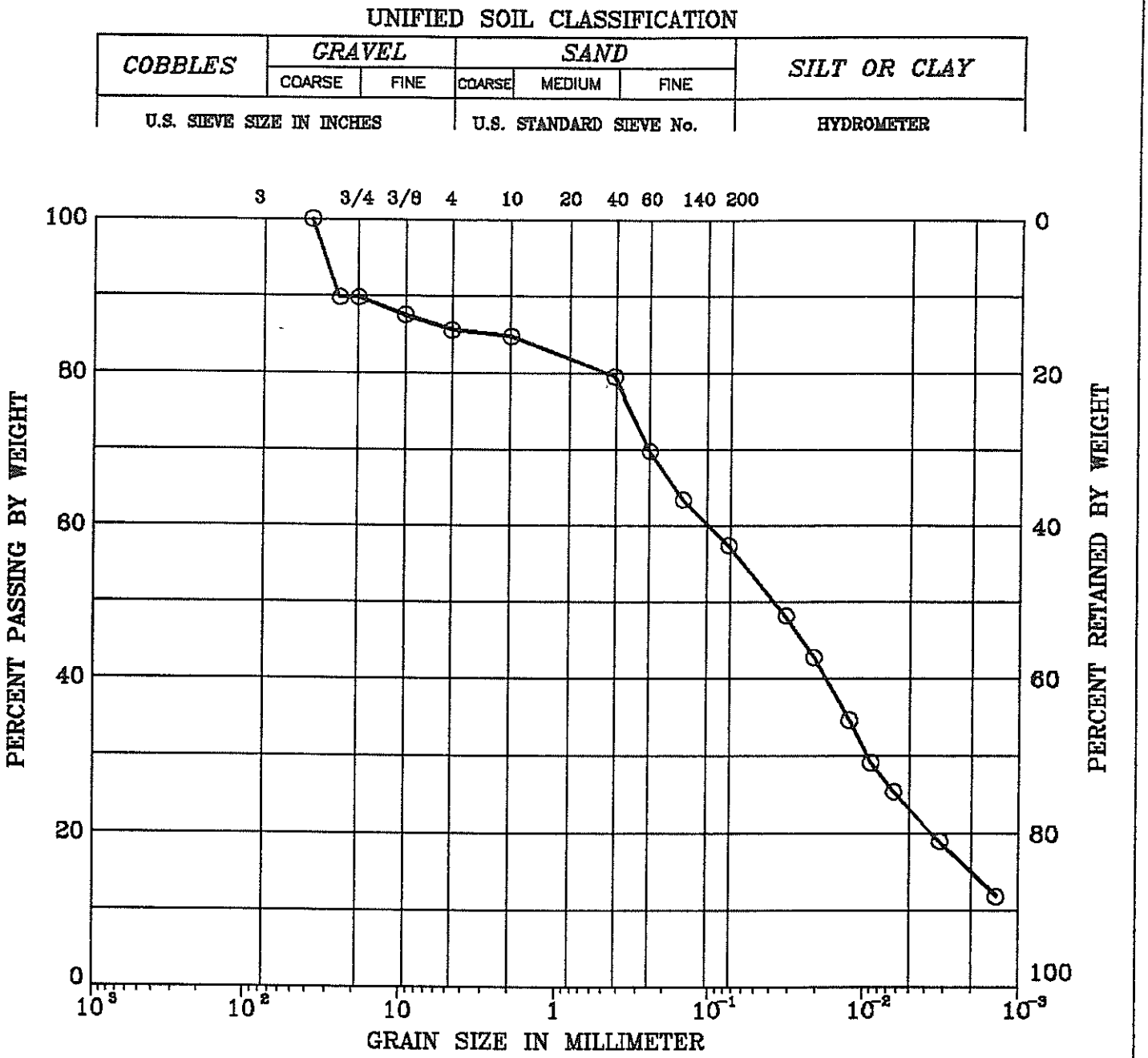
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/17/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	PQ1G12.4				GRAY SILTY SAND (SM)

Remark :

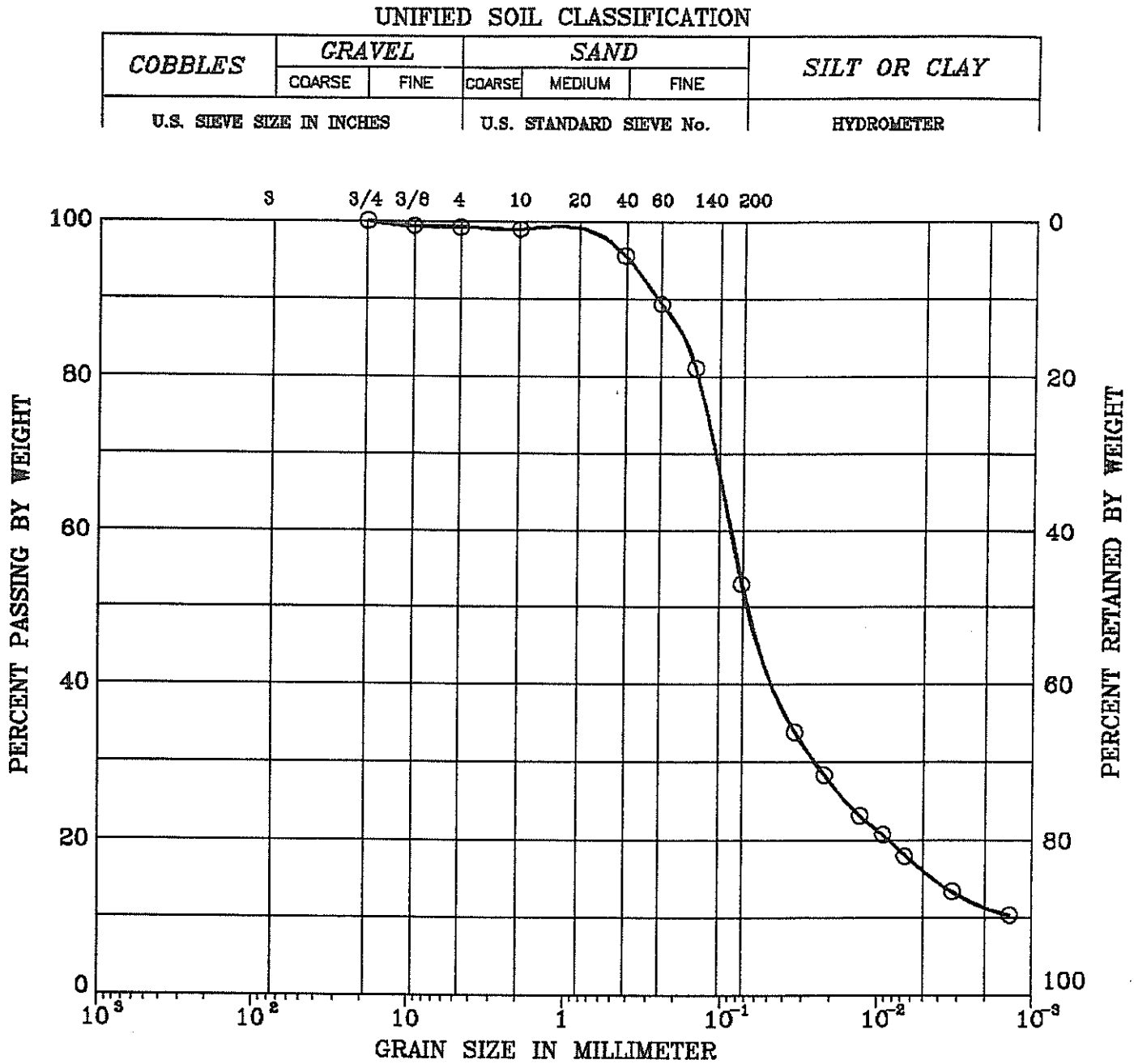
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	PQ2G-0.0		53	23	GRAY ORGANIC SILT (OH)

Remark :

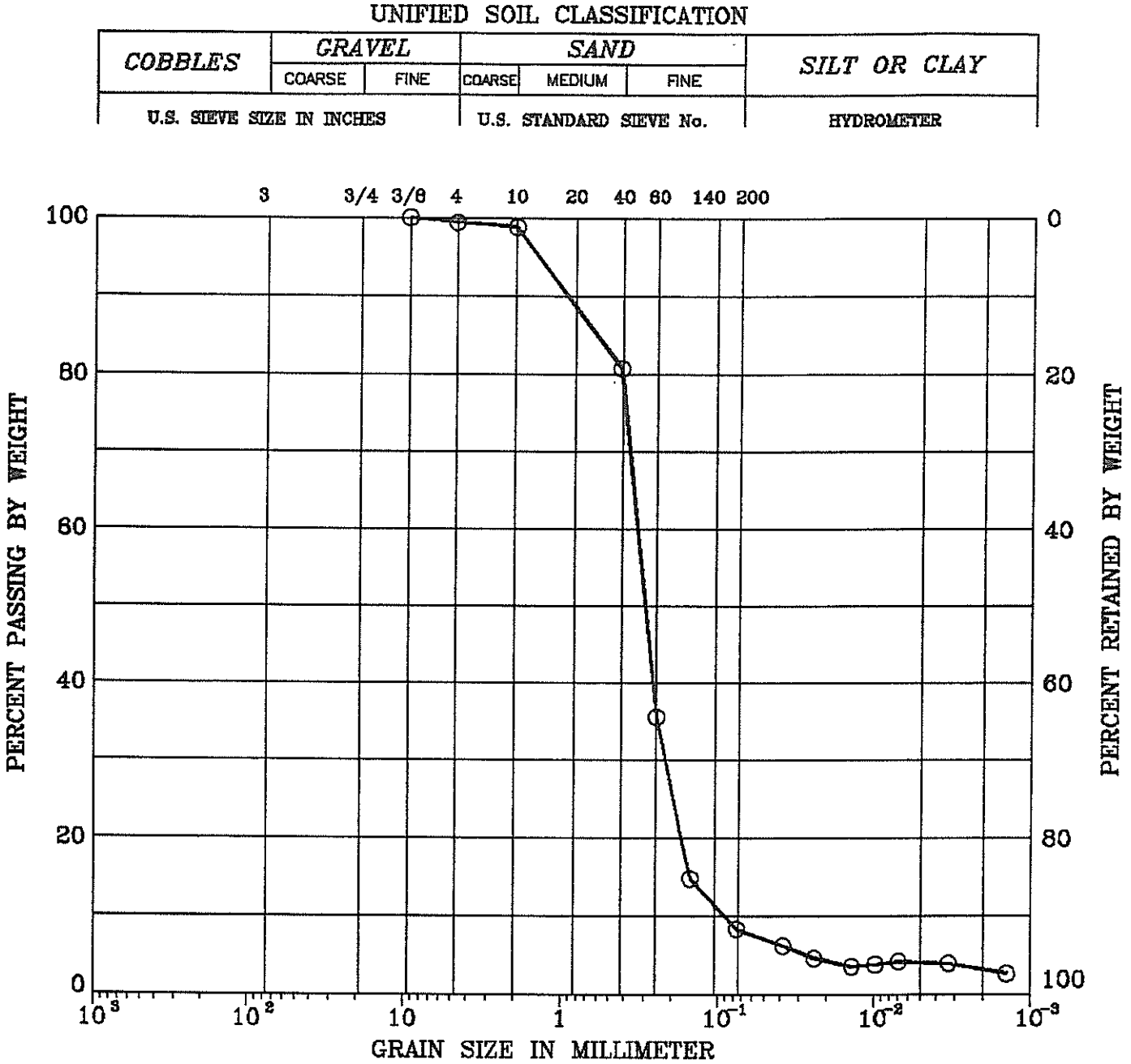
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	PQ2G-1.9		37	13	GRAY ORGANIC CLAY (OL)

Remark :

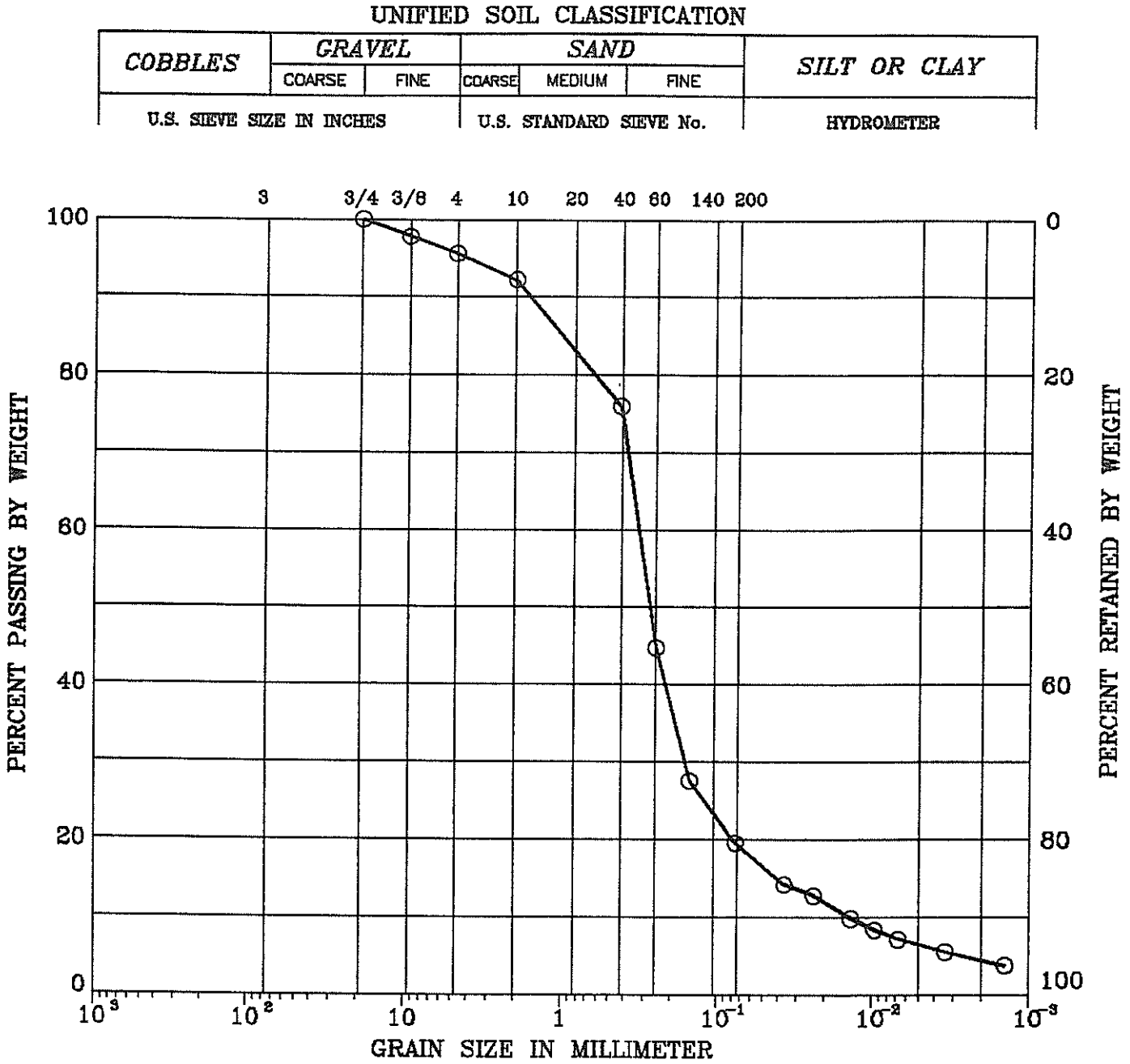
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	PQ2G-5.1				GRAY POORLY-GRADED SAND (SP)

Remark :

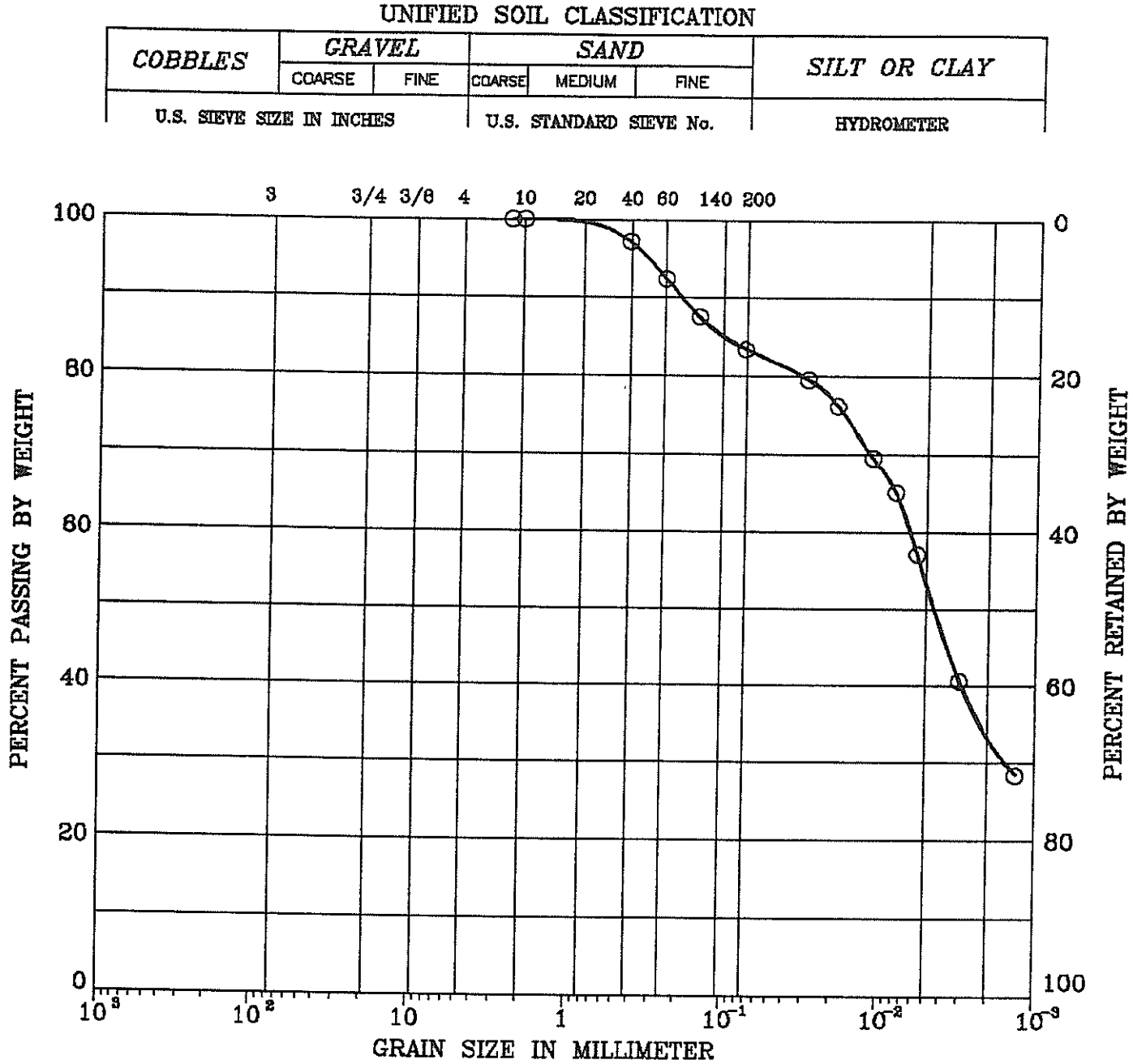
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	PQ2G-10				GRAY SILTY SAND (SM)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



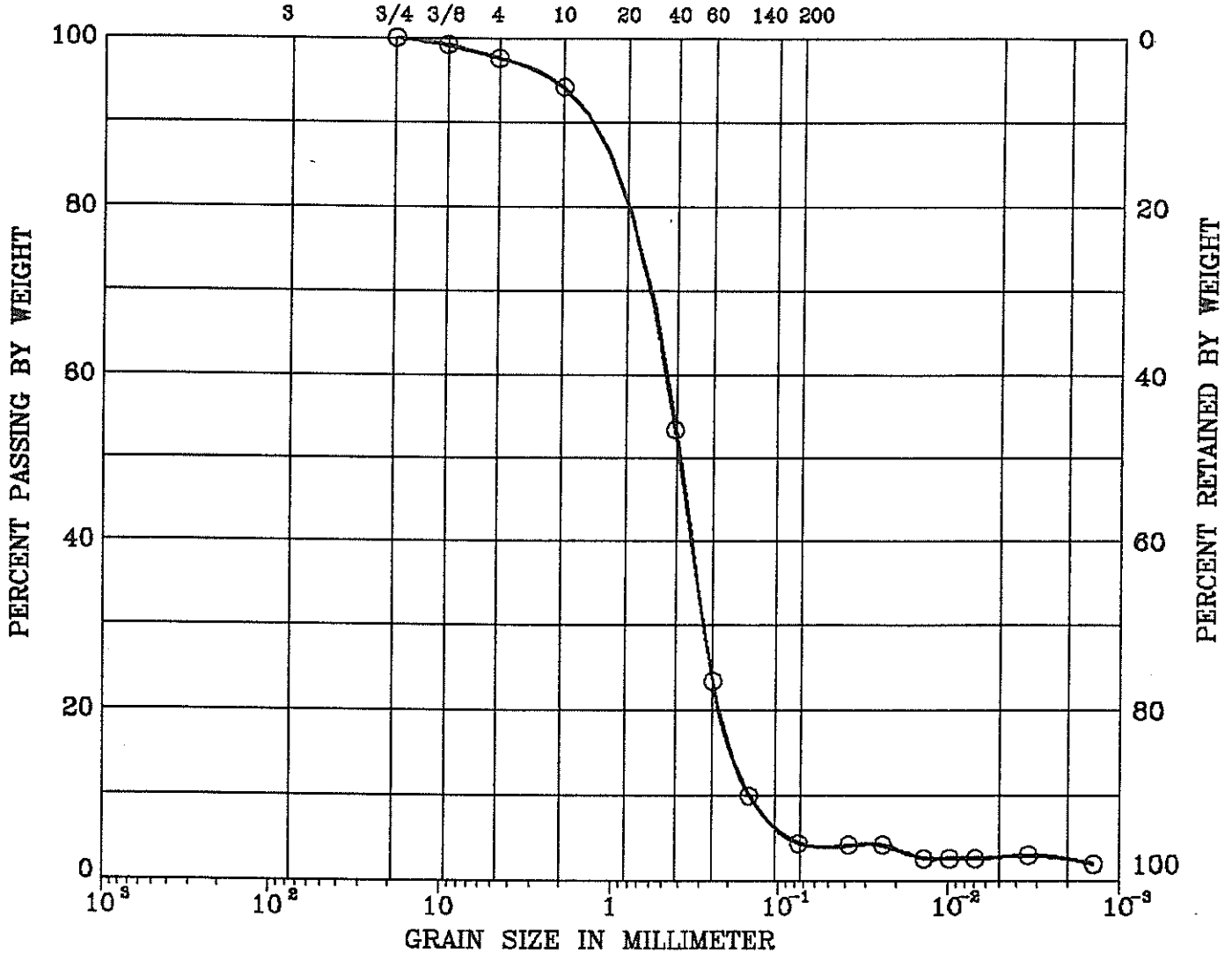
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	PQ2G13.7		73	30	GRAY ORGANIC SILT (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

UNIFIED SOIL CLASSIFICATION

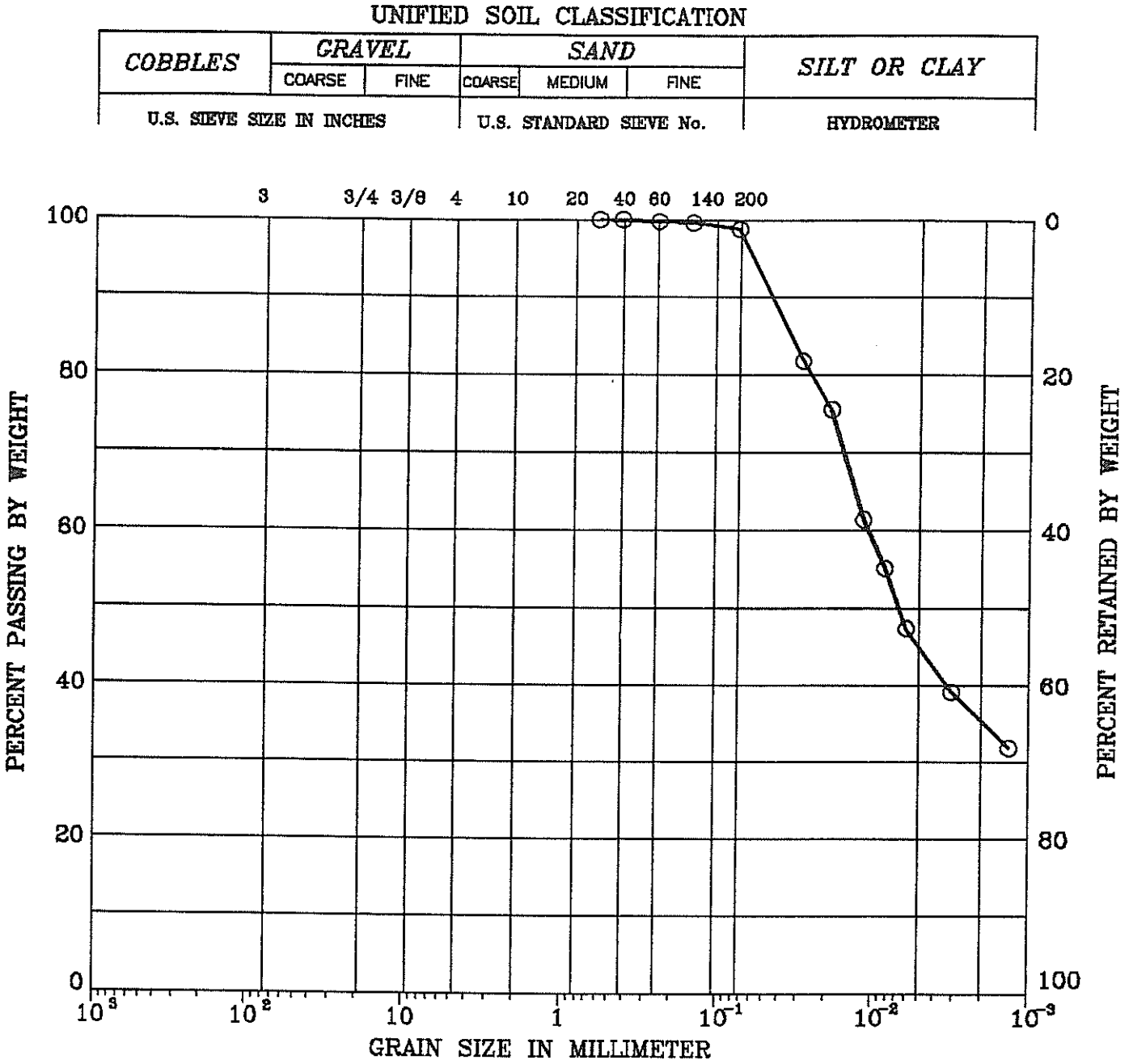
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	PQ2G17.5				GRAY POORLY-GRADED SAND (SP)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



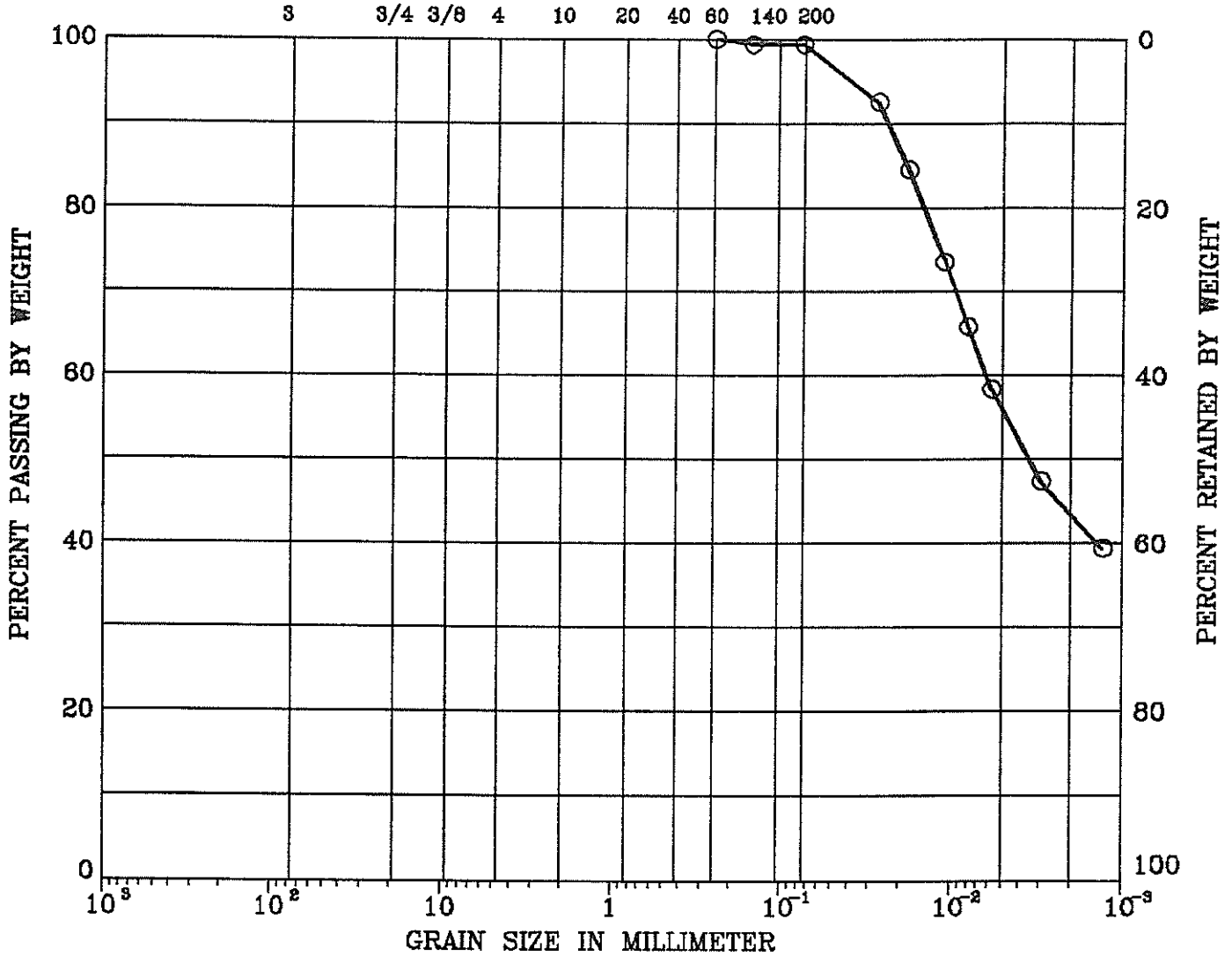
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R1G-3.0		90	52	GRAY ORGANIC CLAY (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

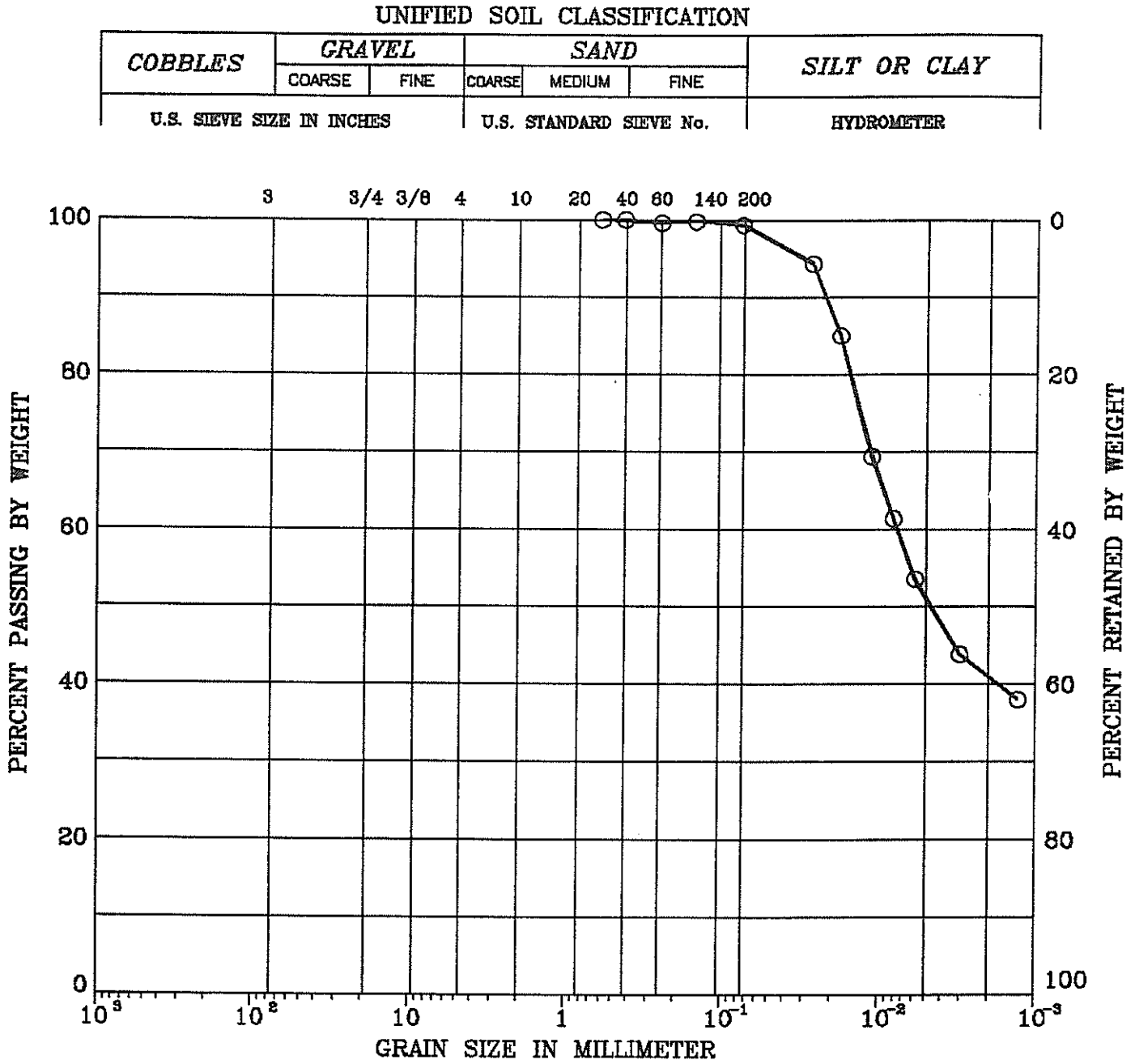
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R1G-6.5		103	64	GRAY ORGANIC CLAY (OH)

Remark :

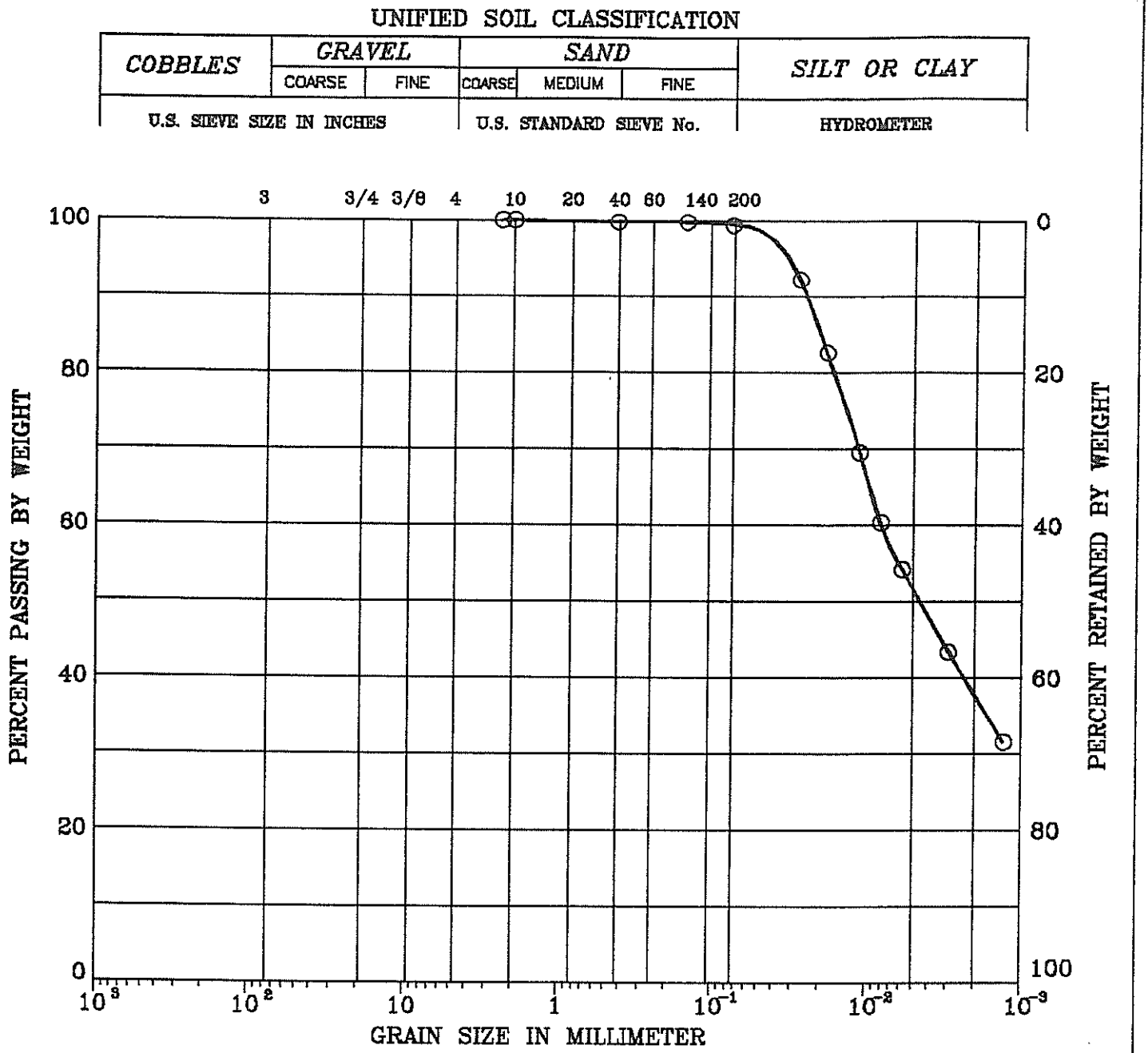
Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	R1G-10.0		95	57	GRAY ORGANIC CLAY (OH)

Remark :

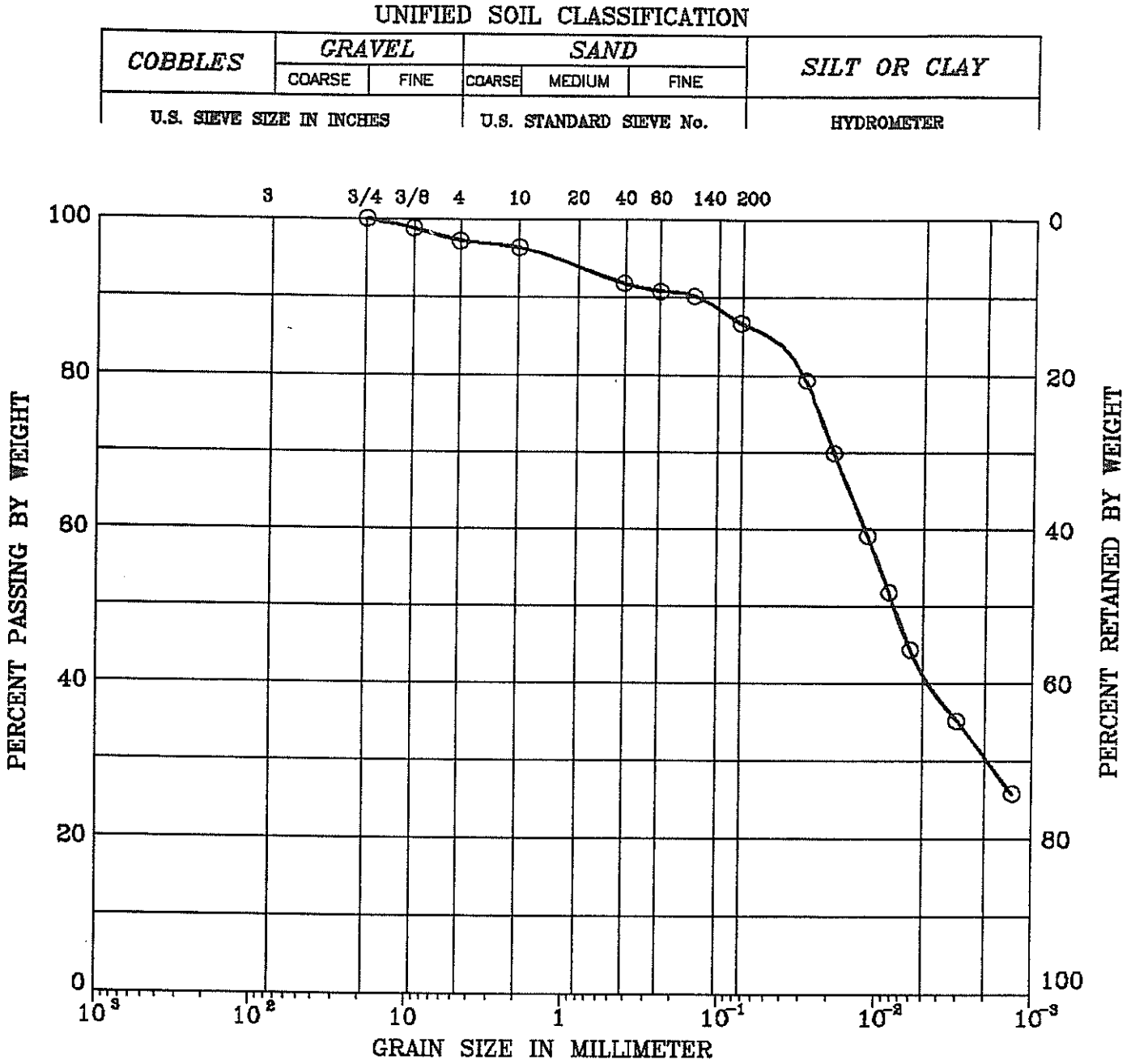
Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	R1G-13.5		72	39	GRAY ORGANIC CLAY (OH)

Remark :

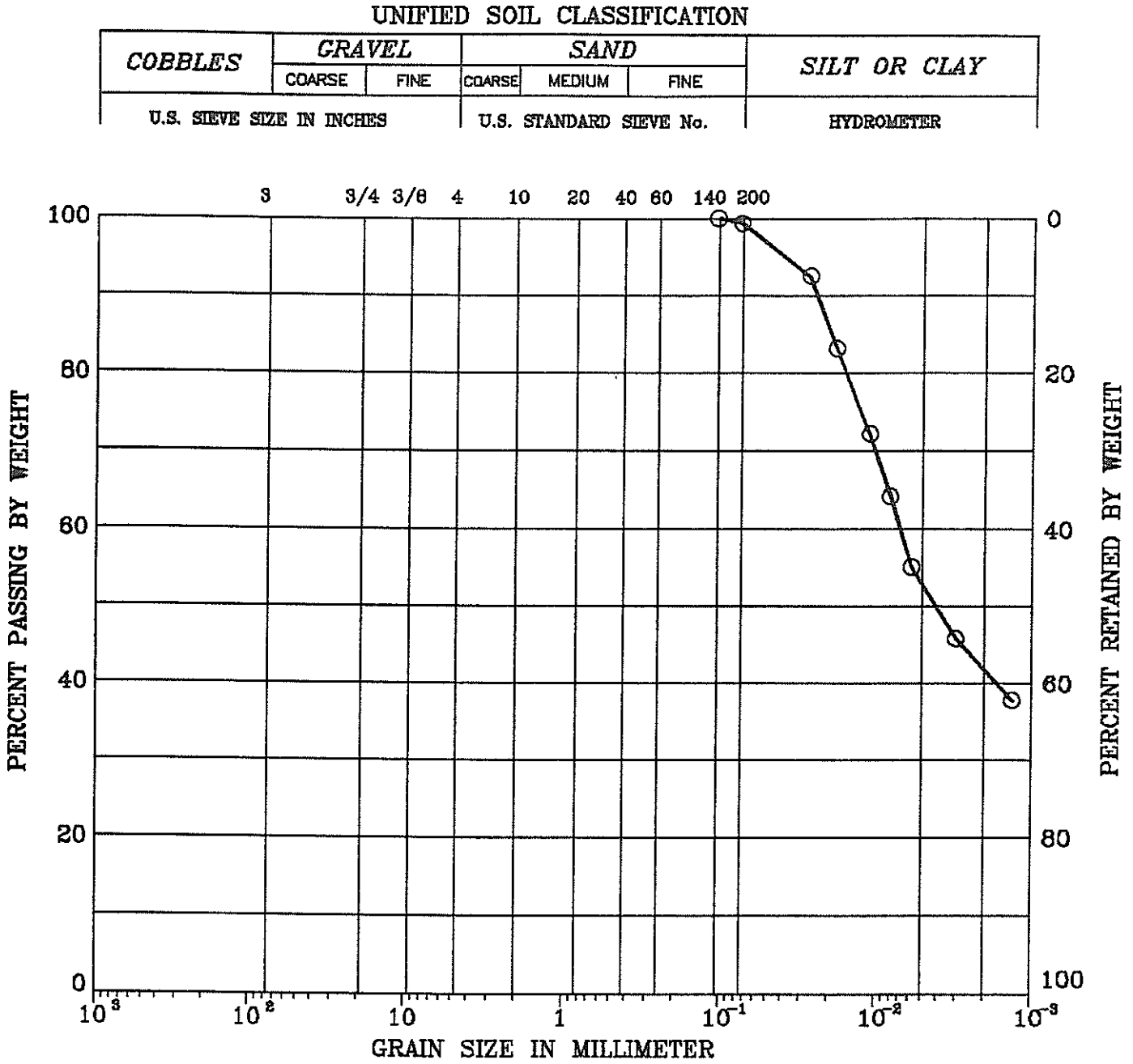
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R2G-3.0		68	34	GRAY ORGANIC SILT (OH)

Remark :

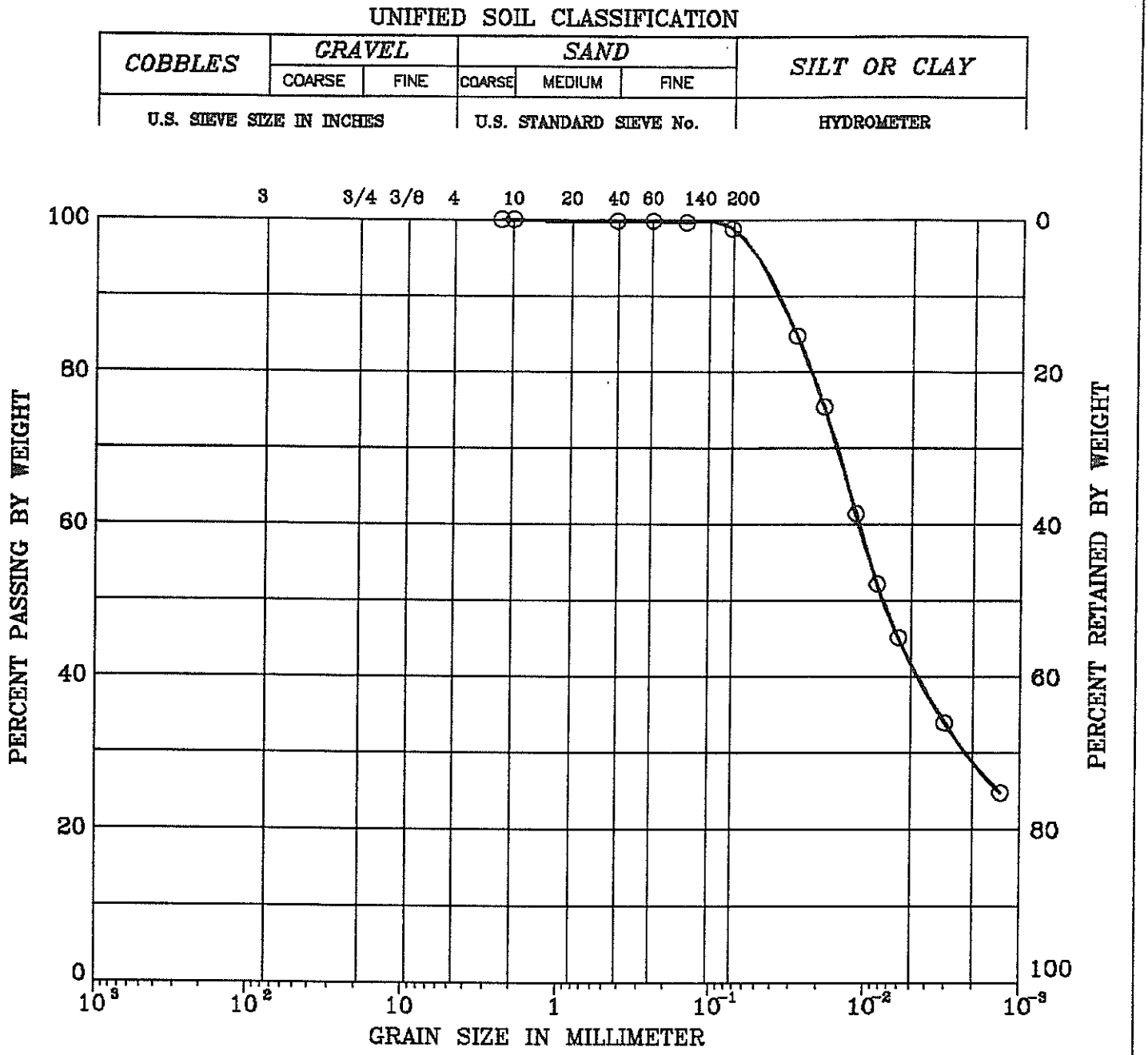
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R2G-7.0		99	63	GRAY ORGANIC CLAY (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



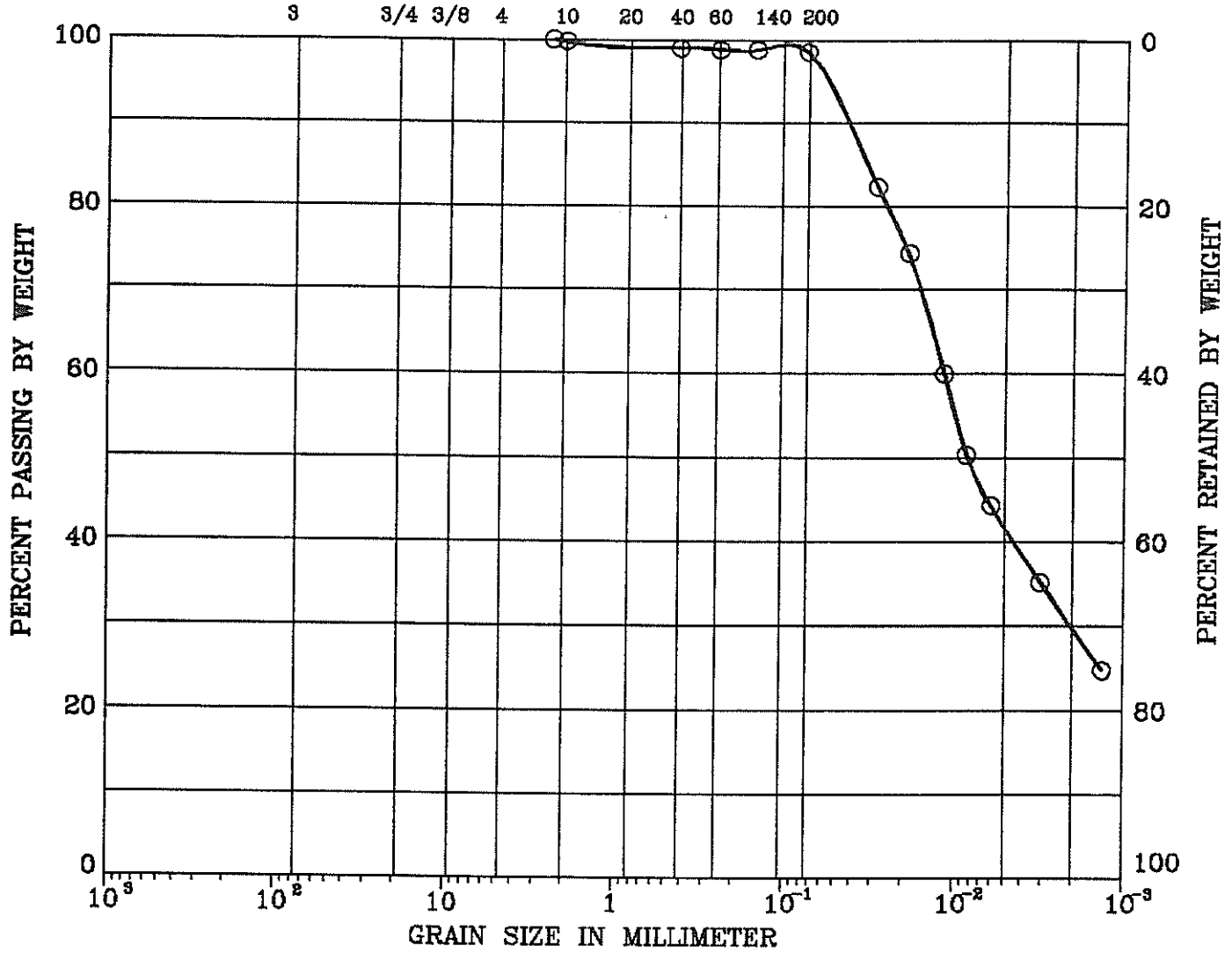
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R2G-11.0		62	32	GRAY ORGANIC CLAY (OH)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

UNIFIED SOIL CLASSIFICATION

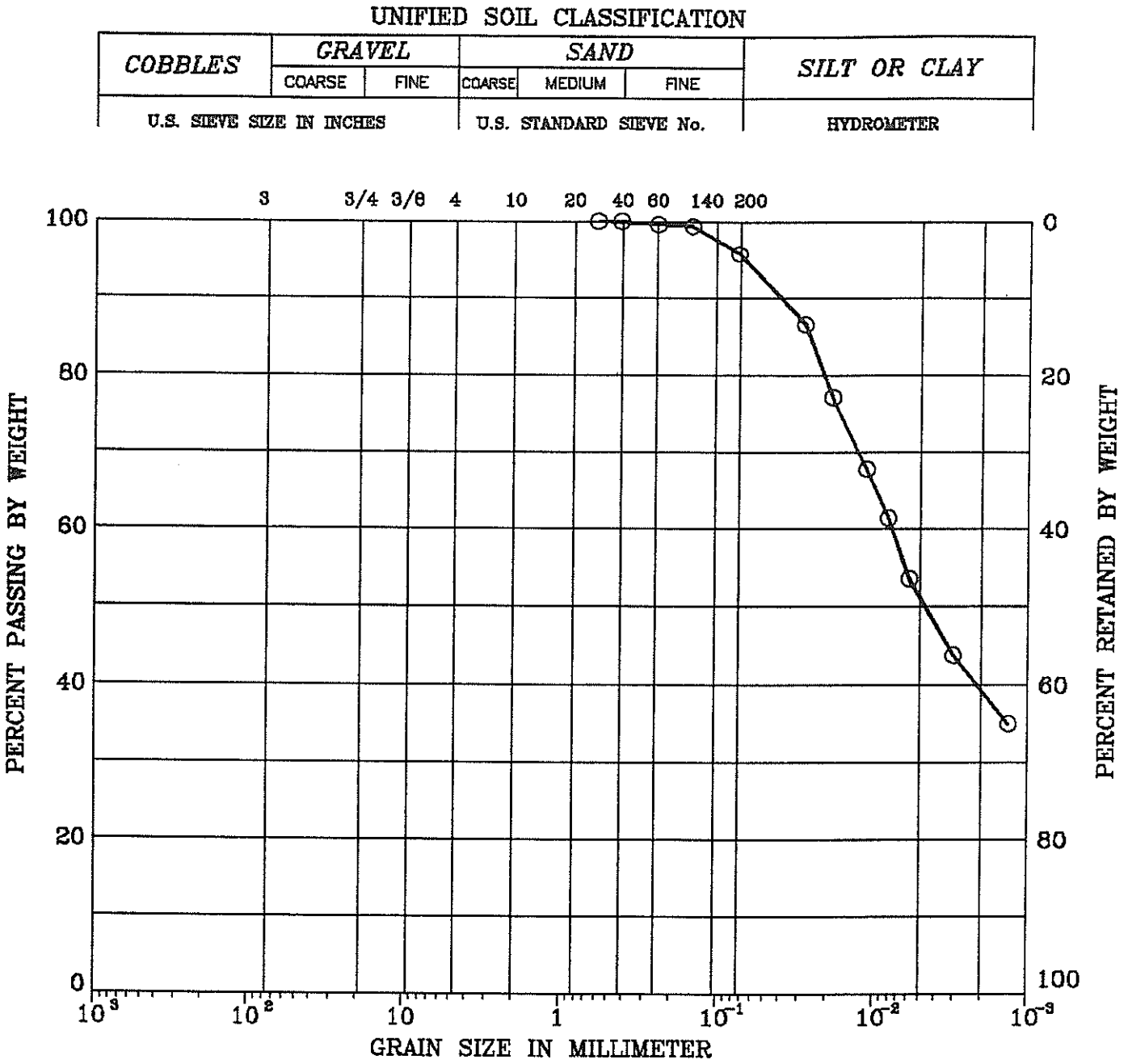
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R2G-15.0		62	31	GRAY ORGANIC CLAY (OH)

Remark :

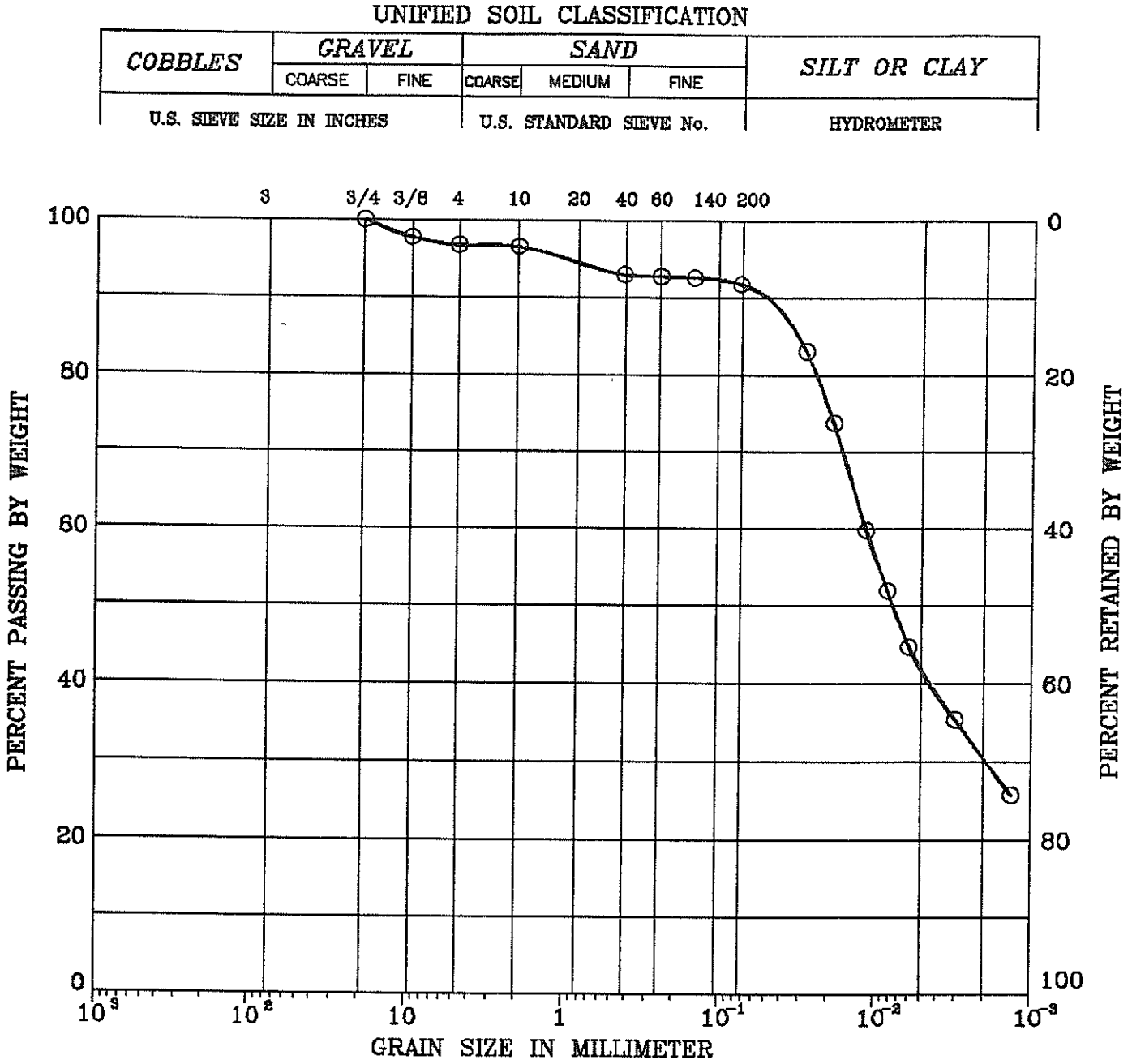
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R3G-2.5		99	61	GRAY ORGANIC CLAY (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	R3G-7.5		65	31	GRAY ORGANIC SILT (OH)

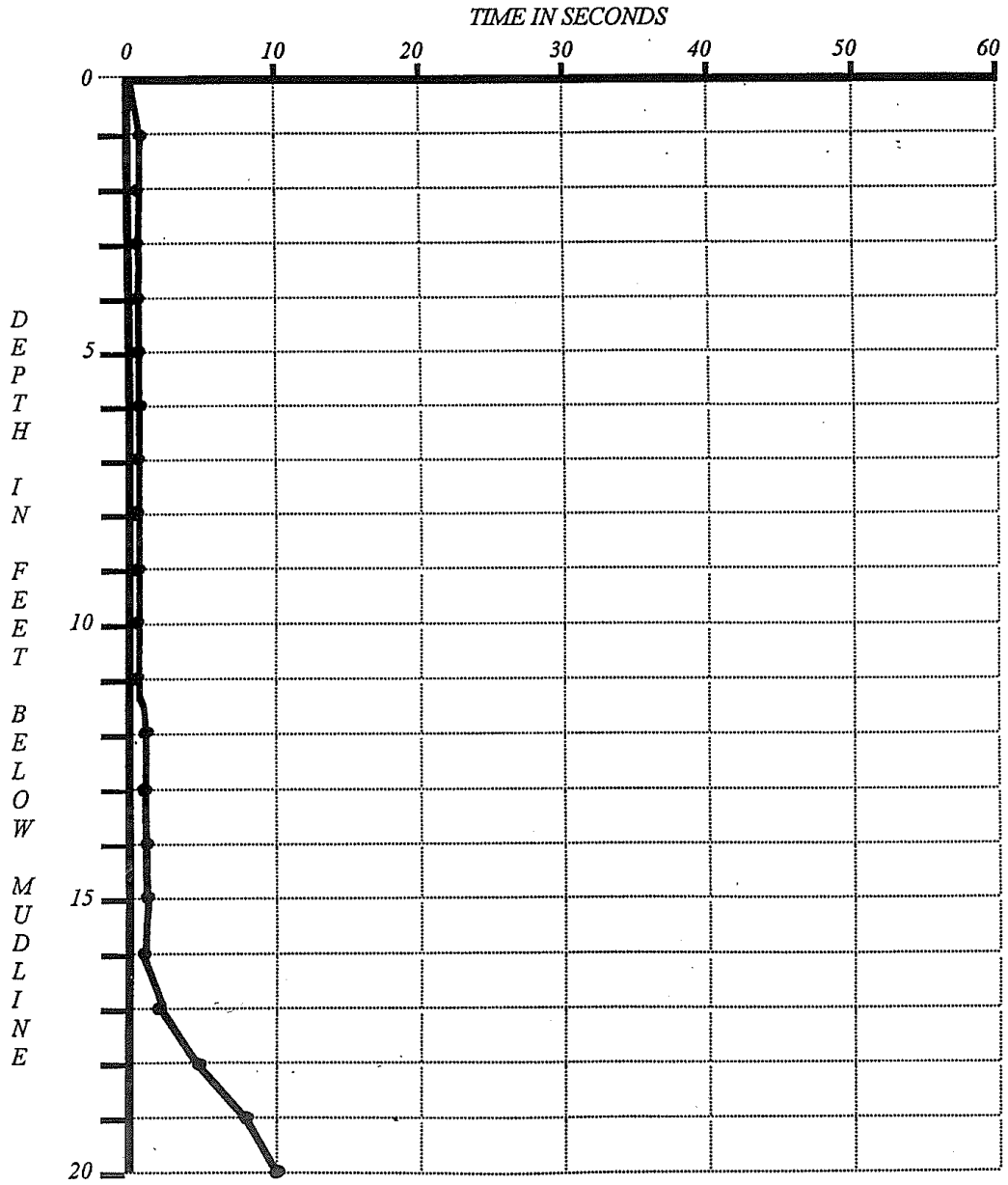
Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

Penetration Graphs

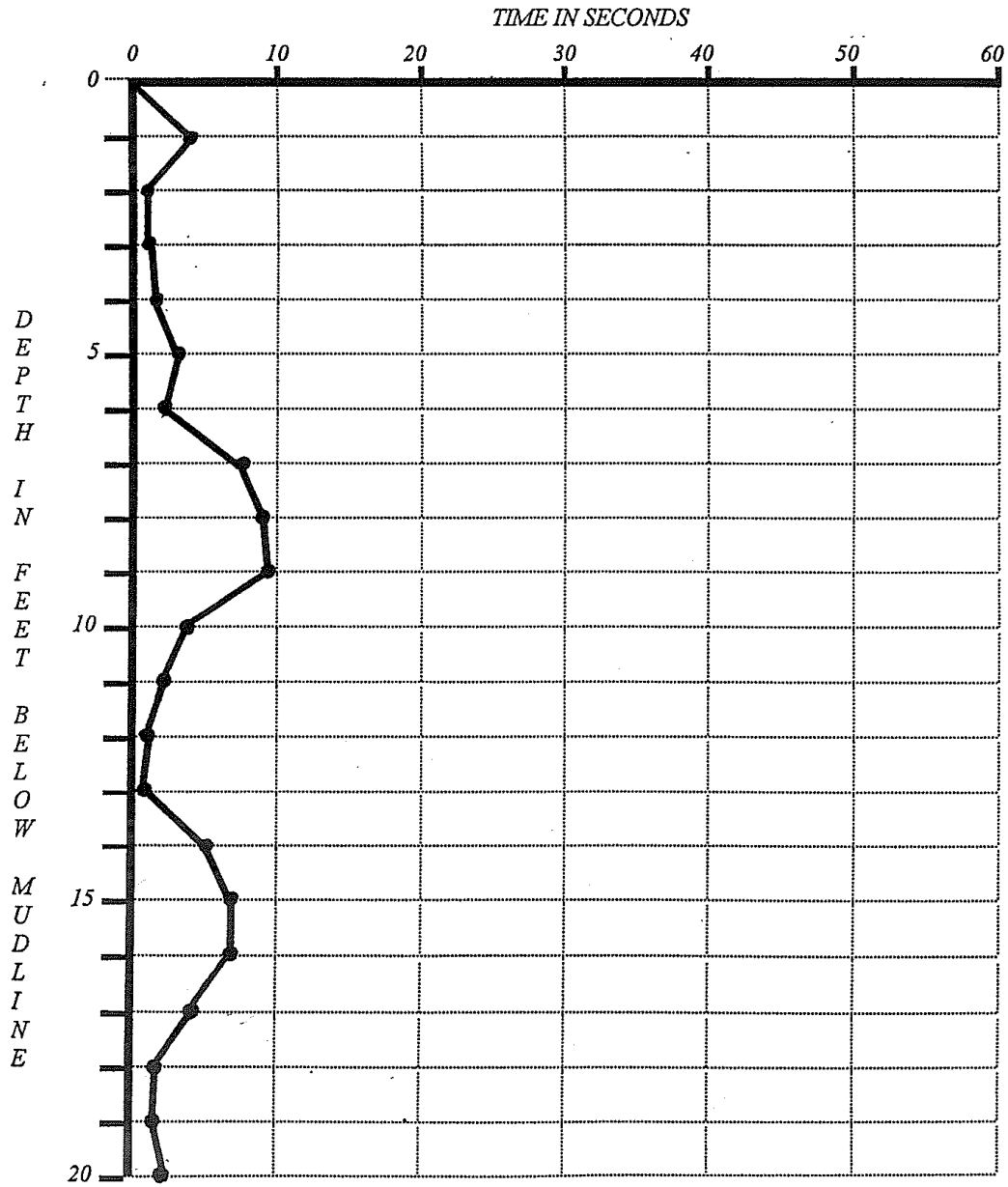
PENETRATION GRAPH

CORE NO. DRV-16 *LOCATION: LATITUDE* N 39° 39' 27.755" *LONGITUDE* W 075° 32' 32.884"
DATE: 8/29/95 *START TIME:* 0917 *STOP TIME:* 0918
WATER DEPTH MEASURED 45.0' *CORRECTED MLW* 45.9'
Total Penetration 20.0' Total Recovery 18.5'



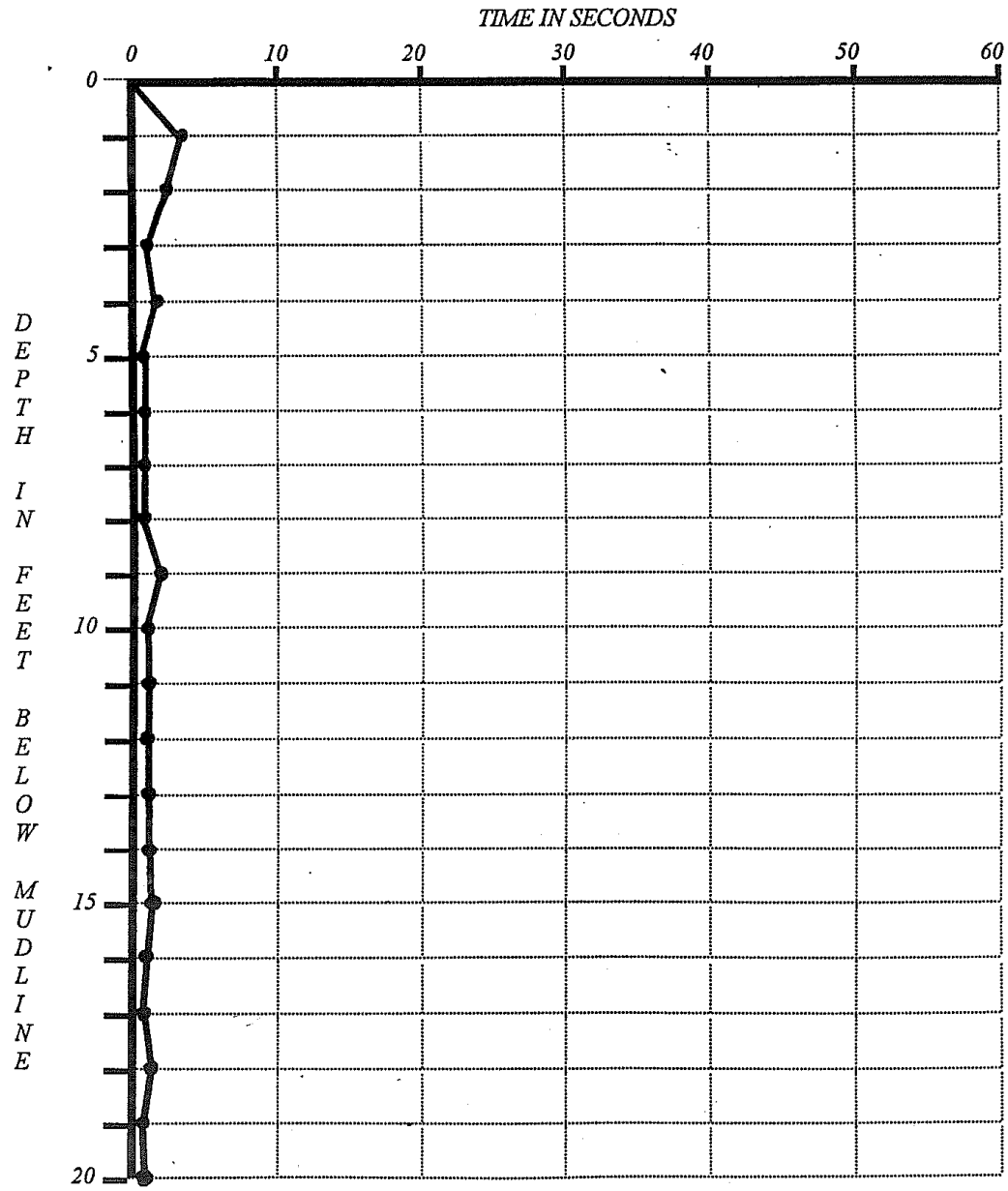
PENETRATION GRAPH

CORE NO. DRV-17 *LOCATION: LATITUDE* N 39° 39' 15.146" *LONGITUDE* W 075° 32' 47.798"
DATE: 8/29/95 *START TIME:* 1459 *STOP TIME:* 1502
WATER DEPTH MEASURED 50.0' *CORRECTED MLW* 45.5'
Total Penetration 20.0' Total Recovery 19.4'



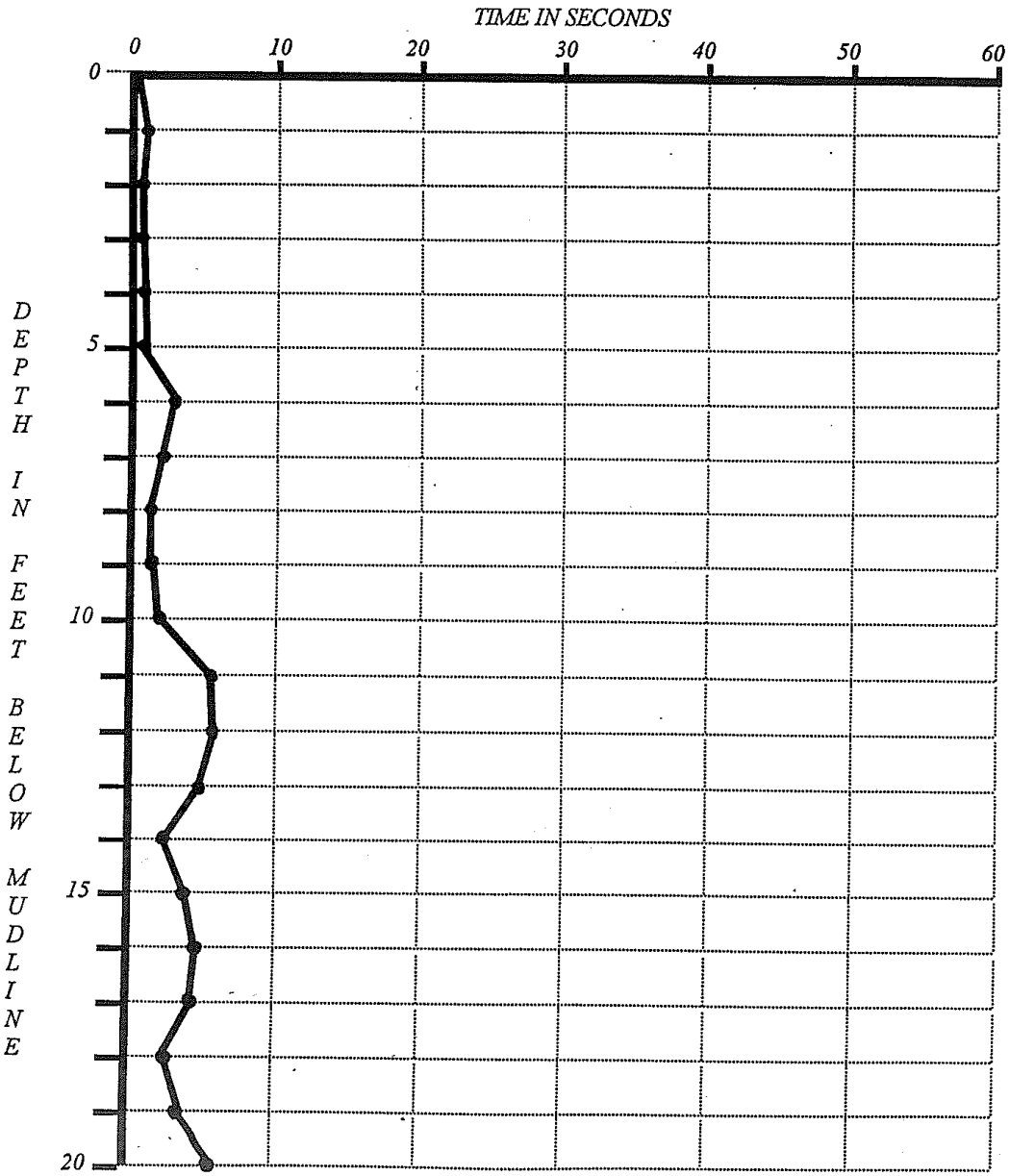
PENETRATION GRAPH

CORE NO. DRV-18 *LOCATION: LATITUDE* N 39° 38' 43.816" *LONGITUDE* W 075° 33' 23.165"
DATE: 8/29/95 *START TIME:* 1532 *STOP TIME:* 1535
WATER DEPTH MEASURED 50.0' *CORRECTED MLW* 45.8'
Total Penetration 20.0' Total Recovery 20.0'



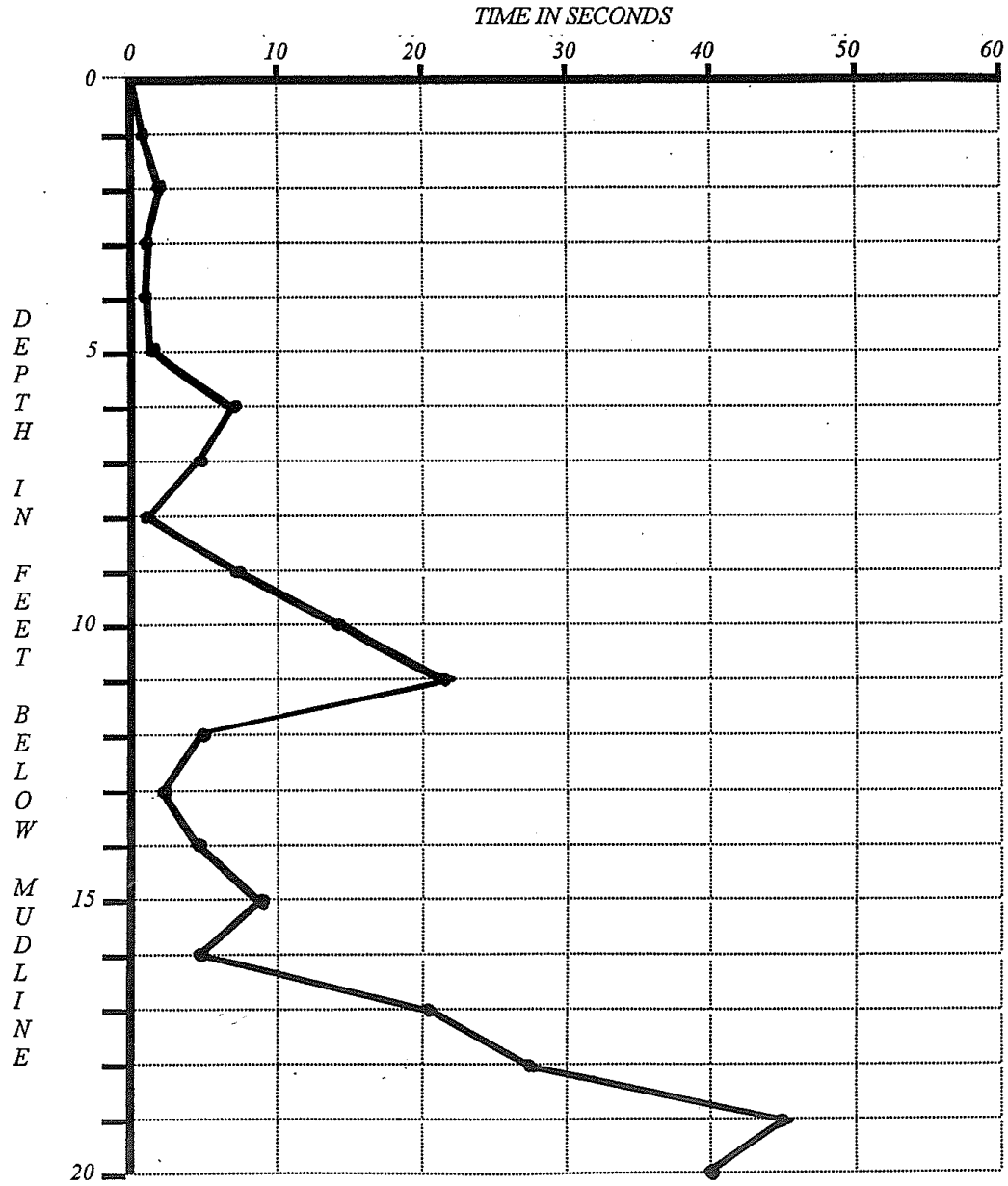
PENETRATION GRAPH

CORE NO. DRV-19 *LOCATION: LATITUDE* N 39° 37' 29.548" *LONGITUDE* W 075° 34' 30.027"
DATE: 8/29/95 *START TIME:* 1610 *STOP TIME:* 1613
WATER DEPTH MEASURED 40.0' *CORRECTED MLW* 36.6'
Total Penetration 20.0' Total Recovery 20.0'



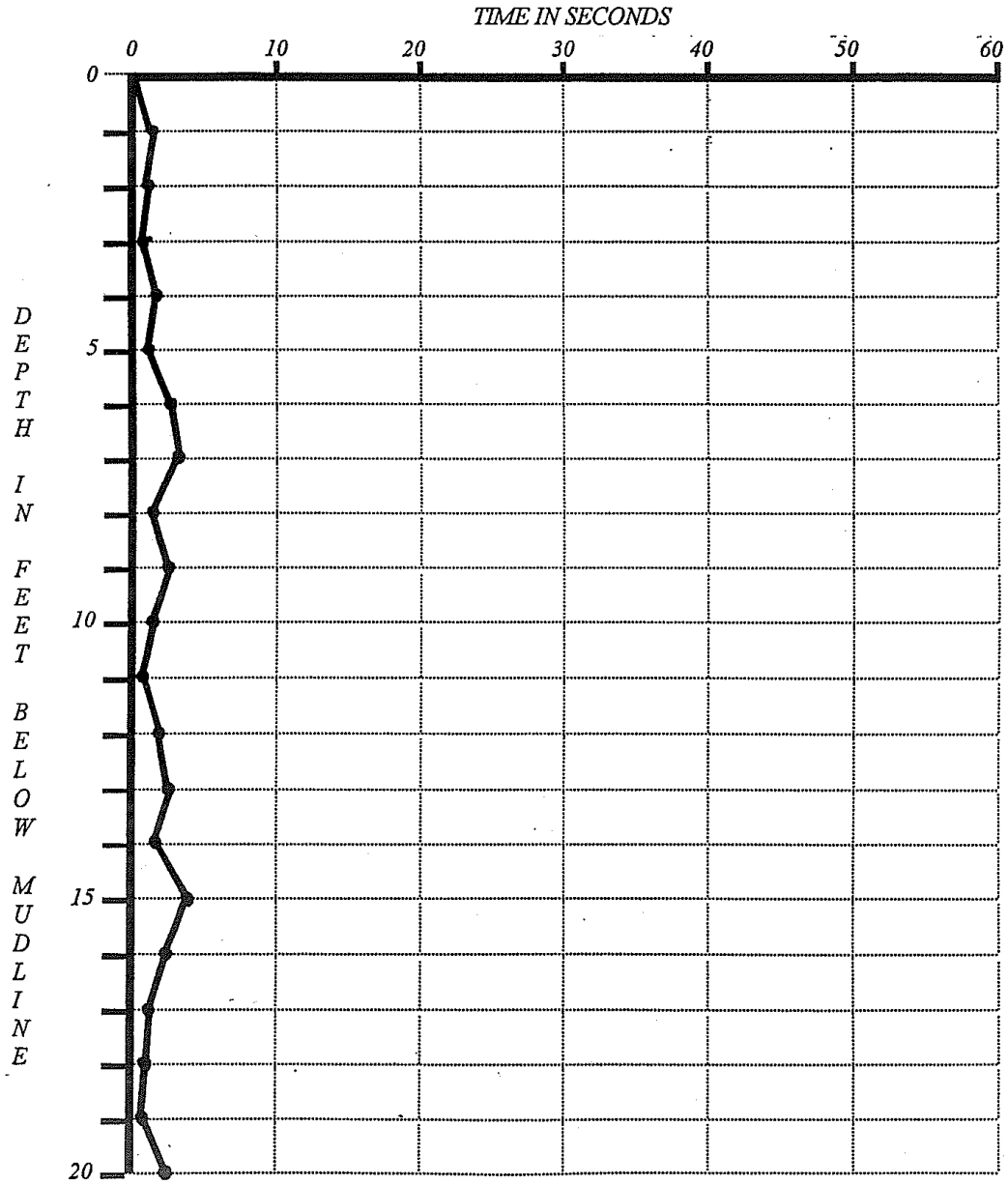
PENETRATION GRAPH

CORE NO. DRV-20 *LOCATION: LATITUDE* N 39° 37' 02.062" *LONGITUDE* W 075° 34' 33.309"
DATE: 8/30/95 *START TIME:* 0734 *STOP TIME:* 0738
WATER DEPTH MEASURED 33.0' *CORRECTED MLW* 33.1'
Total Penetration 20.0' Total Recovery 20.0'



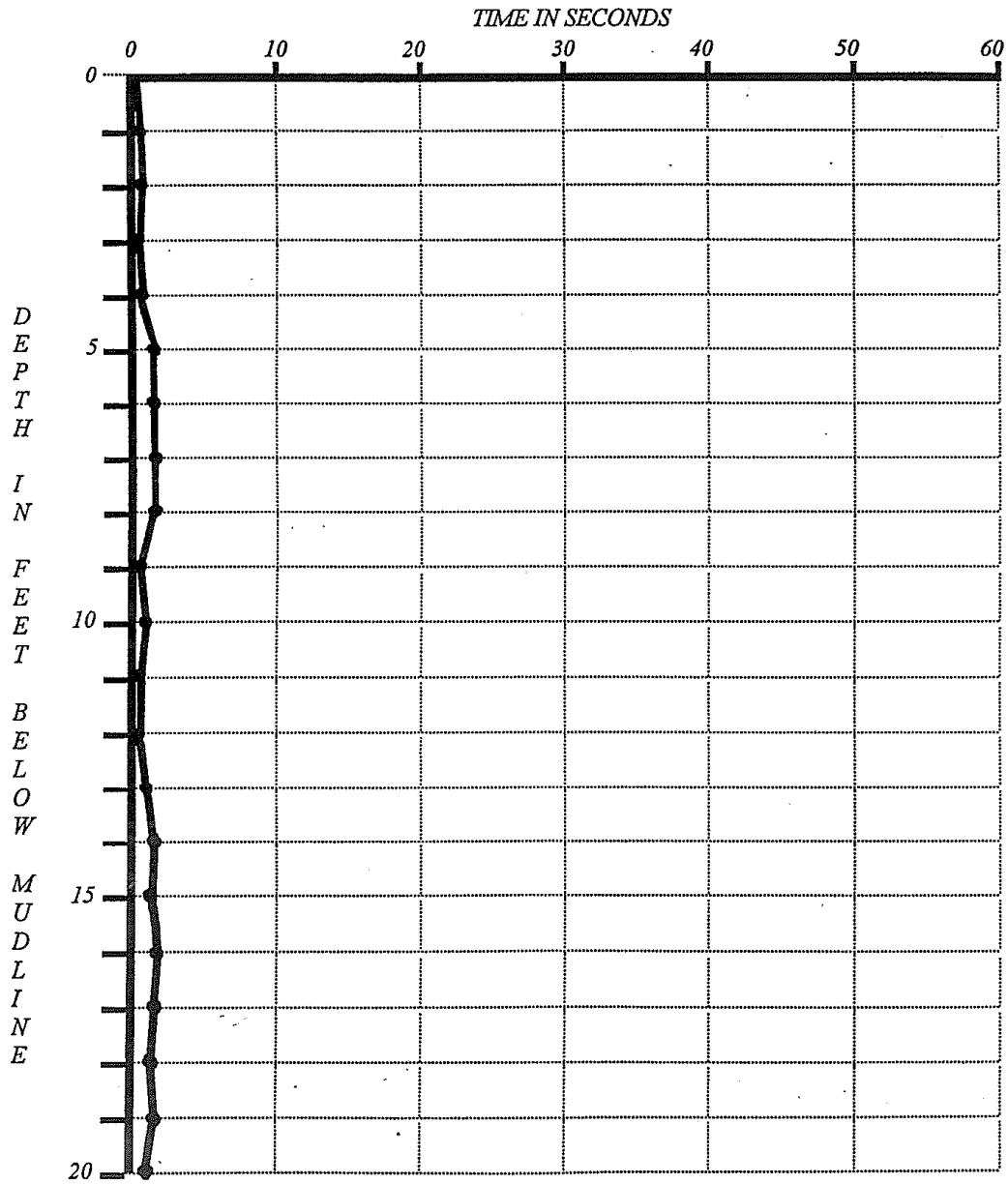
PENETRATION GRAPH

CORE NO. DRV-21 *LOCATION: LATITUDE* N 39° 34' 07.638" *LONGITUDE* W 075° 32' 59.542"
DATE: 8/30/95 *START TIME:* 0934 *STOP TIME:* 0936
WATER DEPTH MEASURED 44.6' *CORRECTED MLW* 46.1'
Total Penetration 20.0' Total Recovery 20.0'



PENETRATION GRAPH

CORE NO. DRV-22 *LOCATION: LATITUDE* N 39° 33' 06.880" *LONGITUDE* W 075° 32' 34.085"
DATE: 8/30/95 *START TIME:* 0934 *STOP TIME:* 0936
WATER DEPTH MEASURED 51.0' *CORRECTED MLW* 50.4'
Total Penetration 20.0' Total Recovery 19.3'



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REACH D

Sampling Logs

Hole No. DRV-13

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 28' 7.65" 75° 33' 44.96"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-13	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/19/91 : COMPLETED 07/19/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -50.7 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 20 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1, 2, 3, 4		Grey clay to silt clay, sand lacks intermittently. Organics in clay at 1.92, 2.74 and 3.3 to 3.6 CH-SC			Sample 0 - 5 ft.
	5, 6, 7, 8, 9		Organics bits random			Sample 5 - 9 1/4 ft.
	.25		Sand, very wet. Dryer toward bottom SP			Sample 9 1/4 - 10 ft.
	10, 11, 12		SP			Sample 10 - 12.4 ft.
	.5, 13, 14		Grey gravelly sand grading down to sandy gravel. Medium to fine sand medium to fine gravel SM-SC			Sample 12.4 - 15 ft.
	15, 16					
	17, 18, 19		Grey gravelly coarse to fine sand with medium to fine gravel M-C			Sample 17.1 - 20 ft. No gravel in sample

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-13

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Lat.
Long. 10m N of plan

Log of Vibrocore No. DRV-23

SURFACE ELEVATION _____ LOCATION Ready Island Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth 30'	
		Gray Dense F-M sand tr F gravel	
5		Gray Dense M-Cs sand tr F gravel	
10		Gray Dense M-Cs sand tr F gravel	
15		Gray V. Dense M-Cs sand tr F-Cs gravel	
		Gray V. Dense M-Cs sand tr F grav.	
20		Recovery 17.5'/20' 20' Bot. of core	
		Note: Apparent moderate to hard penetration resistance	

Completion Depth 20' Feet Water Depth 30 Feet Date 8/31/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.

Log of Vibrocore No. DRV-24

5m N of plan SURFACE ELEVATION _____ LOCATION Bend 5

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		**Water Depth** 44'	
	0-5'	Dk Gray Soft clay	
5		Dk Gray Soft Clay	
	5-10'		
10		Dk Gray Soft Clay	
	10-15'		
		Gray, Dense F-M Sand and F-Grav.	
15		Recovery 13'/15' -15' Bot. of core	
		Note: apparent moderate resistance to penetration except bottom where apparent refusal was encountered	
		Note: a retry at this location encountered similar results with 13' penetration and recovery 12'3"/13'	

Completion Depth _____ Feet Water Depth 44' Feet Date 8/13/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Lat.
Long.

Log of Vibrocore No. DRV-25

16m N of plan SURFACE ELEVATION _____ LOCATION Baker Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth 51'	
		DK Gray soft Clay	
5		DK Gray soft Clay	
10		DK Gray soft clay	
		DK Gray soft Clay	
15		Recovery 15'/15' -15' Bot. of core	
		Note: unknown why penetration was not to -20' apparent 15' of penetration based on mud on side of casing. Apparent moderate penetration resistance	

Completion Depth 15 Feet Water Depth 51' Feet Date 8/31/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

Log of Vibrocore No. DRV-26

Lat.
Long.
19m E of Plan

SURFACE ELEVATION _____ LOCATION Bend T

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth 50'	
		DK Gray soft clay	
5		DK Gray Soft clay	
10		DK Gray Soft clay	
15		DK Gray soft clay w/ F-M Sand lens	
20		DK Gray Soft clay	
		Recovery 19'6"/20' 20' Bot. of core	
		Note: apparent moderate penetration resistance	

Completion Depth 20 Feet Water Depth 50' Feet Date 8/31/95

Project Name Delaware Vibrocore Project Number R95500

Log of Vibrocore No. DRV-27

Lat.
Long.
15m NE of plan

SURFACE ELEVATION _____ LOCATION Liston Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth 45'	
5		DK Gray Soft clay - little F-CS sand and F-Grav	
10		DK Gray Soft clay	
15		DK Gray soft clay	
20		DK Gray Soft clay Recovery 20'/20' 20' Bot. of Core Note: Apparent moderate penetration resistance	

Completion Depth 20' Feet Water Depth 45' Feet Date 8/31/95

Project Name Delaware Vibrocore Project Number R95500

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DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-38*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1337*
Boring Depth (ft): *0.0 - 19.80*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			SA - 2.7-2.9 40 sieve
	4			
	5		GRAY, POORLY GRADED SAND (SP), WITH AN OCCASIONAL POCKET OF (SP-SM).	
	6			
	7			
	8			SA - 8.2-8.4 40 Sieve
	9			
	10			
	11			
	12			
	13			SA - 12.8-13.0 18 sieve
	14			
	15		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	16			
	17			SA - 17.0-17.3 30 Sieve
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

5

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-39*	
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1338*	
Boring Depth (ft): *0.0 - 19.60*	Depth:	Work order: *8303*	
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2			
	3			SA - 3.0-3.3 40 sieve
	4		TAN & GRAY, POORLY GRADED SAND (SP).	
	5			
	6			
	7			SA - 6.8-7.1 50 sieve
	8			
	9		GRAY, POORLY GRADED SILTY SAND (SP-SM).	SA - 9.1-9.4 100 sieve
	10			
	11			
	12			
	13		TAN & GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	SA - 12.5-12.9 25 sieve
	14			
	15			
	16			
	17			SA - 16.6-17.1 20 sieve
	18		TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	19			

Date: *12/05/97* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

10

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-40 REACH 1*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1339*
Boring Depth (ft): *0.0 - 4.30*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
	2		TAN, GRAVELLY POORLY GRADED SAND (SP).	SA - 1.6-2.3 14 sieve
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *1*

16

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-40 REACH 2*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1339*
Boring Depth (ft): *0.0 - 20.40*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			TAN & GRAY, POORLY GRADED SAND (SP), WITH A LITTLE TO SOME GRAVEL SIZES.	
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. 2 of 2

19

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *NEW JERSEY COASTAL STUDIES*		Boring No. *DRV-40 REACH 2*
Location: *Absecon PED & Oakwood Beach Feasibility*		Lab No. *184/1339*
Boring Depth (ft): *0.0 - 20.40*	Depth:	Work order: *8303*
Datum/Notes: *See grain size data on enclosed gradation curves.*		Requisition: *CENAP-EN-97-937*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	1			
			BROWN, POORLY GRADED SAND (SP).	
	2			SA - 1.9-2.2 3 sieve
	3			
	4			
	5			
	6			SA - 5.5-6.1 8 sieve
	7			
	8			
	9			
	10			
	11		TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP).	SA - 10.4-11.2 10 sieve
	12			
	13			
	14			SA - 13.7-14.4 7 sieve
	15			
	16			SA - 16.2-17.0 8 sieve
	17			
	18			
	19			

Date: *12/05/97*

LABORATORY LOG AND SAMPLE DATUM

Sheet No. *1* of *2*

19

49

RECORD OF BOREHOLE: T-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N398522.14 E093780.64
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 08:28
FINISH: 09:20
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -29.8
ELEV. DATUM: Mean low water
WATER DEPTH: 29.8
SIGNATURE: TJ Koch

SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
5	-29.8	0.0 - 0.4' brown to greenish brown, med-grained, silty SAND							
		0.40 - 4.35' interbedded v. fine- to fine-grained SAND and grey to black (stained?) silty CLAY							Run 1: cored 0-20'; recov = 10.0' +/- Run 2: cored 0-20'; recov = 14.5' Run 3: cored 0-20'; recov = 16.1'
3						2	G,C		
		4.35 - 9.1' v. thinly interbedded grey to greenish grey, fine-greined silty SAND and silty CLAY		3 (0.0 - 20.0)	16.1/20.0				Logged/Sampled Core from RUN 3
7						2	G,C		Geotech Samples (G) -- locations noted: in order: T-1-G-0.4 T-1-G-4.35 T-1-G-9.1 Chem Samples (C) -- locations noted: T-1-C-0.4 T-1-C-4.35 T-1-C-9.1
9		9.1 - 16.1' .br grey to greenish grey silty CLAY, w/ few, v. thin interbeds of silty, v. fine-grained sand							

DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 80.5%

RMC ENVIRONMENTAL SERVICES

RECORD OF BOREHOLE: T-1

PROJECT: PCOE Del R. Vibracores
PROJECT LOCATION: Delaware River
PROJECT NO.: 04420
BORING LOCATION: N398522.14 E093780.64
BORING TYPE: Vibracore

BORING DATE: 11/09/92
START: 08:28
FINISH: 09:20
LOGGED: T.J. Koch
DATE: 11/09/92

ELEV. TOP OF HOLE: -29.8
ELEV. DATUM: Mean low water
WATER DEPTH: 29.8
SIGNATURE:

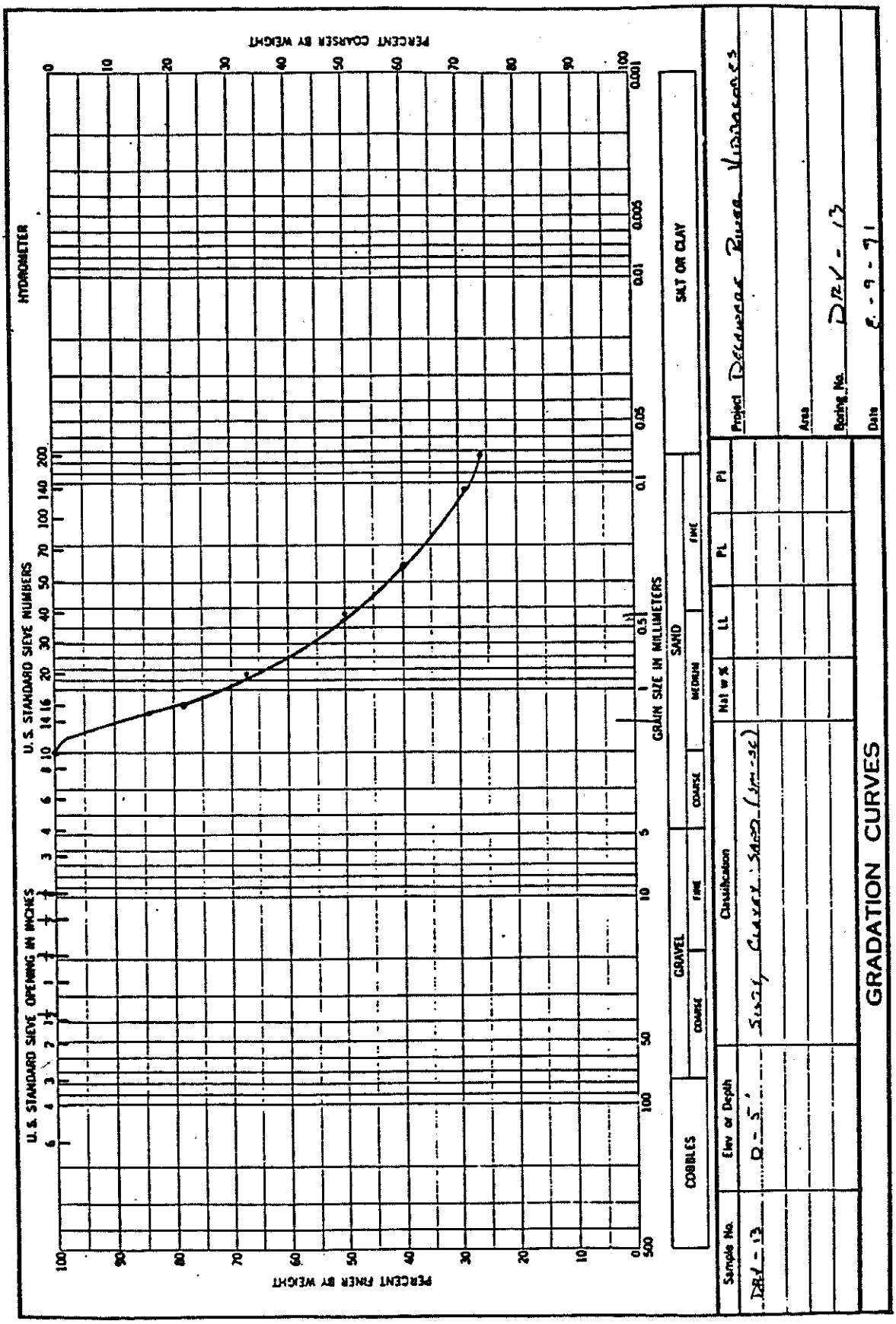
DEPTH SCALE (FEET)	ELEVATION	DESCRIPTION	GRAPHIC LOG	CORE RUN NO.	CORE RUN REC/ATT	SAMPLES NUM.	SAMPLES TYPE	SAMPLES BOX	COMMENTS
10		silty CLAY (as above)							
11									
12						2	G,C		
13									
14									
15				3 (0.0 - 20.0)	16.1/20.0				
16	-45.9	16.1' -- core recovery ends							
17									
18									
19									
20									

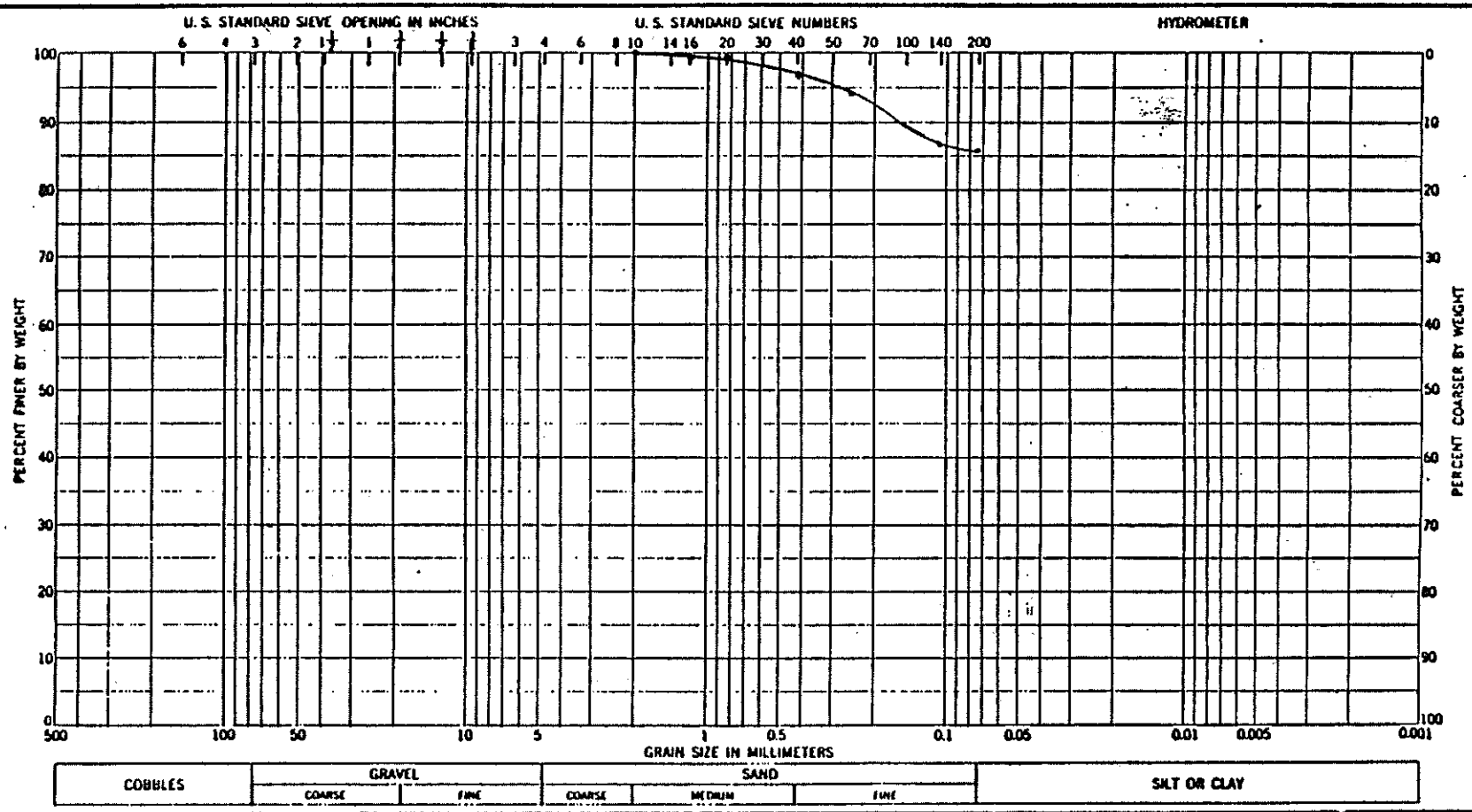
DRILL RIG: EXMAR Vibracorer
DRILLING CONTRACTOR: EXMAR
DRILLER: Rodney Meyer

DIRECTION OF HOLE: Vertical
TOTAL DEPTH OF HOLE: 20.0
TOTAL CORE RECOVERY: 80.5%

RMC ENVIRONMENTAL SERVICES

Gradation Curves & Sieve Analysis


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Mainstem
Area
Boring No. DRV-13
Date 8-9-91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-13
0-5'
Sandy Clayey Silt (SM-ML)
GRADATION CURVES
ENG FORM 1 MAY 83 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRV-13	5 - 9.25'	Clay		50.1	23.7	26.4
		CH				

Project Delaware River Hibernia

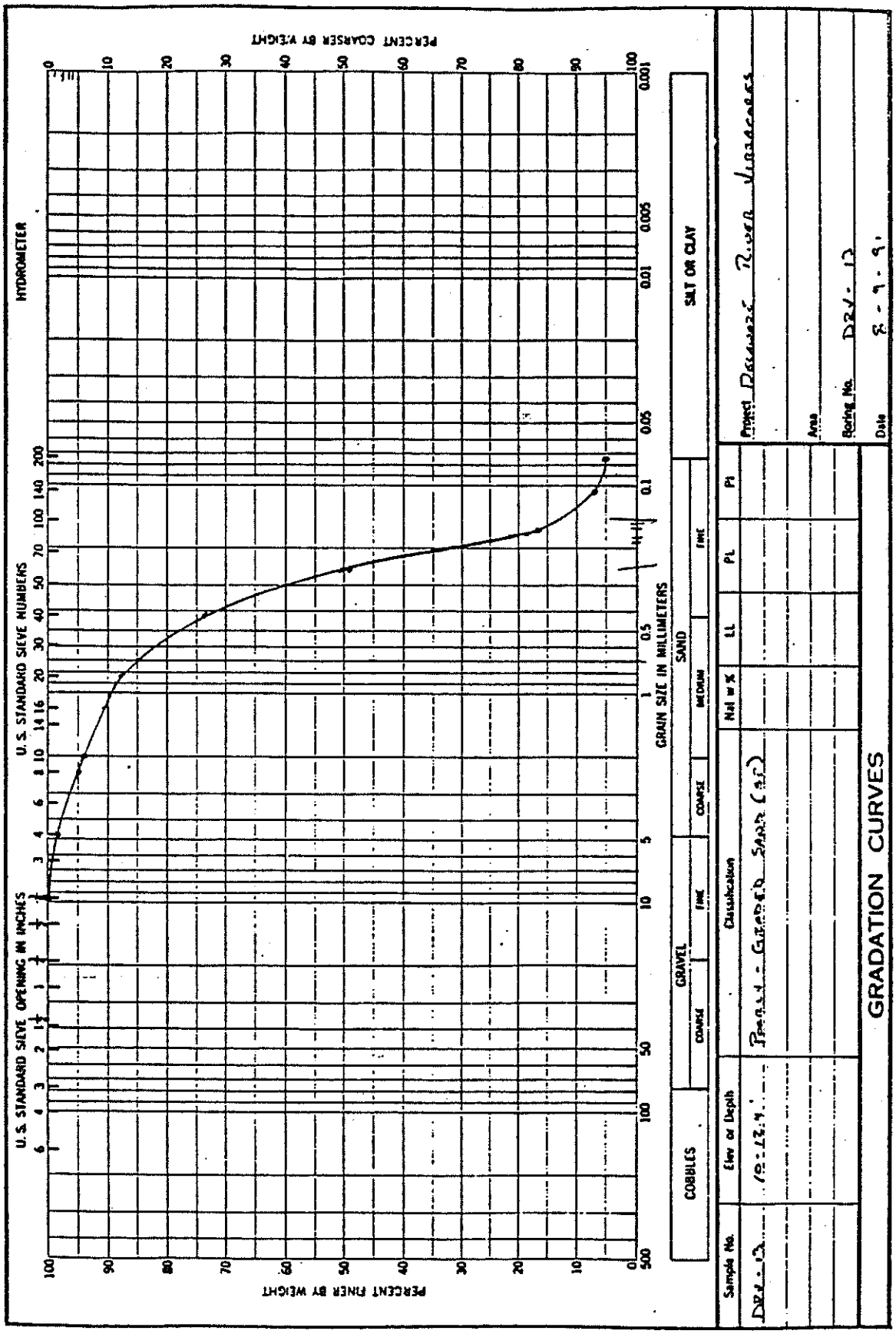
Area

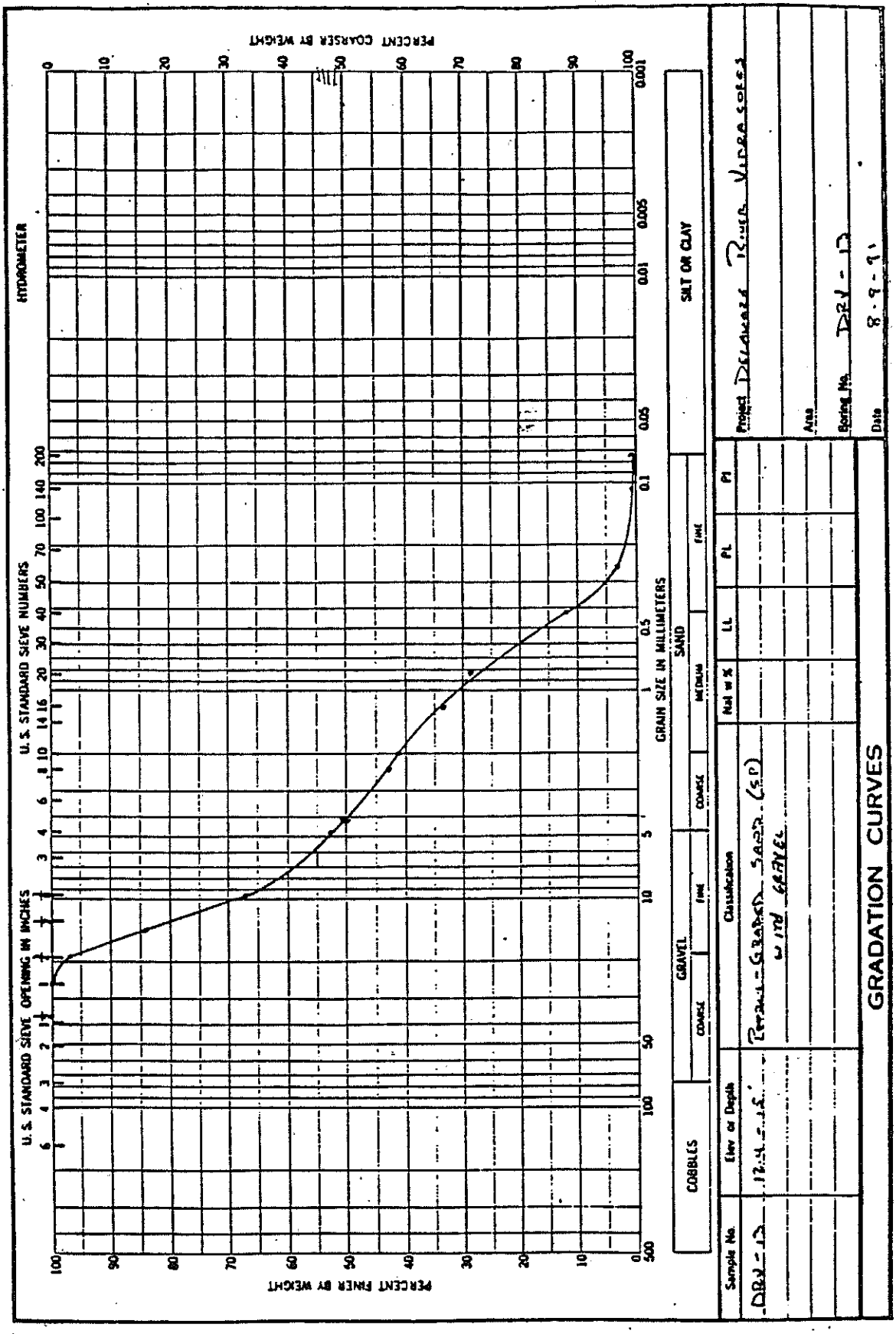
Boring No. DRV - 13

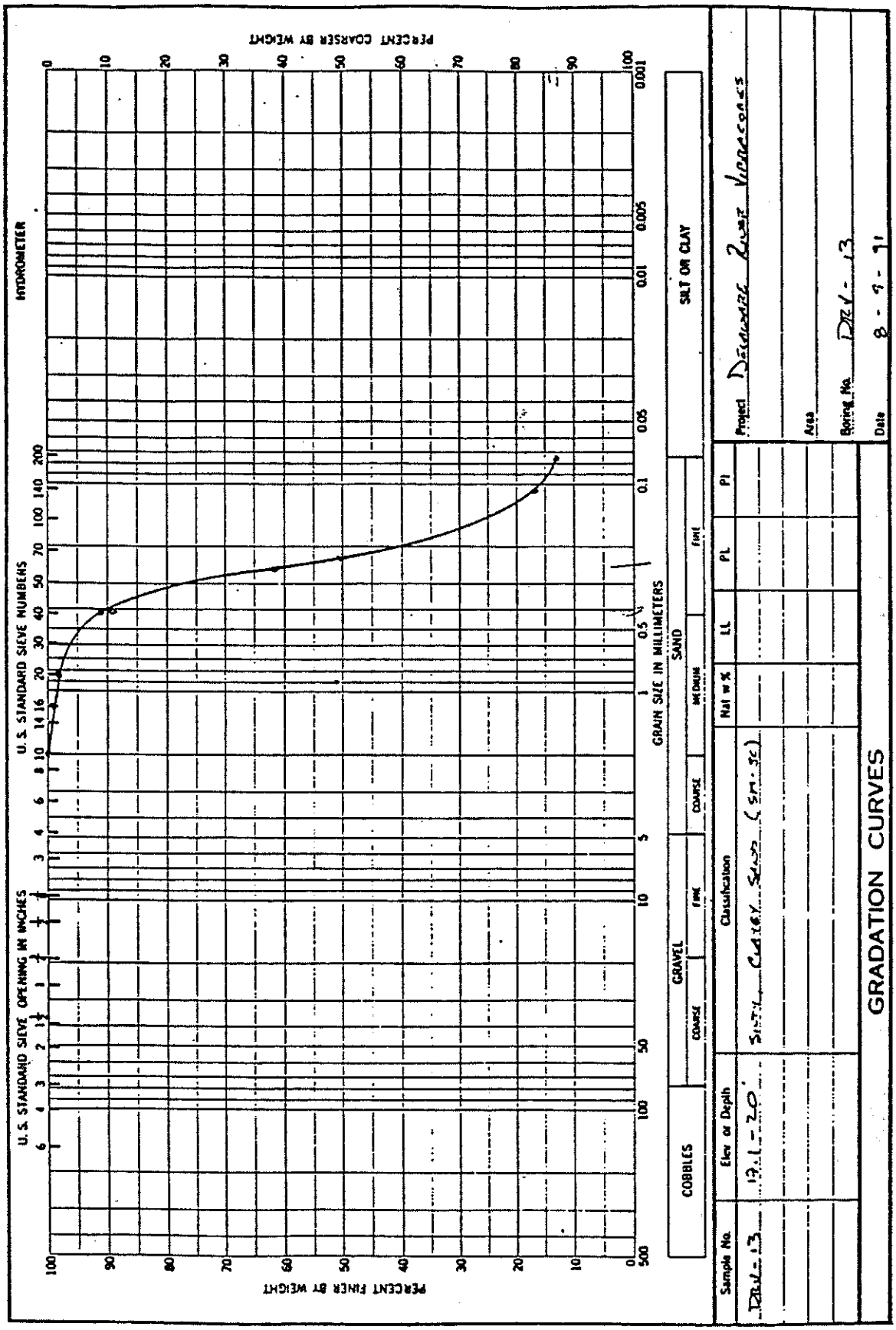
Date 8 - 9 - 91

GRADATION CURVES

ENG FORM 1 MAY 63 2087

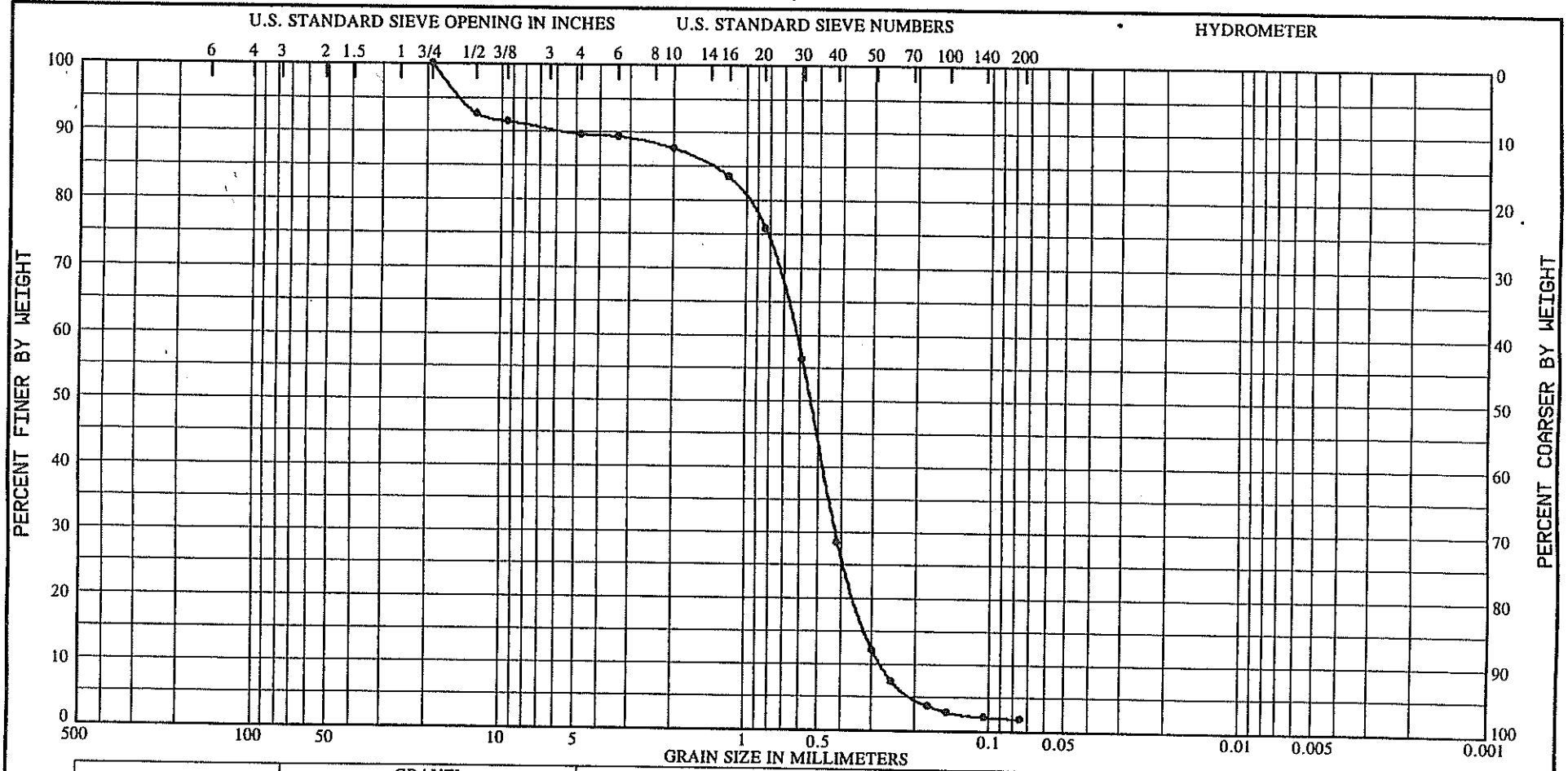

U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 68 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project Delaware River Videocores
Area
Boring No. DRV-13
Date 8-9-91
GRADATION CURVES
DRV-13
19.1-20'
Silty Clayey Sand (SM-SC)
ENG FORM 1 MAY 63 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

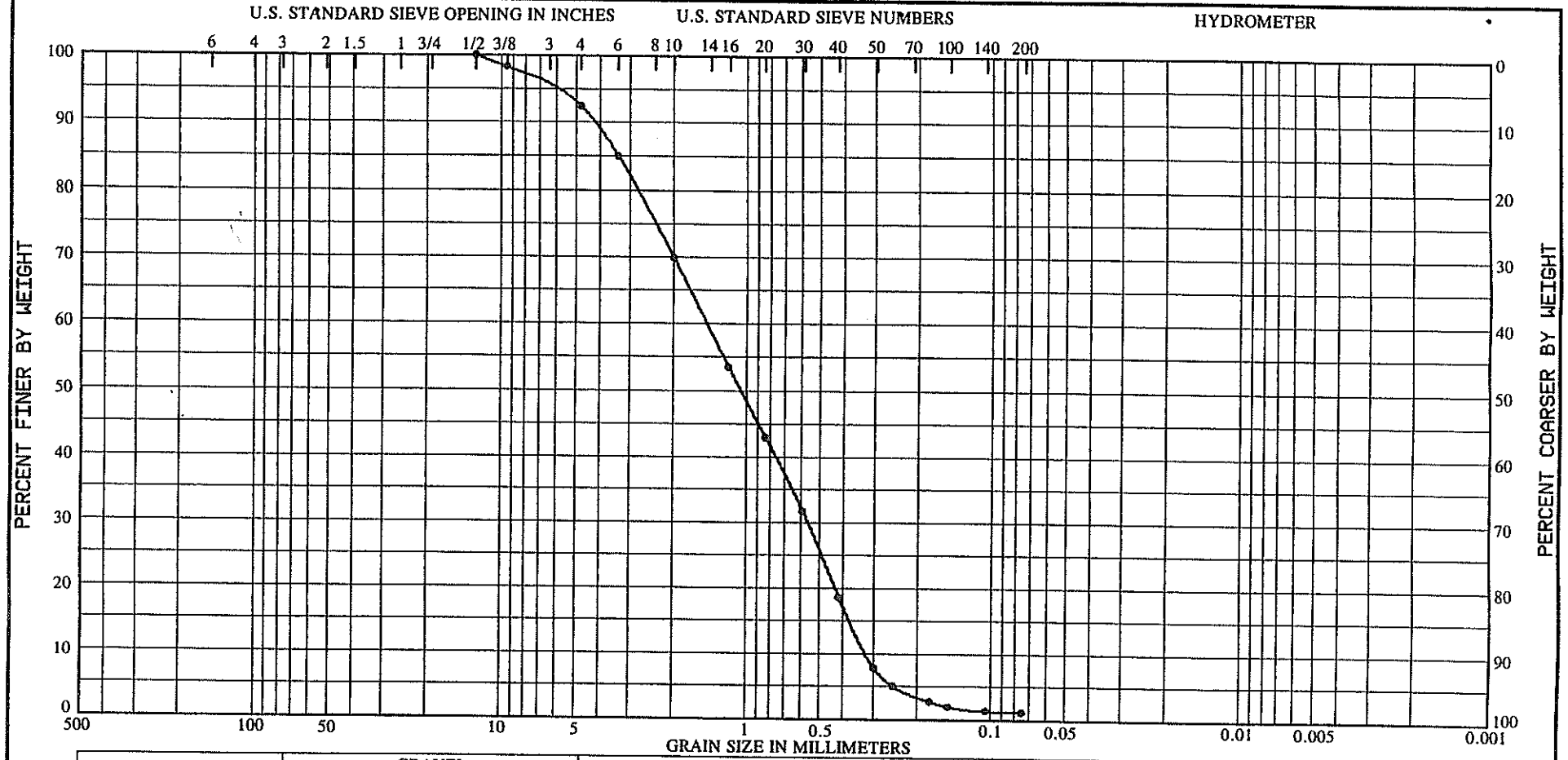
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	17.0 - 17.3	TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1337
Hole No. DRV-38
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

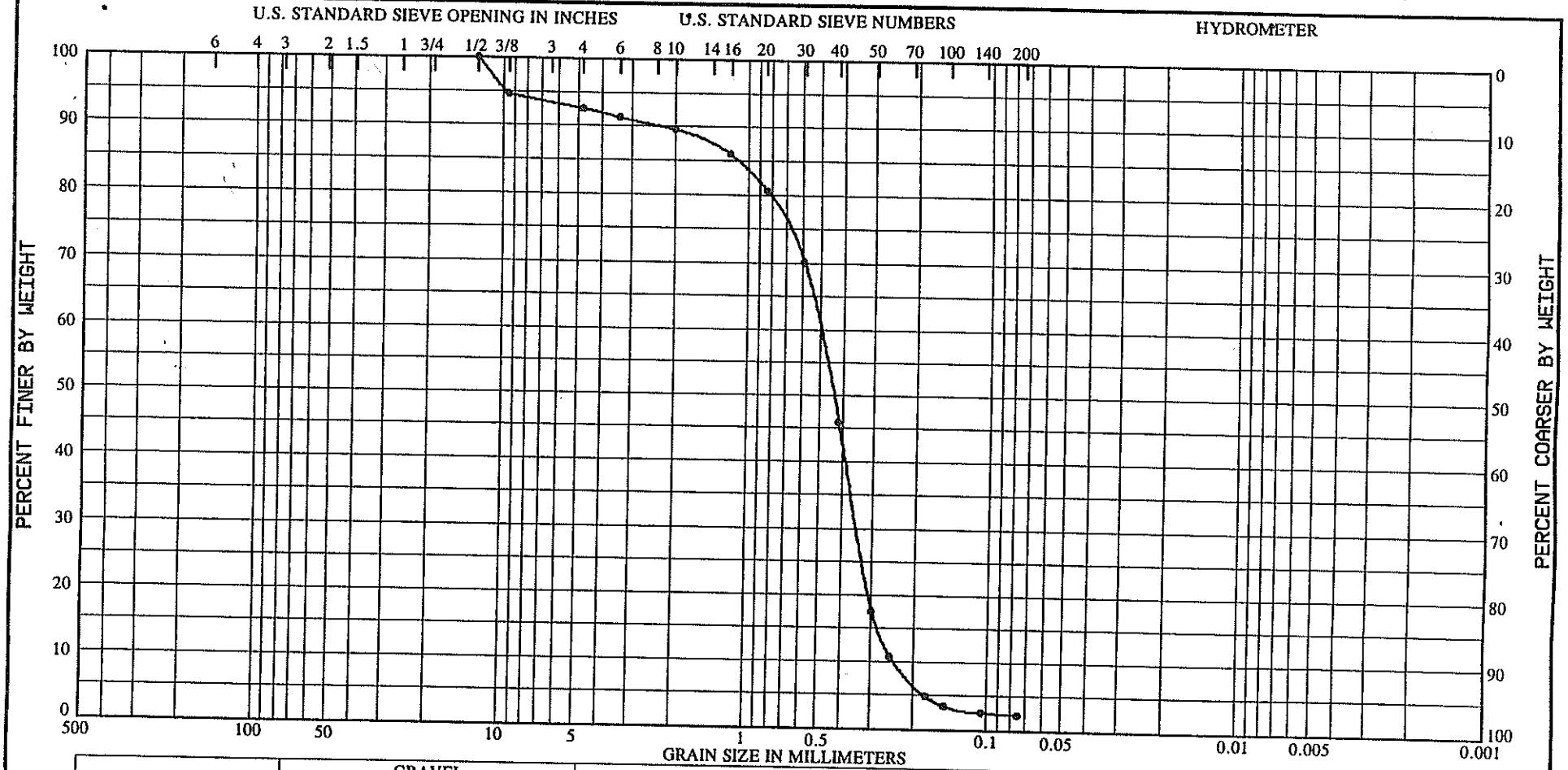
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.8 - 13.0	TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1337
Hole No. DRV-38
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

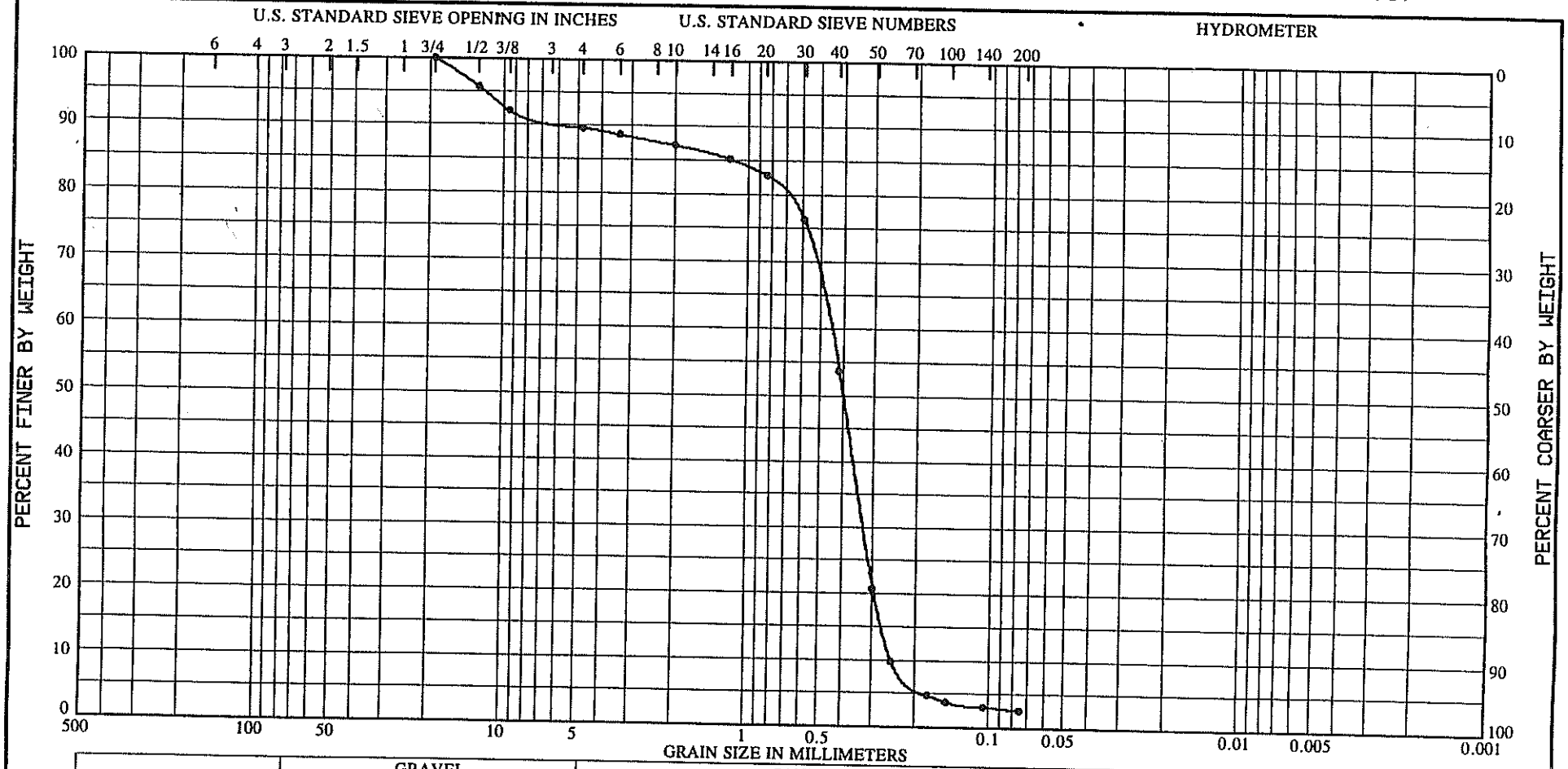
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	8.2 - 8.4	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1337
Hole No. DRV-38
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

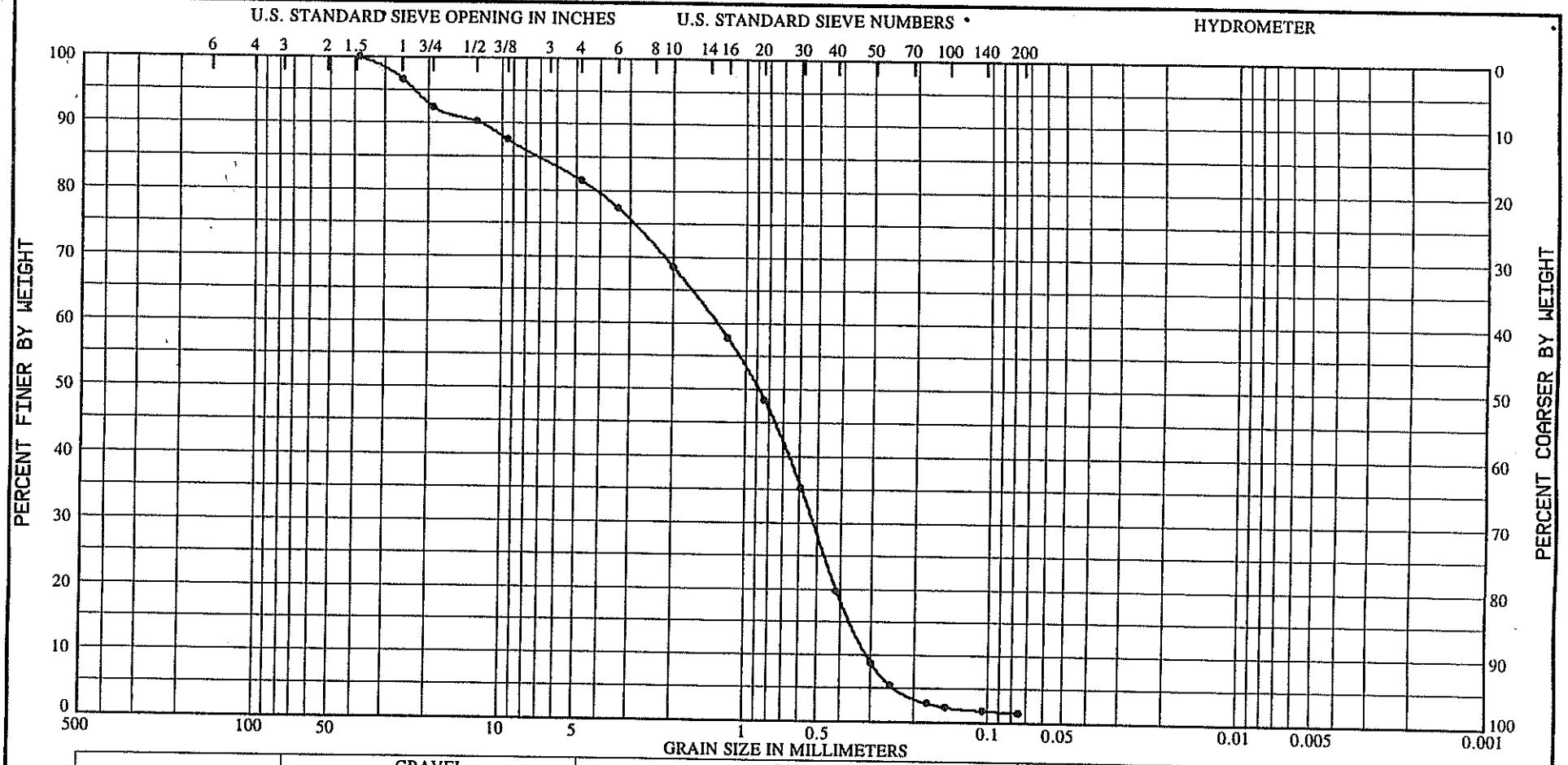
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	2.7 - 2.9	GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1337
Hole No. DRV-38
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

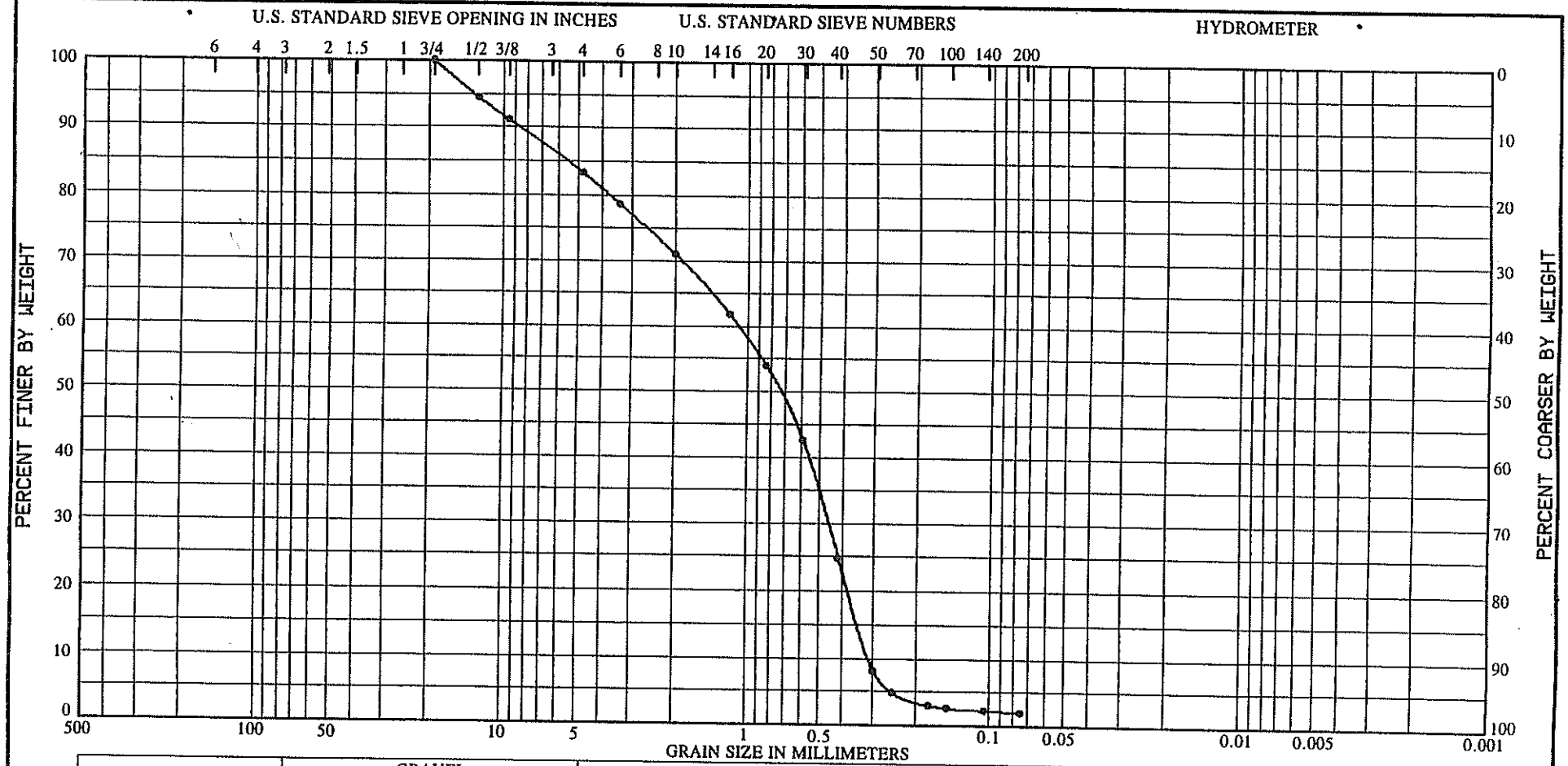
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.6 - 17.1	TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1338
Hole No. DRV-39
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

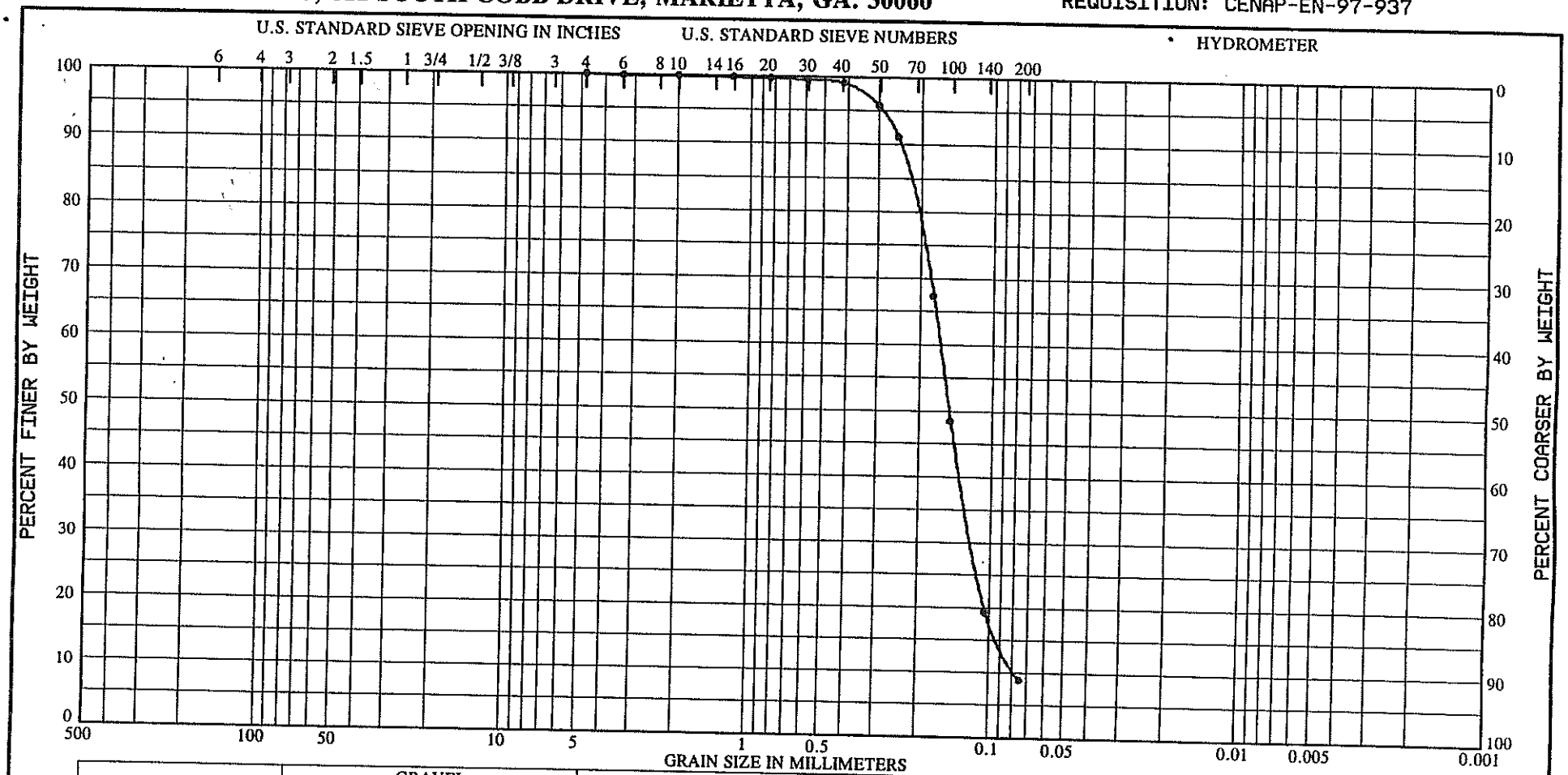
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	12.5 - 12.9	TAN & GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1338
Hole No. DRV-39
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	9.1 - 9.4	GRAY, POORLY GRADED SILTY SAND (SP-SM).				

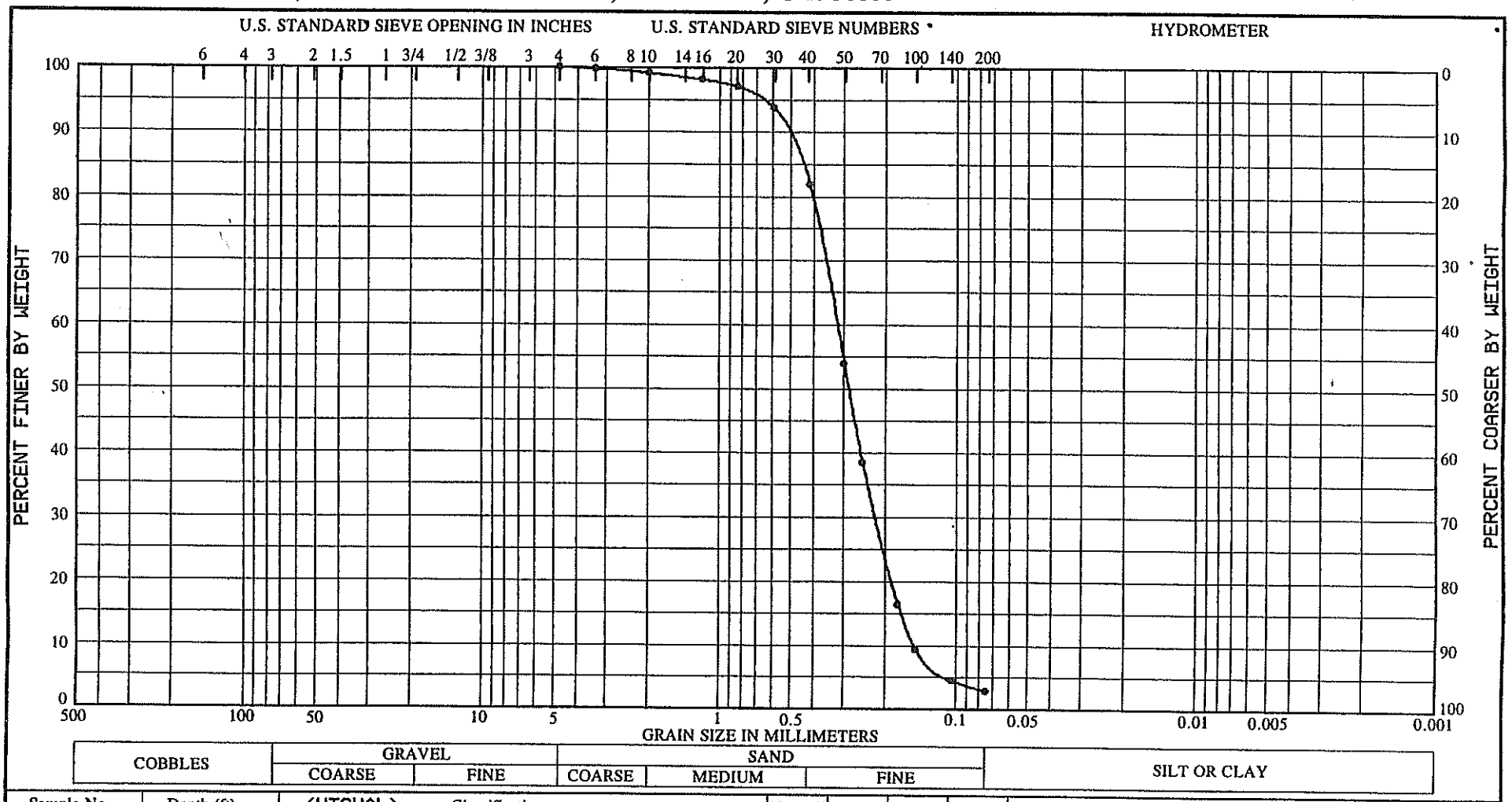
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1338
Hole No. DRV-39
Date 12/04/97

GRADATION CURVES

13

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	6.8 - 7.1	TAN & GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

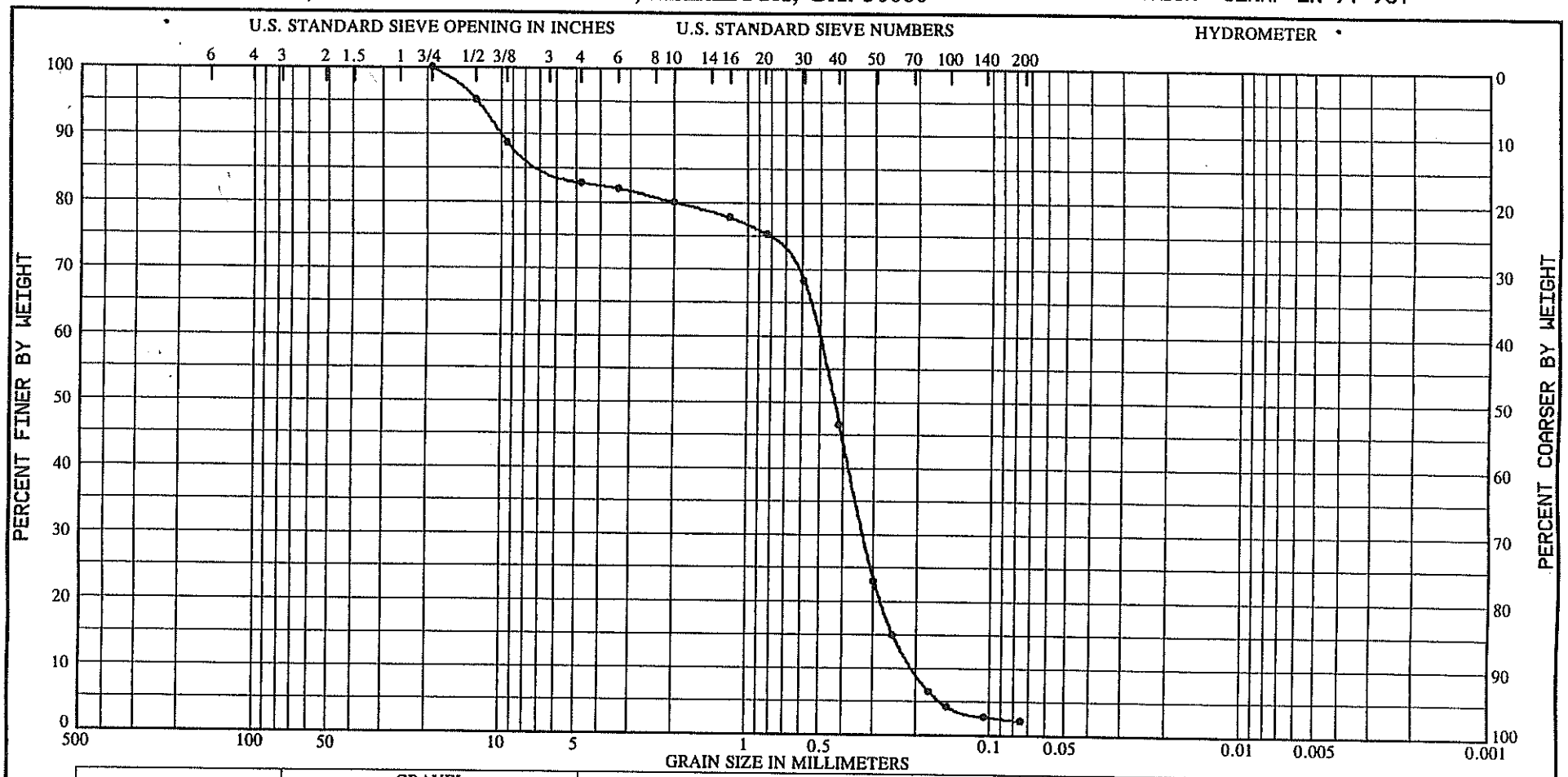
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1338
Hole No. DRV-39
Date 12/04/97

GRADATION CURVES

12

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

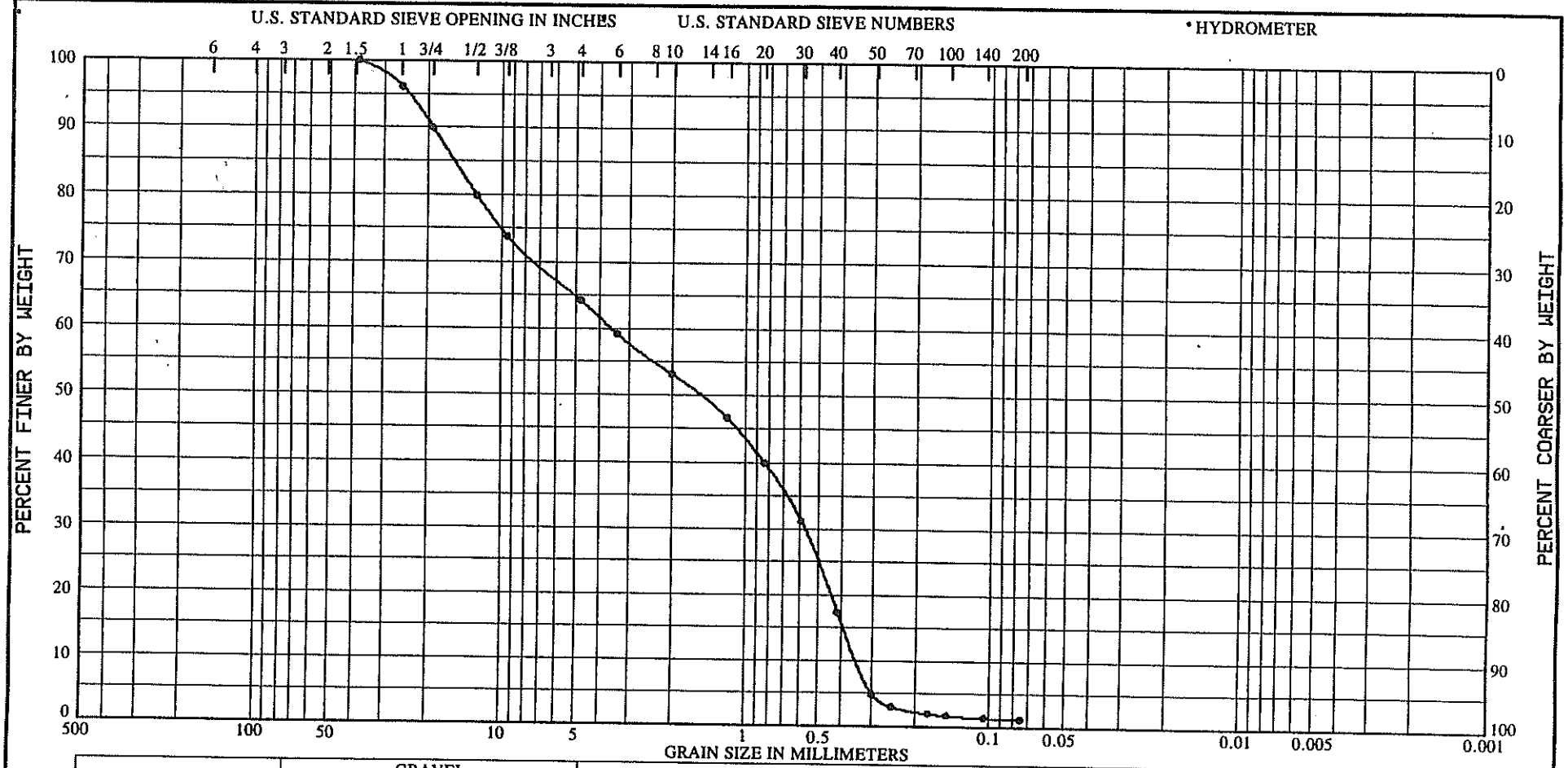
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	3.0 - 3.3	TAN & GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES, AND A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1338
Hole No. DRV-39
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

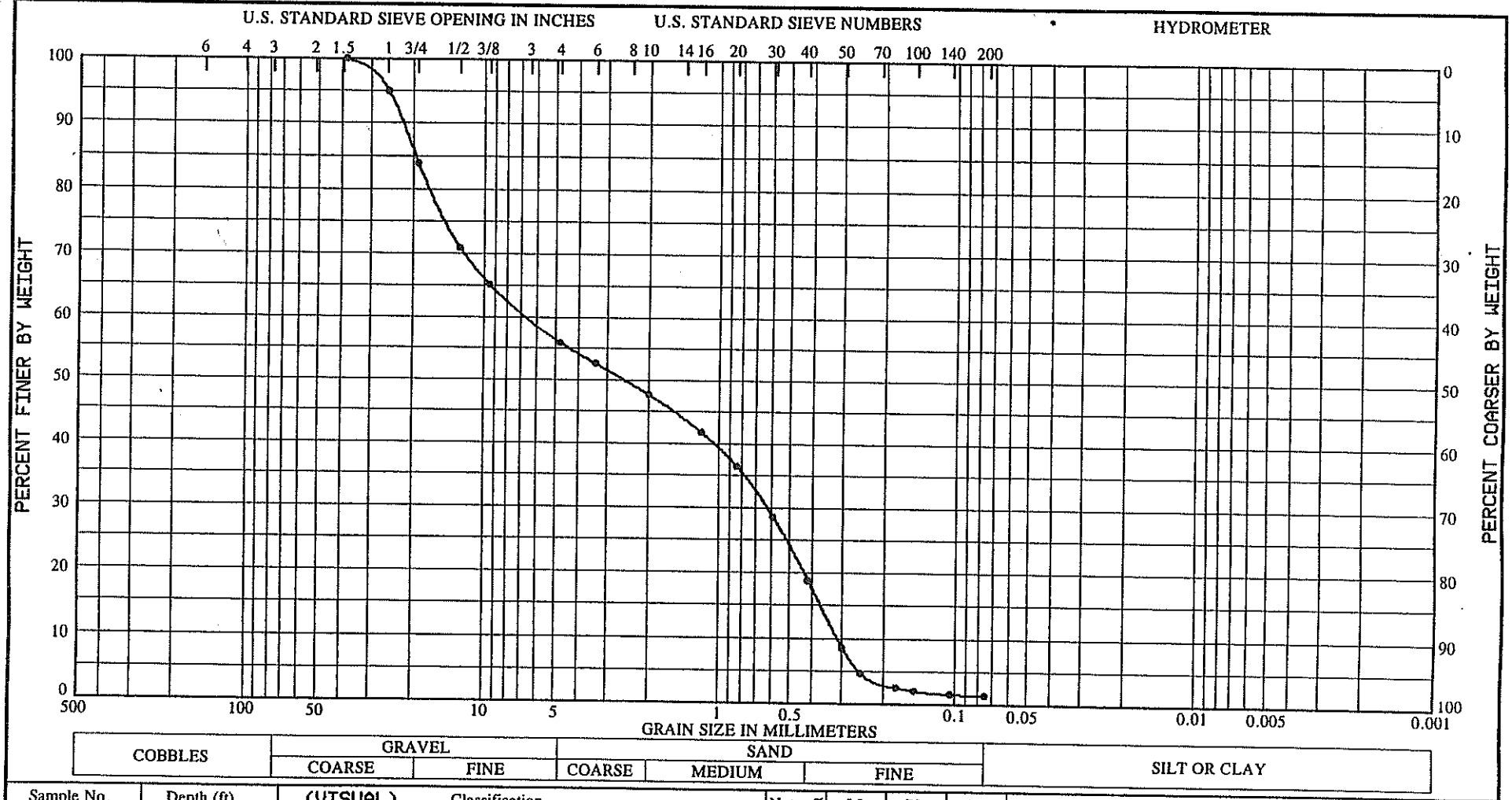
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.6 - 2.3	TAN, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1339
Hole No. DRV-40 REACH 1
Date 12/04/97

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	16.2 - 17.0	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

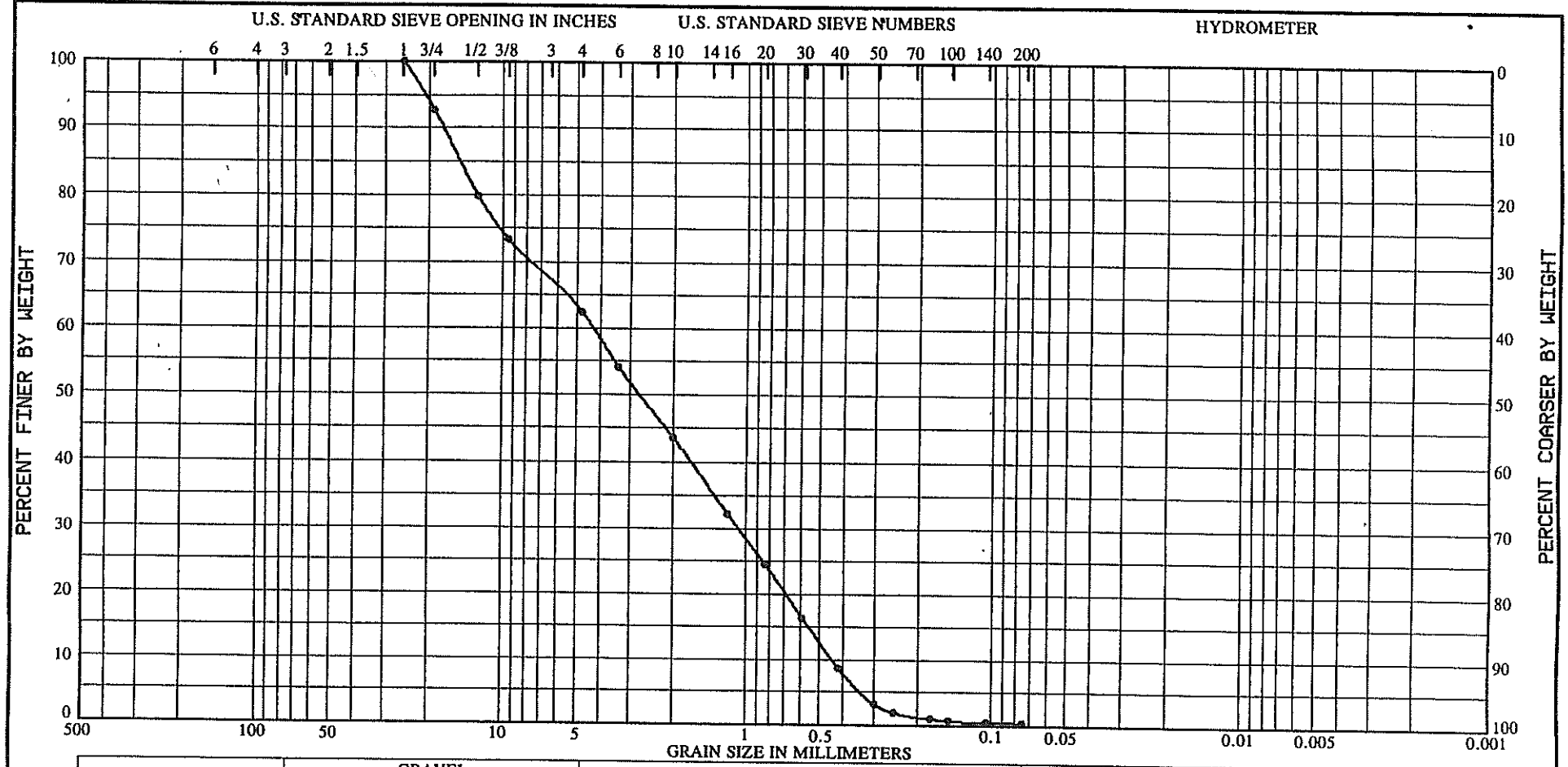
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1339
Hole No. DRV-40 REACH 2
Date 12/04/97

GRADATION CURVES

24

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	13.7 - 14.4	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

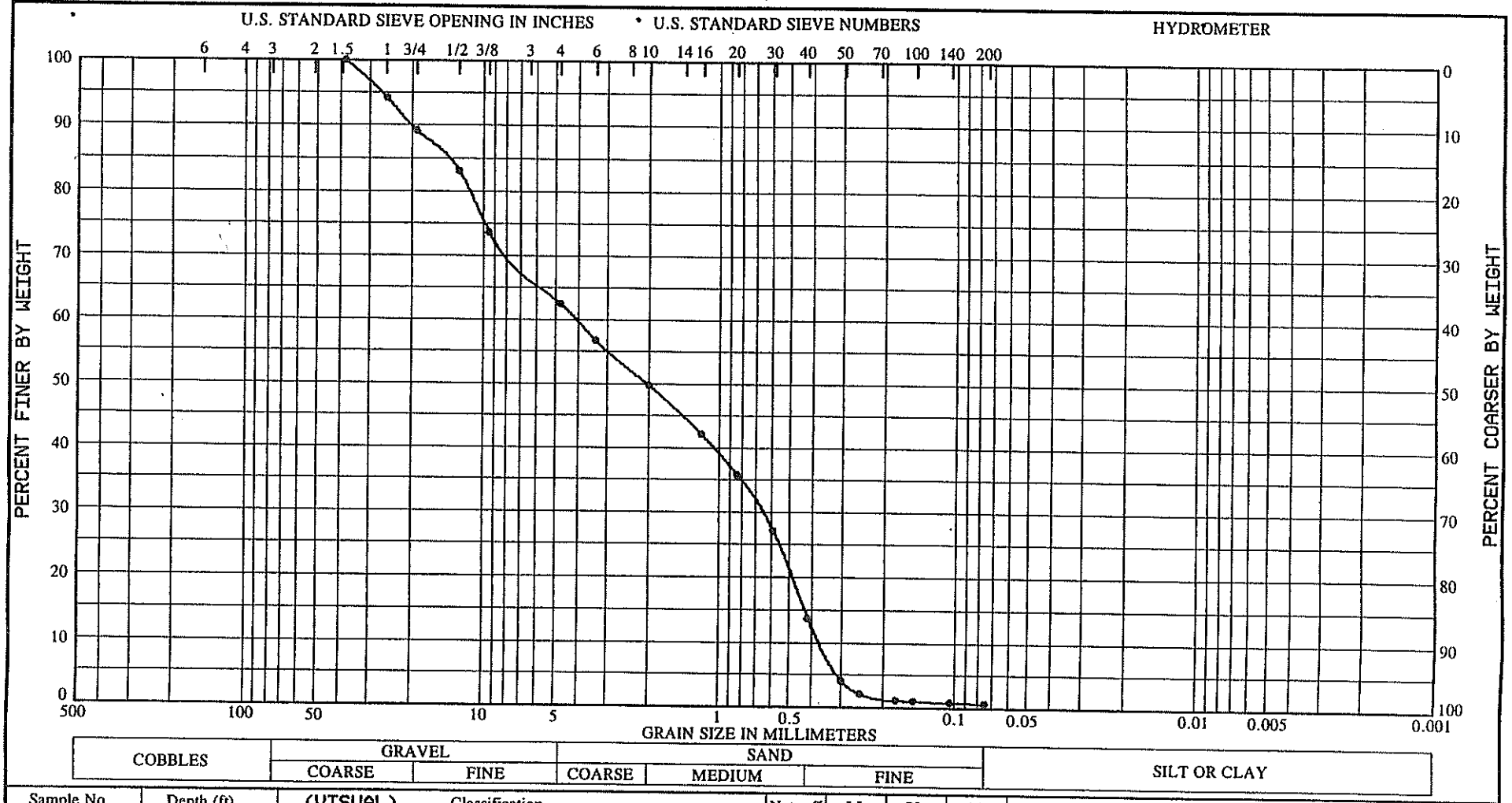
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1339
Hole No. DRV-40 REACH 2
Date 12/04/97

GRADATION CURVES

23

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	10.4 - 11.2	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1339
Hole No. DRV-40 REACH 2
Date 12/04/97

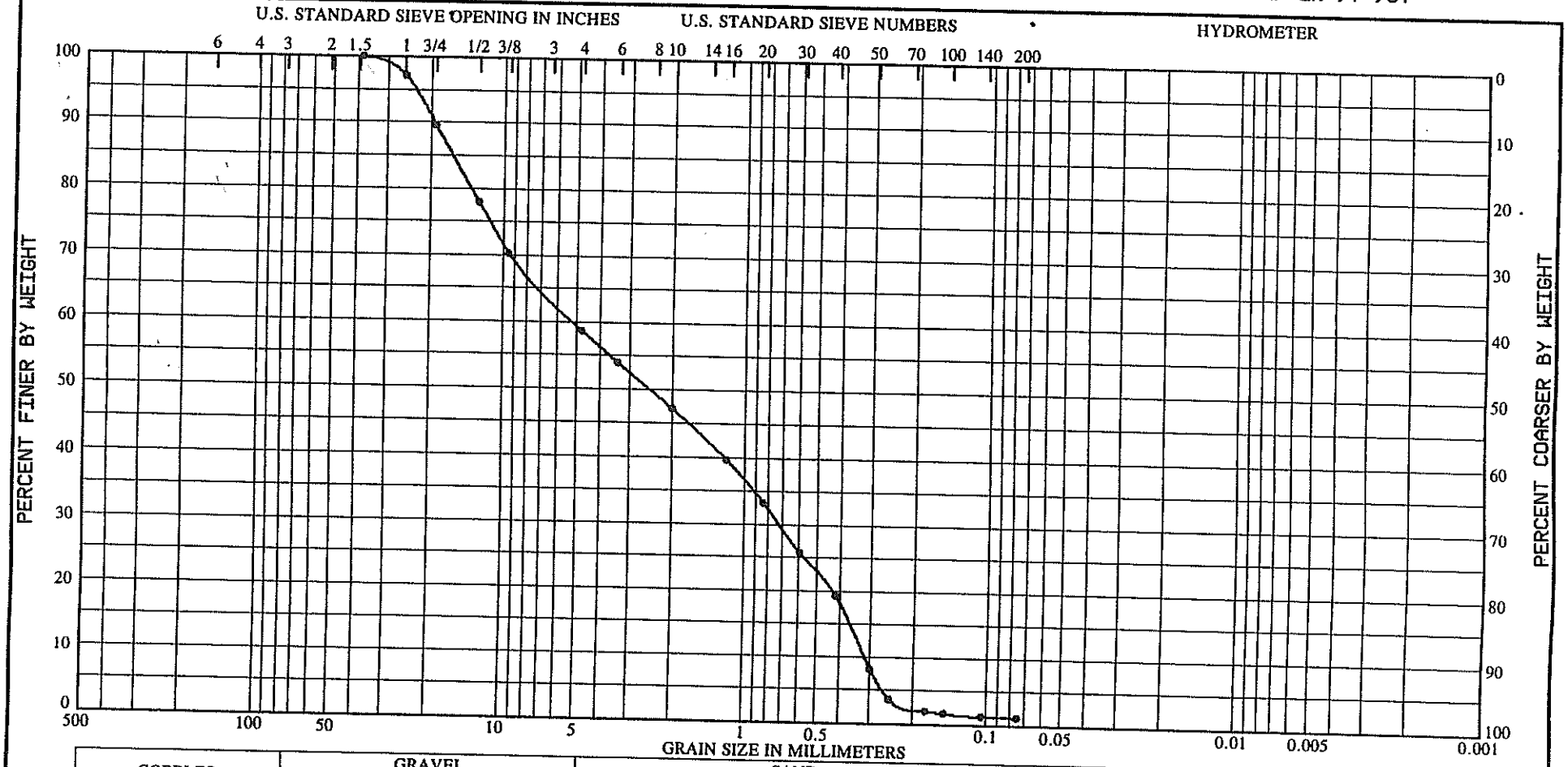
GRADATION CURVES

22

52

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	5.5 - 6.1	TAN & GRAY, GRAVELLY POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

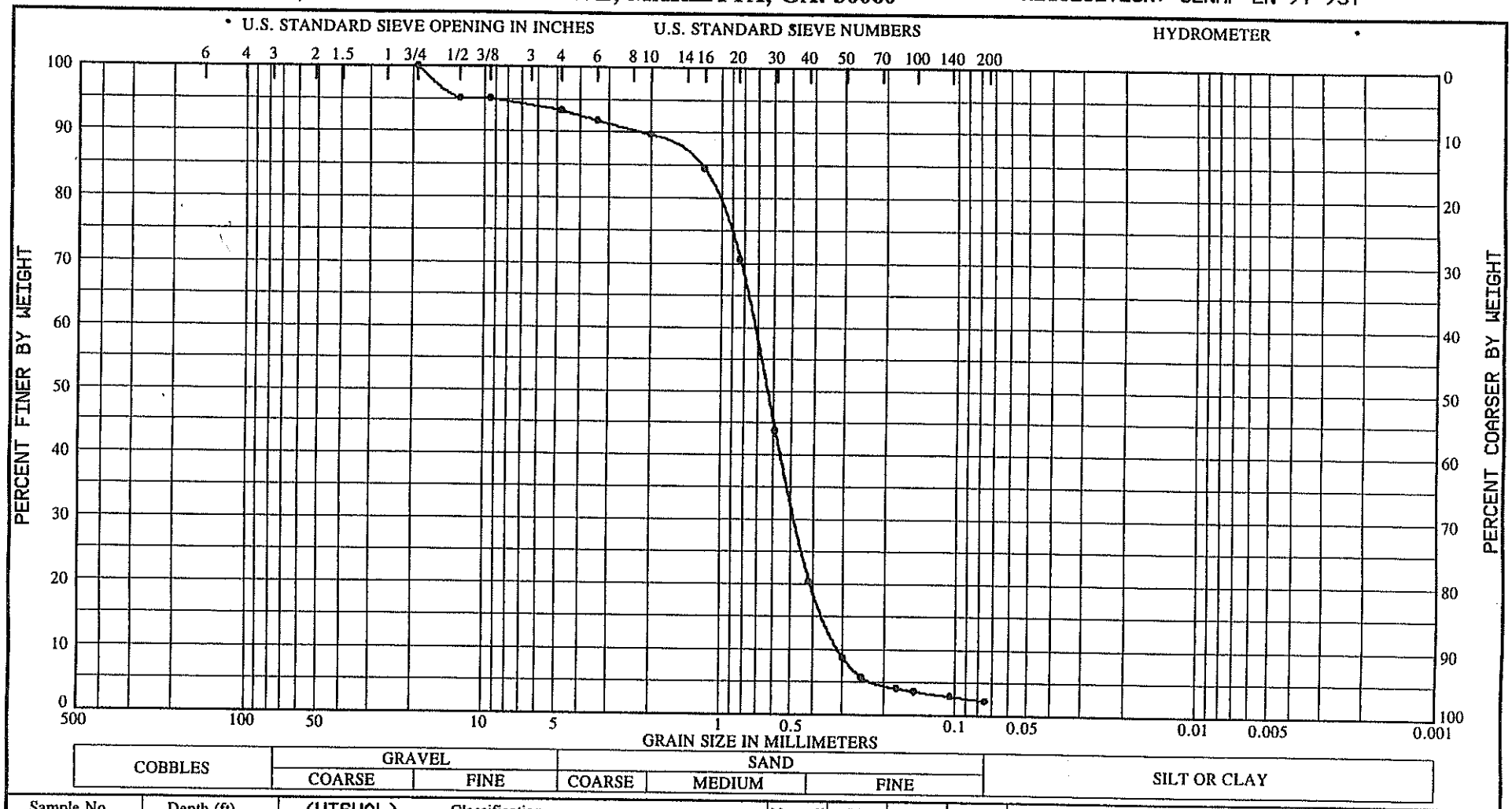
Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1339
Hole No. DRV-40 REACH 2
Date 12/04/97

GRADATION CURVES

21

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8303
REQUISITION: CENAP-EN-97-937



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

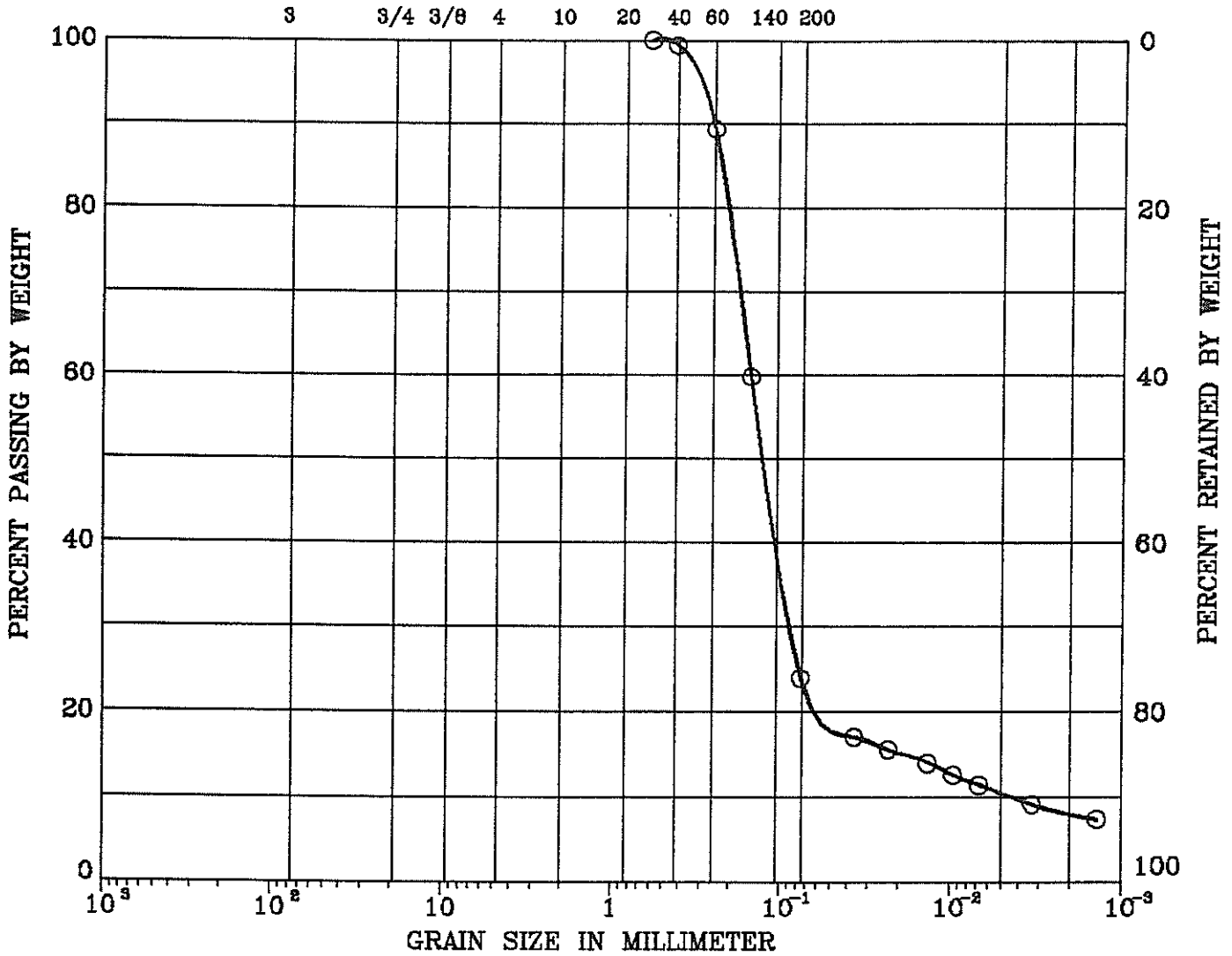
Sample No.	Depth (ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
	1.9 - 2.2	BROWN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project NEW JERSEY COASTAL STUDIES
Absecon PED & Oakwood Beach Feas.
Lab No. 184/1339
Hole No. DRV-40 REACH 2
Date 12/04/97

GRADATION CURVES

UNIFIED SOIL CLASSIFICATION

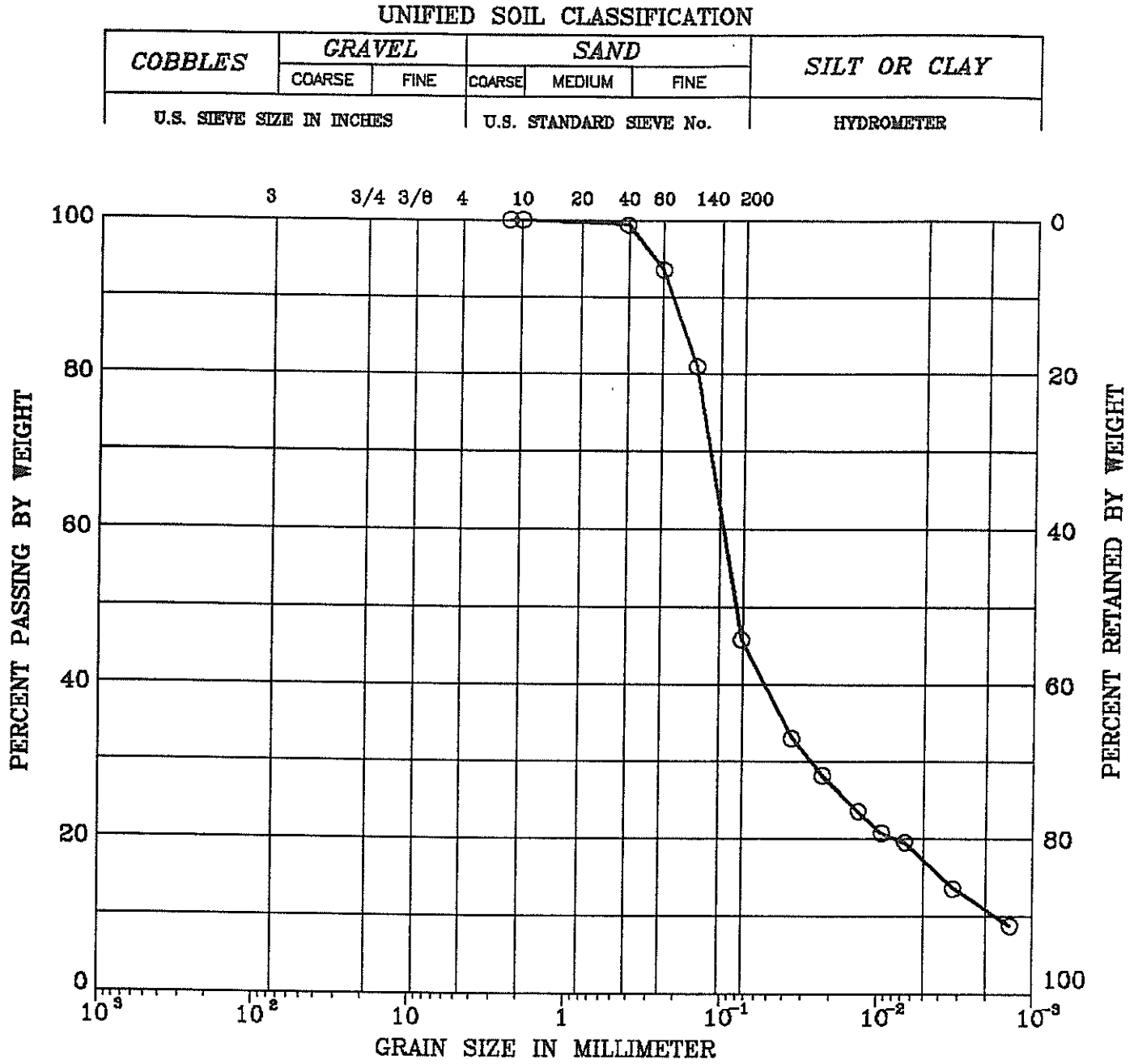
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	T1G-0.4				GRAY SILTY SAND (SM)

Remark :

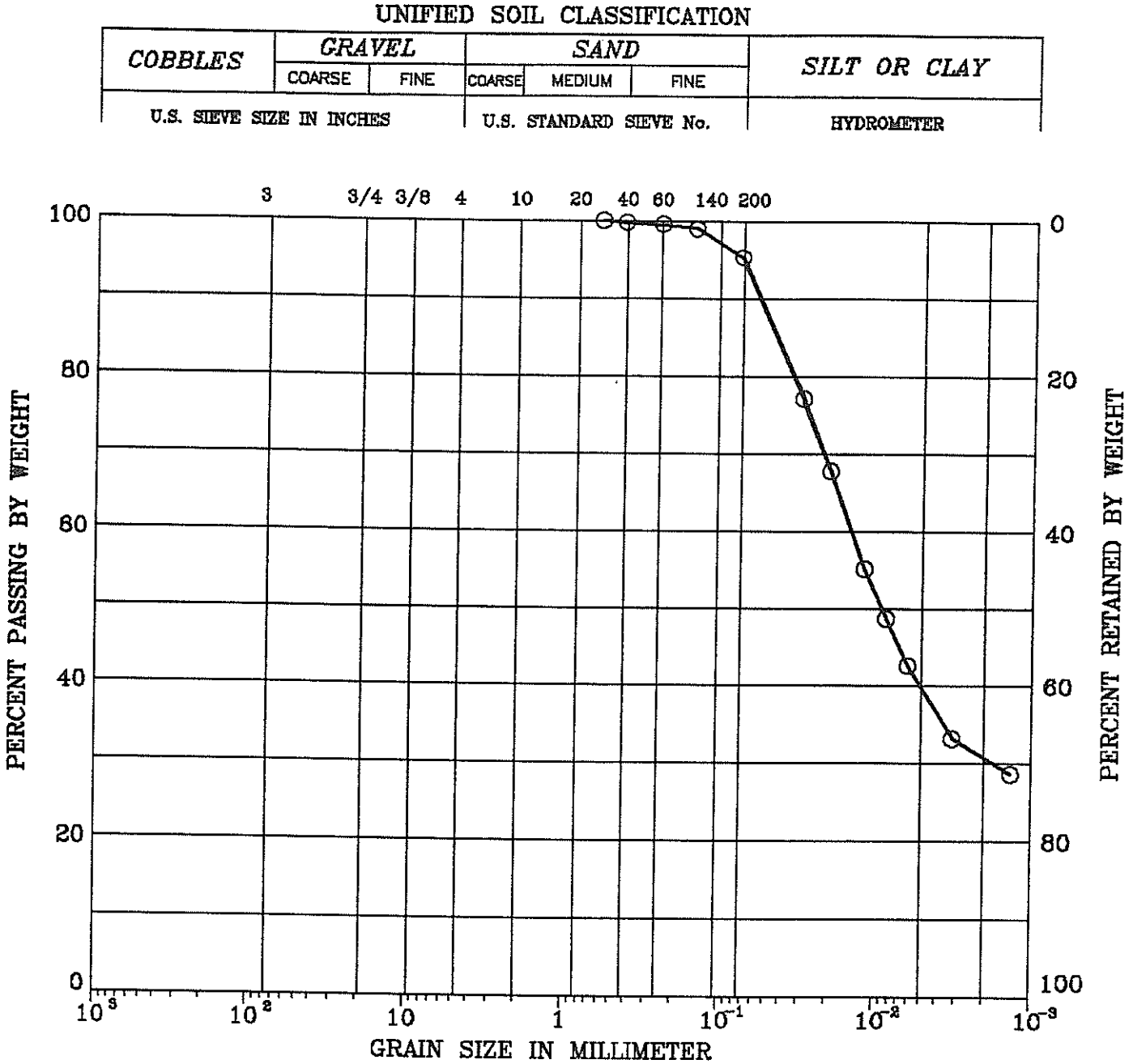
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	T1G-4.35		32	10	GRAY CLAYEY SAND (SC)

Remark :

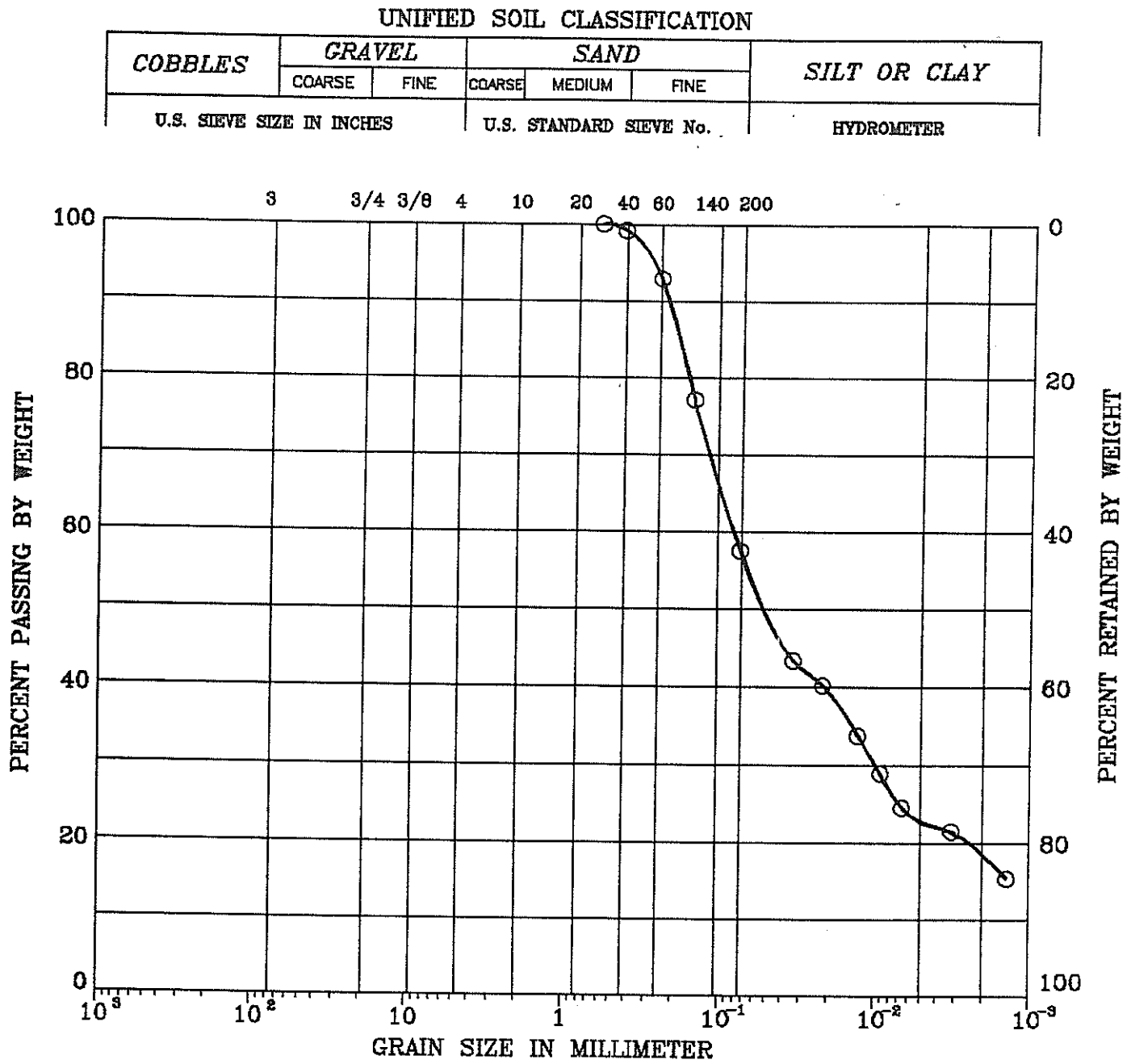
Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	T1G-9.1		86	51	GRAY ORGANIC CLAY (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	AF1G-7.5		34	12	GRAY ORGANIC CLAY (OL)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

Penetration Graphs

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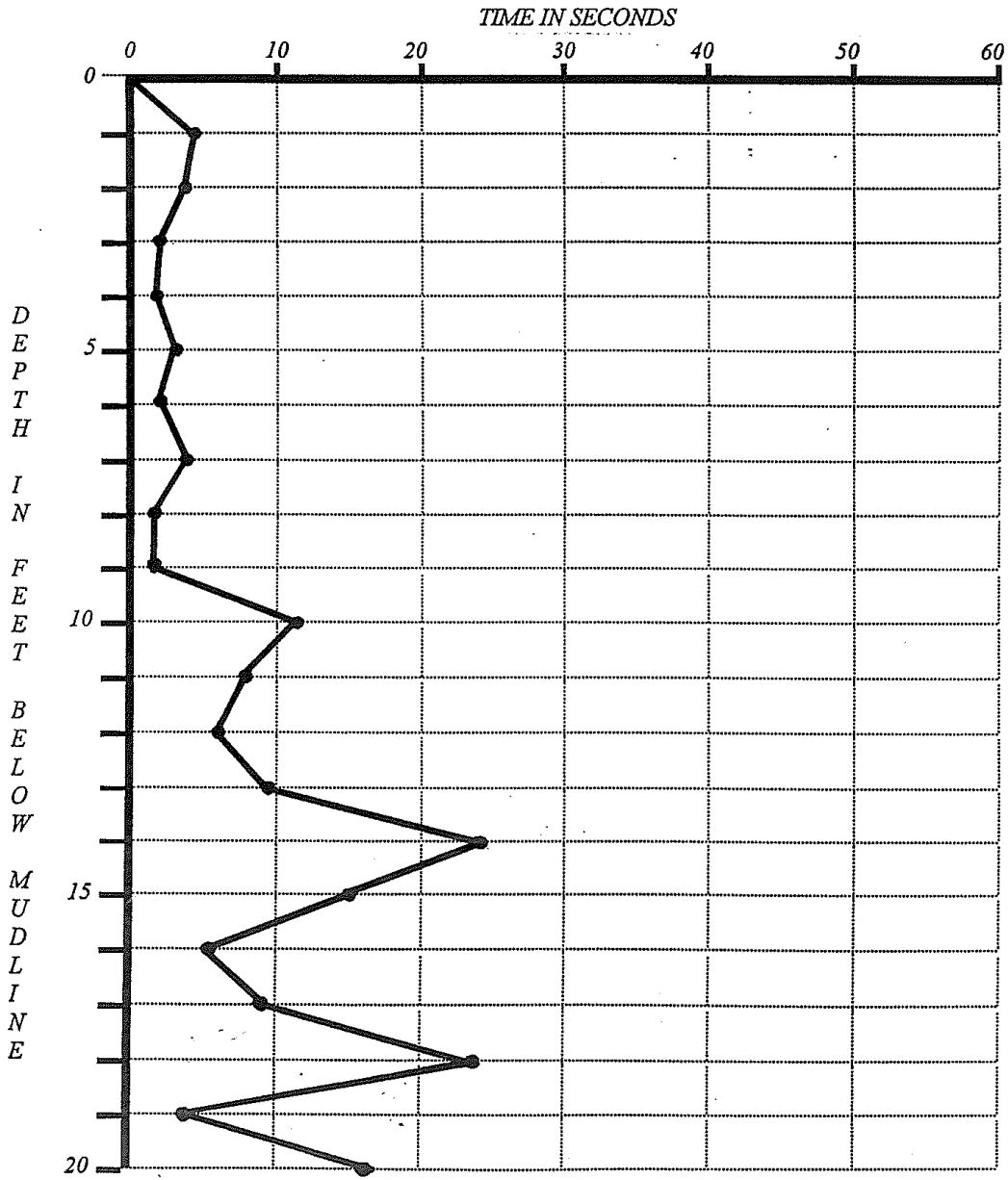
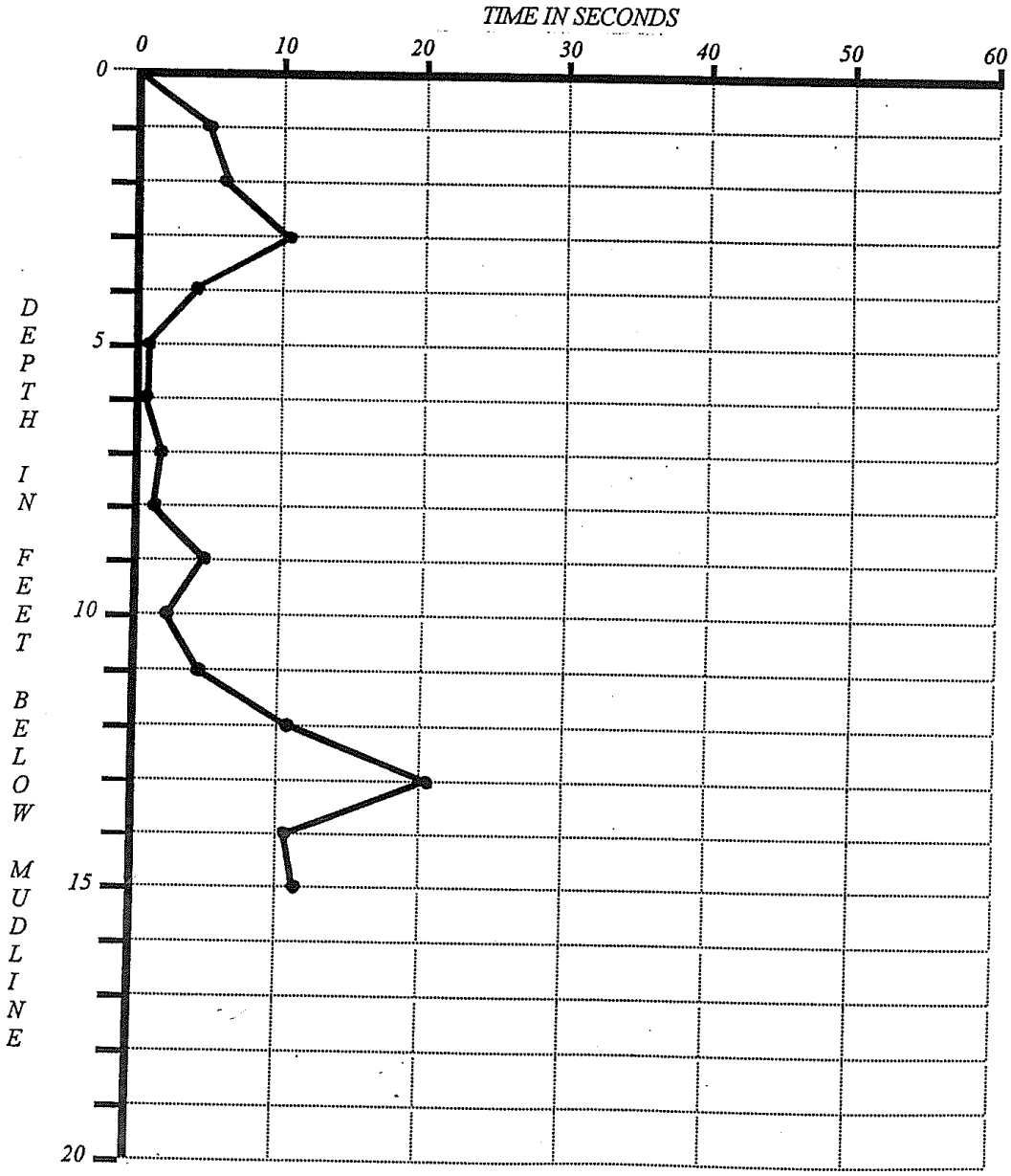
PENETRATION GRAPH

CORE NO. DRV-23 *LOCATION: LATITUDE* N 39° 30' 06.520" *LONGITUDE* W 075° 33' 24.914"
DATE: 8/31/95 *START TIME:* 1605 *STOP TIME:* 1611
WATER DEPTH MEASURED 50.0' *CORRECTED MLW* 45.6'
Total Penetration 20.0' Total Recovery 17.5'



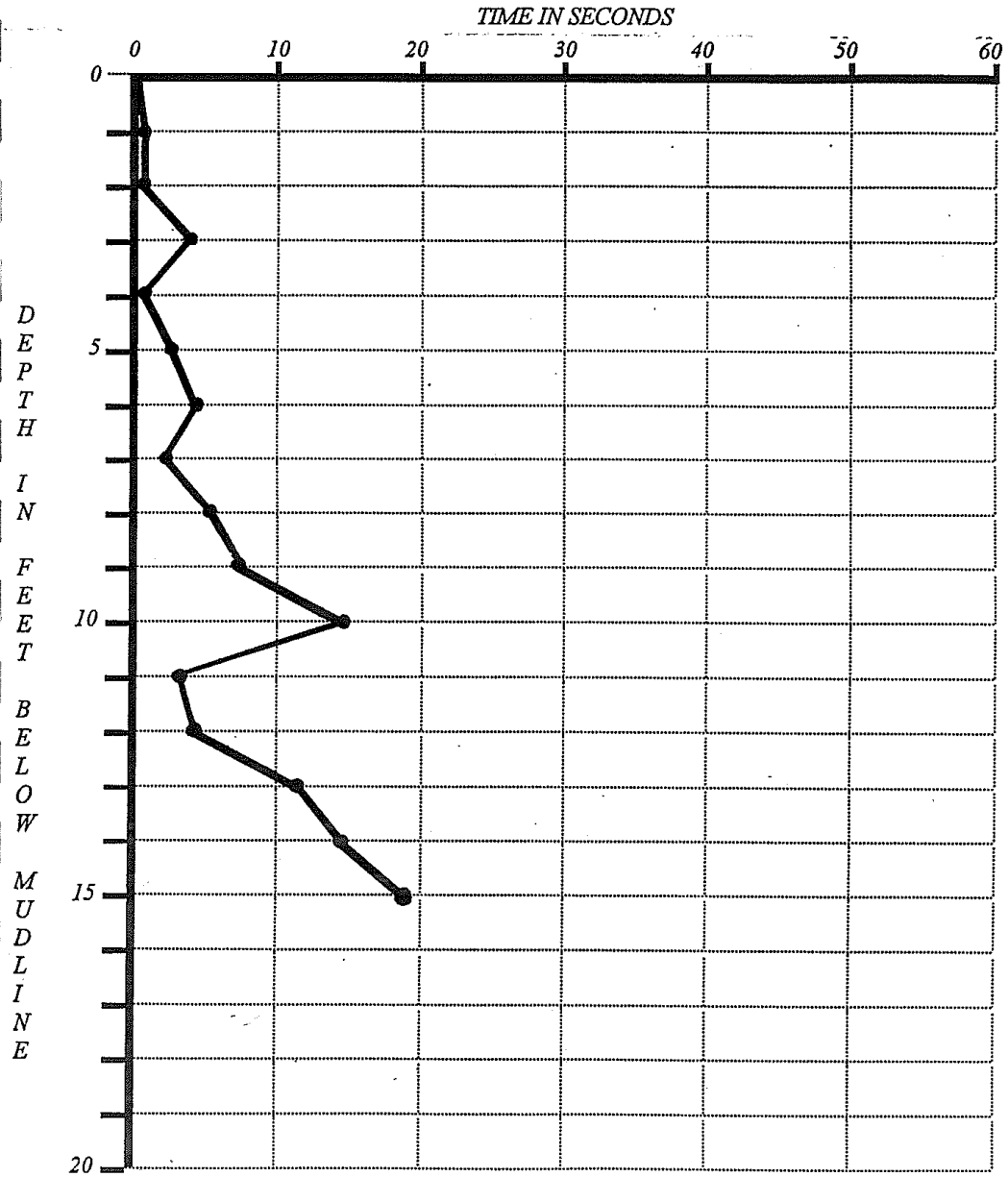
PENETRATION GRAPH

CORE NO. DRV-24 LOCATION: LATITUDE N 39° 29' 05.512" LONGITUDE W 075° 33' 39.106"
DATE: 8/31/95 START TIME: 0931 STOP TIME: 0933
WATER DEPTH MEASURED 44.0' CORRECTED MLW 44.0'
Total Penetration 15.0' Total Recovery 13.3'



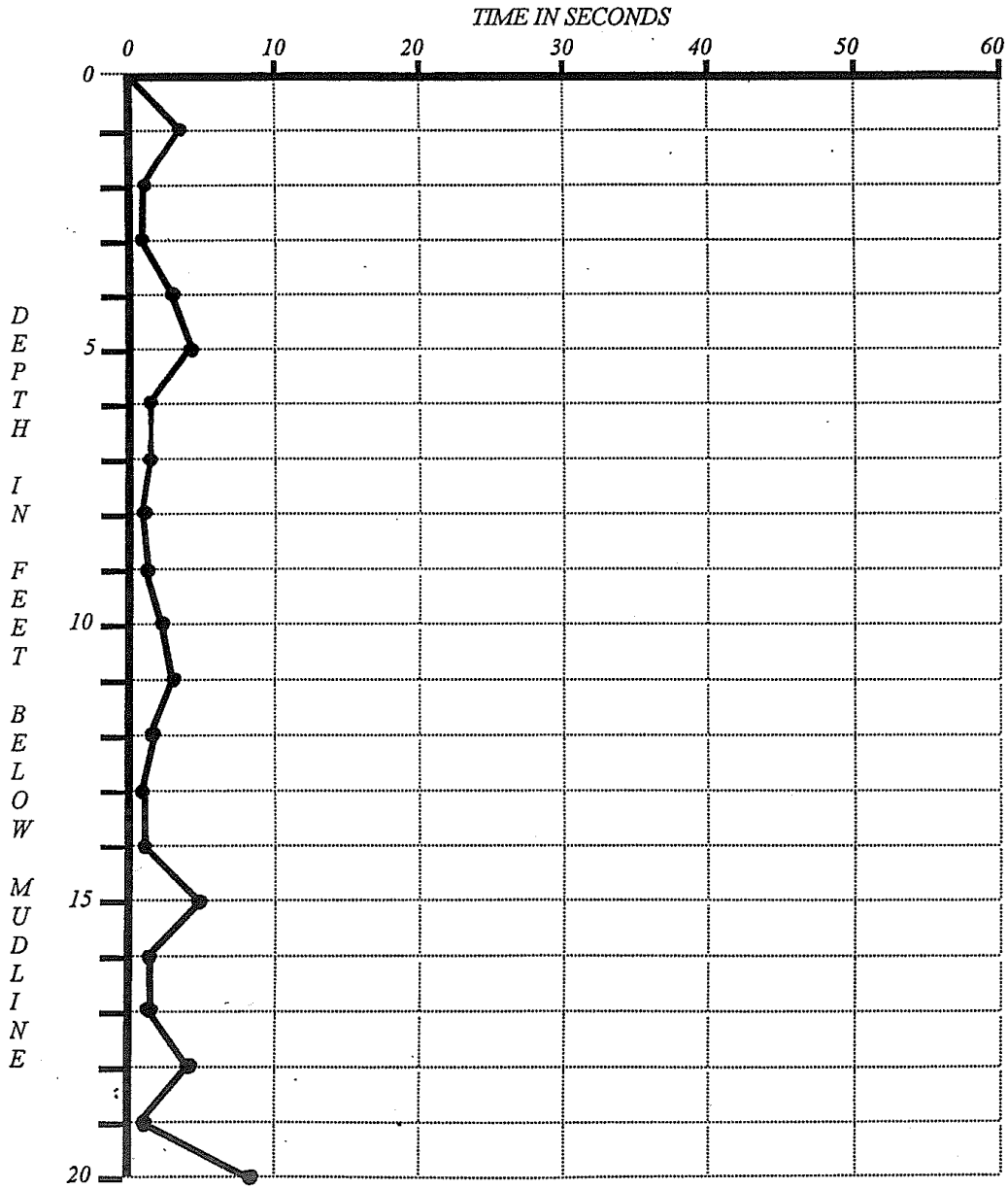
PENETRATION GRAPH

CORE NO. DRV-25 LOCATION: LATITUDE N 39° 28' 07.828" LONGITUDE W 075° 33' 44.772"
DATE: 8/31/95 START TIME: 0931 STOP TIME: 0933
WATER DEPTH MEASURED 51.0' CORRECTED MLW 52.2'
Total Penetration 15.0' Total Recovery 15.0'



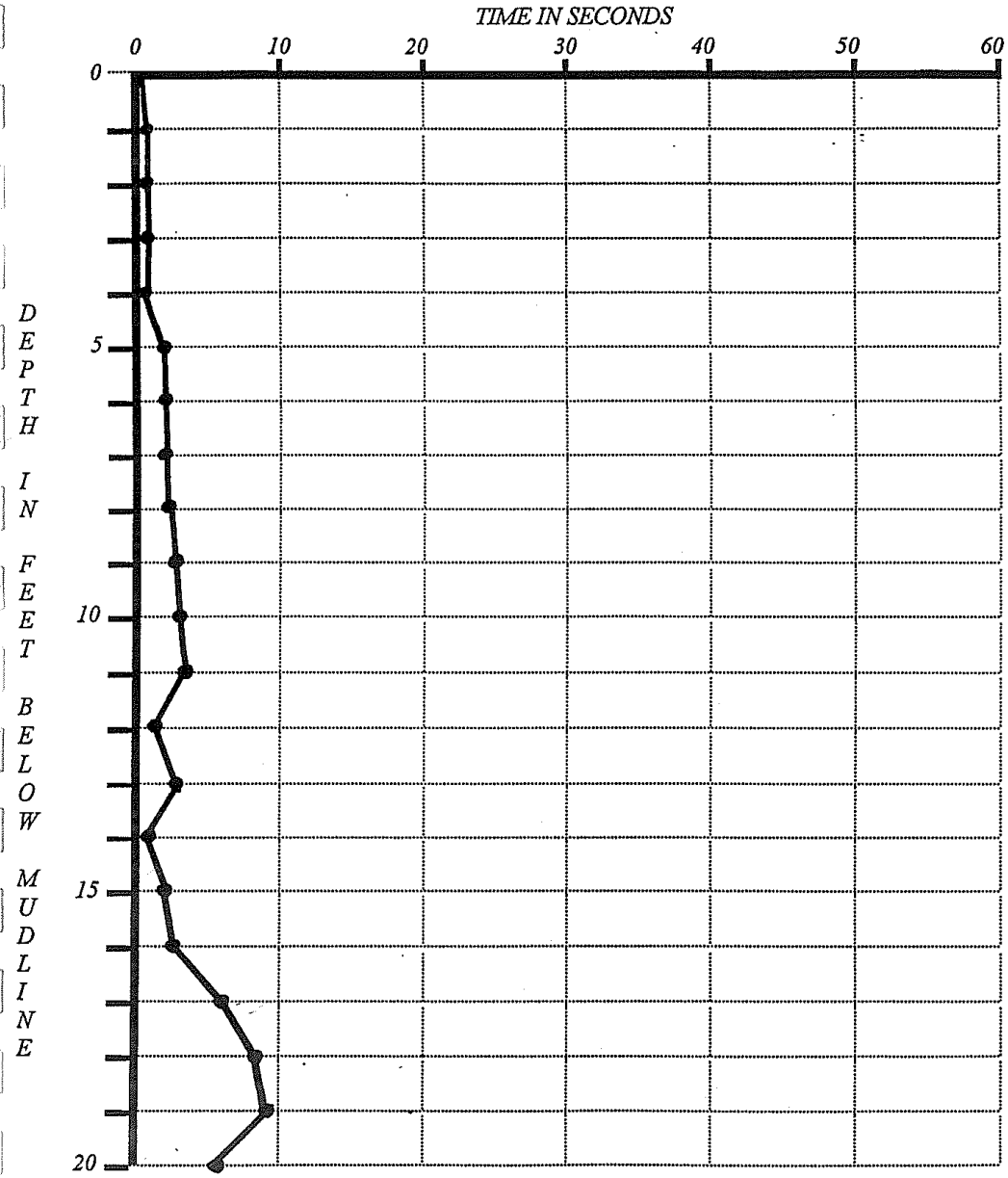
PENETRATION GRAPH

CORE NO. DRV-26 *LOCATION: LATITUDE* N 39° 27' 26.009" *LONGITUDE* W 075° 33' 30.230"
DATE: 8/31/95 *START TIME:* 0931 *STOP TIME:* 0933
WATER DEPTH MEASURED 50.0' *CORRECTED MLW* 50.8'
Total Penetration 20.0' Total Recovery 19.5'



PENETRATION GRAPH

CORE NO. DRV-27 *LOCATION: LATITUDE* N 39° 25' 37.954" *LONGITUDE* W 075° 31' 38.318"
DATE: 8/31/95 *START TIME:* 0817 *STOP TIME:* 0819
WATER DEPTH MEASURED 45.0' *CORRECTED MLW* 46.85'
Total Penetration 20.0' Total Recovery 20.0'



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REACH E

Sampling Logs

Hole No. DRV-14

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 20' 49.15" 75° 25' 50.09"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-14	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/29/91 : COMPLETED 07/29/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -42.7 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 20 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1, 2, 3, 4, 5		Silty clay sand (sces - few sand pockets 1.1 ft. (>.01), scattered shells			Sample 0 - 5 ft.
	6, 7, .4		Grey firm silt			Sample 7.4 - 10 ft.
	10, .7, 11		Grey silty clay, shell layer 12.1 interbedded organic layers 12.65 to 12.85			
	12, .2, 13, 14		Firm clay, scattered shells			Sample 12.2 - 15.0 ft.
	15, 16, 17, 18, 19, .7		19.7 to 19.8 fine sand pockets			Sample 15 - 20 ft. Sand lenses in sample

PROJECT Delaware River Comprehensive Study

HOLE NO. DRV-14

Hole No. DRV-15

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station) 39° 17' 28.96" 75° 22' 18.93"	12. MANUFACTURER'S DESIGNATION OF DRILL NA
3. DRILLING AGENCY Buchart-Horn, Inc.	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
4. HOLE NO. (As shown on drawing title and file number) DRV-15	14. TOTAL NUMBER CORE BOXES NA
	15. ELEVATION GROUND WATER NA
5. NAME OF DRILLER Ocean Survey, Inc.	16. DATE HOLE : STARTED 07/29/91 : COMPLETED 07/29/91
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	17. ELEVATION TOP OF HOLE -46.1 ft. NGVD
7. THICKNESS OF OVERBURDEN NA	18. TOTAL CORE RECOVERY FOR BORING 16.5 ft.
8. DEPTH DRILLED INTO ROCK NA	19. SIGNATURE OF INSPECTOR
9. TOTAL DEPTH OF HOLE 20 ft.	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1, 2, 3		Coarse to fine sand SP			Sample 0 - 3.4 ft.
	.4		Brown fine to medium gravel gravelly coarse to fine brown sand sand SP			Sample 3.4 - 5.0 ft.
	4, 5		Black silt with gravel			
	.15		Coarse to fine gravel with scattered cobbles -rounders brown sand at bottom SP			
	7					
	.5		Very dense brown, orange interbedded sand SP			Sample 7.5 - 9.2 ft.
	8					
	.2		White and dark brown marbled silt sand			
	9, 10					
			White sandy silt SM-SC			
	11		Orange sand silt with dark brown pods SP			Sample 10.8 - 14 ft.
	12					
	13		White silty sand with dark brown pods SP			
	14					
	15		Orange sandy silt SM-SC			
	16					Bottom of recovery
	17, 18, 19					

PROJECT Delaware River Comprehensive Study

HOLE NO. DRV-15

Hole No. DRV-16

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 15' 5" 75° 20' 1.19"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-16	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/19/91 : COMPLETED 07/19/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -35.5 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 19 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		Black gritty clay with fine sand lenses at .6 to .9 ft., 1.4 ft., 1.9 ft. and medium to fine sand at 2.3 to 2.4			
	2					Sample 0 - 5 ft. Sand lenses in samples
	.4		Grey (dark) sandy silt grading finer downward			
	3					
	4					
	5		Sand at 5.3, 6.0, 7.05, 8.0 to 8.2			
	6					Sample 5 - 10 ft.
	7					
	8					
	9					
	10					
	11		Sand shell layer at 11.6 to 10.8			
	12		Sandy silt 12.2			Sample 10 - 15 ft.
	13					
	14					
	15		Sandy silt 15.75 Sandy silt 15.90			
	16					Sample 15 - 19 ft.
	17		Sandy silt 17.05 to 17.3			
	18					
	19		Bottom of recovery			

PROJECT Delaware River Comprehensive Study HOLE NO. DRV-16

Hole No. DRV-17

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 13' 02.67" 75° 17' 40.30"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-17	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE: STARTED 07/19/91: COMPLETED 07/19/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -46.5 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 10 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Brown medium to fine sand SP			20 ft. penetration 10 ft. recovery, rest of sample fell out. Oyster shells destroyed capture cone
	1 .2		Grey silt SM-SC			Sample 0 - 1.2 ft.
	2 .4					Sample 1.1 - 2.4 ft. Sample 2.4 - 3.7 ft.
	3 .7		Grey fine sand, some shells SM-SC			
	4		Grey clay or silt with sand and and shell layer at 4.2 to 4.5, 5.6 to 6.2, 6.5, 6.6 to 7.6 and 8.2 to 8.3			
	5		SM-SC			
	6					Sample 3.7 - 10 ft. Sand in sample
	7					
	8					
	9					
	10				10.5	Bottom of recovery
	11		Rest of sample fell out.			
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-17

Hole No. DRV-18

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 10' 35.08" 75° 16' 0.16"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-18	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
	14. TOTAL NUMBER CORE BOXES NA
5. NAME OF DRILLER Ocean Survey, Inc.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE : STARTED 07/18/91 : COMPLETED 07/18/91
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	17. ELEVATION TOP OF HOLE -43.2 ft. NGVD
7. THICKNESS OF OVERBURDEN NA	18. TOTAL CORE RECOVERY FOR BORING 12 ft.
8. DEPTH DRILLED INTO ROCK NA	19. SIGNATURE OF INSPECTOR
9. TOTAL DEPTH OF HOLE 14.5 ft.	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Fine sand grey			
	1					Sample 0 - 4.1 ft.
	.5					
	2		Brown fine sand			
			Black fine sand			
	3					
	4					
	.2		Black fine sand			
	5					
	.2		Sandy gravel			Sample 5.2 - 9.1 ft.
	6					
	7					
	8					
	9					
	.1		Grey fine silty sand			Sample 9.1 - 10 ft.
	10					
	.3					
	.7		Grey coarse to fine sand			
	11		Grey silty fine sand with scattered gravel			Sample 10.7 - 11.7 ft.
	.7					
	12		Silty gravel			Bottom of recovery
	13					
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-18

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Hole No. DRV-19

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 08' 47.16" 75° 14' 30.27"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-19	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/18/91 : COMPLETED 07/18/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -45.5 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 20 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		SM-SC Grey silty sand with shell fragments			Recovery - 20 of 20 ft. Sample 0 - 2.1 ft.
	2 .1		Grey clay with scattered shells sand lenses at 3.7, 4.0, 4.5, 5.7, 6.0-6.5 to 6.8-8 to 8.5, 9.5, 8.8' and 9.5 shells in fine grey sandy layers SM-SC			Sample 2.1 - 5.0 ft. Sand lenses in sample
	5		SM-SC			Sample 5 - 10.0 ft.
	11 .1		Grey clayey sand with shell layers at 11.3, 13.0 to 13.8, 14.1 to 14.2, and 14.4 to 14.6 SM-SC			Sample 11 - 15 ft.
	15 .7		Clayey coarse to fine gravel SP			Sample 15.7 - 16.7 ft.
	17 .7		Grey clay, sandy gravel-13.2 to 13.3 SM-SC			Sample 5 - 10 ft.
	19 .9		Fine sandy coarse to fine gravel SP			Sample 15.7 - 16.7 ft.

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-19

Hole No. DRV-20

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 7' 8.45" 75° 13' 5.44"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-20	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/18/91 : COMPLETED 07/18/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -44.9 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 20 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Black sandy gravel-medium to fine gravel			
	1 .1		Light grey silt clay			
	2		Yellow fine sand with scattered gravel, red clay pod at 2.25 to 2.5, grey clay packets (1") throughout			Sample 1.1 - 5.0 ft.
	3					
	4		No gravel below 4.2 ft.			
	5					
	6					
	7					
	8		Grey silty sand grading finer downward			
	9					Sample 8.1 - 10 ft.
	10					
	11 .2		Red sandy silt			
	12					
	13 .3		Brown clayey sand, fining downward, micaceous			Sample 13.4 - 15.0 ft.
	14					
	15					
	16 .9		Fine clayey sand			
	17					Sample 15.9 - 20 ft.
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-20

Hole No. DRV-21

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT
Delaware River Comprehensive Study

2. LOCATION (Coordinates or Station)
39° 06' 6.7" 75° 12' 2.56"

3. DRILLING AGENCY
Buchart-Horn, Inc.

4. HOLE NO. (As shown on drawing title and file number) DRV-21

5. NAME OF DRILLER Ocean Survey, Inc.

6. DIRECTION OF HOLE
VERTICAL INCLINED _____ DEG. FROM VERT.

7. THICKNESS OF OVERBURDEN NA

8. DEPTH DRILLED INTO ROCK NA

9. TOTAL DEPTH OF HOLE 10 ft.

10. SIZE AND TYPE OF BIT Vibracore.

11. DATUM FOR ELEVATION SHOWN (TBM or MSL)

12. MANUFACTURER'S DESIGNATION OF DRILL
NA

13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED

14. TOTAL NUMBER CORE BOXES NA

15. ELEVATION GROUND WATER NA

16. DATE HOLE : STARTED 07/18/91 : COMPLETED 07/18/91

17. ELEVATION TOP OF HOLE -45.7 ft. NGVD

18. TOTAL CORE RECOVERY FOR BORING 14 ft.

19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		Light red brown medium to fine sand with scattered gravel SP			Sample 0 - 5 ft.
	2					
	3					
	.6					
	4		Light red brown sandy gravel SP			
	.3		Light red brown medium to fine sand SP			
	5					Sample 4.3 - 5.7 ft.
	.7		Dark grey silty sand SM			
	6					Sample 5.7 - 10 ft.
	.6		Dark grey silty sand SM-SC			
	7					
	.1		Dark grey clayey sand			
	8					
	9					
	10					
	11		SM-SC			Sample 10 - 14 ft.
	12					
	13					
	.75		Grey sandy silt			
	14					Bottom of recovery
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study

HOLE NO. DRV-21

Hole No. DRV-22

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT: Delaware River Comprehensive Study
2. LOCATION (Coordinates or Station): 39° 05' 01.5" 75° 11' 03.94"
3. DRILLING AGENCY: Buchart-Horn, Inc.
4. HOLE NO. (As shown on drawing title and file number): DRV-22
5. NAME OF DRILLER: Ocean Survey, Inc.
6. DIRECTION OF HOLE: VERTICAL INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 20 ft.
10. SIZE AND TYPE OF BIT: Vibracore
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: NA
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 07/18/91; COMPLETED 07/18/91
17. ELEVATION TOP OF HOLE: -48.9 ft. NGVD
18. TOTAL CORE RECOVERY FOR BORING: 10.5 ft.
19. SIGNATURE OF INSPECTOR:

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Coarse to medium gravel some cobbles SP			Sample 0 - 1.0 ft.
	1					
	.6		Black coarse to fine sandy gravel some cobble SP			
	2		Dark grey clay, piece of wood at 3 feet ML			Two jet retrys
	3					Sample 1.6 to 5.3 ft.
	4					
	5					
	.3		Pockets of dark medium brown silt at 6.0 to 6.3, 6.9 to 7.0 9.3 to 9.7, 10.3 to 10.5			
	6					
	7		CH			Sample 7.0 - 9.2 ft.
	8					Two retries with jetting, unable to penetrate gravel
	9					
	10					
	.6					Bottom of recovery
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT: Delaware River Comprehensive Study | HOLE NO. DRV-22

Hole No. DRV-23

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station) 39° 03' 10.54" 75° 10' 7.61"	12. MANUFACTURER'S DESIGNATION OF DRILL NA
3. DRILLING AGENCY Buchart-Horn, Inc.	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
4. HOLE NO. (As shown on drawing title and file number) DRV-23	14. TOTAL NUMBER CORE BOXES NA
5. NAME OF DRILLER Ocean Survey, Inc.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE : STARTED 07/17/91 : COMPLETED 07/17/91
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	17. ELEVATION TOP OF HOLE -47.8 ft. NGVD
7. THICKNESS OF OVERBURDEN NA	18. TOTAL CORE RECOVERY FOR BORING 12.8 ft.
8. DEPTH DRILLED INTO ROCK NA	19. SIGNATURE OF INSPECTOR
9. TOTAL DEPTH OF HOLE 15.5 ft.	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1		Grey and grey brown mixed fine sand with shells SP			Sample 0 - 3.7 ft.
	2		Light grey fine sand			
	3					
	4 .7		Sandy gravel-brown, coarse to fine gravel with coarse to fine sand GP			
	5		Varying to gravelly coarse to fine sand			Sample 3.7 - 5.0 ft.
	6					
	7					
	8 .1		White fine to medium sand SP			Sample 8.3 - 9.2 ft.
	.3		Red brown clay CL			
	9 .2		Grey silty sand SM-SC			Sample 9.2 - 13 ft.
	10					
	11		Becoming finer with depth			
	12					
	13 .8					Bottom of recovery
	14					
	15					
	16					
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-23

Hole No. DRV-24

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 01' 40" 75° 09' 18.02"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-24	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/17/91 : COMPLETED 07/17/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -47.1 ft. NGVD
9. TOTAL DEPTH OF HOLE 19 ft.	18. TOTAL CORE RECOVERY FOR BORING 15.4 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1, 2		Medium to fine dark grey micaceous sand with some shells SP			Sample 0 - 3 ft.
	3, 4		Light grey medium to fine sand micaceous....			
	5, 6, 7, 8, 9, 10		...with locally coarse to fine quartz sand zones SP			Sample 5 - 10 ft.
	11.6, 12, 13		Grey medium to fine sand SP			Sample 11.6 - 13.6 ft.
	13.6, 14		Grey brown (tan?) to light grey very coarse to fine gravelly sand, one cobble SP			Sample 13.6 - 15.6 ft.
	15		Light grey medium to fine sand with trace of gravel SP			
	16		Gravelly sand SP			Bottom of recovery
	17, 18, 19					

PROJECT Delaware River Comprehensive Study HOLE NO. DRV-24

Hole No. DRV-25

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 39° 00' 9.85" 75° 08' 26.36"	11. DATUM FOR ELEVATION SHOWN (TBM or M.L)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-25	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/17/91 : COMPLETED 07/17/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -44.4 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 19.8 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		Brown sand with some silt Coarse to fine sand, micaceous SP			Sample 0 - 5 ft.
	2					
	3					
	4					
	.2		Grey silt clay SM-SC			
	.4		Brown sand SP			
	5		coarse to fine micaceous			Sample 5 - 7.8 ft.
	.8		Medium to fine brown sand SP			
	6					
	7					
	.4		Coarse to fine grey sand, quartz			
	.8		Gray fine sand, micaceous SP			Sample 7.8 - 10 ft.
	8					
	9					
	10		Some 0.5 ft. clay lenses Medium to fine grey sand, micaceous, grey, quartz, thin layers of fine sand SP			Sample 10 - 15 ft.
	11					
	12					
	13					
	14					
	15					
	.3		Coarse sand with gravel SP			
	.8		Medium to fine grey sand, quartz SP			
	16					
	.7		Grey coarse sand with gravel SP			Sample 16.5 - 17.5 ft.
	17					
	.5		Silt, micaceous, dark grey ML			Sample 17.5 - 20 ft.
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-25

Hole No. DRV-26

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 38° 57' 7.9" 75° 06' 46.38"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-26	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/16/91 : COMPLETED 07/16/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -46.3 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 16 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Grey sand with black stains SP			
	1		Grey sand with scattered shells silter with depth SP			Sample 0 - 5.0 ft.
	2					
	3					
	4					
	5					
	6		Grey sand SP			
	7 .1		Red brown sand, interbedded with grey SP			
	8 .3		Red brown sand SP			
	9					
	10		SP			Sample 8.3 - 10 ft.
	11					
	12		Grey silt ML			
	13 .3		Red silt ML			Sample 12 - 14.6 ft.
	14 .6		Red brown silty sand SM-SC			Sample 14.6 - 16 ft.
	15					
	16					Bottom of recovery
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study

HOLE NO. DRV-26

Hole No. DRV-27

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT: Vibracore
	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station) 38° 55' 35.16" 75° 06' 03.83"	12. MANUFACTURER'S DESIGNATION OF DRILL NA
3. DRILLING AGENCY Buchart-Horn, Inc.	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
4. HOLE NO. (As shown on drawing title and file number): DRV-27	14. TOTAL NUMBER CORE BOXES: NA
5. NAME OF DRILLER: Ocean Survey, Inc.	15. ELEVATION GROUND WATER: NA
	16. DATE HOLE: STARTED 06/14/91; COMPLETED 06/14/91
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	17. ELEVATION TOP OF HOLE -46.5 ft. NGVD
7. THICKNESS OF OVERBURDEN: NA	18. TOTAL CORE RECOVERY FOR BORING: 15.9/3.9 ft.
8. DEPTH DRILLED INTO ROCK: NA	19. SIGNATURE OF INSPECTOR
9. TOTAL DEPTH OF HOLE: 15 ft.	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SP Brown medium to fine sand			One jet retry
	.8					Sample 0 - .8 ft.
	1		Interbedded brown sand with gray sand			
	.7					Sample 1.8 - 5.0 ft.
	2		Grey sandy with some shells SP			
	3					
	4					
	5					
	6					
	7		Grey sandy silt with shells SM-SC			Sample 7.2 - 10 ft.
	8					
	.8					
	9		Grey clay silt to silty clay firm with shells SM-SC			80° dips
	10					
	.6					
	11		Interbedded above and below			
	.3					
	12		Brown silty sand SP			Sample 11.3 - 15 ft.
	13					
	14					
	15					
	16		White sand fine, loose SP			Sample 15 - 16.5 ft.
	.5					
	17		Yellow brown fine sand firm some interbedded white SP			Sample 16.4 - 18 ft.
	18					Bottom of recovery
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-27

Lat.
Long.
2m W of Plan

Log of Vibrocore No. DRV-28

SURFACE ELEVATION _____ LOCATION Ready Island Range

DEPTH, ft.	SAMPLES	DESCRIPTION	ELEVATION
0		Water Depth 50'	
		Dk Gray soft Clay	
5		Dk Gray Soft Clay	
10		Dk Gray Soft Clay	
15		Dk Gray Soft Clay	
		Dk Gray Soft Clay	
20		Recovery 20/20' 20'-Bot. of core	

Completion Depth 20' Feet Water Depth 50' Feet Date 8/30/95

Project Name Delaware Vibrocore Project Number R95500

Woodward-Clyde Consultants

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Hole No. DRV-28

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 38° 54' 16.71" 75° 04' 40.68"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL Vibracore
4. HOLE NO. (As shown on drawing title and file number) DRV-28	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 07/15/91 : COMPLETED 07/15/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -48.6 ft. NGVD
9. TOTAL DEPTH OF HOLE 18 ft.	18. TOTAL CORE RECOVERY FOR BORING 16.5 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
			Grey silt sand			
	1					
	2					Sample 1.0 to 5.0 ft.
	3					
	4					
	5					
	6					Sample 5 - 10 f.t
	7					
	8					
	9					
	10					
	11					Sample 10 - 16.5 ft.
	12					
	13					
	14					
	15					
	16					
	17					Bottom of recovery
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-28

Hole No. DRV-29

DRILLING LOG	DIVISION	INSTALLATION	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Comprehensive Study	10. SIZE AND TYPE OF BIT Vibracore
2. LOCATION (Coordinates or Station) 38° 51' 50.89" 75° 03' 48.42"	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Buchart-Horn, Inc.	12. MANUFACTURER'S DESIGNATION OF DRILL NA
4. HOLE NO. (As shown on drawing title and file number) DRV-29	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED
5. NAME OF DRILLER Ocean Survey, Inc.	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE VERTICAL INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE : STARTED 06/14/91 : COMPLETED 06/14/91
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE -49.0 ft. NGVD
9. TOTAL DEPTH OF HOLE 20 ft.	18. TOTAL CORE RECOVERY FOR BORING 19.6 ft.
	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant g
	1		Interbedded brown and black silty sand with few shells			Sample 0 - 1.8 ft.
	.8 2		Black sand with shells			Sample 1.9 - 5.0 ft.
	3					
	4					
	5		Trace of clay - black sand with shells		C'	
	6					
	7					
	.7 8		Brown sandy silt with few shells			Sample 7.7 - 10 ft.
	9					
	10					
	.4 11		Black silty sand with concentrations of shell at 10.5, 12.7, 14.6			Sample 10.4 - 15 ft.
	12					
	13					
	14					
	15		Black sand with shell concentrations at 15.8 through 16.2			
	16		Scattered shells below 16.2			Sample 15 - 20 ft.
	17					
	18					
	19					

PROJECT Delaware River Comprehensive Study | HOLE NO. DRV-29

30C

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No.	*DRV-30*
Location: *VIBRA-CORE SAMPLES*		Lab No.	*184/1295*
Boring Depth (ft): *18.70*	Depth:	Work order:	*8015*
Datum/Notes:		Requisition:	*CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1			
	2		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND SHELL FRAGMENTS.	
	3			SA, 2.5 - 2.9
	4		GRAY, POORLY GRADED SAND (SP).	
	5			
	6		GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA, 5.6 - 6.2
	7			
	8			
	9		BLACK, ORGANIC MATTER.	
	10			
	11			
	12			
	13			SA, 13.0 - 13.3
	14		LT. GRAY, SILTY FAT CLAY (CH), WITH A TRACE OF SAND SIZES.	
	15			
	16			
	17			
	18			
	19			

Date: *08/29/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-31*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1296*
Boring Depth (ft): *20.10*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1		GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF GRAVEL SIZES AND SHELL FRAGMENTS.	SA, 1.1 - 1.4
	2		----------	
	3			
	4			
	5		TAN & GRAY, CLAYEY SAND (SC).	SA, 5.2 - 5.5
	6			
	7			
	8		----------	
	9			
	10			SA, 9.7 - 10.0
	11			
	12			
	13			
	14		TAN & GRAY, POORLY GRADED SAND (SP).	
	15			SA, 15.2 - 15.5
	16			
	17			
	18			
	19			

Date: *08/29/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *2*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-31*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1296*
Boring Depth (ft): *20.10*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
	21			
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

Date: *08/29/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *2* of *2*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No.	*DRV-32*
Location: *VIBRA-CORE SAMPLES*		Lab No.	*184/1297A*
Boring Depth (ft): *6.60*	Depth:	Work order:	*8015*
Datum/Notes:		Requisition:	*CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF DECOMPOSED SHELL FRAGMENTS.	DEPTHS FROM TOP OF HOLE.
	1		GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF PLASTIC FINES AND GRAVEL SIZES.	
	2			SA, 2.0 - 2.3
	3		GRAY, POORLY GRADED SILTY SAND (SP-SM).	
	4			SA, 4.3 - 4.6
	5			
	6		TAN & GRAY, SANDY INORGANIC SILT LOW LL (ML).	
	7		GRAY, POORLY GRADED SILTY SAND (SP-SM).	
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *08/29/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-32*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1297B*
Boring Depth (ft): *6.70*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1		GRAY, POORLY GRADED SAND (SP), WITH POCKETS OF SILTY SAND (SM), SLIGHTLY PLASTIC, AND A TRACE OF SHELL FRAGMENTS.	
	2		GRAY, SILTY SAND (SM).	SA, 2.5 - 2.8
	3			
	4		GRAY, POORLY GRADED SAND (SP), WITH OCCASIONAL LAYERS AND POCKETS OF SILTY SAND (SM).	SA, 4.4 - 4.7
	5			
	6		GRAY, POORLY GRADED SAND (SP).	
	7		GRAY, POORLY GRADED SILTY SAND (SP-SM).	
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *08/29/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-32*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1297C*
Boring Depth (ft): *8.10*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1		GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF GRAVEL AND DECOMPOSED SHELL.	
	2			
	3		GRAY, POORLY GRADED SILTY SAND (SP-SM).	SA, 2.5 - 2.8
	4			
	5		GRAY, POORLY GRADED SAND (SP), WITH POCKETS OF SILTY SAND (SM).	SA, 5.0 - 5.3
	6		GRAY, POORLY GRADED SILTY SAND (SP-SM).	
	7		TAN, SILTY SAND (SM), SLIGHTLY PLASTIC.	
	8		GRAY, SILTY SAND (SM).	
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *08/29/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-33*	
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1298A*	
Boring Depth (ft): *9.30*	Depth:	Work order: *8015*	
Datum/Notes:		Requisition: *CENAP-EN-96-813*	

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF SAMPLE.
	1		GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A LITTLE GRAVEL SIZES.	SA, 1.0 - 1.3
	2		GRAY, INORGANIC SILT LOW LL (ML), WITH A TRACE OF SAND SIZES.	
	3			
	4			SA, 4.0 - 5.0
	5		TAN & GRAY, GRAVELLY POORLY GRADED SILTY SAND (SP-SM).	
	6			
	7			
	8		TAN & GRAY, SILTY SAND (SM).	
	9			
	10			
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *09/03/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-33*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1298B*
Boring Depth (ft): *10.30*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			GRAYISH TAN, POORLY GRADED SAND (SP).	DEPTHS FROM TOP OF SAMPLE.
	1		GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF GRAVEL SIZES.	
	2		GRAY, POORLY GRADED SAND (SP), WITH POCKETS OF SILTY SAND (SM), AND SANDY INORGANIC SILT LOW LL (ML).	SA, 2.4 - 2.6
	3			
	4		TAN, GRAVELLY POORLY GRADED SAND (SP).	SA, 4.5 - 6.3
	5			
	6		TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	
	7		TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA, 6.9 - 7.5
	8		TANNISH GRAY, POORLY GRADED SAND (SP).	
	9			
	10		TAN, SILTY SAND (SM).	
	11			
	12			
	13			
	14			
	15			
	16			
	17			
	18			
	19			

Date: *09/03/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-33*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1298C*
Boring Depth (ft): *19.50*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
			TAN, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	DEPTHS FROM TOP OF SAMPLE.
	1			
	2			
				SA, 2.3 - 2.9
	3			
	4		TAN & GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES TO 2 1/2 INCH SIZES.	
	5			
	6			SA, 5.7 - 6.0
	7			
	8			
	9			SA, 9.1 - 9.4
	10			
	11		TAN, SILTY SAND (SM).	
	12			
	13			
	14			
	15			SA, 15.0 - 15.3
	16			
	17		GRAY, SILTY SAND (SM).	
	18			
	19			

Date: *09/04/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-34*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1299*
Boring Depth (ft): *15.80*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1		GRAY, SILTY SAND (SM), WITH PLASTIC FINES AND TRACE OF DECOMPOSED SHELL FRAGMENTS.	SA, 1.3 - 1.6
	2		----------	
	3			
	4			
	5		GRAY, SILTY SAND (SM), WITH A TRACE OF DECOMPOSED SHELL FRAGMENTS.	
	6			SA, 6.1 - 6.3
	7		----------	
	8			
	9			
	10			
	11		GRAY, SILTY FAT CLAY (CH), WITH A LITTLE SAND SIZES.	
	12			SA, 11.6 - 11.9
	13			
	14			
	15			
	16		----------	
	17			
	18			
	19			

Date: *09/10/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-35*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1300*
Boring Depth (ft): *18.40*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1			
	2		GRAYISH TAN, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	3			SA, 3.1 - 3.9
	4		----------	
	5			
	6		GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES.	SA, 6.2 - 6.5
	7		----------	
	8		GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES.	
	9		----------	
	10			
	11			
	12			SA, 12.0 - 12.3
	13		GRAY, POORLY GRADED SAND (SP).	
	14			
	15			
	16			SA, 16.0 - 16.3
	17		----------	
			TAN, INORGANIC SILT LOW LL (ML).	
	18		----------	
	19			

Date: *09/10/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-36*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1301*
Boring Depth (ft): *19.50*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1		TANNISH GRAY, POORLY GRADED SAND (SP).	SA, 1.1 - 1.3
	2		----------	
	3		GRAYISH TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES.	SA, 3.0 - 3.7
	4		----------	
	5		TANNISH GRAY, SANDY INORGANIC SILT LOW LL (ML).	
	6		----------	SA. 5.6 - 5.9
	7			
	8			
	9			
	10			
	11			
	12			
	13		GRAY, INORGANIC SILT LOW LL (ML), WITH A LITTLE SAND SIZES AND MICA.	SA, 12.3 - 12.6
	14			
	15			
	16			
	17			
	18			
	19		----------	

Date: *09/10/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

Project: *DELAWARE RIVER*		Boring No. *DRV-37*
Location: *VIBRA-CORE SAMPLES*		Lab No. *184/1302*
Boring Depth (ft): *15.20*	Depth:	Work order: *8015*
Datum/Notes:		Requisition: *CENAP-EN-96-813*

Elev. (feet)	Depth (feet)	Leg-end	Material Description	Comments
				DEPTHS FROM TOP OF HOLE.
	1			
	2		TANNISH GRAY, POORLY GRADED SILTY SAND (SP-SM).	SA, 1.7 - 2.0
	3			
	4		----------	
	5			
				SA, 5.3 - 5.6
	6			
	7		GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF GRAVEL SIZES.	
	8			
	9			
	10		----------	
	11			SA, 10.7 - 11.3
			GRAY, GRAVELLY POORLY GRADED SAND (SP).	
	12			
	13		----------	
			BROWN, POORLY GRADED SAND (SP).	SA, 13.6 - 13.9
	14		----------	
	15		GRAY, INORGANIC SILT LOW LL (ML), WITH A TRACE OF MICA.	

	16		GRAY, SILTY SAND (SM)>	

	17			
	18			
	19			

Date: *09/10/96* **LABORATORY LOG AND SAMPLE DATUM** Sheet No. *1* of *1*

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Vibrocore DRV-58 R1

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 169,362.9
Easting Coord.	: E 244,340.4

Uncorrected Depth	: 46.7 feet
Tide	: - 0.2 feet
Corrected Depth	: 46.9 feet (2)
Vibration time	: 6'49"
Core penetration	: 5.55 feet
Core recovery	: 3.7 feet
Percent recovery	: 67%

Depth in Feet	Surf. Elev. -46.9 (2)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SW		Brown fine to medium SAND and gravel, trace coarse sand, trace silt/clay, trace shell fragments.	1	1/0.0-3.7
	-50					
5						
	-55					
10						
	-60					
15						
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

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Vibrocore DRV-58 R2

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 169,342.5
Easting Coord.	: E 244,347.6

Uncorrected Depth	: 46.3 feet
Tide	: -1.7 feet
Corrected Depth	: 48.0 feet (1)
Vibration time	: 4'32"
Core penetration	: 3.99 feet
Core recovery	: 0.0 feet (2)
Percent recovery	: 0% (2)

Depth in Feet	Surf. Elev. -48.0 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0						
	-50					
5						
	-55					
10						
	-60					
15						
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. No sample recovered in vibrocore liner.

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Vibrocore DRV-58 R3

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 169,317.1
Easting Coord.	: E 244,365.1

Uncorrected Depth	: 46.3 feet
Tide	: -1.7 feet
Corrected Depth	: 47.2 feet (3)
Vibration time	: 6'32"
Core penetration	: 19.7 feet (1)
Core recovery	: 19.3 feet
Percent recovery	: 116% (1) (2)

Depth in Feet	Surf. Elev. -47.2 (3)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0				Jet to 3.0 feet, then start vibration.		
	-50					
		SP-SM		Brown coarse SAND and gravel, some fine sand, little medium sand, trace silt/clay. Orange/tan fine SAND, little silt/clay, trace medium sand, trace coarse sand.	1	1/3.3-8.2
5						
	-55					2/8.2-13.2
		SM		SAME.	2	
10						
	-60					3/13.2-18.2
		SM		SAME.	3	
15						
	-65					4/18.2-22.6
		SM		SAME.	4	
20						
	-70					
25						

Notes:
1. Actual sample penetration from 3 feet to 19.7 feet, total core penetration 16 feet.
2. Percent recovery reflects "over recovery" of sample possibly due to sample heave in liner and/or difficulty of penetration through dense strata. Core intervals reflect recovered material obtained from vibrocore liner.
3. Corrected water depth and ground surface datum is NGVD.
4. Sample depths are based on core recovery lengths.

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Vibrocore DRV-59

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny, 1-2 foot seas
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 168,911.8
Easting Coord.	: E 245,433.7

Uncorrected Depth	: 45.4 feet
Tide	: -1.9 feet
Corrected Depth	: 47.3 feet (2)
Vibration time	: 9'46"
Core penetration	: 15.98 feet
Core recovery	: 17.7 feet
Percent recovery	: 111% (1)

Depth in Feet	Surf. Elev. -47.3 (2)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SW		Orange/brown medium SAND, some gravel, little fine sand, little coarse sand, trace silt/clay.	1	1/0.0-4.4
	-50					
		SW		Orange/brown GRAVEL, little fine sand, little medium sand, trace coarse sand, trace silt/clay.		2/4.4-5.2
5		SW		Orange/brown medium to fine SAND and gravel, trace coarse sand, trace silt/clay.	2	3/5.2-5.7 4/5.7-10.2
	-55	SM		Orange/tan fine SAND, some silt/clay.		
10		SP-SM		Orange/tan fine SAND, little silt/clay, trace medium sand.	3	5/10.2-15.2
	-60					
15		SP-SM		Gray fine SAND, little silt/clay, trace medium sand.	4	6/15.2-17.7
	-65					
20						

Notes:
1. Percent recovery reflects "over recovery" of sample possibly due to sample heave in liner and/or difficulty of penetration through dense strata. Core intervals reflect recoved material obtained from the vibrocore liner.
2. Corrected water depth and ground surface datum is NGVD.
3. Sample depths are based on core recovery lengths.

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Vibrocore DRV-60

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 167,364.6
Easting Coord.	: E 246,321.0

Uncorrected Depth	: 41.0 feet
Tide	: -3.8 feet
Corrected Depth	: 44.8 feet (2)
Vibration time	: 8'10"
Core penetration	: 18.23 feet
Core recovery	: 19.2 feet (1)
Percent recovery	: 105% (1)

Depth in Feet	Surf. Elev. -44.8 (2)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0	-45	SW		Gray medium SAND and gravel, little fine sand, little coarse sand, trace silt/clay.	1	1/0.0-4.8 2/4.8-9.0
5	-50	SW		Gray medium SAND and gravel, trace coarse sand, trace fine sand, trace silt/clay.	2	3/9.0-9.9
		SP-SM		Tan/green fine SAND, little silt/clay, trace medium sand.		4/9.9-14.8
10	-55	SP-SM		SAME.	3	5/14.8-19.2
15	-60	SM		SAME.	4	
20						

Notes:
1. Percent recovery reflects "over recovery" of sample possibly due to sample heave in liner and/or difficulty of penetration through dense strata. Core intervals reflect recovered material obtained from the vibrocore liner.
2. Corrected water depth and ground surface datum is NGVD.
3. Sample depths based on core recovery lengths.

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Vibrocore DRV-61 R1

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 166,435.5
Easting Coord.	: E 246,758.4

Uncorrected Depth	: 43.3 feet
Tide	: -2.7 feet
Corrected Depth	: 46.0 feet (1)
Vibration time	: 3'57"
Core penetration	: 4.82 feet
Core recovery	: 4.8 feet
Percent recovery	: 100%

Depth in Feet	Surf. Elev. -46.0 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SP		Orange/gray medium SAND, some fine sand, trace gravel, trace coarse sand, trace silt/clay.	1	1/0.0-4.0
	-50	GW		Orange/tan GRAVEL, some medium sand, little coarse sand, little fine sand, trace silt/clay (two cobbles at approximately 4.6 feet to 4.8 feet).		2/4.0-4.8
5						
	-55					
10						
	-60					
15						
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

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Vibrocore DRV-61 R2

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 166,455.9
Easting Coord.	: E 246,775.4

Uncorrected Depth	: 44.3 feet
Tide	: -2.1 feet
Corrected Depth	: 46.4 feet (1)
Vibration time	: 2'02"
Core penetration	: 3.73 feet
Core recovery	: 0.0 feet (2)
Percent recovery	: 0% (2)

Depth in Feet	Surf. Elev. -46.4 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0						
	-50					
5						
	-55					
10						
	-60					
15						
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. No sample recovered in vibrocore liner.

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Vibrocore DRV-61 R3

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 166,456.8
Easting Coord.	: E 246,753.6

Uncorrected Depth	: 43.3 feet
Tide	: - 1.3 feet
Corrected Depth	: 44.6 feet (1)
Vibration time	: 4'16"
Core penetration	: 6.73 feet
Core recovery	: 4.8 feet
Percent recovery	: 71%

Depth in Feet	Surf. Elev. -44.6 (1)	USCS	GRAPHIC	DESCRIPTION	Core Interval	Sample No./Interval
0	-45			Jet to 2.8 feet, then start vibration.		
				Tan/orange COBBLE.		
		SP		Tan/orange medium SAND, little gravel, little fine sand, trace coarse sand, trace silt/clay.	1	1/3.2-7.5
5	-50					
10	-55					
15	-60					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Actual sample penetration from 2.8 feet to 6.73 feet, total core penetration is 3.93 feet.
3. Sample depths are based on core recovery lengths.

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Vibrocore DRV-62 R1

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny andcalm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 166,314.0
Easting Coord.	: E 247,758.4

Uncorrected Depth	: 49.9 feet
Tide	: +1.8 feet
Corrected Depth	: 48.1 feet (1)
Vibration time	: 8'11"
Core penetration	: 17.65 feet
Core recovery	: 13.2 feet
Percent recovery	: 75%

Depth in Feet	Surf. Elev. -48.1 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SP		Gray medium SAND, some fine sand, little gravel, trace coarse sand, trace silt/clay, trace shell fragments.	1	1/0.0-3.3
	-50	SP		Gray medium SAND, and fine sand, little gravel, trace coarse sand, trace silt/clay.		2/3.3-5.0
5		SP		Gray medium SAND, some gravel, little coarse sand, trace fine sand, trace silt/clay.	2	3/5.0-6.7
	-55	SP-SM		Orange/tan fine SAND, trace silt/clay, trace medium sand.		4/6.7-10.0
10	-60	SP-SM		Orange/tan fine SAND, little silt/clay.	3	5/10.0-13.2
15	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Penetration stopped at 17.65 feet due to boat traffic.
3. Sample depths are based on core recovery lengths.

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Vibrocore DRV-62 R2

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 166,290.9
Easting Coord.	: E 247,704.1

Uncorrected Depth	: 49.5 feet
Tide	: +1.0 feet
Corrected Depth	: 48.5 feet (1)
Vibration time	: 4'42"
Core penetration	: 19.79 feet (2)
Core recovery	: 7.2 feet
Percent recovery	: 82.6% (2)

Depth in Feet	Surf. Elev. -48.5 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0				Jet to 11.07 feet, then start vibration.		
	-50					
5						
	-55					
10						
	-60	SP-SM		Tan/gray/orange fine SAND, little silt/clay.	1	1/11.1-16.1
15						
	-65	SP-SM		Tan/gray/orange fine SAND, little silt/clay, trace medium sand.	2	2/16.1-18.3
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Actual sample penetration from 11.07 feet to 19.79 feet, total core penetration 8.72 feet.
3. Sample depths are based on core recovery lengths.

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Vibrocore DRV-63

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 165,526.1
Easting Coord.	: E 247,580.1

Uncorrected Depth	: 49.5 feet
Tide	: +2.7 feet
Corrected Depth	: 46.8 feet (1)
Vibration time	: 4'04"
Core penetration	: 19.55 feet
Core recovery	: 19.6 feet
Percent recovery	: 100%

Depth in Feet	Surf. Elev. -46.8 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SP		Orange/tan medium SAND, some gravel, some fine sand, trace coarse sand, trace silt/clay.	1	1/0.0-4.5
	-50					
5		SW		Brown/orange fine to coarse SAND and gravel, trace silt/clay.	2	2/4.5-8.9
	-55					
		SM		Tan/gray/orange fine SAND, little silt/clay, trace medium sand.		3/8.9-9.7
10		SM		SAME.	3	4/9.7-14.8
	-60					
15		SP-SM		SAME.	4	5/14.8-19.6
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

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Vibrocore DRV-64

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 17, 1999
Weather	: Sunny and calm
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 165,037.4
Easting Coord.	: E 248,482.6

Uncorrected Depth	: 49.0 feet
Tide	: +4.25 feet
Corrected Depth	: 44.75 feet (1)
Vibration time	: 4'08"
Core penetration	: 19.76 feet
Core recovery	: 18.7 feet
Percent recovery	: 95%

Depth in Feet	Surf. Elev. -44.8 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0	-45	SP		Brown/orange medium SAND, some fine sand, some gravel, trace coarse sand, trace silt/clay.	1	1/0.0-4.8
5	-50			Light-gray SILT/ CLAY, trace fine sand.	2	2/4.8-6.3 (not tested, fine grained sample)
		SM		Light-gray/tan fine SAND, some silt/clay.		3/6.3-10.1
10	-55	SM		Light-gray/tan fine SAND, little silt/clay.	3	4/10.1-14.8
15	-60	SP-SM		SAME.	4	5/14.8-18.7
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

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Vibrocore DRV-65 R1

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 14, 1999
Weather	: Overcast, 1-2 foot seas
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 103,340.5
Easting Coord.	: E 290,214.3

Uncorrected Depth	: 48.0 feet
Tide	: 1.1 feet
Corrected Depth	: 46.9 feet (1)
Vibration time	: 4'17"
Core penetration	: 19.48 feet
Core recovery	: 12.5 feet
Percent recovery	: 64%

Depth in Feet	Surf. Elev. -46.9 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SP		Gray medium SAND, little gravel, trace coarse sand, trace fine sand, trace silt/clay.	1	1/0.4-5.0
	-50			Gray fine SAND, trace medium sand, trace silt/clay.		
5		SP		SAME.	2	2/5.0-8.9
	-55					
				Gray SILT/CLAY, trace fine sand.		3/8.9-10.0 (not tested, fine grained sample)
10				SAME.		4/10.0-11.3 (not tested, fine grained sample)
				Tan fine SAND, little medium sand, trace silt/clay, trace coarse sand.	3	5/11.3-12.5 (not tested, see DRV-65 run #2)
	-60					
15						
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

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Vibrocore DRV-65 R2

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 14, 1999
Weather	: Overcast, 1-2 foot seas
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 103,339.2
Easting Coord.	: E 290,222.3

Uncorrected Depth	: 47.5 feet
Tide	: +0.35 feet
Corrected Depth	: 47.15 feet (1)
Vibration time	: 4'17"
Core penetration	: 19.75 feet (2)
Core recovery	: 11.3 feet
Percent recovery	: 57% (2) (3)

Depth in Feet	Surf. Elev. -47.2 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0				Jet to 10.0 feet, then start vibration.		
	-50					
5						
	-55					
10						
		SP		Tan fine SAND, little medium sand, trace silt/clay, trace coarse sand.	1	1/11.1-12.4
	-60	SM		Tan fine SAND, little silt/clay, little medium sand.	1	2/12.4-13.9
15		SM		Tan/brown fine SAND, some silt/clay, trace medium sand.	1	3/13.9-15.9
				Gray SILT/CLAY, trace fine sand.	2	4/15.9-19.0 (not tested, fine grained sample)
	-65					
20		SM		Gray fine SAND, little silt/clay, trace medium sand.	2	5/19.0-22.4
	-70					
25						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Actual sample penetration from 10.0 feet to 19.75 feet, total core penetration 9.75 feet.
3. Percent recovery reflects "over recovery" of sample possibly due to sample heave in liner and/or difficulty of penetration through dense strata. Core intervals reflect recovered material obtained from the vibrocore liner.
4. Sample depths are based on core recovery lengths.

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Vibrocore DRV-66 R1

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 14, 1999
Weather	: Overcast, 1-2 foot seas
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 100,002.5
Easting Coord.	: E 292,477.8

Uncorrected Depth	: 47.9 feet
Tide	: -0.1 feet
Corrected Depth	: 48.0 feet (1)
Vibration time	: 10'50"
Core penetration	: 19.02 feet
Core recovery	: 14.3 feet
Percent recovery	: 75%

Depth in Feet	Surf. Elev. -48.0 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SP		Gray fine SAND, some medium sand, little gravel, trace coarse sand, trace silt/clay.		1/0.0-0.5
	-50	SM		Tan/brown fine SAND, some silt/clay, trace medium sand, trace coarse sand, trace gravel.	1	2/0.5-3.9
				Dark-gray/tan SILT/CLAY, trace fine sand.		3/3.9-5.0 (not tested, fine grained sample)
5	-55	SM		Dark-gray fine SAND, some silt/clay, trace medium sand.	2	4/5.0-10.0
10	-60	SP		Dark-gray fine SAND, little medium sand, trace silt/clay.	3	5/10.0-14.3
15	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

08-23-1999 f:\boring logs\vibro99\port mahon\drv66r1.bor

DUFFIELD ASSOCIATES
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Vibrocore DRV-66 R2

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 14, 1999
Weather	: Overcast, 1-2 foot seas
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 100,010.5
Easting Coord.	: E 292,506.5

Uncorrected Depth	: 50.5 feet
Tide	: +1.8 feet
Corrected Depth	: 48.7 feet (1)
Vibration time	: 4'07"
Core penetration	: 19.74 feet (2)
Core recovery	: 8.5 feet
Percent recovery	: 128% (2) (3)

Depth in Feet	Surf. Elev. -48.7 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0				Jet to 13.09 feet, then start vibration.		
	-50					
5						
	-55					
10						
	-60					
		SP		Gray/tan fine SAND, little medium sand, trace silt/clay.	1	1/13.1-15.8
15						
	-65	SP		Gray/tan fine SAND, trace medium sand, trace silt/clay.	2	2/15.8-18.3
		SM		Gray SILT/CLAY, some fine sand, little medium sand, little gravel, trace coarse sand, trace shell fragments.		3/18.3-19.75
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Actual sample penetration from 13.09 feet to 19.75 feet, total core penetration 6.65 feet.
3. Percent recovery reflects "over recovery" of sampel possibly due to sample heave in liner and/or difficulty of penetration through dense strata. Core intervals reflect recovered material obtained from the vibrocore liner.
4. Sample depths are based on core recovery lengths

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Vibrocore DRV-67

U.S. Army Corps of Engineers
Vibrocore - Deleware Coast
Contract Number DACW-61-98-D-0008
Task Order 8
Port Mahon PED

Date	: March 14, 1999
Weather	: Overcast, 1-2 foot seas
Vibrocore contractor	: Alpine Ocean Seismic Sur.
Location	: Port Mahon, DE
Northing Coord.	: N 97,506.5
Easting Coord.	: E 294,196.4

Uncorrected Depth	: 47.3 feet
Tide	: -0.1 feet
Corrected Depth	: 47.4 feet (1)
Vibration time	: 6'04"
Core penetration	: 17.55 feet
Core recovery	: 17.0 feet
Percent recovery	: 97%

Depth in Feet	Surf. Elev. -47.4 (1)	USCS	GRAPHIC	DESCRIPTION	Core interval	Sample No./Interval
0		SP		Orange/tan fine SAND, little gravel, little medium sand, trace coarse sand, trace silt/clay.	1	1/0.0-1.6
	-50	SP		Orange/tan fine SAND, trace medium sand, trace silt/clay.		2/1.6-5.1
5		SP-SM		Orange/tan fine SAND, some medium sand, trace silt/clay.	2	3/5.1-6.0
	-55			Dark-gray/green SILT/CLAY, some fine sand.		4/6.0-10.1 (not tested, fine grained sample)
10	-60			SAME.	3	5/10.1-15.1 (not tested, fine grained sample)
15				SAME.	4	6/15.1-16.2 (not tested, fine grained sample)
		SP-SM		Gray fine SAND, little silt/clay, trace medium sand.		7/16.2-17.0
	-65					
20						

Notes:
1. Corrected water depth and ground surface datum is NGVD.
2. Sample depths are based on core recovery lengths.

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CORE LOG

Job # 1378

DRV 68

Core No. ~~68~~ Run No. 1 Date: 04-27-01 Area: Delaware River Main Channel

Grid Position: Easting 260031.90 Northing 152613.54 Filename 1049.DAT

Geographic Position: Lat. 39°14.9699 Long. 75°19.1758

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 50.4	Stop: 10 56 02	Penetration: 19.58	
Tide: −5.18	Start: 10 50 17	Recovery:	
= Corrected: 45.2	= Elapsed:		

Depth	Core Description	Depth	Core Description
0			
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

no recovery did not break in liner

Comments: Liner Stuck in Pipe — Changed Pipe

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CORE LOG

Job # 1378

DRV

Core No. 68 Run No. 2 Date: 04/27/01 Area: Delaware River Main Channel

Grid Position: Easting 260020.89 Northing 152617.28 Filename ____

Geographic Position: Lat. 38° 14.9705 Long. 75° 19.1781

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 52.0	Stop: 13 12 58	Penetration: 18.18	
Tide: -4.10	Start: 13 04 36	Recovery: 19.7	
= Corrected: 47.9	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	Orange Brown red sand		
1		21	
2		22	
3		23	
4		24	
5	orange clay	25	
6		26	
7		27	
8		28	
9		29	
10	olive clay	30	
11		31	
12		32	
13		33	
14		34	
15	brown clay	35	
16		36	
17		37	
18		38	
19		39	
20	~~fine brown sand w/silt~~	40	

Comments: ____

DRILLING LOG DRV-68 R2

(Page 1 of 1)

1. PROJECT : DE River Main Channel
2. LOCATION : N152617.28 E260020.89
2a. DATUM : NJ State Plane NAD-83
3. DRILLING AGENCY: Alpine
4. HOLE NO. : DRV-68 Run 2
5. DRILLER NAME : O. Hernandez

7. OVERBURDEN THICKNESS : NA
8. DEPTH TO ROCK : NA
9. TOTAL DEPTH : 18.18'
10. BIT SIZE/ TYPE : 3.5" Cutting Shoe
11. ELEV. DATUM : NAVD(88)
12. DRILL RIG : Alpine Model 271
13a. DIST. SAMPLES : 5
UNDIST. SAMPLES : NA

14. NO. OF CORE BOXES : NA
15. GW ELEV. : NA
16. DATE STARTED : 4/27/01
DATE COMPLETED : 4/27/01
17. ELEVATION : -49.4 NAVD(88)
18. TOTAL RECOVERY : 19.70'/18.18'
19. INSPECTOR : Tamera L. Renninger

DEPTH FEET	NAVD ELEV. -49.4	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0					
	-50	SP	SAND: Poorly Graded, Fine to Medium Sand, wet, loose, subangular to subrounded grains, Dark Yellowish Brown 10YR 4/6	S-1	Run1 Uncorrected Water Depth= 50.4' MLLW=46.0' Liner could not be removed; therefore, sample was recollected. Run1 Location: N152613.54 E260031.90 Total Penetration= 19.58' Total Recovery= 0.0'
2	-52				
4	-54	ML	SILT: with trace amounts of Fine Sand, low plasticity, soft, Brownish Yellow 10YR 6/8 to Gray 2.5Y 6/1	S-2	Run 2 Uncorrected water depth= 52.0' MLLW= 45.9'
6	-56	SM	SILTY SAND: with some Clay, very Fine to Fine Sand, low to medium plasticity, soft, Light Yellowish Brown 2.5Y 6/3	S-3	S-1 collected from 0.0' - 4.5' S-2 collected from 4.5' - 6.0' S-3 collected from 6.0' - 10.0'
8	-58				
10	-60	SM	As above		
12	-62				
14	-64	ML	CLAYEY SILT: with Fine to Medium Sand, angular, low plasticity, soft, Light Olive Brown 2.5Y 5/3	S-4	Samples 4 & 5 were not analyzed
16	-66	ML	As above		
18	-68	ML	SANDY SILT: Poorly Graded, rounded, Very Dark Gray 2.5Y 3/1	S-5	Bottom of Boring= 18.18' Greater recovery than penetration
20					

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Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-68 R2

(Page 1 of 1)

Hole No. DRV-68

DRILLING LOG	DIVISION USACE Philadelphia	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT: Delaware River Main Channel
2. LOCATION (Coordinates or Station):
3. DRILLING AGENCY: Alpine
4. HOLE NO. (As shown on drawing title and file number): DRV-68
5. NAME OF DRILLER: O. Hernandez
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 19.58'
10. SIZE AND TYPE OF BIT: 3.5" Cutting Shoe
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: Alpine Model 271
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 4/27/01; COMPLETED 4/27/01
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 100 %
19. SIGNATURE OF INSPECTOR: James [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1.0'	SP	2.0': POORLY-GRADED FINE TO MEDIUM SAND (SP), WET, LOOSE, DARK YELLOWISH BROWN 10YR 4/6 SAND SUBANGULAR TO SUBROUNDED	19.70'/18.18'		R1 Uncorrected Water Depth = 50.4' - R1 liner could not be removed, therefore we recollected sample. R2 UNCORRECTED WATER DEPTH = 52.0'
	2.0'					
	3.0'					
	4.0'					
	5.0'	CL	5.0': CLAY WITH TRACE AMOUNTS OF FIND SAND (3%) (CL) LOW PLASTICITY, SOFT, BROWNISH YELLOW 10YR 6/8			DRV-68 R1 260031.98 E 152613.54 N
	6.0'					
	7.0'					
	8.0'					DRV-68 R2 260028.89 E 152617.28 N
	9.0'					
	10.0'	ML	10.0': SANDY SILT WITH SOME CLAY (ML), LOW-MEDIUM PLASTICITY, VERY FINE TO FINE GRAINED SAND, SOFT, LIGHT YELLOWISH BROWN 2.5Y 6/3			
	11.0'					
	12.0'					
	13.0'					
	14.0'					
	15.0'	CL	15.0': CLAYEY SILT WITH FINE TO MED. GRAINED SAND, (CL) SAND GRAINS ANGULAR, SOFT, LOW PLASTICITY, LIGHT OLIVE BROWN 2.5Y 5/3			
	16.0'					
	17.0'					
	18.0'					
	19.0'	SP	18.18': SAND WITH SOME SILT, POORLY GRADED, (SP), ROUNDED, VERY DARK GRAY (TRANSLUCENT) 2.5Y 3/1			Bottom of Boring = 19.58'
	20.0'					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

Bottom of R2 Boring = 18.18

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CORE LOG

Job # 1378

DRV

Core No. 69 Run No. 1 Date: 04/27/01 Area: Delaware River Main Channel

Grid Position: Easting 262635.19 Northing 148544.77 Filename ____

Geographic Position: Lat. 39°14.4688 Long. 75°18.6185'

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 53.8	Stop: 14 22 10	Penetration: 18.58	
Tide: −2.81	Start: 14 14 23	Recovery: 20.0	
= Corrected: 51.0	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	fine/med gray sand w/ Rocks		
1		21	
2		22	
3		23	
4		24	
5	med orange/brown sand	25	
6		26	
7		27	
8		28	
9		29	
10	Clay w/ sand - dark gray	30	
11		31	
12		32	
13		33	
14		34	
15	fine/med gray sand w/ clay	35	
16		36	
17		37	
18		38	
19		39	
20	brown/gray silty sand w/ clay	40	

Comments:

DRILLING LOG DRV-69

(Page 1 of 1)

1. PROJECT : DE River Main Channel
2. LOCATION : N149544.77 E262635.19
2a. DATUM : NJ State Plane NAD-83
3. DRILLING AGENCY: Alpine
4. HOLE NO. : DRV-69
5. DRILLER NAME : O. Hernandez

7. OVERBURDEN THICKNESS : NA
8. DEPTH TO ROCK : NA
9. TOTAL DEPTH : 18.58'
10. BIT SIZE/ TYPE : 3.5" Cutting Shoe
11. ELEV. DATUM : NAVD(88)
12. DRILL RIG : Alpine Model 271
13a. DIST. SAMPLES : 4
UNDIST. SAMPLES : NA

14. NO. OF CORE BOXES : NA
15. GW ELEV. : NA
16. DATE STARTED : 4/27/01
DATE COMPLETED : 4/27/01
17. ELEVATION : -51.7 NAVD(88)
18. TOTAL RECOVERY : 20.0'/18.58'
19. INSPECTOR : Tamera L. Renninger

DEPTH FEET	NAVD ELEV. -51.7	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-52	SP-SM	SAND with SILT: Poorly Graded, with some Silt, loose, subrounded to rounded grains, wet, Light Olive Brown 2.5Y 5/3		Uncorrected Water Depth= 53.8' MLLW= 48.2'
		ML	SILT: with trace Fine Sand and Fine Gravel, Greenish Gray 5GY 5/1		
2	-54	SP-SM	SAND with SILT: Poorly Graded Fine to Coarse Sand with Gravel, Yellowish Brown 10YR 5/8		
4	-56	SP-SM	SAND with SILT: Poorly Graded, Fine to Medium Sand, subangular to subrounded grains, loose, wet, Yellowish Brown 10YR 5/8	S-1	S-1 collected from 2.5' - 5.0' Sieve analysis results from S-1 are indicative of 0.0' - 5.5' based on field classification.
6	-58	ML	SILT: with Sand and Gravel, medium plasticity, soft to medium stiffness, Very Dark Gray 7.5YR 3/1		
8	-60			S-2	S-2 collected from 5.5' - 10.0'
10	-62				
12	-64	ML	SANDY SILT to SILTY SAND: Fine Sand, low plasticity, Very Dark Gray 7.5YR 3/1	S-3	Samples 3 & 4 were not analyzed
14	-66				
16	-68	ML	CLAYEY SILT: with Fine Sand, low plasticity, soft, Very Dark Grayish Brown 2.5Y 3/2	S-4	
18	-70				Bottom of Boring= 18.58'
20					

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Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-69

(Page 1 of 1)

Hole No. DRV-69

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION N/A	SHEET 1 OF 1 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CONT / NO SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-69	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER D. HERNANDEZ	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER N/A
	16. DATE HOLE: STARTED 4/27/01 COMPLETED 4/27/01
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING 100 %
9. TOTAL DEPTH OF HOLE 18.58'	19. SIGNATURE OF INSPECTOR Tamera Runiga

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SW	0.0': GRAVELLY WELL-GRADED SAND WITH TRACE AMOUNTS OF SILT (SW), LOOSE, WET, GRAINS ROUNDED TO SUB-ROUNDED, LIGHT OLIVE BROWN 2.5Y 5/3	100 / 18.58'		UNCORRECTED WATER DEPTH = 53.8'
	1.0					DRV-69
	2.0					362635.19E
	3.0					149644.77N
	4.0					
	5.0	SP	5.0': POORLY GRADED FINE TO MEDIUM GRAIN SAND (SP), SUBANGULAR TO SUBROUNDED GRAINS, LOOSE, WET, YELLOWISH BROWN 10YR 5/8			
	6.0					
	7.0					
	8.0					
	9.0					
	10.0	CL	10.0': CLAY WITH SAND AND GRAVEL, (CL), MEDIUM PLASTICITY, SOFT TO MEDIUM STIFF, VERY DARK GRAY 7.5 YR 3/1			
	11.0					
	12.0					
	13.0					
	14.0					
	15.0	ML	15.0': ~~CLAYEY SILT~~ SILT W/ CLAY & W/ FINE-GRAINED SAND (ML), LOW PLASTICITY, SOFT, VERY DARK GRAY 7.5 YR 3/1			
	16.0					
	17.0					
	18.0					
	19.0	ML	18.58': CLAYEY SILT W/ FINE-GRAINED SAND (ML), SOFT, LOW PLASTICITY, VERY ~~DARK GRAYISH BROWN~~ 2.5Y 3/2			BOTTOM OF BORING = 18.58'
	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT) SHEET 1 OF 1 SHEETS

PROJECT: DELAWARE RIVER MAIN CHANNEL

HOLE NO. DRV-69

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CORE LOG

Job # 1378

DRV

Core No. 70 Run No. 1 Date: 04/27/01 Area: Delaware River Main Channel

Grid Position: Easting 267384.25 Northing 141101.48 Filename ____

Geographic Position: Lat. 39°13.0844 Long. 75°17.5968'

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 49.7	Stop: 150158	Penetration: 19.52	
Tide: −1.83	Start: 150010	Recovery: 18.6	
= Corrected: 47.9	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	Silty gray/brown sand w/shell frag.	21	
1		22	
2		23	
3		24	
4		25	
5	Silty gray/brown sand w/clay	26	
6		27	
7		28	
8		29	
9		30	
10	dark gray clay	31	
11		32	
12		33	
13		34	
14		35	
15	dark gray clay w/ sand contrib	36	
16		37	
17		38	
18		39	
19	dark gray clay	40	
20			

Comments: ____

DRILLING LOG DRV-70

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N141101.48 E267384.25	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/27/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 19.52'	DATE COMPLETED	: 4/27/01
4. HOLE NO.	: DRV-70	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -48.3 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 18.60'/19.52'
		12. DRILL RIG	: Alpine Model 271	19. INSPECTOR	: Tamera L. Renninger
		13a. DIST. SAMPLES	: 4		
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -48.3	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-49	SP-SM	SAND and SILT: Poorly Graded, Fine Sand with some Silt, rounded grains, 20-25% Shell Fragments, loose, Dark Olive Gray 5Y 3/2	S-1	Uncorrected Water Depth= 49.7' MLLW= 44.8' S-1 collected from 0.0' - 2.5'
2	-51	ML	SANDY SILT: contains 20% Shell Fragments, very soft, with occasional (1-2") lens of shell fragments, trace amounts of peat, Dark Gray 5Y 4/1	S-2	Complete/Whole Bivalve Shell at 24" S-2 collected from 2.5' - 5.0' Sieve analysis results are indicative of 2.5' - 10.0' based on field classification.
4	-53				
6	-55				
8	-57				
10	-59	CL	SILT to CLAYEY SILT: with trace amounts of Shell Fragments, low to nonplastic, soft to medium stiffness, Very Dark Gray 5Y 3/1	S-3	Samples 3 & 4 were not analyzed
12	-61				
14	-63		14.5-15.0' Peat lenses		
16	-65	CL	SILT to CLAYEY SILT: medium plasticity, medium stiffness, Very Dark Gray 5Y 3/1, with increased peat lenses	S-4	
18	-67	CL	CLAY: with trace amounts of Shell Fragments, low to medium plasticity, medium stiffness, Very Dark Gray 2.5Y 3/1		Bottom of Boring= 19.52'
20					

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Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-70

(Page 1 of 1)

Hole No. DRV-78

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT: DELAWARE RIVER MAIN CHANNEL
2. LOCATION (Coordinates or Station):
3. DRILLING AGENCY: ALPINE
4. HOLE NO. (As shown on drawing title and file number): DRV-78
5. NAME OF DRILLER: O. HERNANDEZ
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 19.52'
10. SIZE AND TYPE OF BIT: 3.5" CLAY ING SHOE
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: ALPINE MODEL 271
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED ____ UNDISTURBED ____
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 4/27/01 COMPLETED 4/27/01
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 95 %
19. SIGNATURE OF INSPECTOR: Tamera Jennings

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0'	SP	0.0': POORLY-GRADED SAND WITH SOME SILT (SP), FINE GRAIN SAND, 20-25% SHELL FRAGS., ROUNDED GRAINS, LOOSE, DARK OLIVE GRAY 5Y 3/2	18.60' / 19.52'		UNCORRECTED WATER DEPTH=49.7 DRV-78 267384.25 E 141181.48 N
	1.0'					
	2.0'					
	3.0'					
	4.0'					
	5.0'	CL	5.0': SILTY CLAY (CL), NONPLASTIC, CONTAINS 20% SHELL FRAGMENTS, VERY SOFT, DARK GRAY 5Y 4/1			
	6.0'					
	7.0'					
	8.0'					
	9.0'					
	10.0'	CL	10.0': CLAY WITH SILT AND TRACE AMOUNTS OF SHELL FRAGMENTS (CL), LOW TO NONPLASTIC, SOFT TO MEDIUM STIFF, VERY DARK GRAY 5Y 3/1			
	11.0'					
	12.0'					
	13.0'					
	14.0'					
	15.0'	CL	15.0': CLAY WITH SOME SILT (CL), MEDIUM STIFF, MEDIUM PLASTICITY, VERY DARK GRAY 5Y 3/1			CONTAINS SOME PLANT MATERIAL
	16.0'					
	17.0'					
	18.0'					
	19.0'	CL	19.52': CLAY WITH TRACE AMOUNTS OF SHELL FRAGMENTS (CL) MEDIUM STIFF, LOW PLASTICITY, VERY DARK GRAY			BOTTOM OF BORING=19.52'
	20.0'					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (Text continued on reverse side)

PROJECT: DELAWARE RIVER MAIN CHANNEL

HOLE NO. DRV-78

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

DRJ

Core No. 71 Run No. 1 Date: 04-27-01 Area: Delaware River Main Channel

Grid Position: Easting 272958.36 Northing 129134.81 Filename ____

Geographic Position: Lat. 39°11.1210 Long. 75°16.3947

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 49.1	Stop: 15 54 55	Penetration: 18.24	
Tide: -1.10	Start: 153902	Recovery: 20.0	
= Corrected: 48.0	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	silty dark gray sand		
1		21	
2		22	
3		23	
4		24	
5	silty gray sand w/clay content	25	
6		26	
7		27	
8		28	
9		29	
10	hard pack clay	30	
11		31	
12		32	
13		33	
14		34	
15	hard packed clay	35	
16		36	
17		37	
18		38	
19		39	
20	hard packed clay	40	

Comments: same sand content

DRILLING LOG DRV-71

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF	: NA
2. LOCATION	: N129134.81 E272958.36	7. OVERBURDEN	: NA	CORE BOXES	:
2a. DATUM	: NJ State Plane NAD-83	THICKNESS	:	15. GW ELEV.	: NA
3. DRILLING AGENCY	: Alpine	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/27/01
4. HOLE NO.	: DRV-71	9. TOTAL DEPTH	: 18.24'	DATE COMPLETED	: 4/27/01
5. DRILLER NAME	: O. Hernandez	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -48.5 NAVD(88)
		11. ELEV. DATUM	: NAVD(88)	18. TOTAL	: 20.0'/18.24'
		12. DRILL RIG	: Alpine Model 271	RECOVERY	:
		13a. DIST. SAMPLES	: 4	19. INSPECTOR	: Tamera L. Renninger
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -48.5	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-49	SP-SM	SAND with SILT: Poorly Graded, Fine to Medium Sand with some Silt, trace amounts of Shell Fragments, loose, Very Dark Gray 2.5Y 3/1	S-1	Uncorrected Water Depth= 49.1' MLLW= 44.9' S-1 collected from 0.0' - 4.3'
2	-51		Grading downward to Fine Sand: 2.5-4.3'		
4	-53	SW	GRAVELLY SAND: Fine to Coarse Sand with Fine Gravel, Gray N 5/0		
6	-55	ML	SANDY SILT: nonplastic, wet, loose, Dark Olive Gray 5Y 3/2	S-2	S-2 collected from 5.0' - 8.6' Sieve analysis results from S-2 are indicative of 4.8' - 8.6' based on field classification.
8	-57	ML	SILT: contains some Mica, low plasticity, medium stiffness, Very Dark Gray 5Y 3/1		
10	-59	ML	As above	S-3	S-3 collected from 10.0' - 15.0' Sieve analysis results from S-3 are indicative of 8.6' - 15.0' based on field classification.
12	-61				
14	-63				
16	-65	ML	SILT: with Fine Sand laminations, low plasticity, medium stiffness, Very Dark Gray 5Y 3/1	S-4	Sample 4 not analyzed
18	-67				Bottom of Boring= 18.24'
20					

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12-03-2001

Science Applications International Corporation
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USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-71

(Page 1 of 1)

Hole No. DRV-71

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-71	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER O. HERNANDEZ	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
7. THICKNESS OF OVERBURDEN NA	16. DATE HOLE STARTED 4/27/01 COMPLETED 4/27/01
8. DEPTH DRILLED INTO ROCK NA	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE 18.24'	18. TOTAL CORE RECOVERY FOR BORING 110 %
	19. SIGNATURE OF INSPECTOR Tamara J. Remigio

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SP	0.0' = POORLY-GRADED SAND WITH SOME SILT (SP), FINE-GRAIN, CONTAINS TRACE AMOUNTS OF SHELL FRAGMENTS, LOOSE, VERY DARK GRAY 2.5Y 3/1	20.00' / 18.24'		UNCORRECTED WATER DEPTH=14.1' DRV-71 272958.36 E 129134.81 N
	1.0					
	2.0					
	3.0					
	4.0					
	5.0	ML	5.0' = SILT WITH SAND, NONPLASTIC (ML), LOOSE, WET, DARK OLIVE GRAY 5Y 3/2			
	6.0'					
	7.0					
	8.0					
	9.0					
	10.0	CL	10.0' = CLAY (CL) LOW TO MEDIUM ~~TO HIGH~~ PLASTICITY 4/27/01, CONTAINS SOME MICA, MEDIUM STIFF, VERY DARK GRAY 5Y 3/1			
	11.0					
	12.0					
	13.0					
	14.0					
	15.0	CL	15.0' = SAME AS ABOVE			
	16.0					
	17.0					
	18.0	CL	18.24' = CLAY WITH SOME SILT (CL), LOW-MED PLASTICITY, CONTAINS SOME MICA, VERY DARK GRAY 5Y 3/1			BOTTOM OF BORING = 18.24'
	19.0					
	20.0					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT) Page 1 of 1 PROJECT DELAWARE RIVER MAIN CHAN. HOLE NO. DRV-71

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07648
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E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

Core No. DRV 72 Run No. 1 Date: 04/27/01 Area: Delaware River Main Channel

Grid Position: Easting 273824.08 Northing 125867.14 Filename ____

Geographic Position: Lat. 39° 10.5840' Long. 75° 16.2056'

Water Depth	Vibration Time	Core Depth	Fix # 33
Uncorrected: 48.9	Stop: 16 36 23	Penetration: 20.02	
Tide: -0.63	Start: 16 35 00	Recovery: 19.6	
= Corrected: 48.3	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	med dark gray sand		
1		21	
2		22	
3		23	
4		24	
5	fine dark gray sand	25	
6		26	
7		27	
8		28	
9		29	
10	Silty gray sand w/ Clay Content	30	
11		31	
12		32	
13		33	
14		34	
15	med dark gray sand	35	
16		36	
17		37	
18		38	
19	Silty gray sand w/ Clay content	39	
20		40	

Comments: ____

DRILLING LOG DRV-72

(Page 1 of 1)

1. PROJECT	: DE River Main Channel
2. LOCATION	: N125867.14 E273824.08
2a. DATUM	: NJ State Plane NAD-83
3. DRILLING AGENCY	: Alpine
4. HOLE NO.	: DRV-72
5. DRILLER NAME	: O. Hernandez
6. DIR. OF HOLE	: vertical
7. OVERBURDEN THICKNESS	: NA
8. DEPTH TO ROCK	: NA
9. TOTAL DEPTH	: 20.02'
10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe
11. ELEV. DATUM	: NAVD(88)
12. DRILL RIG	: Alpine Model 271
13a. DIST. SAMPLES	: 4
UNDIST. SAMPLES	: NA
14. NO. OF CORE BOXES	: NA
15. GW ELEV.	: NA
16. DATE STARTED	: 4/27/01
DATE COMPLETED	: 4/27/01
17. ELEVATION	: -49.4 NAVD(88)
18. TOTAL RECOVERY	: 19.6'/20.02'
19. INSPECTOR	: Tamera L. Renninger

DEPTH FEET	NAVD ELEV. -49.4	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-50	SM	SILTY SAND: Fine to Medium Grain, subangular to subrounded, with some Shell Fragments, Dark Olive Gray 5Y 3/2	S-1	Uncorrected Water Depth= 48.9' MLLW= 45.9'
2	-52				S-1 collected from 0.0' - 5.0'
4	-54	SP-SM	SAND with SILT: Poorly Graded, Fine to Medium Grain with trace amount of shell fragments, Dark Olive Gray 5Y 3/2	S-2	
6	-56				
8	-58				S-2 collected from 0.0' - 10.0'
10	-60	SP-SM	SAND with SILT: Poorly Graded with some Silt, and occasional Clayey Silt to Silty Sand interbeds, trace amounts of Shell Fragments, loose, wet, Very Dark Gray 5Y 3/1	S-3	Samples 3 & 4 were not analyzed
12	-62				
14	-64	SP-SM	SAND with SILT: Poorly Graded, Medium to Coarse Sand, subrounded to rounded, with some Shell Fragments, and occasional Clayey Silt to Silty Sand interbeds, loose, wet, Dark Gray 5Y 4/1	S-4	
16	-66				
18	-68				
20	-70	ML	CLAYEY SILT: with some Fine Sand, trace amounts of Shell Fragments, Very Dark Gray 5Y 3/1		Bottom of Boring= 20.02'
22					

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12-03-2001

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USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-72

(Page 1 of 1)

Hole No. DRV-72

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CLIMBING SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-72	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER D. HERNANDEZ	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE STARTED 4/27/01 COMPLETED 4/27/01
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 98 %
9. TOTAL DEPTH OF HOLE 20.0'	19. SIGNATURE OF INSPECTOR Tammy Remington

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SP	0.0': POORLY-GRADED SAND (SP), FINE TO MEDIUM GRAIN, SUBANGULAR TO SUBROUNDED, CONTAINS SOME SHELL FRAGMENTS, DARK OLIVE GRAY 5Y 3/2	19.0' / 20.0'		UNCORRECTED WATER DEPTH = 48.9' DRV-71 272958.36E 129134.81N
	1.0					
	2.0					
	3.0					
	4					
	5.0	SP	5.0': SAME AS ABOVE, EXCEPT TRACE AMOUNTS OF SHELL FRAGS.			
	6					
	7.0					
	8					
	9.0					
	10	SP	10.0': POORLY-GRADED SAND WITH SOME SILT (SP), LOOSE, WET, TRACE AMOUNTS OF SHELL FRAGMENTS, VERY DARK GRAY 5Y 3/1			
	11.0					
	12					
	13.0					
	14					
	15.0	SP	15.0': POORLY-GRADED SAND WITH SOME SHELL FRAGMENTS (SP), MEDIUM TO LARGE GRAIN, SUBROUNDED TO ROUNDED, LOOSE, WET, DARK GRAY 5Y 4/1			
	16					
	17.0					
	18					
	19.0					BOTTOM OF BORING = 20.0'
	20	ML	20.0': CLAYEY SILT WITH SOME FINE SAND (ML)			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT DELAWARE MAIN CHANNEL HOLE NO. DRV-72

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70 Oak Street Norwood, New Jersey
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CORE LOG

Job # 1378

DRV

Core No. 73 Run No. 1 Date: 04-29-01 Area: Delaware River Main Channel

Grid Position: Easting 281652.66 Northing 115856.99 Filename ____

Geographic Position: Lat. 39°08.9457 Long. 75°14.5314'

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 50.3	Stop: 14 57 37	Penetration: 19.63	
Tide: -3.32	Start: 14 55 52	Recovery: 18.6	
= Corrected: 47.0	= Elapsed: ____		

Depth	Core Description	Depth	Core Description
0	Coarse gray Sand		
1		21	
2		22	
3		23	
4		24	
5	silty sand & clay	25	
6		26	
7		27	
8		28	
9		29	
10	gray clay	30	
11		31	
12		32	
13		33	
14		34	
15	gray clay	35	
16		36	
17		37	
18		38	
19		39	
20	gray clay w/ peat	40	

Comments: ____

DRILLING LOG DRV-73

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N115856.99 E281652.66	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/29/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 19.63'	DATE COMPLETED	: 4/29/01
4. HOLE NO.	: DRV-73	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -48.4 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 19.60'/19.63'
		12. DRILL RIG	: Alpine Model 271	19. INSPECTOR	: Tamera L. Renninger
		13a. DIST. SAMPLES	: 3		
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -48.4	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0					
	-49	SP-SM	SAND with SILT: Poorly Graded, Fine to Coarse Sand, with Silt, subangular to subrounded, very loose, wet, Dark Gray 5Y 4/1	S-1	Uncorrected Water Depth= 50.3' MLLW= 44.9' S-1 collected from 0.0' - 3.0' Sieve analysis results from S-1 are indicative of 0.0' - 5.0' based on field classification.
2	-51	SP-SM	SAND: As above, but with Silt to Clayey Silt stringers		
4	-53	SM	SILTY SAND: Fine to Medium Sand with Silt, with Silt and Clayey Silt interbeds, Dark Gray 2.5Y 4/1	S-2	S-2 collected from 5.0' - 8.0' Sieve analysis results from S-2 are indicative of 5.0' - 9.0' based on field classification.
6	-55				
8	-57	SM	SILTY SAND: As above, but coarser, Medium to Coarse Sand with Fine Gravel		
10		ML	SILT: with Fine Sand, low plasticity, soft, moist, Very Dark Grayish Brown 2.5Y 3/2		With peat from 9.5-10.0'
	-59	ML	SILT: with occasional peat nodules, nonplastic, soft, wet, Very Dark Gray 2.5Y 3/1	S-3	S-3 collected from 10.0' - 15.0' Sieve analysis results from S-3 are indicative of 9.0' - 15.0' based on field classification.
12	-61				
14	-63				
16	-65	ML	As above		
18	-67				Bottom of Boring= 19.63'
20					

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12-04-2001

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USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-73

(Page 1 of 1)

Hole No. DRV-73

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT: DELAWARE RIVER MAIN CHANNEL
2. LOCATION (Coordinates or Station):
3. DRILLING AGENCY: ALPINE
4. HOLE NO. (As shown on drawing title and file number): DRV-73
5. NAME OF DRILLER: D. HERNANDEZ
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 19.63'
10. SIZE AND TYPE OF BIT: 3.5" CUTTING SHOE
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: ALPINE MODEL 271
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 4/29/01; COMPLETED 4/29/01
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 95 %
19. SIGNATURE OF INSPECTOR: Tamera Minogue

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0	SP	0.0': POORLY GRADED SAND WITH SILT (SP), FINE TO COARSE-GRAIN, SUBANGULAR TO SUBROUNDED, VERY LOOSE, WET, DARK GRAY 5Y 4/1,	19.60 / 19.63		UNCORRECTED WATER DEPTH=50.3' DRV-73 COORDINATES 281652.06 E 115856.99 N
	1.0					
	2.0					
	3.0					
	4.0					
	5.0	CL	5.0': SANDY CLAY (CL), FINE-GRAINED SAND, NONPLASTIC, WET, VERY SOFT, 2% SHELL FRAGMENTS, DARK GRAY 2.5Y 4/1,			
	6.0					
	7.0					
	8.0					
	9.0					
	10.0	CL	10.0': CLAY WITH SAND (CL), FINE-GRAINED SAND, LOW PLASTICITY, SOFT, MOIST, VERY DARK GRAYISH BROWN 2.5Y 3/2			
	11.0					
	12.0					
	13.0					
	14.0					
	15.0	CL	15.0': CLAY WITH SOME SILT, (CL), NONPLASTIC, WET, SOFT, VERY DARK GRAY 2.5Y 3/1			
	16.0					
	17.0					
	18.0					
	19.0	CL	19.63': CLAY WITH SILT (CL), CONTAINS SOME PLANT PIECES, LOW-NONPLASTIC, MOIST, SOFT, VERY DARK GRAY 2.5Y 3/1 (TRANSLUCENT)			BOTTOM OF BORING=19.63'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT: DELAWARE RIVER MAIN CHANNEL HOLE NO. DRV-73

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CORE LOG

Job # 1378

Core No. DRV 7~~4~~ Run No. 1 Date: 04-29-01 Area: Delaware River Main Channel

Grid Position: Easting 283487.05 Northing 112490.32 Filename ____

Geographic Position: Lat. 39°08.3936 Long. 75°14.1376

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 47.9	Stop: 14 18 10	Penetration: 19.31	
Tide: −3.91	Start: 14 12 14	Recovery: 20.0	
= Corrected: 44.0	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	Gray Clay		
1		21	
2		22	
3		23	
4		24	
5	gray Clay	25	
6		26	
7		27	
8		28	
9		29	
10	gray clay	30	
11		31	
12		32	
13		33	
14		34	
15	gray Clay	35	
16		36	
17		37	
18		38	
19		39	
20	gray Clay w/ some sand content	40	

Comments:

DRILLING LOG DRV-74

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N112490.32 E283487.05	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/29/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 19.31'	DATE COMPLETED	: 4/29/01
4. HOLE NO.	: DRV-74	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -46.1 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 20.0'/19.31'
		12. DRILL RIG	: Alpine Model 271	19. INSPECTOR	: Tamera L. Renninger
		13a. DIST. SAMPLES	: 3		
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -46.1	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0					
	-47	ML	SILT: organics, low to medium plasticity, medium stiffness, moist, Dark Gray 5Y 4/1		Uncorrected Water Depth= 47.9' MLLW= 42.6'
2	-49			S-1	3" Cobble at 2.0' S-1 collected from 0.0' - 5.0' Sieve analysis results from S-1 are indicative of 0.0' - 6.3'
4	-51				
6		ML	SILT: with organics, and trace amounts of Sand, medium plasticity, medium stiffnes, moist, Dark Gray 5Y 4/1		
	-53	ML	SILT: with organics, trace amounts of Mica, low to nonplastic, medium stiffness, dry, Very Dark Gray 5Y 3/1		7.2' - 7.6' SILT SAND lens, Medium Sand, trace amounts of Fine Gravel
8	-55	ML	As above	S-2	S-2 collected from 7.6' - 10.0' Sieve analysis results from S-2 are indicative of 6.3' - 10.0'
10	-57	ML	As above		
12	-59				
14	-61				
16	-63	ML	As above	S-3	Sample 3 not analyzed
18	-65				
		CL	SILTY CLAY: with some Sand and organics, low plasticity, moist, Very Dark Gray 5Y 3/1		Bottom of Boring= 19.31'
20					

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Vibracoring Delaware River Main Channel

DRILLING LOG DRV-74

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Hole No. DRV-74

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALDINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALDINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-74	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: — UNDISTURBED:
5. NAME OF DRILLER O. HERNANDEZ	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE — STARTED 4/29/01 — COMPLETED 4/29/01
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 104 %
9. TOTAL DEPTH OF HOLE 19.31'	19. SIGNATURE OF INSPECTOR Tamer Almiza

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1.0' 2.0' 3.0' 4.0'	CL	0.0': CLAY WITH TRACE AMOUNTS OF SILT (CL), MEDIUM STIFF, MOIST, LOW-MEDIUM PLASTICITY, DARK GRAY 5Y 4/1	20.00 / 19.31		UNCORRECTED WATER DEPTH=47.9' DRV-74 COORDINATES 273487.05 E 112490.32 N
	5.0' 6.0' 7.0' 8.0' 9.0'	CL	5.0': CLAY WITH SOME SAND (TRACE AMNTS) (CL), CONTAINS 1-2% MICA, MED. STIFF, MED. PLASTICITY, MOIST, DARK GRAY 5Y 4/1			
	10.0' 11.0' 12.0' 13.0' 14.0'	CL	10.0': CLAY WITH TRACE SILT (CL), DRY, CONTAINS TRACE AMNTS. OF MICA, LOW-NONPLASTIC, MED. STIFF, VERY DARK GRAY 5Y 3/1 (4/29/01)			
	15.0' 16.0' 17.0' 18.0'	CL	15.0': SAME AS ABOVE			
	19.0'	CL	19.31': SILTY CLAY WITH SOME SAND (CL), LOW PLASTICITY, MOIST, VERY DARK GRAY 5Y 3/1			BOTTOM OF BORING = 19.31'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT DELAWARE RIVER — HOLE NO. DRV-74

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

Core No. DR75 Run No. 1 Date: 04-29-01 Area: Delaware River Main Channel

Grid Position: Easting 289014.55 Northing 105208.27 Filename ____

Geographic Position: Lat. 39°07.2013 Long. 75°12.9562

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 48.7	Stop: 13 35 48	Penetration: 19.2	
Tide: -4.30	Start: 13 26 38	Recovery: 20.0	
= Corrected: 44.4	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	med fine sand some clay		
1		21	
2		22	
3		23	
4		24	
5	gray clay w/ some sand	25	
6		26	
7		27	
8		28	
9		29	
10	gray clay w/ little sand	30	
11		31	
12		32	
13		33	
14		34	
15	gray clay w/ sand content	35	
16		36	
17		37	
18		38	
19		39	
20	gray clay w/ sand content	40	

Comments:

DRILLING LOG DRV-75

(Page 1 of 1)

1. PROJECT	: DE River Main Channel
2. LOCATION	: N105208.27 E289014.55
2a. DATUM	: NJ State Plane NAD-83
3. DRILLING AGENCY	: Alpine
4. HOLE NO.	: DRV-75
5. DRILLER NAME	: O. Hernandez
6. DIR. OF HOLE	: vertical
7. OVERBURDEN THICKNESS	: NA
8. DEPTH TO ROCK	: NA
9. TOTAL DEPTH	: 19.2'
10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe
11. ELEV. DATUM	: NAVD(88)
12. DRILL RIG	: Alpine Model 271
13a. DIST. SAMPLES	: 4
UNDIST. SAMPLES	: NA
14. NO. OF CORE BOXES	: NA
15. GW ELEV.	: NA
16. DATE STARTED	: 4/29/01
DATE COMPLETED	: 4/29/01
17. ELEVATION	: -47.5 NAVD(88)
18. TOTAL RECOVERY	: 20.0'/19.2'
19. INSPECTOR	: Tamera L. Renninger

DEPTH FEET	NAVD ELEV. -47.5	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-48	SP	SAND: Poorly Graded, Fine to Medium Sand with Silt, subrounded, loose, moist, Olive 5Y 4/3		Uncorrected Water Depth= 48.7' MLLW= 44.0'
		ML	SILT: with trace Fine Sand, dense, Greenish Gray 5GY 5/1, with thin Brownish Yellow 10YR 6/8 laminations	S-1	S-1 collected from 0.5' - 2.0'
2	-50	ML	SILT: with Fine Sand, dense, Gray 2.5Y 5/1	S-2	S-2 collected from 2.0' - 5.0'
4	-52				
6	-54	SM	SILTY SAND: Fine Sand, medium dense, Dark Greenish Gray 5GY 4/1 with trace Silt	S-3	S-3 collected from 5.0' - 7.0'
8	-56	SM	SILTY SAND: Fine Sand, slight plasticity, medium dense, Dark Greenish Gray 5GY 4/1	S-4	S-4 collected from 7.0' - 10.0'
10	-58	SM	As above		
12	-60				
14	-62				
16	-64	SM	As above		
18	-66				Bottom of Boring= 19.2'
20					

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DRILLING LOG DRV-75

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Hole No. DRV-75

DRILLING LOG	DIVISION: USACE PHILADELPHIA	INSTALLATION: NA	SHEET 1 OF 1 SHEETS

1. PROJECT: DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT: 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station):	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL: ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number): DRV-75	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
5. NAME OF DRILLER: D. HERNANDEZ	14. TOTAL NUMBER CORE BOXES: NA
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: NA
	16. DATE HOLE: STARTED 4/29/01 COMPLETED 4/29/01
7. THICKNESS OF OVERBURDEN: NA	17. ELEVATION TOP OF HOLE:
8. DEPTH DRILLED INTO ROCK: NA	18. TOTAL CORE RECOVERY FOR BORING: 100%
9. TOTAL DEPTH OF HOLE: 19.2'	19. SIGNATURE OF INSPECTOR: Tamer Elmiogy

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1.0' 2.0' 3.0' 4.0'	SP	0.0': POORLY-GRADED SAND WITH SILT (SP), FINE-MEDIUM GRAIN, SUBROUNDED, MOIST, LOOSE, OLIVE 5Y 4/3	20.0' / 19.2'		UNCORRECTED WATER DEPTH = 48.7' DRV-75 COORDINATES TA 04/29/01 289014.66 N E 105208.27 N
	5.0' 6.0' 7.0' 8.0' 9.0'	CL	5.0': CLAY WITH SOME SILT (CL), LOW-NONPLASTIC, DRY, SOFT, DARK GRAY 5Y 4/1, CONTAINS TRACE MICA			
	10.0' 11.0' 12.0' 13.0' 14.0'	CL	10.0': SILTY CLAY (CL), MEDIUM PLASTICITY, MOIST, CONTAINS TRACE MICA, SOFT, VERY DARK GRAY 5Y 3/1			
	15.0' 16.0' 17.0' 18.0'	CL	15.0': SAME AS ABOVE			
	19.0'	CL	19.2': SAME AS ABOVE			BOTTOM OF BORING = 19.2'

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PROJECT: DELAWARE RIVER MAIN CHANNEL HOLE NO. DRV-75

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

DRV

Core No. 76 **Run No.** 1 **Date:** 04-29-01 **Area: Delaware River Main Channel**

Grid Position: Easting 296732.81 **Northing** 93100.24 **Filename** ____

Geographic Position: Lat. 39°05.2165 **Long.** 75°11.3045

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 46.6	Stop: 12 48 42	Penetration: 19.1	
Tide: -4.41	Start: 12 42 47	Recovery: 19.6	
= Corrected: 42.2	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	gray Clay w/ Some brown Sand		
1		21	
2		22	
3		23	
4		24	
5	grey & brown clayey sand	25	
6		26	
7		27	
8		28	
9		29	
10	fine/silty brown Sand	30	
11		31	
12		32	
13		33	
14		34	
15	gray clay w/ Some fine Sand	35	
16		36	
17		37	
18		38	
19	gray clay w/ Some fine Sand	39	
20		40	

Comments: ____

DRILLING LOG DRV-76

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1. PROJECT : DE River Main Channel
2. LOCATION : N93100.24 E296732.81
2a. DATUM : NJ State Plane NAD-83
3. DRILLING AGENCY: Alpine
4. HOLE NO. : DRV-76
5. DRILLER NAME : O. Hernandez

6. DIR. OF HOLE : vertical
7. OVERBURDEN THICKNESS : NA
8. DEPTH TO ROCK : NA
9. TOTAL DEPTH : 19.1'
10. BIT SIZE/ TYPE : 3.5" Cutting Shoe
11. ELEV. DATUM : NAVD(88)
12. DRILL RIG : Alpine Model 271
13a. DIST. SAMPLES : 4
UNDIST. SAMPLES : NA

14. NO. OF CORE BOXES : NA
15. GW ELEV. : NA
16. DATE STARTED : 4/29/01
DATE COMPLETED : 4/29/01
17. ELEVATION : -45.5 NAVD(88)
18. TOTAL RECOVERY : 19.6'/19.1'
19. INSPECTOR : Tamera L. Renninger

DEPTH FEET	NAVD ELEV. -45.5	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-46	SM	SILTY SAND: with trace Gravel, trace amounts of Shell Fragments, Light Brownish Gray 2.5Y 6/2	S-1	Uncorrected Water Depth= 46.6' MLLW= 42.2'
2	-48	SM	SILTY SAND: As above, Gray 10YR 6/1, with Brownish Yellow laminations 10YR 6/8		S-1 collected from 0.25' - 2.5'
4	-50	SM	SILTY SAND: Fine Sand, Light Gray 5Y 7/2	S-2	S-2 collected from 2.5' - 5.0' Sieve anlaysis results from S-2 are indicative of 2.5' - 7.5' based on field classification
6	-52	SM	As above		
8	-54	SP-SM	SAND with SILT: Poorly Graded Fine Sand, Light Gray 2.5Y 7/2, and Light Yellowish Brown 2.5Y 6/4	S-3	S-3 collected from 7.5' - 10.0'
10	-56	SM	SILTY SAND: Fine Sand, very loose, wet, Light Yellowish Brown 2.5Y 6/4 and Light Gray 2.5Y 7/1		
12	-58				
14	-60	ML	SILT with SAND: Fine Sand, medium stiffness, Dark Gray 5Y 3/1	S-4	Sample 4 not analyzed
16	-62	ML	As above		
18	-64				Bottom of Boring= 19.1'
20					

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DRILLING LOG DRV-76

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Hole No. DRV-76

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-76	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER D. HERNANDEZ	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE: STARTED 4/29/81 COMPLETED 4/29/81
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 103 %
9. TOTAL DEPTH OF HOLE 19.1'	19. SIGNATURE OF INSPECTOR [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0'	CL	0.0': SANDY CLAY WITH 5% GRAVEL (CL), MEDIUM TO LOW PLASTICITY, MEDIUM STIFF, MOIST, CONTAINS TRACE AMOUNTS OF SHELL FRAGS., LIGHT BROWNISH GRAY 2.5Y 6/2.	19.6' / 19.1'		UNCORRECTED WATER DEPTH=46.6
	1.0'					
	2.0'					DRV-76 COORDINATES AT 4/29
	3.0'					296732.81 N E
	4.0'					93180.24 N
	5.0'					
			5.0': CLAYEY SILT (ML), VERY SOFT, NONPLASTIC, MOIST, GREENISH GRAY, 6/10Y			
	6.0'					
	7.0'					
	8.0'					
	9.0'					
	10.0'	SM	10.0': SILTY SAND (SM), VERY LOOSE, WET, FINE-GRAINED LIGHT YELLOWISH BROWN 2.5Y 6/4			
	11.0'					
	12.0'					
	13.0'					
	14.0'					
	15.0'	CL	15.0': CLAY WITH SILT AND SOME GRAVEL (CL), DRY, NONPLASTIC, MEDIUM STIFF, VERY DARK GRAY 5Y 3/1			
	16.0'					
	17.0'					
	18.0'					
	19.0'	ML	19.1': CLAYEY SILT (ML), DRY, CONTAINS TRACE AMTS OF MICA, DARK GRAY 5Y 4/1			BOTTOM OF BORING = 19.1'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

PROJECT DELAWARE RIVER MAIN CHANNEL

HOLE NO. DRV-76

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

Core No. DRV 77 Run No. 1 Date: 04-29-01 Area: Delaware River Main Channel

Grid Position: Easting 297984.99 Northing 90759.06 Filename ____

Geographic Position: Lat. 39°04.8324 Long. 75°11.0361

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 45.3	Stop: 10 27 30	Penetration: 7.88	
Tide: -2.9	Start: 10 22 22	Recovery: 5.6	
= Corrected: 42.4	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	Coarse Sand & gravel w/shell		
1		21	
2		22	
3		23	
4		24	
5		25	
5.6	Coarse sand & gravel	26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

Comments: gravel throughout liner

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

Core No. DRV 7 Run No. 2 Date: 04-29-01 Area: Delaware River Main Channel

Grid Position: Easting 298025.75 Northing 90774.60 Filename ____

Geographic Position: Lat. 39° 04.835 Long. 75° 11.0275

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 45.5	Stop: 11 37 52	Penetration: 17.66	
Tide: -3.92	Start: 11 22 12	Recovery: 19.4	
= Corrected: 41.6	= Elapsed:	Jet 3.6	

Depth	Core Description	Depth	Core Description
3.	fine/med gray sand		
1		21	
2		22	
3		23	
4		24	
8.	brown coarse sand & gravel	25	
6		26	
7		27	
8		28	
9		29	
13.6	10 clay	30	
11		31	
12		32	
13		33	
14		34	
18.6	15 clay	35	
16		36	
17		37	
18		38	
23.	19 Clay w/ med sand & silt	39	
	20	40	

Comments: Expansion in liner – 8 min last 3 feet

DRILLING LOG DRV-77 R1

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1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N90759.06 E297984.99	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/29/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 7.88'	DATE COMPLETED	: 4/29/01
4. HOLE NO.	: DRV-77 Run1	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -45.7 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 5.6'/7.88'
		12. DRILL RIG	: Alpine Model 271		
		13a. DIST. SAMPLES	: 3	19. INSPECTOR	: Tamera L. Renninger
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -45.7	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-46	SP	SAND: Poorly Graded, Medium to Coarse Sand with some Gravel (3%) and some Shell Fragments, subrounded to rounded, loose, Gray 5Y 5/1	S-1	Uncorrected Water Depth= 45.3' MLLW= 42.4' S-1 collected from 0.0' - 1.0'
2	-48	SP	SAND: Poorly Graded, Medium Sand, loose, subrounded, coarser with depth, Gray 5Y 5/1	S-2	S-2 collected from 1.0' - 3.5'
4	-50	SP	SAND: Poorly Graded, Medium to Coarse Sand with Silt and Fine to Coarse Gravel, loose, subangular to subrounded, Gray 5Y 4/1	S-3	S-3 collected from 3.5' - 5.6'
6	-52	NR	NO RECOVERY		NR= No Recovery Bottom of Boring= 7.88'
8	-54				
10	-56				
12	-58				
14	-60				
16	-62				
18	-64				
20					

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DRILLING LOG DRV-77 R1

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DRILLING LOG DRV-77 R2

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1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N90774.60 E298025.75	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/29/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 17.66'	DATE COMPLETED	: 4/29/01
4. HOLE NO.	: DRV-77 Run2	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -44.9 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 19.40'/17.66'
		12. DRILL RIG	: Alpine Model 271		
		13a. DIST. SAMPLES	: 4	19. INSPECTOR	: Tamera L. Renninger
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -44.9	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-45		Jetted down to 3.6'		Uncorrected Water Depth= 45.5' MLLW= 41.6'
2	-47				
4	-49	SP	SAND: Poorly Graded, Fine Sand with trace Silt, trace amount of Shell Fragments, loose, moist, Olive Gray 5Y 4/2		Jetted down to 3.6'
6	-51			S-1	S-1 collected from 3.6' - 7.6' Sieve analysis results from S-1 are indicative of 3.6' - 8.6' based on field classification
8	-53	SP	SAND: Poorly graded, Sand with Gravel, subangular to subrounded, very loose, moist, Olive Gray 5Y 5/2		
10	-55	SP	As above, but Gray 5Y 6/1	S-2	S-2 collected from 8.6' - 12.4'
12	-57	CL	SILTY CLAY: contains some Mica, medium plasticity, soft, moist, Dark Gray 2.5Y 4/1		
14	-59	CL	As above		
16	-61			S-3	Samples 3 & 4 were not analyzed
18	-63				Bottom of Boring= 17.66' Greater recovery than penetration
20	-65	CL	CLAY: with Silt and Sand, contains some Mica, medium plasticity, medium stiffness, dry to moist, Very Dark Gray 2.5Y 3/1	S-4	
22	-67	SM	SILTY SAND: Fine Sand with Silt, trace amounts of Gravel, subangular, loose, moist, Very Dark Gray 2.5Y 3/1		
24					

C:\MTECH5\VIBRACORE\DE RIVER MC\DRV77R2C.BOR

12-03-2001

Science Applications International Corporation
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USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-77 R2

(Page 1 of 1)

Hole No. DRV-77-R1

DRILLING LOG	DIVISION: USACE PHILADELPHIA	INSTALLATION: NA	SHEET 1 OF 1 SHEETS

1. PROJECT: DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT: 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station):	11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
3. DRILLING AGENCY: ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL: ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number): DRV-77-R1	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER: O. HERNANDEZ	14. TOTAL NUMBER CORE BOXES: NA
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: NA
	16. DATE HOLE: STARTED 4/29/81 COMPLETED 4/29/81
7. THICKNESS OF OVERBURDEN: NA	17. ELEVATION TOP OF HOLE:
8. DEPTH DRILLED INTO ROCK: NA	18. TOTAL CORE RECOVERY FOR BORING: 72 %
9. TOTAL DEPTH OF HOLE: 7.88'	19. SIGNATURE OF INSPECTOR: Tamer Ahmed

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1.0'	SP	0.0'-5.6': POORLY-GRADED SAND WITH SOME GRAVEL (3%) AND SOME SMALL FRAGS. (3%) (SP), SUB-ROUNDED TO ROUNDED, LOOSE, GRAY 5Y 5/1, MEDIUM GRAIN SIZE TO COARSE			UNCORRECTED WATER DEPTH= (TT) 45.3
	2.0'			TT: 5.60'/7.88'		DRV-77-R1 COORDINATES 297984.99 E 90759.06 N
	3.0'					
	4.0'					
	5.0'	TT 4/29/81	7.88'			
	6.0'	SP	5.6'-7.88': POORLY-GRADED SAND WITH SILT AND TRACE AMOUNTS OF GRAVEL (SP), LOOSE SUBANGULAR TO SUBROUNDED MEDIUM GRAINS, GRAY 5Y 4/1			
	7.0'					
	8.0'					
	9.0'					
	10.0'					
	11.0'					
	12.0'					
	13.0'					
	14.0'					
	15.0'					
	16.0'					
	17.0'					
	18.0'					
	19.0'					BOTTOM OF BORING=7.88

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: DELAWARE RIVER MAIN CHANNEL HOLE NO. DRV-77-R1

Hole No. DRV-77-R2

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 1 OF 2 SHEETS

1. PROJECT: DELAWARE RIVER MAIN CHANNEL
2. LOCATION (Coordinates or Station):
3. DRILLING AGENCY: ALPINE
4. HOLE NO. (As shown on drawing title and file number): DRV-77-R2
5. NAME OF DRILLER: D. HERNANDEZ
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 17.66'
10. SIZE AND TYPE OF BIT: 3.5" CUTTING SHOE
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: ALPINE MODEL 271
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 4/29/81; COMPLETED 4/29/81
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 100 %
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	1.0'			19.40' / 17.66'		UNCORRECTED WATER DEPTH= (R2) 45.5'
	2.0'					
	3.0'					-JETTED TO 3.6' BSS
	4.0'	SP	3.6': FINE-GRAINED, POORLY-GRADED SAND WITH SILT (SP), CONTAINS TRACE AMOUNTS OF SHELL FRAGS. LOOSE, MOIST, OLIVE GRAY 5Y 4/2			DRV-77-R2 COORDINATES 298025.75 E 90774.60 N
	5.0'					
	6.0'					
	7.0'					
	8.0'	SW	8.6': WELL-GRADED (SW) SAND WITH (10%) GRAVEL, SUBANGULAR TO SUBROUNDED, VERY LOOSE, MOIST, OLIVE GRAY 5Y 5/2			
	9.0'					
	10.0'					
	11.0'					
	12.0'					
	13.0'	CL	13.6': SILTY CLAY (CL), MEDIUM PLASTICITY, CONTAINS SOME MICA, MOIST, SOFT, DARK GRAY 2.5Y 4/1			
	14.0'					
	15.0'					
	16.0'					
	17.0'					
	18.0'	CL	18.6': CLAY WITH SILT AND SAND (CL), MED. PLASTICITY, DRY TO MOIST, CONTAINS SOME MICA, MED. STIFF, VERY DARK GRAY 2.5Y 3/1			
	19.0'					BOTTOM OF BORING = 17.66'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (THIS SHEET)

PROJECT: DELAWARE RIVER

HOLE NO. DRV-77-R2

Hole No. DRV-77-R2

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION NA	SHEET 2 OF 2 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-77-R2	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER D. HERNANDEZ	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE: STARTED 4/29/01 COMPLETED 4/29/01
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 100 %
9. TOTAL DEPTH OF HOLE 17.66'	19. SIGNATURE OF INSPECTOR Tamara Mirza

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	21.0					
	22.0	SM	22.4' SILTY SAND WITH TRACE AMOUNTS OF GRAVEL (SM), SUBANGULAR, FINE-GRAINED, LOOSE, MOIST, VERY DARK GRAY 2.5Y 3/1			

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

DRV

Core No. 78 Run No. 1 Date: 04/29/01 Area: Delaware River Main Channel

Grid Position: Easting 300727.30 Northing 845477.37 Filename ____

Geographic Position: Lat. 39°03.8124 Long. 75°10.4468

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 43.2	Stop: 093436	Penetration: 20.03	
Tide: −1.90	Start: 093023	Recovery: 19.4	
= Corrected: 41.3	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	Rocks & gravel		
1		21	
2		22	
3		23	
4		24	
5	gray silty sand w clay	25	
6		26	
7		27	
8		28	
9		29	
10	gray silty sand w clay	30	
11		31	
12		32	
13		33	
14		34	
15	gray silty sand w clay	35	
16		36	
17		37	
18		38	
19		39	
20	gray silty sand w clay	40	

Comments: ____

DRILLING LOG DRV-78

(Page 1 of 1)

1. PROJECT	: DE River Main Channel
2. LOCATION	: N84547.37 E300727.30
2a. DATUM	: NJ State Plane NAD-83
3. DRILLING AGENCY	: Alpine
4. HOLE NO.	: DRV-78
5. DRILLER NAME	: O. Hernandez
6. DIR. OF HOLE	: vertical
7. OVERBURDEN THICKNESS	: NA
8. DEPTH TO ROCK	: NA
9. TOTAL DEPTH	: 20.03'
10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe
11. ELEV. DATUM	: NAVD(88)
12. DRILL RIG	: Alpine Model 271
13a. DIST. SAMPLES	: 4
UNDIST. SAMPLES	: NA
14. NO. OF CORE BOXES	: NA
15. GW ELEV.	: NA
16. DATE STARTED	: 4/29/01
DATE COMPLETED	: 4/29/01
17. ELEVATION	: -44.6 NAVD(88)
18. TOTAL RECOVERY	: 19.4'/20.03'
19. INSPECTOR	: Tamera L. Renninger

DEPTH FEET	NAVD ELEV. -44.6	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-45	SP-SM	SAND with SILT: and Gravel, Poorly Graded subrounded to rounded, loose, wet, Gray 10YR 5/1	S-1	Uncorrected Water Depth= 43.2' MLLW= 41.3' S-1 collected from 0.0' - 1.0'
		ML	SILT: with Fine Sand, Yellowish Brown 10YR 5/8		
2	-47	SM	SILTY SAND: Fine Sand, trace Silt, medium dense, Greenish Gray 5GY 5/1	S-2	S-2 collected from 2.0' - 5.0'
4	-49				
6	-51	SM	SILTY SAND: Fine Sand with Silt, Greenish Gray 5GY 5/1	S-3	S-3 collected from 5.0' - 10.0'
8	-53				
10	-55	SM	As above	S-4	Sample 4 not analyzed
12	-57				
14	-59	SM	As above		
16	-61				
18	-63				
20		ML			Bottom of Boring= 20.03'

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12-03-2001

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Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-78

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Hole No. DRV-78

DRILLING LOG	DIVISION USACE PHILADELPHIA	INSTALLATION N/A	SHEET 1 OF 1 SHEETS

1. PROJECT DELAWARE RIVER MAIN CHANNEL	10. SIZE AND TYPE OF BIT 3.5" CUTTING SHOE
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY ALPINE	12. MANUFACTURER'S DESIGNATION OF DRILL ALPINE MODEL 271
4. HOLE NO. (As shown on drawing title and file number) DRV-78	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER D. HERNANDEZ	14. TOTAL NUMBER CORE BOXES N/A
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER N/A
	16. DATE HOLE STARTED 4/29/01 COMPLETED 4/29/01
7. THICKNESS OF OVERBURDEN N/A	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK N/A	18. TOTAL CORE RECOVERY FOR BORING 97 %
9. TOTAL DEPTH OF HOLE 20.03'	19. SIGNATURE OF INSPECTOR James Lumsden

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		GM	0.0': GRAVEL WITH SAND AND SILT (GM), SUBROUNDED TO ROUNDED GRAINS, LOOSE, WET, GRAY 10YR 5/1	19.48' / 20.03'		UNCORRECTED WATER DEPTH 4.35'
	1.0					
	2.0					
	3.0					DRV-78 COORDINATES 300727.30 E 84547.37 N
	4.0					
	5.0	ML	5.0': CLAYEY SILT (ML), SOFT, LOW PLASTICITY, CONTAINS SOME MICA, DARK GRAY 5Y 4/1			
	6.0					
	7.0					
	8.0					
	9.0					
	10.0	ML	10.0': SAME AS ABOVE			
	11.0					
	12.0					
	13.0					
	14.0					
	15.0	ML	15.0' = SAME AS ABOVE			
	16.0					
	17.0					
	18.0					
	19.0	ML	20.03': CLAYEY SILT (ML), VERY SOFT, WET NONPLASTIC, DARK GRAY (TRANSLUCENT) 5Y 4/1			BOTTOM OF BORING = 20.03'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. Page 614

PROJECT DELAWARE RIVER (NAME OF BUILDING)

HOLE NO. DRV-78

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

Core No. DRV 79 Run No. 1 Date: 4-26-01 Area: Delaware River Main Channel

Grid Position: Easting 302929.33 Northing 80027.07 Filename ____

Geographic Position: Lat. 39 03.0705 Long. 75 09.9744

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 47.8	Stop: 14 35 02	Penetration: 19.71	
Tide: -1.37	Start: 14 30 14	Recovery: 19.3	
= Corrected: 46.4	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	fine brown/grey sand		
1		21	
2		22	
3		23	
4		24	
5	med brown sand	25	
6		26	
7		27	
8		28	
9		29	
10	med brown sand w/gravel & Rock	30	
11		31	
12		32	
13		33	
14		34	
15	Clay	35	
16		36	
17		37	
18		38	
19		39	
20	Clay	40	

Comments:

DRILLING LOG DRV-79

(Page 1 of 1)

1. PROJECT	: DE River Main Channel
2. LOCATION	: N80027.07 E302929.33
2a. DATUM	: NJ State Plane NAD-83
3. DRILLING AGENCY	: Alpine
4. HOLE NO.	: DRV-79
5. DRILLER NAME	: O. Hernandez
6. DIR. OF HOLE	: vertical
7. OVERBURDEN THICKNESS	: NA
8. DEPTH TO ROCK	: NA
9. TOTAL DEPTH	: 19.71'
10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe
11. ELEV. DATUM	: NAVD(88)
12. DRILL RIG	: Alpine Model 271
13a. DIST. SAMPLES	: 4
UNDIST. SAMPLES	: NA
14. NO. OF CORE BOXES	: NA
15. GW ELEV.	: NA
16. DATE STARTED	: 4/26/01
DATE COMPLETED	: 4/26/01
17. ELEVATION	: -49.7 NAVD(88)
18. TOTAL RECOVERY	: 19.3'/19.71'
19. INSPECTOR	: Paul J. Lucot

DEPTH FEET	NAVD ELEV. -49.7	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-50	SP	SAND: Poorly Graded, Fine to Medium Sand, with 25% Shell Fragments, rounded to subrounded, loose, Greenish Gray 5GY 4/1	S-1	Uncorrected Water Depth= 47.8' MLLW= 46.4' S-1 collected from 0.0' - 1.25'
2	-52	SP	SAND: Poorly Graded, Medium Sand, rounded to subrounded, loose, wet, Dark Grayish Brown 2.5Y 4/2	S-2	S-2 collected from 1.25' - 5.0' Sieve analysis results from S-2 are indicative of 1.25' - 8.0' based on field classification
4	-54				
6	-56	SP	As above		
8	-58	SP	SAND: Poorly Graded, Medium to Coarse Sand, trace of Fine Gravel, loose, Pale Yellow 5Y 7/4	S-3	S-3 collected from 8.0' - 9.0'
10	-60	SP	SAND: As 1.25-8.0' interval, but with some (~15%) rounded, well graded Gravel		
		SP	SAND: As 8.0-9.0' interval, but with Coarse Gravel and Cobbles		
12	-62	CL	SILTY CLAY: with traces of very Fine Sand, slight to moderate plasticity, soft, wet, Dark Greenish Gray 10GY 6/4	S-4	Sample 4 not analyzed
14	-64				
16	-66	CL	As above		
18	-68				
20					Bottom of Boring= 19.71'

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12-03-2001

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USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-79

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Hole No. DRV-79

DRILLING LOG	DIVISION U.S.A.C.E. Philadelphia	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Main Channel	10. SIZE AND TYPE OF BIT 3.5" Cutting Shoe
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Alpine	12. MANUFACTURER'S DESIGNATION OF DRILL Alpine Model 271
4. HOLE NO. (As shown on drawing title and file number) DRV-79	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER O. Hernandez	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE STARTED 4/26/01 COMPLETED 4/26/01
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 98 %
9. TOTAL DEPTH OF HOLE 19.71'	19. SIGNATURE OF INSPECTOR Paul A. Lynott

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SP	0.0': Poorly graded SAND (SP), Fine to medium grained, loose, dark greenish gray (5GY4/1). <5% shell fragments, rounded to subrounded grains	19.30' / 19.71'		Uncorrected water depth = 47.8' R1 Cordinates 302929.33 E 800027.07 N
	1.0'					
	2.0'					
	3.0'					
	4.0'					
	5.0'	SP	5.0': ~~W~~ Poorly graded SAND (SP), wet, loose, rounded to subrounded, dark grayish brown (2.5Y4/2).			
	6.0'					
	7.0'					
	8.0'					
	9.0'					9.1': Color change observed through acetate liner.
	10.0'	SP	10.0': Same as above; but with some (~15%) rounded, well graded gravel.			
	11.0'					
	12.0'					
	13.0'					
	14.0'					
	15.0'	CL	15.0': Silty CLAY (CL) with traces of very fine sand, wet, soft, slight to moderate plasticity, dark greenish gray (10GY6/1).			
	16.0'					
	17.0'					
	18.0'					
	19.0'					
	20.0'	CL	19.71' ~~20.0'~~: Same as 15.0'			Bottom of Boring = 19.71'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

PROJECT Delaware River Main Channel HOLE NO. DRV-79

ALPINE OCEAN SEISMIC SURVEY, INC
70 Oak Street Norwood, New Jersey
07648
Tel: (201) 768-8000 Fax: (201) 768-5750
E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

DRV

Core No. 80 **Run No.** 1 **Date:** 04-26-01 **Area: Delaware River Main Channel**

Grid Position: Easting 303843.29 **Northing** 76192.38 **Filename** ____

Geographic Position: Lat. 39 02.4398 **Long.** 75 09.7754

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 49.4	Stop: 13 46 51	Penetration: 19.75	
Tide: −2.25	Start: 13 41 32	Recovery: 19.3	
= Corrected: 47.1	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	fine/med grey sand		
1		21	
2		22	
3		23	
4		24	
5	fine/med grey sand	25	
6		26	
7		27	
8		28	
9		29	
10	fine/med grey sand	30	
11		31	
12		32	
13		33	
14		34	
15	Clay w/some sand	35	
16		36	
17		37	
18		38	
19		39	
20	Clay	40	

Comments:

DRILLING LOG DRV-80

(Page 1 of 1)

1. PROJECT	: DE River Main Channel
2. LOCATION	: N76192.38 E303843.29
2a. DATUM	: NJ State Plane NAD-83
3. DRILLING AGENCY	: Alpine
4. HOLE NO.	: DRV-80
5. DRILLER NAME	: O. Hernandez
6. DIR. OF HOLE	: vertical
7. OVERBURDEN THICKNESS	: NA
8. DEPTH TO ROCK	: NA
9. TOTAL DEPTH	: 19.75'
10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe
11. ELEV. DATUM	: NAVD(88)
12. DRILL RIG	: Alpine Model 271
13a. DIST. SAMPLES	: 3
UNDIST. SAMPLES	: NA
14. NO. OF CORE BOXES	: NA
15. GW ELEV.	: NA
16. DATE STARTED	: 4/26/01
DATE COMPLETED	: 4/26/01
17. ELEVATION	: -50.4 NAVD(88)
18. TOTAL RECOVERY	: 19.3'/19.75'
19. INSPECTOR	: Paul J. Lucot

DEPTH FEET	NAVD ELEV. -50.4	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-51	SP	SAND: Poorly Graded Medium to Fine Sand, subrounded to rounded, trace Shell Fragments (<5%), very loose, Dark Greenish Gray 5GY 3/1		Uncorrected Water Depth= 49.4' MLLW= 47.1'
2	-53			S-1	S-1 collected from 0.0' - 5.0'
4	-55				
6	-57	SP-SM	SAND with SILT: Poorly Graded Fine to Medium Sand with some silt, trace shell fragments, Dark Greenish Gray 5GY 3/1	S-2	S-2 collected from 5.0' - 10.0'
8	-59				
10	-61	SP-SM	As above		
12	-63	SP-SM	SAND with SILT: As above, but with occasional Fine Gravel		
14	-65	CL	SILTY CLAY: traces of Fine to Very Fine Sand, slight to moderate plasticity, soft to medium dense, wet, Dark Greenish Gray 10GY 6/4	S-3	Sample 3 not analyzed
16	-67				
18	-69				
20					Bottom of Boring= 19.75'

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Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-80

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12-03-2001

Hole No. DRV-8Ø

DRILLING LOG	DIVISION USACE Philadelphia	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Main Channel	10. SIZE AND TYPE OF BIT 3.5" Cutting Shoe
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Alpine	12. MANUFACTURER'S DESIGNATION OF DRILL Alpine Model 271
4. HOLE NO. (As shown on drawing title and file number) DRV-8Ø	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER O. Hernandez	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE: STARTED 4/26/Ø1 COMPLETED 4/26/Ø1
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE NA
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 98 %
9. TOTAL DEPTH OF HOLE 19.75'	19. SIGNATURE OF INSPECTOR Paul A. [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SP	Ø.Ø': Well sorted SAND (SP), wet, very loose, subrounded to rounded, dark greenish gray (5GY3/1) sand is medium to fine grained. <5% shell fragments	19.3Ø'/19.75'		Uncorrected water depth 49.4' R1 Cordinates 3Ø3843.29 E 76192.38 N
	1.Ø'					
	2.Ø'					
	3.Ø'					
	4.Ø'					
	5.Ø'	SP	5.0': Same as Ø.Ø' but with some silt			
	6.Ø'					
	7.Ø'					
	8.Ø'					
	9.Ø'					
	10.Ø'	SP	10.0': Same as Ø.Ø'			
	11.Ø'					
	12.Ø'					
	13.Ø'					
	14.Ø'					
	15.Ø'	CL	15.0': Silty CLAY (CL), wet, soft to medium dense, traces of fine to very fine sand, dark greenish gray (10GY6/1), slight to moderate plasticity			
	16.Ø'					
	17.Ø'					
	18.Ø'					
	19.Ø'					
	20.Ø'		20.0': Same as 15.Ø'			Bottom of Boring 19.75'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT) Page | 620

PROJECT Delaware River Main Channel HOLE NO. DRV-8Ø

ALPINE OCEAN SEISMIC SURVEY, INC
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E-mail alpine@alpineocean.com

CORE LOG

Job # 1378

Core No. DRV 81 Run No. 1 Date: 04/26/9 Area: Delaware River Main Channel

Grid Position: Easting 308486.8 Northing 64884.2 Filename ____

Geographic Position: Lat. 39 00.5824 Long. 75 08.7757

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 49.2	Stop: 12 14 16	Penetration: 19.98	
Tide: −3.97	Start: 12 12 02	Recovery: 20.0	
= Corrected: 45.2	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	med/fine brown sand		
1		21	
2		22	
3		23	
4		24	
5	med brown sand	25	
6		26	
7		27	
8		28	
9		29	
10	med brown sand	30	
11		31	
12		32	
13		33	
14		34	
15	med/fine brown sand	35	
16		36	
17		37	
18		38	
19		39	
20	Clay	40	

Comments:

DRILLING LOG DRV-81

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N64884.2 E308486.8	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/26/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 19.98'	DATE COMPLETED	: 4/26/01
4. HOLE NO.	: DRV-81	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -48.5 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 20.0'/19.98'
		12. DRILL RIG	: Alpine Model 271		
		13a. DIST. SAMPLES	: 5	19. INSPECTOR	: Paul J. Lucot
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -48.5	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-49	SP-SM	SAND with SILT: Poorly Graded, Medium to Fine Sand, rounded to subrounded, loose, wet, Light Olive Brown 2.5Y 5/3	S-1	Uncorrected Water Depth= 49.2' MLLW= 45.2' S-1 Collected from 0.0' - 1.75'
2	-51	SM	SILTY SAND: Fine Sand with Silt, medium dense, Greenish Gray 5GY 6/1	S-2	S-2 collected from 1.75' - 3.3'
4	-53	SP	SAND: Poorly graded, rounded to subrounded, wet, Light Brownish Gray 2.5Y 6/2		
6	-55	SP	SAND: Poorly Graded, As above, Fine to Coarse Sand	S-3	S-3 collected from 5.0' - 8.4'
8	-57	SP	SAND: Poorly Graded, with some Silt and traces of Gravel, loose, wet, Light Olive Brown 2.5Y 5/3		8.4' - 10.0' zone represented in sample S-4
10	-59	SP	As above		
12	-61	SP		S-4	S-4 collected from 10.0' - 15.0' Sieve analysis results from S-4 are indicative of 8.4' - 15.0' based on field classification
14	-63				
16	-65	ML	SILT: with some Very Fine Sand, slight plasticity, soft, wet, Dark Greenish Gray 10GY 4/1	S-5	Sample 5 not analyzed
18	-67				
20					Bottom of Boring= 19.98'

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Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-81

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Hole No. DRV-81

DRILLING LOG	DIVISION USACE Philadelphia	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Main Channel	10. SIZE AND TYPE OF BIT 3.5" Cutting Shoe
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Alpine	12. MANUFACTURER'S DESIGNATION OF DRILL Alpine Model 271
4. HOLE NO. (As shown on drawing title and file number) DRV-81	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER O. Hernandez	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE: STARTED 4/26/01 COMPLETED 4/26/01
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 100 %
9. TOTAL DEPTH OF HOLE	19. SIGNATURE OF INSPECTOR Paul Gucob

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SP	0.0': Poorly graded SAND (SP), wet, medium to fine grained, rounded to subrounded, light olive brown (2.5Y 5/3), loose, little to no fines	20.0'/20.0'		Uncorrected water depth = 49.2' R1 Cordinates 308486.8 E 64884.2 N
	1.0					
	2.0					
	3.0					
	4.0					
	5.0	SW	5.0': Well graded SAND (SW), wet, rounded to subrounded, light brownish gray (2.5Y 6/2),			
	6.0					
	7.0					
	8.0					
	9.0					
	10.0	SM	10.0': Poorly graded SAND with some silt (SM) and traces of gravel, wet, loose, light olive brown (2.5Y 5/3),			
	11.0					
	12.0					
	13.0					
	14.0					
	15.0	SM	15.0': Silty SAND (SM), with traces of gravel, wet, loose, light olive brown (2.5Y 5/3).			
	16.0					
	17.0					
	18.0		20.0': SILT (ML) with some very fine sand, wet, soft, ~~(medium)~~ slightly plastic, dark greenish gray (10GY 4/1),			
	19.0					
	20.0	ML				Bottom of Boring = 19.98'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT) Page 623

PROJECT Delaware River Main Channel HOLE NO. DRV-81

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CORE LOG

Job # 1378

DRJ

Core No. 82 Run No. 1 Date: 04-26-01 Area: Delaware River Main Channel

Grid Position: Easting 310253.10 Northing 61346.63 Filename 0932.DAT

Geographic Position: Lat. 39 00.0017 Long. 75 08.3994

Water Depth	Vibration Time	Core Depth	Fix # 12
Uncorrected: 47.8	Stop: 093545	Penetration: 19.97	
Tide: -4.98	Start: 093307	Recovery: 18.6	
= Corrected: 42.8	= Elapsed:		

Depth	Core Description	Depth	Core Description
0	Dark brown med sand		
1		21	
2		22	
3		23	
4		24	
5	Brown med sand	25	
6		26	
7		27	
8		28	
9		29	
10	Brown med sand	30	
11		31	
12		32	
13		33	
14		34	
15	Brown med sand w stone	35	
16		36	
17		37	
18		38	
18½	gravel w/med sand		
19		39	
20		40	

Comments:

DRILLING LOG DRV-82

(Page 1 of 1)

1. PROJECT : DE River Main Channel
2. LOCATION : N61346.63 E310253.10
2a. DATUM : NJ State Plane NAD-83
3. DRILLING AGENCY: Alpine
4. HOLE NO. : DRV-82
5. DRILLER NAME : O. Hernandez

6. DIR. OF HOLE : vertical
7. OVERBURDEN THICKNESS : NA
8. DEPTH TO ROCK : NA
9. TOTAL DEPTH : 19.97'
10. BIT SIZE/ TYPE : 3.5" Cutting Shoe
11. ELEV. DATUM : NAVD(88)
12. DRILL RIG : Alpine Model 271
13a. DIST. SAMPLES : 4
UNDIST. SAMPLES : NA

14. NO. OF CORE BOXES : NA
15. GW ELEV. : NA
16. DATE STARTED : 4/26/01
DATE COMPLETED : 4/26/01
17. ELEVATION : -46.1 NAVD(88)
18. TOTAL RECOVERY : 18.6'/19.97'
19. INSPECTOR : Paul J. Lucot

DEPTH FEET	NAVD ELEV. -46.1	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0					
	-47	SP-SM	SAND with SILT: Poorly Graded, little to no Shell Fragments,rounded to subrounded, loose, Dark Bluish Gray 10BG 31	S-1	Uncorrected Water Depth= 47.8' MLLW= 42.8' S-1 collected from 0.0' - 2.5'
2					
	-49	SP	SAND: Poorly Graded, little to no Shell Fragments or Fines, very loose, wet, Light Yellowish Brown 2.5Y 6/3	S-2	S-2 collected from 2.5' - 5.0'
4					
	-51	SP	SAND: Poorly Graded, as above	S-3	S-3 collected from 5.0' - 10.0'
6					
	-53				
8					
	-55				
10					
	-57	SP	As above	S-4	Sample 4 not analyzed
12					
	-59				
14					
	-61	SW	SAND: Well Graded, with traces of Gravel (<5%), very loose, wet, Light Yellowish Brown 2.5Y 6/3		
16					
	-63				
18					
	-65	NR	NO RECOVERY		NR= No Recovery
20					Bottom of Boring= 19.97'

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DRILLING LOG DRV-82

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Hole No. DRU-82

DRILLING LOG	DIVISION USACE Philadelphia	INSTALLATION NA	SHEET 1 OF 1 SHEETS

1. PROJECT Delaware River Main Channel	10. SIZE AND TYPE OF BIT 3.5" Cutting Shoe
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY Alpine	12. MANUFACTURER'S DESIGNATION OF DRILL Alpine, Model 271
4. HOLE NO. (As shown on drawing title and file number) DRU-82	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER O. Hernandez	14. TOTAL NUMBER CORE BOXES NA
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER NA
	16. DATE HOLE: STARTED 4/26/01 COMPLETED 4/26/01
7. THICKNESS OF OVERBURDEN NA	17. ELEVATION TOP OF HOLE NA
8. DEPTH DRILLED INTO ROCK NA	18. TOTAL CORE RECOVERY FOR BORING 93 %
9. TOTAL DEPTH OF HOLE 19.97'	19. SIGNATURE OF INSPECTOR Paul C. Lucot

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SW	0.0': Well graded SAND (SW), wet, rounded to subrounded, loose, dark bluish gray (10 BG 3/1). Little to no shell Fragments or Fines.	R1 18.5'/20.0'		Uncorrected water depth = 47.8' R1 Cordinates 310253.10 E 61346.63 N
	1.0					
	2.0					
	3.0					
	4.0					
	5.0	SW	5.0': Well graded SAND (SW), wet, very loose, light yellowish brown (2.5Y 6/3), Little to no shell Fragments or Fines.			
	6.0					
	7.0					
	8.0					
	9.0					
	10.0	SW	10.0': Same as 5.0'			
	11.0					
	12.0					
	13.0'					
	14.0'					
	15.0'	SW	15.0' Well graded SAND (SW) with traces (<5%) of gravel, wet, very loose, light yellowish brown (2.5Y 6/3)			
	16.0'					
	17.0'					
	18.0'		20.0': Well graded Gravel and SAND ( ), wet, loose, light brownish gray (2.5Y 6/2), Little to no Fines or Shell Frags.			
	19.0'					Bottom of Boring = 19.97'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

PROJECT Delaware River Main Channel HOLE NO. DRU-82

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CORE LOG

Job # 1378

DRV

Core No. 83 Run No. 1 Date: 04-25-01 Area: Delaware River Main Channel

Grid Position: Easting 320563.29 Northing 357641.50 Filename ____

Geographic Position: Lat. 38°55.7989 Long. 75°06.1869

Water Depth		Vibration Time		Core Depth	Fix #
Uncorrected:	47.2	Stop:	16 42 10	Penetration:	19.87
Tide:	-0.46	Start:	16 36 38	Recovery:	18.4
= Corrected:	46.7	= Elapsed:			

Depth	Core Description	Depth	Core Description
0	med brown sand		
1		21	
2		22	
3		23	
4		24	
5	clayey sand	25	
6		26	
7		27	
8		28	
9		29	
10	fine/med brown sand	30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
18.4	fine/med brown sand		
19		39	
20		40	

Comments: ____

DRILLING LOG DRV-83

(Page 1 of 1)

1. PROJECT : DE River Main Channel
2. LOCATION : N35764.50 E320563.29
2a. DATUM : NJ State Plane NAD-83
3. DRILLING AGENCY: Alpine
4. HOLE NO. : DRV-83
5. DRILLER NAME : O. Hernandez

6. DIR. OF HOLE : vertical
7. OVERBURDEN THICKNESS : NA
8. DEPTH TO ROCK : NA
9. TOTAL DEPTH : 19.87'
10. BIT SIZE/ TYPE : 3.5" Cutting Shoe
11. ELEV. DATUM : NAVD(88)
12. DRILL RIG : Alpine Model 271
13a. DIST. SAMPLES : 4
UNDIST. SAMPLES : NA

14. NO. OF CORE BOXES : NA
15. GW ELEV. : NA
16. DATE STARTED : 4/26/01
DATE COMPLETED : 4/26/01
17. ELEVATION : -50.0 NAVD(88)
18. TOTAL RECOVERY : 18.4'/19.87'
19. INSPECTOR : Paul J. Lucot

DEPTH FEET	NAVD ELEV. -50.0	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-50	SP	SAND: Poorly Graded, rounded to subrounded, trace Shell Fragments, very loose, wet, Very Dark Grayish Brown 2.5Y 3/2	S-1	Uncorrected Water Depth= 47.2' MLLW= 46.7' S-1 collected from 0.0' - 0.8'
2	-52	SM	SILTY SAND: with traces of Clay, low plasticity, very soft, wet, Dark Greenish Gray 10GY 4/1	S-2	S-2 collected from 0.8' - 5.0' Sieve analysis results from S-2 are indicative of 0.8' - 7.5' based on field classification
4	-54				
6	-56	SM	As above		5.0' - 7.5' zone represented in sample S-2
8	-58	SP-SM	SAND with SILT: Poorly Graded Fine to Medium Sand, rounded, Light Olive Brown 2.5Y 4/3, with occasional Clay stringers	S-3	S-3 collected from 7.5' - 10.0'
10	-60	SP-SM	As above, with no stringers	S-4	Sample 4 not analyzed
12	-62				
14	-64				
16	-66	SP-SM	As above		
18	-68	NR	NO RECOVERY		NR= No Recovery
20					Bottom of Boring= 19.87'

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Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-83

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Hole No. DRU-83

DRILLING LOG	DIVISION USACE Philadelphia	INSTALLATION NA	SHEET 1 OF SHEETS

1. PROJECT: Delaware River Main Channel
2. LOCATION (Coordinates or Station):
3. DRILLING AGENCY: Alpine
4. HOLE NO. (As shown on drawing title and file number): DRU-83
5. NAME OF DRILLER: O. Hernandez
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: NA
8. DEPTH DRILLED INTO ROCK: NA
9. TOTAL DEPTH OF HOLE: 19.87'
10. SIZE AND TYPE OF BIT: 3.5" Cutting Shoe
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: Alpine Model 271
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED: ; UNDISTURBED:
14. TOTAL NUMBER CORE BOXES: NA
15. ELEVATION GROUND WATER: NA
16. DATE HOLE: STARTED 4/26/01; COMPLETED 4/26/01
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 92 %
19. SIGNATURE OF INSPECTOR: Paul J. Finch

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			~~Well P3~~ 4/26/01	R1		DRU-83-R1
	1		0.0': Well graded SAND (SW), wet, very loose, rounded to subrounded, very dark grayish brown (2.5Y 3/2), <5% shell fragments	18.4'/ 20.0'		coordinates: 320563.29 E 35764.50 N
	2					Uncorrected water depth = 47.2'
	3					
	4					
	5		5.0': Sandy SILT with traces of clay (ML), wet, very soft, low plasticity, dark greenish gray (10GY 4/1)			
	6					
	7					
	8					
	9					
	10		10.0': Well sorted SAND (SP), Fine to medium grained, rounded, light olive brown (2.5Y 4/3).			
	11					
	12					
	13					
	14					
	15		15.0': Same as 10.0'			
	16					
	17					
	18					
	19					Total penetration = 19.87'
			20.0': Same as 10.0'			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT) PROJECT HOLE NO.

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CORE LOG

Job # 1378

DKV

Core No. 84 Run No. 1 Date: 04-25-9 Area: Delaware River Main Channel

Grid Position: Easting 321289.97 Northing 34273.33 Filename ____

Geographic Position: Lat. 38°55.5540 Long. 75°06.0316

Water Depth	Vibration Time	Core Depth	Fix # 5
Uncorrected: 49.7	Stop: 12 49 31	Penetration: 20.01	
Tide: -2.3	Start: 12 46 50	Recovery: 9.8	
= Corrected: 47.4	= Elapsed: ____		

Depth	Core Description	Depth	Core Description
0	Black Med Sand		
1		21	
2		22	
3		23	
4		24	
5	Clayey sand	25	
6		26	
7		27	
8		28	
9		29	
9.8 10	Clay	30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

Comments: ____

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CORE LOG

Job # 1378

DRV

Core No. 84 Run No. 2 Date: 04/25/01 Area: Delaware River Main Channel

Grid Position: Easting 321280.89 Northing 34269.51 Filename ____

Geographic Position: Lat. 38°55.5533 Long. 75°06.0335

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 46.7	Stop: 15 42 06	Penetration: 20.02	
Tide: +0.15	Start: 15 38 02	Recovery: 5.1	
= Corrected: 46.9	= Elapsed:	Jet 7.5	

Depth	Core Description	Depth	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5		26	
6		27	
7		28	
8	Silty Sand w/Clay	29	
9		30	
10		31	
11		32	
12		33	
12.1 13	Clay	34	
14		35	
15		36	
16		37	
17		38	
18		39	
19		40	
20			

Comments: ____

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CORE LOG

Job # 1378

Core No. DRJ 84 Run No. 3 Date: 04/25/01 Area: Delaware River Main Channel

Grid Position: Easting 321264.94 Northing 34280.48 Filename ____

Geographic Position: Lat. 38° 55.5551 Long. 75° 06.0368

Water Depth	Vibration Time	Core Depth	Fix #
Uncorrected: 45.8	Stop: 16 04 23	Penetration: 19.98	
Tide: −0.08	Start: 16 00 51	Recovery: 4.8	
= Corrected: 45.7	= Elapsed:	Jet 10.0	

Depth	Core Description	Depth	Core Description
0		21	
1		22	
2		23	
3		24	
4		25	
5	Jet	26	
6		27	
7		28	
8		29	
9		30	
10		31	
11	Clayey Sand	32	
12		33	
13		34	
14		35	
15	Clay	36	
16		37	
17		38	
18		39	
19		40	
20			

Comments:

DRILLING LOG DRV-84 R1

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF CORE BOXES	: NA
2. LOCATION	: N34273.33 E321289.97	7. OVERBURDEN THICKNESS	: NA	15. GW ELEV.	: NA
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/25/01
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 20.01'	DATE COMPLETED	: 4/25/01
4. HOLE NO.	: DRV-84 Run1	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -50.7 NAVD(88)
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	18. TOTAL RECOVERY	: 9.8'/20.01'
		12. DRILL RIG	: Alpine Model 271		
		13a. DIST. SAMPLES	: 4	19. INSPECTOR	: Paul J. Lucot
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -50.7	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-51	SM	SILTY SAND: Poorly Graded, Very Fine to Medium Sand, subrounded to rounded, trace Shell Fragments (<5%), wet, Dark Greenish Gray 10GY 4/1	S-1	Run 1 Uncorrected Water Depth= 49.7' MLLW= 47.4' S-1 collected from 0.0' - 5.0'
2	-53				
4	-55				
6	-57	SM	SILTY SAND: with some Very Fine Sand, 5-10% Shell Fragments, very soft, wet, Dark Greenish Gray 10GY 4/1	S-2	S-2 collected from 5.0' - 9.8'
8	-59				
10	-61	NR	NO RECOVERY		NR= No Recovery
12	-63				
14	-65				
16	-67				
18	-69				
20					Bottom of Boring= 20.01'

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12-03-2001

Science Applications International Corporation
An Employee-Owned Company

USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-84 R1

(Page 1 of 1)

DRILLING LOG DRV-84 R2

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF	: NA
2. LOCATION	: N34269.51 E321280.89	7. OVERBURDEN THICKNESS	: NA	CORE BOXES	:
2a. DATUM	: NJ State Plane NAD-83	8. DEPTH TO ROCK	: NA	15. GW ELEV.	: NA
3. DRILLING AGENCY	: Alpine	9. TOTAL DEPTH	: 20.02'	16. DATE STARTED	: 4/25/01
4. HOLE NO.	: DRV-84 Run2	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	DATE COMPLETED	: 4/25/01
5. DRILLER NAME	: O. Hernandez	11. ELEV. DATUM	: NAVD(88)	17. ELEVATION	: -50.2 NAVD(88)
		12. DRILL RIG	: Alpine Model 271	18. TOTAL RECOVERY	: 5.1'/12.52'
		13a. DIST. SAMPLES	: 4		
		UNDIST. SAMPLES	: NA	19. INSPECTOR	: Paul J. Lucot

DEPTH FEET	NAVD ELEV. -50.2	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0			Jetted to 7.5'		Run 2 Uncorrected water depth= 46.7' MLLW= 46.9'
	-51				
2	-53				
4	-55				
6	-57				
8	-59	SM	SILTY SAND: with some Very Fine Sand, 5-10% Shell Fragments, very soft, wet, Dark Greenish Gray 10GY 4/1		
10	-61	SM	SILTY SAND: with some Clay, very soft, wet, Dark Greenish Gray 10GY 4/1	S-1	S-1 collected from 7.5' - 10.0'
12	-63	NR	NO RECOVERY		NR= No Recovery
14	-65				
16	-67				
18	-69				
20					Bottom of Boring= 20.02'

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12-03-2001

Science Applications International Corporation
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USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-84 R2

(Page 1 of 1)

DRILLING LOG DRV-84 R3

(Page 1 of 1)

1. PROJECT	: DE River Main Channel	6. DIR. OF HOLE	: vertical	14. NO. OF	: NA
2. LOCATION	: N34280.48 E321264.94	7. OVERBURDEN	: NA	CORE BOXES	:
2a. DATUM	: NJ State Plane NAD-83	THICKNESS	:	15. GW ELEV.	: NA
3. DRILLING AGENCY	: Alpine	8. DEPTH TO ROCK	: NA	16. DATE STARTED	: 4/25/01
4. HOLE NO.	: DRV-84 Run3	9. TOTAL DEPTH	: 19.98'	DATE COMPLETED	: 4/25/01
5. DRILLER NAME	: O. Hernandez	10. BIT SIZE/ TYPE	: 3.5" Cutting Shoe	17. ELEVATION	: -49.0 NAVD(88)
		11. ELEV. DATUM	: NAVD(88)	18. TOTAL	: 4.8'/9.98'
		12. DRILL RIG	: Alpine Model 271	RECOVERY	:
		13a. DIST. SAMPLES	: 4	19. INSPECTOR	: Paul J. Lucot
		UNDIST. SAMPLES	: NA		

DEPTH FEET	NAVD ELEV. -49.0	LEGEND	DESCRIPTION	Box Or Sample No.	REMARKS
0	-49		Jetted to 10.0'		Run 3 Uncorrected Water Depth= 45.8' MLLW= 45.7' NR= No Recovery
2	-51				
4	-53				
6	-55				
8	-57				
10	-59		SILT: with some Clay, very soft, wet, Dark Greenish Gray 10GY 4/1		
12	-61	ML		S-1	Sample 1 (R3) not analyzed
14	-63				
		CL	CLAY: with some Silt and traces of Fines Sand, low plasticity, soft, wet, Dark Greenish Gray 10GY 6/4		
16	-65		NO RECOVERY		
18	-67	NR			
20					Bottom of Boring= 19.98'

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12-03-2001

Science Applications International Corporation
An Employee-Owned Company

USACE Philadelphia District
Contract No. DACW61-00-D-0007
Task Order No. 008
Vibracoring Delaware River Main Channel

DRILLING LOG DRV-84 R3

(Page 1 of 1)

Hole No. DRU-84

DRILLING LOG	DIVISION USACE Philadelphia	INSTALLATION	SHEET 1 OF SHEETS
1. PROJECT Delaware River Main Channel		10. SIZE AND TYPE OF BIT 3.5" cutting shoe	
2. LOCATION (Coordinates or Station) DRU-84		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY Alpine		12. MANUFACTURER'S DESIGNATION OF DRILL Alpine Model 271	
4. HOLE NO. (As shown on drawing title and file number) DRU-84		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED / UNDISTURBED
5. NAME OF DRILLER O. Hernandez		14. TOTAL NUMBER CORE BOXES NA	
6. DIRECTION OF HOLE ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER NA	
		16. DATE HOLE	STARTED 4/25/01 / COMPLETED 4/25/01
7. THICKNESS OF OVERBURDEN NA		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK NA		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 14.8'		19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		SW	0.0' Well graded SAND (SW) very fine to medium grained, subrounded to rounded, wet, dark greenish gray (10GY4/1), <5% shell fragments.	~~DRU-1~~ R1 9.8'/20.0'	PSC 4/25/01	Raw water depth = 49.8' (R1) R1 Cordinates 321289.97 E 34273.33 N
	1.0'					
	2.0'					
	3.0'					
	4.0'					
	5.0'		5.0' with some very fine sand, SILT (ML), wet, very soft, dark greenish gray (10GY4/1), 5-10% shell fragments, very soft.			
	6.0'					
	7.0'					
	8.0'			R2 = 5.1'/12.5'	7.5'	R2 jetted to 7.5' BSS. R2 Cordinates 321280.89 E 34269.51 N R2 Raw Water Depth = 46.5'
	9.0'					
	10.0'		9.8' SILT with some clay (ML), wet, very soft, dark greenish gray (10GY4/1),	~~R3~~ R3 = 4.8'/10.0'	PSC 10.0'	R3 jetted to 10.0' BSS R3 Cordinates 321264.94 E 34280.48 N R3 Raw Water Depth = 45.4'
	11.0'					
	12.0'		12.6': Same as ~~(10.0)~~ 9.8' PSC 4/25/01			
	13.0'					
	14.0'					
			14.8': CLAY (CL) with some silt and traces of fine sand, wet, soft, low plasticity, dark greenish gray (10GY6/1)			Bottom of Boring = 14.8'

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

PROJECT Delaware River Main Channel HOLE NO. DRU-84

DUFFIELD ASSOCIATES
Consultants in the Geosciences

VIBRATIONAL CORE DRV-85

U.S. Army Corps of Engineers
Vibrational Coring in the Liston Range
of the Delaware River Main Channel
Contract No. DACW61-01-D-0004
Task Order 027, Modification 01

Date Started	: August 16, 2004	Drilling Equipment	: 271B Alpine Vibracore
Date Completed	: August 16, 2004	Drilling Methods	: Vibrational Core
Logged by	: STS	Surface Elevation	: -51.9 feet NAVD 88
Weather	: P. Cloudy, 70s	Northing	: 170,029 NJ-NAD 83
Driller/Agency	: Alpine Ocean Seismic Sur.	Easting	: 244,497 NJ-NAD 83

Depth in feet	Surf. Elev. -51.9 ft	GRAPHIC	USCS	DESCRIPTION	Core Interval	Remarks
0	-52		SM	Tan, brown, orange fine SAND, little silt/clay, trace medium sand		S-1/ 0.0-5.0
2	-54					
4	-56					
6	-58		SM	Tan, brown, orange fine SAND, little silt/clay, trace medium sand		S-2/ 5.0-10.0
8	-60					
10	-62		SM	Tan, gray, orange fine SAND, little silt/clay, trace medium sand		S-3/ 10.0-15.0
12	-64					
14	-66					
			SM	Tan, gray, orange fine SAND, little silt/clay, trace medium sand		S-4/ 15.0-16.0
16	-68		ML	Dark gray SILT, little fine sand		S-5/ 16.0-16.8 Fine-grained sample, sieve analysis not performed.
18	-70		SM	Dark gray fine SAND, little silt/clay, trace medium sand		S-6/ 16.8-20.0
20	-72					
22	-74					

NOTES:
1. Soil descriptions and USCS classifications according to Visual-Manual Procedure (ASTM D 2488) and/or mechanical sieve analysis if performed.
2. Sample depths are based on core recovery lengths.
3. Core Penetration = 18.8 feet, Core Recovery = 19.0 feet.
4. Percent Recovery = 101.2 %

VIBRACORE 5739GB-DRV.GPJ DUFFIELD.GDT 1/19/05

DUFFIELD ASSOCIATES
Consultants in the Geosciences

VIBRATIONAL CORE DRV-86

U.S. Army Corps of Engineers
Vibrational Coring in the Liston Range
of the Delaware River Main Channel
Contract No. DACW61-01-D-0004
Task Order 027, Modification 01

Date Started	: August 16, 2004	Drilling Equipment	: 271B Alpine Vibracore
Date Completed	: August 16, 2004	Drilling Methods	: Vibrational Core
Logged by	: STS	Surface Elevation	: -48.3 feet NAVD 88
Weather	: P. Cloudy, 70s	Northing	: 168,800 NJ-NAD 83
Driller/Agency	: Alpine Ocean Seismic Sur.	Easting	: 244,653 NJ-NAD 83

Depth in feet	Surf. Elev. -48.3 ft	GRAPHIC	USCS	DESCRIPTION	Core Interval	Remarks
0			GP	Brown, gray GRAVEL, some medium sand, little coarse sand, trace fine sand, trace silt/clay		S-1/ 0.0-2.0
2	-50		SM	Orange, brown, tan fine SAND, little silt/clay, trace medium sand		S-2/ 2.0-5.0
4	-52					
6	-54		SM	Gray, orange fine SAND, little silt/clay, trace medium sand		S-3/ 5.0-7.5
8	-56		SM	Orange, brown, tan fine SAND, some silt/clay, trace medium sand		S-4/ 7.5-10.0
10	-58					
12	-60		SM	Brown, orange fine SAND, little silt/clay, trace medium sand, trace coarse sand		S-5/ 10.0-15.0
14	-62					
16	-64		SM	Dark gray fine SAND, little silt/clay, little medium sand, trace coarse sand, trace gravel		S-6/ 15.4-16.7
18	-66		SP-SM	Dark gray fine SAND, some medium sand, trace coarse sand, trace silt/clay, trace shell fragments, trace organic matter		S-7/ 16.7-19.5
20	-68					
22	-70					

NOTES:
1. Soil descriptions and USCS classifications according to Visual-Manual Procedure (ASTM D 2488) and/or mechanical sieve analysis if performed.
2. Sample depths are based on core recovery lengths.
3. Core Penetration = 18.04 feet, Core Recovery = 19.5 feet.
4. Percent Recovery = 108.1 %

VIBRACORE 5739GB-DRV.GPJ DUFFIELD.GDT 1/19/05

DUFFIELD ASSOCIATES
Consultants in the Geosciences

VIBRATIONAL CORE DRV-87

U.S. Army Corps of Engineers
Vibrational Coring in the Liston Range
of the Delaware River Main Channel
Contract No. DACW61-01-D-0004
Task Order 027, Modification 01

Date Started	: August 16, 2004	Drilling Equipment	: 271B Alpine Vibracore
Date Completed	: August 16, 2004	Drilling Methods	: Vibrational Core
Logged by	: STS	Surface Elevation	: -48.5 feet NAVD 88
Weather	: P. Cloudy, 70s	Northing	: 168,167 NJ-NAD 83
Driller/Agency	: Alpine Ocean Seismic Sur.	Easting	: 246,213 NJ-NAD 83

Depth in feet	Surf. Elev. -48.5 ft	GRAPHIC	USCS	DESCRIPTION	Core Interval	Remarks
0			SP	Dark gray medium to coarse SAND and gravel, trace fine sand, trace silt/clay		S-1/ 0.0-1.1
	-50		SM	Tan, orange fine to medium SAND and silt/clay		S-2/ 1.1-2.1
2						S-3/ 2.1-5.0
	-52		SP-SM	Orange, tan fine SAND, little silt/clay, trace coarse sand		
4						
	-54					S-4/ 5.0-10.0
6						
	-56		SP-SM	Orange, tan fine SAND, little silt/clay, trace medium sand, trace coarse sand		
8						
	-58					
10			SM	Orange, tan fine SAND, some silt/clay		S-5/ 10.0-11.5
	-60					
12			SM	Brown, gray fine SAND, little silt/clay, trace medium sand		S-6/ 11.5-13.8
	-62					
14			SP-SM	Dark gray fine SAND, little medium sand, trace silt/clay		S-7/ 13.8-15.0
	-64					S-8/ 15.0-19.5
16						
	-66		SP-SM	Dark gray fine SAND, little medium sand, little silt/clay		
18						
	-68					
20						
	-70					
22						

NOTES:
1. Soil descriptions and USCS classifications according to Visual-Manual Procedure (ASTM D 2488) and/or mechanical sieve analysis if performed.
2. Sample depths are based on core recovery lengths.
3. Core Penetration = 18.6 feet, Core Recovery = 19.5 feet.
4. Percent Recovery = 105.0 %

VIBRACORE 5739GB-DRV.GPJ DUFFIELD.GDT 1/19/05

DUFFIELD ASSOCIATES
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VIBRATIONAL CORE DRV-88 R1

U.S. Army Corps of Engineers
Vibrational Coring in the Liston Range
of the Delaware River Main Channel
Contract No. DACW61-01-D-0004
Task Order 027, Modification 01

Date Started	: August 16, 2004	Drilling Equipment	: 271B Alpine Vibracore
Date Completed	: August 16, 2004	Drilling Methods	: Vibrational Core
Logged by	: STS	Surface Elevation	: -49.4 feet NAVD 88
Weather	: P. Cloudy, 70s	Northing	: 167,293 NJ-NAD 83
Driller/Agency	: Alpine Ocean Seismic Sur.	Easting	: 247,031 NJ-NAD 83

Depth in feet	Surf. Elev. -49.4 ft	GRAPHIC	USCS	DESCRIPTION	Core Interval	Remarks
0	-50		SP	Dark gray fine to medium SAND, some to and gravel, trace coarse sand, trace silt		S-1/ 0.0-4.1 Not tested, over lap with DRV-88-R2, S-1
2	-52					
4	-54		SP	Brown fine SAND, trace to little medium to coarse sand, trace silt		S-2/ 4.1-5.2 Not tested, over lap with DRV-88-R2, S-1
6	-56		SP	Light brown, light gray fine SAND, trace silt, trace medium sadn		S-3/ 5.2-7.6 Not tested, over lap with DRV-88-R2, S-1
8	-58					
10	-60					
12	-62					
14	-64					
16	-66					
18	-68					
20	-70					
22	-72					

NOTES:
1. Soil descriptions and USCS classifications according to Visual-Manual Procedure (ASTM D 2488) and/or mechanical sieve analysis if performed.
2. Sample depths are based on core recovery lengths.
3. Core Penetration = 6.4 feet, Core Recovery = 7.2 feet.
4. Percent Recovery = 112.7 %

VIBRACORE 5739GB-DRV.GPJ DUFFIELD.GDT 01/21/05

DUFFIELD ASSOCIATES
Consultants in the Geosciences

VIBRATIONAL CORE DRV-88 R2

U.S. Army Corps of Engineers
Vibrational Coring in the Liston Range
of the Delaware River Main Channel
Contract No. DACW61-01-D-0004
Task Order 027, Modification 01

Date Started	: August 16, 2004	Drilling Equipment	: 271B Alpine Vibracore
Date Completed	: August 16, 2004	Drilling Methods	: Vibrational Core
Logged by	: STS	Surface Elevation	: -50.6 feet NAVD 88
Weather	: P. Cloudy, 70s	Northing	: 167,283 NJ-NAD 83
Driller/Agency	: Alpine Ocean Seismic Sur.	Easting	: 246,988 NJ-NAD 83

Depth in feet	Surf. Elev. -50.6 ft	GRAPHIC	USCS	DESCRIPTION	Core Interval	Remarks
0						S-1/ 0.0-5.0
	-52					
2			SP	Gray, dark gray medium SAND, some gravel, little fine sand, trace coarse sand, trace silt/clay		
	-54					
4						
	-56					S-2/ 5.0-7.8 Not tested, over lap with DRV-88-R3, S-1
6			SP	Brown fine to coarse sand, and gravel, trace silt		
	-58					
8						
	-60					
10						
	-62					
12						
	-64					
14						
	-66					
16						
	-68					
18						
	-70					
20						
	-72					
22						

NOTES:
1. Soil descriptions and USCS classifications according to Visual-Manual Procedure (ASTM D 2488) and/or mechanical sieve analysis if performed.
2. Sample depths are based on core recovery lengths.
3. Core Penetration = 7.0 feet, Core Recovery = 7.8 feet.
4. Percent Recovery = 112.1 %

VIBRACORE 5739GB-DRV.GPJ DUFFIELD.GDT 1/19/05

DUFFIELD ASSOCIATES
Consultants in the Geosciences

VIBRATIONAL CORE DRV-88 R3

U.S. Army Corps of Engineers
Vibrational Coring in the Liston Range
of the Delaware River Main Channel
Contract No. DACW61-01-D-0004
Task Order 027, Modification 01

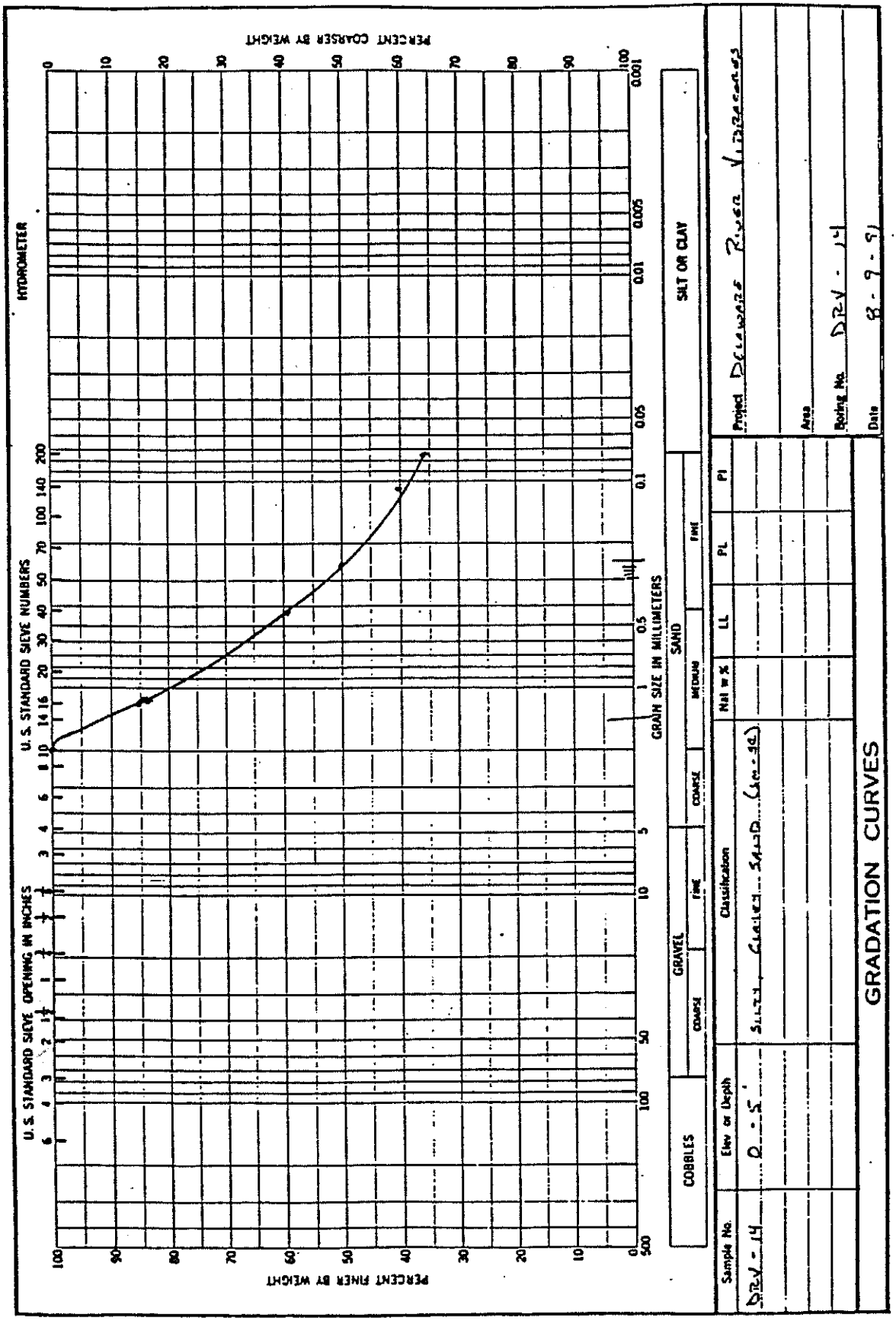
Date Started	: August 16, 2004	Drilling Equipment	: 271B Alpine Vibracore
Date Completed	: August 16, 2004	Drilling Methods	: Vibrational Core
Logged by	: STS	Surface Elevation	: -50.6 feet NAVD 88
Weather	: P. Cloudy, 70s	Northing	: 167,315 NJ-NAD 83
Driller/Agency	: Alpine Ocean Seismic Sur.	Easting	: 246,981 NJ-NAD 83

Depth in feet	Surf. Elev. -50.6 ft	GRAPHIC	USCS	DESCRIPTION	Core Interval	Remarks
0						
	-52			Jet to 3.7 +/- feet		
2						
	-54					
4						S-1/ 3.7-8.7
	-56					
6			SP	Dark brown medium SAND, little fine sand, trace gravel, trace coarse sand, trace silt/clay		
	-58					
8						
	-60		SP-SM	Brown fine to coarse SAND and gravel, trace silt/clay		S-2/ 8.7-10.7
10						
	-62		SP-SM	Brown fine SAND, trace silt/clay		S-3/ 10.7-13.7
12						
	-64					
14						S-4/ 13.7-18.7
	-66					
16			SP-SM	Yellow-green fine SAND, trace silt/clay		
	-68					
18						
	-70		SP-SM	Orange-brown fine SAND, trace silt/clay		S-5/ 18.7-22.0
20						
	-72					
22			SM	Orange, brown fine SAND, little silt/clay, trace medium sand		S-6/ 22.0-22.7

NOTES:
1. Soil descriptions and USCS classifications according to Visual-Manual Procedure (ASTM D 2488) and/or mechanical sieve analysis if performed.
2. Sample depths are based on core recovery lengths.
3. Core Penetration = 19.0 feet, Core Recovery =19.0 feet.
4. Percent Recovery = 100.0 %

VIBRACORE 5739GB-DRV.GPJ DUFFIELD.GDT 1/19/05

Gradation Curves & Sieve Analysis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U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
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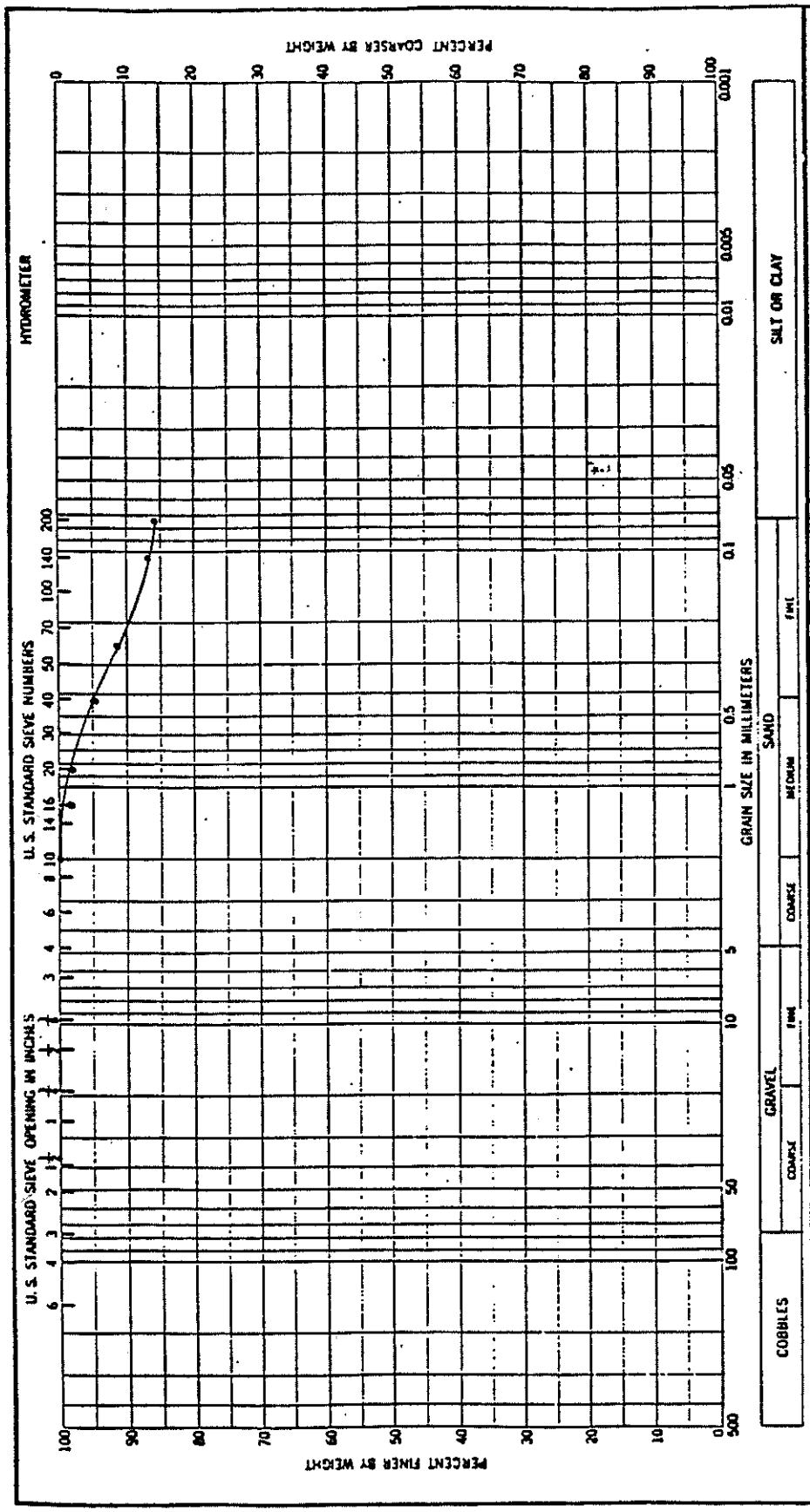
ENG FORM 1 MAY 63 2087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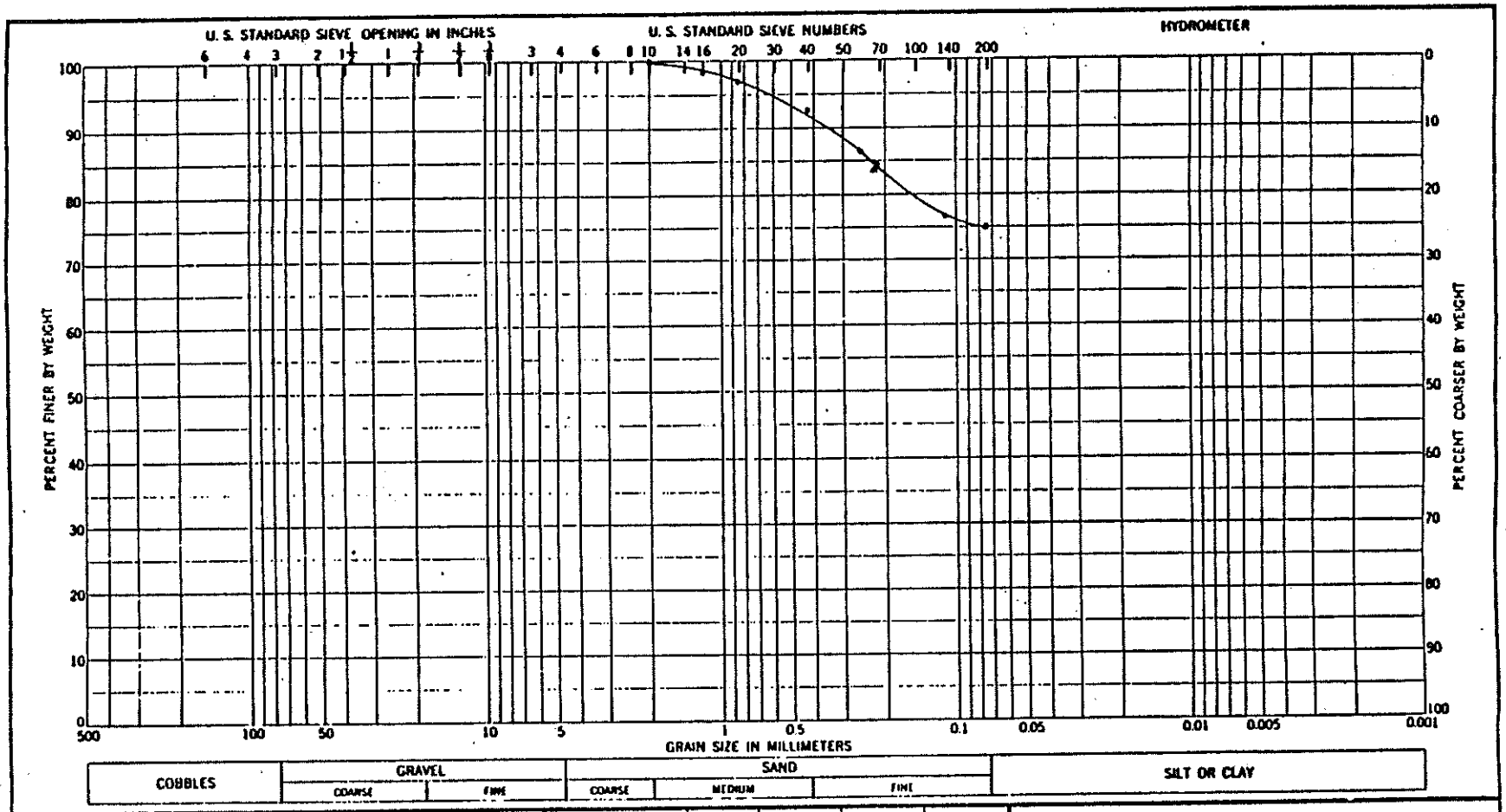
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Dredgers
Area
Boring No. DR1-14
Date 8-9-91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DR1-14
74-10'
Silt
62.7
29.1
33.6
MH
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRV-14	12.2-15'	Clay		34.6	21.0	13.6
		CL				

Project Delaware River Vibracores

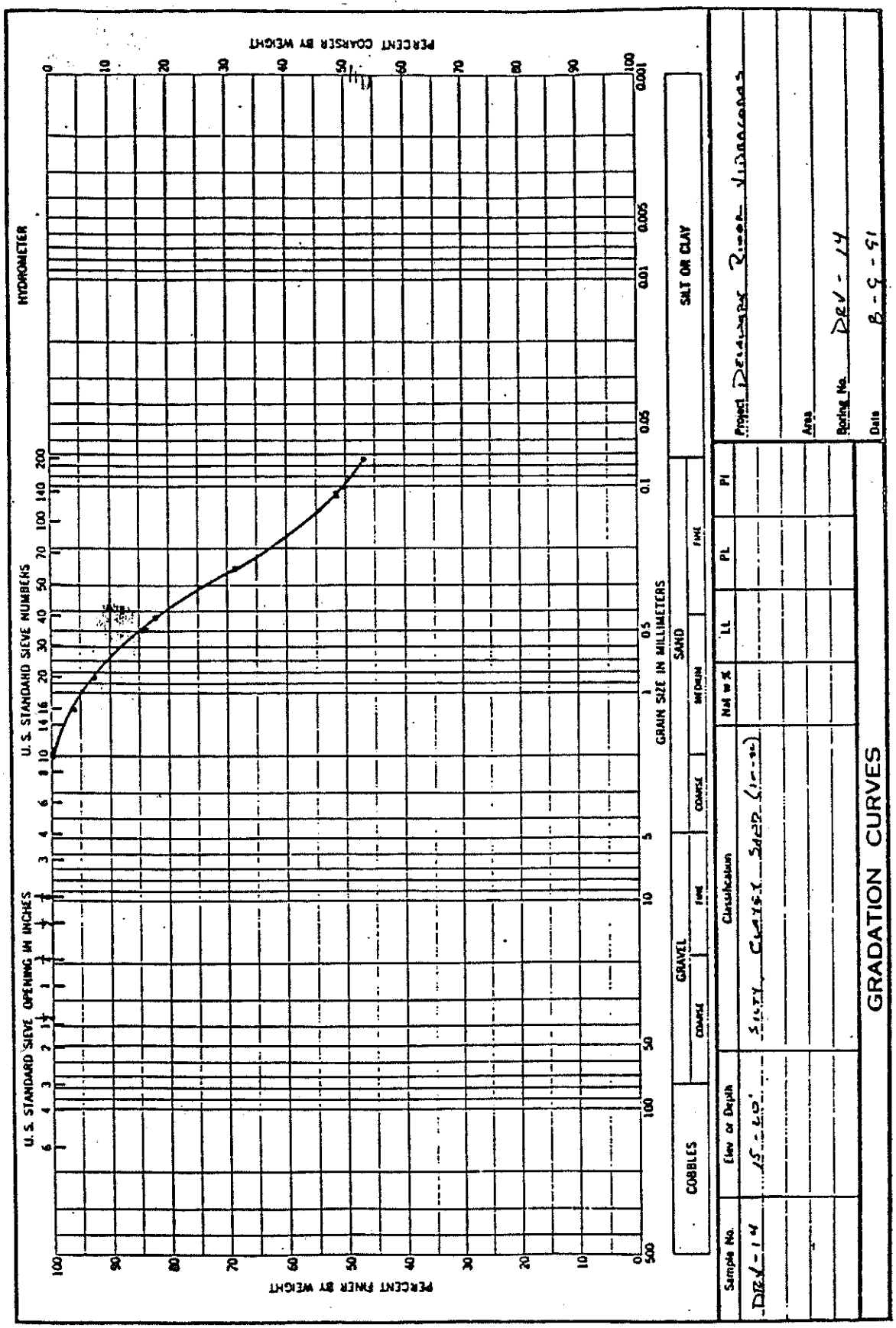
Area

Boring No. DRV-14

Date 8-9-91

GRADATION CURVES

ENG FORM 1 MAY 63 2087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U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project
Area
Boring No.
Date
Sample No.
Elev or Depth
Classification
NM w %
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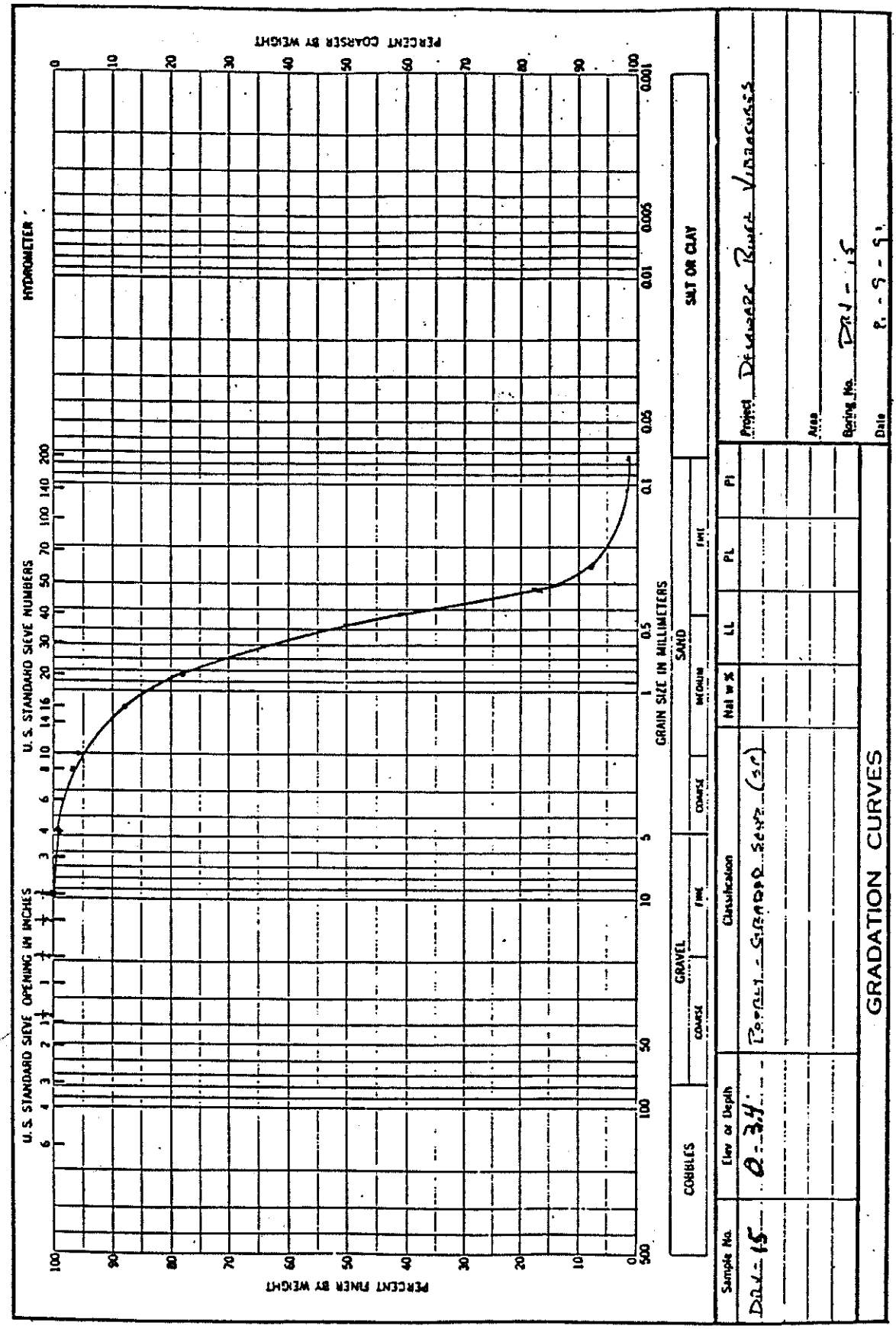
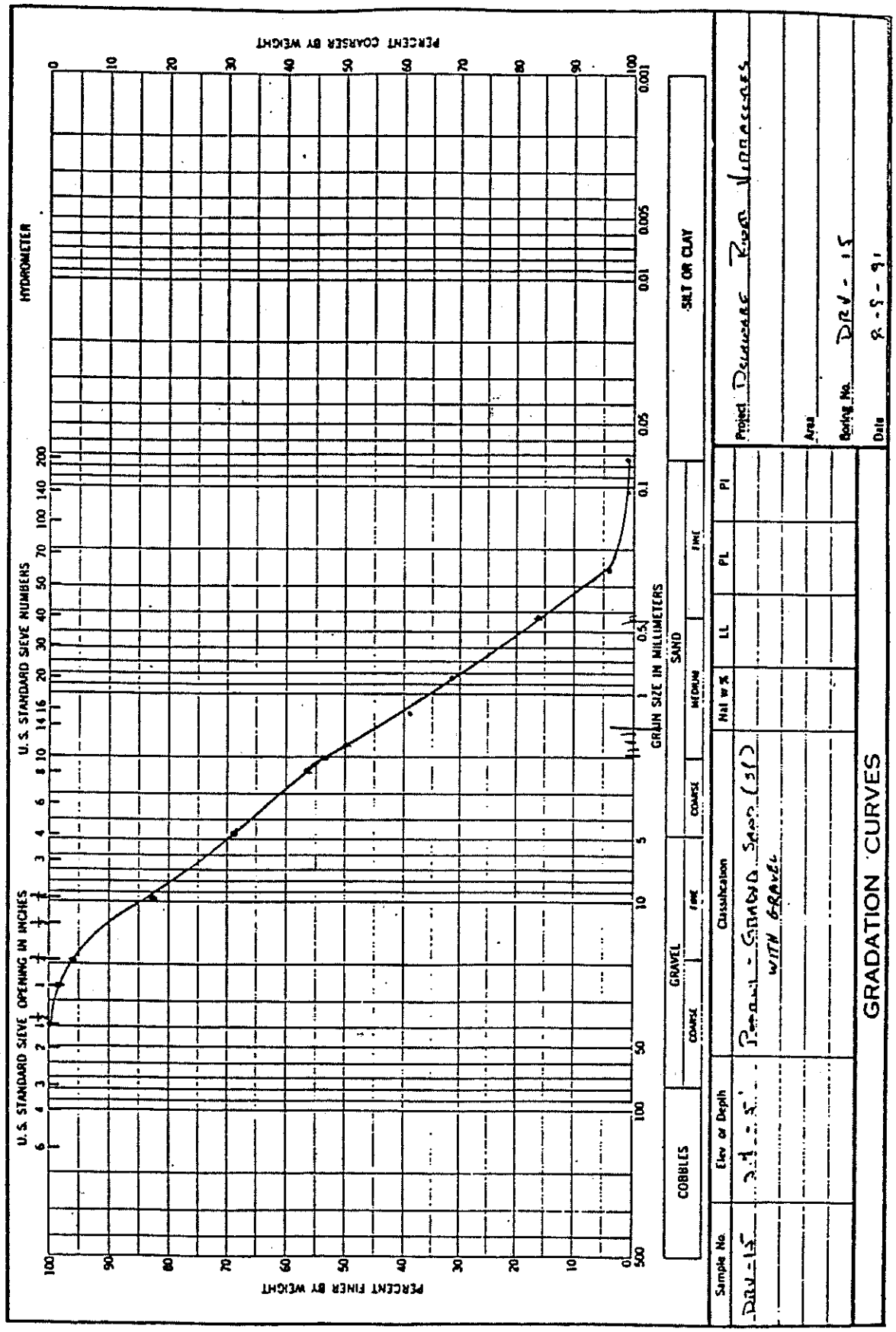
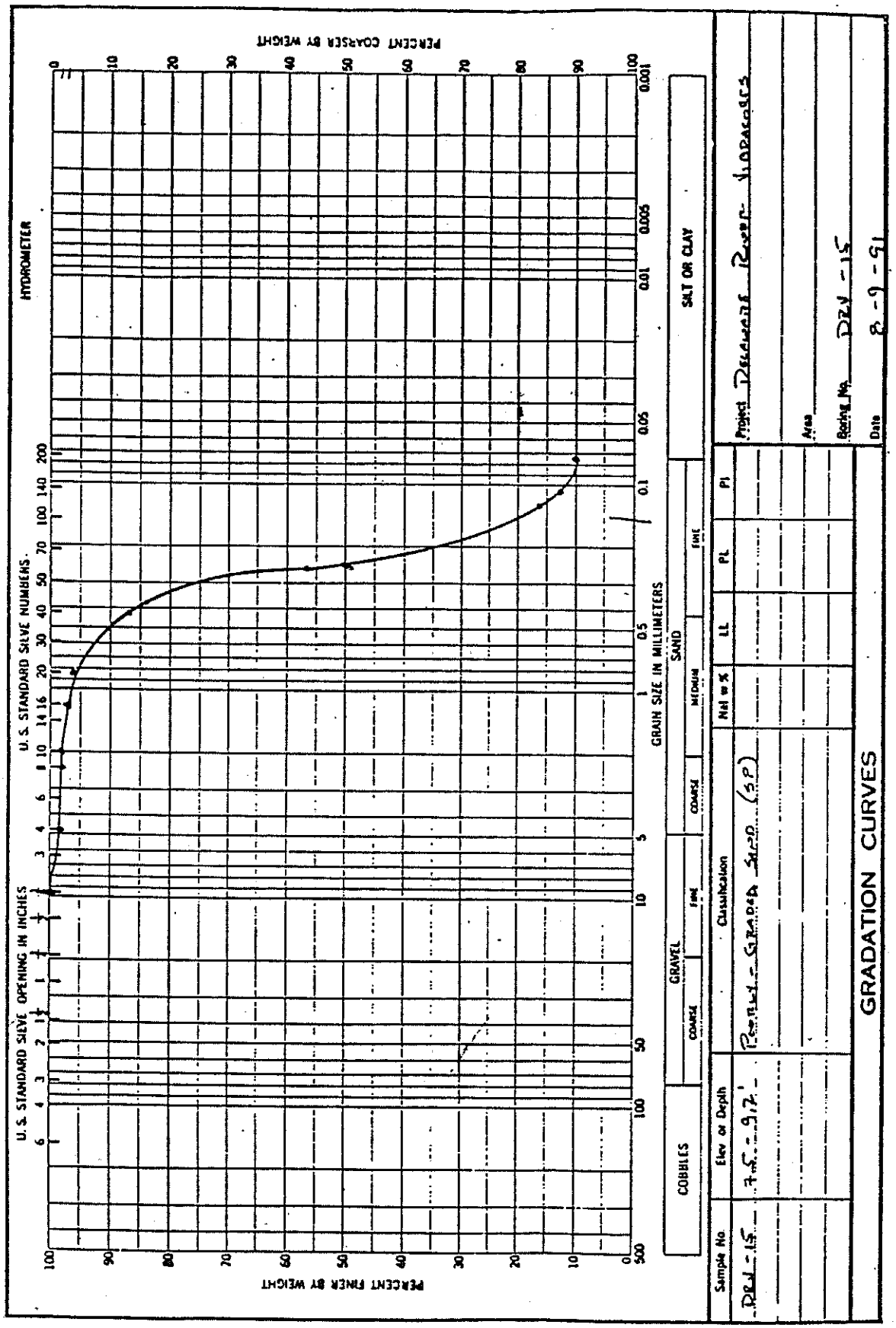
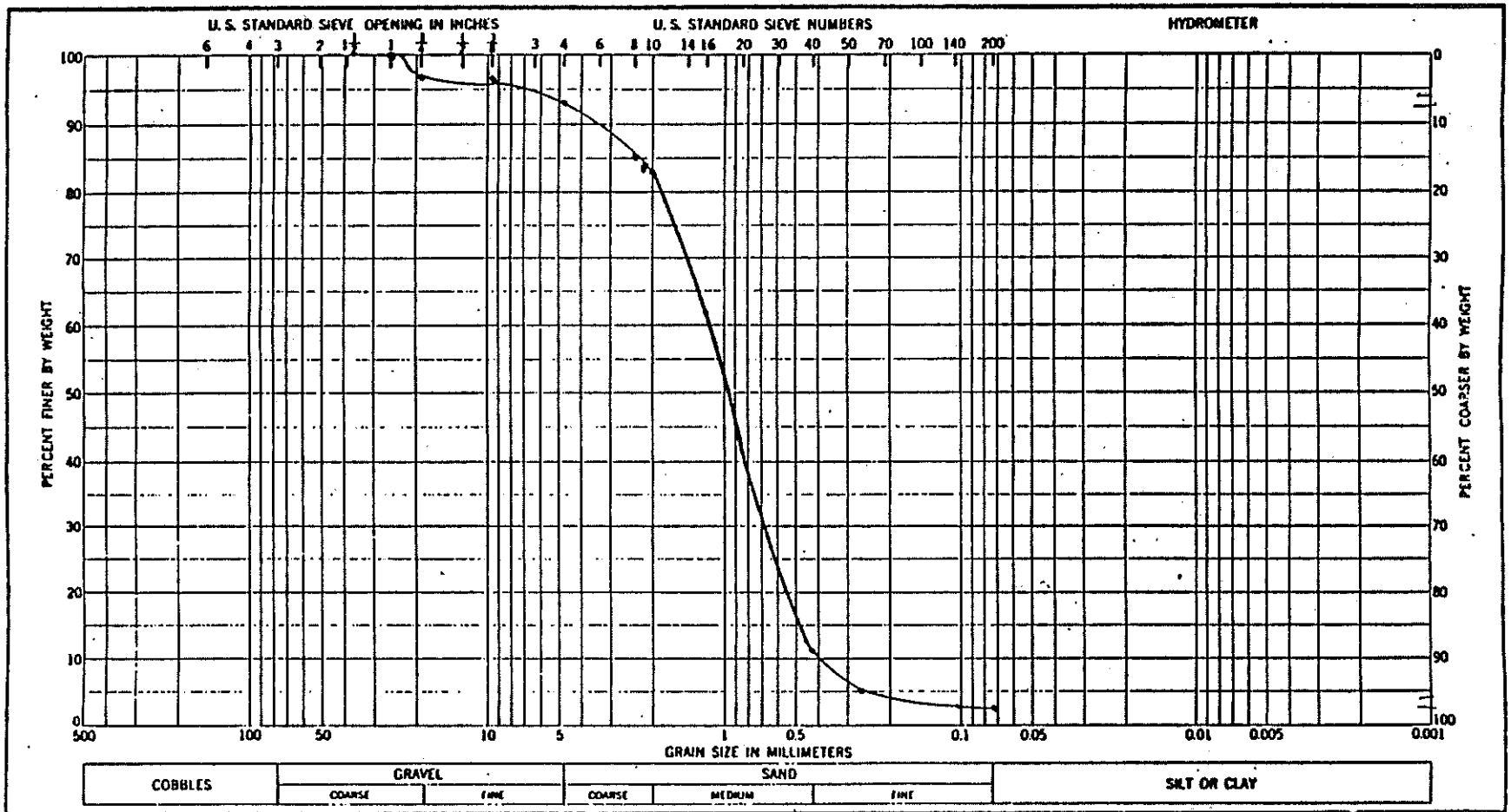
GRADATION CURVES
ENG FORM 1 MAY 68 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
Project
Area
Boring No.
Date
GRADATION CURVES
ENG FORM (MAY 63) 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Hopper
Area
Boring No. DRV-15
Date 8-5-91
Sample No.
Elev or Depth
Classification
Nat W%
LL
PL
PI
DRV-15
3.1-3.5'
Peat - Sandy Silt (Pt)
with gravel
GRADATION CURVES
ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Hydrologics
Area
Boring No. DRJ-15
Date 8-9-91
Sample No. DRJ-15
Elev or Depth 7.5-9.7'
Classification Poorly-Graded Sand (SP)
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087

230



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRV-15	10.8-14'	Poorly-Graded Sand (SP)				

Project Delaware River Vibracores

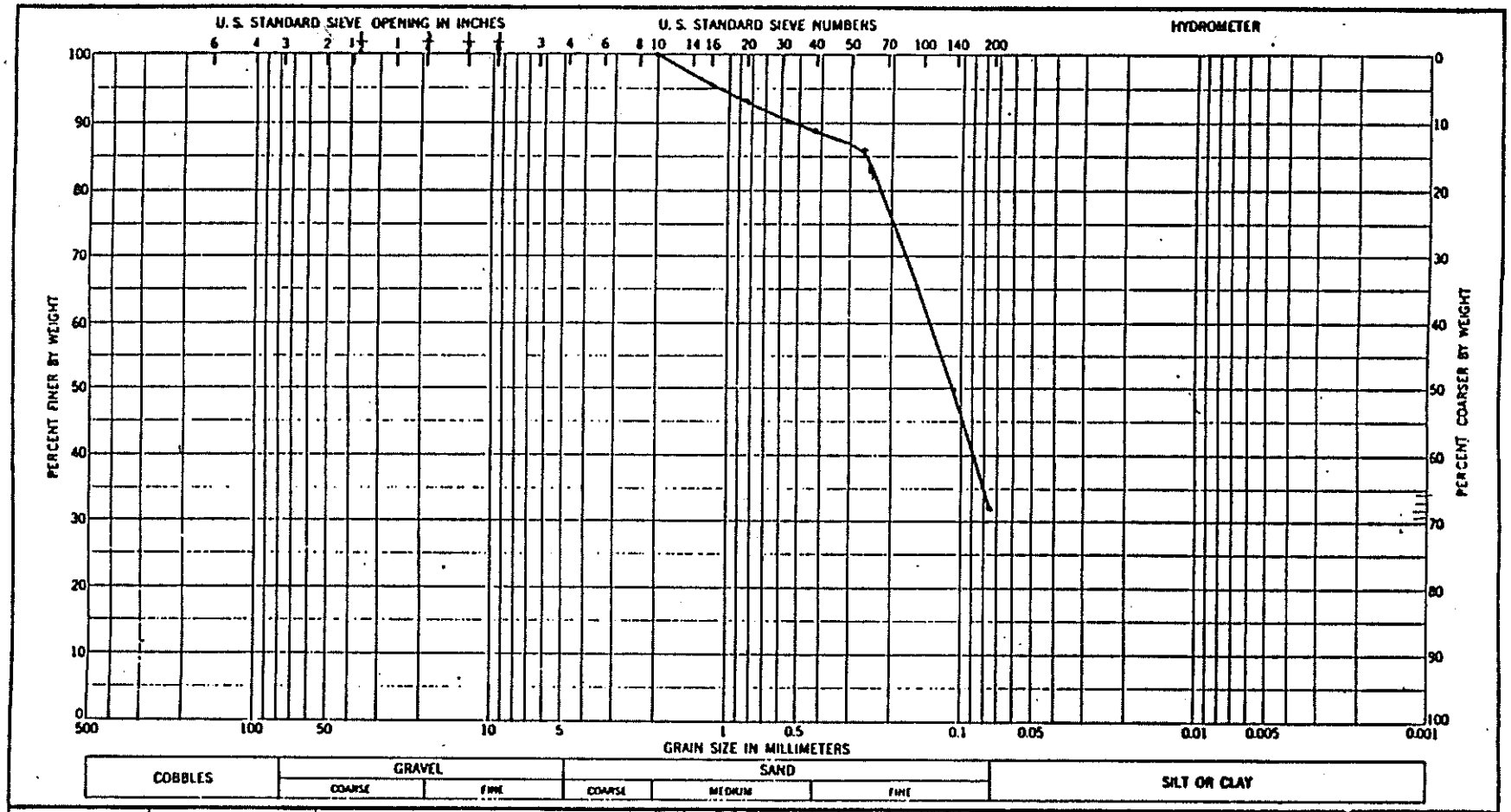
Area

Boring No. DRV-15

Date 8-9-91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-16	0.0-5.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

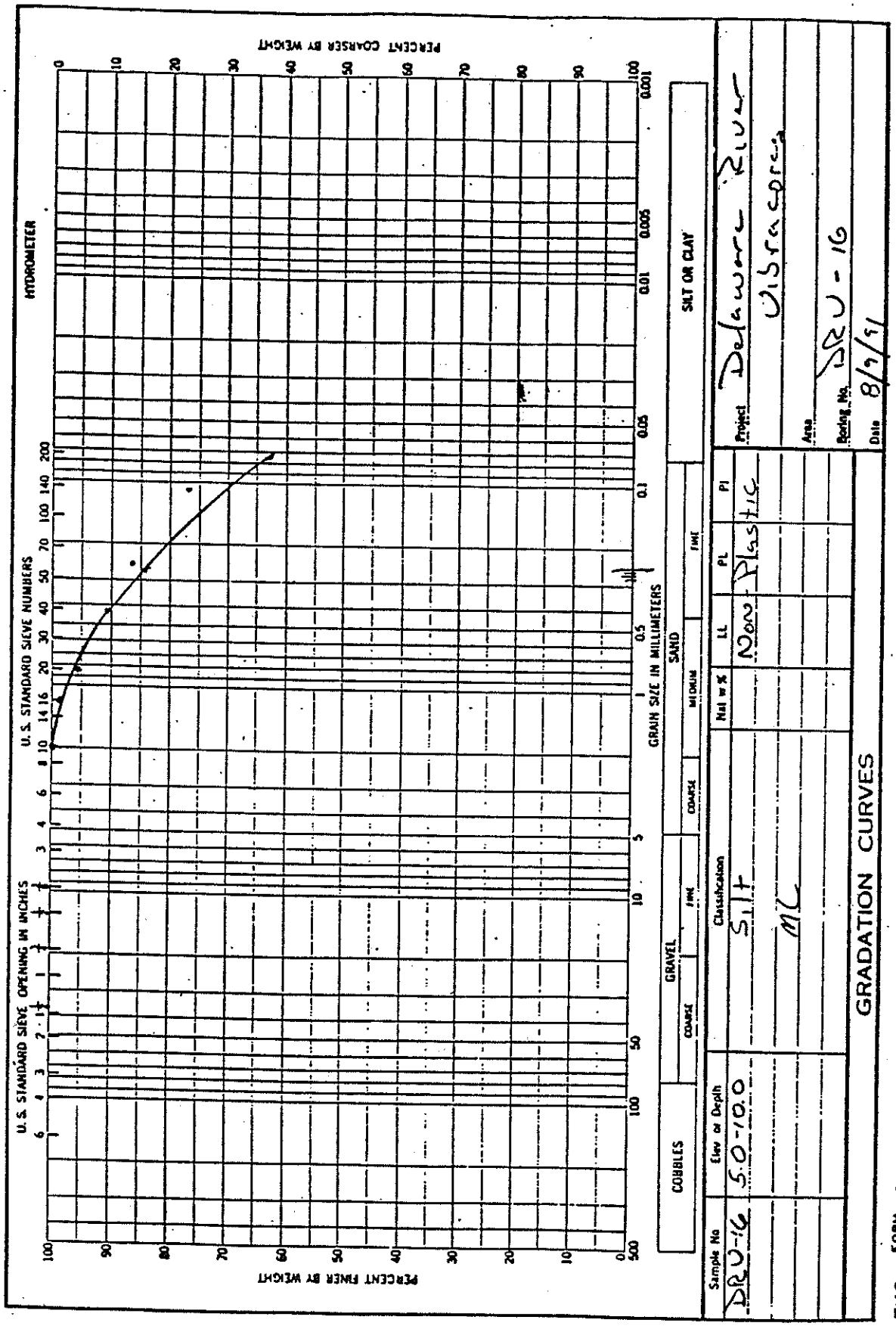
Area

Boring No. DRU-16

Date 8/6/91

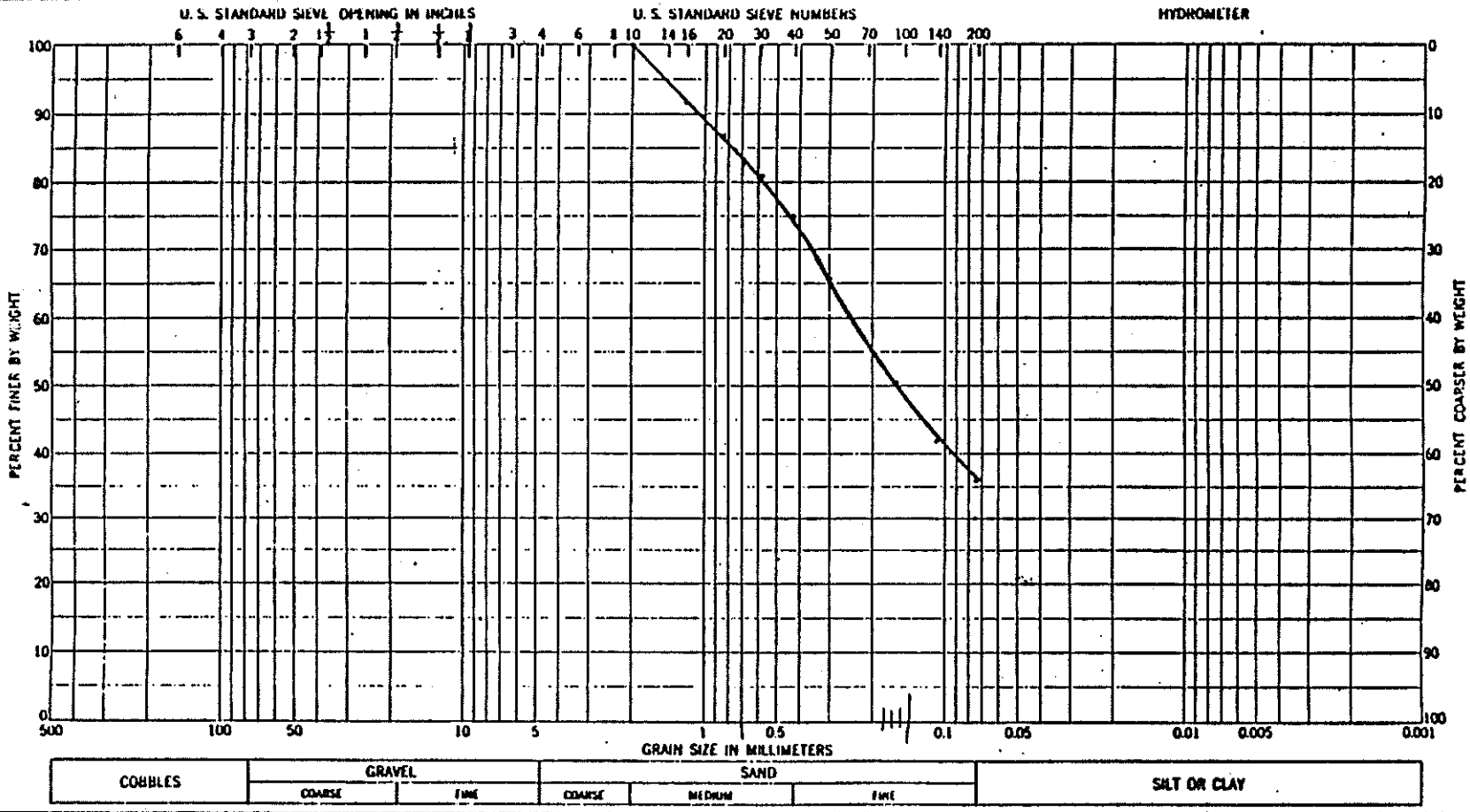
GRADATION CURVES

ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River Dredging
Area
Boring No. DRU-16
Date 8/9/91
Sample No DRU-16
Elev or Depth 5.0-10.0
Classification Silt
ML
LL Non-Plastic
PL
PI
Nat w %
GRADATION CURVES
ENG FORM 1 MAY 63 2087

234

235



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-16	10.0-15.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

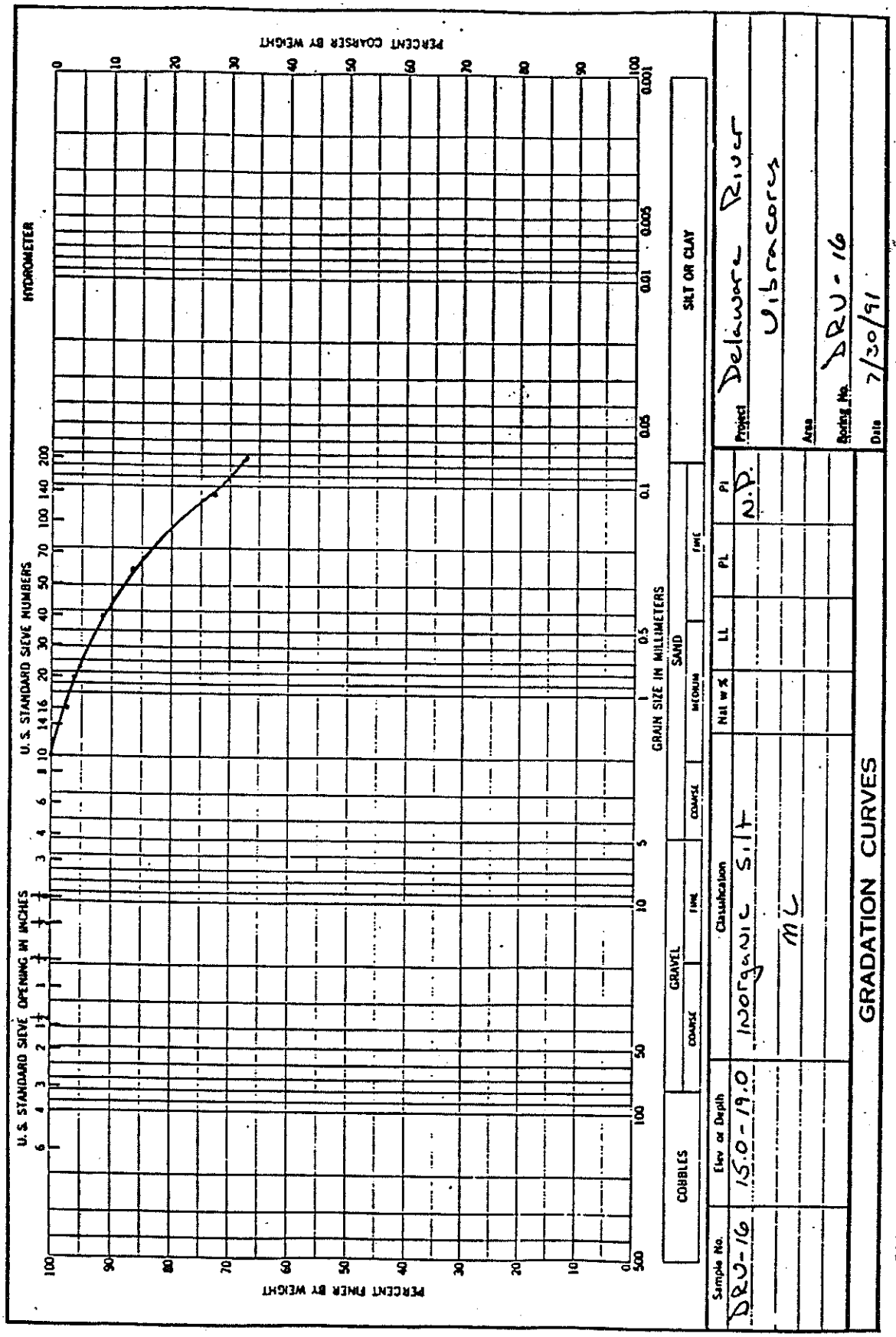
Area

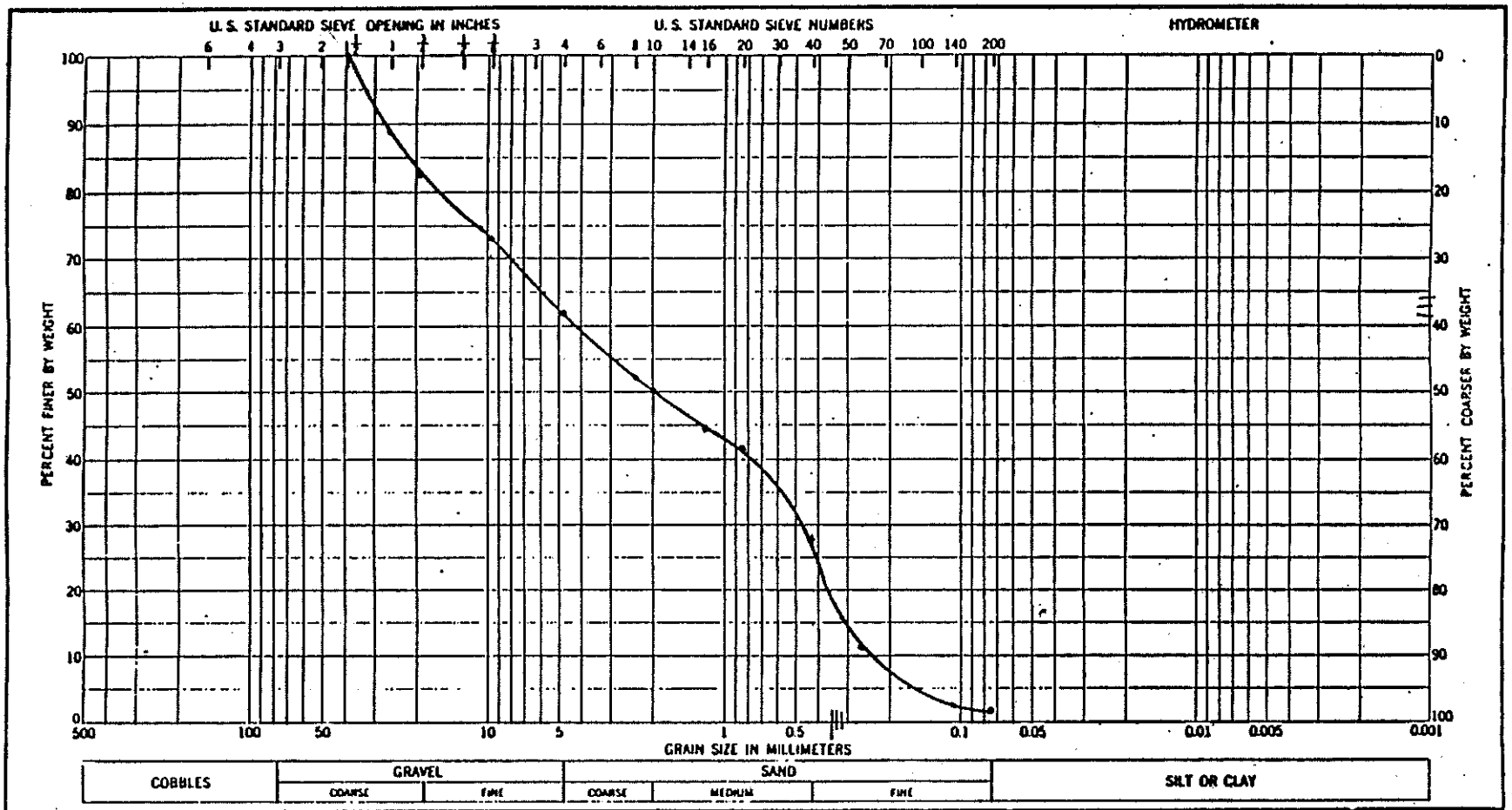
Boring No. DRU-16

Date 7/29/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Ubracers
Boring No. DRU-16
Date 7/30/91
Sample No. DRU-16
Elev or Depth 15.0-19.0
Classification Inorganic Silt
ML
Nat w % LL PL PI
N.P.
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-17	0 - 1.2	Poorly-Graded Sand SP				

Project Delaware River Vibracores

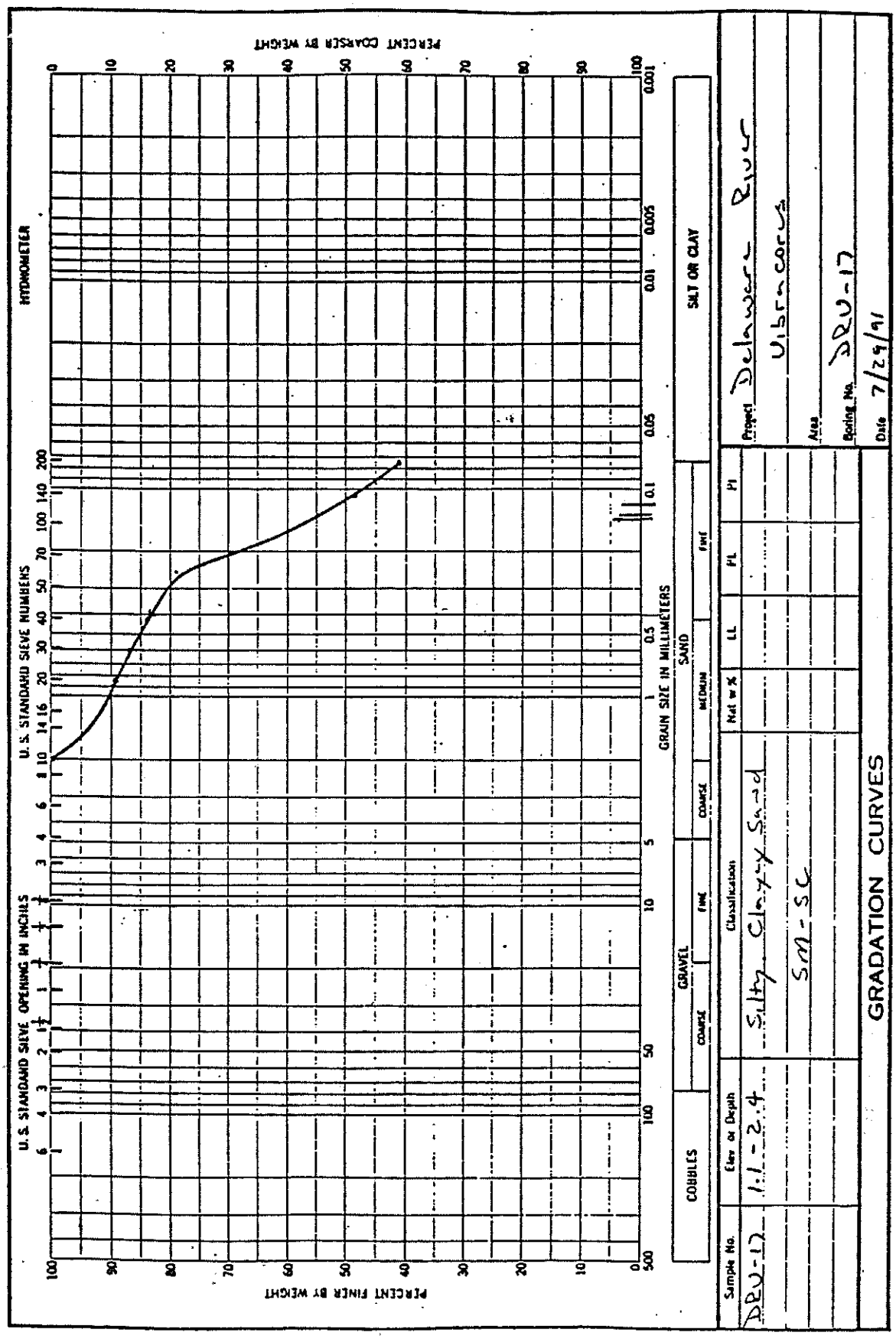
Area

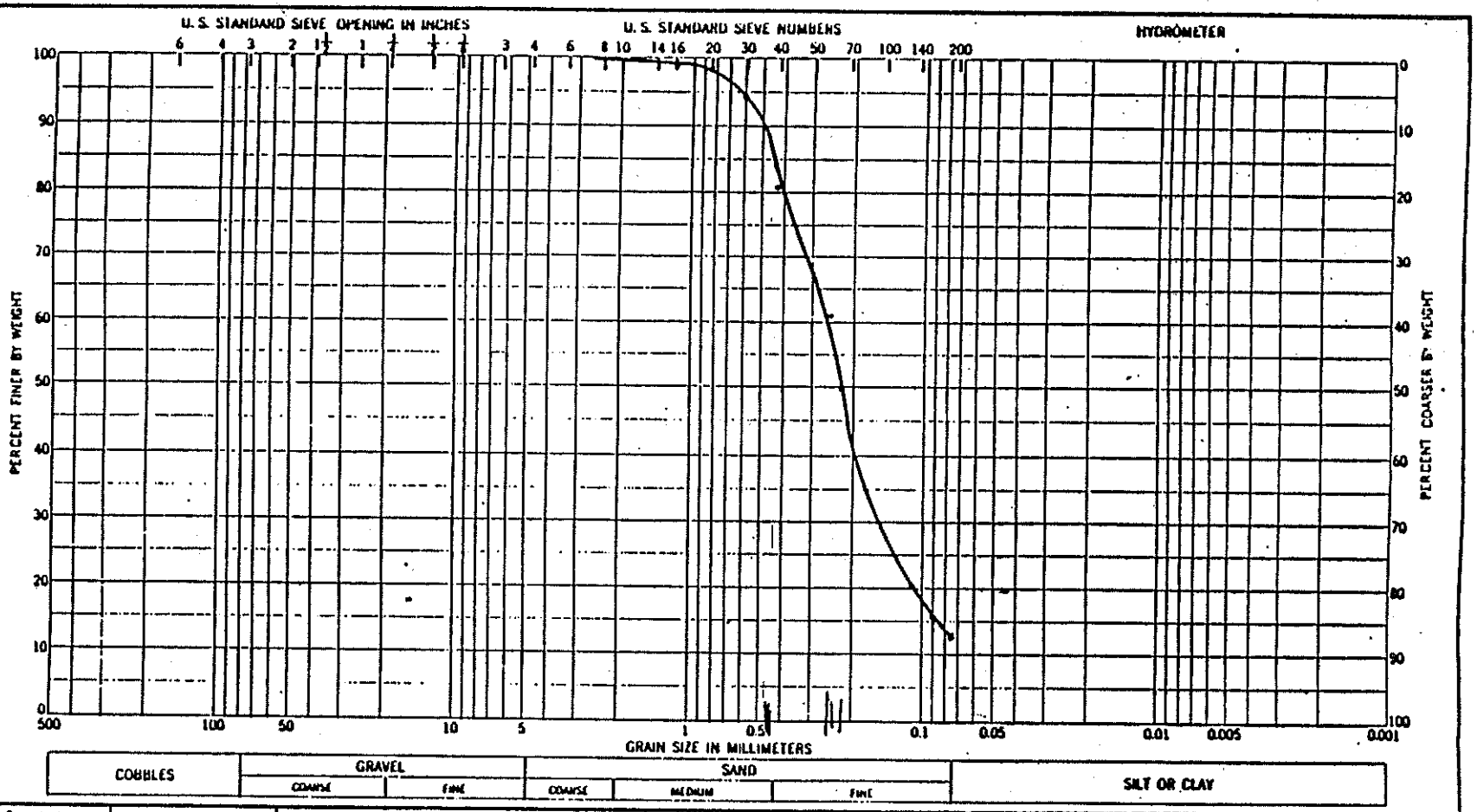
Boring No. DRU-17

Date 8/6/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-17
1.1-2.4
Silty Clayey Sand
SM-SC
Project Delaware River
Area Ubrecorcs
Boring No. DRU-17
Date 7/29/91
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-17	2.4-3.7	Silty, Clayey Sand SM-SC				

Project Delaware River Vibracore

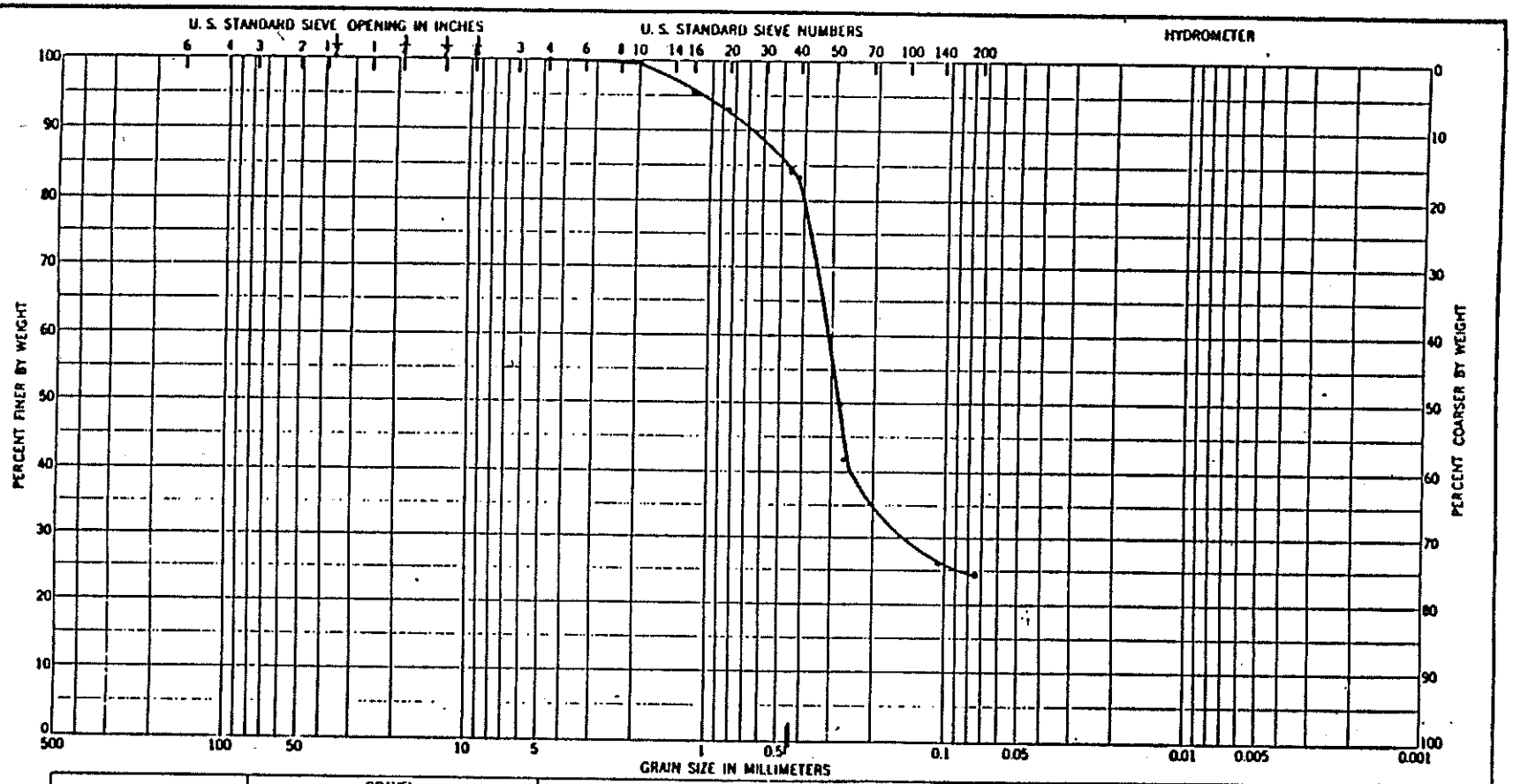
Area

Boring No. DRU-17

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-17	3.7-10.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

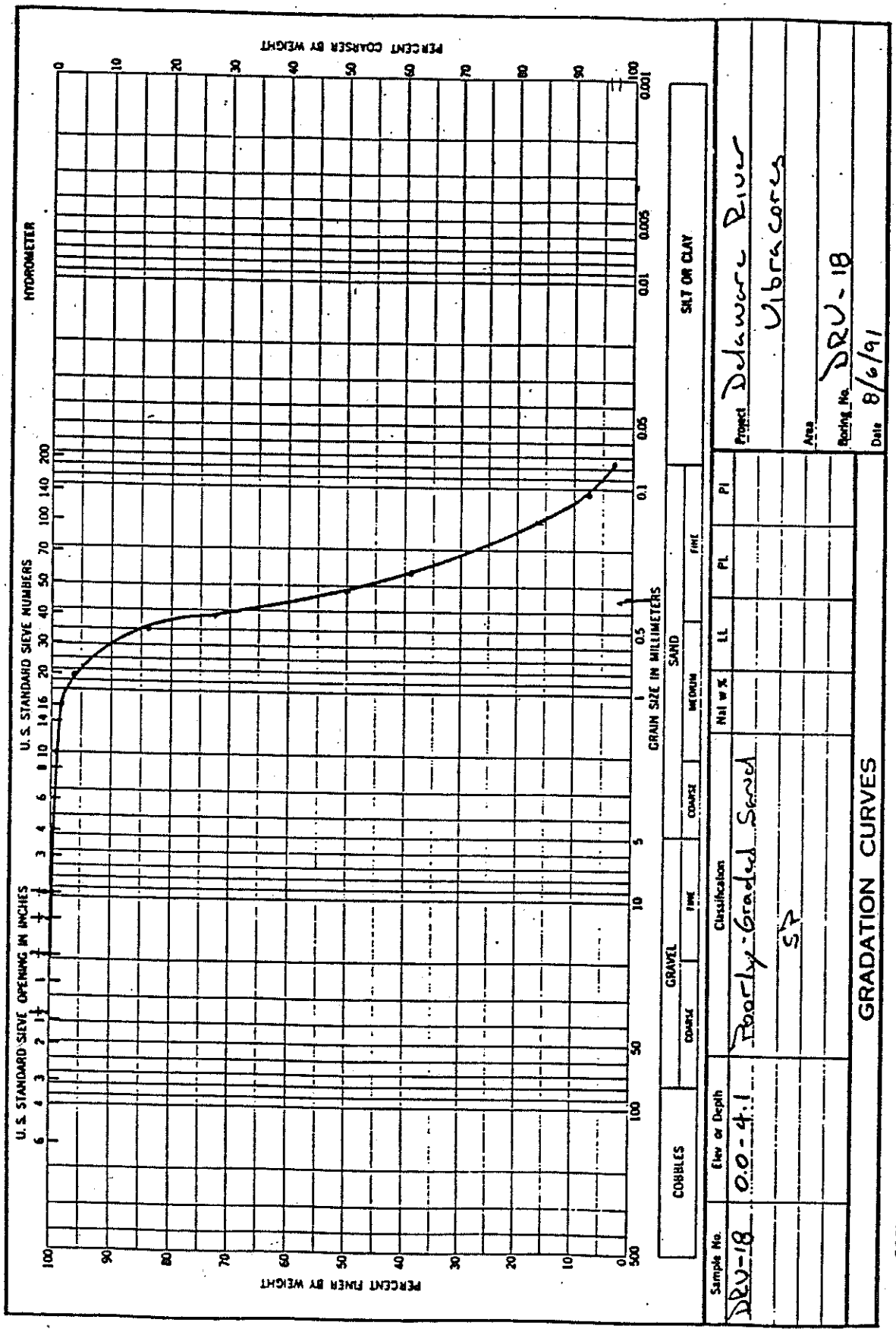
Area

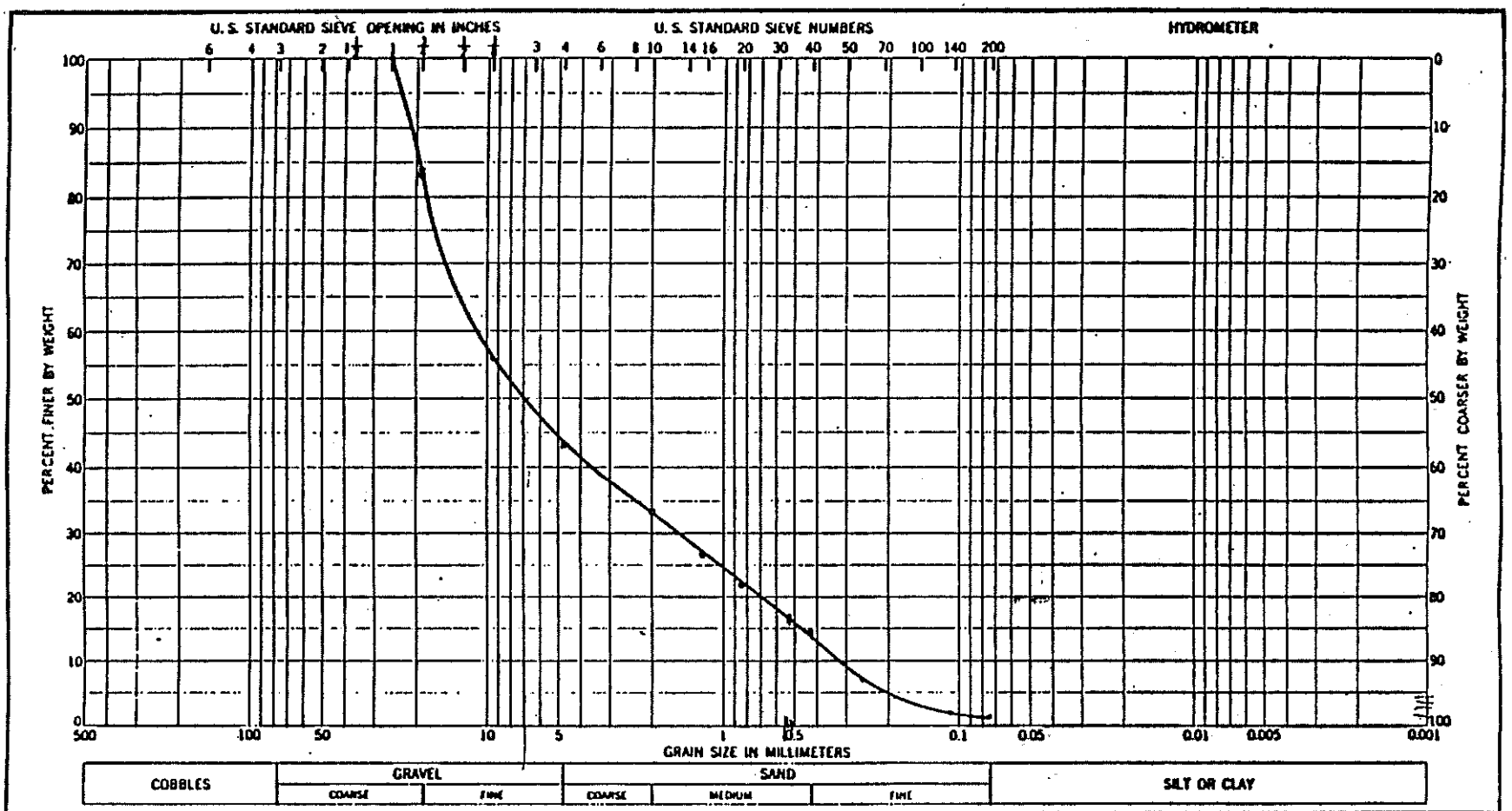
Boring No. DRU-17

Date 8/6/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-18
0.0-4.1
Poorly-Graded Sand
SP
Project Delaware River
Ultra cores
Area
Boring No. DRU-18
Date 8/6/91
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-1B	5.1-9.1	Poorly-Graded Gravel GP				

Project Delaware River Vibracores

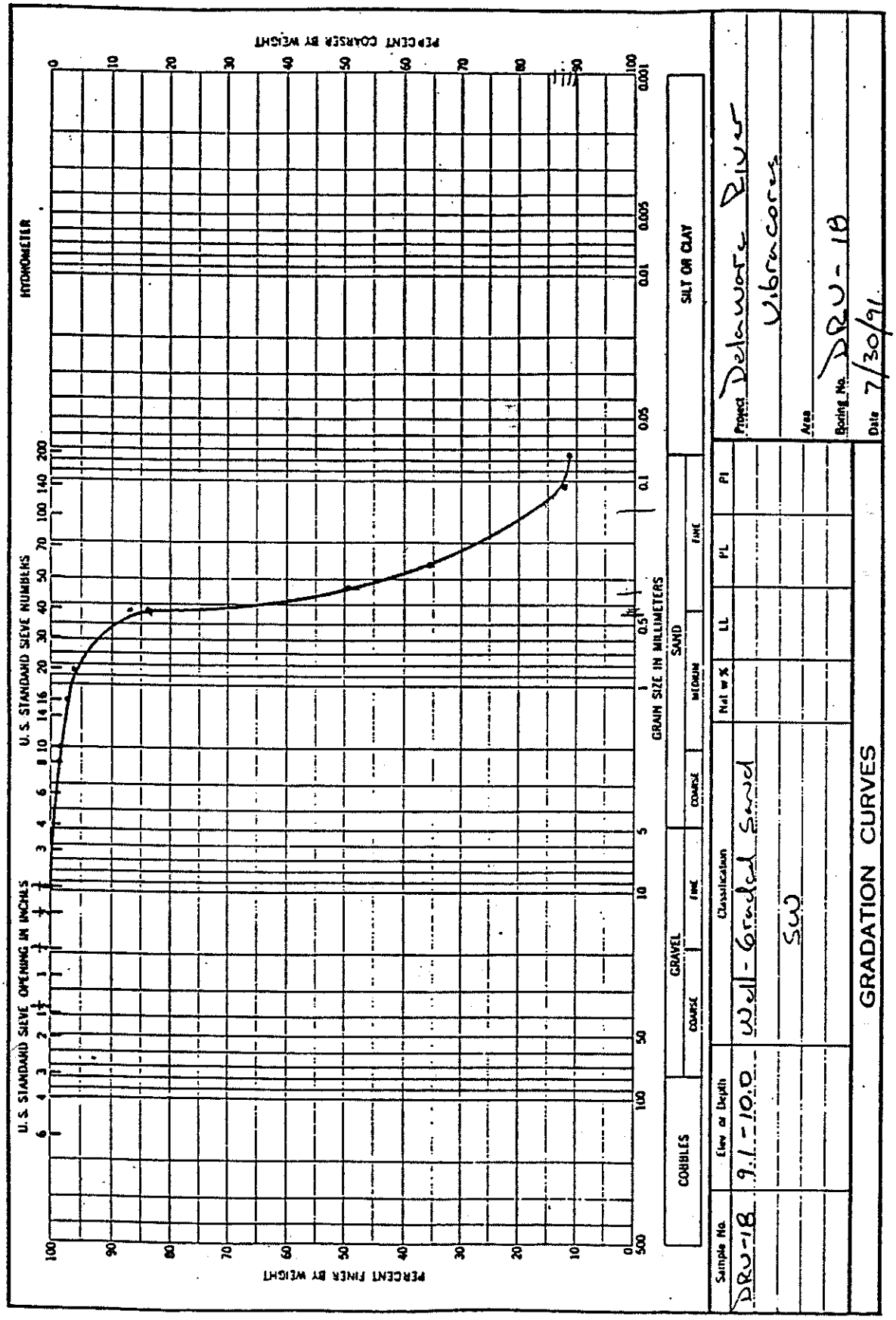
Area

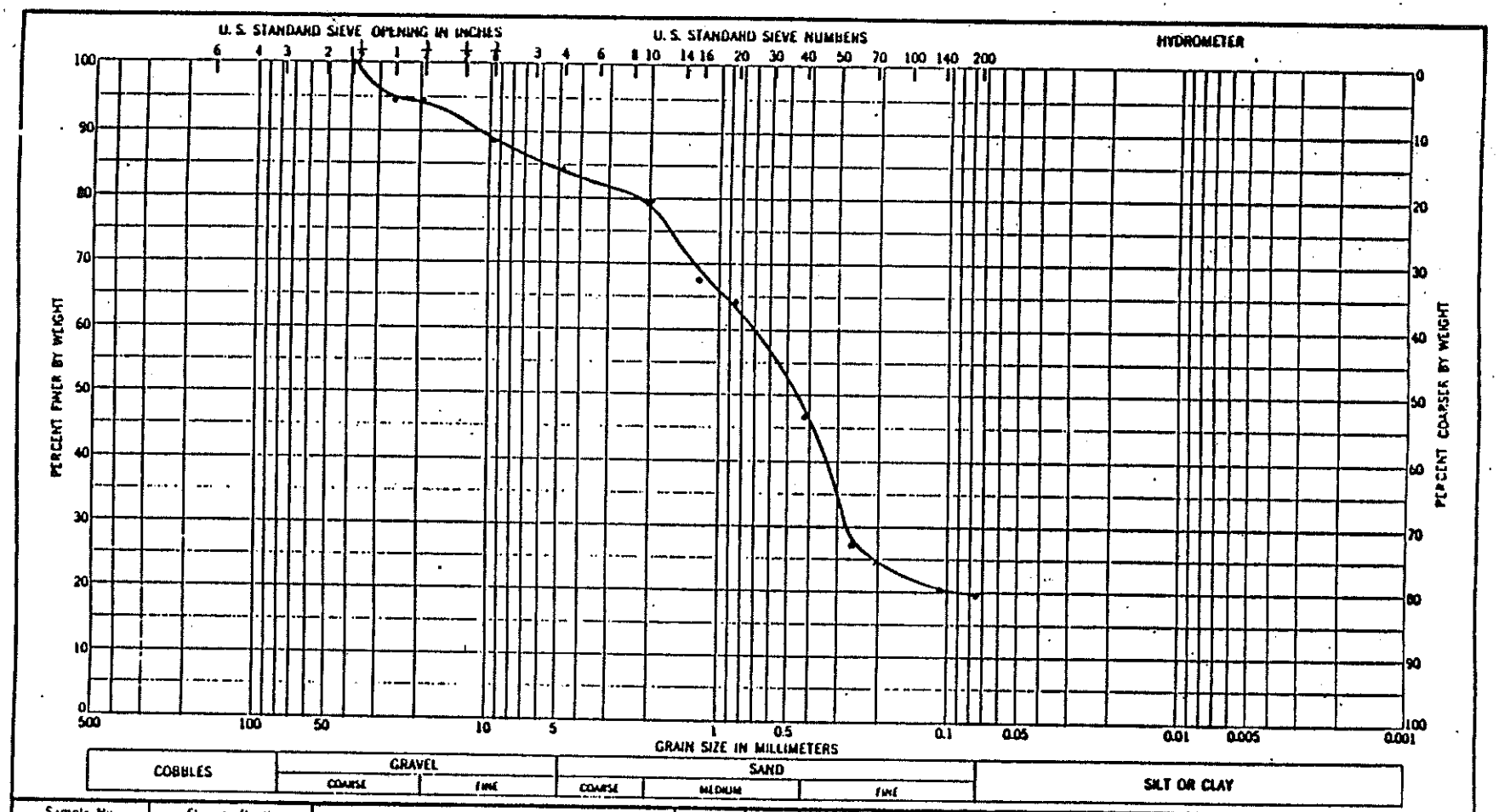
Boring No. DRU-1B

Date 8/5/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRU-18
Date 7/30/91
Sample No. DRU-18
Elev or Depth 9.1-10.0
Classification Well-Graded Sand
SW
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087

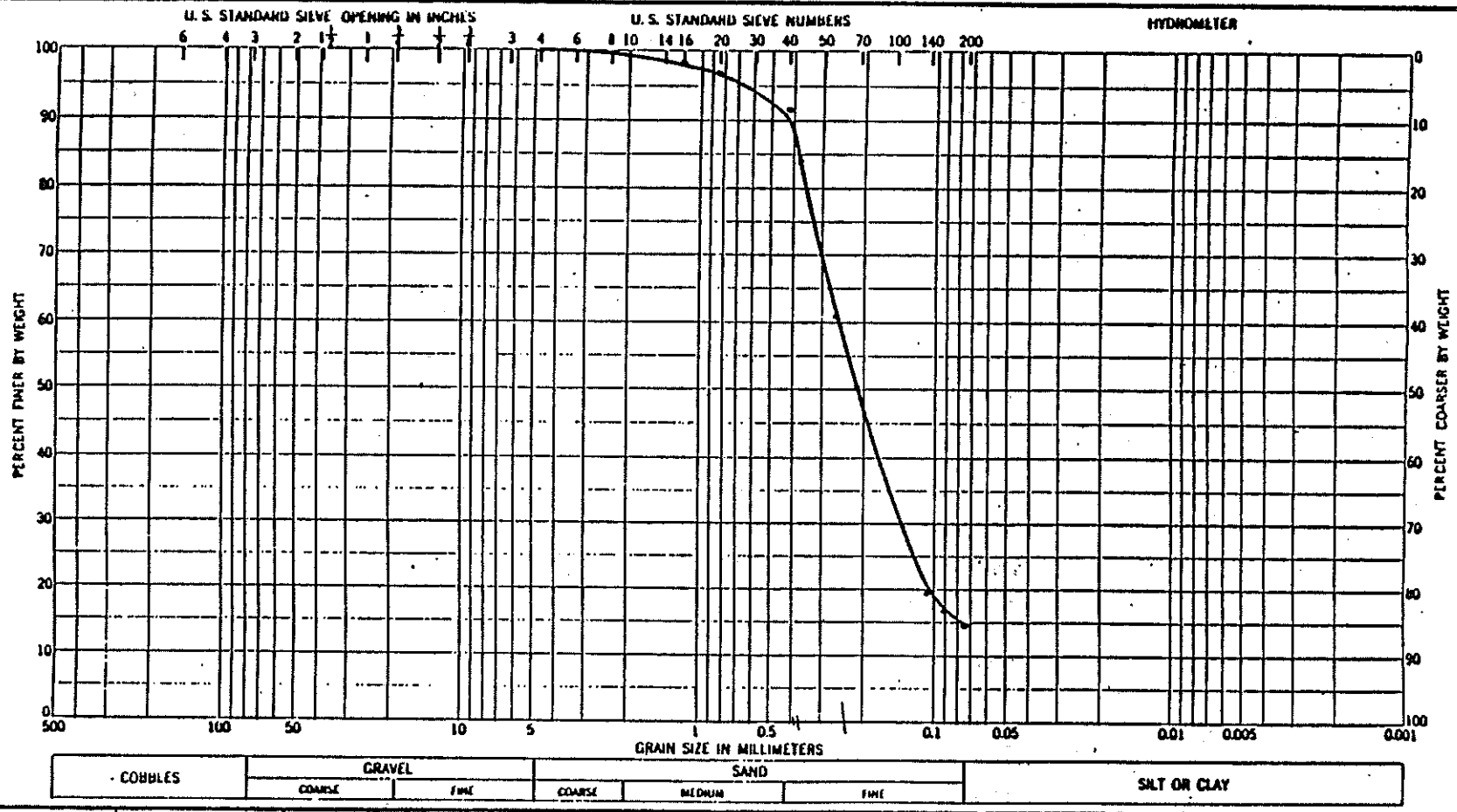


Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-18	10.7-11.7	Silty, Clayey Sand				
		SM-SC				

Project Delaware River
Vibracores
Area
Boring No. DRU-18
Date 7/31/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-19	0.0 - 2.1	Silty, Clayey Sand				
		SM - SC				

Project: Delaware River Vibracore

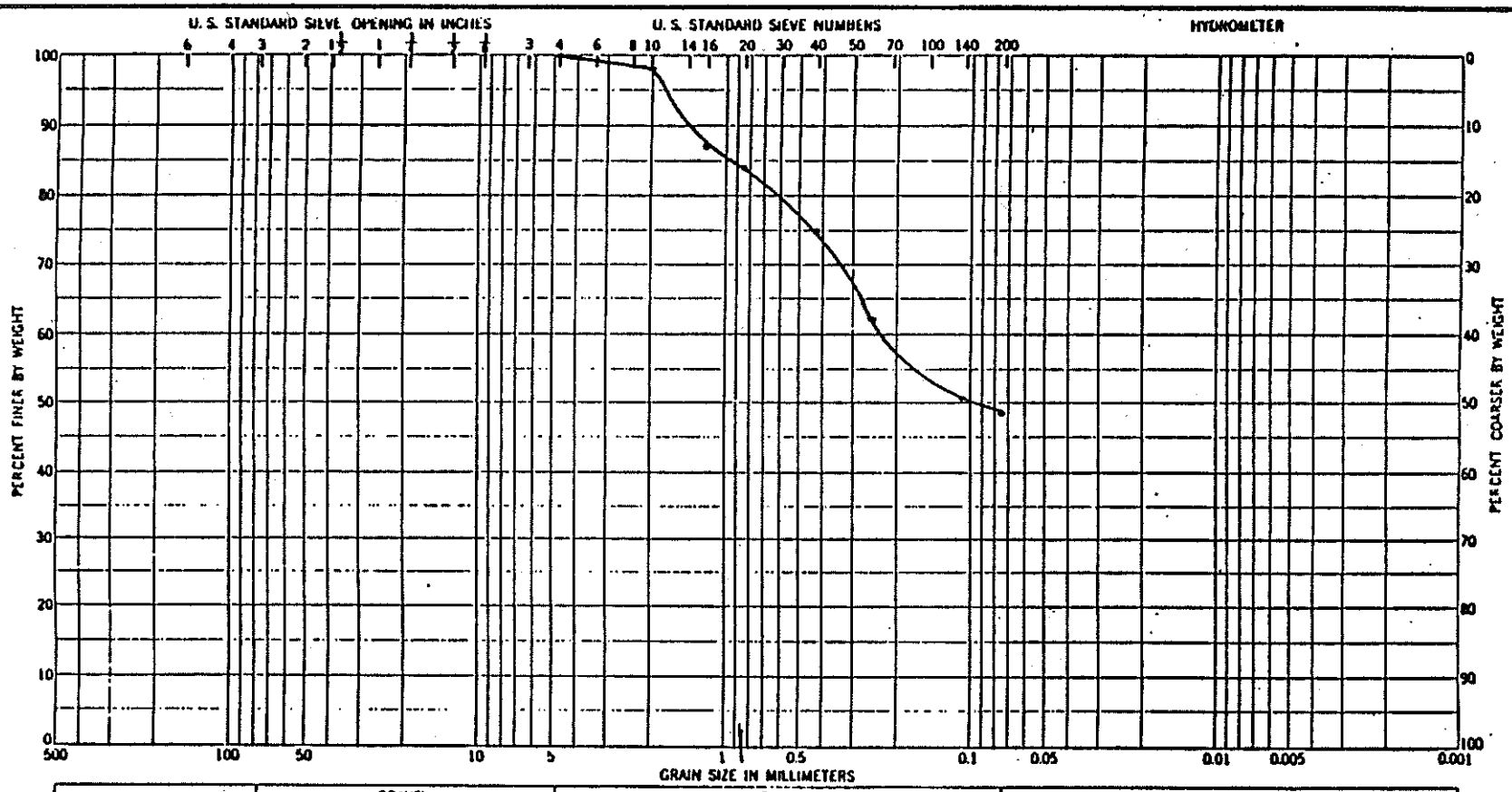
Area:

Boring No. DRU - 19

Date: 7/31/91

GRADATION CURVES

ENG FORM 1 MAY 62 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-19	2.1-5.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

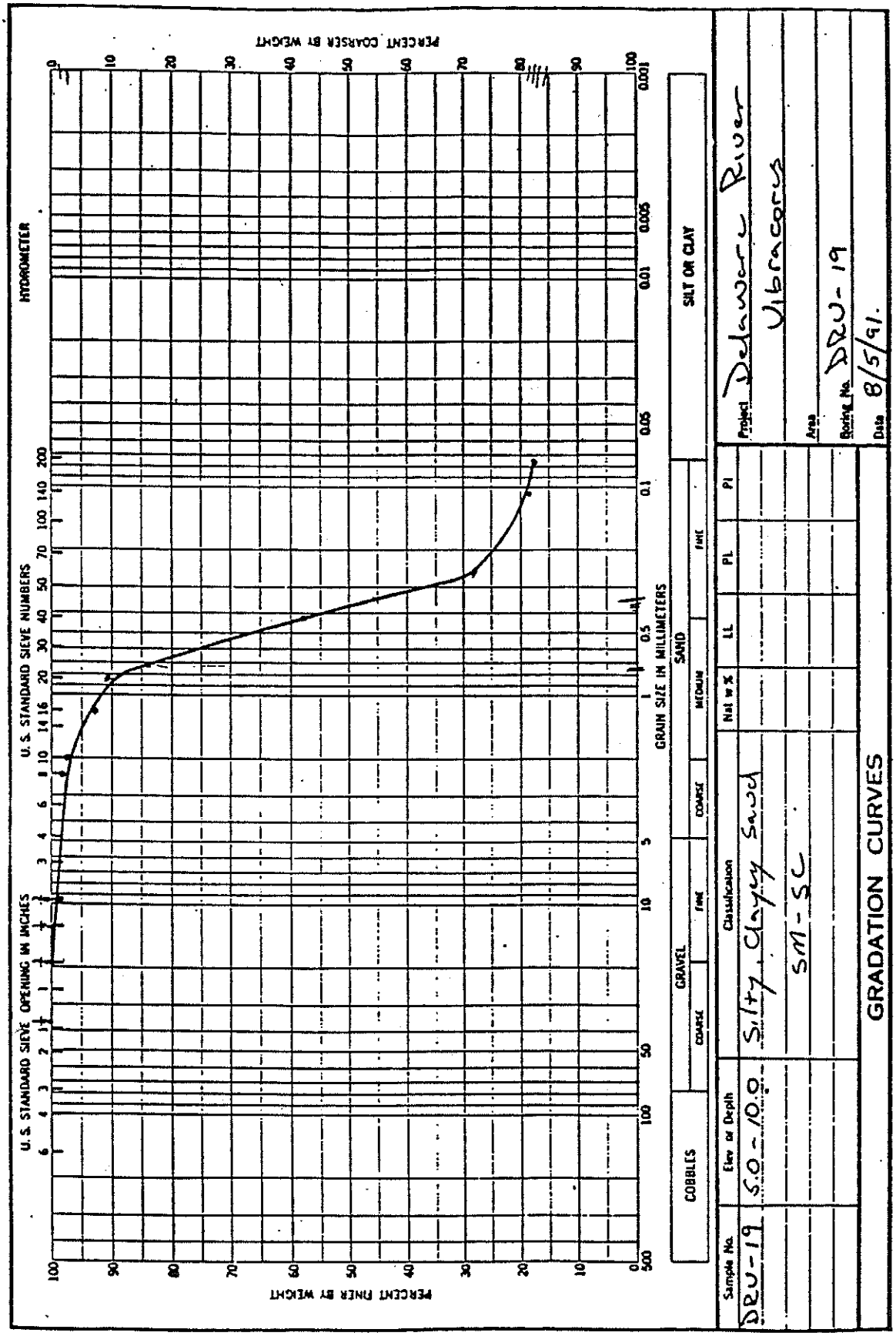
Area

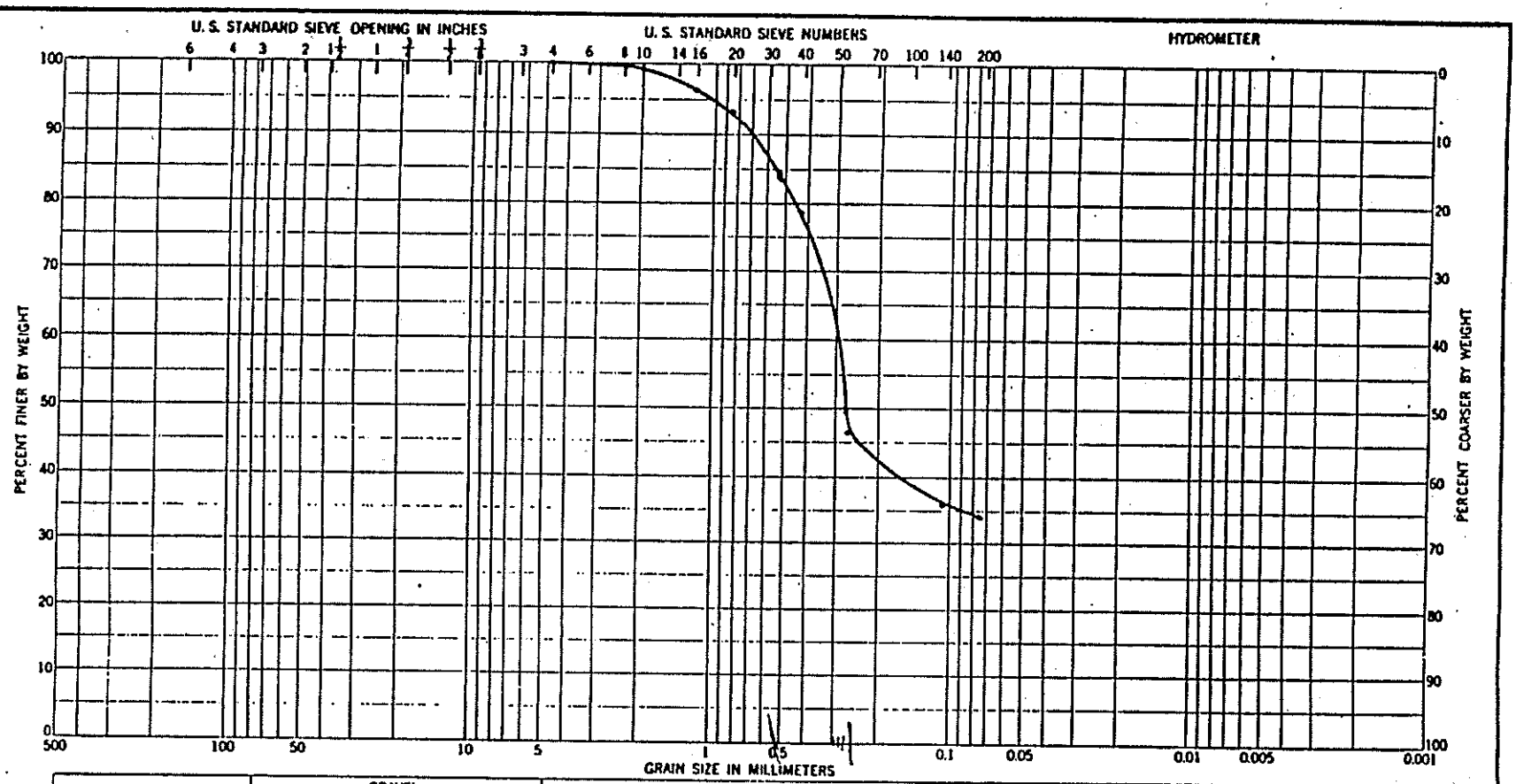
Boring No. DRU-19

Date 7/31/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracore
Area
Boring No. DRU-19
Date 8/5/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-19
5.0-10.0
Silty, Clayey Sand
SM-SC
GRADATION CURVES
ENG FORM 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-19	11.0-15.0	Silty, Clayey Sand SM-SC				

Project Delaware River Vibracores

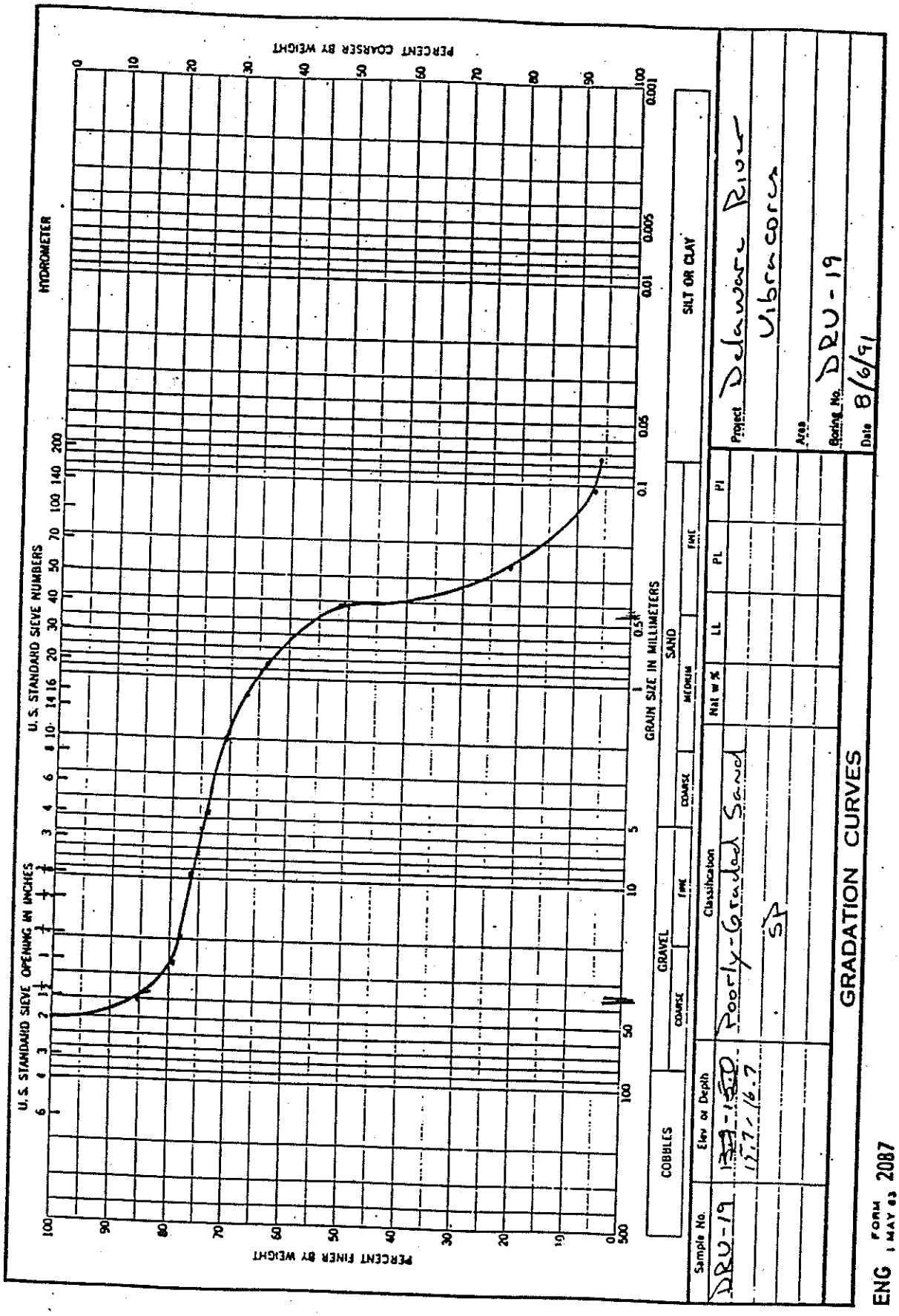
Area

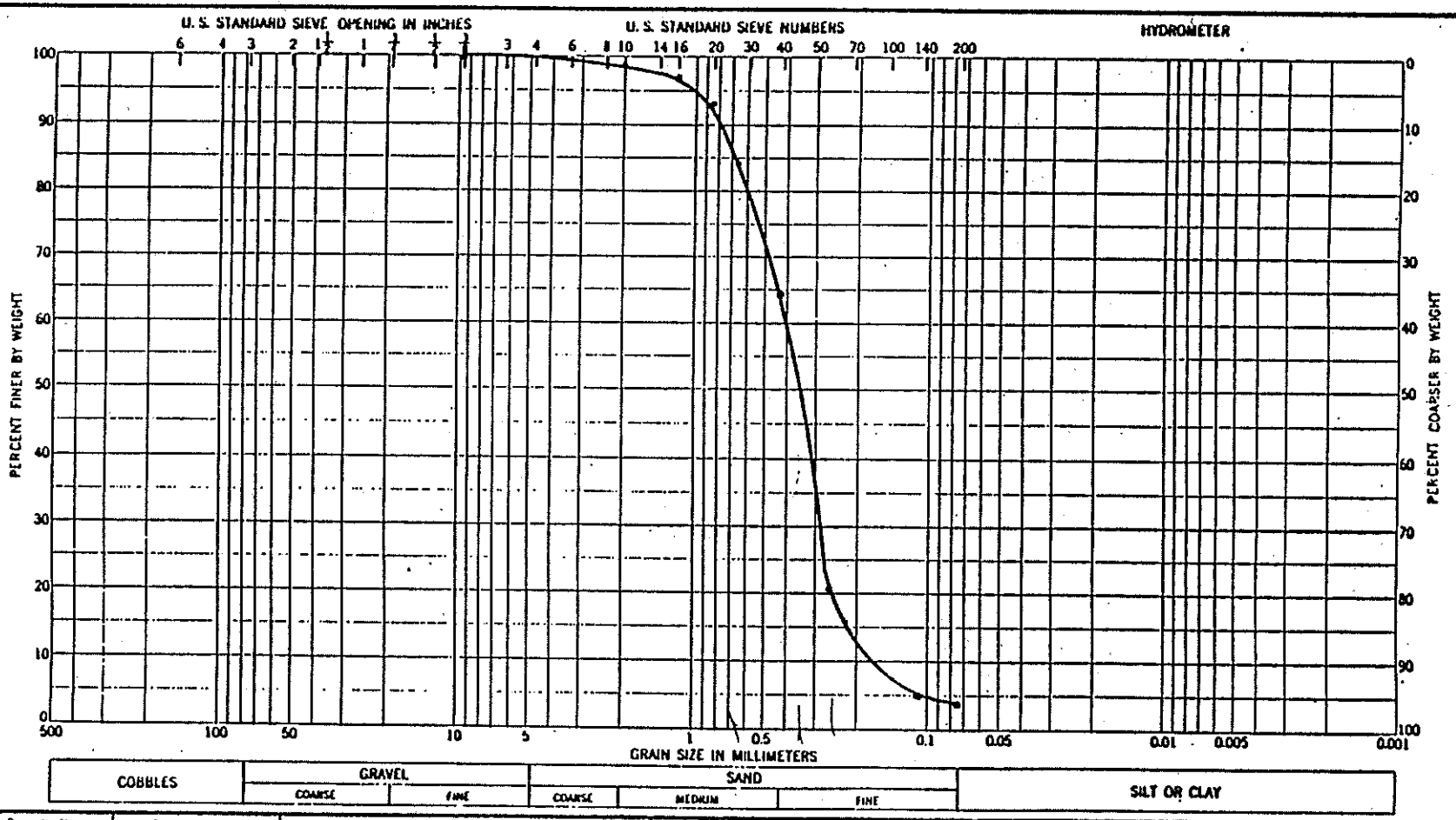
Boring No. DRU-19

Date 8/6/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat W %
LL
PL
PI
DRU-19
Poorly-Graded Sand
SP
Project Delaware River
Area
Boring No. DRU-19
Date 8/6/91
GRADATION CURVES
ENG FORM 1 MAY 83 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-20	1.1-5.0	Poorly-Graded Sand SP				

Project Delaware River Vibracores

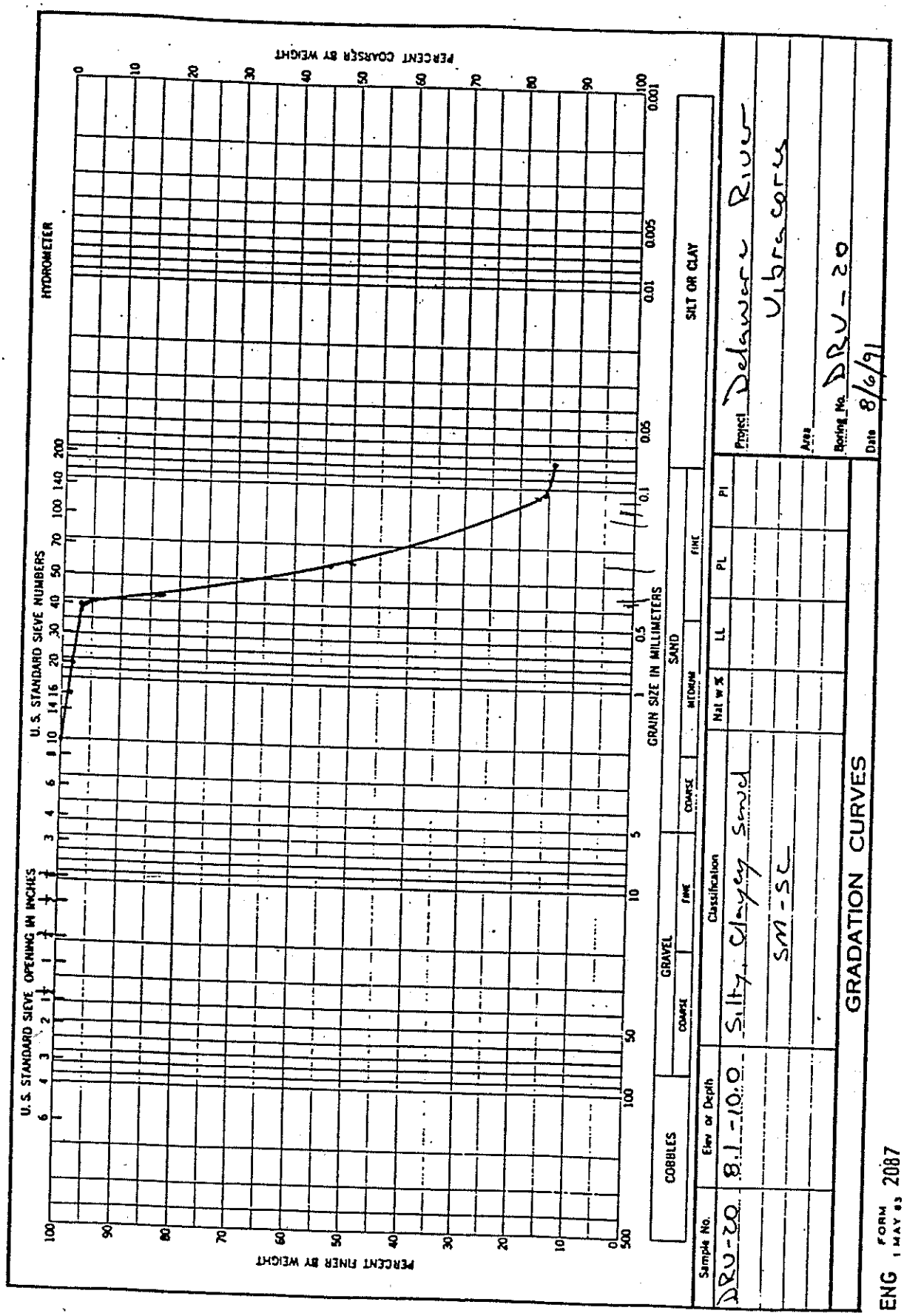
Area

Boring No. DRU-20

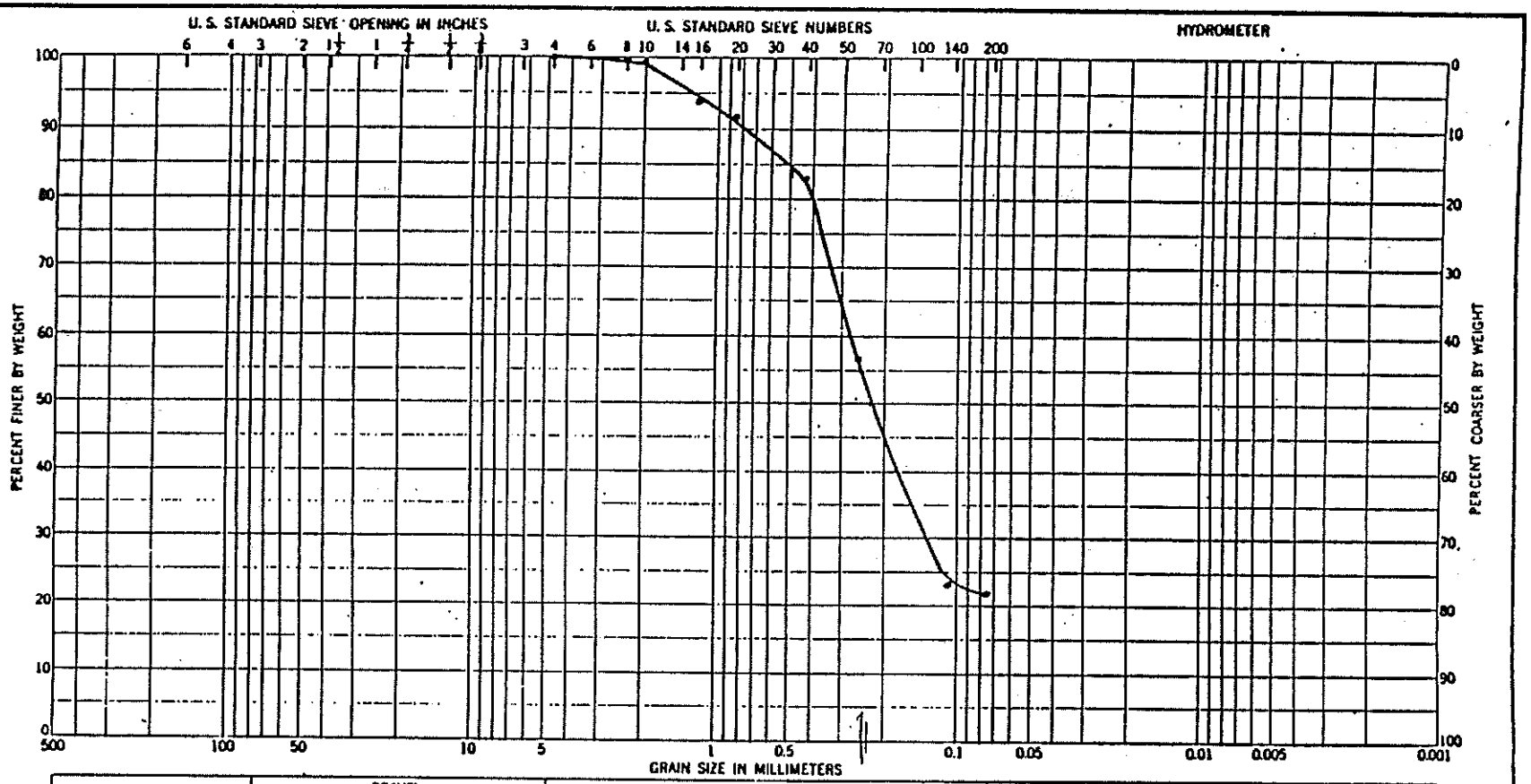
Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-20
8.1-10.0
Silty Clayey Sand
SM-SC
Project Delaware River
Area
Boring No. DRU-20
Date 8/6/91
GRADATION CURVES
ENG FORM 1 MAY 83 2087

255



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-20	13.4-15.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracorus

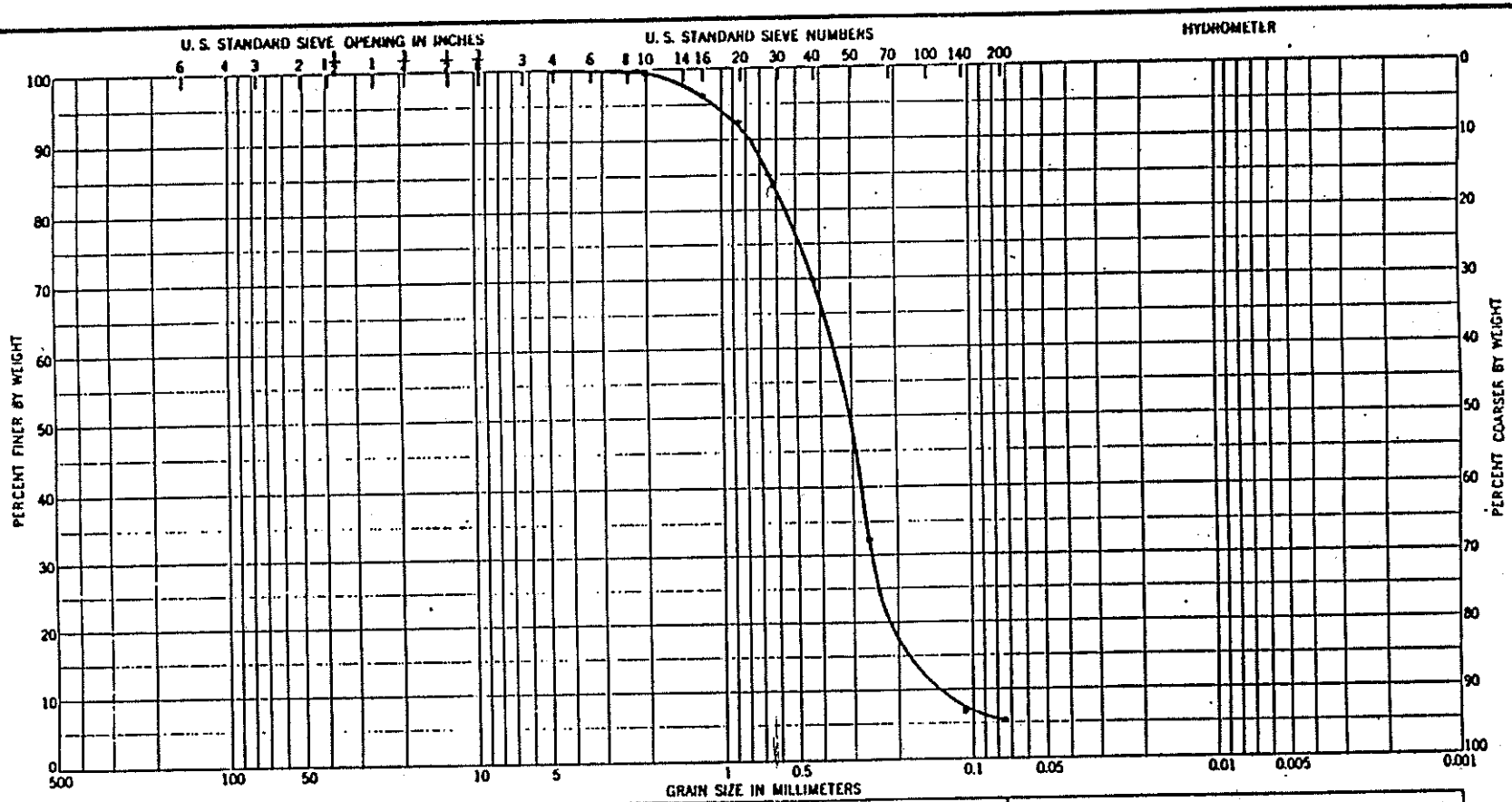
Area

Boring No. DRU-20

Date 8/5/91

GRADATION CURVES

ENG FORM 1 MAY 62 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-20	15.9-20.0	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

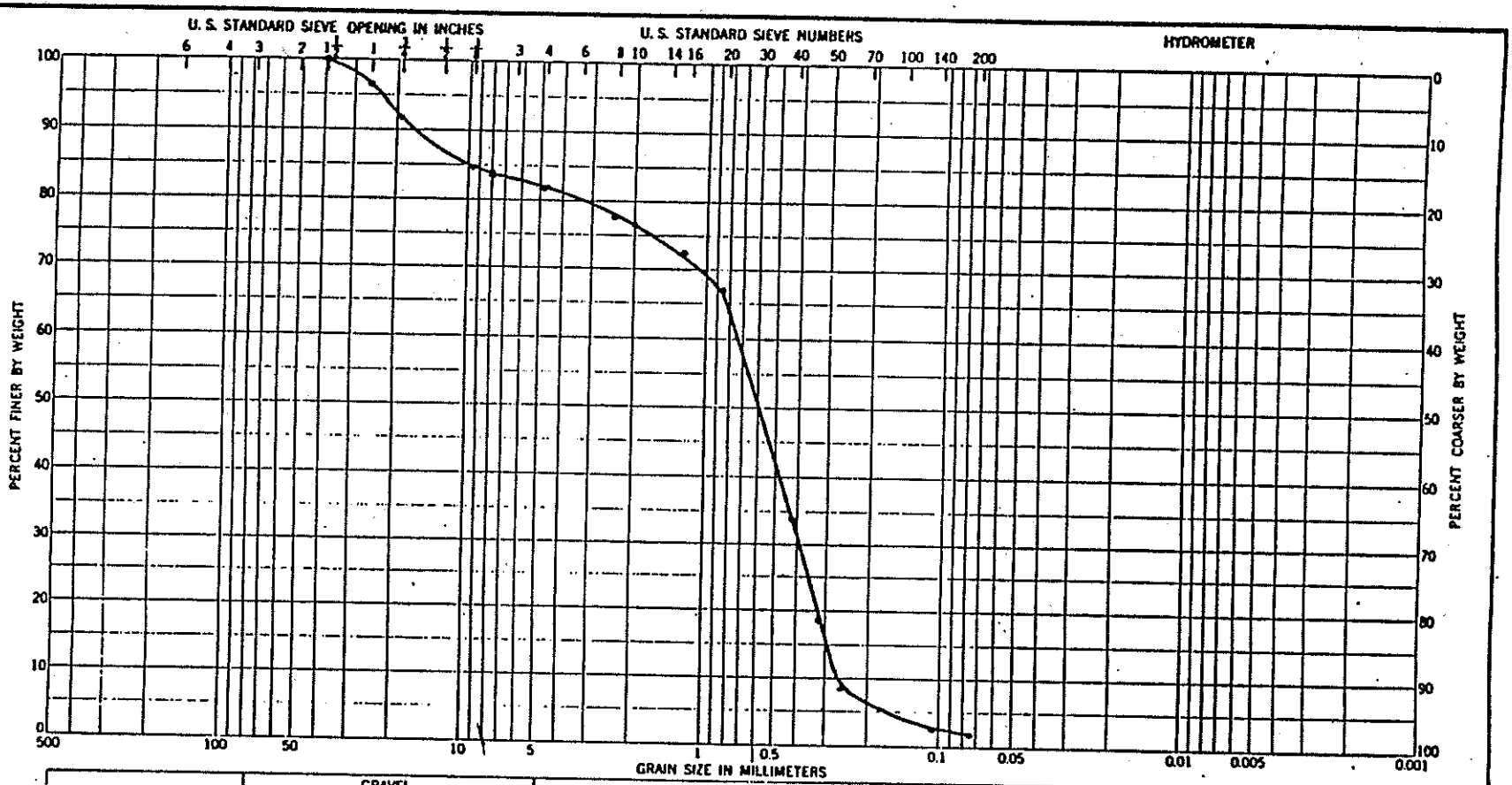
Area

Boring No. DRU-20

Date 7/21/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-21	0.0-5.0	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

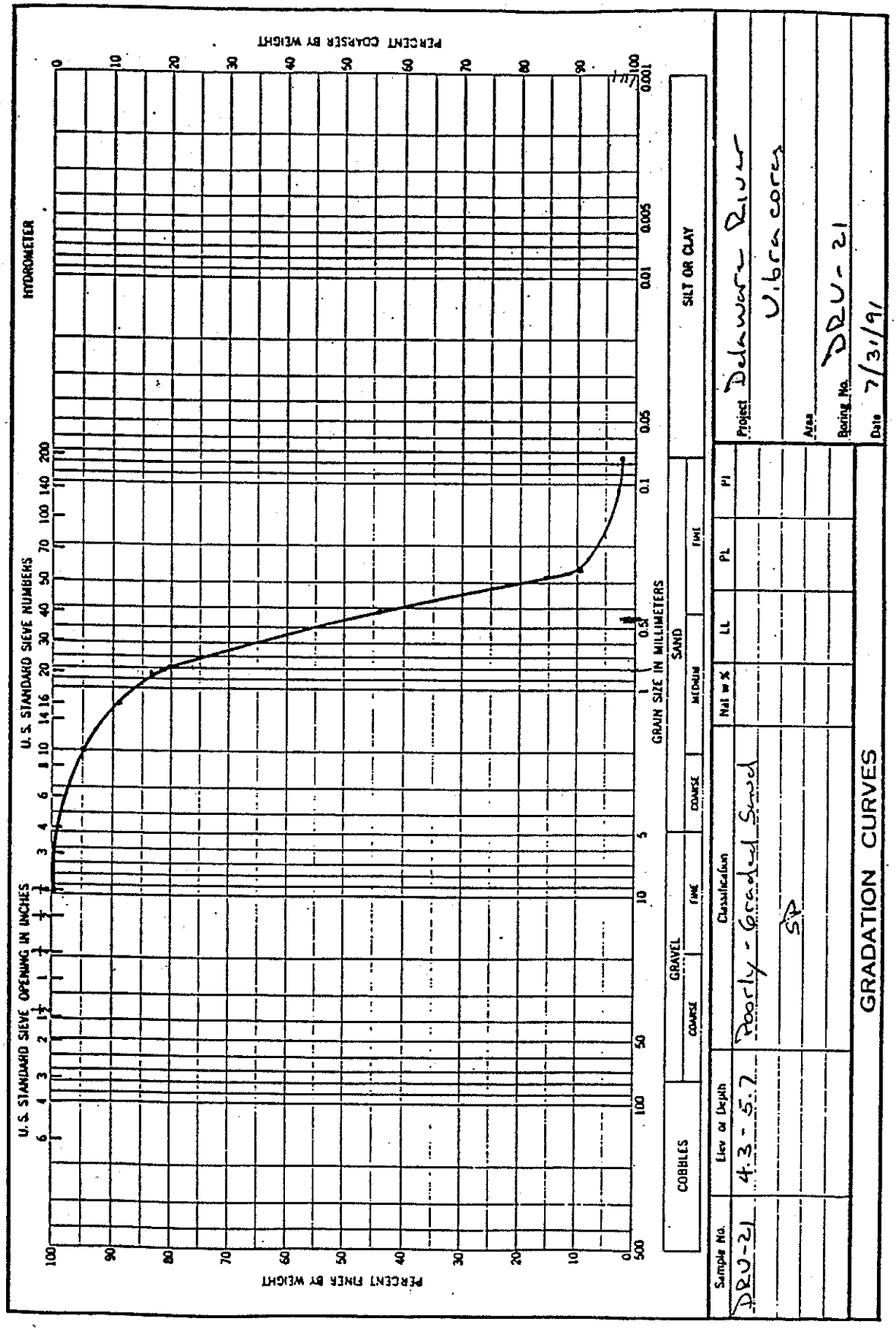
Area

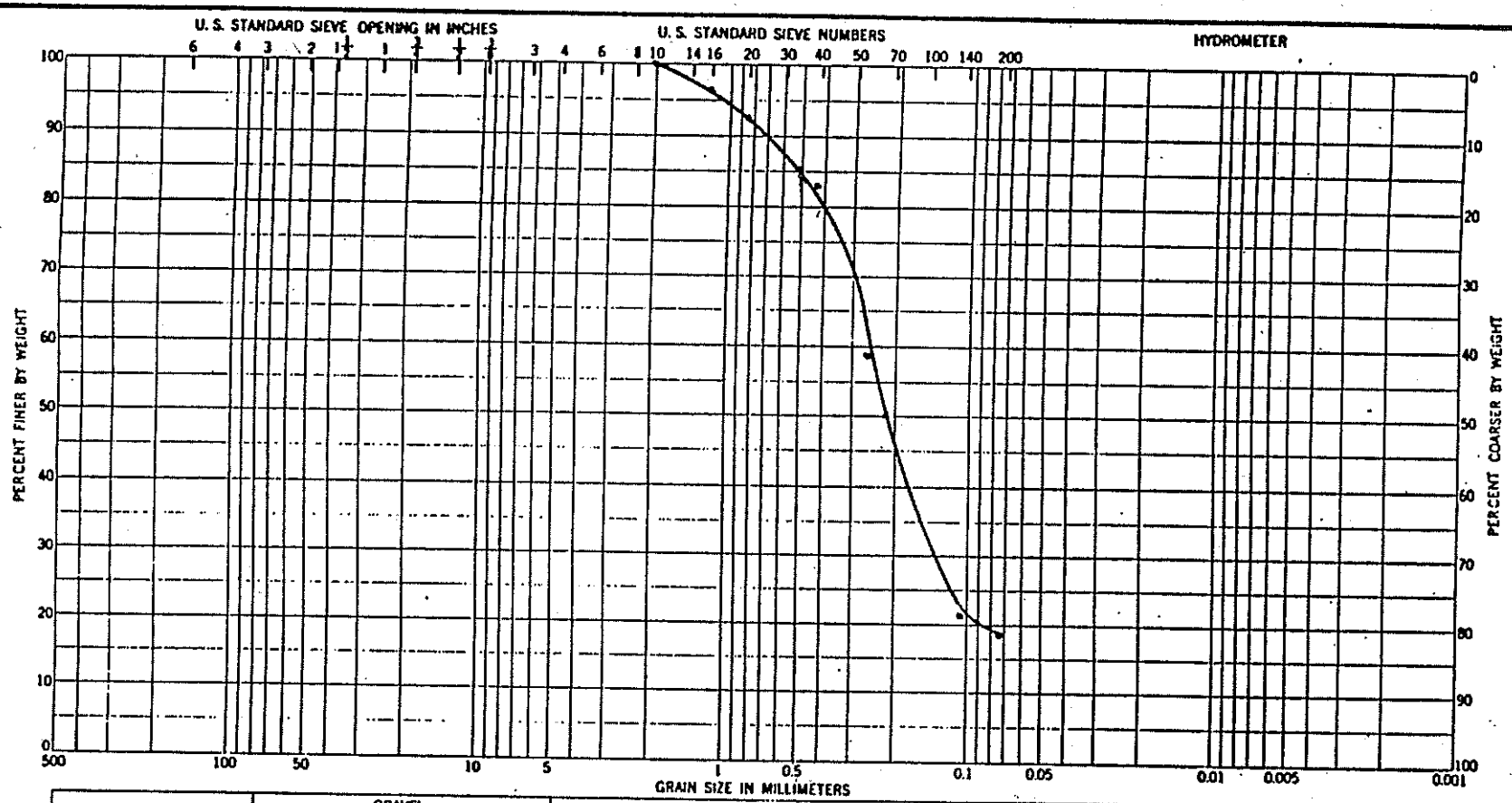
Boring No. DRU-21

Date 8/6/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area U.bra cores
Boring No. DRU-21
Date 7/31/91
Sample No. DRU-21
Elev or Depth 4.3 - 5.7
Classification Poorly - Graded Sand
SP
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-21	~~5.0-10.0~~ 5.7-10.0	Silty Clayey Sand SM-SC				

Project Delaware River Vibracores

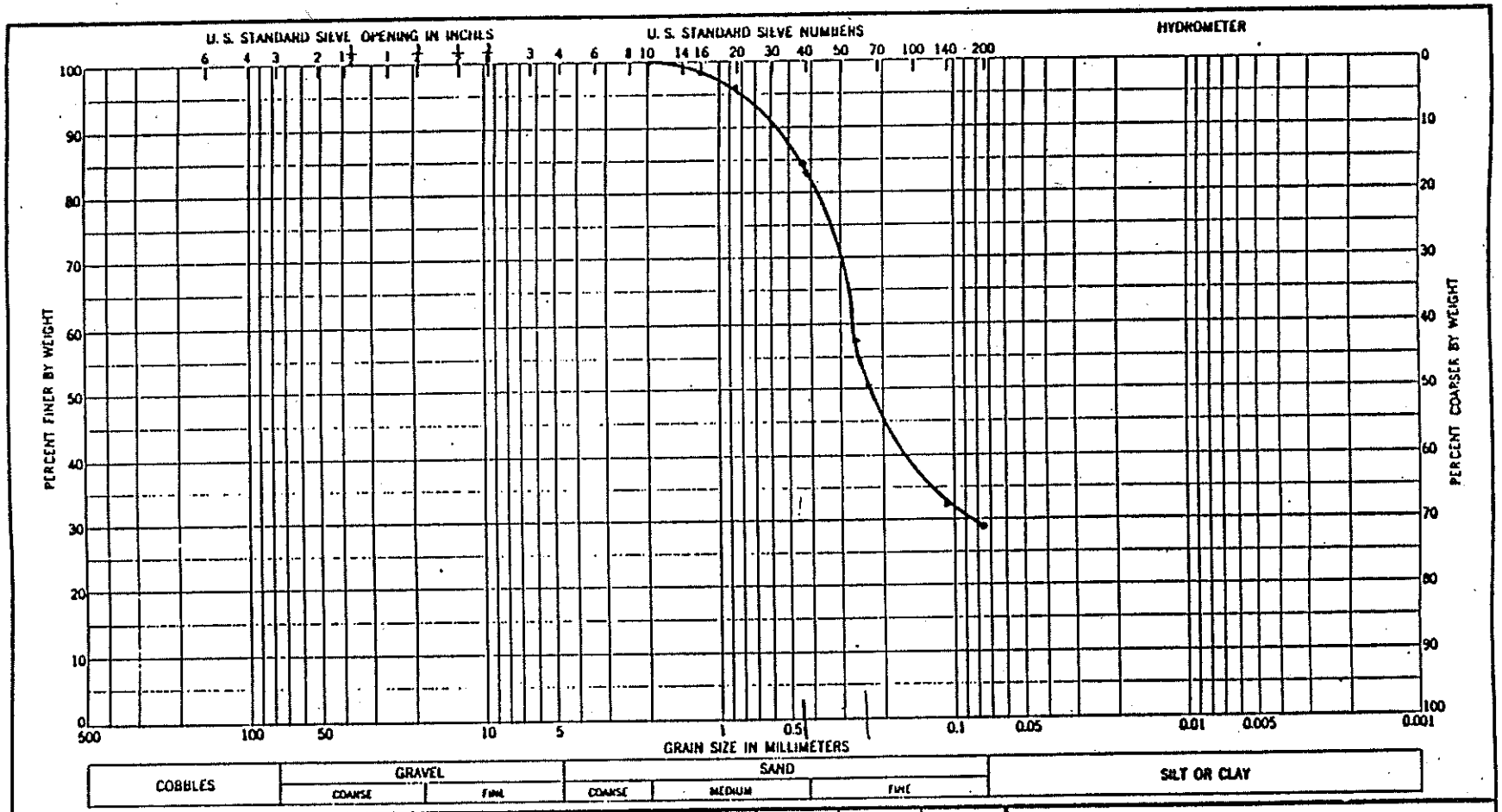
Area

Boring No. DRU-21

Date 8/5/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-21	10.0-14.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

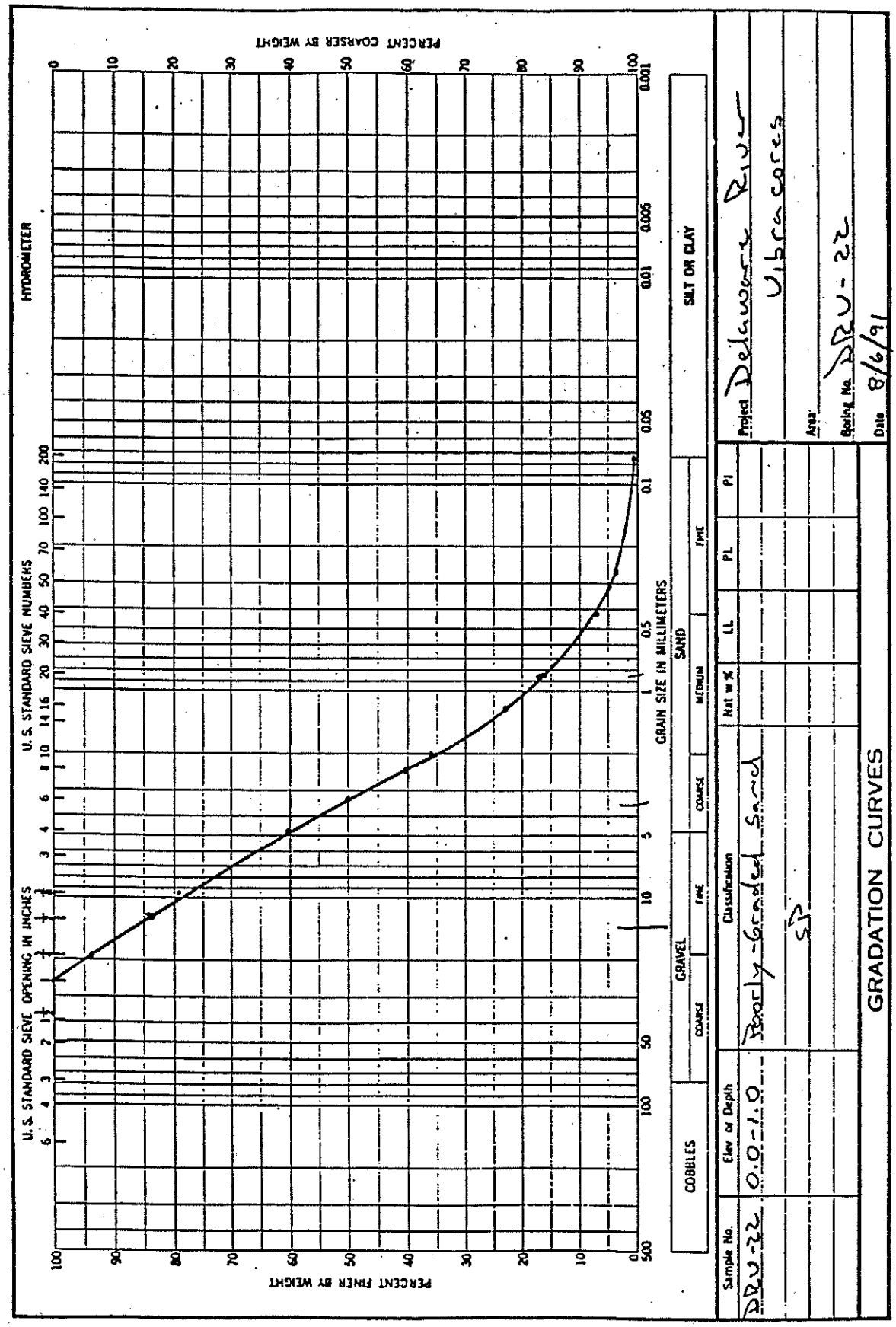
Area

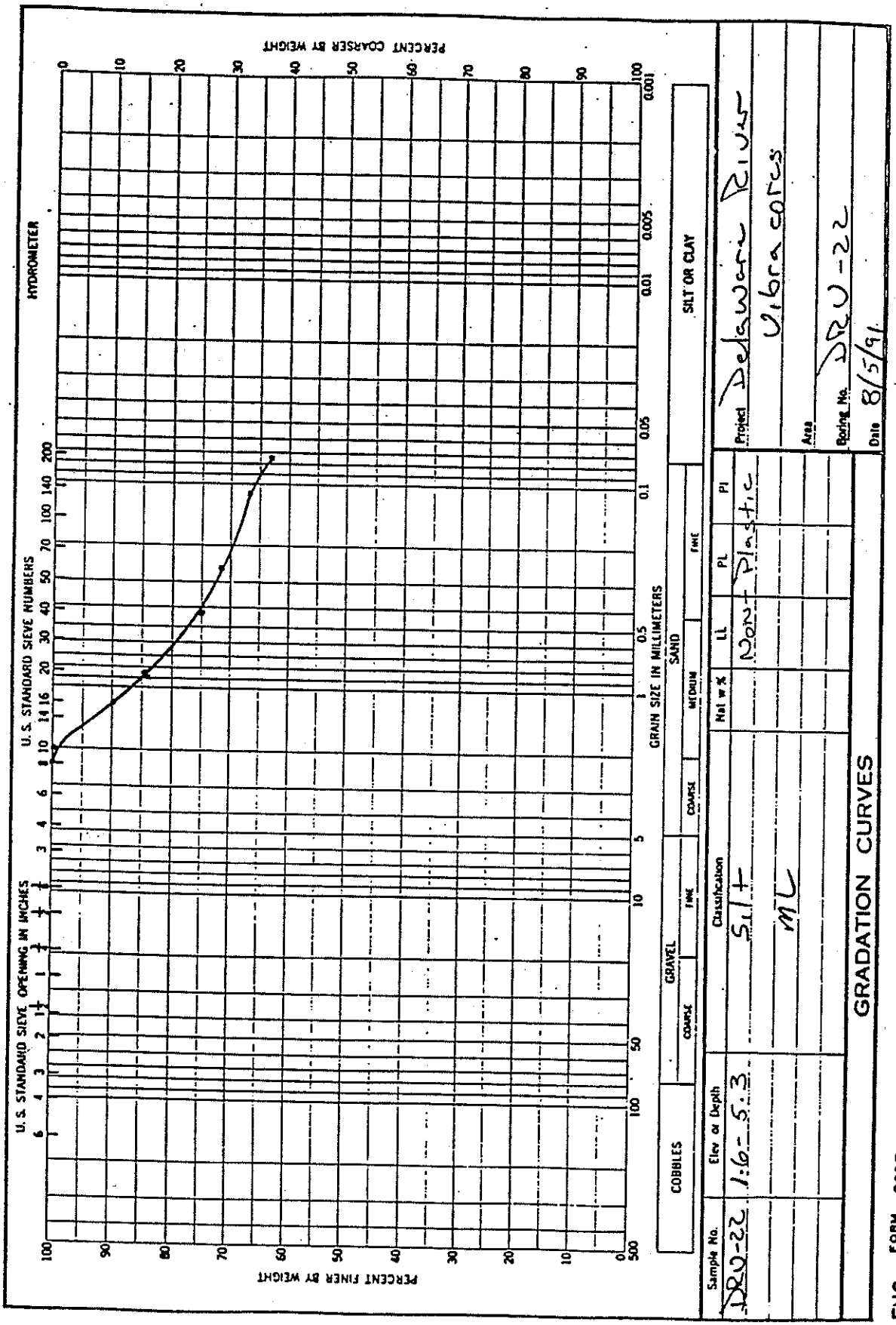
Boring No. DRU-21

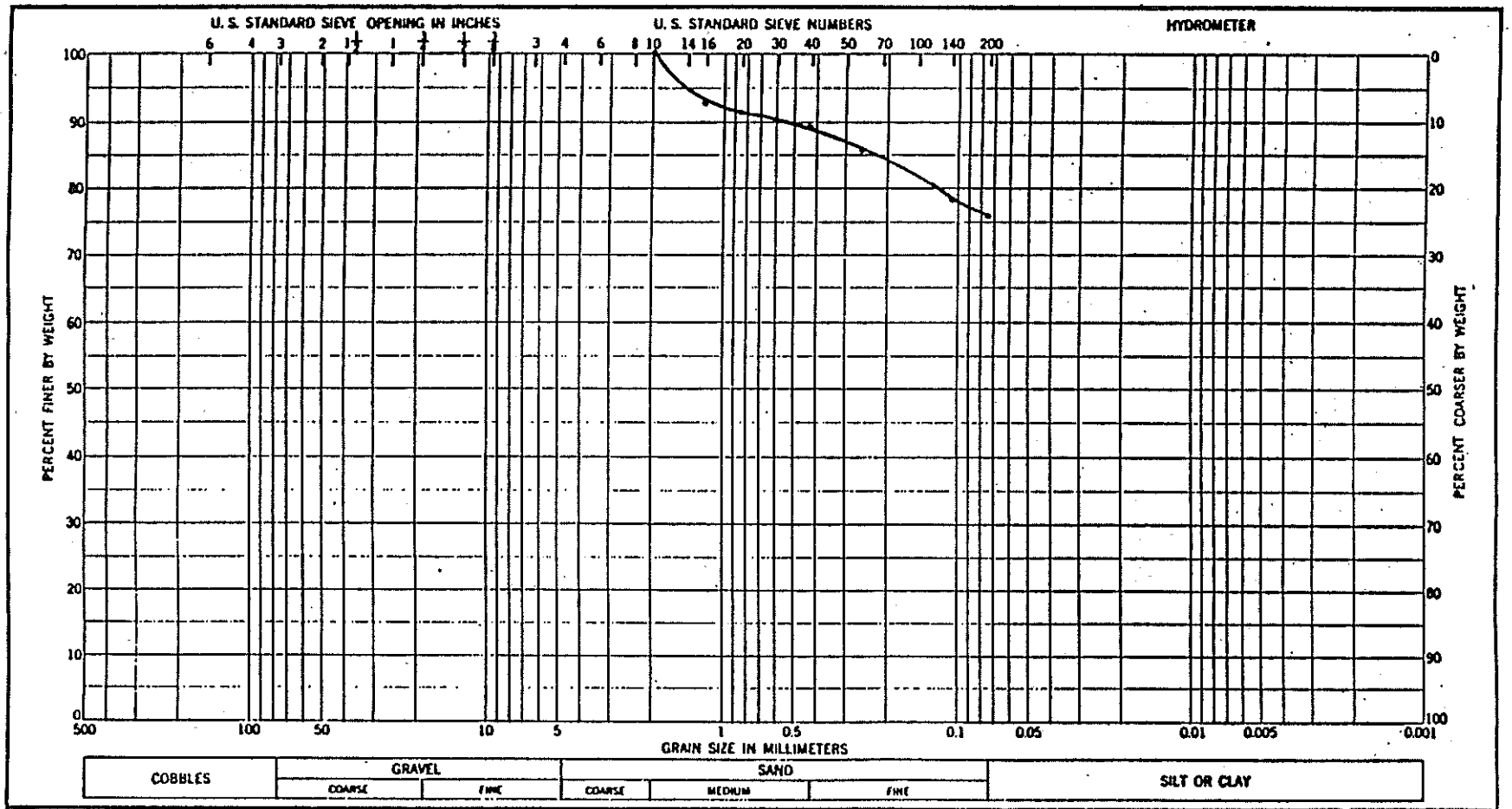
Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. PRU-22
Date 8/6/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
PRU-22
0.0-1.0
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 83 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRV-22
Date 8/5/91
Sample No. DRV-22
Elev or Depth 1.6-5.3
Classification Silt
ML
Nat w % LL PL PI
Non-Plastic
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-22	7.0-9.2	Clay		50.8	23.7	27.1
		CH				

Project Delaware River Vibracores

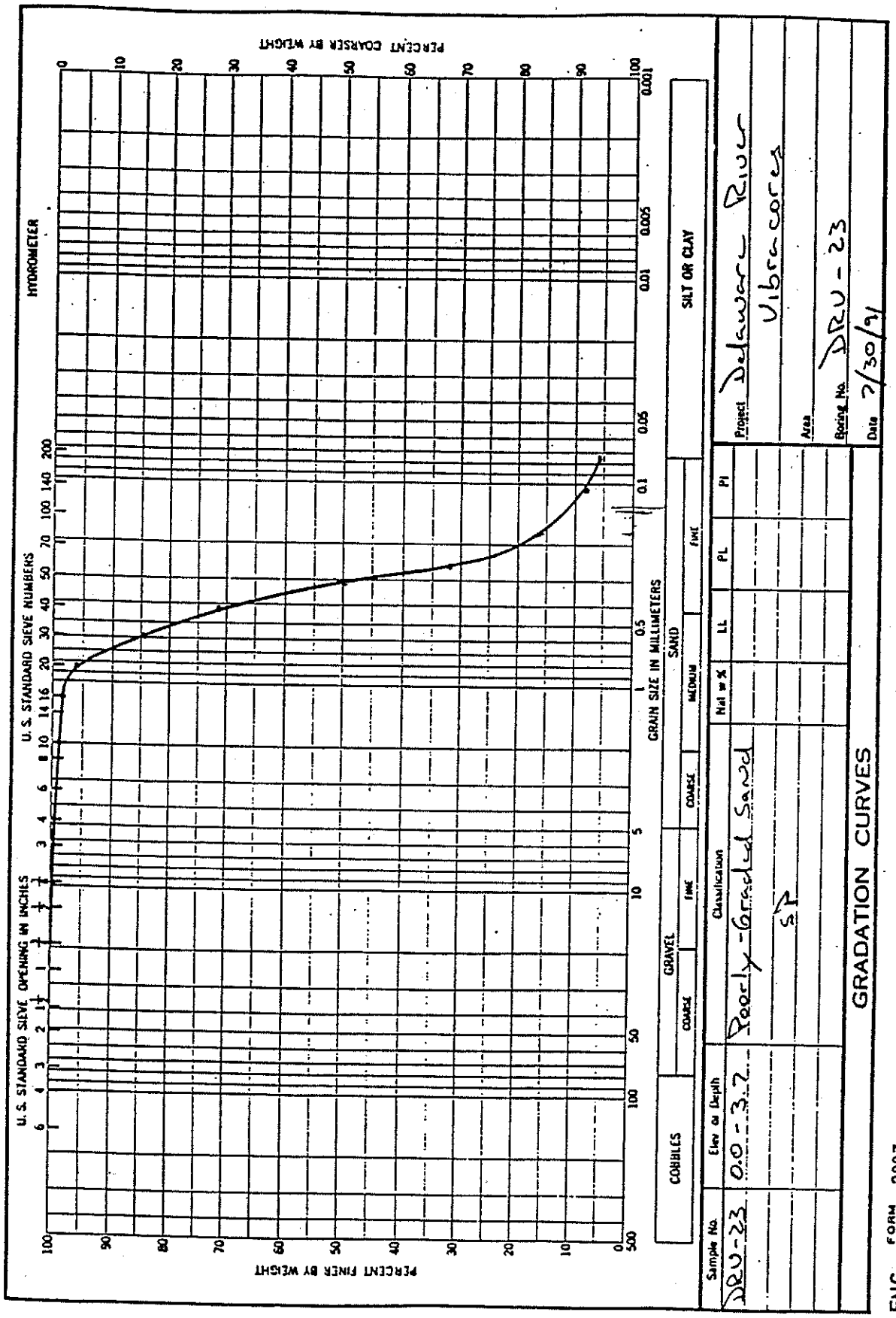
Area

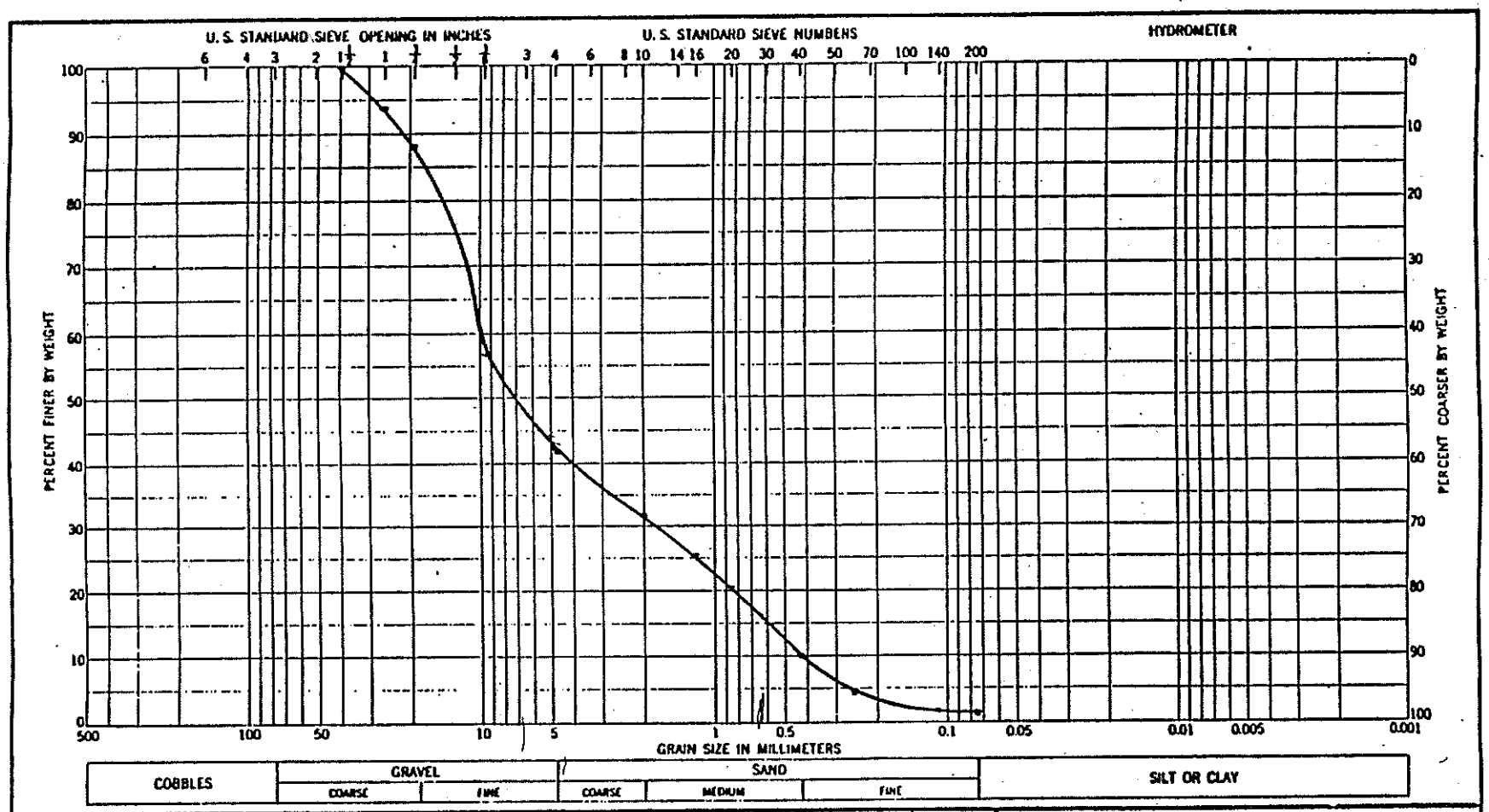
Boring No. DRU-22

Date 8/5/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracore
Area
Boring No. DRU-23
Date 7/30/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-23
0.0 - 3.2
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-23	3.7-5.0	Poorly Graded Gravel				
		GP				

Project Delaware River Vibracores

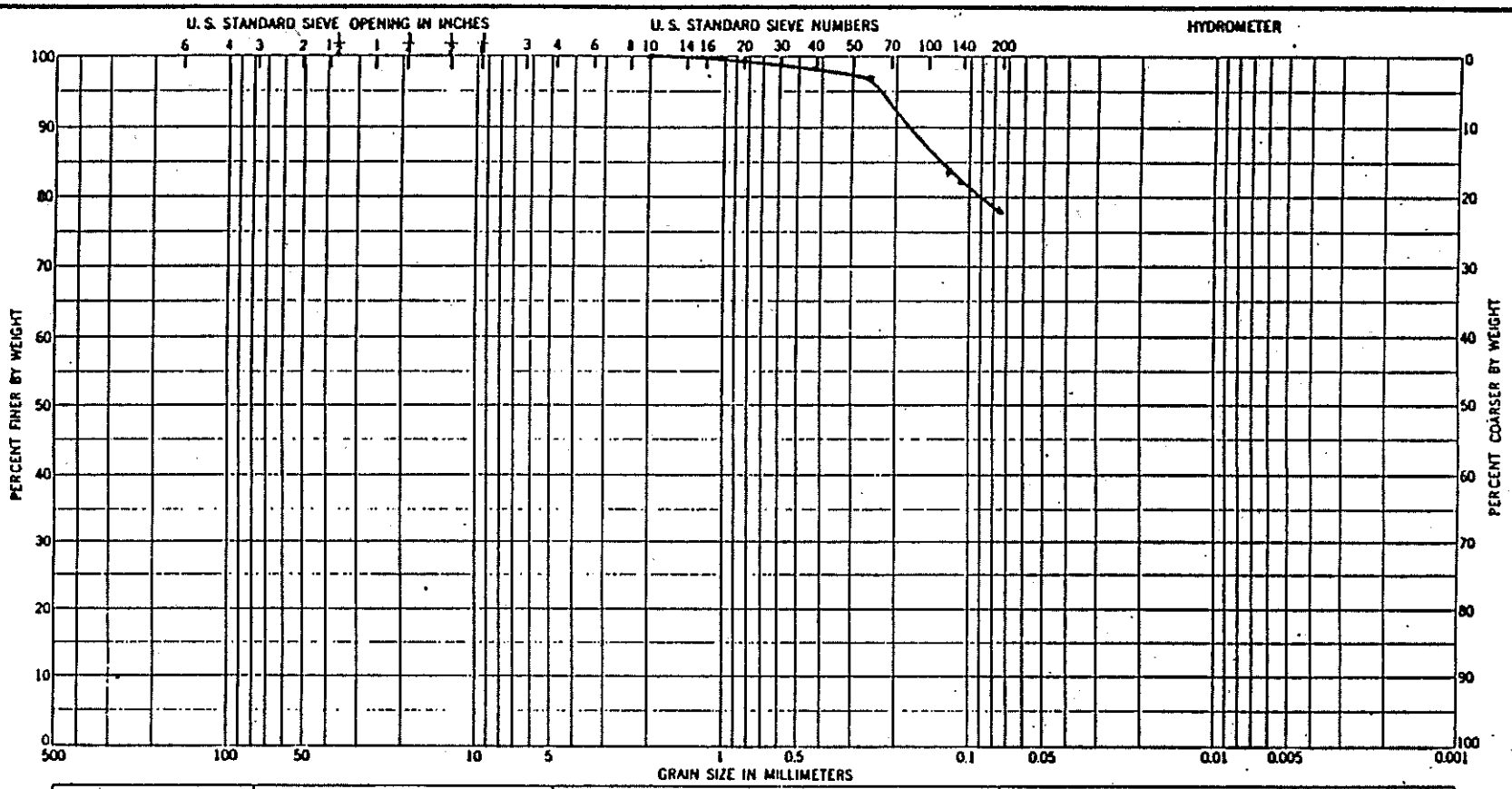
Area

Boring No. DRU-23

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-23	8.3-9.2	Clay		32.3	20.65	11.65
		CL				

Project Delaware River Vibracores

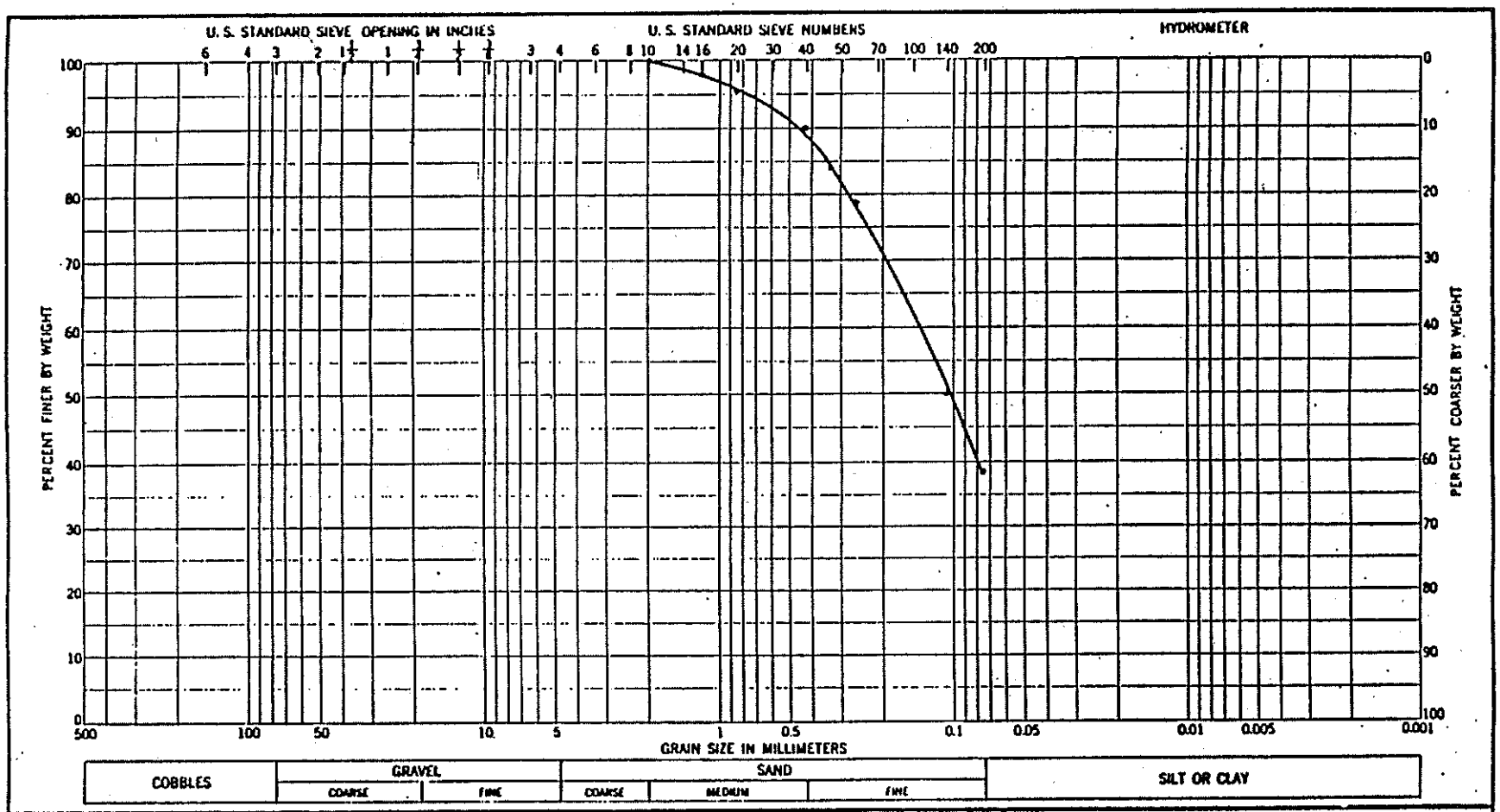
Area

Boring No. DRU-23

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-23	9.2-13.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

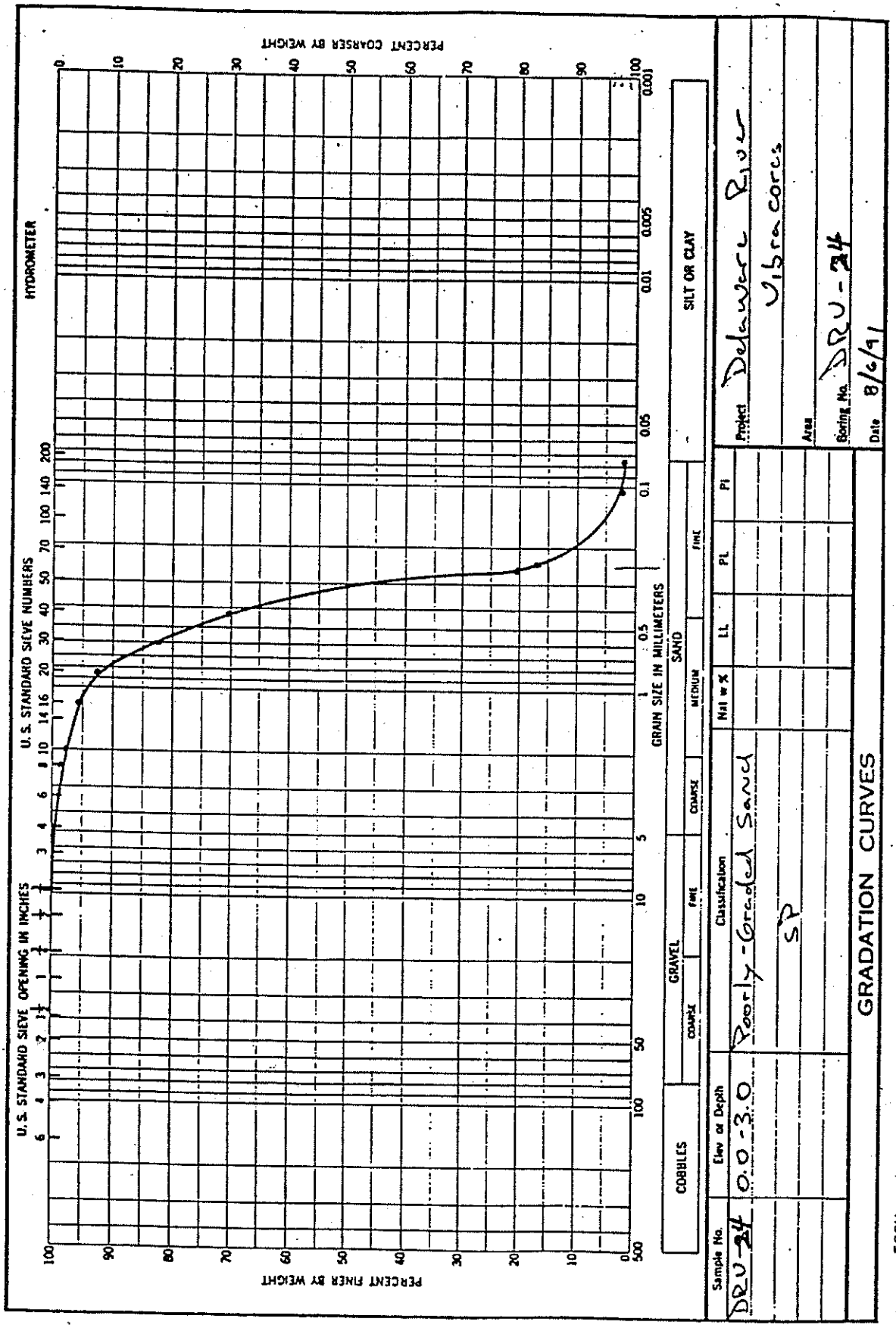
Area

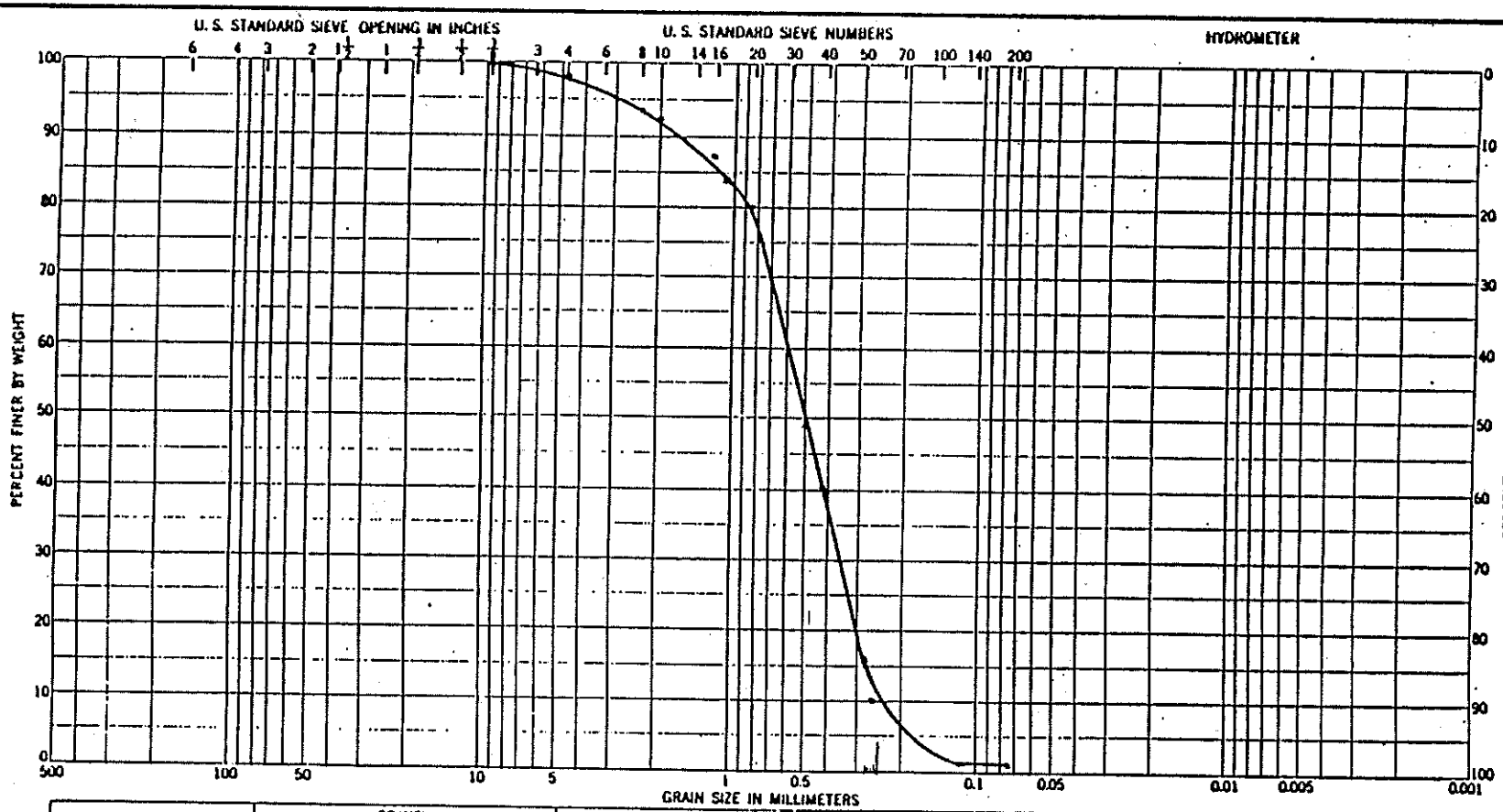
Boring No. DRU-23

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-24
0.0-3.0
Poorly-Graded Sand
SP
Project
Delaware River
Vibracores
Area
Boring No.
DRU-24
Date
8/6/91
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-24	5.0-10.0	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

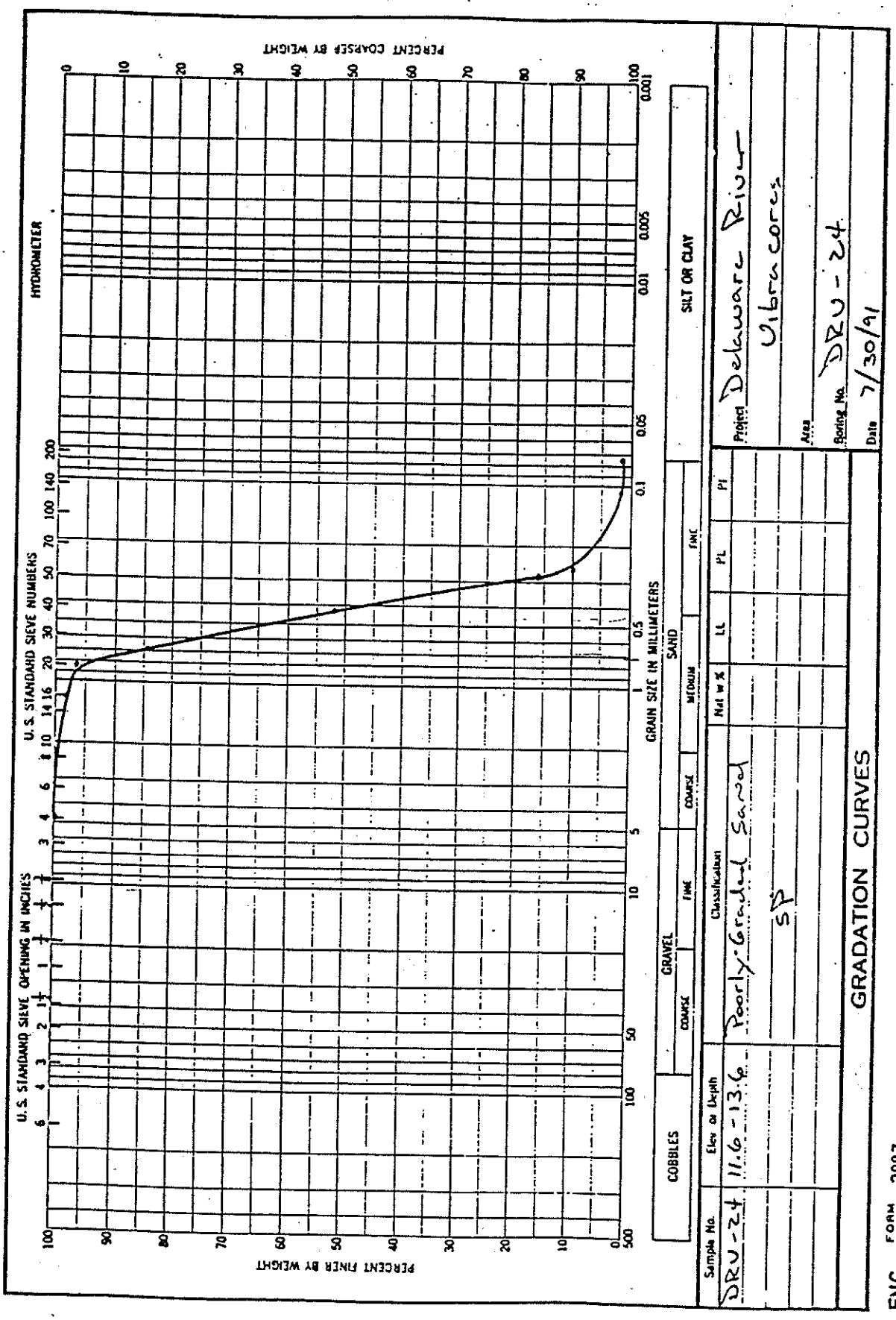
Area

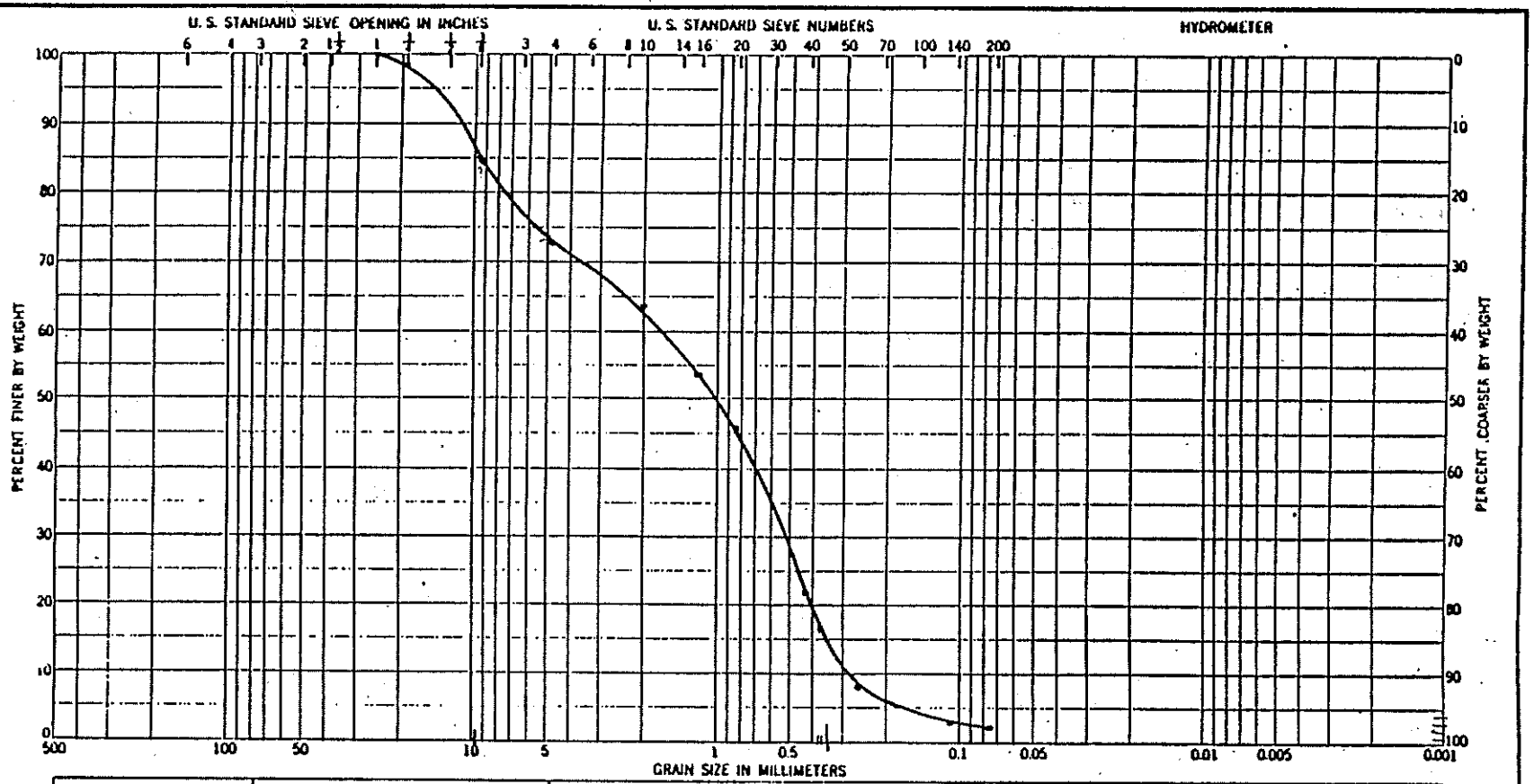
Boring No. DRU-24

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Vibracores
Boring No. DRV-24
Date 7/30/91
Sample No. DRV-24
Elev or Depth 11.6-13.6
Classification Poorly-Graded Sand
SP
Nat W %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRV-24	13.6-15.6	Poorly-Graded Sand SP				

Project Delaware River Vibracore

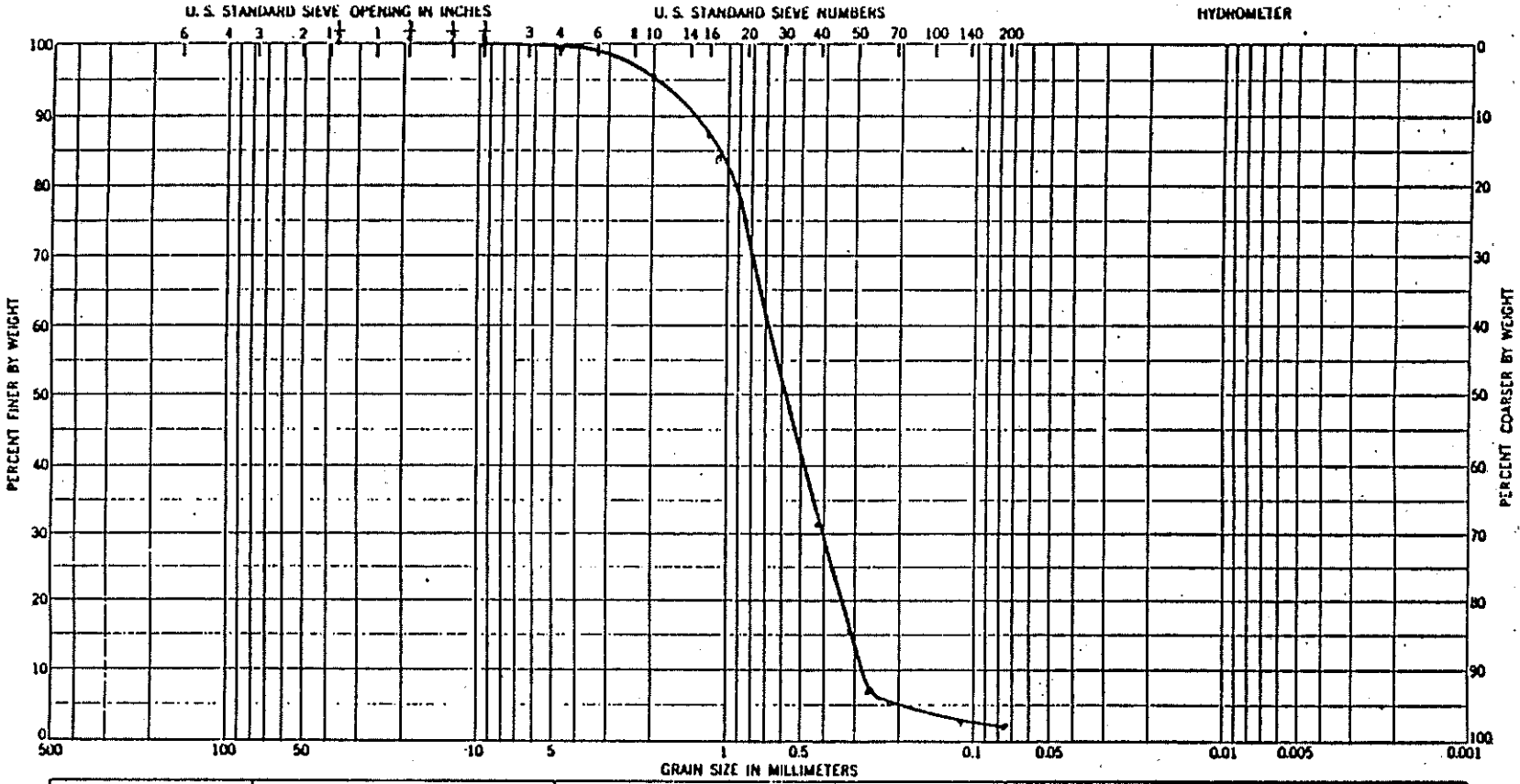
Area

Boring No. DRV - 24

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-25	0.0-5.0	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

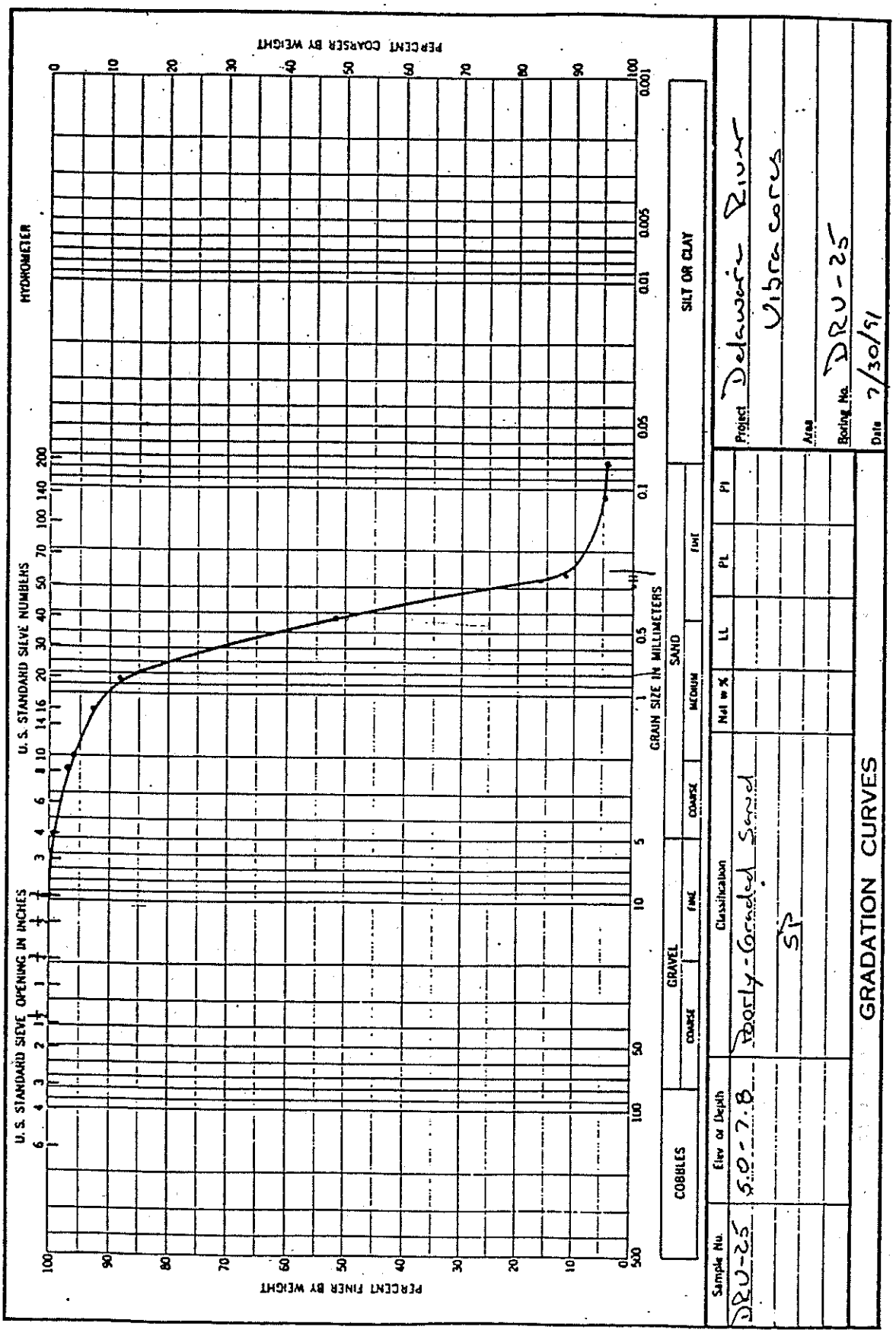
Area

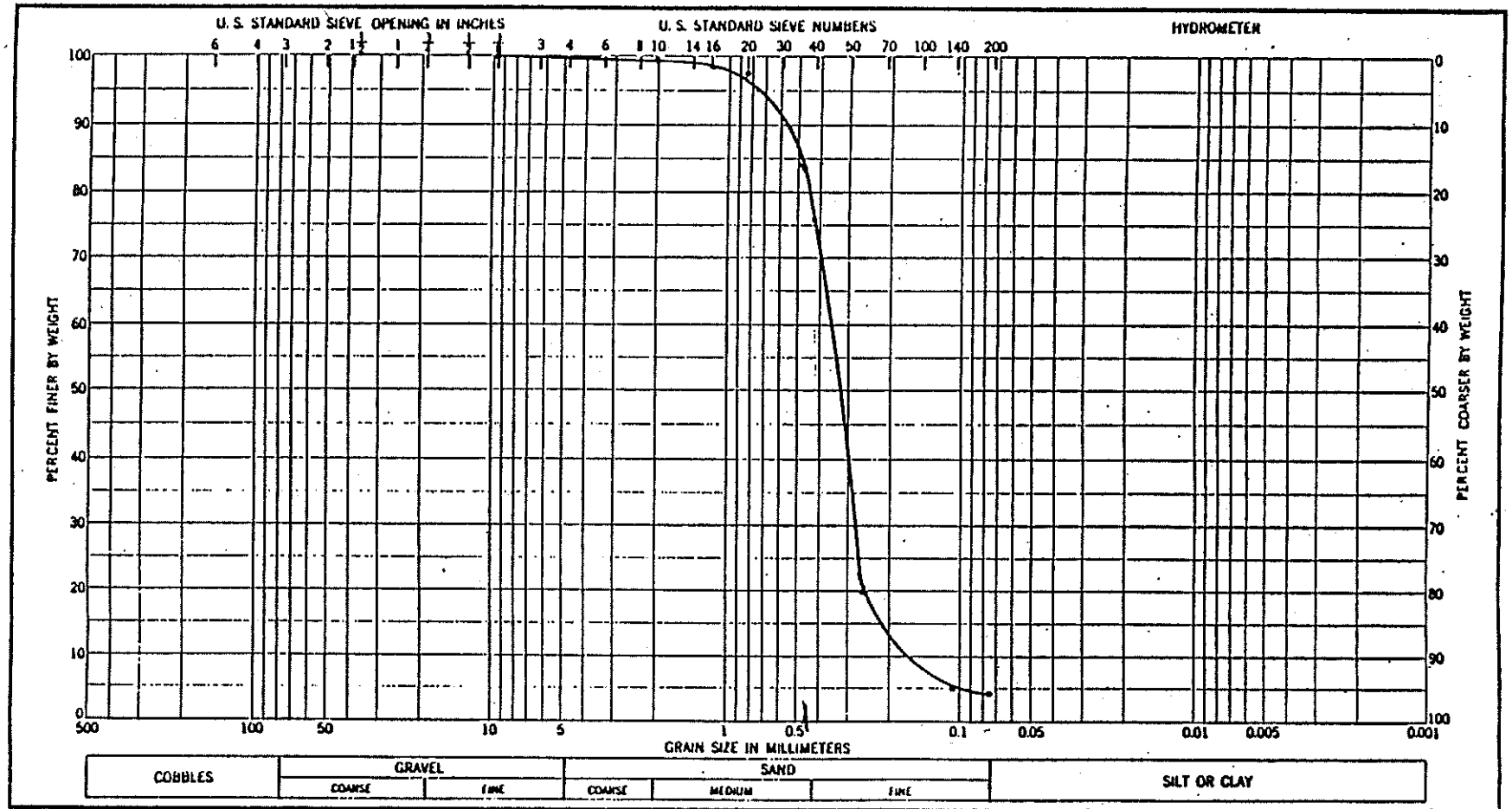
Boring No. DRU-25

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracore
Area
Boring No. DRU-25
Date 7/30/91
Sample No. DRU-25
Elev or Depth 50-7.8
Classification Poorly-Graded Sand
SP
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 83 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-25	7.8-10.0	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

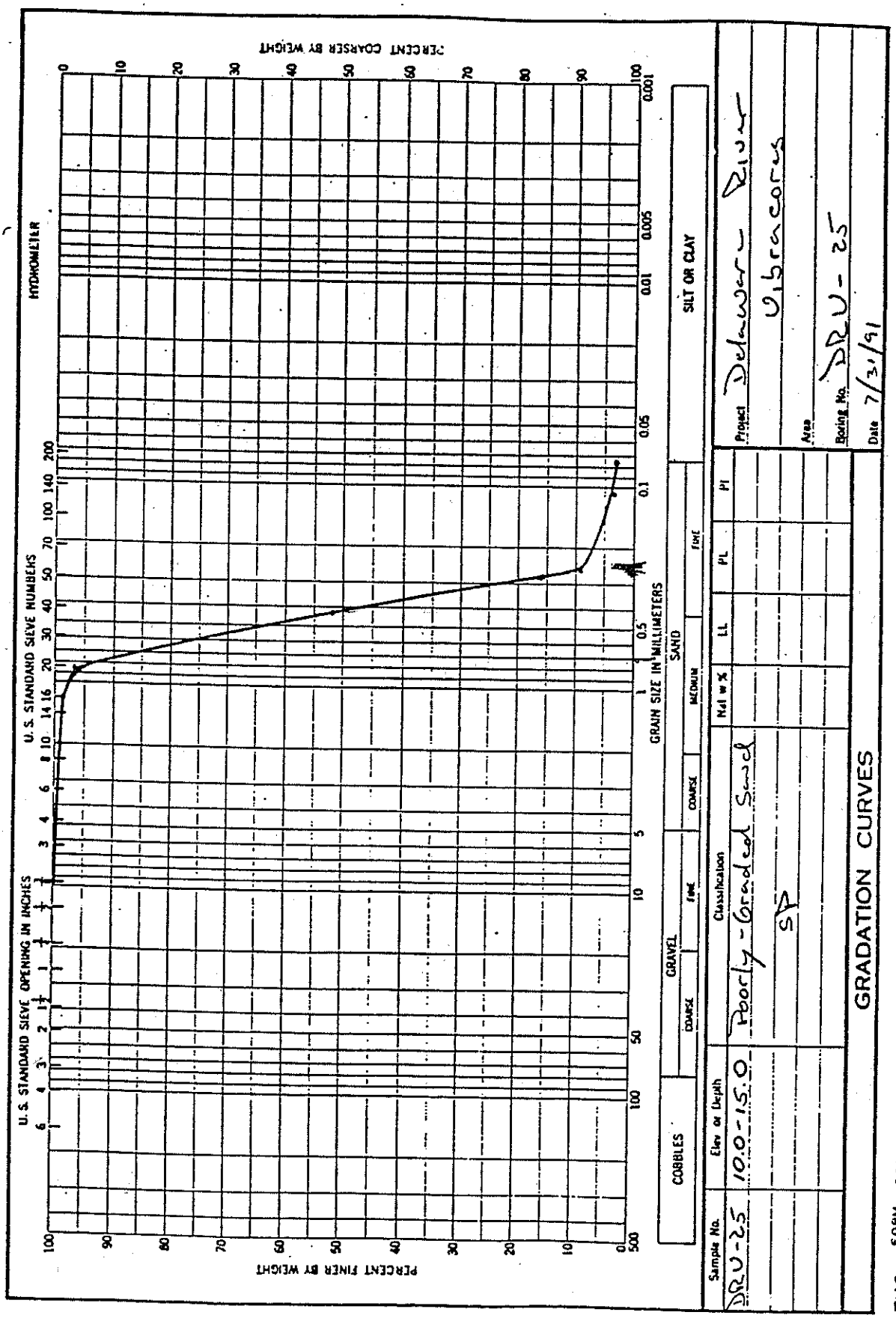
Area

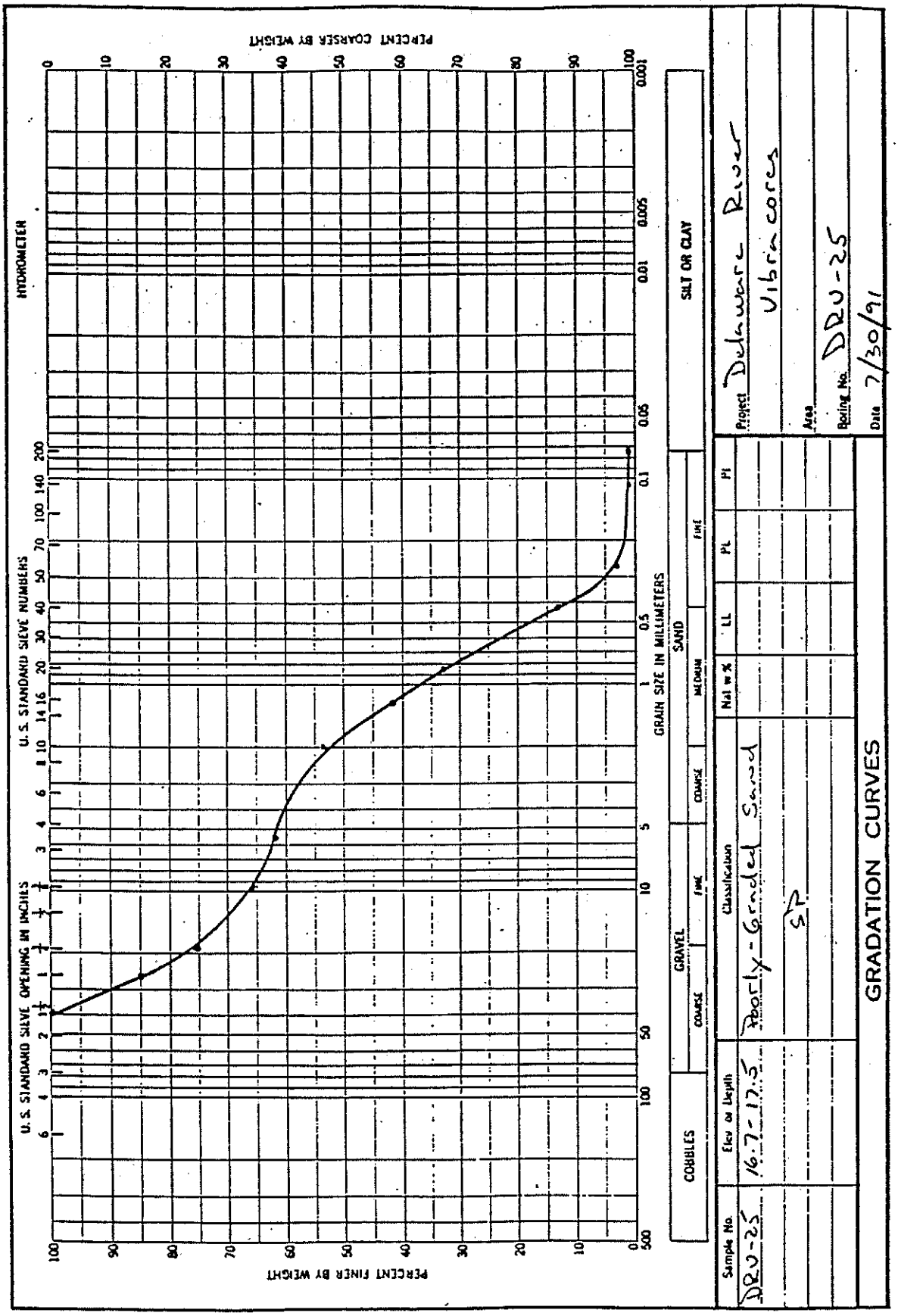
Boring No. DRU-25

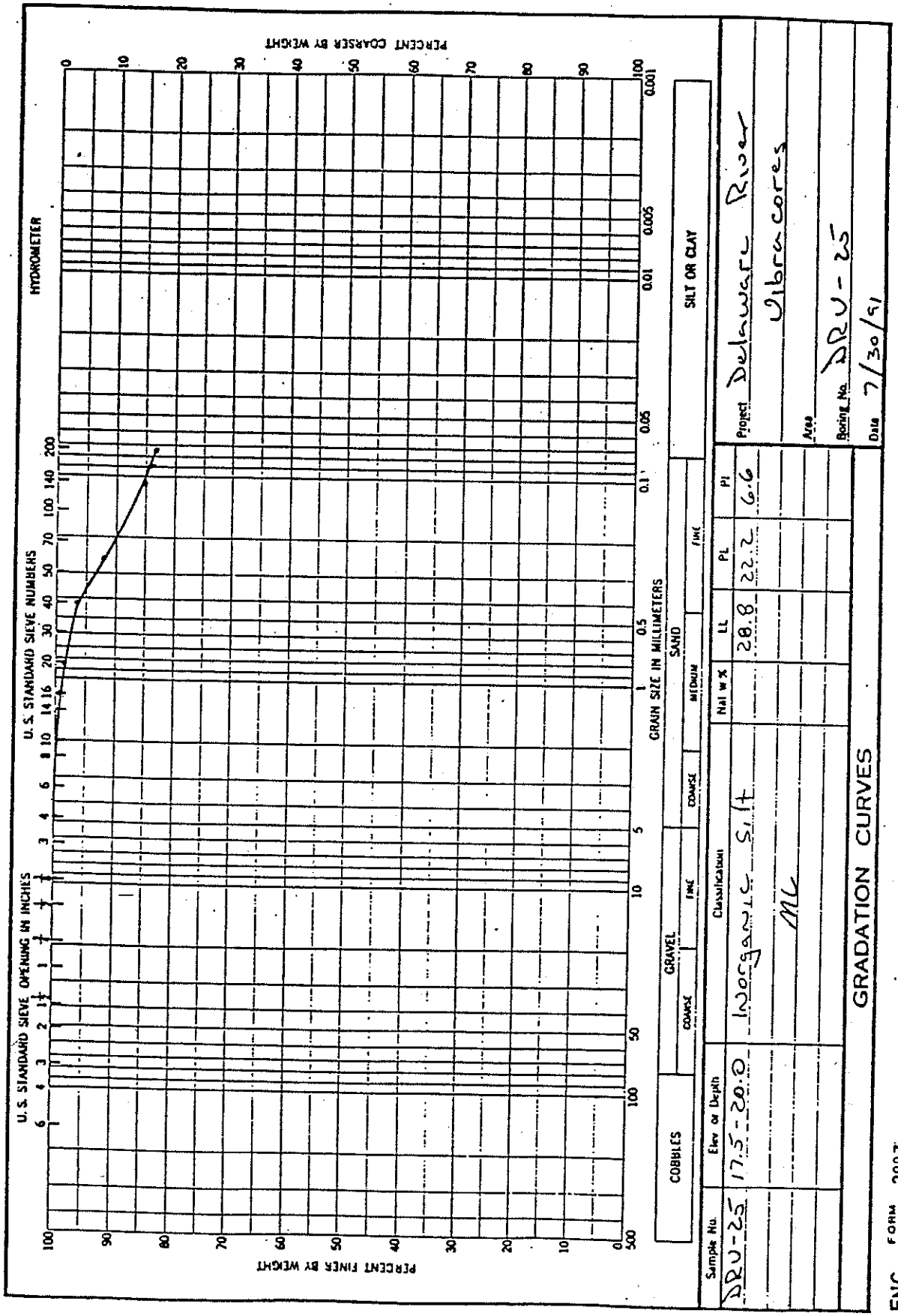
Date 7/30/91

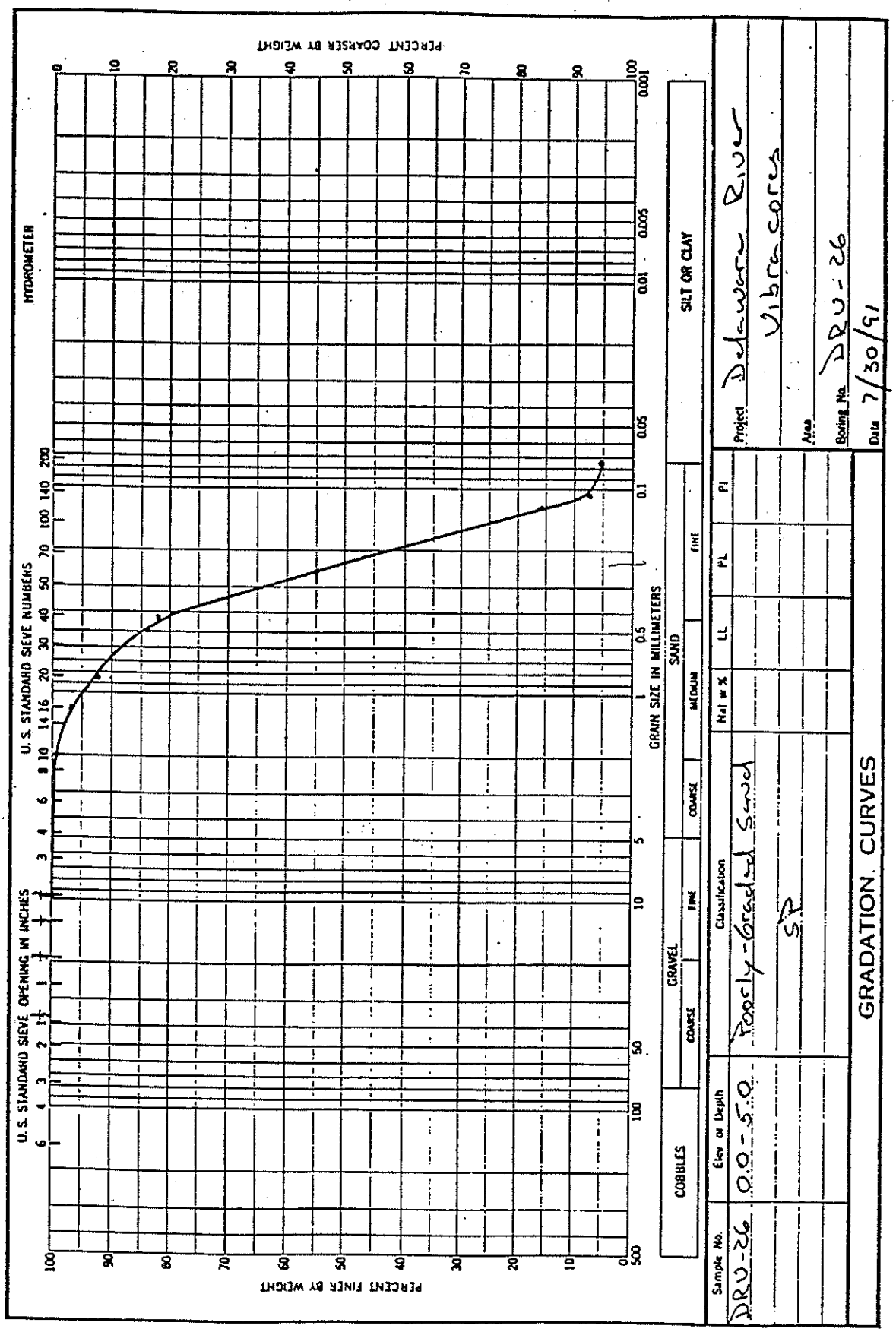
GRADATION CURVES

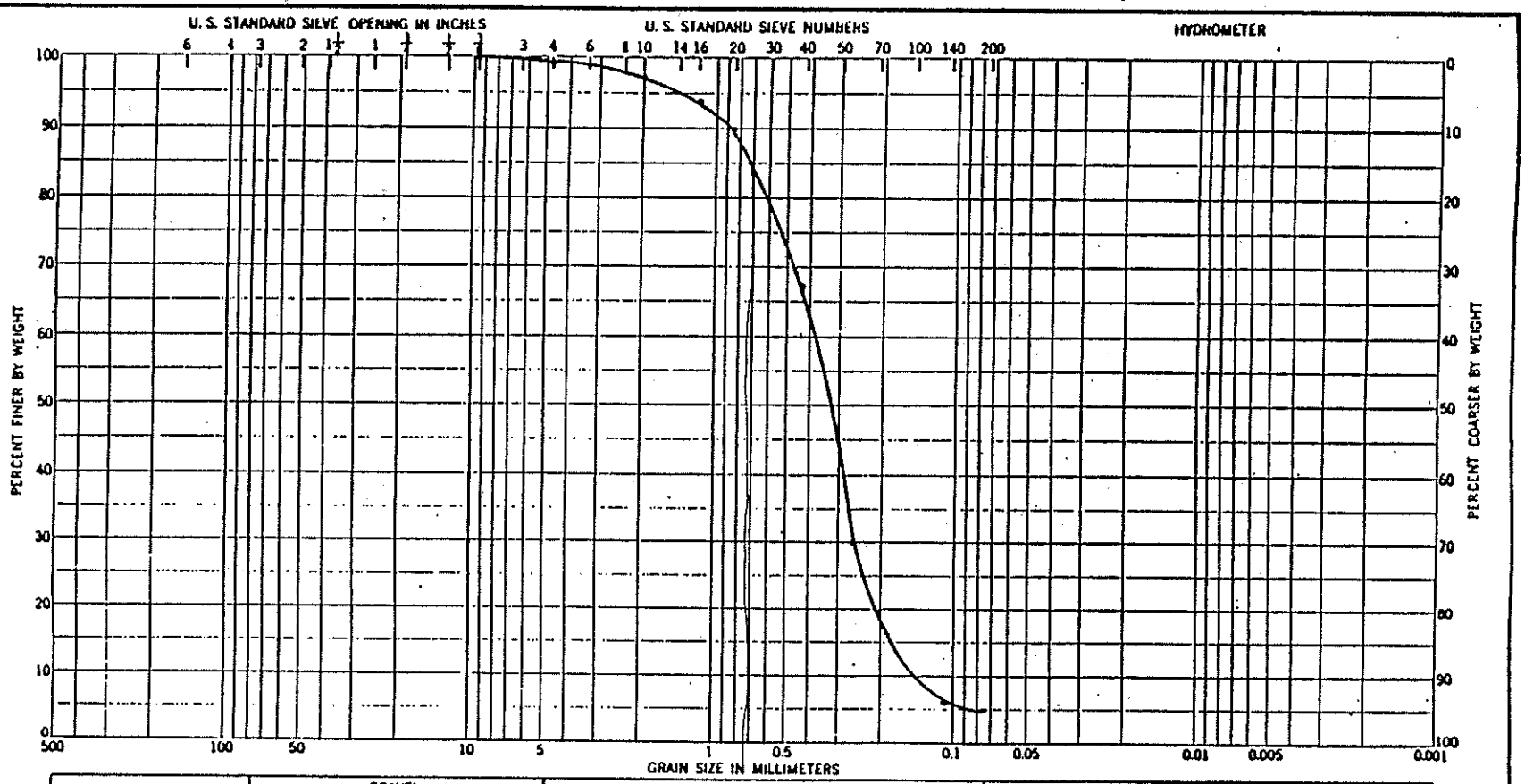
ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-25
10.0-15.0
Poorly-Graded Sand
SP
Project Delaware River
Area Ubracorus
Boring No. DRU-25
Date 7/31/91
GRADATION CURVES
ENG FORM 1 MAY 83 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRU-25
Date 7/30/91
Sample No. DRU-25
Elev or Depth 16.7-17.5
Classification Poorly-Graded Sand
SP
Nat w %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 83 2087


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat W %
LL
PL
PI
DRU-25
17.5-20.0
Inorganic Silt
ML
28.8
22.2
6.6
Project Delaware River
Area Vibracores
Boring No. DRU-25
Date 7/30/91
GRADATION CURVES
ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-26
0.0-5.0
Poorly-Graded Sand
SP
Project Delaware River
Vibracores
Area
Boring No. DRU-26
Date 7/30/91
GRADATION CURVES
ENG FORM 1 MAY 83 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-26	8.3 - 10.0	Poorly - Graded Sand				
		SP				

Project Delaware River Vibracores

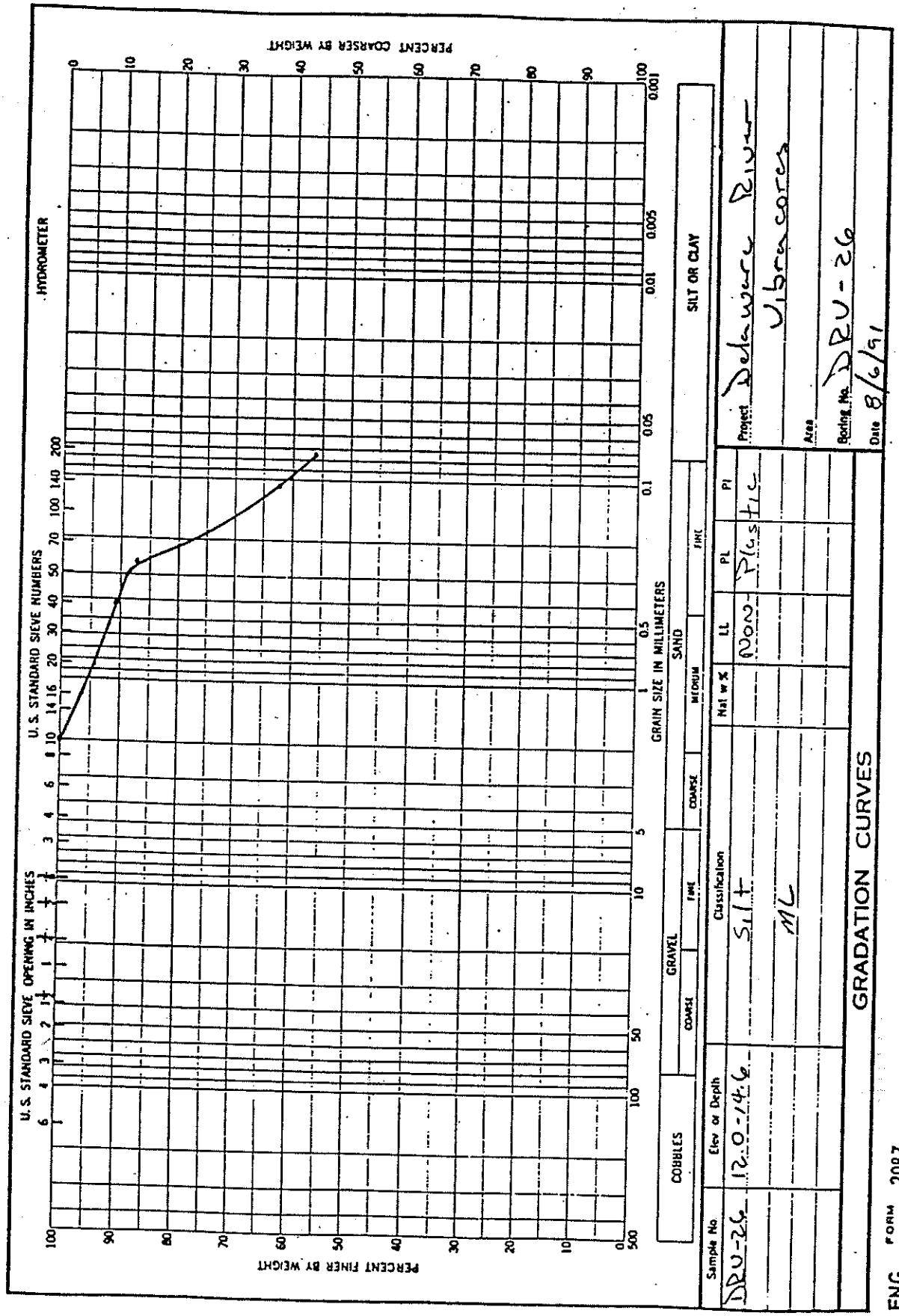
Area

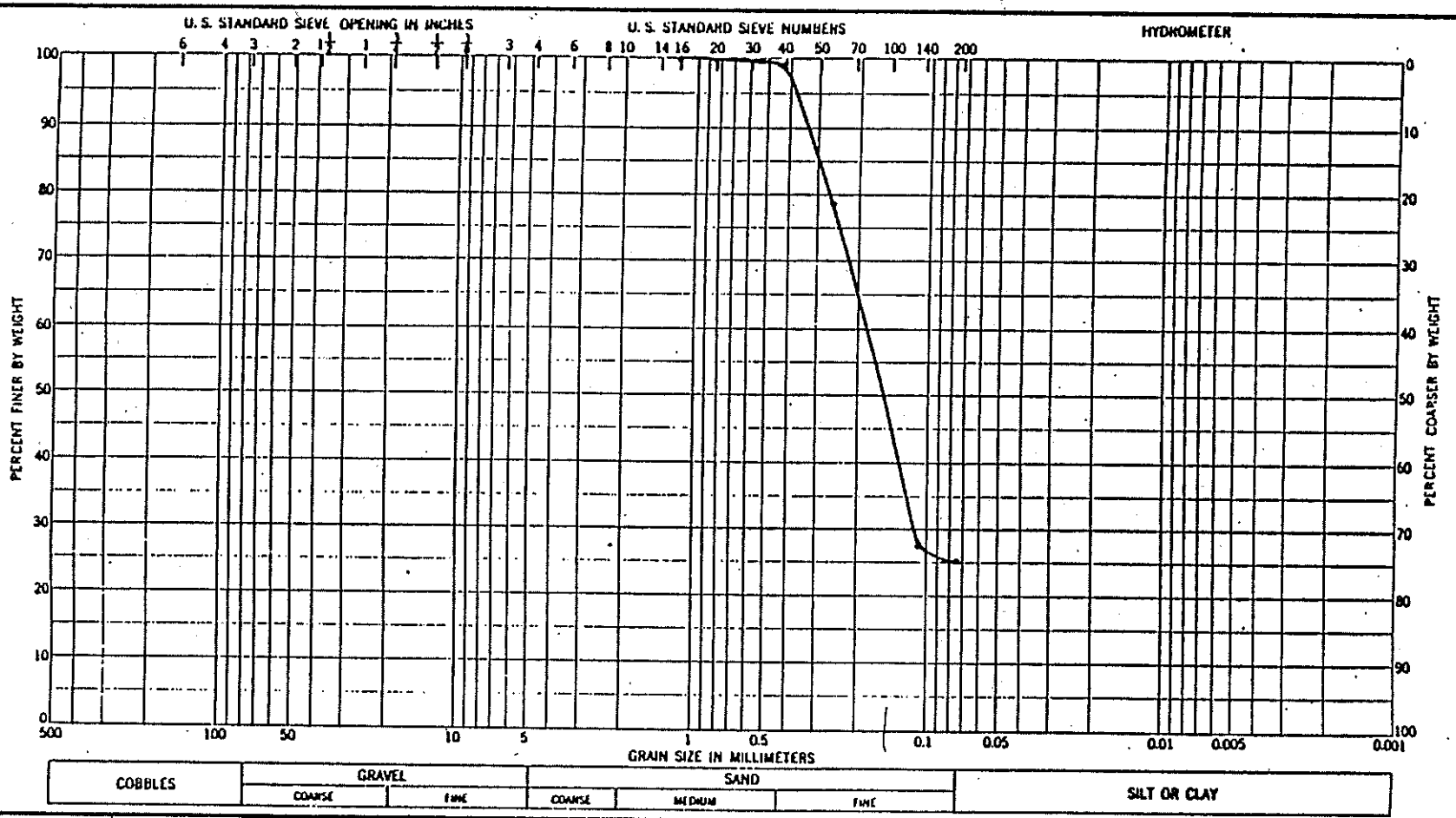
Boring No. DRU-26

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-26
12.0-14.6
Silt
ML
Nonplastic
Project Delaware River
Area Ubrecorea
Boring No. DRU-26
Date 8/6/91
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-26	14.6-16.0	Silty, Clayey Sand SM-SC				

Project Delaware River Vibracorus

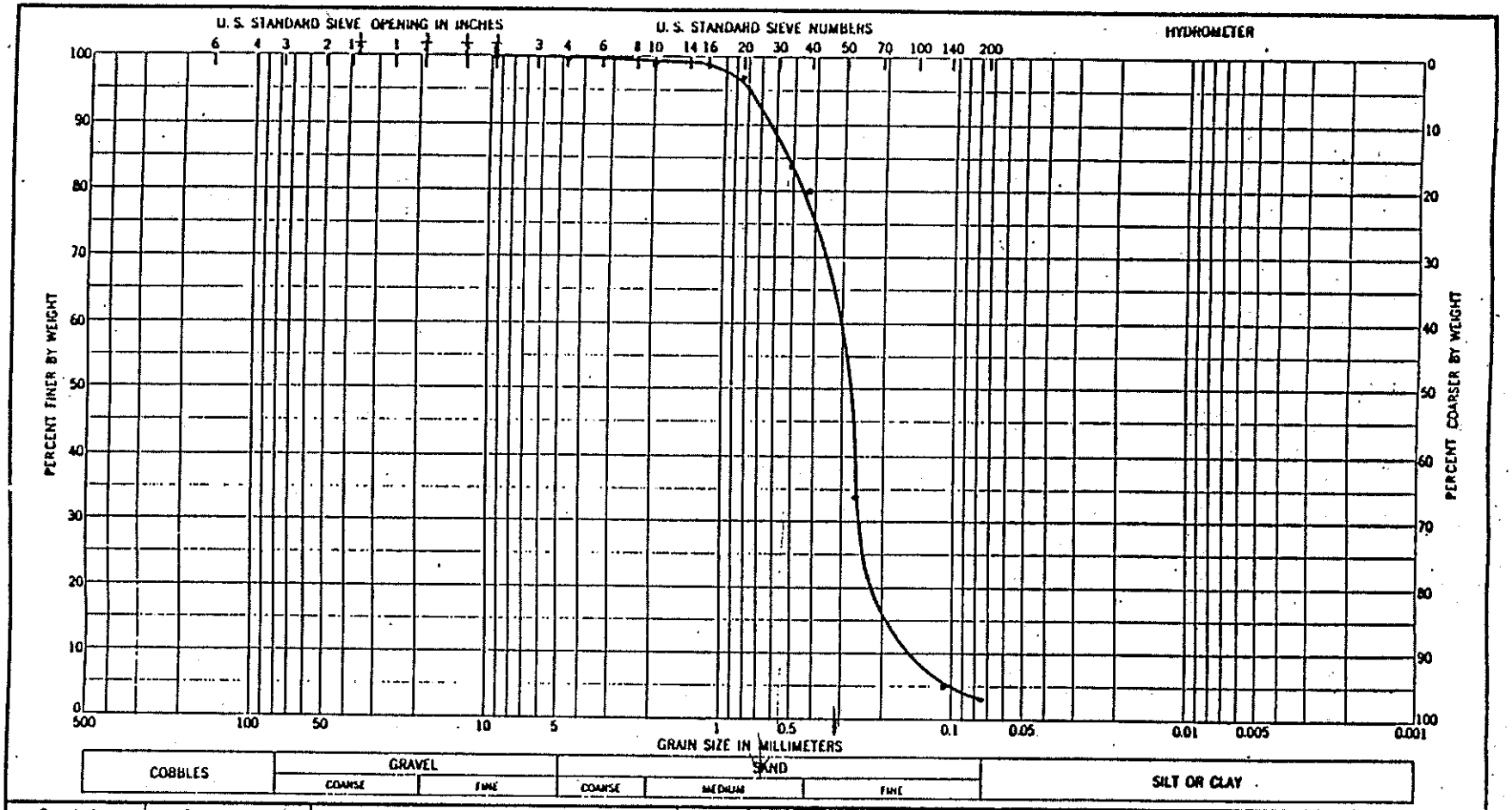
Area

Boring No. DRU-26

Date 7/31/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-27	0.0 - 8.0	Poorly-Graded Sand SP				

Project Delaware River Vibracores

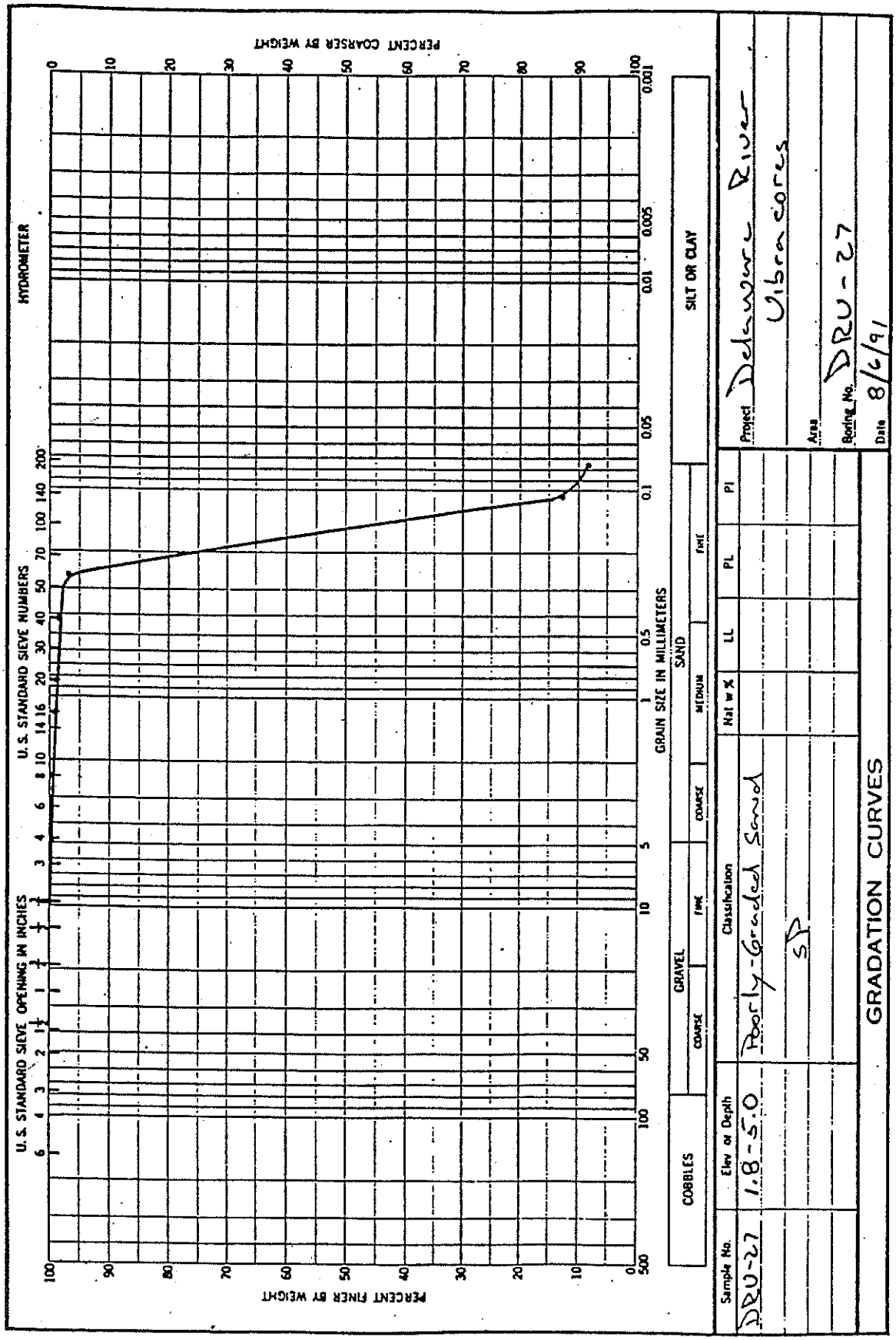
Area

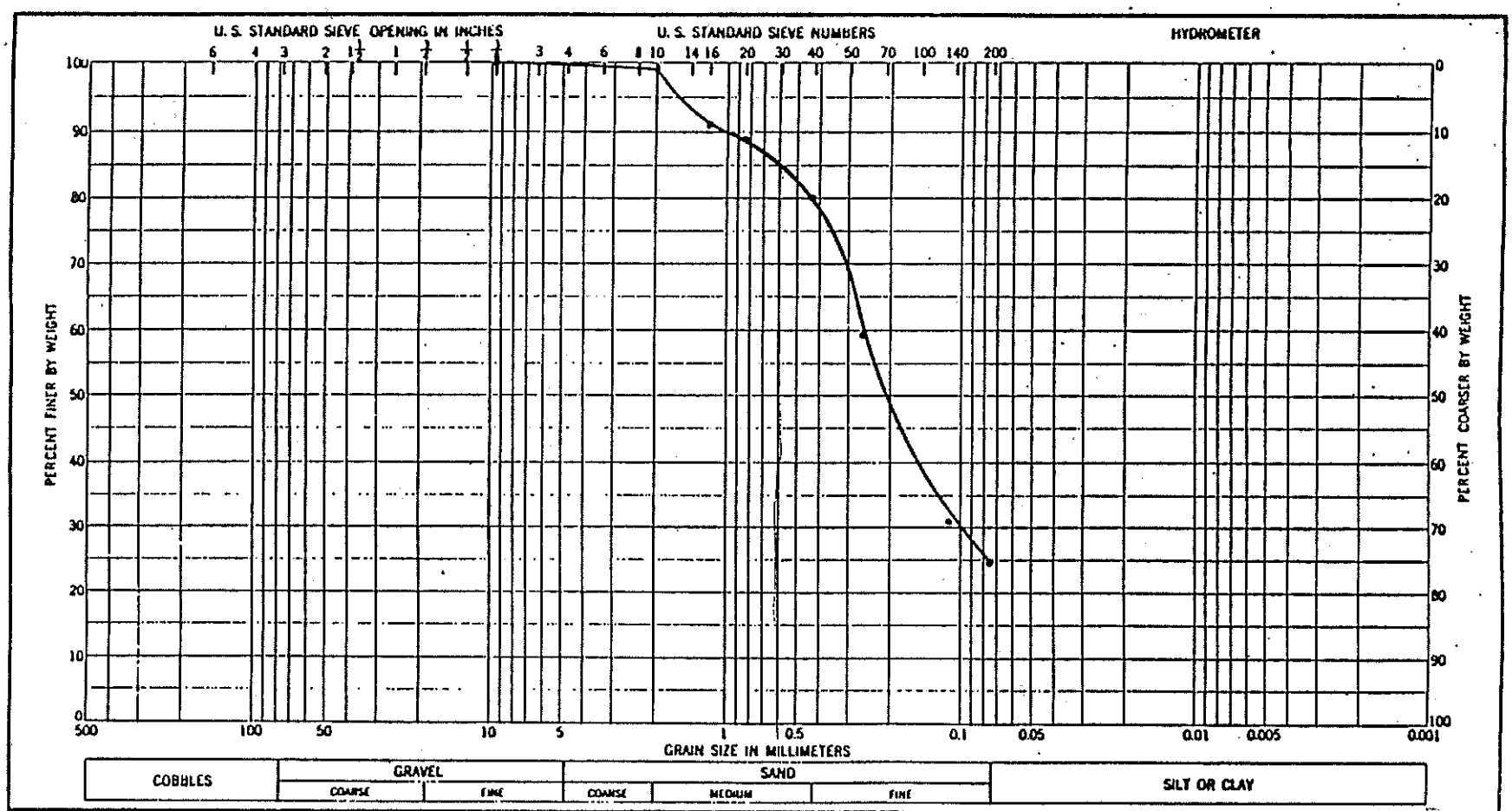
Boring No. DRU-27

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U. S. STANDARD SIEVE OPENING IN INCHES
U. S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRU-27
Date 8/6/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-27
1.8-5.0
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-29	7.2-10.0	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

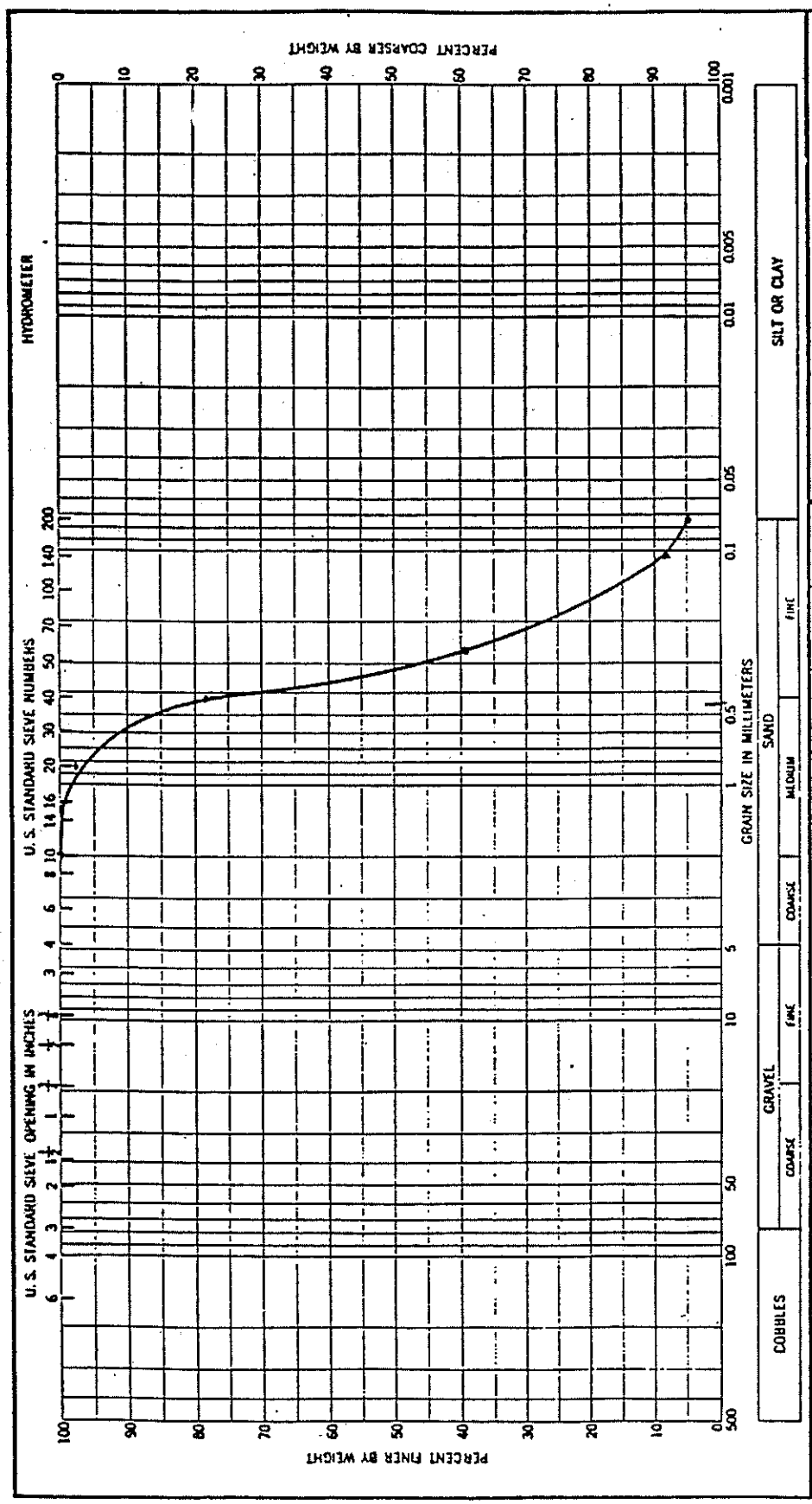
Area

Boring No. DRU-29 7.2-10.0

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Project: Delaware River

Area: Ubrecorer

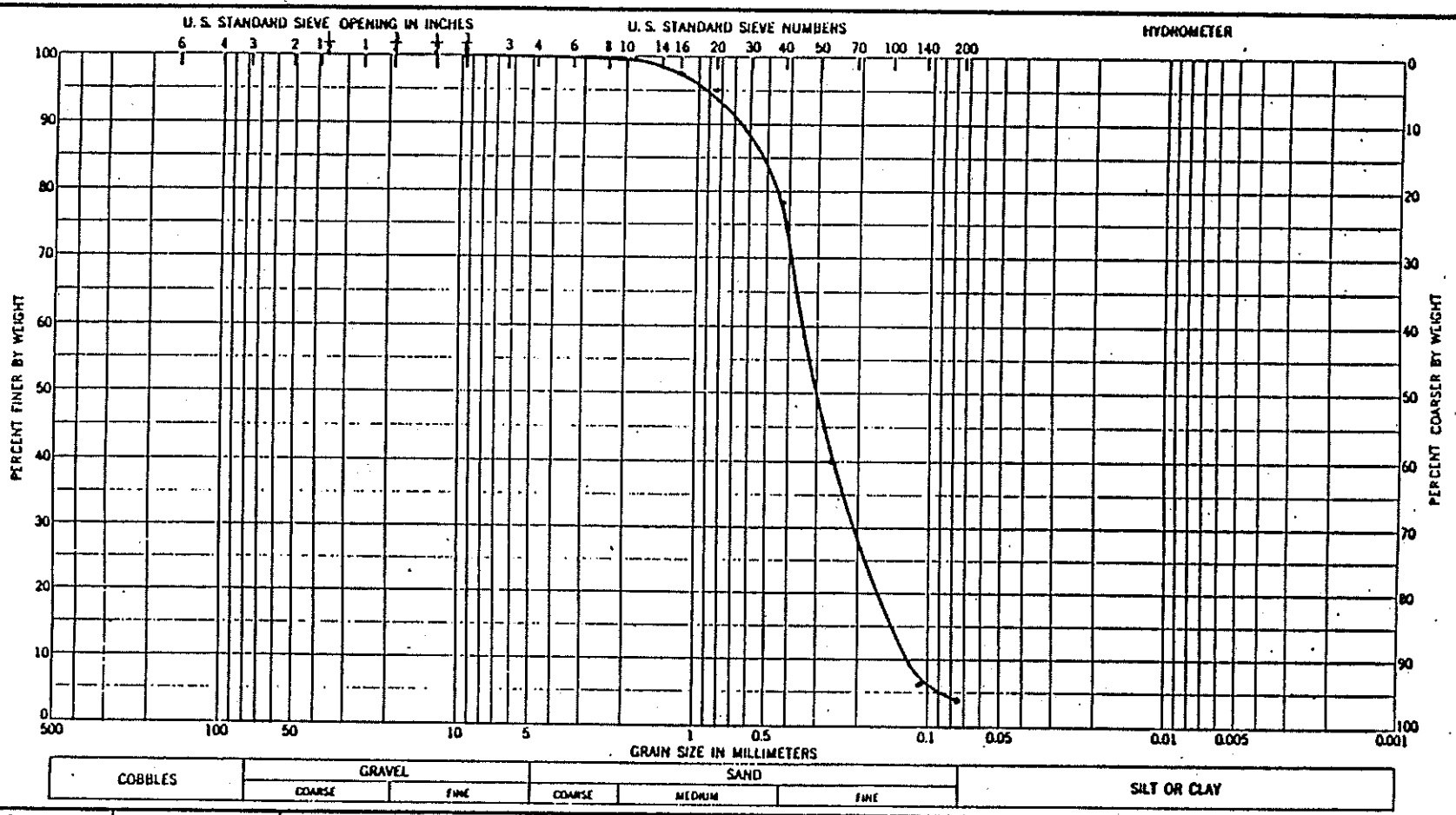
Boring No. DRU-27

Date 7/30/91

Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-27	11.3-15.0	Poorly-Graded Sand SP				

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-27	15.0-16.5	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

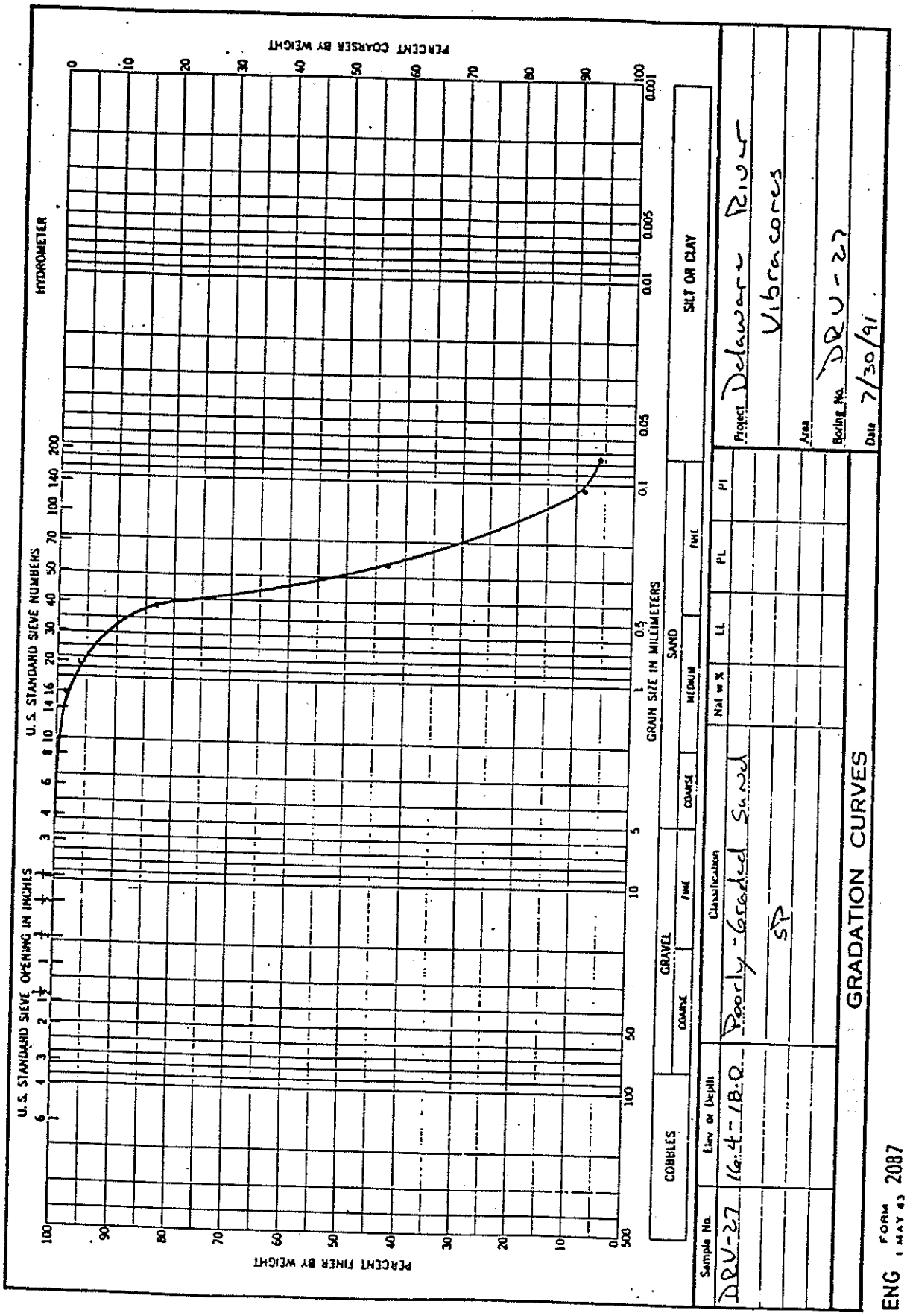
Area

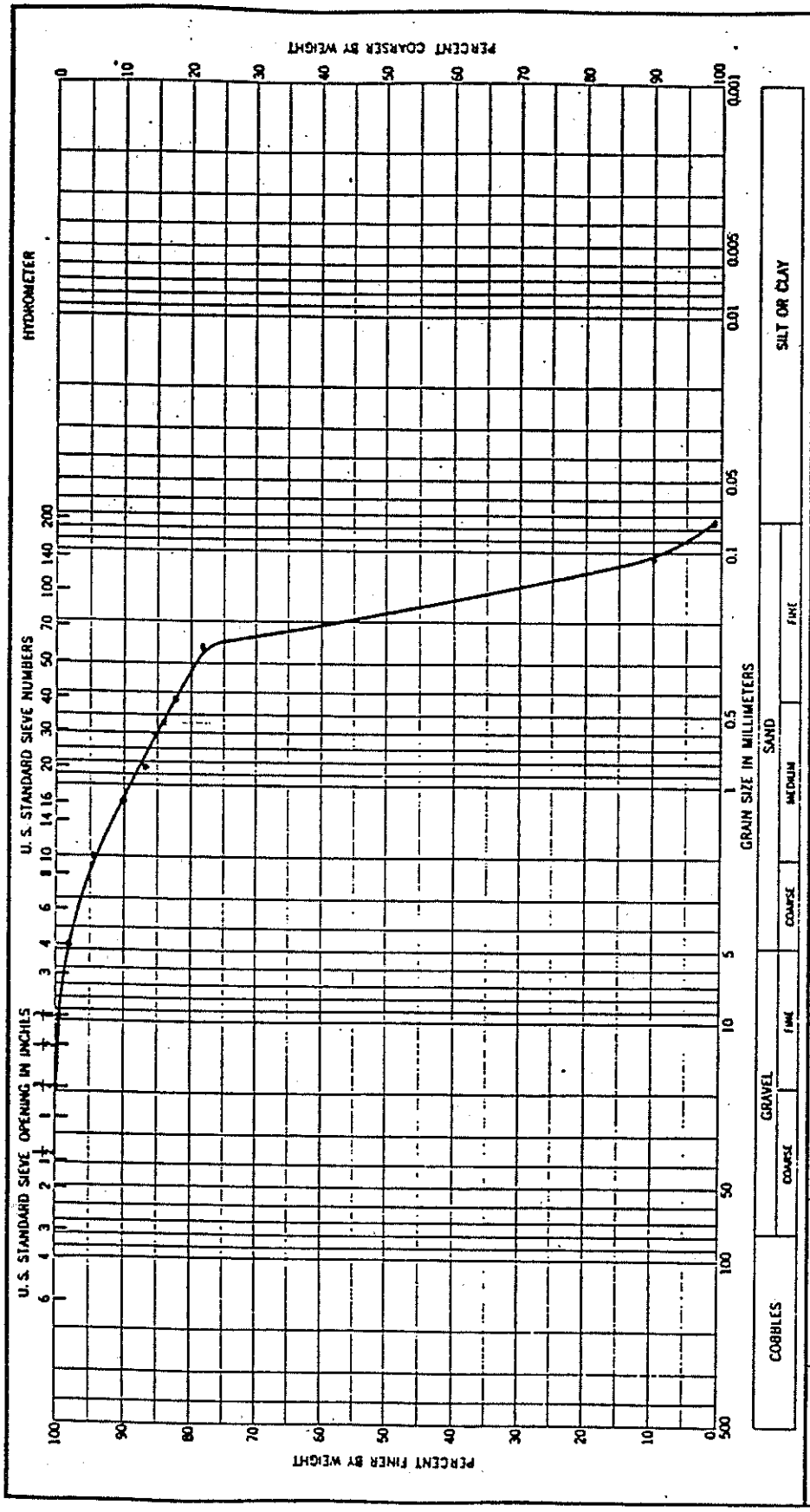
Boring No. DRU-27

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRV-27
Date 7/30/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRV-27
16.4-18.0
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 63 2087

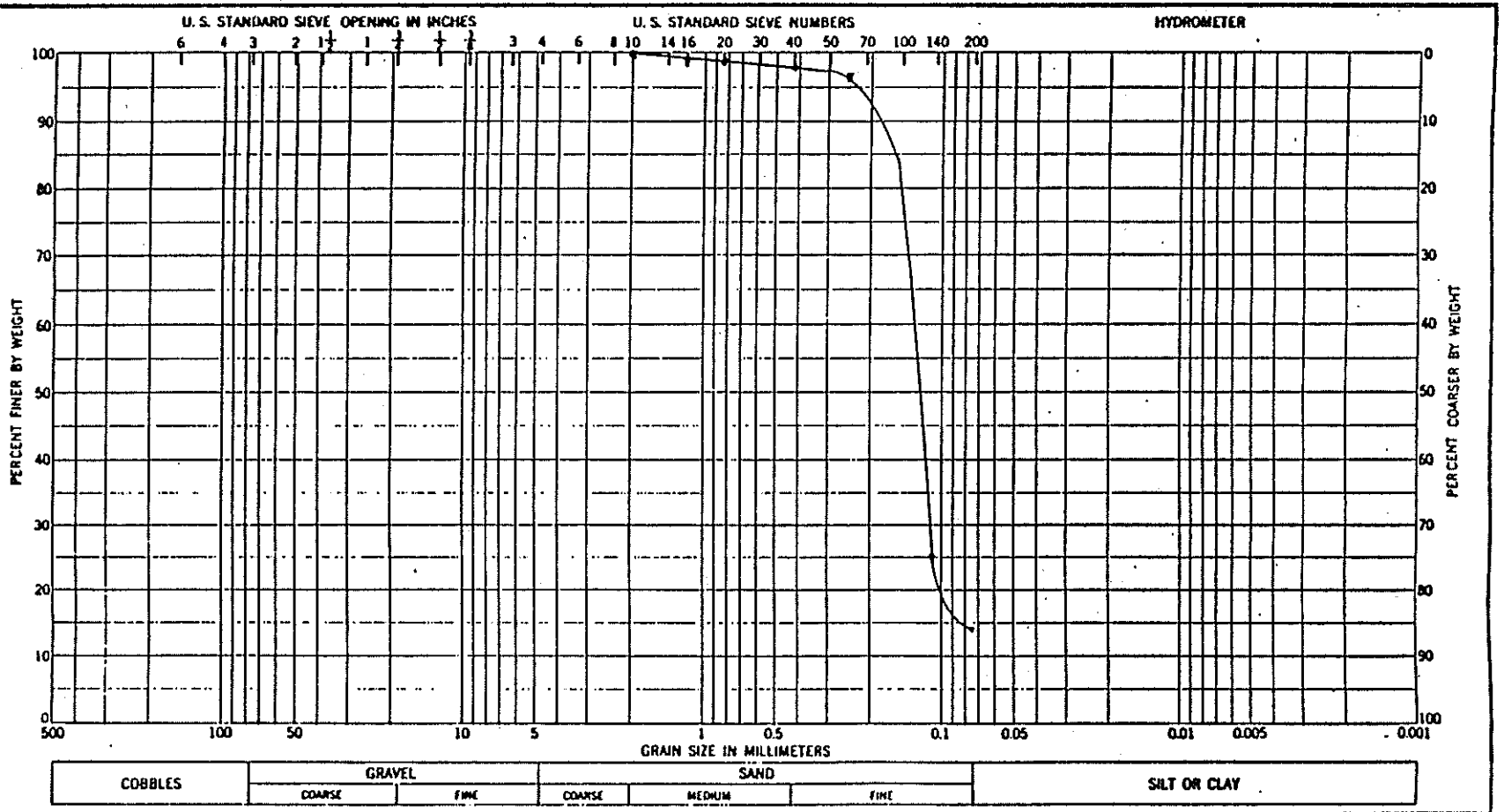


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-28	1.0-5.0	Poorly-Graded Sand				
		SP				

Project: Delaware River
Area: Vibracores
Boring No.: DRU-28
Date: 7/30/91

GRADATION · CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRV-28	5.0-10'	SILTY, CLAYEY SAND (SM-SC)				

Project DELAWARE RIVER HYDRACORES

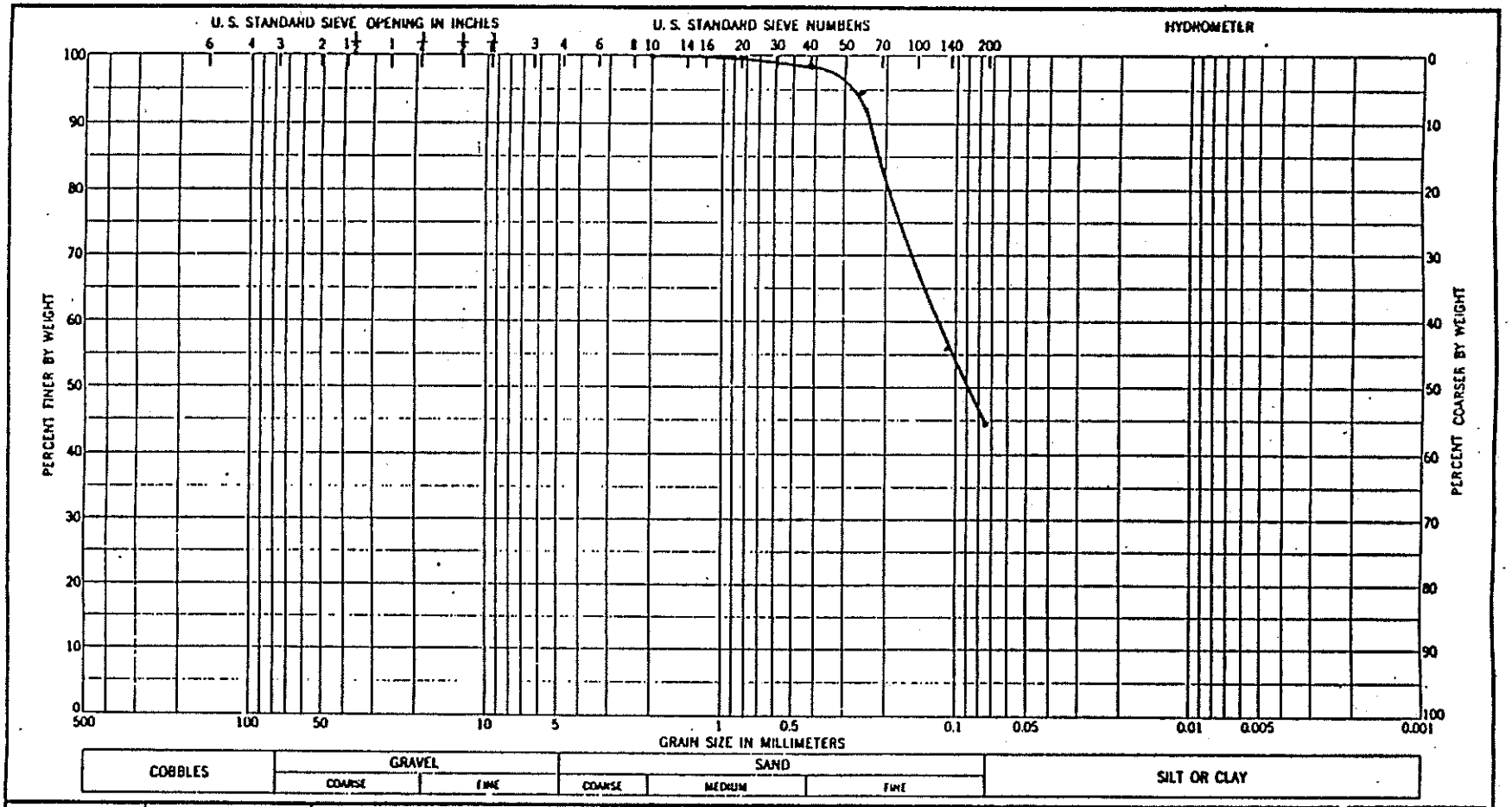
Area

Boring No. DRV-28

Date 8-9-91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-28	10.0-16.5	Silty, Clayey Sand				
		SM-SC				

Project Delaware River Vibracores

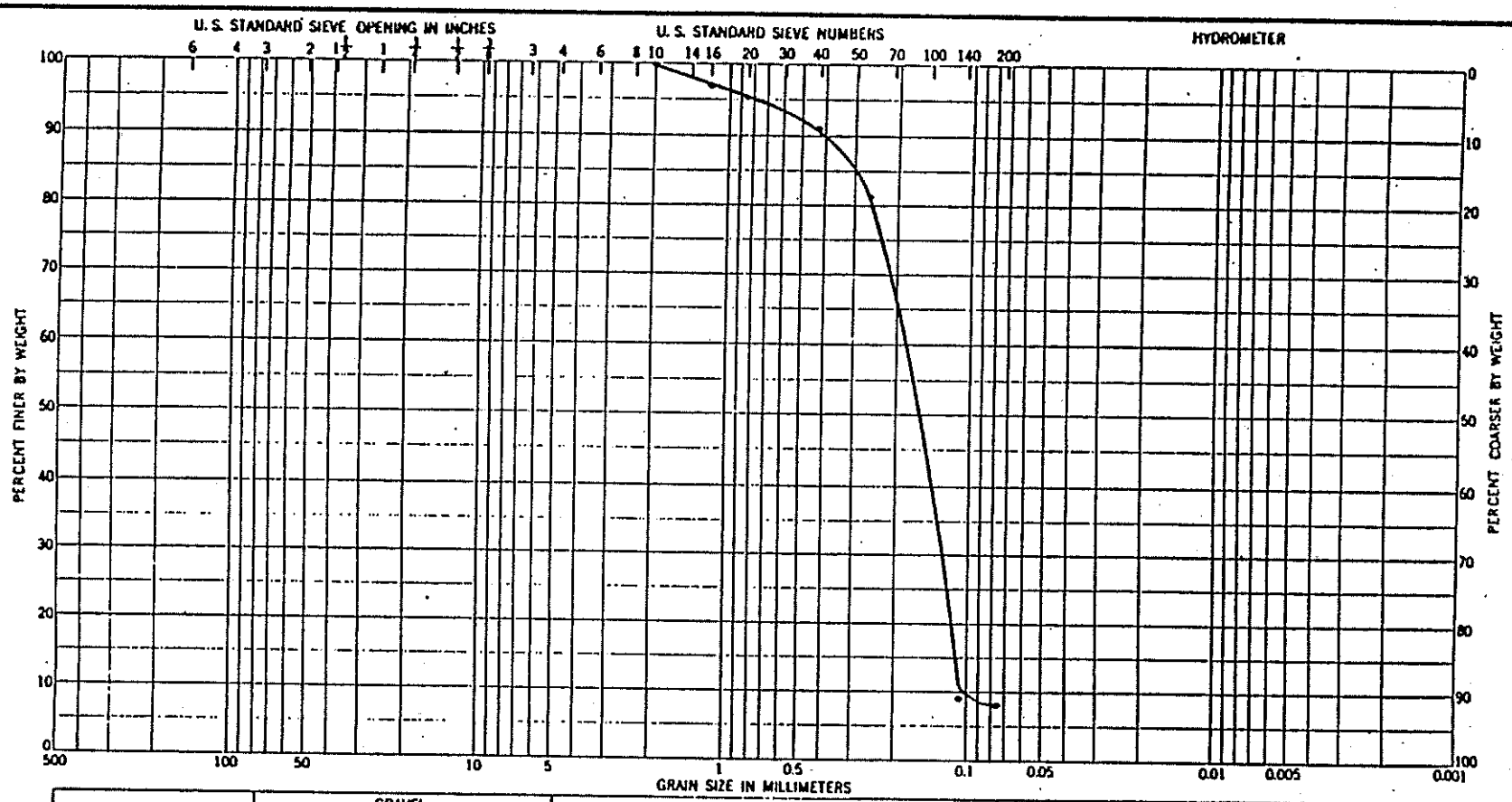
Area

Boring No. DRU-28

Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-29	0.0-1.8	Poorly-Graded Sand SP				

Project Delaware River Vibracores

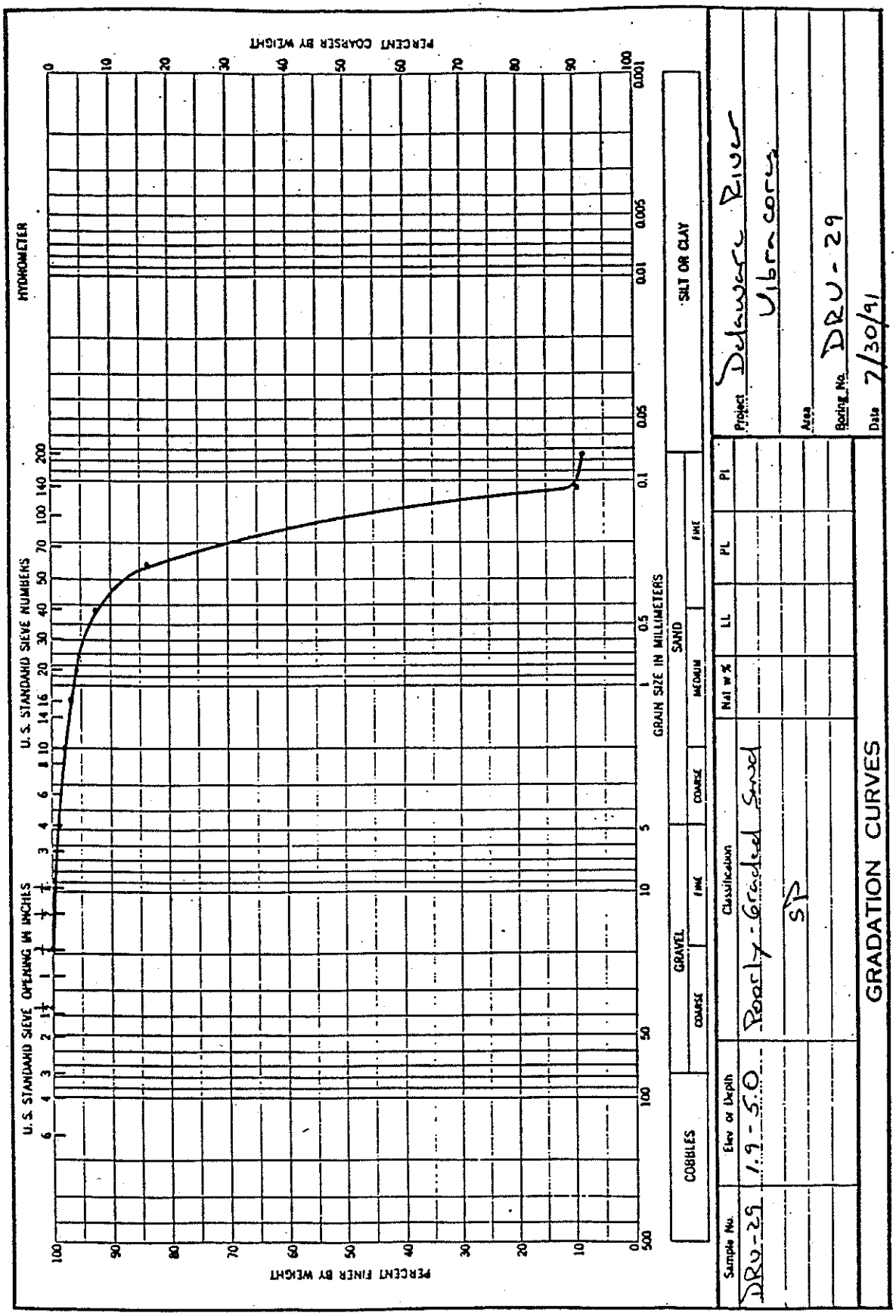
Area

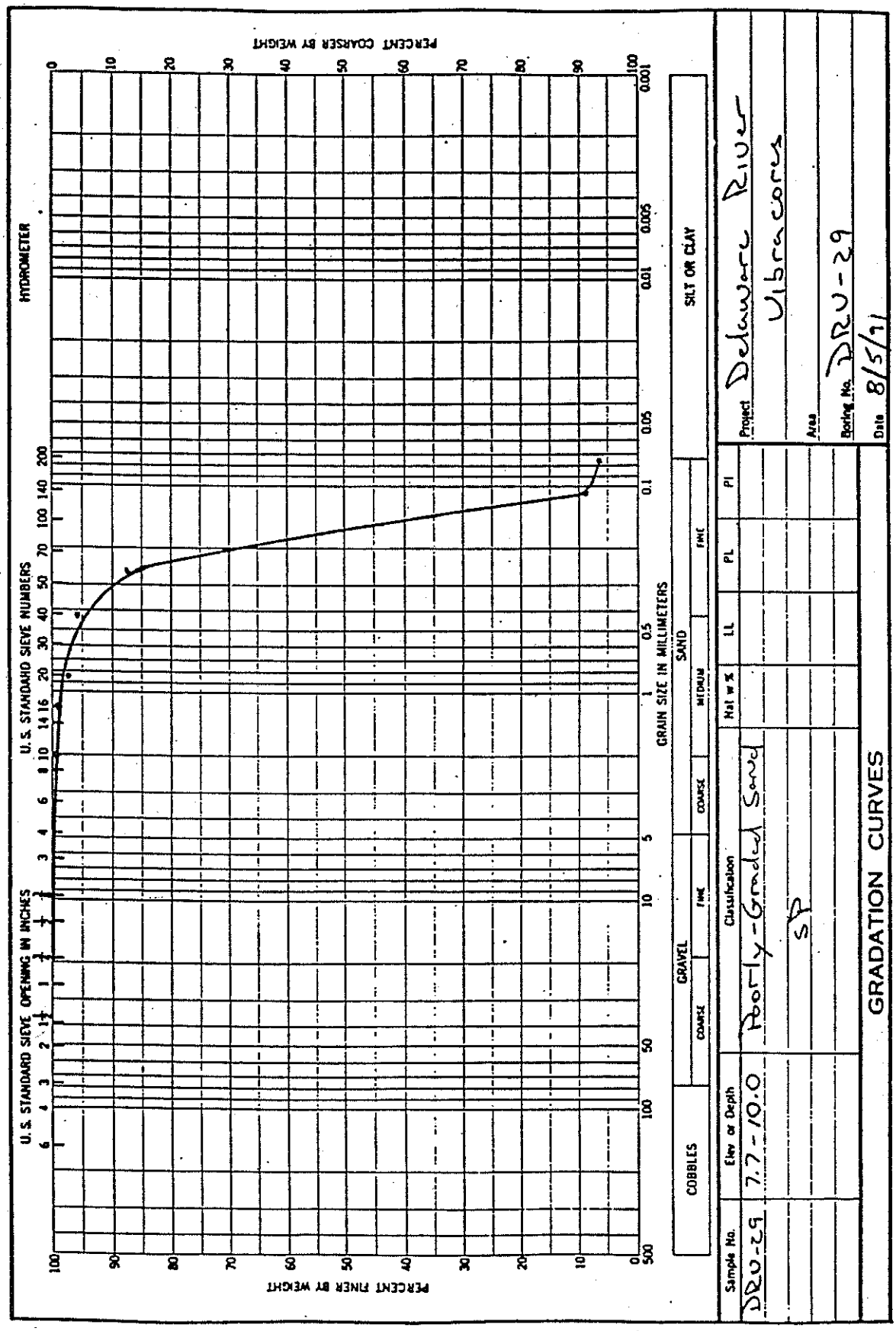
Boring No. DRU-29

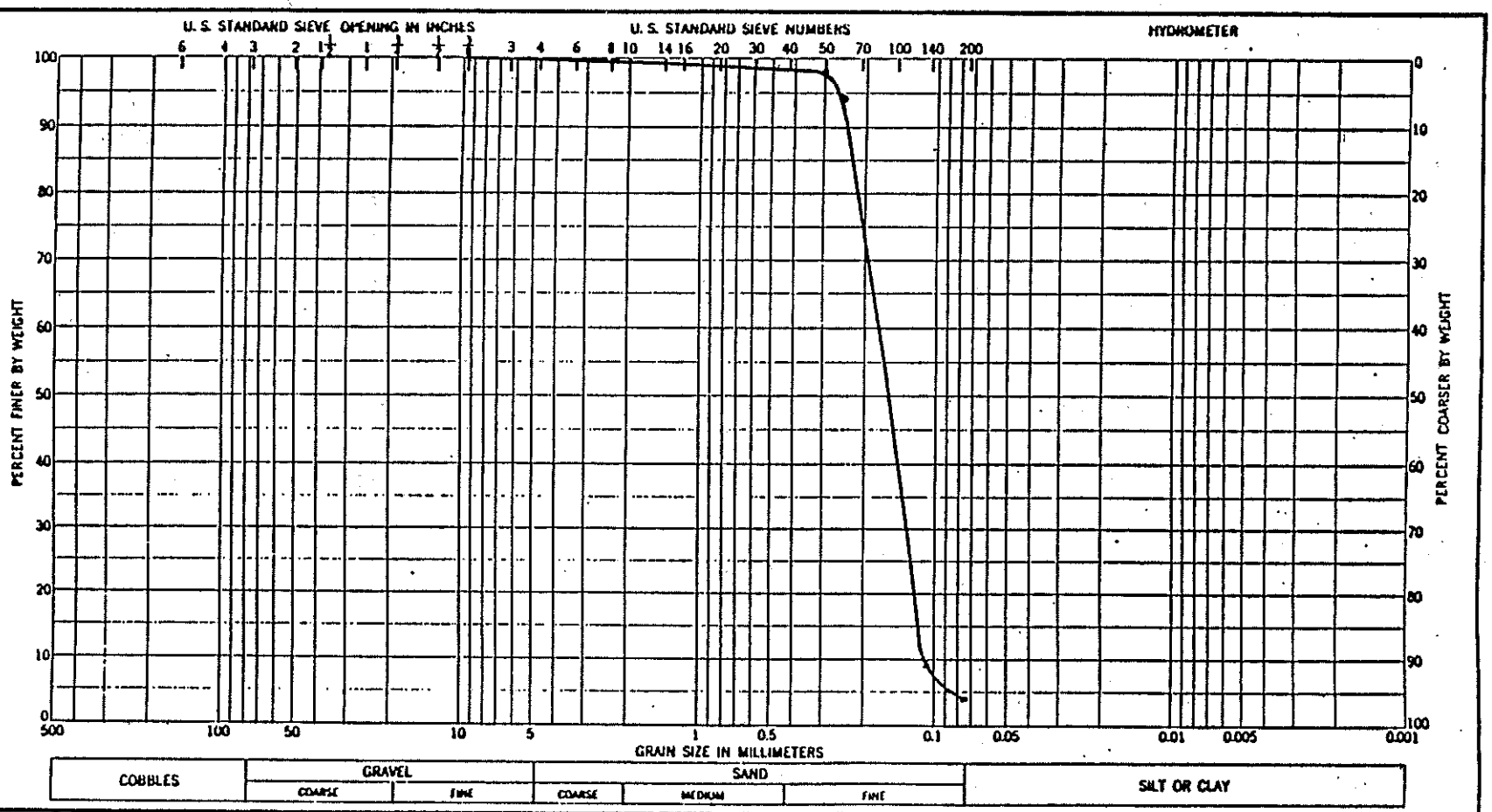
Date 7/30/91

GRADATION CURVES

ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Area Ultracorm
Boring No. DRU-29
Date 7/30/91
Sample No. DRU-29
Elev or Depth 1.9 - 5.0
Classification Poorly-Graded Sand
SP
Nat W %
LL
PL
PI
GRADATION CURVES
ENG FORM 1 MAY 83 2087


PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
HYDROMETER
U.S. STANDARD SIEVE NUMBERS
U.S. STANDARD SIEVE OPENING IN INCHES
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRU-29
Date 8/5/91
Sample No.
Elev or Depth
Classification
Nat W %
LL
PL
PI
DRU-29
7.7-10.0
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 63 2087



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
DRU-29	10.4-15.0	Poorly-Graded Sand				
		SP				

Project Delaware River Vibracores

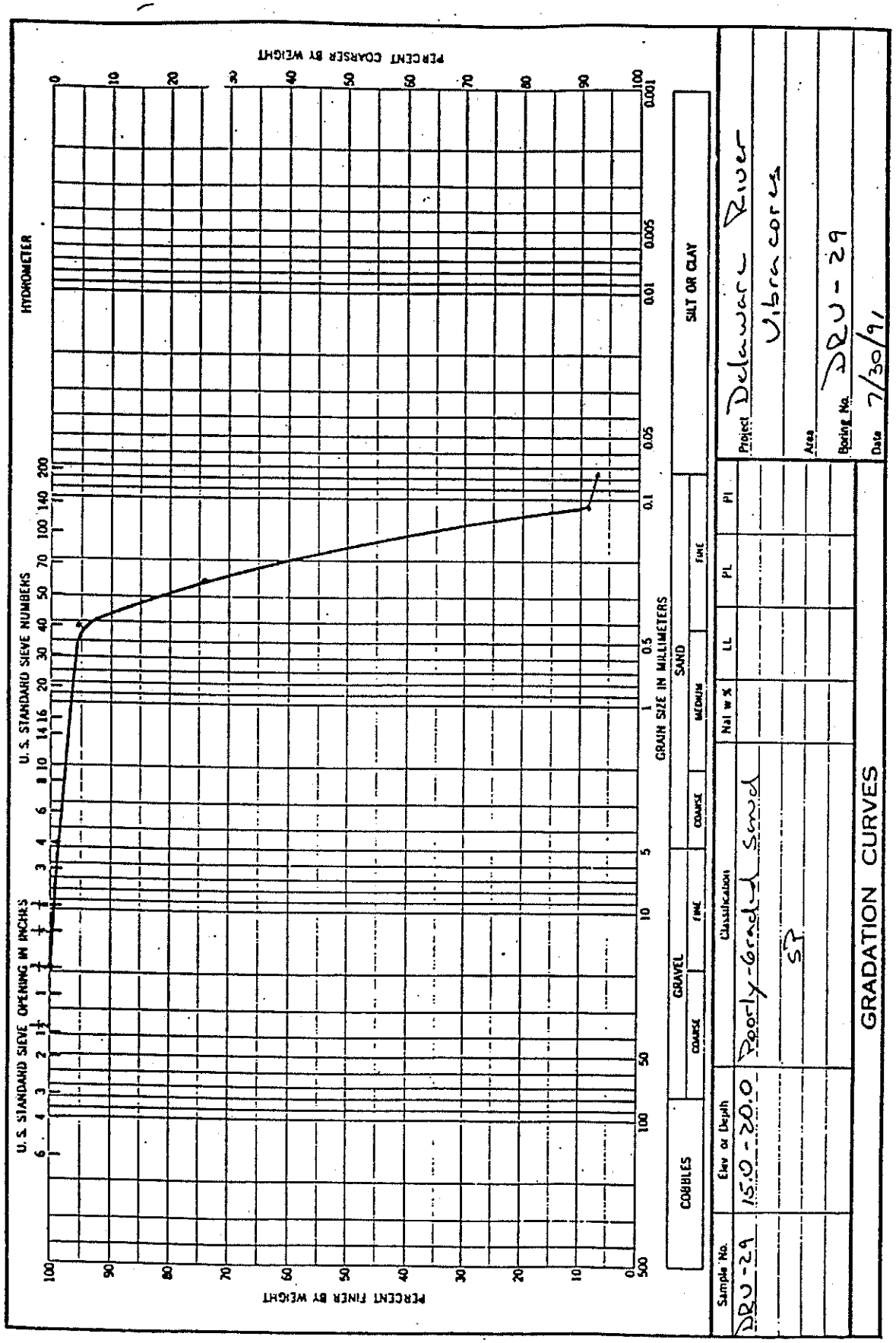
Area

Boring No. DRU-29

Date 7/30/91

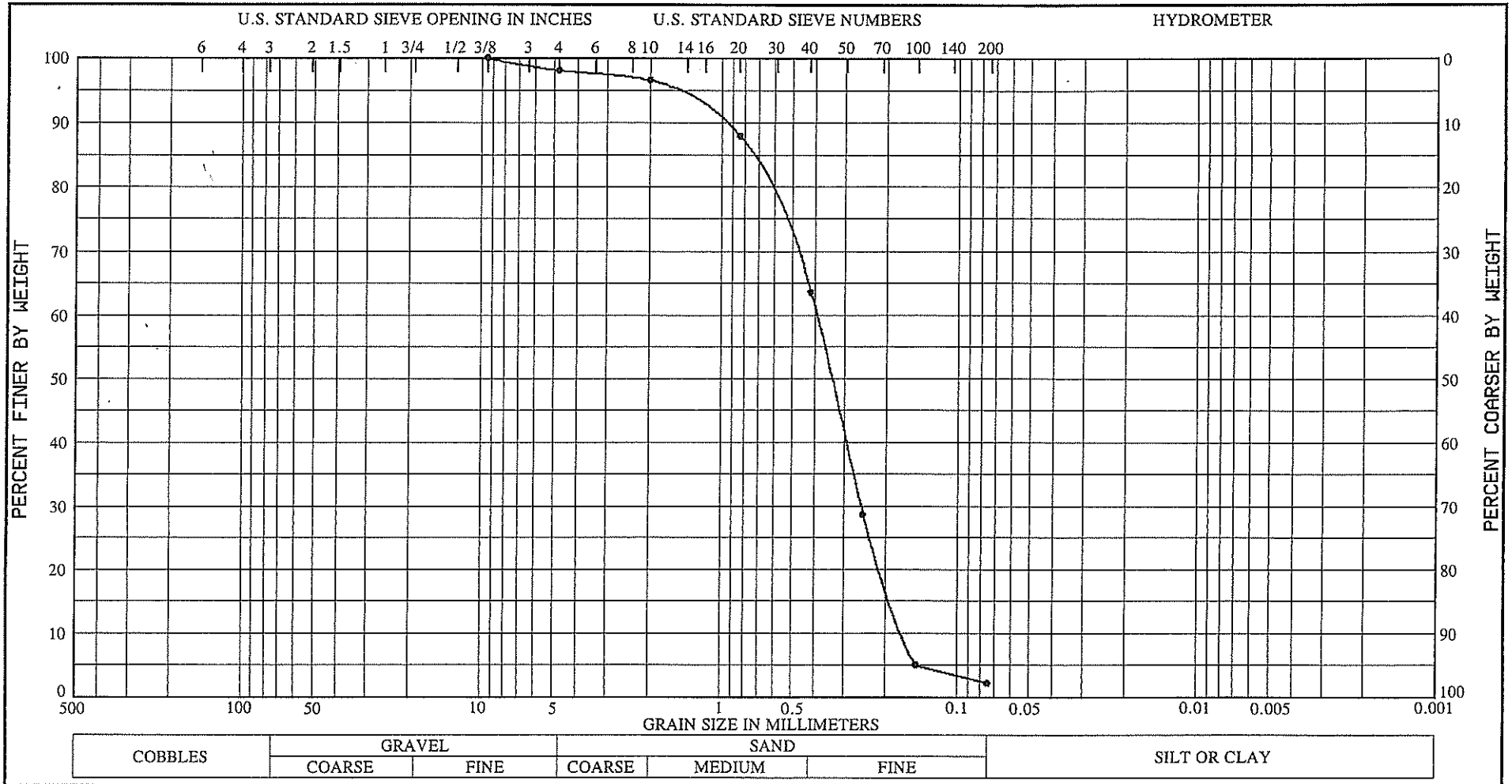
GRADATION CURVES

ENG FORM 1 MAY 63 2087


HYDROMETER
U. S. STANDARD SIEVE NUMBERS
U. S. STANDARD SIEVE OPENING IN INCHES
PERCENT COARSER BY WEIGHT
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
SILT OR CLAY
Project Delaware River
Vibracores
Area
Boring No. DRU-29
Date 7/30/91
Sample No.
Elev or Depth
Classification
Nat w %
LL
PL
PI
DRU-29
15.0-20.0
Poorly-Graded Sand
SP
GRADATION CURVES
ENG FORM 1 MAY 63 2087

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

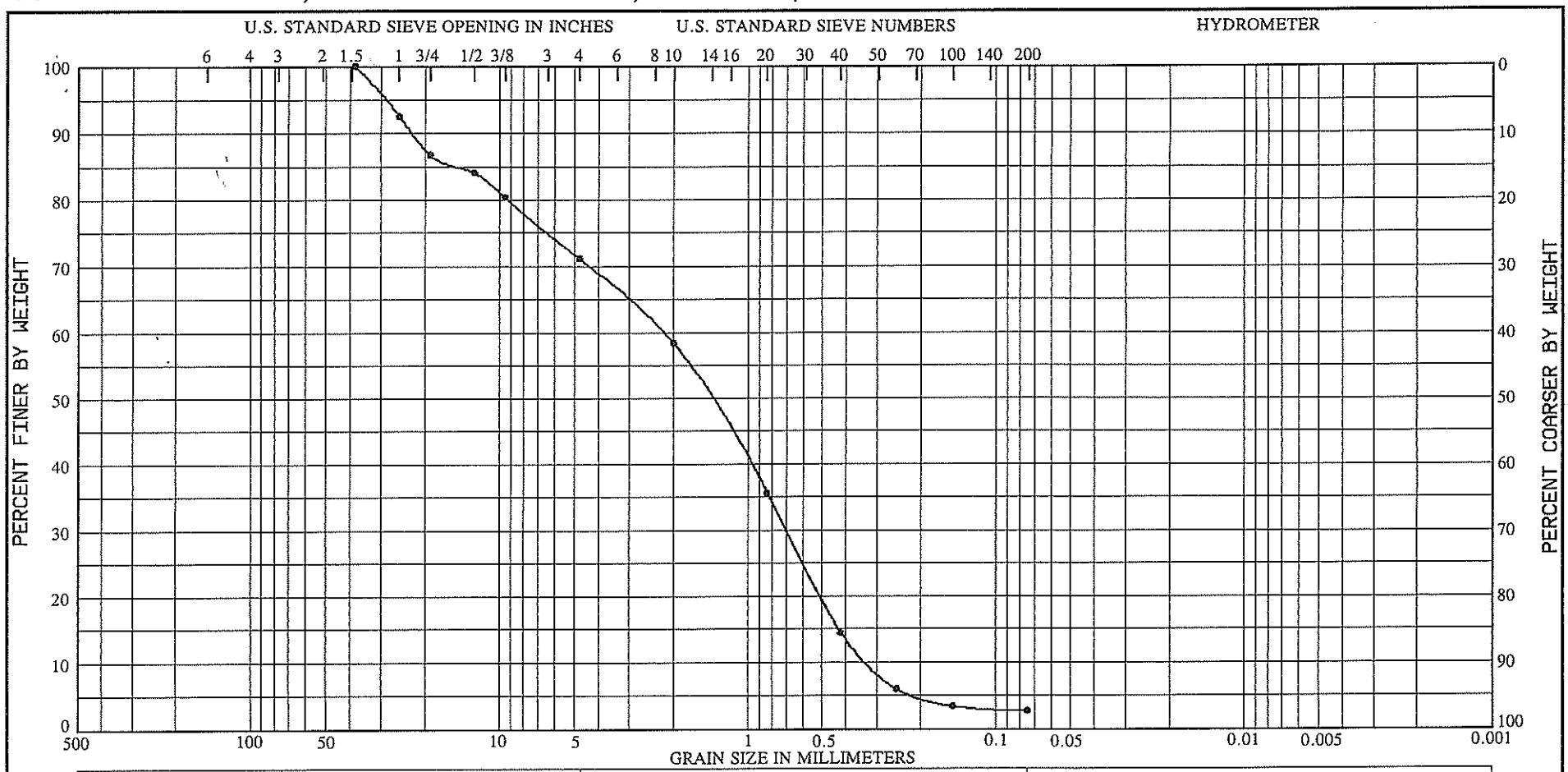
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	2.5-2.9	TAN, POORLY GRADED SAND (SP), WITH A				
		TRACE OF GRAVEL SIZES AND MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1295
Boring No. DRV-30
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



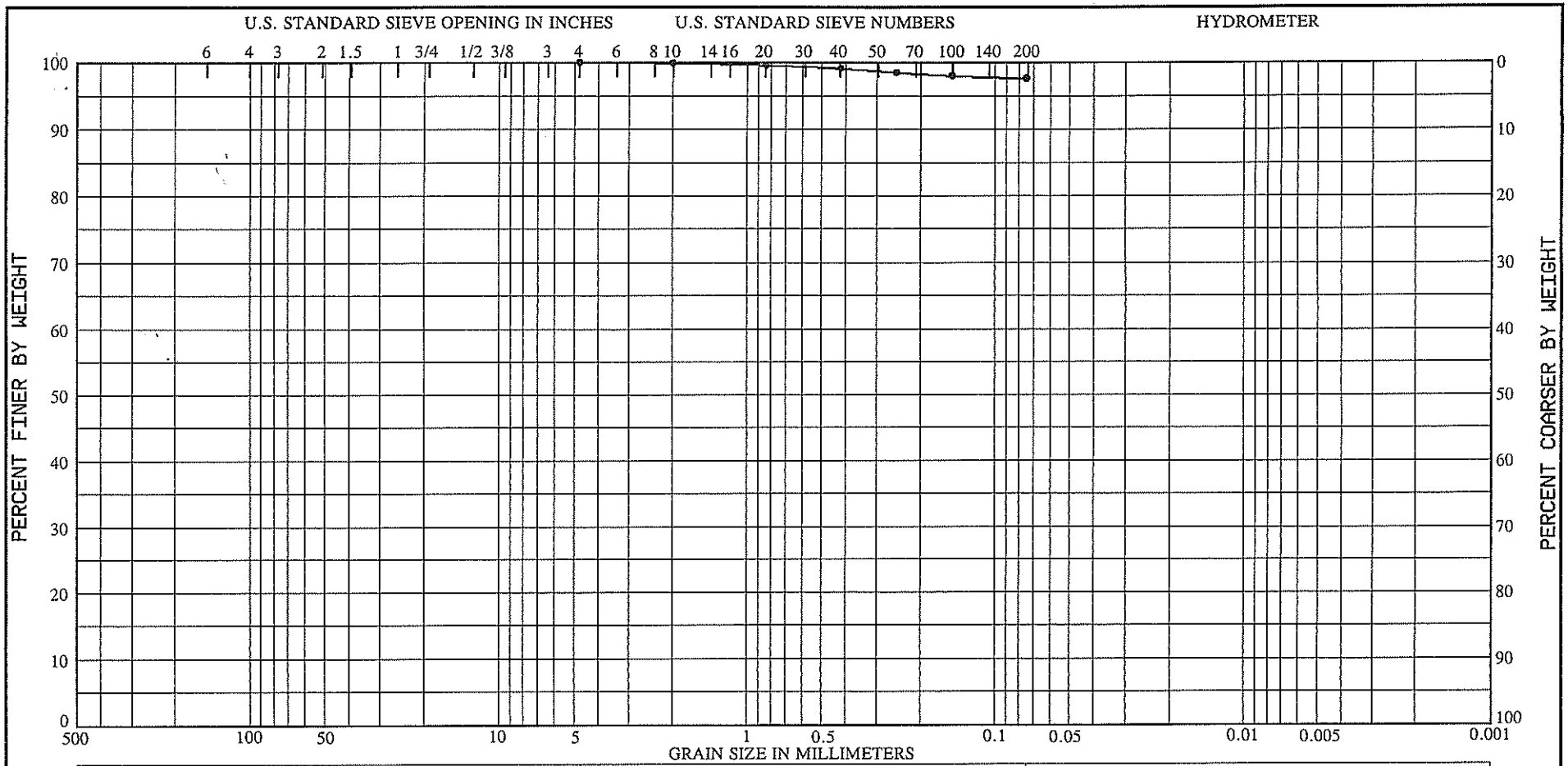
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	5.6-6.2	GRAY, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES AND A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1295
Boring No. DRV-30
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

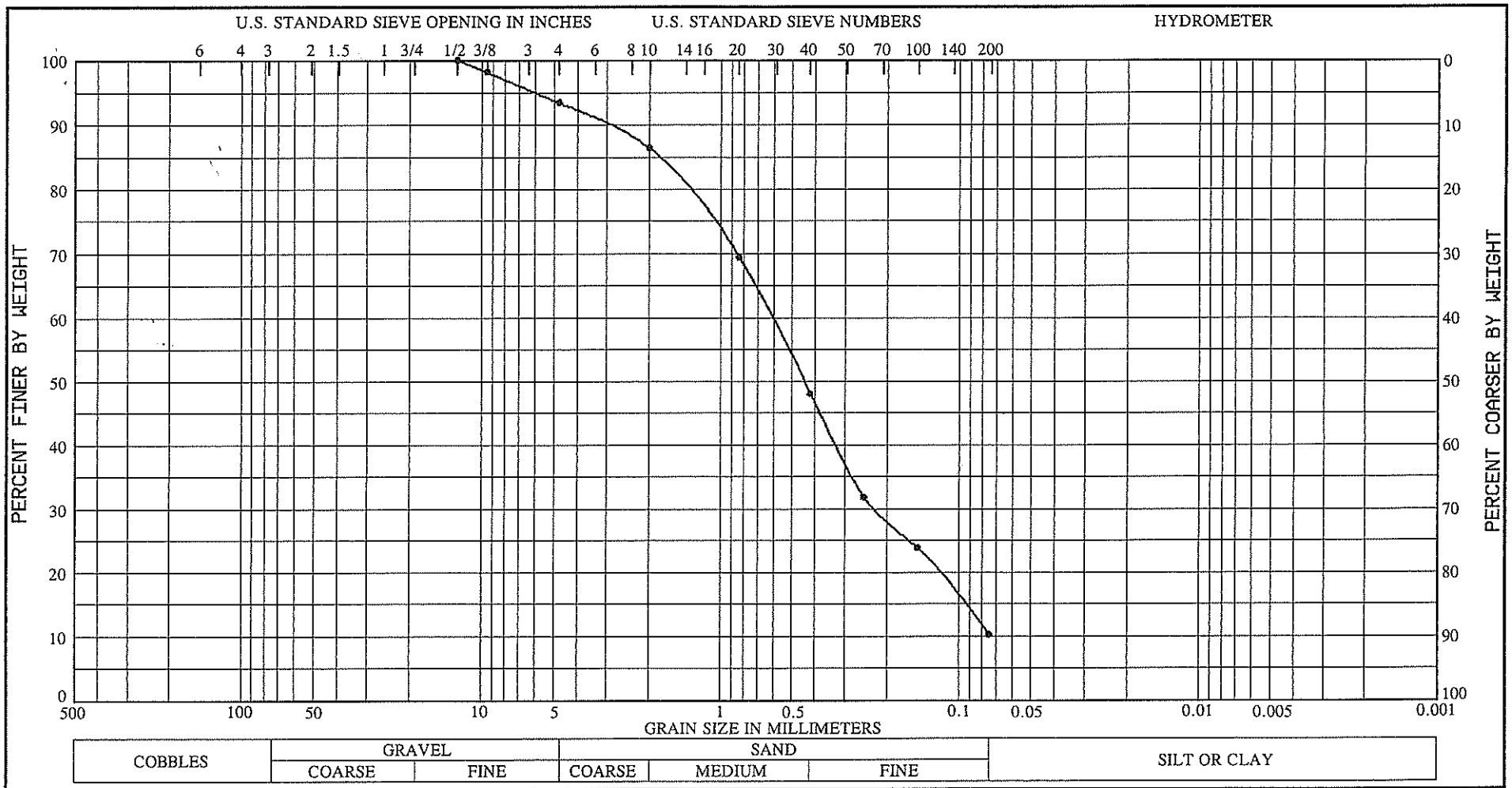
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	13.0-13.3	LT. GRAY, FAT CLAY (CH), WITH A TRACE OF SAND SIZES.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1295
Boring No. DRV-30
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



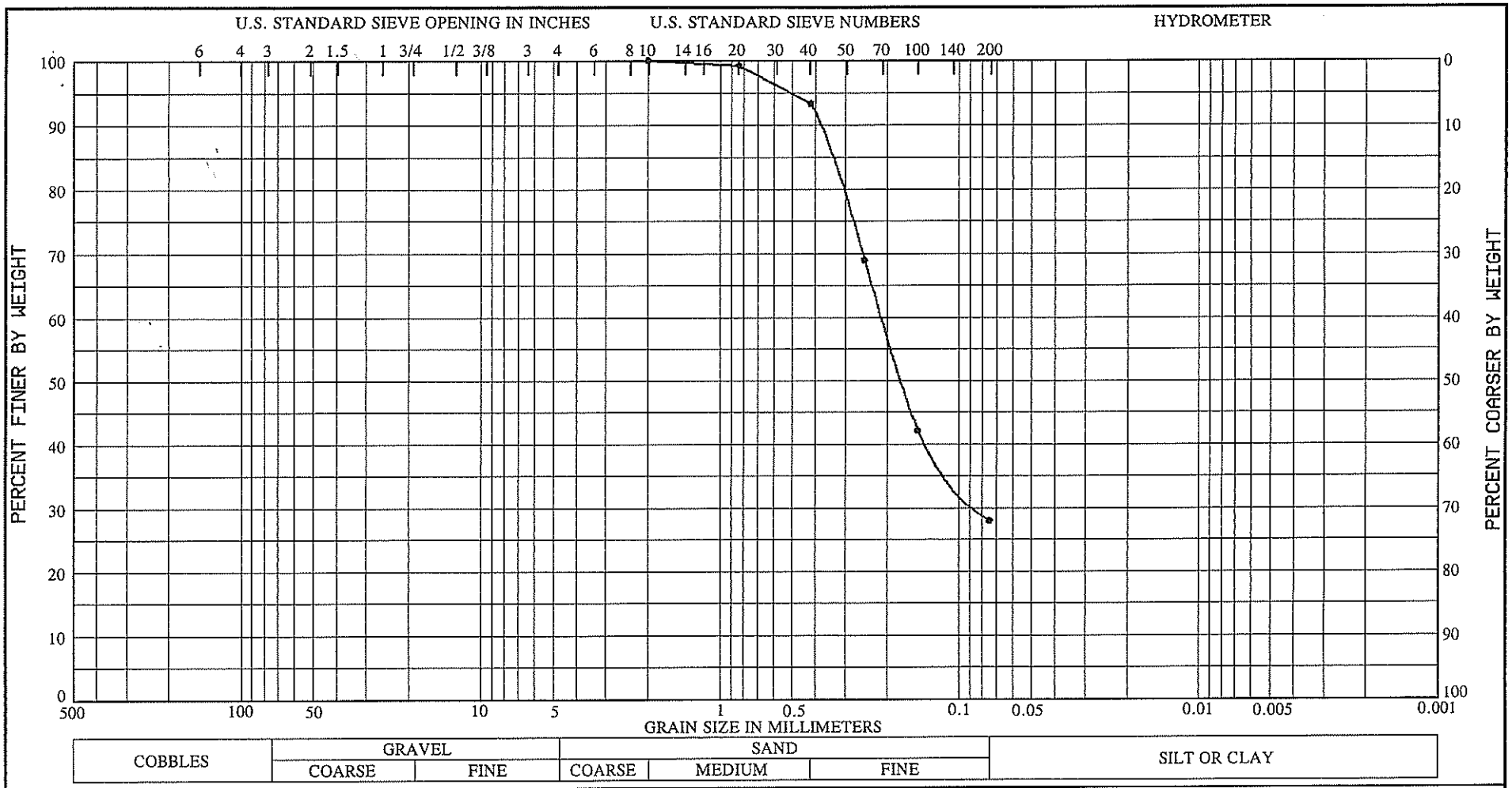
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.1-1.4	GRAY, POORLY GRADED SILTY SAND (SP-SM),				
		WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1296
Boring No. DRV-31
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



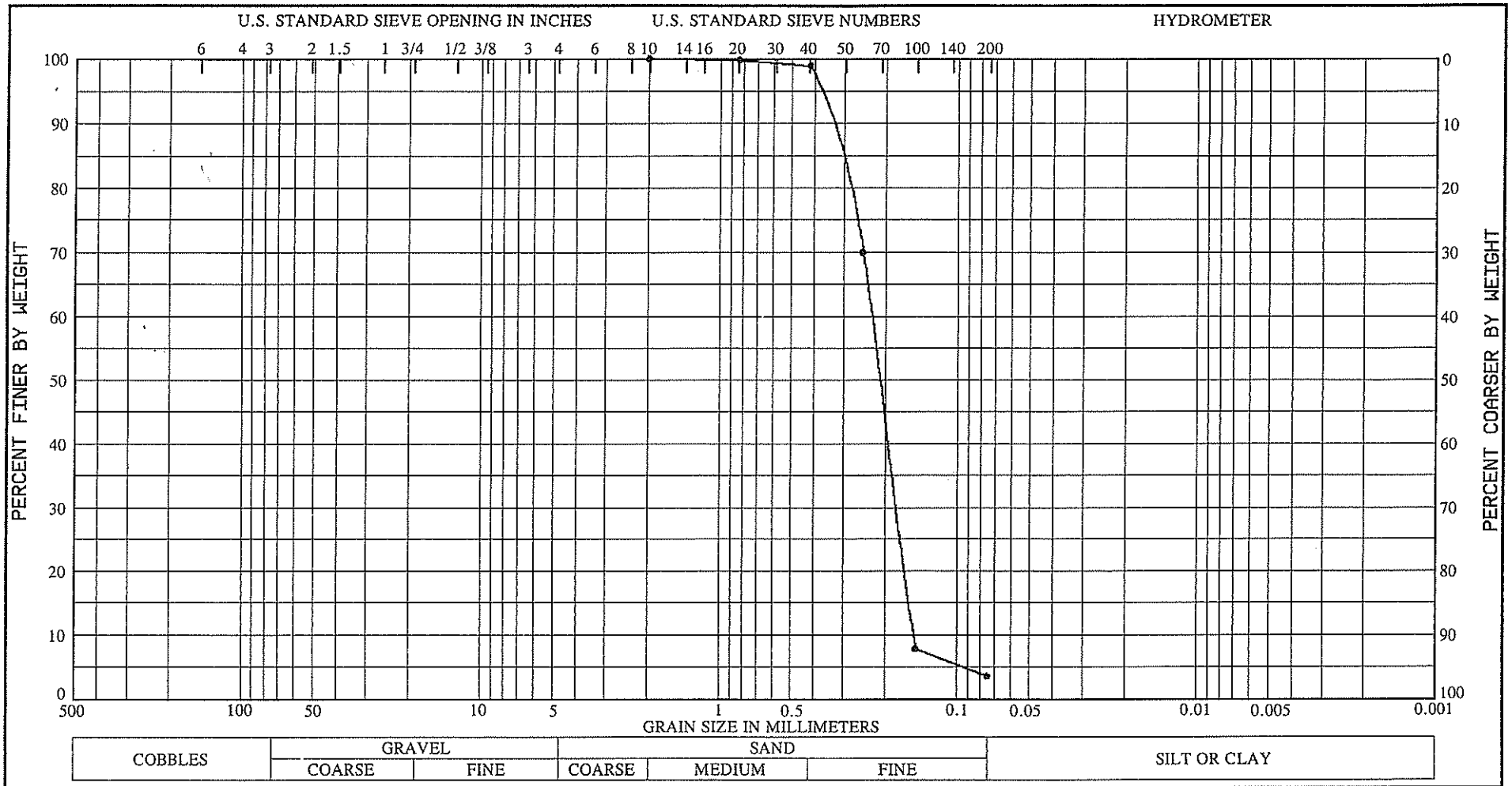
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	5.2-5.5	TAN & GRAY, CLAYEY SAND (SC).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1296
Boring No. DRV-31
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

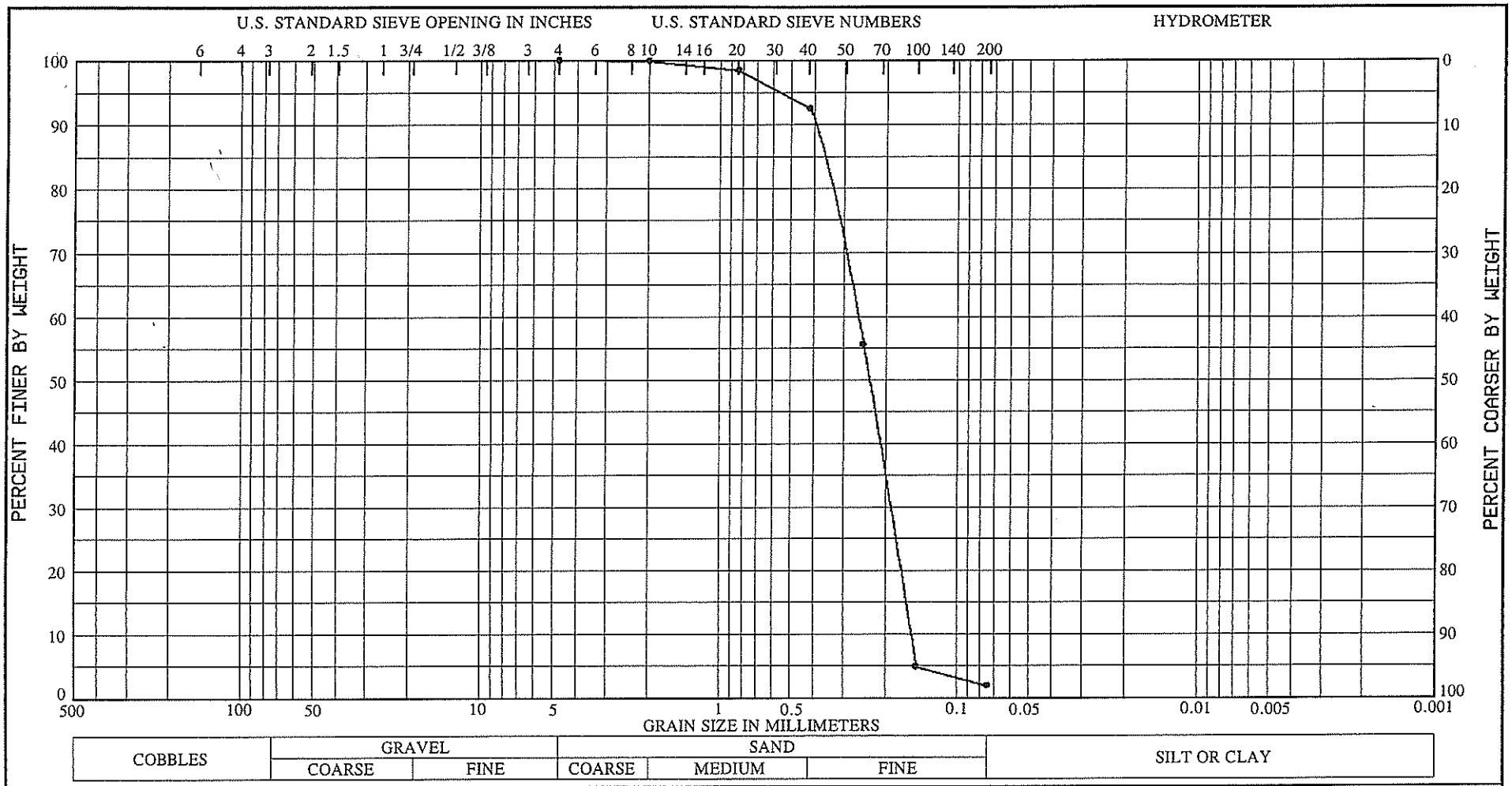
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	9.7-10.0	TAN & GRAY, POORLY GRADED SAND (SP).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1296
Boring No. DRV-31
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



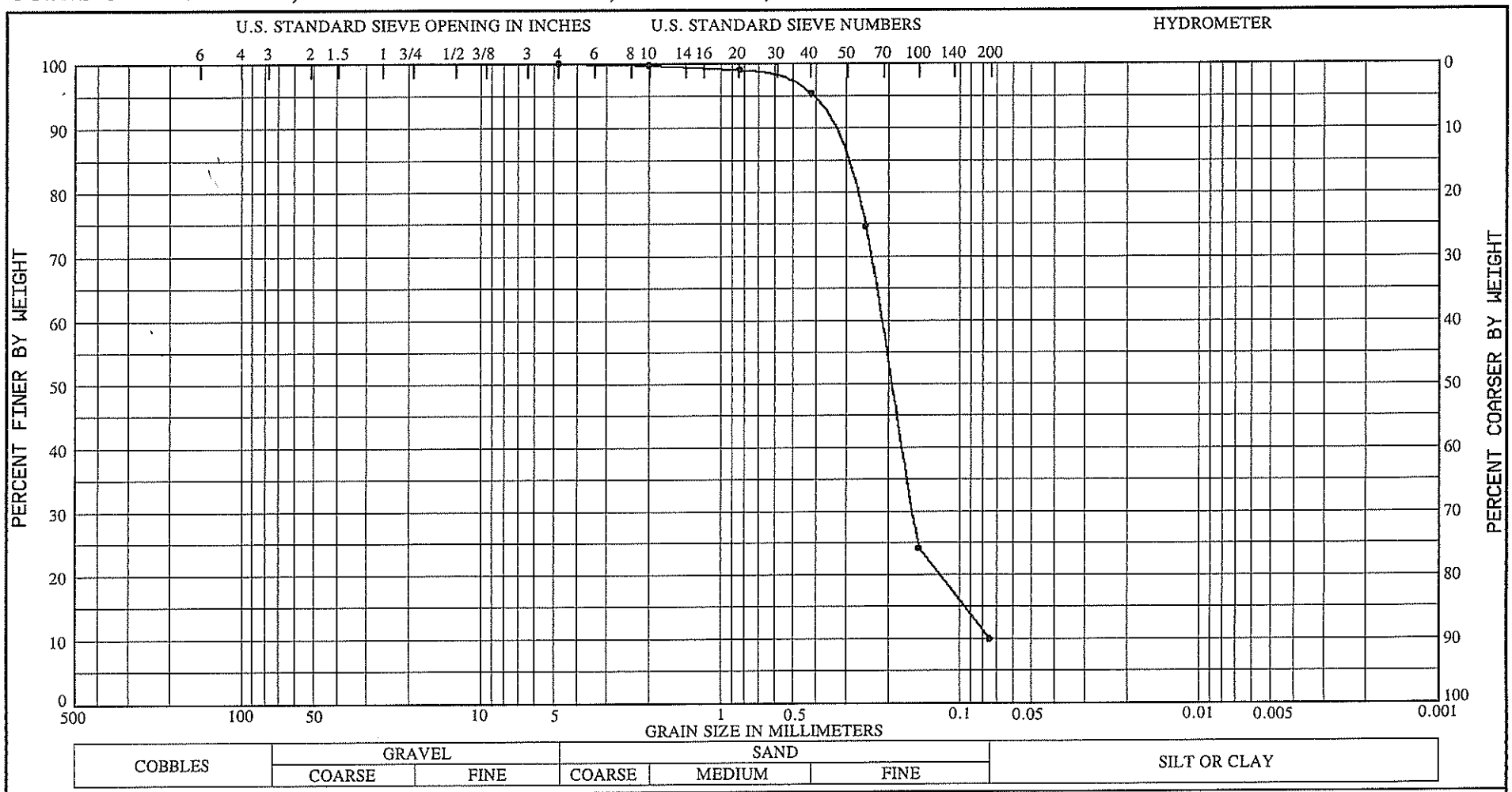
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
4	15.2-15.5	TAN & GRAY, POORLY GRADED SAND (SP).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1296
Boring No. DRV-31
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



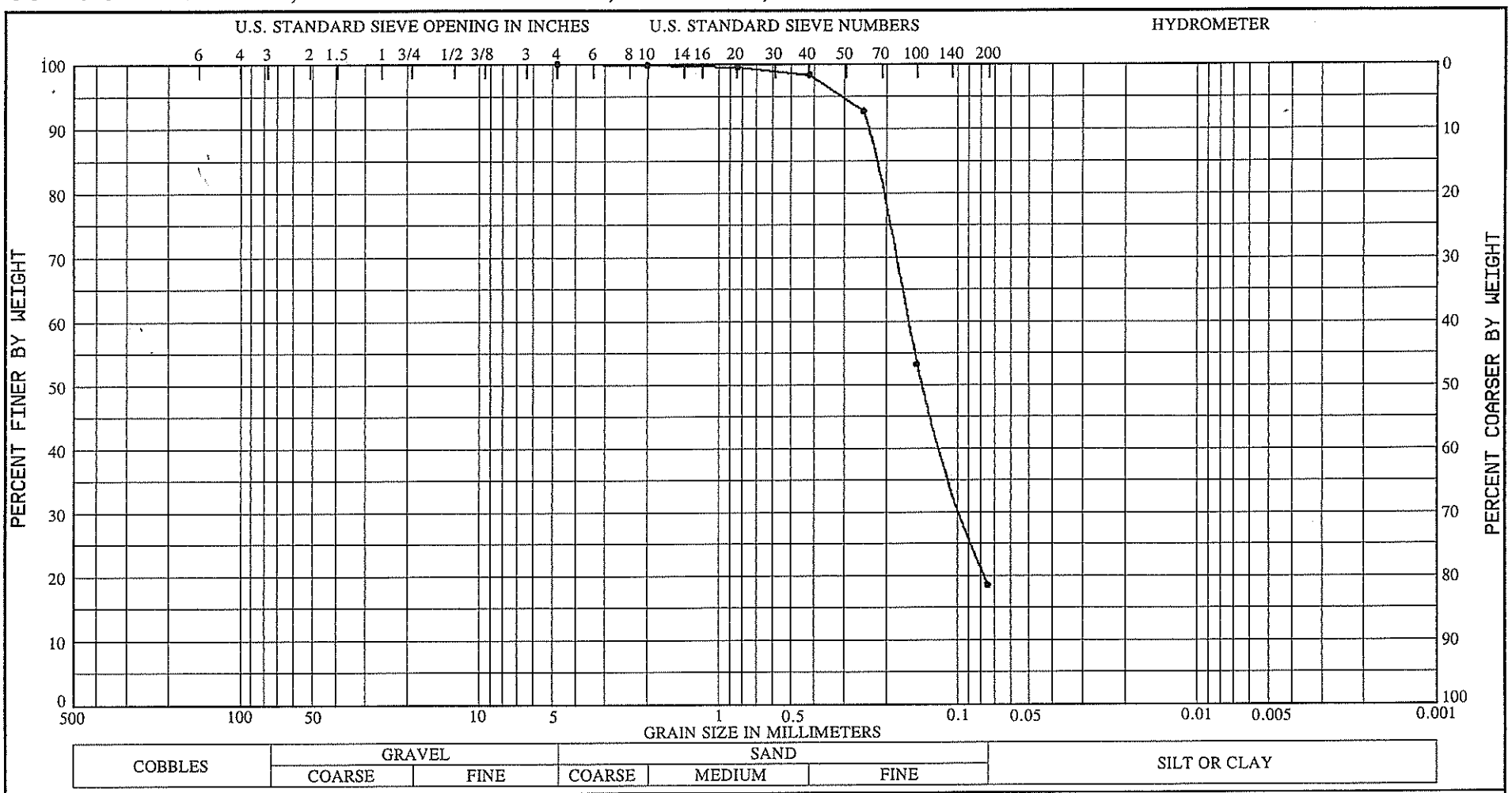
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 1-1	2.0-2.3	GRAY, POORLY GRADED SILTY SAND (SP-SM),				
		WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1297A
Boring No. DRV-32
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



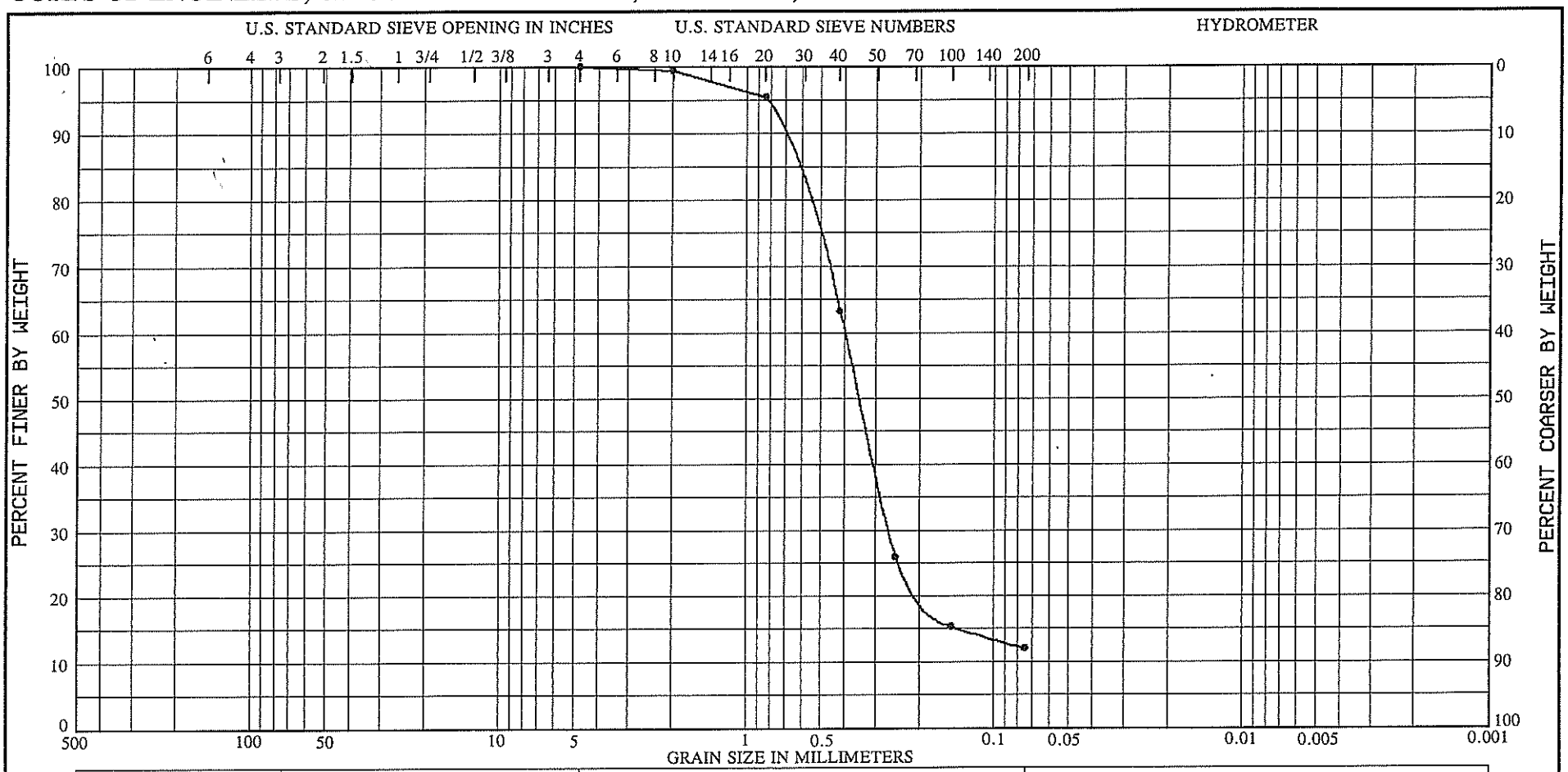
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 1-2	4.3-4.6	GRAY, SILTY SAND (SM), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1297A
Boring No. DRV-32
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

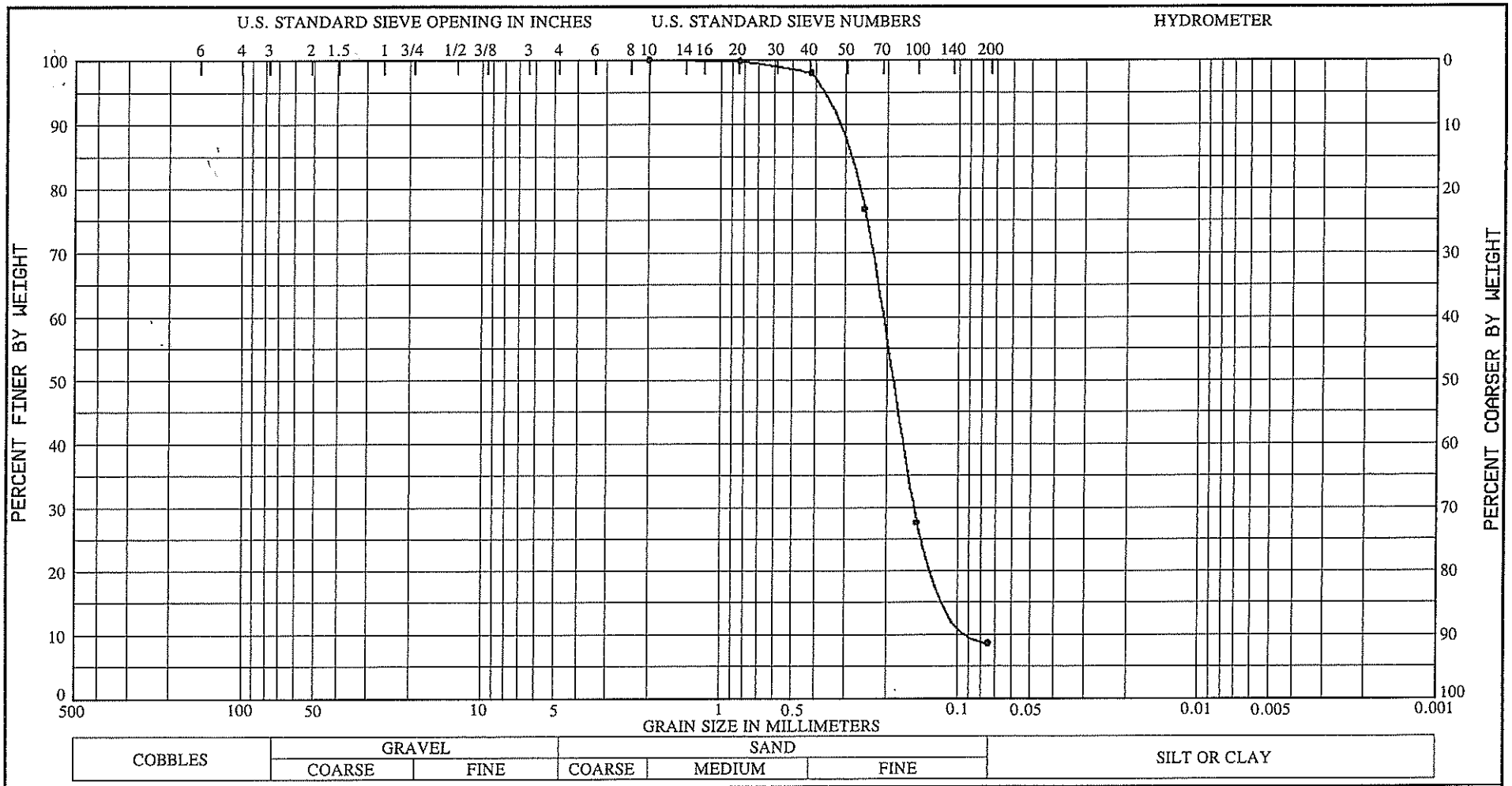
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 2-1	2.5-2.8	GRAY, SILTY SAND (SM), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1297B
Boring No. DRV-32
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



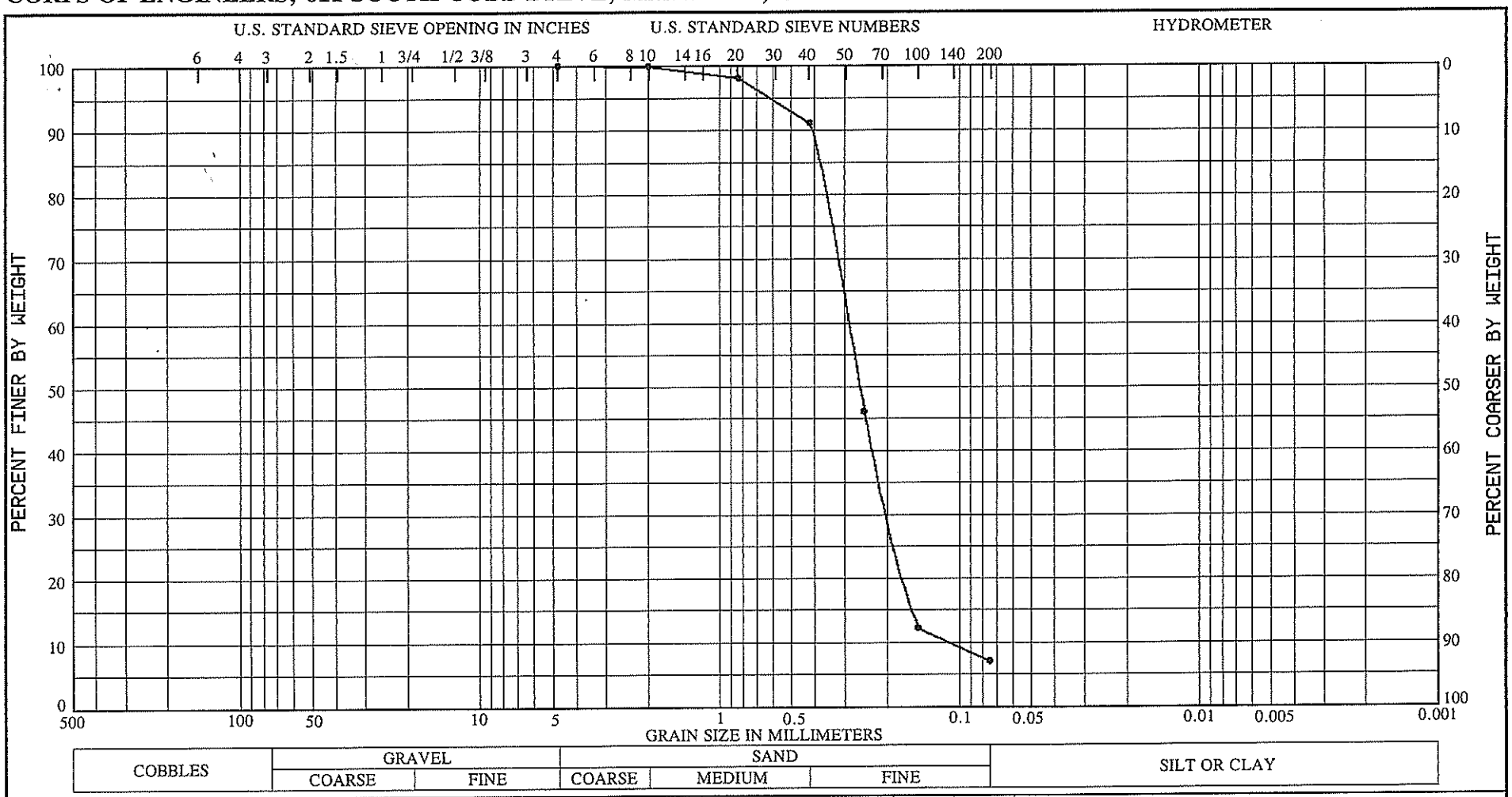
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 2-2	4.4-4.7	GRAY, POORLY GRADED SILTY SAND (SP-SM),				
		WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1297B
Boring No. DRV-32
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



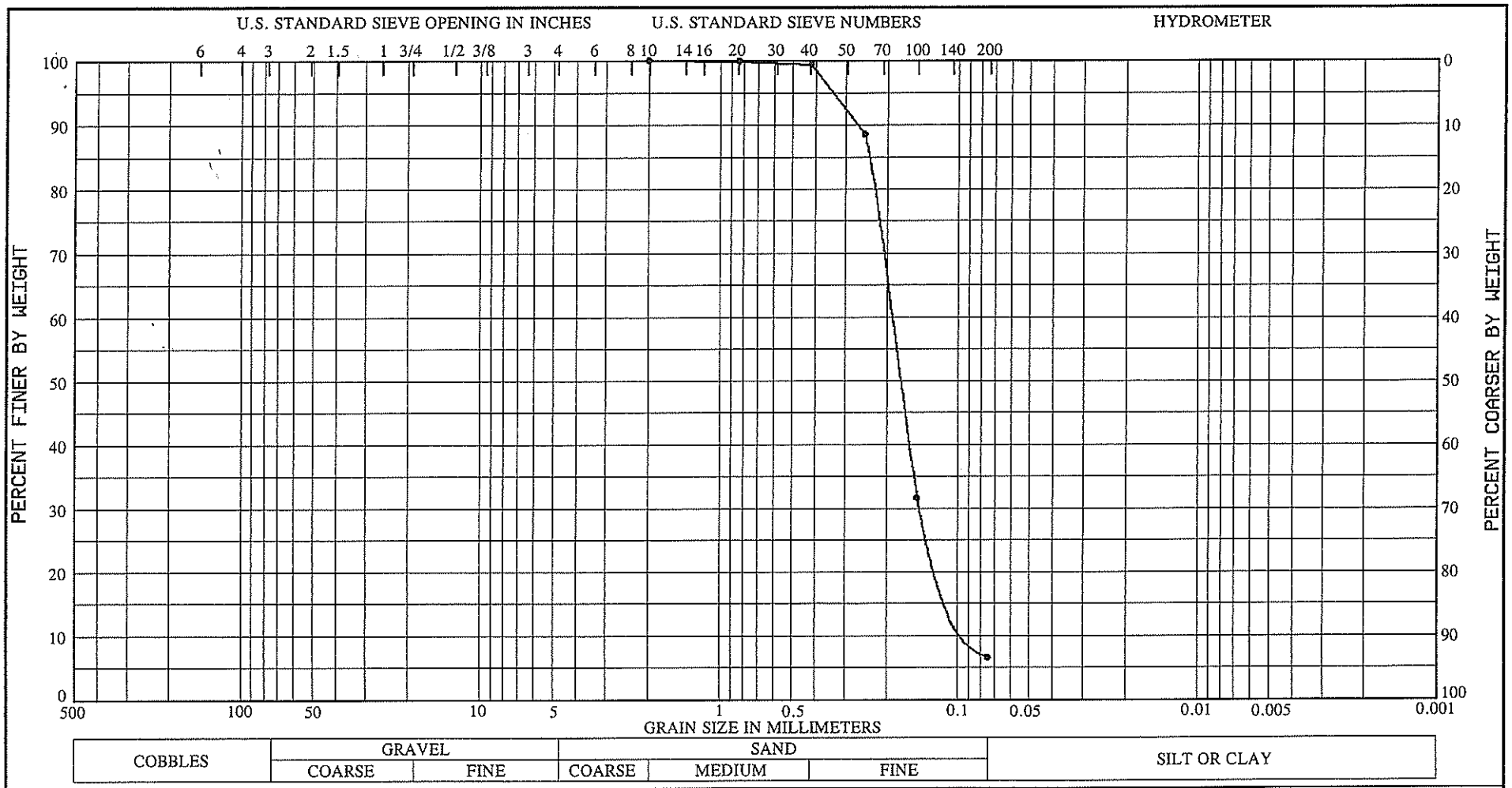
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 3-1	2.5-2.8	GRAY, POORLY GRADED SILTY SAND (SP-SM).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1297C
Boring No. DRV-32
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

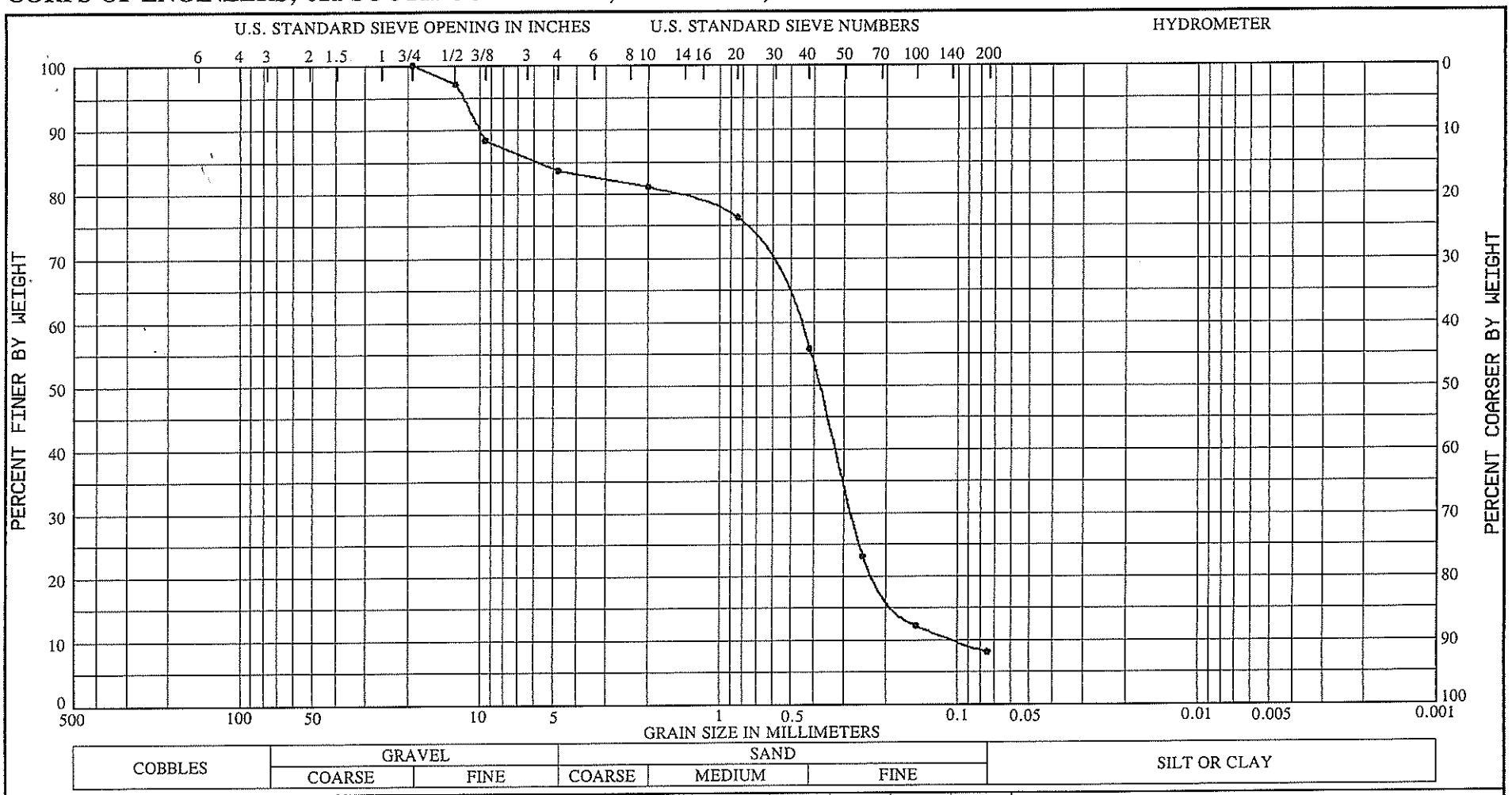
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 3-2	5.0-5.3	GRAY, POORLY GRADED SILTY SAND (SP-SM),				
		WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1297C
Boring No. DRV-32
Date 08/29/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



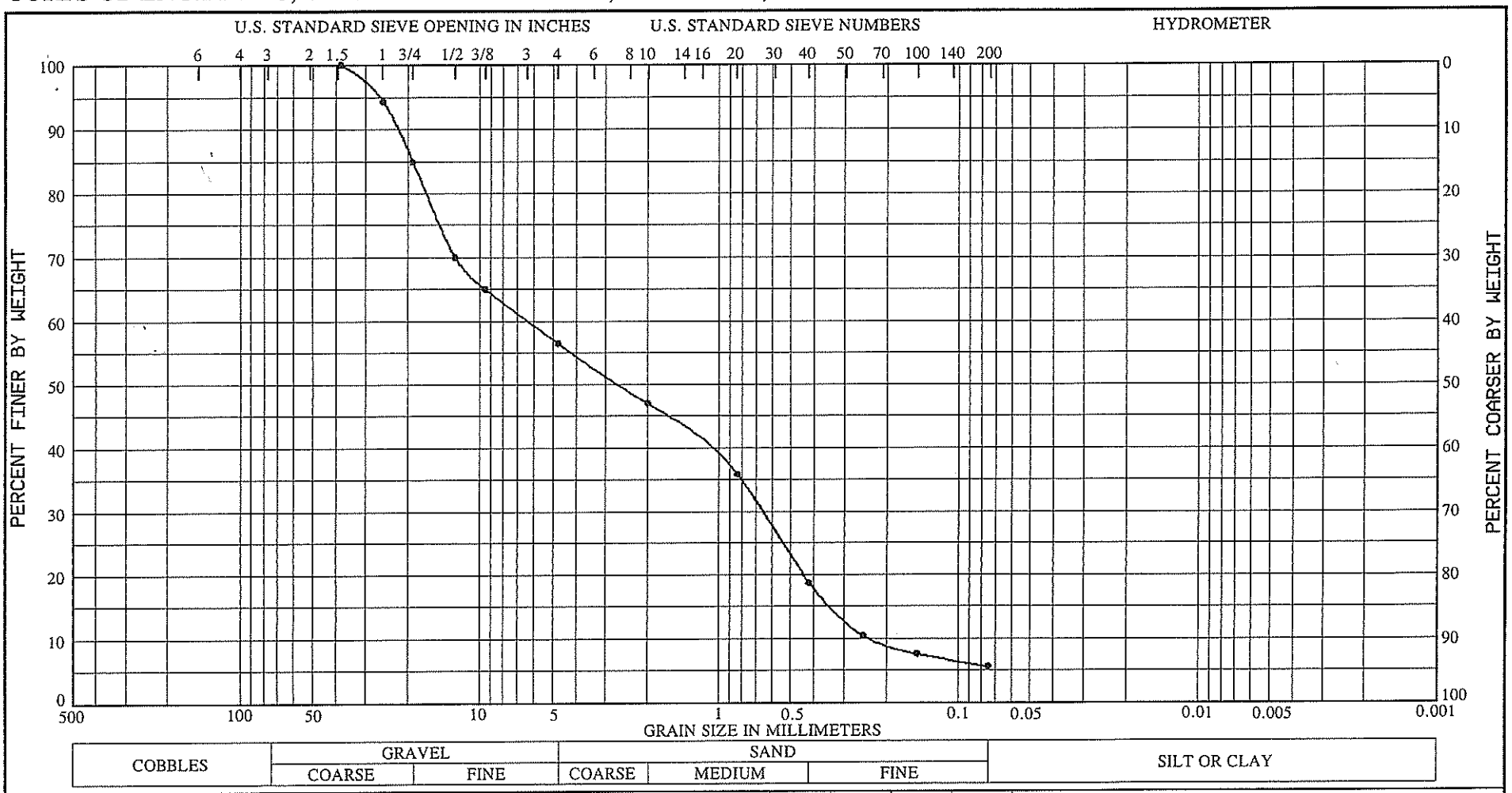
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 1-1	1.0-1.3	GRAY, POORLY GRADED SILTY SAND (SP-SM),				
		WITH A LITTLE GRAVEL SIZES.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298A
Boring No. DRV-33
Date 09/03/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



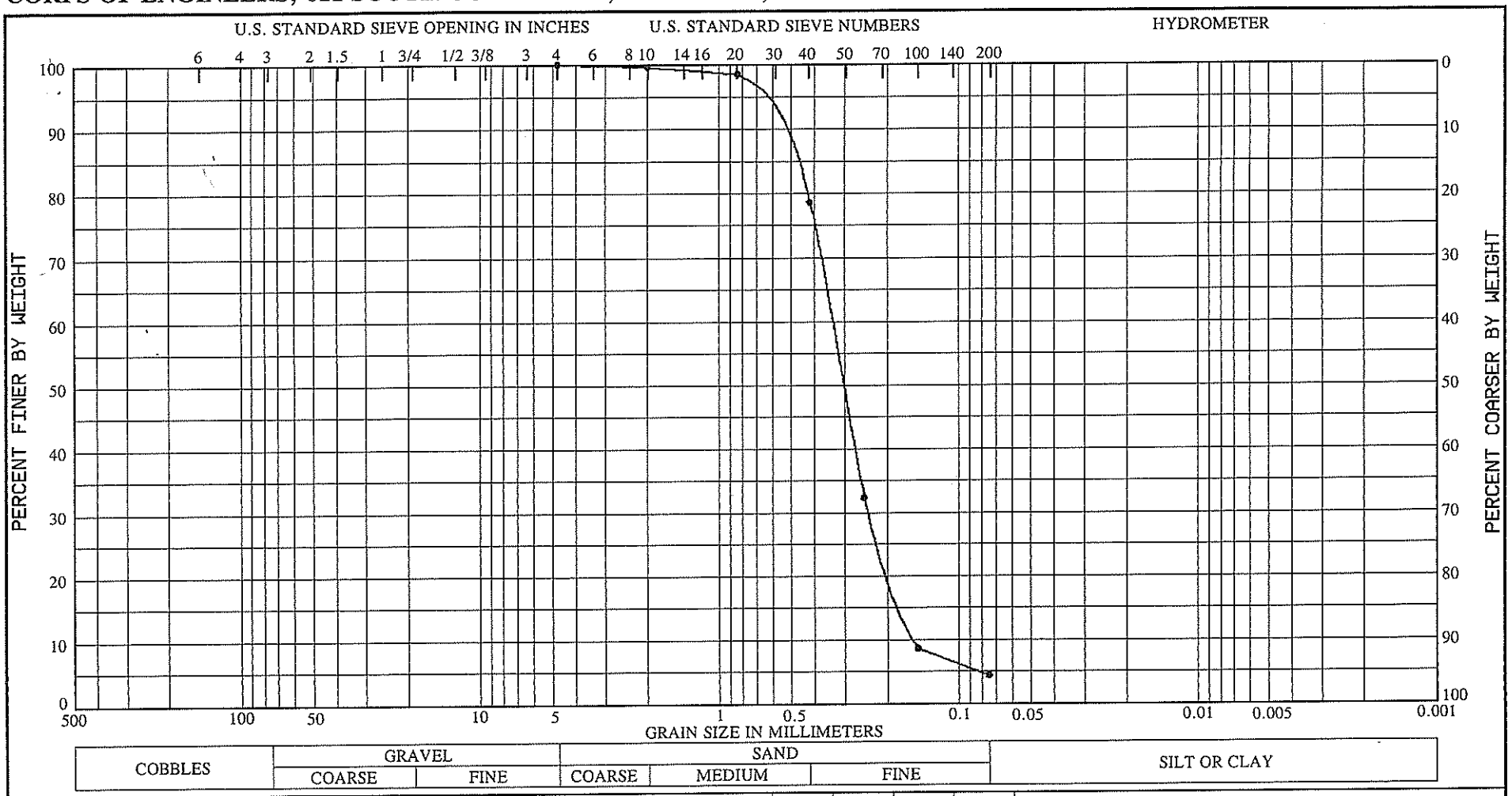
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 1-2	4.0-5.0	TAN & GRAY, GRAVELLY POORLY GRADED SILTY SAND (SP-SM).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298A
Boring No. DRV-33
Date 09/03/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



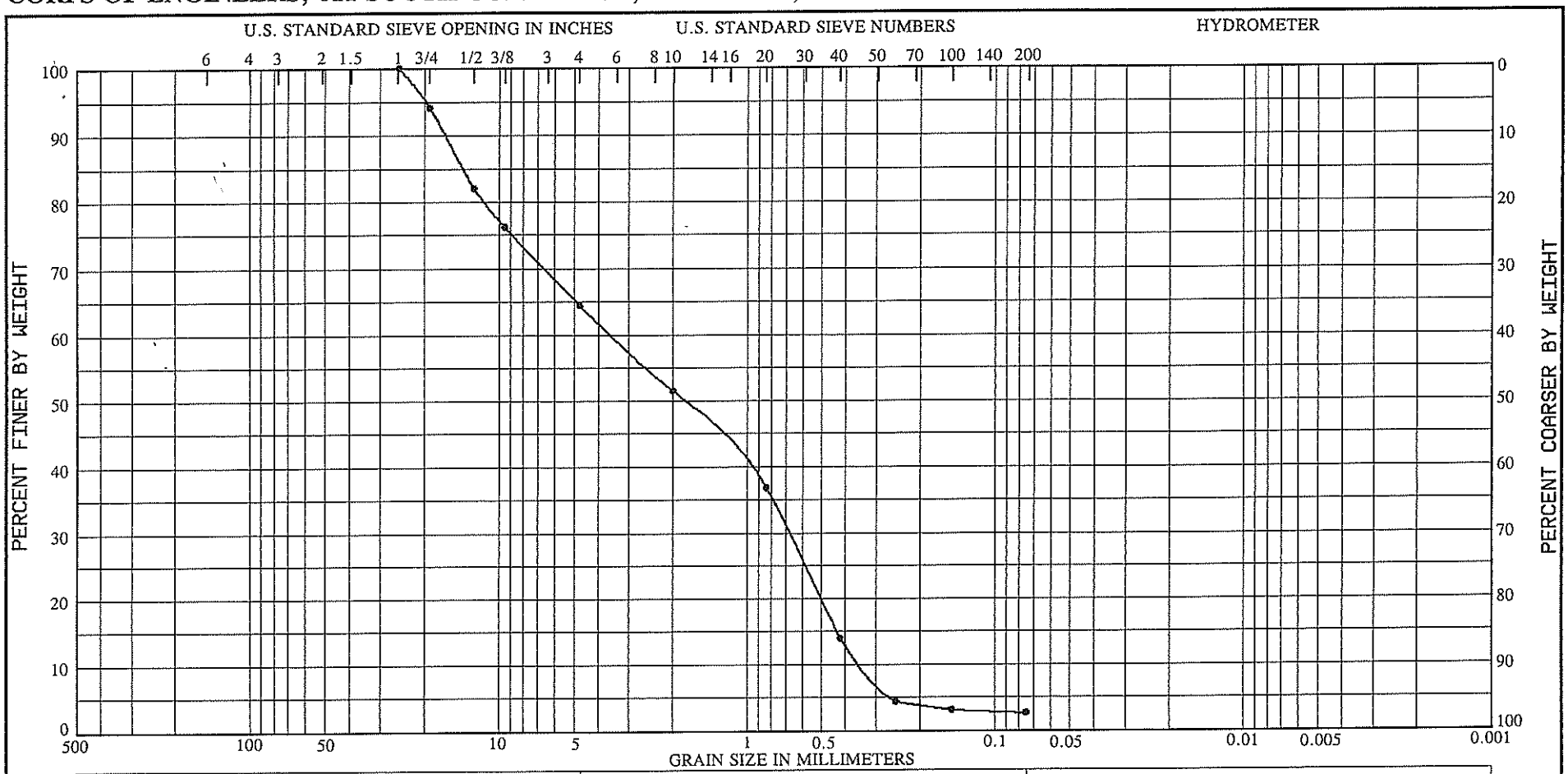
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 2-1	2.4-2.6	GRAY, POORLY GRADED SAND (SP).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298B
Boring No. DRV-33
Date 09/03/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



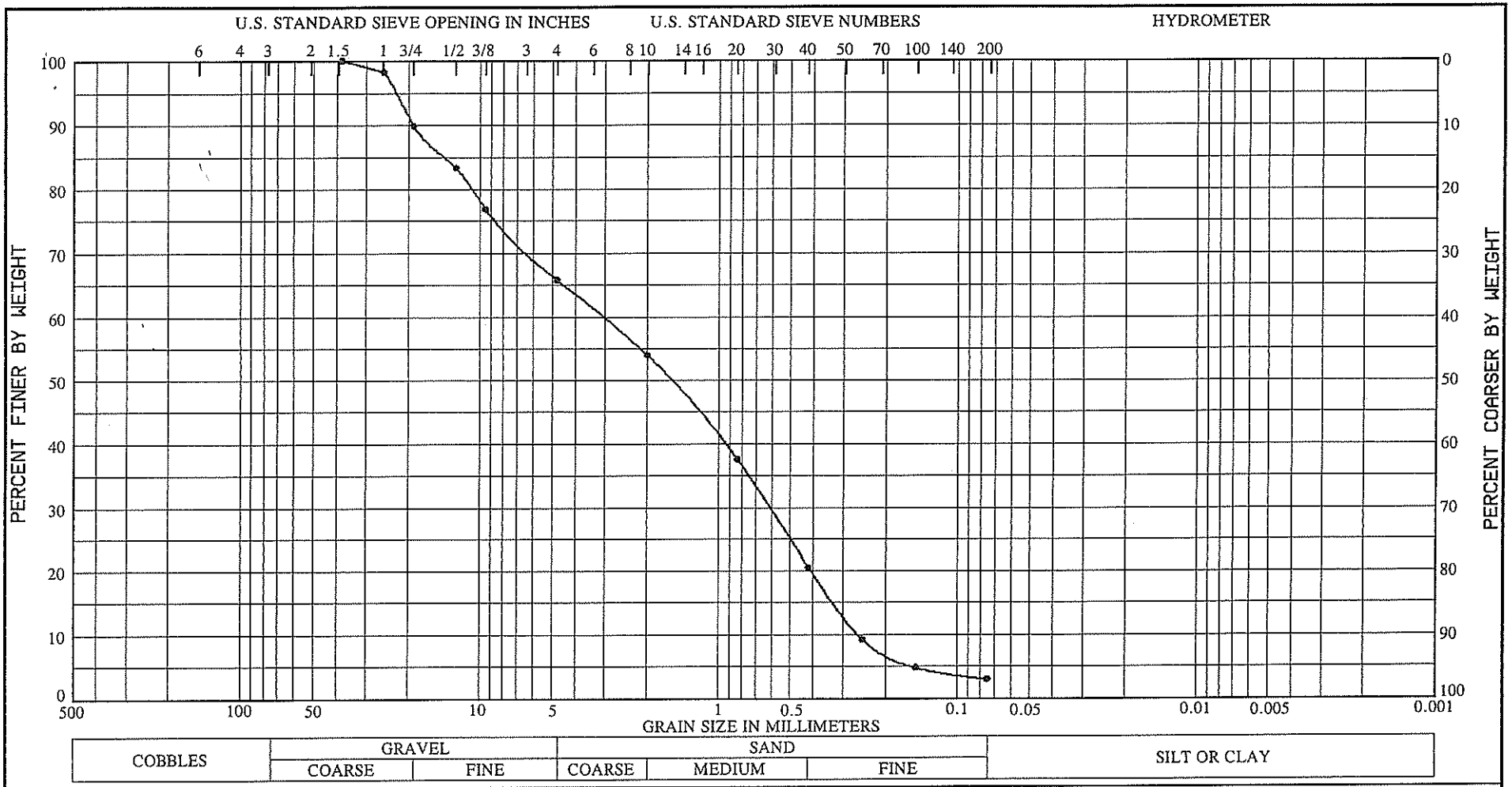
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 2-2	4.5-6.3	TAN, GRAVELLY POORLY GRADED SAND (SP),				
		WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298B
Boring No. DRV-33
Date 09/03/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



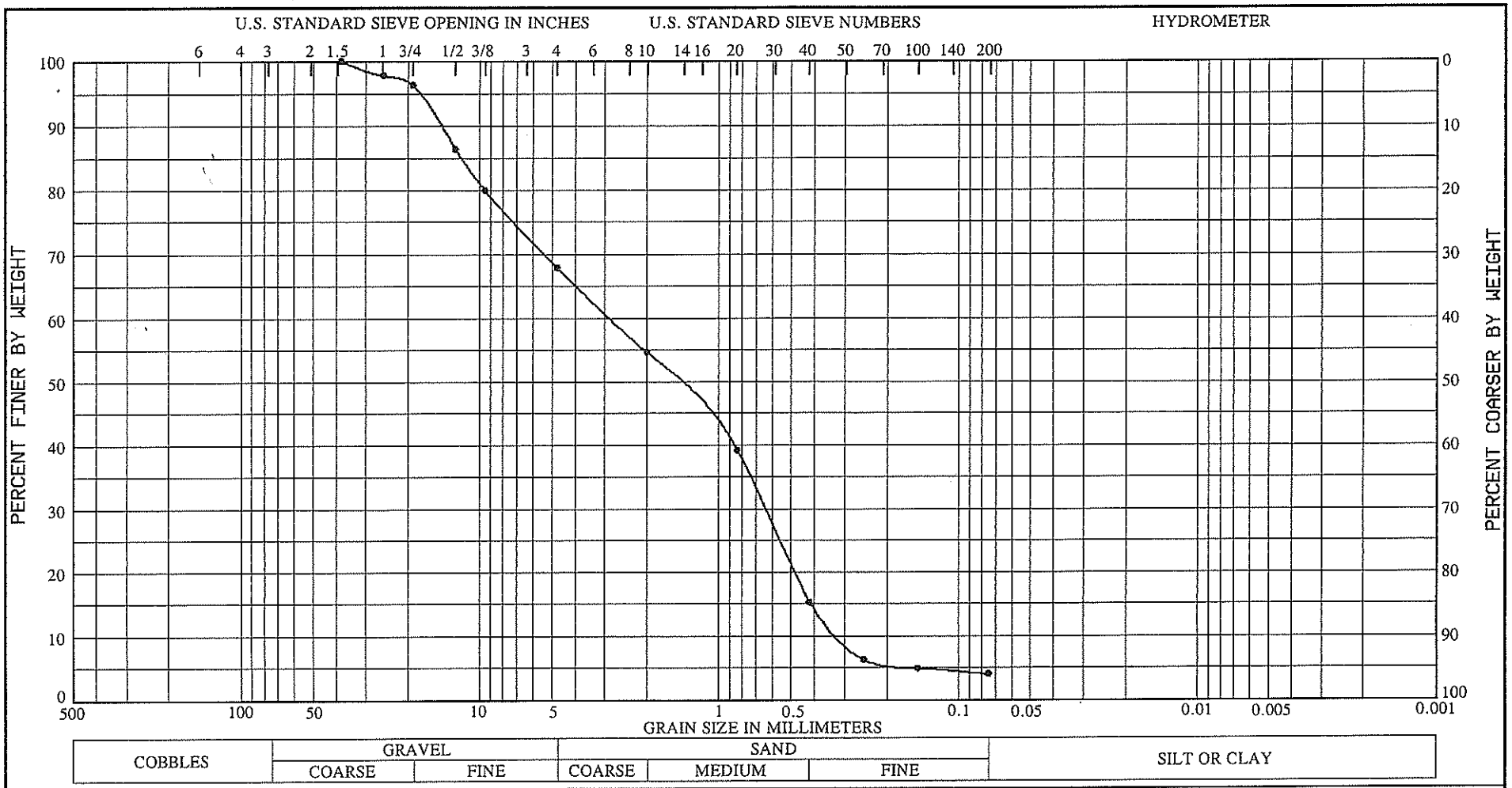
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 2-3	6.9-7.5	TAN, POORLY GRADED SAND (SP), WITH SOME GRAVEL SIZES AND A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298B
Boring No. DRV-33
Date 09/03/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



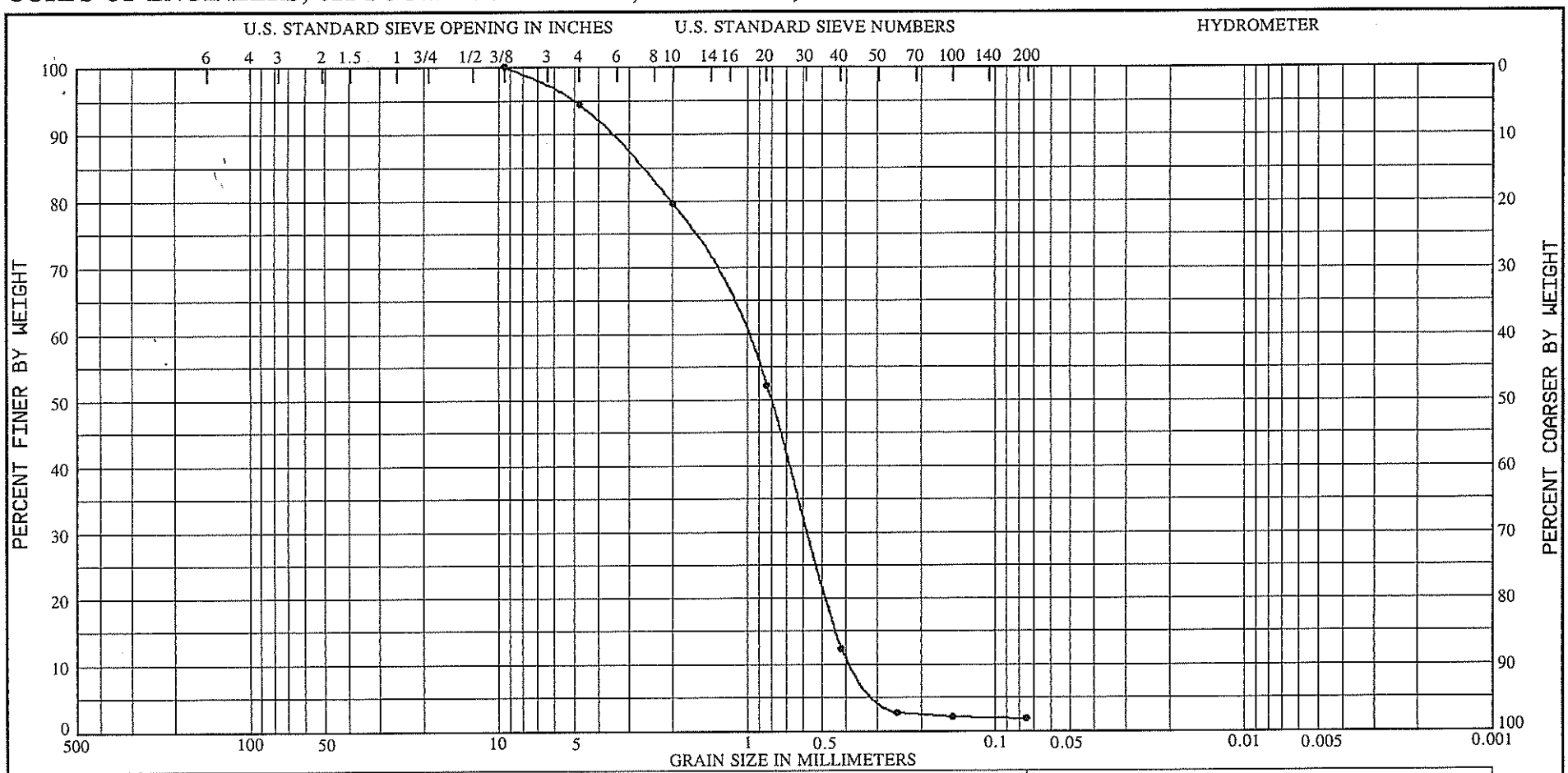
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 3-1	2.3-2.9	TAN & GRAY, POORLY GRADED SAND (SP).				
		WITH SOME GRAVEL SIZES.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298C
Boring No. DRV-33
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

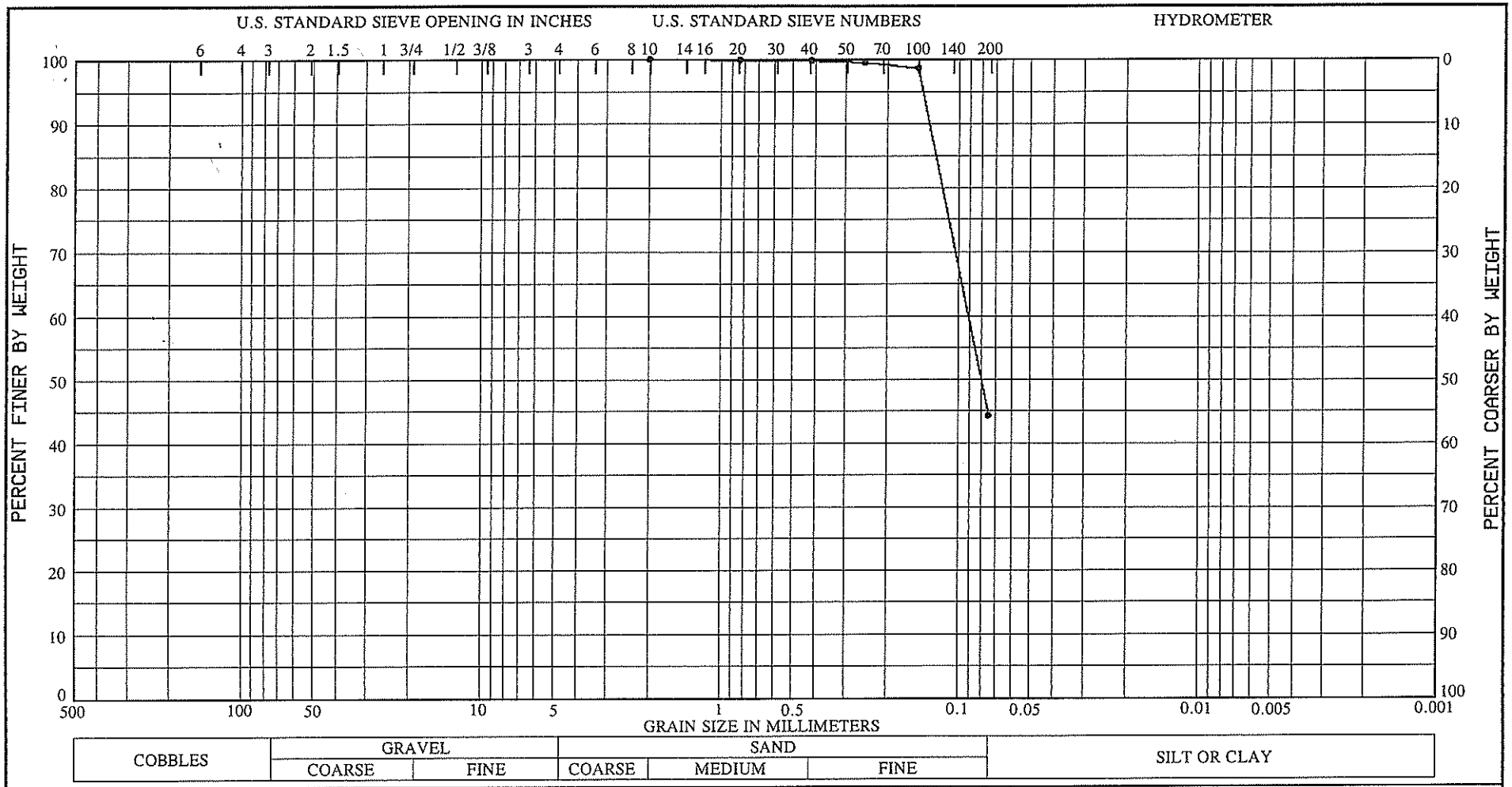
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 3-2	5.7-6.0	TAN & GRAY, POORLY GRADED SAND (SP),				
		WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298C
Boring No. DRV-33
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



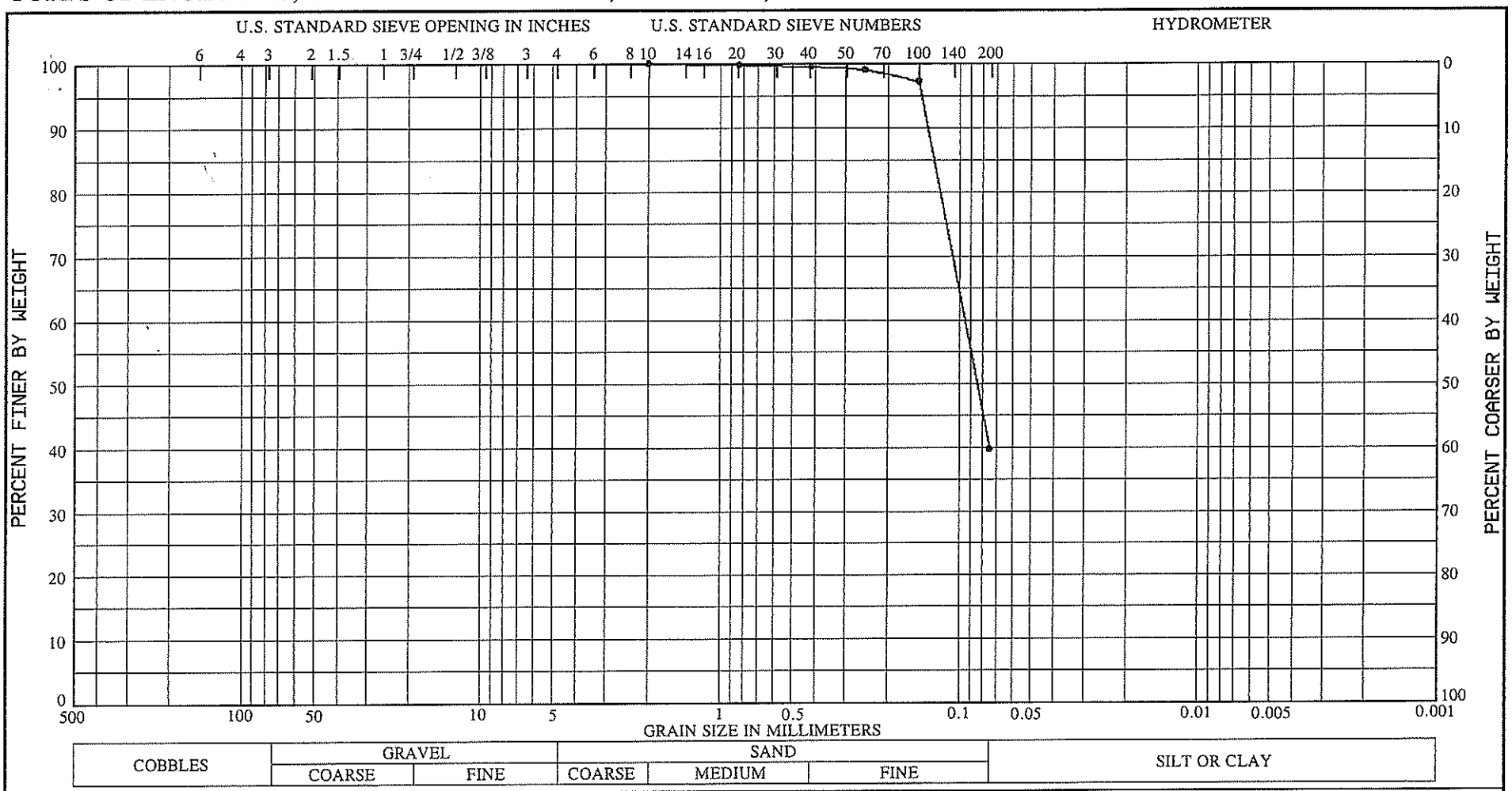
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 3-3	9.1-9.4	TAN, SILTY SAND (SM), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298C
Boring No. DRV-33
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



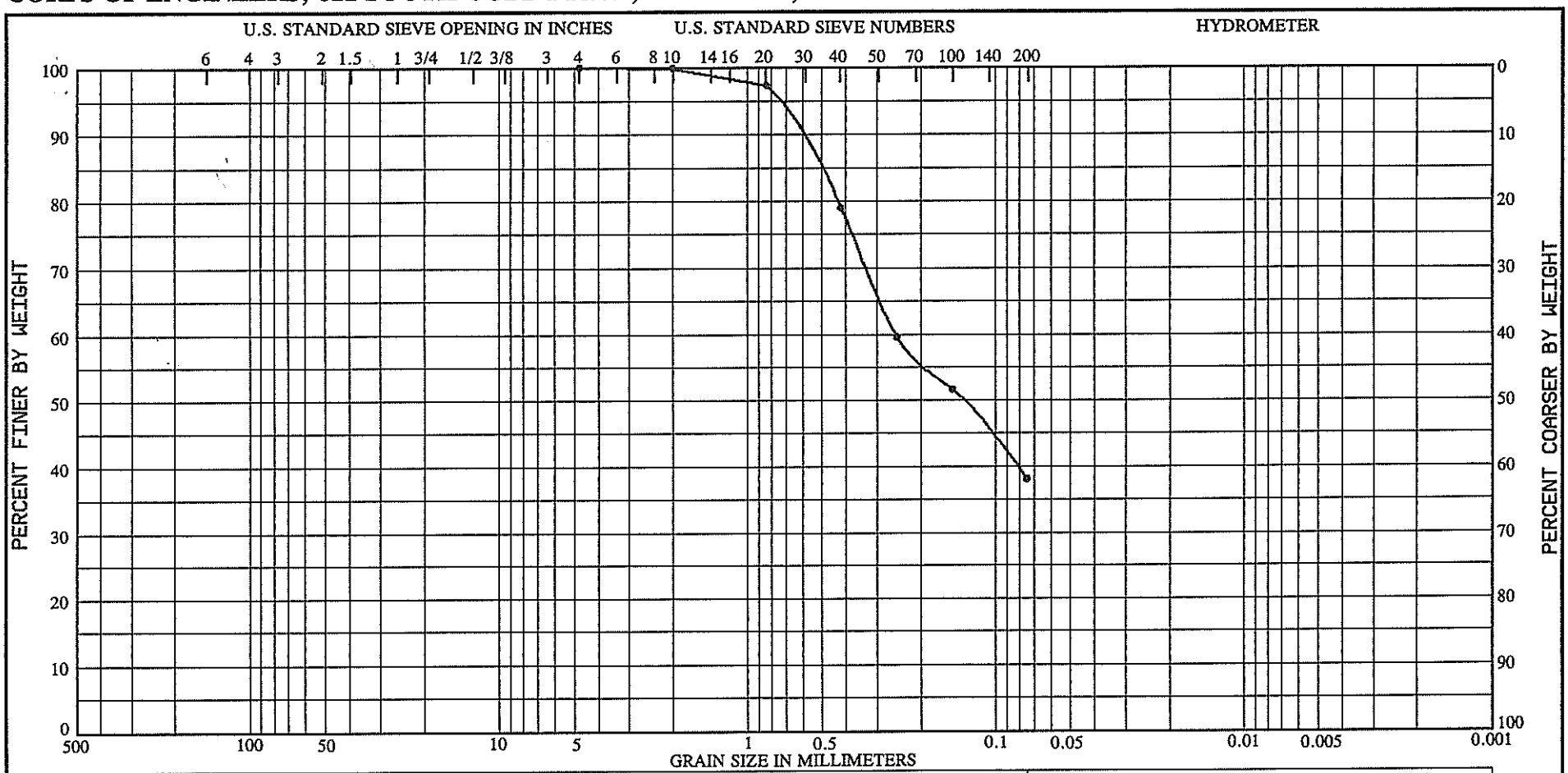
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
REACH 3-4	15.0-15.3	GRAY, MICACEOUS SILTY SAND (SM).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1298C
Boring No. DRV-33
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

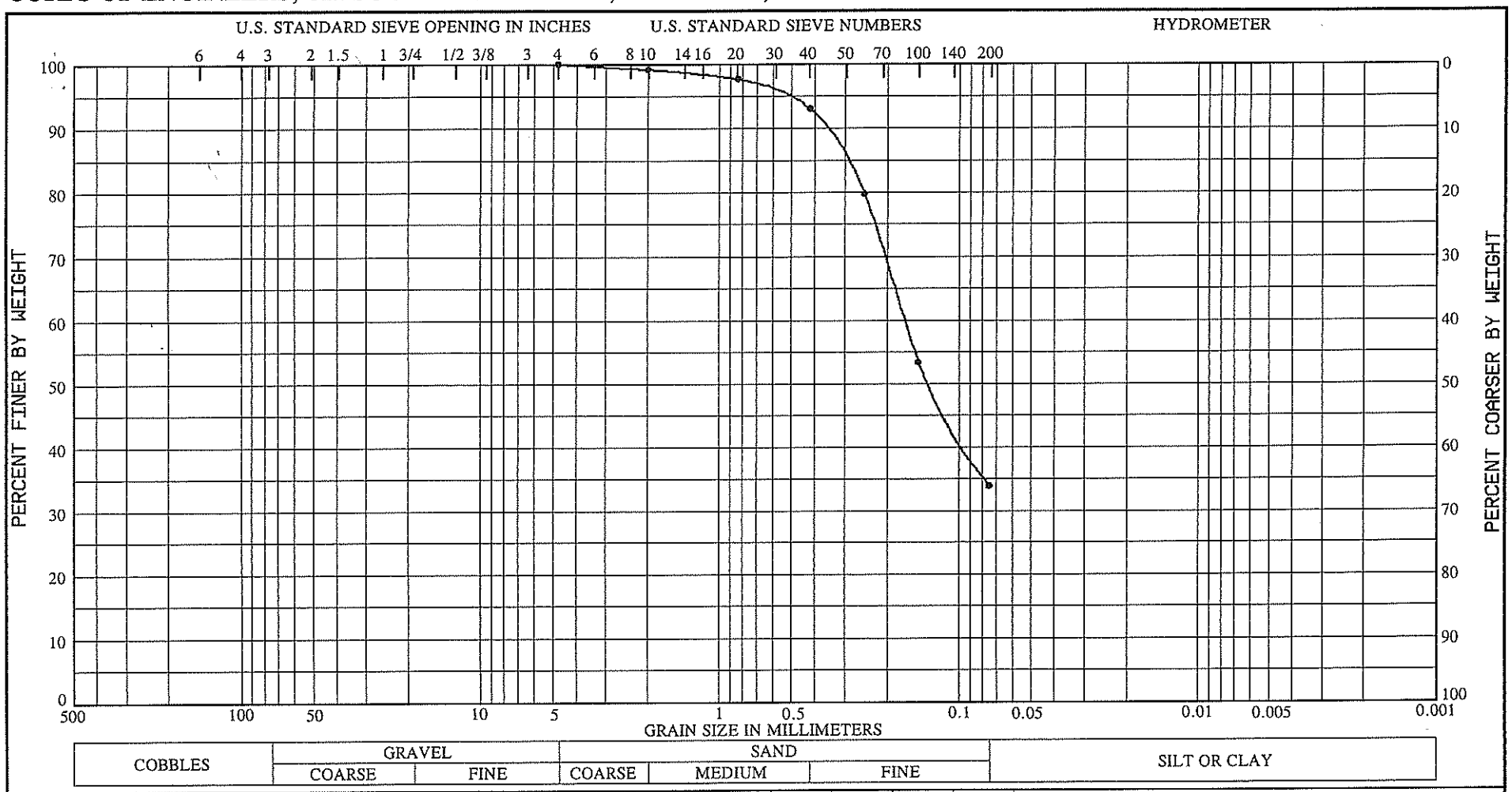
Sample No.	Depth (Ft)	Classification	Nat w%	LL	PL	PI
1	1.3-1.6	GRAY, SILTY SAND (SM), WITH A TRACE OF MICA AND ORGANIC MATTER.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1299
Boring No. DRV-34
Date 10/01/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



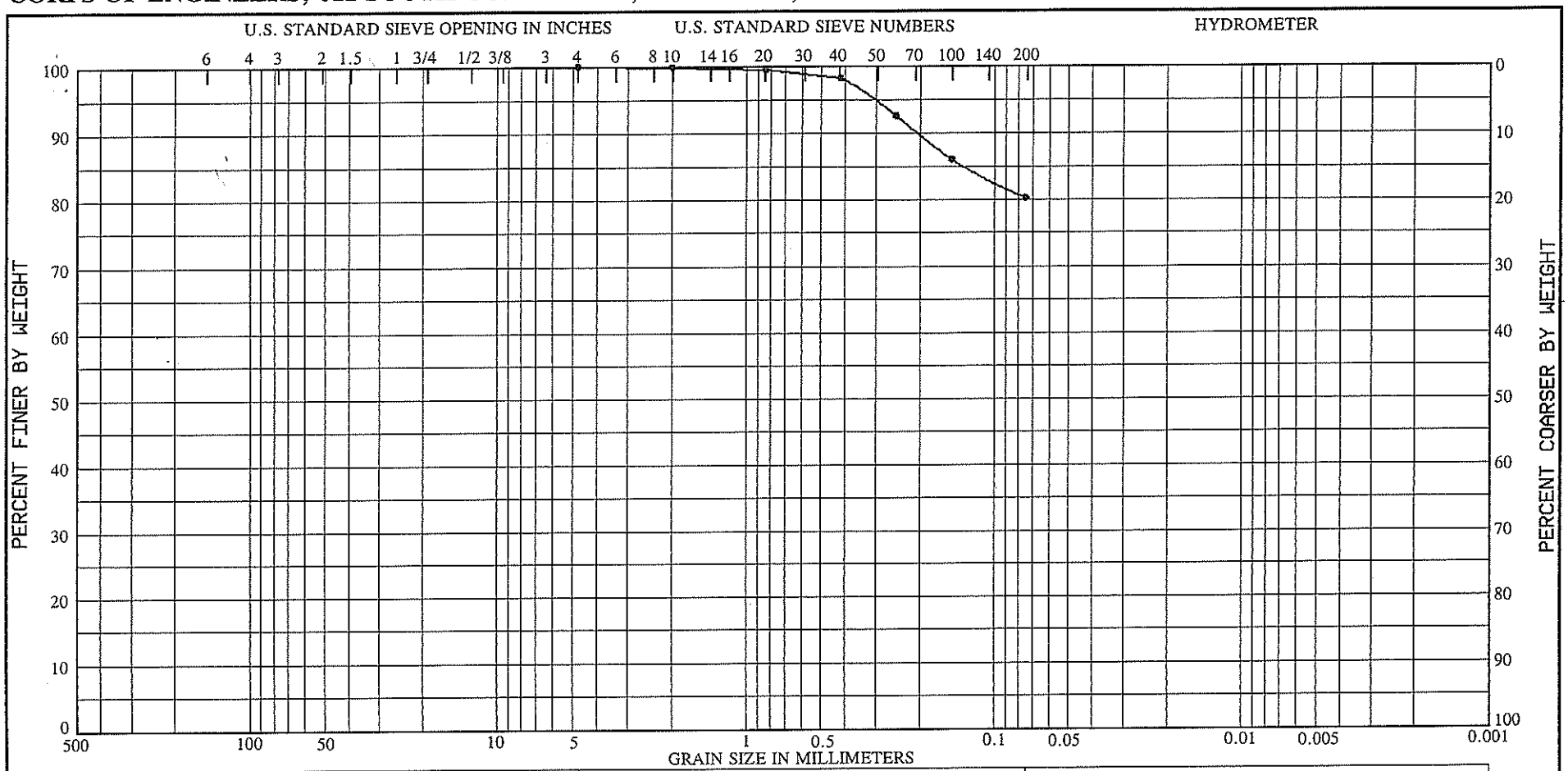
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	6.1-6.3	GRAY, SILTY SAND (SM).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1299
Boring No. DRV-34
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



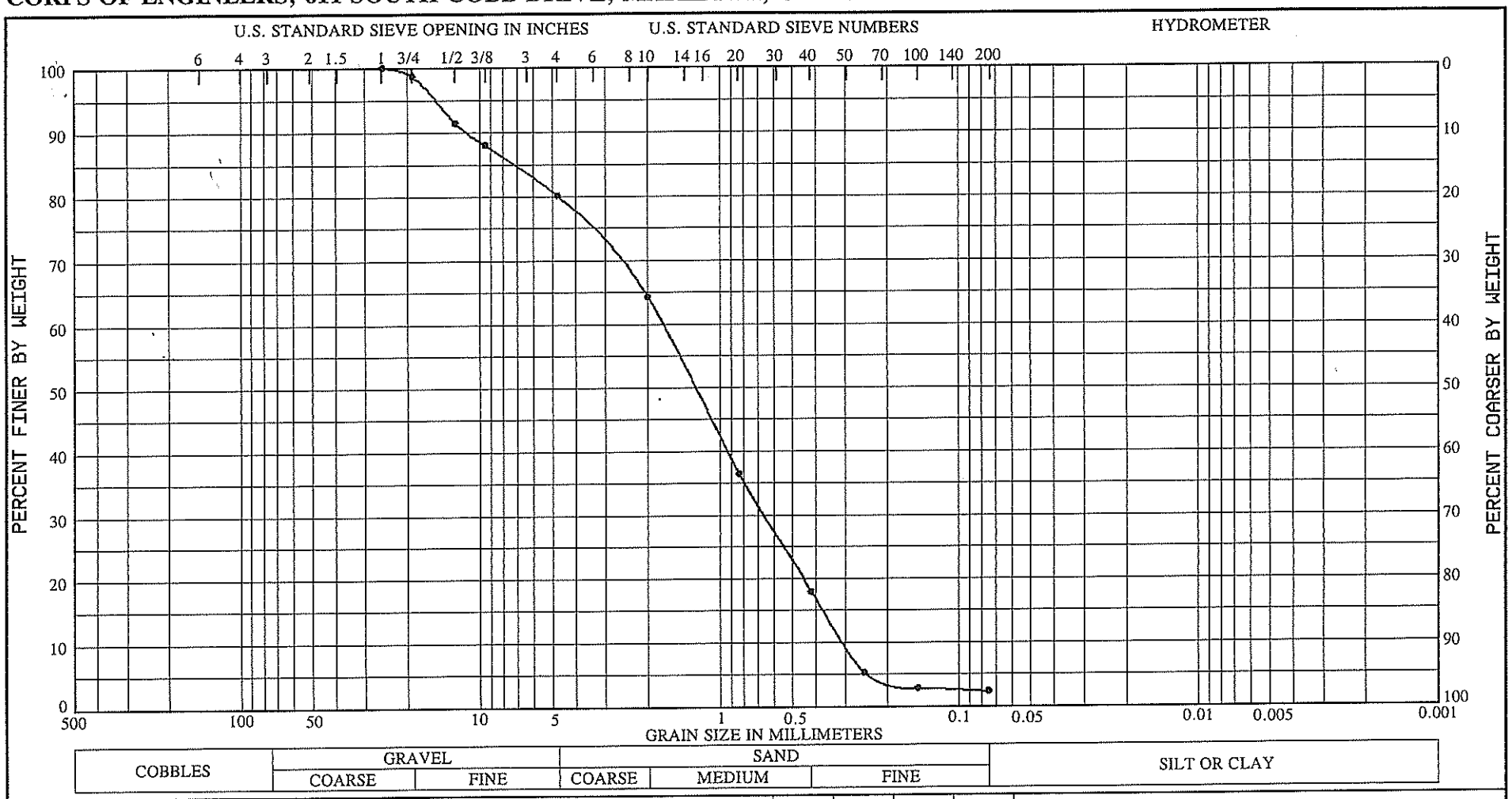
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	11.6-11.9	GRAY, SILTY FAT CLAY (CH), WITH A LITTLE				
		SAND SIZES AND A TRACE OF MICA AND				
		ORGANIC MATTER.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1299
Boring No. DRV-34
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



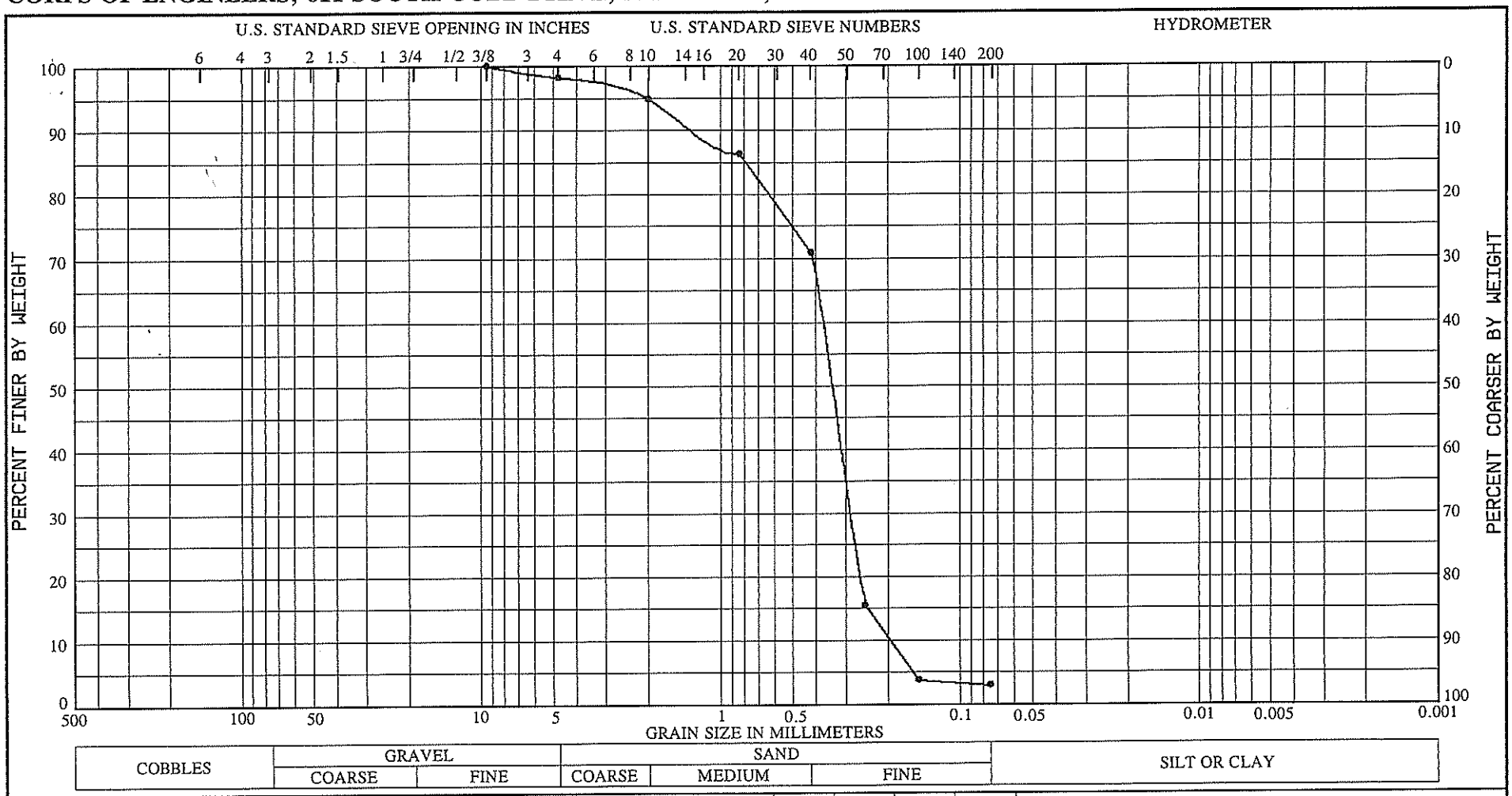
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	3.1-3.9	GRAY, POORLY GRADED SAND (SP), WITH A LITTLE GRAVEL SIZES AND A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1300
Boring No. DRV-35
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



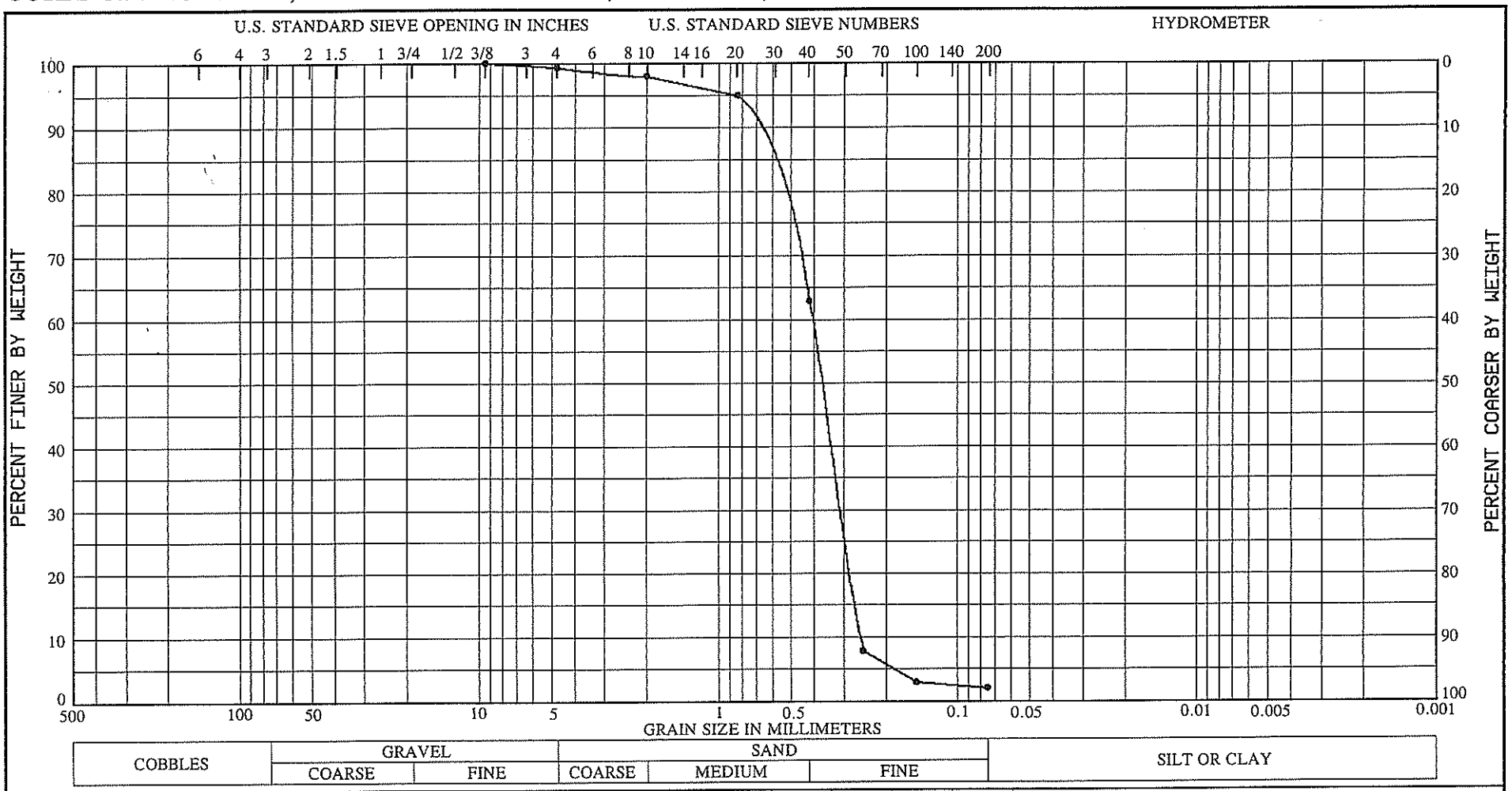
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	6.2-6.5	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1300
Boring No. DRV-35
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



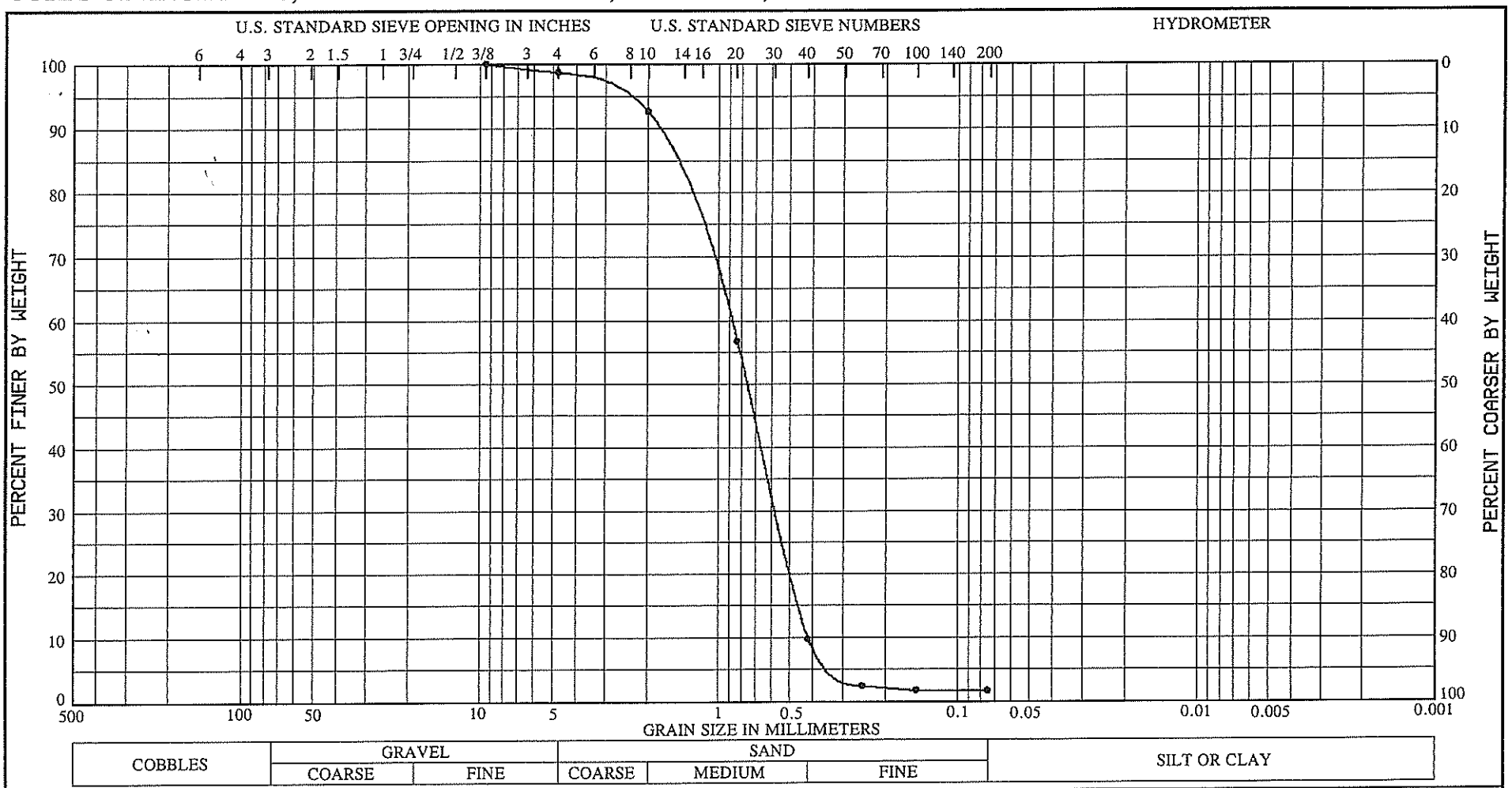
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	12.0-12.3	GRAY, POORLY GRADED SAND (SP), WITH A				
		TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1300
Boring No. DRV-35
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



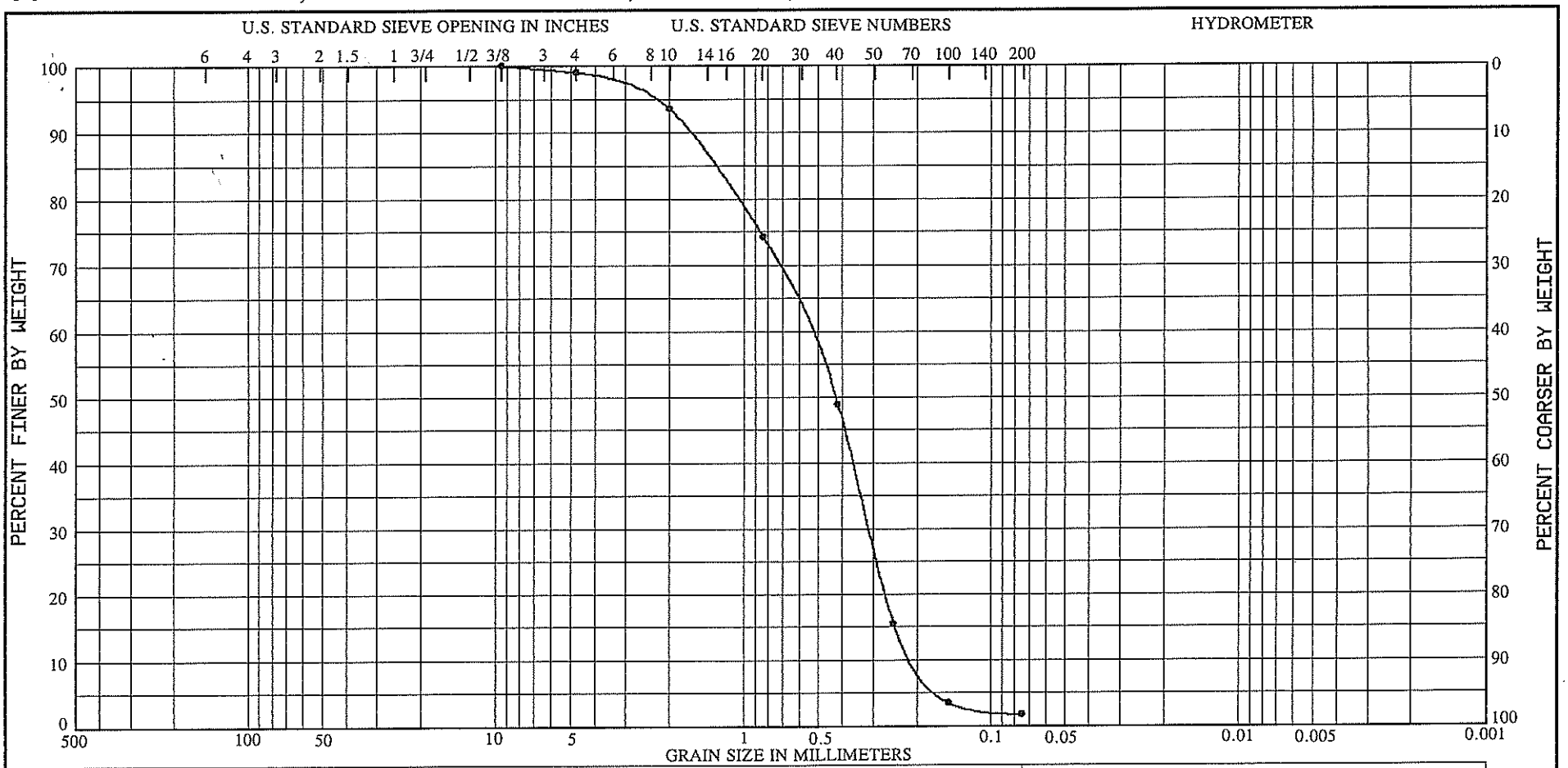
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
4	16.0-16.3	GRAY, POORLY GRADED SAND (SP), WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1300
Boring No. DRV-35
Date 09/04/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

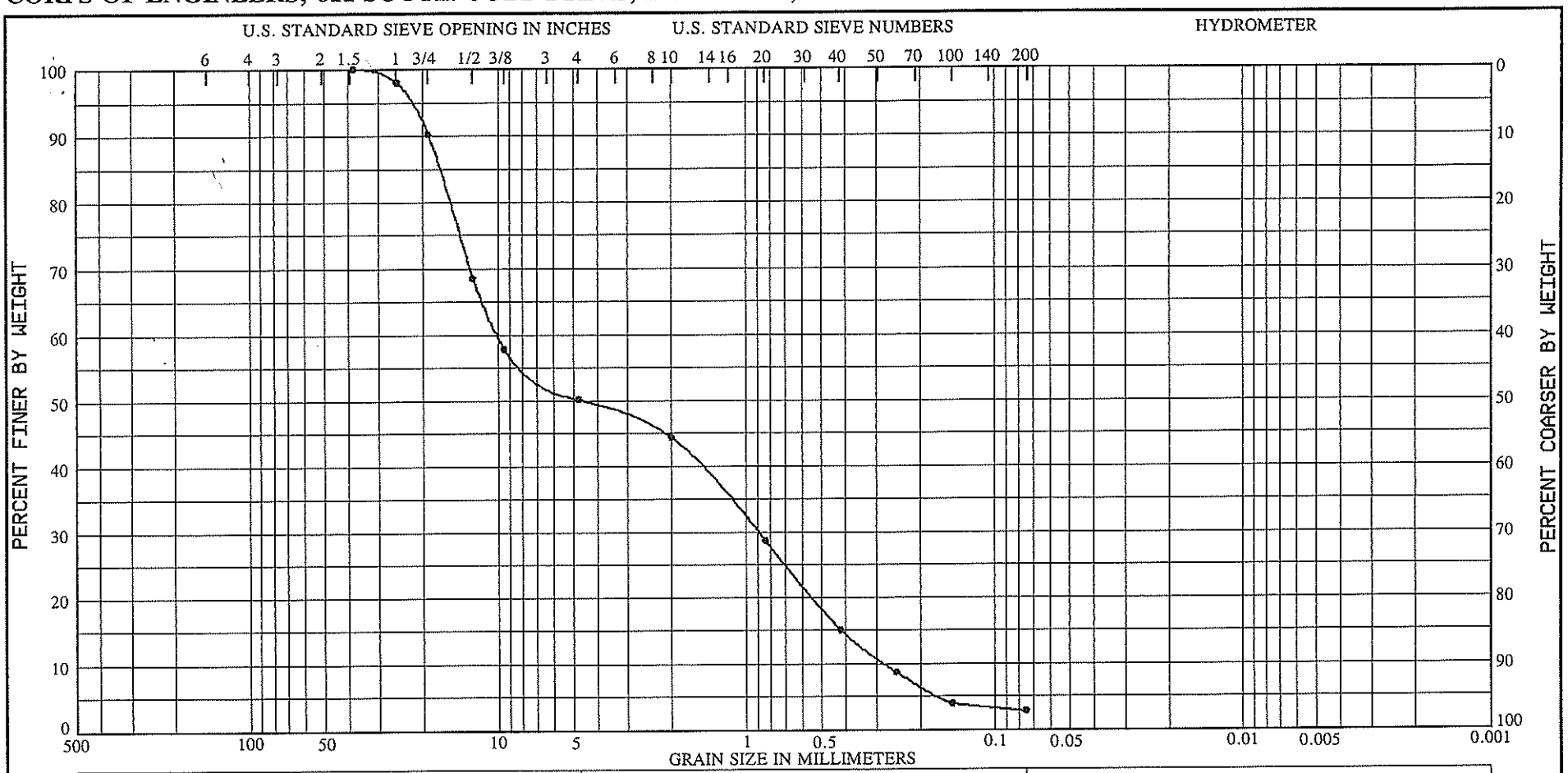
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.1-1.3	TANNISH GRAY, POORLY GRADED SAND (SP),				
		WITH A TRACE OF GRAVEL SIZES AND MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1301
Boring No. DRV-36
Date 09/10/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

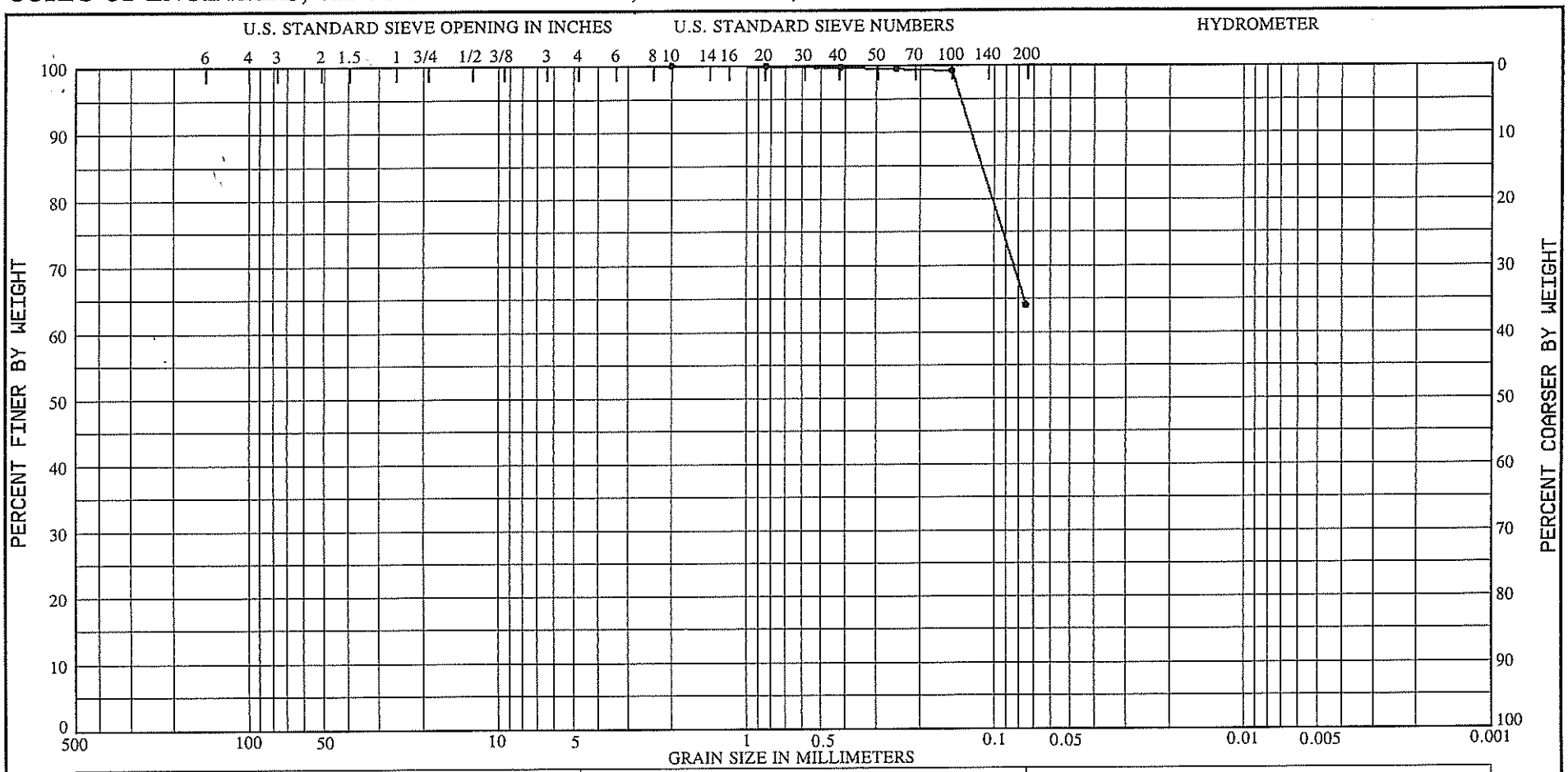
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	3.0-3.7	GRAYISH TAN, SANDY POORLY GRADED GRAVEL				
		(GP), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1301
Boring No. DRV-36
Date 09/10/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



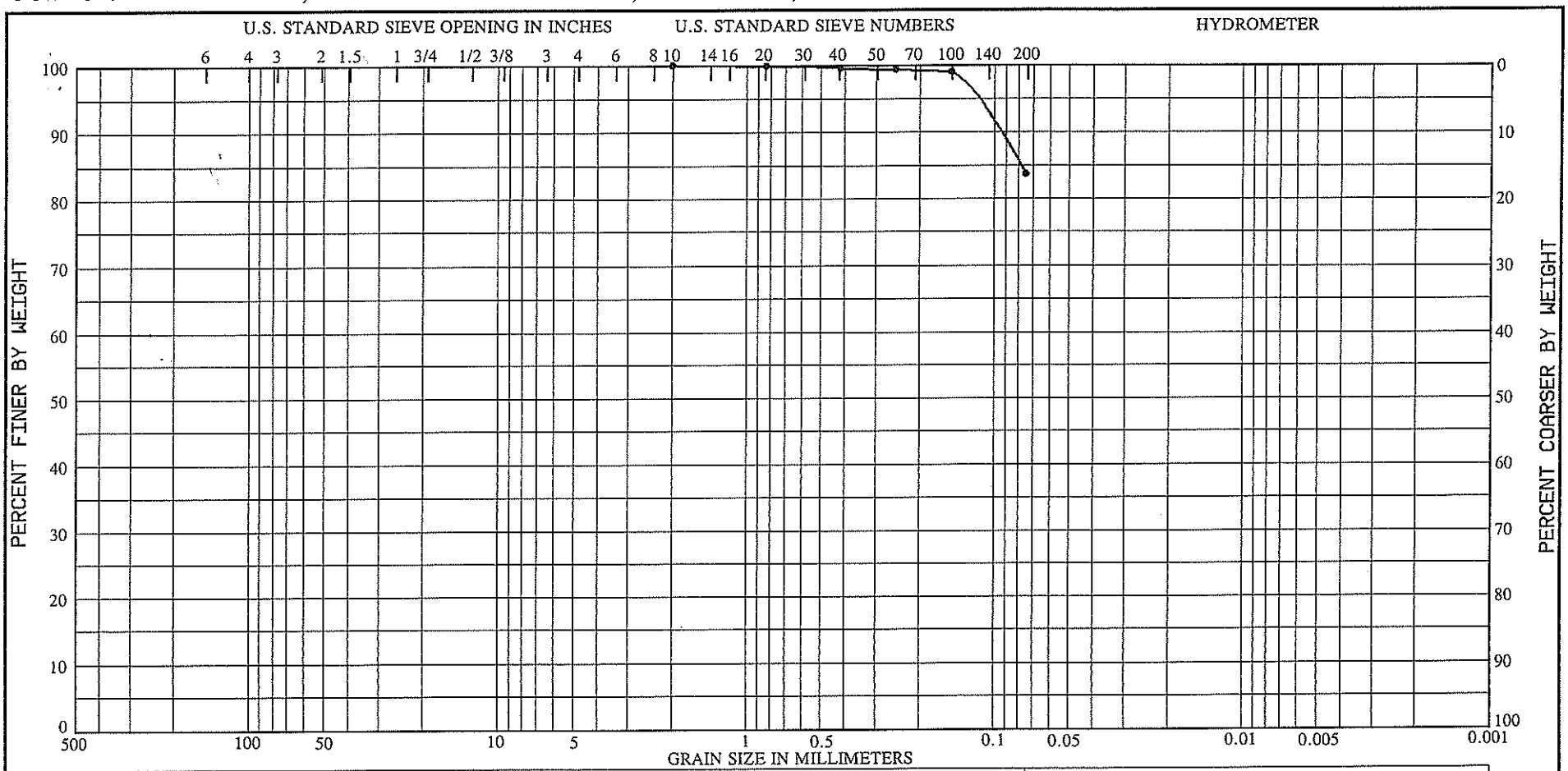
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	5.6-5.9	TANNISH GRAY, SANDY INORGANIC SILT LOW LL (ML), (MICACEOUS).				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1301
Boring No. DRV-36
Date 09/10/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



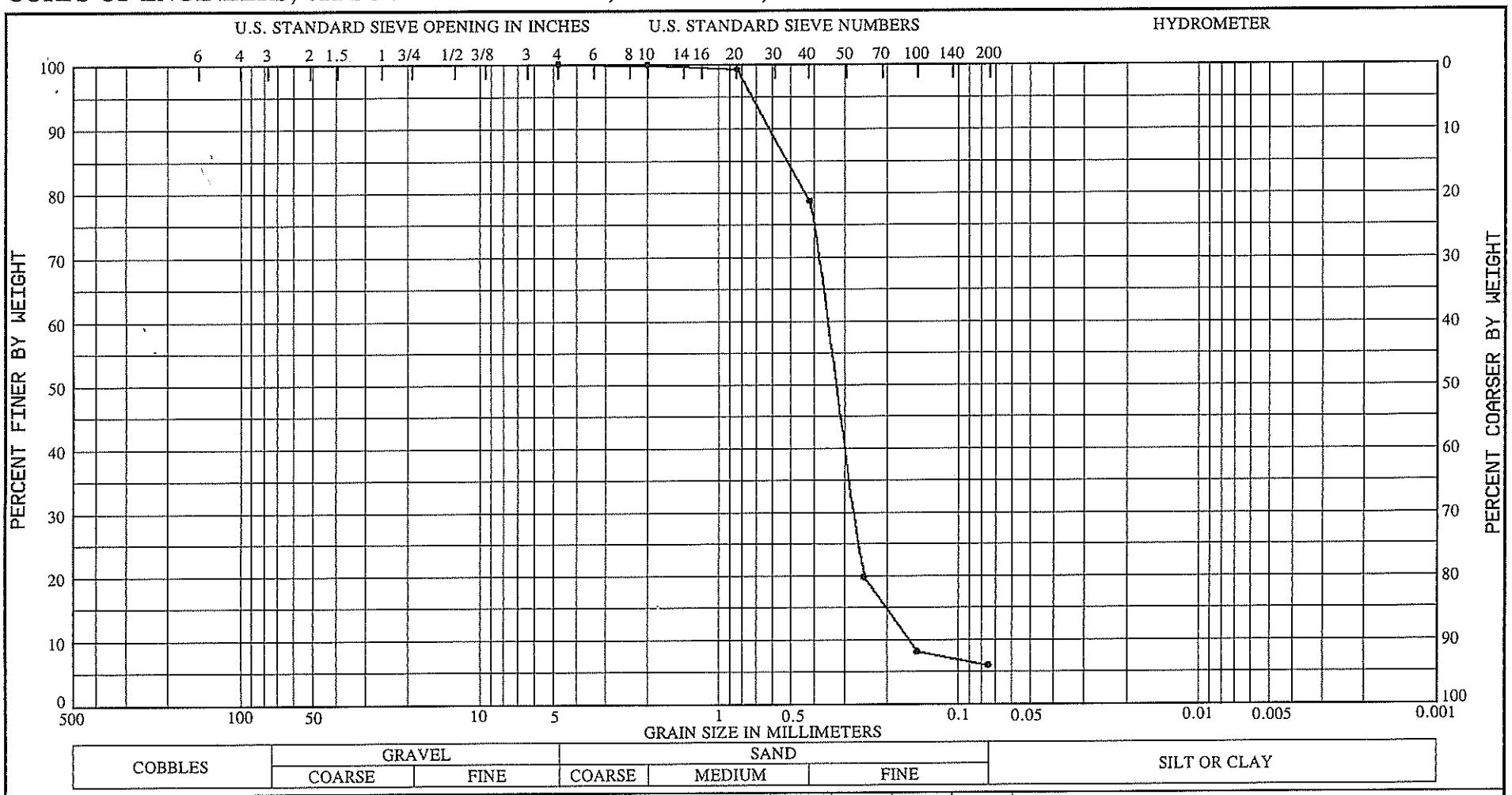
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
4	12.3-12.6	GRAY, MICACEOUS INORGANIC SILT LOW LL				
		(ML), WITH A LITLE SAND SIZES.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1301
Boring No. DRV-36
Date 09/10/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



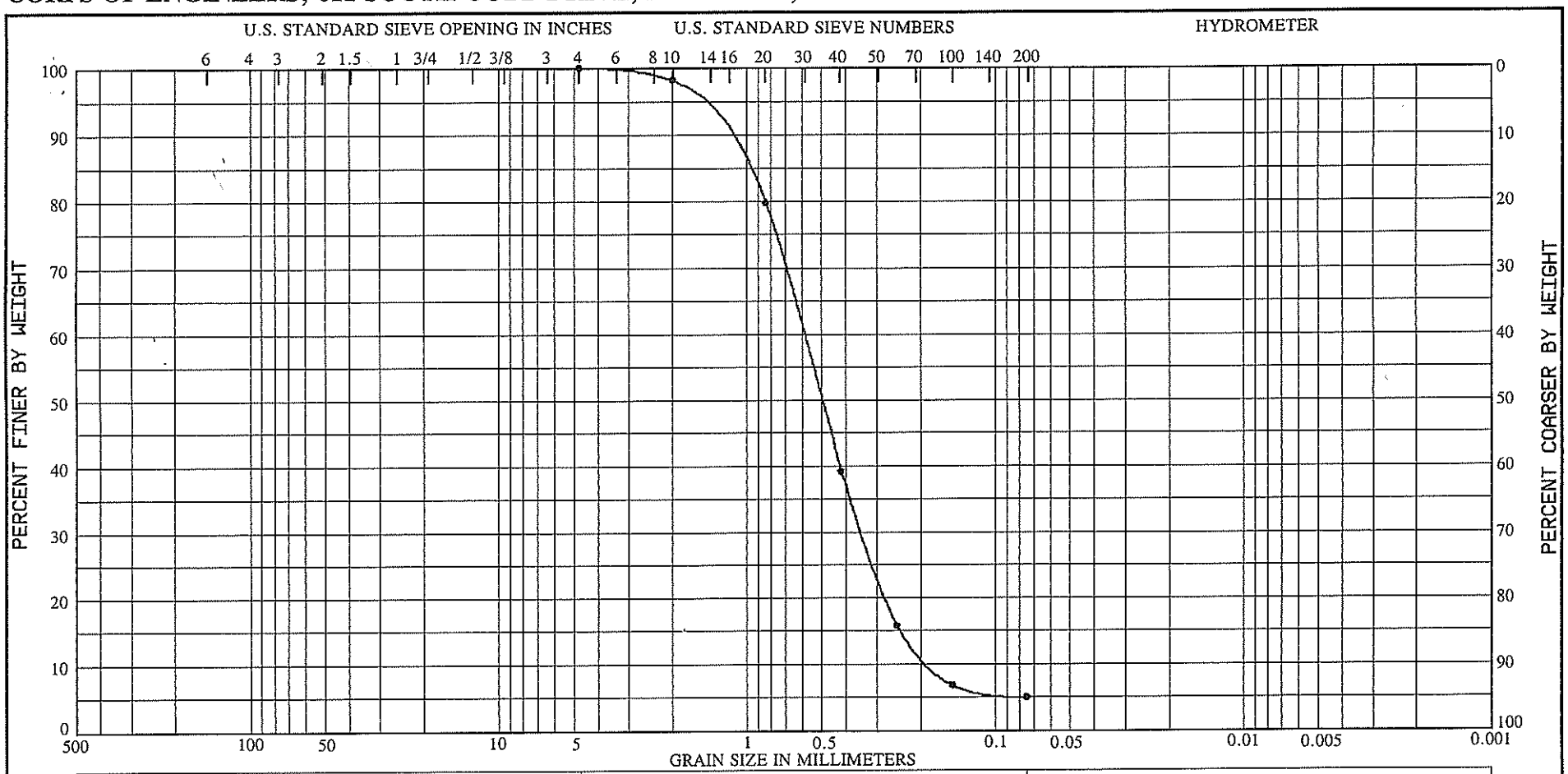
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
1	1.7-2.0	TANNISH GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1302
Boring No. DRV-37
Date 09/10/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813

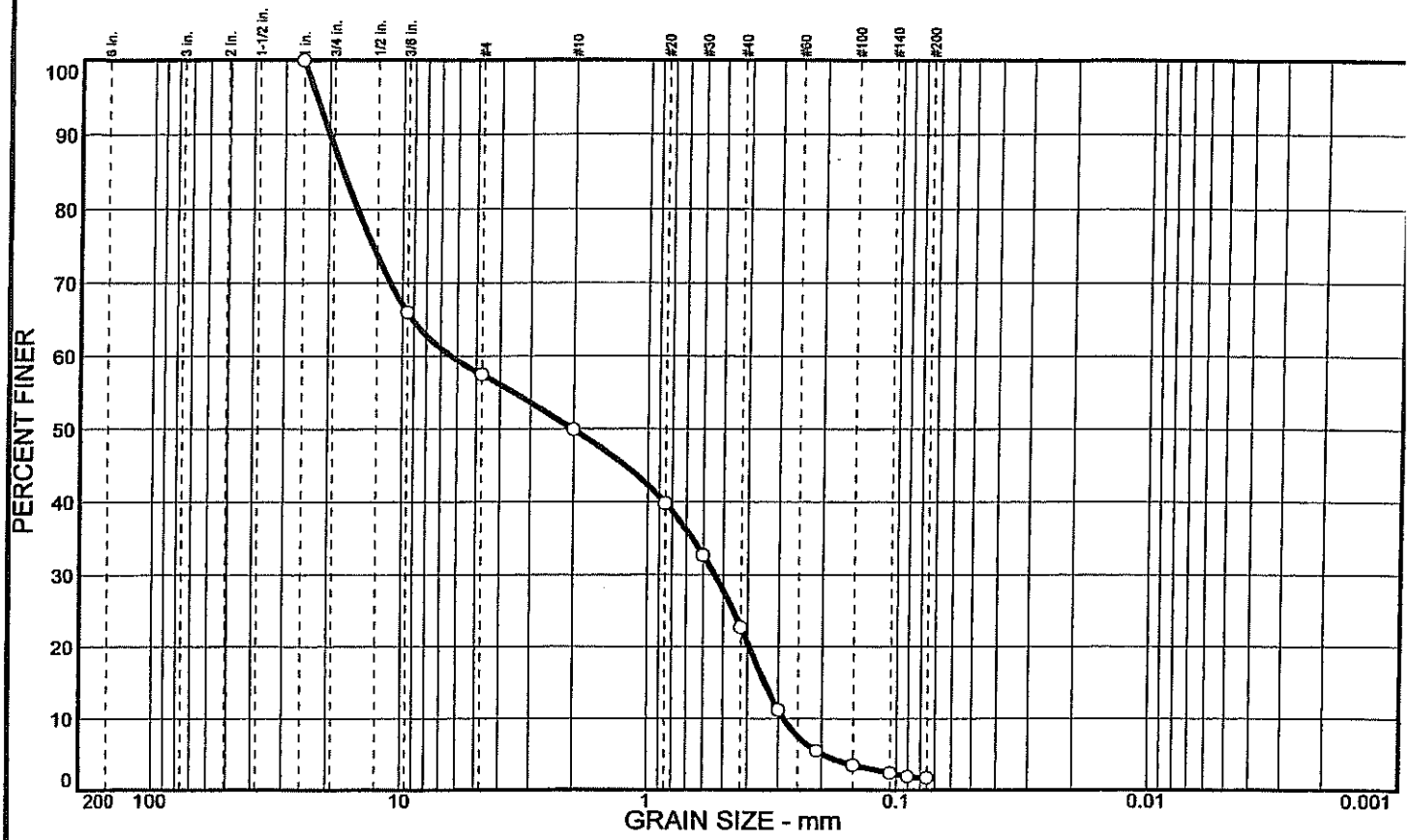


Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
2	5.3-5.6	GRAY, POORLY GRADED SILTY SAND (SP-SM), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1302
Boring No. DRV-37
Date 09/10/96

GRADATION CURVES

Particle Size Distribution Report DRV-58R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
O		42.5	55.8	1.7		SW			

SIEVE inches size	PERCENT FINER O		
1	100.0		
3/8	66.0		
	GRAIN SIZE		
D_{60}	6.36		
D_{30}	0.540		
D_{10}	0.286		
	COEFFICIENTS		
C_c	0.16		
C_u	22.26		

SIEVE number size	PERCENT FINER O		
#4	57.5		
#10	49.9		
#20	39.8		
#30	32.7		
#40	22.7		
#50	11.2		
#70	5.5		
#100	3.5		
#140	2.4		
#170	1.9		
#200	1.7		

SOIL DESCRIPTION

O Brown fine to medium SAND and gravel, trace coarse sand, trace silt.

REMARKS:

O

O Source: DRV58R1 Sample No.: S-1 Elev./Depth: 0.0'-3.7'

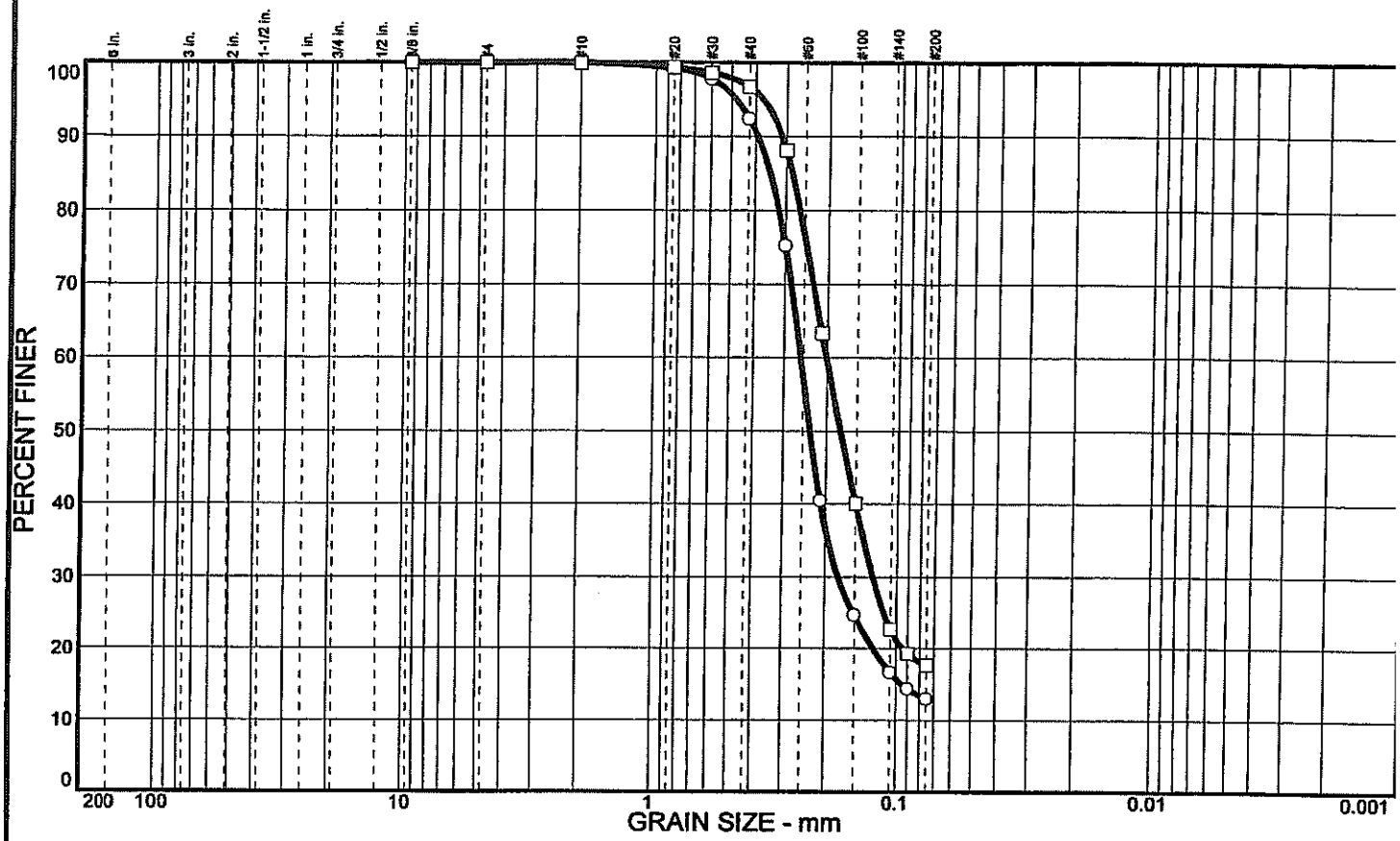
DUFFIELD ASSOCIATES
5400 LIMESTONE ROAD
WILMINGTON, DELAWARE 19808-1232
TEL. (302) 239-6634 FAX (302) 239-8485
E-MAIL: DUFFIELD@DUFFNET.COM

Client: U.S. Army Corps of Engineers

Project: Vibrocoring, Delaware Coast, Port Mahon PED, Contract #DACW-61-98-D-0008, Task Order #8.

Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-58R3



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			87.0	13.0		SP-SM			
□			82.3	17.7		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.256	0.201	
D_{30}	0.176	0.126	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	99.9	
#20	99.2	99.4	
#30	97.8	98.6	
#40	92.4	96.7	
#50	75.3	88.1	
#70	40.5	63.3	
#100	24.7	40.1	
#140	16.7	22.7	
#170	14.4	19.3	
#200	13.0	17.7	

SOIL DESCRIPTION

○ Orange/tan fine SAND, little silt, trace medium sand.

□ Orange/tan fine SAND, little silt, trace medium sand, trace coarse sand.

REMARKS:

○

□

○ Source: DRV58R3 Sample No.: S-1 Elev./Depth: 3.3'-8.2'

□ Source: DRV58R3 Sample No.: S-2 Elev./Depth: 8.2'-13.2'

DUFFIELD ASSOCIATES
5400 LIMESTONE ROAD
WILMINGTON, DELAWARE 19808-1232
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Client: U.S. Army Corps of Engineers

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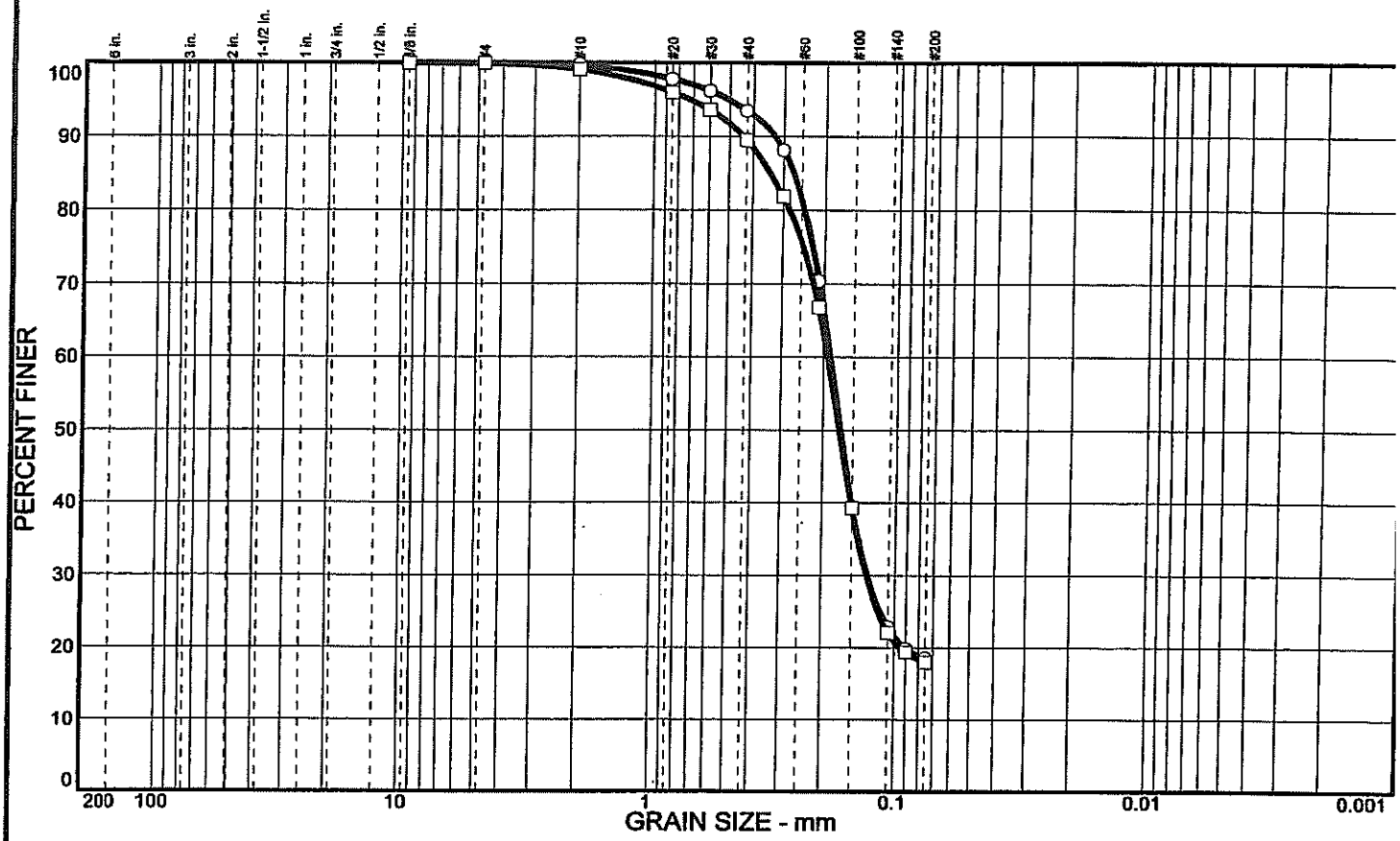
Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-58R3



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			81.4	18.6		SM			
□			82.0	18.0		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
GRAIN SIZE			
D_{60}	0.187	0.192	
D_{30}	0.129	0.130	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	99.8	99.1	
#20	97.8	96.0	
#30	96.2	93.6	
#40	93.5	89.5	
#50	88.1	81.8	
#70	70.4	66.8	
#100	39.5	39.3	
#140	22.9	22.1	
#170	19.9	19.4	
#200	18.6	18.0	

SOIL DESCRIPTION

○ Orange/tan fine SAND, little silt, trace medium sand.

□ Orange/tan fine SAND, little silt, trace medium sand, trace coarse sand.

REMARKS:

○

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○ Source: DRV58R3 Sample No.: S-3 Elev./Depth: 13.2'-18.2'

□ Source: DRV58R3 Sample No.: S-4 Elev./Depth: 18.2'-22.6'

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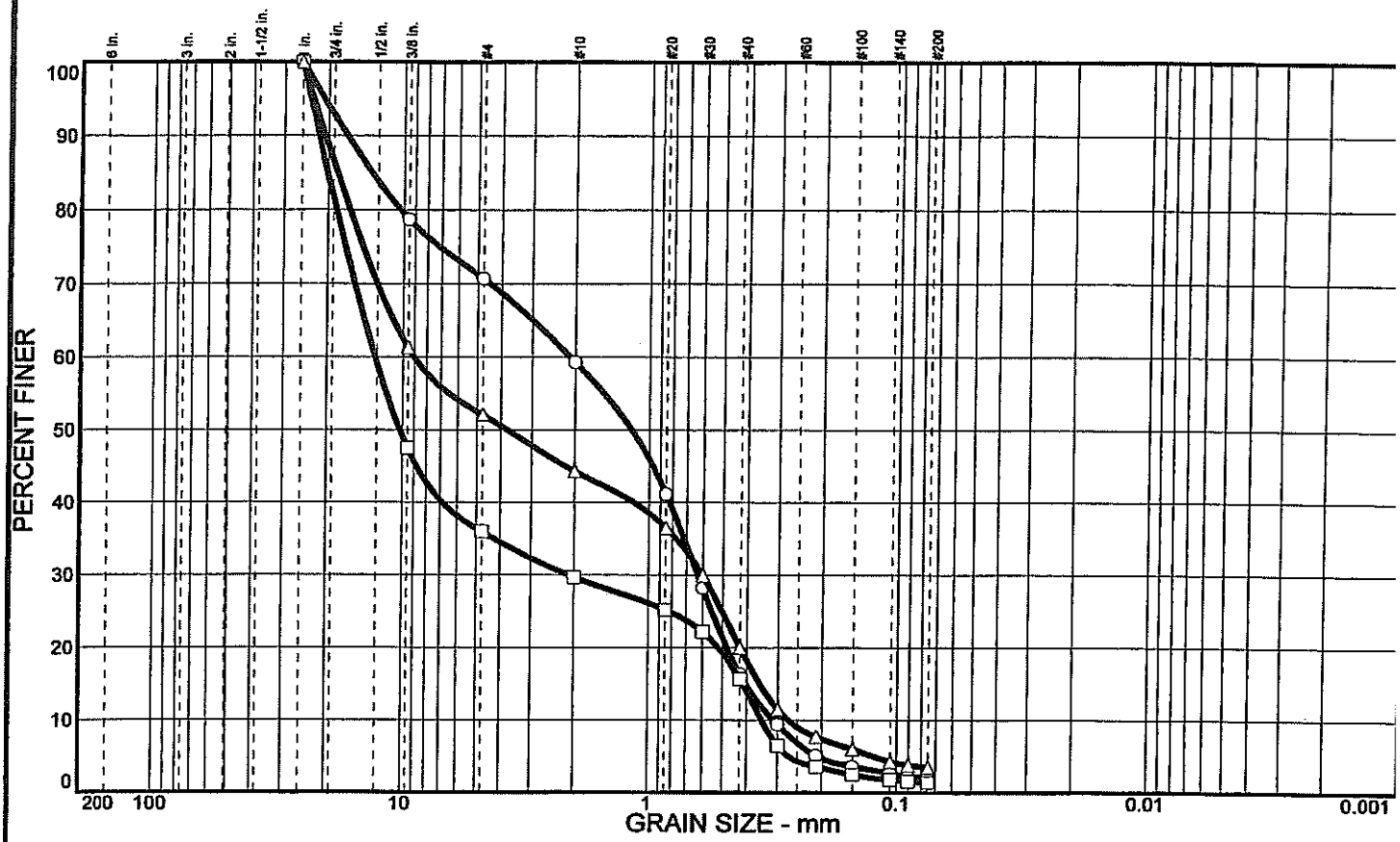
Particle Size Distribution Report DRV-59



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		29.3	68.6	2.1		SW			
□		64.0	34.6	1.4		SW			
△		47.9	48.6	3.5		SW			

SIEVE inches size	PERCENT FINER ○	□	△
1.0	100.0	100.0	100.0
3/8	78.7	47.5	61.3
GRAIN SIZE			
D_{60}	2.10	12.9	8.99
D_{30}	0.629	2.11	0.602
D_{10}	0.312	0.347	0.272
COEFFICIENTS			
C_c	0.60	0.99	0.15
C_u	6.73	37.20	33.09

SIEVE number size	PERCENT FINER ○	□	△
#4	70.7	36.0	52.1
#10	59.3	29.7	44.3
#20	41.1	25.2	36.5
#30	28.2	22.2	29.9
#40	16.4	15.7	20.0
#50	9.4	6.5	11.5
#70	5.1	3.6	7.7
#100	3.6	2.5	6.0
#140	2.7	1.8	4.3
#170	2.3	1.6	3.8
#200	2.1	1.4	3.5

SOIL DESCRIPTION

○ Orange/brown medium SAND, some gravel, little fine sand, little coarse sand, trace silt.

□ Orange/brown GRAVEL, little fine sand, little medium sand, trace coarse sand, trace silt

△ Orange/brown medium to fine SAND and GRAVEL, trace coarse sand, trace silt.

REMARKS:

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○ Source: DRV59 Sample No.: S-1 Elev./Depth: 0.0'-4.4'

□ Source: DRV59 Sample No.: S-2 Elev./Depth: 4.4'-5.2'

△ Source: DRV59 Sample No.: S-3 Elev./Depth: 5.2'-5.7'

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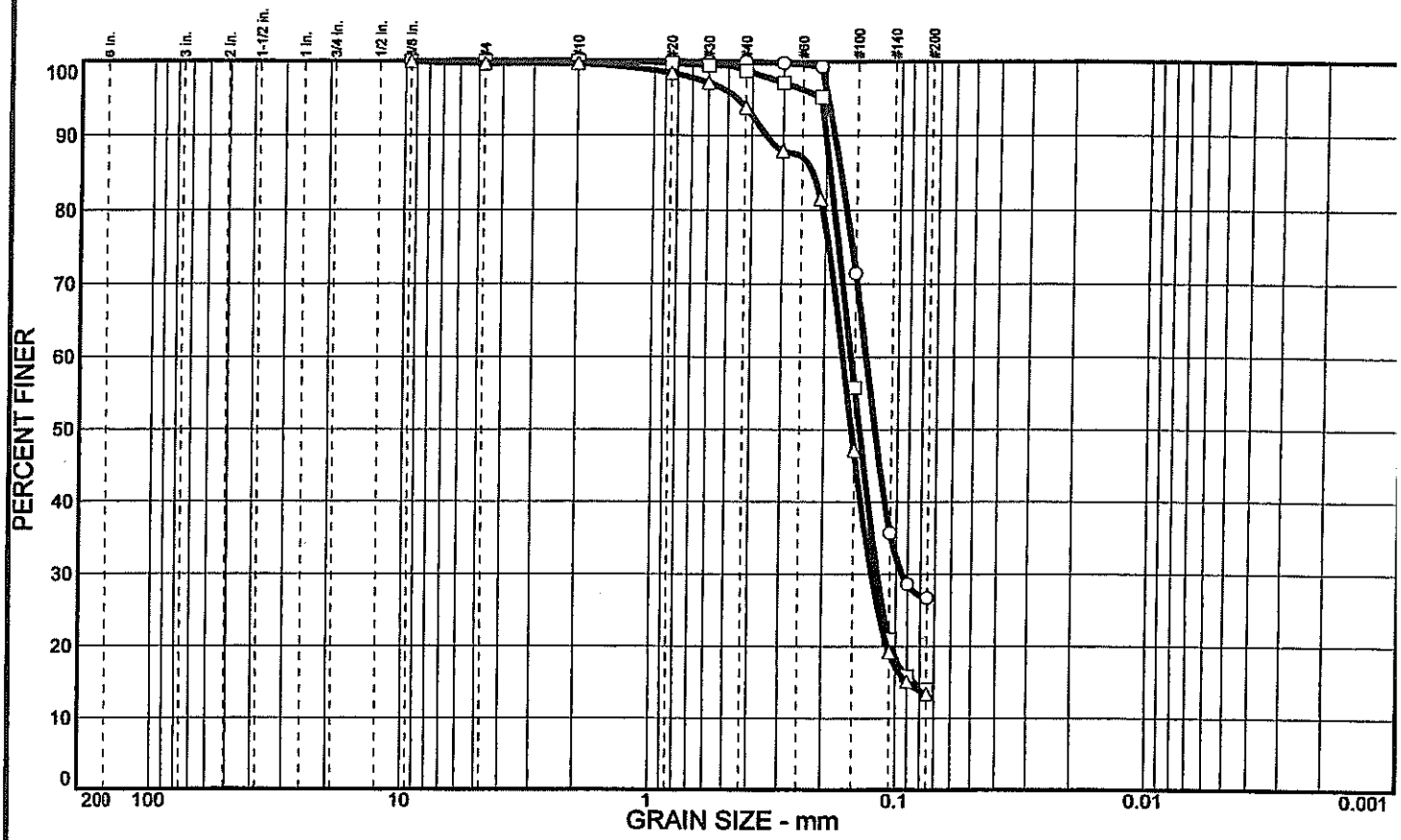
Particle Size Distribution Report DRV-59



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			73.3	26.7		SM			
□			86.0	14.0		SP-SM			
△		0.3	86.3	13.4		SP-SM			

SIEVE inches size	PERCENT FINER ○	□	△
3/8	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.135	0.155	0.168
D_{30}	0.0947	0.119	0.126
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	99.7
#10	100.0	100.0	99.7
#20	100.0	99.8	98.4
#30	99.9	99.5	97.1
#40	99.9	98.7	93.8
#50	99.8	97.1	87.9
#70	99.3	95.2	81.5
#100	71.4	55.8	47.1
#140	35.7	21.0	19.2
#170	28.6	15.9	15.1
#200	26.7	14.0	13.4

SOIL DESCRIPTION

○ Orange/tan fine SAND, some silt.

□ Orange/tan fine SAND, little silt, trace medium sand.

△ Gray fine SAND, little silt, trace medium sand.

REMARKS:

○

□

△

○ Source: DRV59 Sample No.: S-4 Elev./Depth: 5.7'-10.2'

□ Source: DRV59 Sample No.: S-5 Elev./Depth: 10.2'-15.2'

△ Source: DRV59 Sample No.: S-6 Elev./Depth: 15.2'-17.7'

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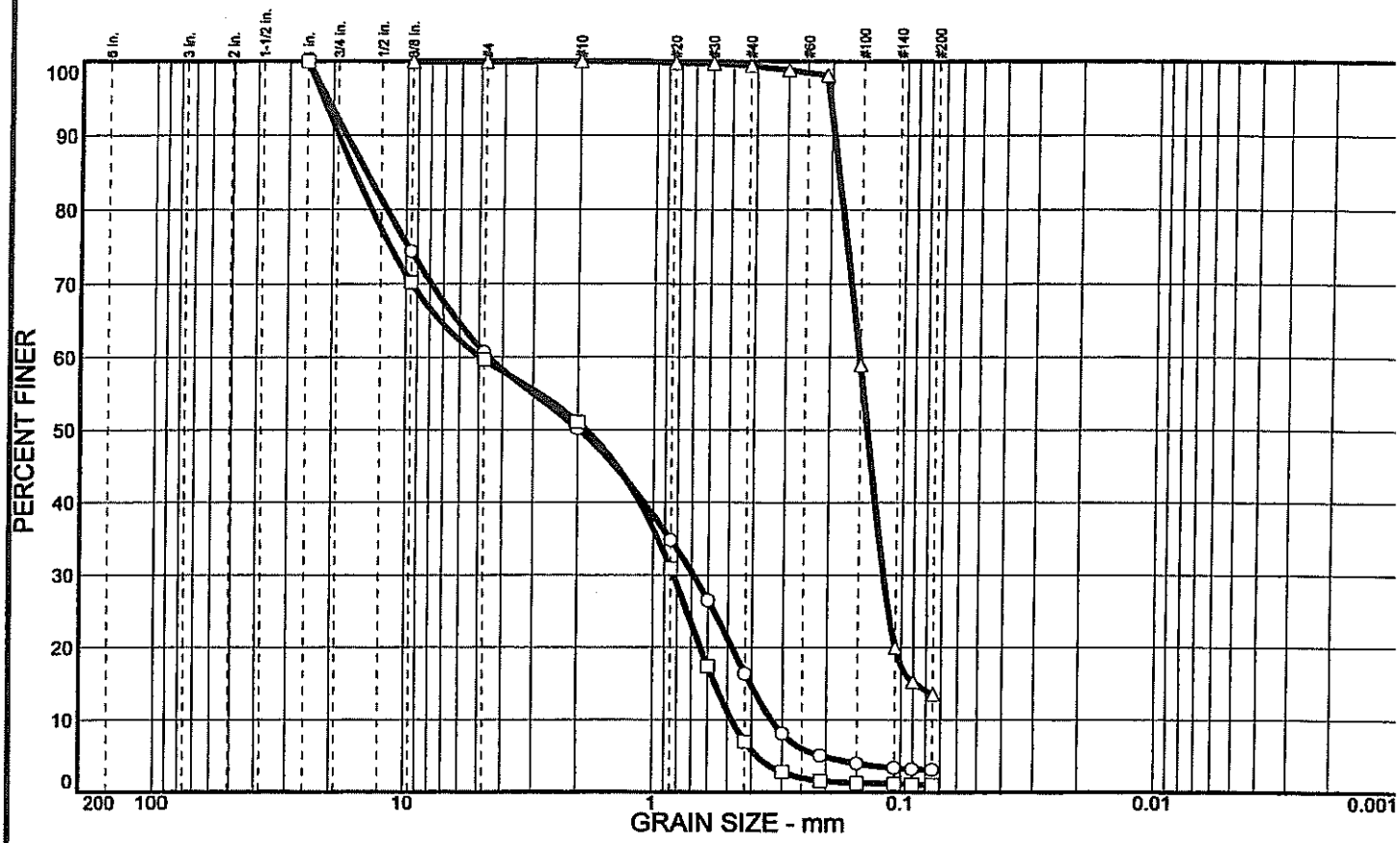
Particle Size Distribution Report DRV-60



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		39.3	57.6	3.1		SW			
□		40.3	58.7	1.0		SW			
△			86.5	13.5		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	PERCENT FINER △
1	100.0	100.0	
3/8	74.4	70.2	100.0
GRAIN SIZE			
D_{60}	4.53	4.89	0.151
D_{30}	0.688	0.829	0.119
D_{10}	0.332	0.480	
COEFFICIENTS			
C_c	0.31	0.29	
C_u	13.64	10.19	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	PERCENT FINER △
#4	60.7	59.7	100.0
#10	50.2	51.1	100.0
#20	34.8	30.9	99.8
#30	26.5	17.4	99.7
#40	16.4	7.0	99.4
#50	8.1	2.8	98.8
#70	5.1	1.6	98.1
#100	4.0	1.3	58.9
#140	3.4	1.2	20.0
#170	3.2	1.1	15.3
#200	3.1	1.0	13.5

SOIL DESCRIPTION

○ Gray medium SAND and gravel, little fine sand, little coarse sand, trace silt.

□ Gray medium SAND and gravel, trace coarse sand, trace fine sand, trace silt.

△ Tan/green fine SAND, little silt, trace medium sand.

REMARKS:

○

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○ Source: DRV60 Sample No.: S-1 Elev./Depth: 0.0'-4.8'

□ Source: DRV60 Sample No.: S-2 Elev./Depth: 4.8'-9.0'

△ Source: DRV60 Sample No.: S-3 Elev./Depth: 9.0'-9.9'

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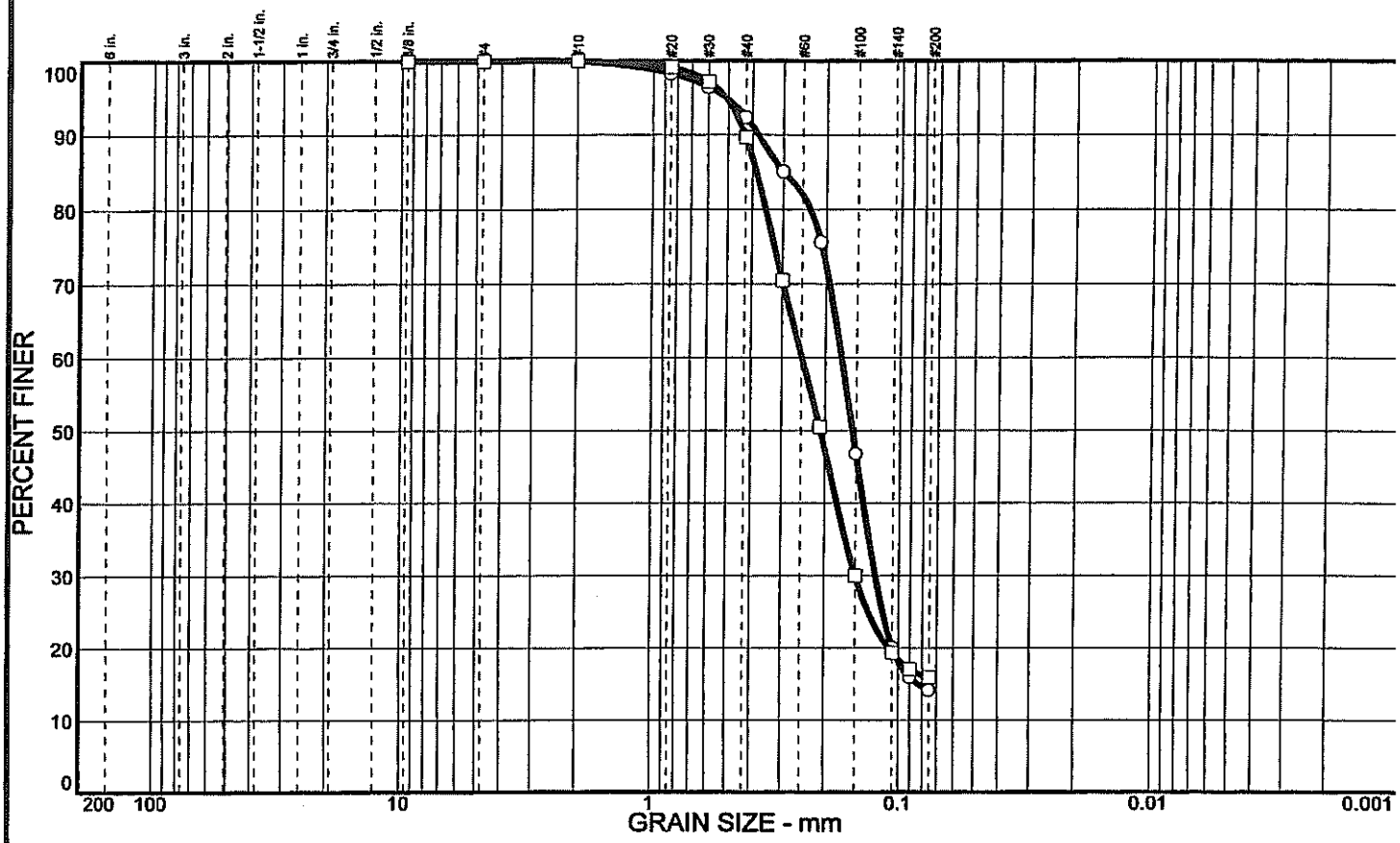
Particle Size Distribution Report DRV-60



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			85.8	14.2		SP-SM			
□			84.0	16.0		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
GRAIN SIZE			
D_{60}	0.172	0.248	
D_{30}	0.124	0.150	
D_{10}			
COEFFICIENTS			
C_C			
C_U			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	100.0	
#20	98.3	99.2	
#30	96.5	97.2	
#40	92.4	89.7	
#50	85.1	70.5	
#70	75.6	50.5	
#100	46.8	30.0	
#140	20.1	19.4	
#170	16.0	17.1	
#200	14.2	16.0	

SOIL DESCRIPTION

○ Tan/green fine SAND, little silt, trace medium sand.

□ Tan/green fine SAND, little silt, trace medium sand.

REMARKS:

○

□

○ Source: DRV60 Sample No.: S-4 Elev./Depth: 9.9'-14.8'

□ Source: DRV60 Sample No.: S-5 Elev./Depth: 14.8'-19.2'

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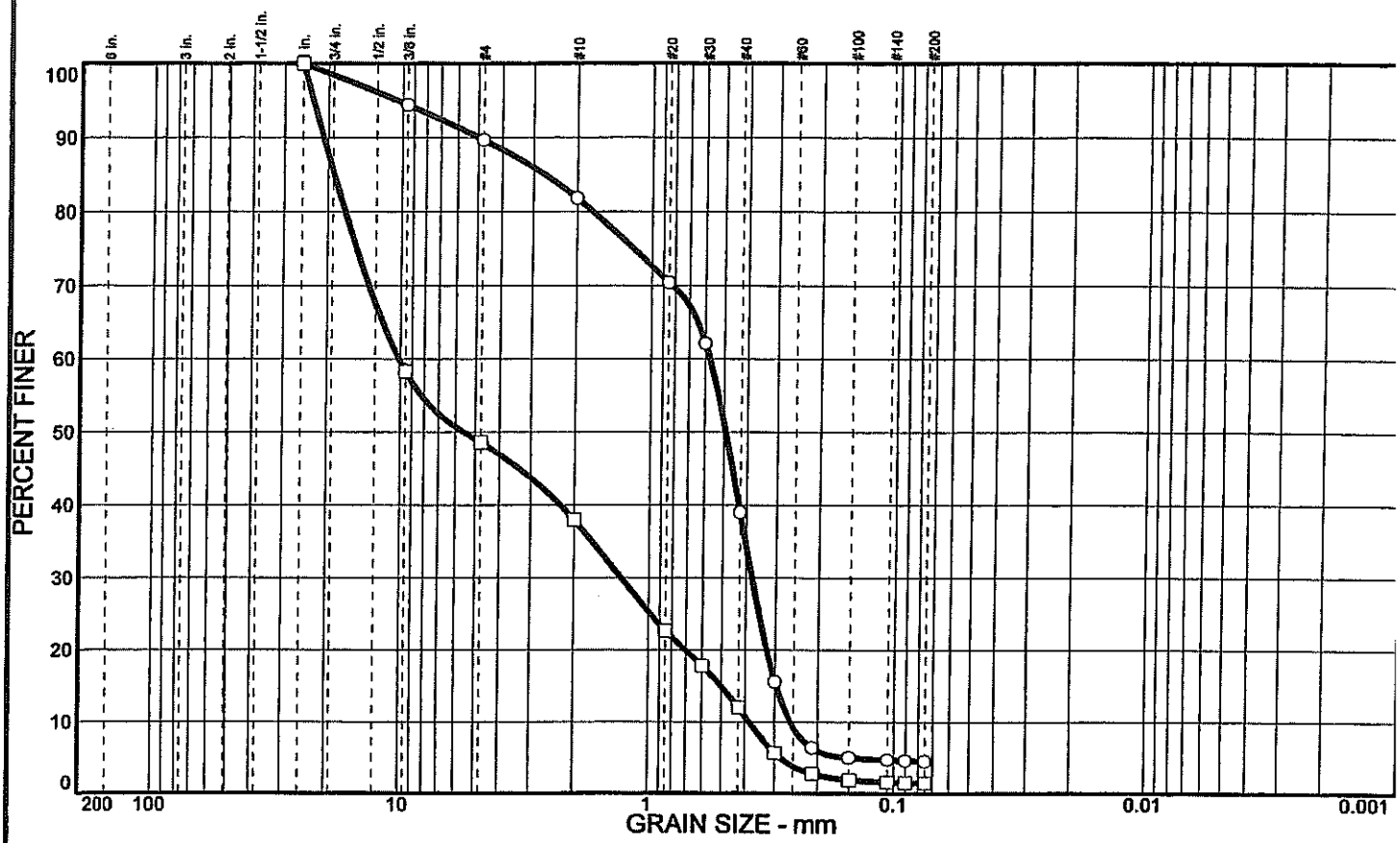
Particle Size Distribution Report DRV-61R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		10.3	85.2	4.5		SP			
□		51.4	47.1	1.5		GW			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1	100.0	100.0	
3/8	94.4	58.3	
	GRAIN SIZE		
D_{60}	0.575	10.1	
D_{30}	0.377	1.29	
D_{10}	0.258	0.383	
	COEFFICIENTS		
C_c	0.96	0.43	
C_u	2.23	26.45	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	89.7	48.6	
#10	81.8	38.0	
#20	70.4	22.7	
#30	62.1	17.8	
#40	39.0	12.0	
#50	15.6	5.7	
#70	6.4	2.8	
#100	5.0	1.9	
#140	4.7	1.6	
#170	4.6	1.5	
#200	4.5	1.5	

SOIL DESCRIPTION

○ Orange/gray medium SAND, some fine sand, trace gravel, trace coarse sand, trace silt.

□ Orange/tan GRAVEL, some medium sand, little coarse sand, little fine sand, trace silt.

REMARKS:

○

□

○ Source: DRV61R1 Sample No.: S-1 Elev./Depth: 0.0'-4.0'

□ Source: DRV61R1 Sample No.: S-2 Elev./Depth: 4.0'-4.8'

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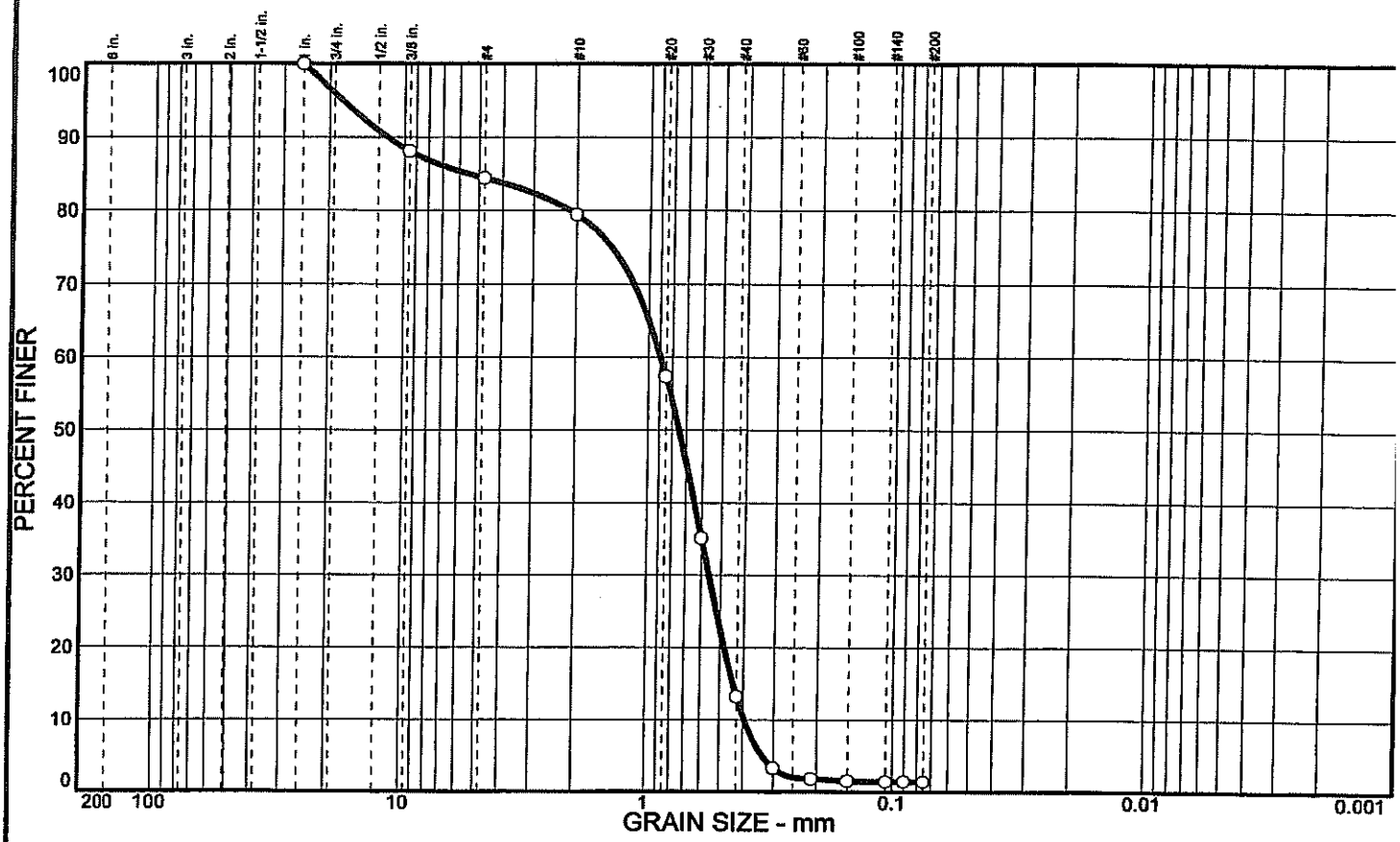
Particle Size Distribution Report DRV-61R3



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
O		15.6	83.0	1.4		SP			

SIEVE inches size	PERCENT FINER O		
1	100.0		
3/8	88.1		
	GRAIN SIZE		
D_{60}	0.895		
D_{30}	0.558		
D_{10}	0.395		
	COEFFICIENTS		
C_c	0.88		
C_u	2.27		

SIEVE number size	PERCENT FINER O		
#4	84.4		
#10	79.4		
#20	57.4		
#30	35.1		
#40	13.2		
#50	3.3		
#70	1.8		
#100	1.5		
#140	1.4		
#170	1.4		
#200	1.4		

SOIL DESCRIPTION

O Tan/orange medium SAND, little gravel, little fine sand, trace coarse sand, trace silt.

REMARKS:

O

O Source: DRV61R3 Sample No.: S-1 Elev./Depth: 3.2'-7.5'

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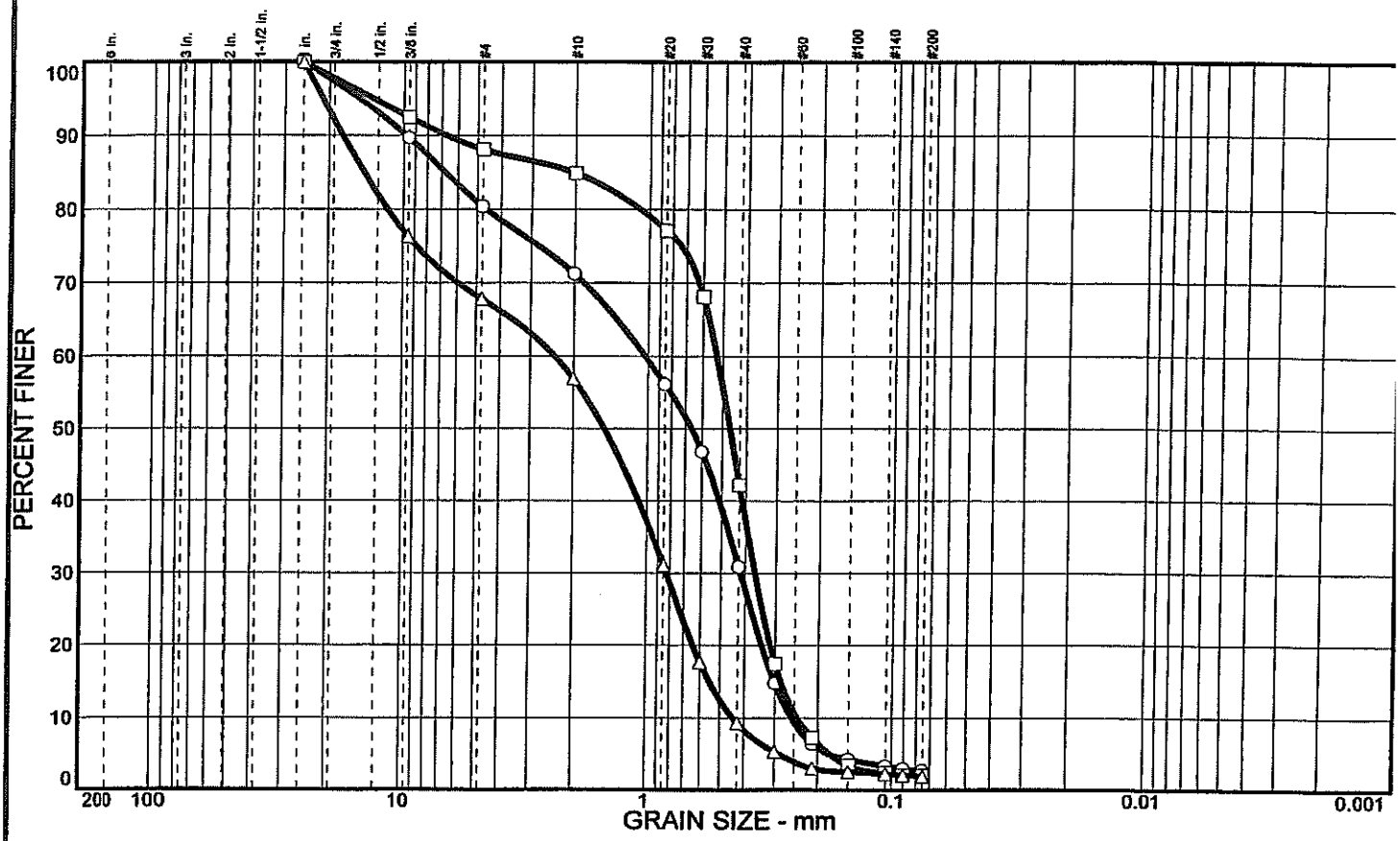
Particle Size Distribution Report DRV-62R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		19.6	77.7	2.7		SP			
□		11.9	86.1	2.0		SP			
△		32.2	65.9	1.9		SP			

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0	100.0	100.0
3/8	89.7	92.5	76.3
	GRAIN SIZE		
D_{60}	1.03	0.528	2.38
D_{30}	0.418	0.365	0.827
D_{10}	0.256	0.242	0.443
	COEFFICIENTS		
C_c	0.66	1.04	0.65
C_u	4.01	2.18	5.38

SIEVE number size	PERCENT FINER ○	□	△
#4	80.4	88.1	67.8
#10	71.2	84.9	56.9
#20	56.1	77.1	31.1
#30	46.8	68.1	17.7
#40	30.9	42.2	9.3
#50	14.8	17.5	5.3
#70	6.4	7.3	3.0
#100	4.2	3.4	2.5
#140	3.3	2.4	2.2
#170	2.9	2.1	2.0
#200	2.7	2.0	1.9

SOIL DESCRIPTION

○ Gray medium SAND, some fine sand, little gravel, trace coarse sand, trace silt.

□ Gray medium SAND and fine sand, little gravel, trace coarse sand, trace silt.

△ Gray medium SAND, some gravel, little coarse sand, trace fine sand, trace silt.

REMARKS:

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○ Source: DRV62R1 Sample No.: S-1 Elev./Depth: 0.0'-3.3'

□ Source: DRV62R1 Sample No.: S-2 Elev./Depth: 3.3'-5.0'

△ Source: DRV62R1 Sample No.: S-3 Elev./Depth: 5.0'-6.7'

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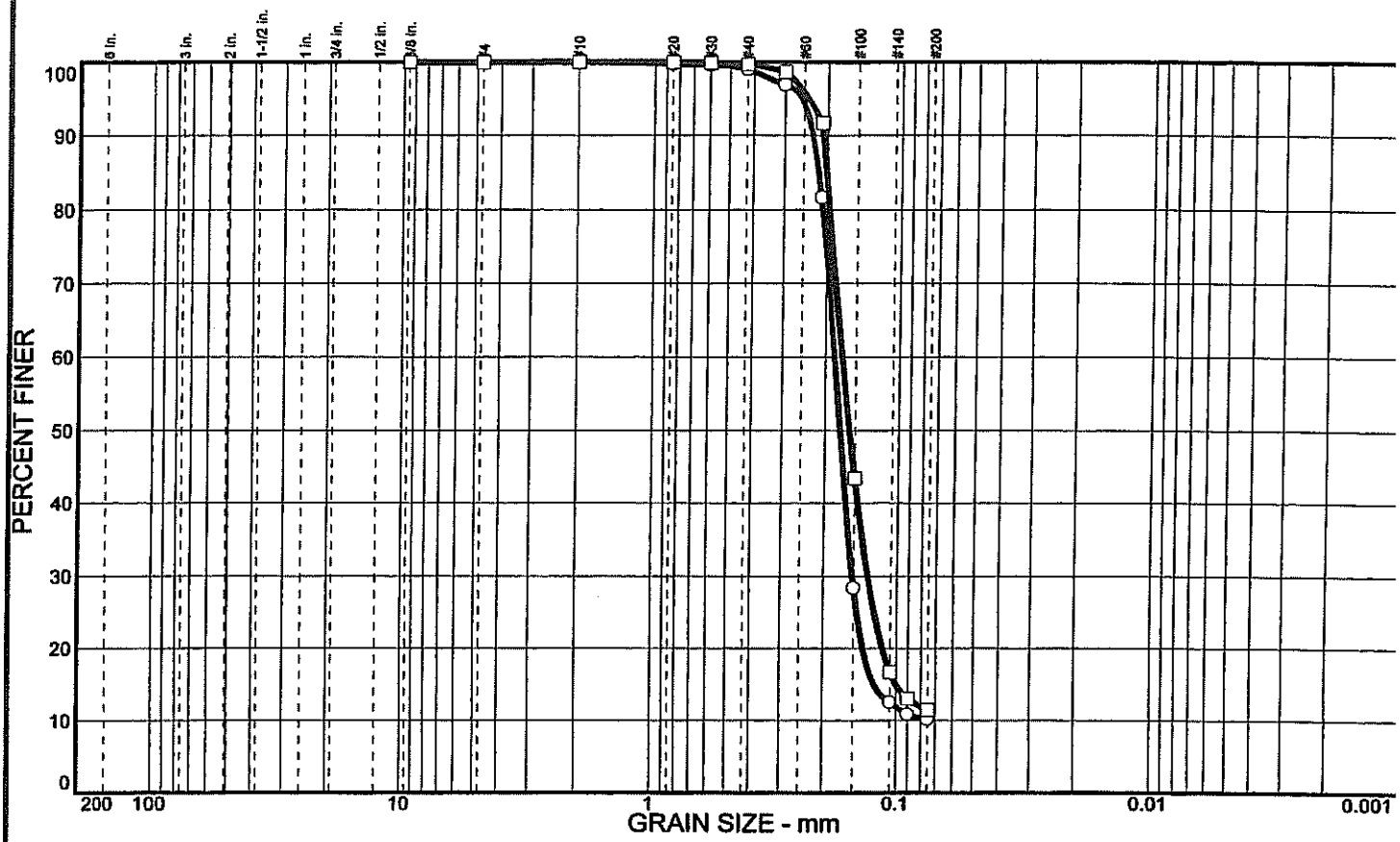
Particle Size Distribution Report DRV-62R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			89.8	10.2		SP-SM			
□			88.5	11.5		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.183	0.170	
D_{30}	0.152	0.132	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	100.0	
#20	99.8	100.0	
#30	99.6	99.9	
#40	99.0	99.7	
#50	96.9	98.7	
#70	81.7	91.7	
#100	28.4	43.4	
#140	12.6	16.7	
#170	10.9	13.1	
#200	10.2	11.5	

SOIL DESCRIPTION

○ Orange/tan fine SAND, trace silt, trace medium sand.

□ Orange/tan fine SAND, little silt.

REMARKS:

○

□

○ Source: DRV62R1 Sample No.: S-4 Elev./Depth: 6.7'-10.0'

□ Source: DRV62R1 Sample No.: S-5 Elev./Depth: 10.0'-13.2'

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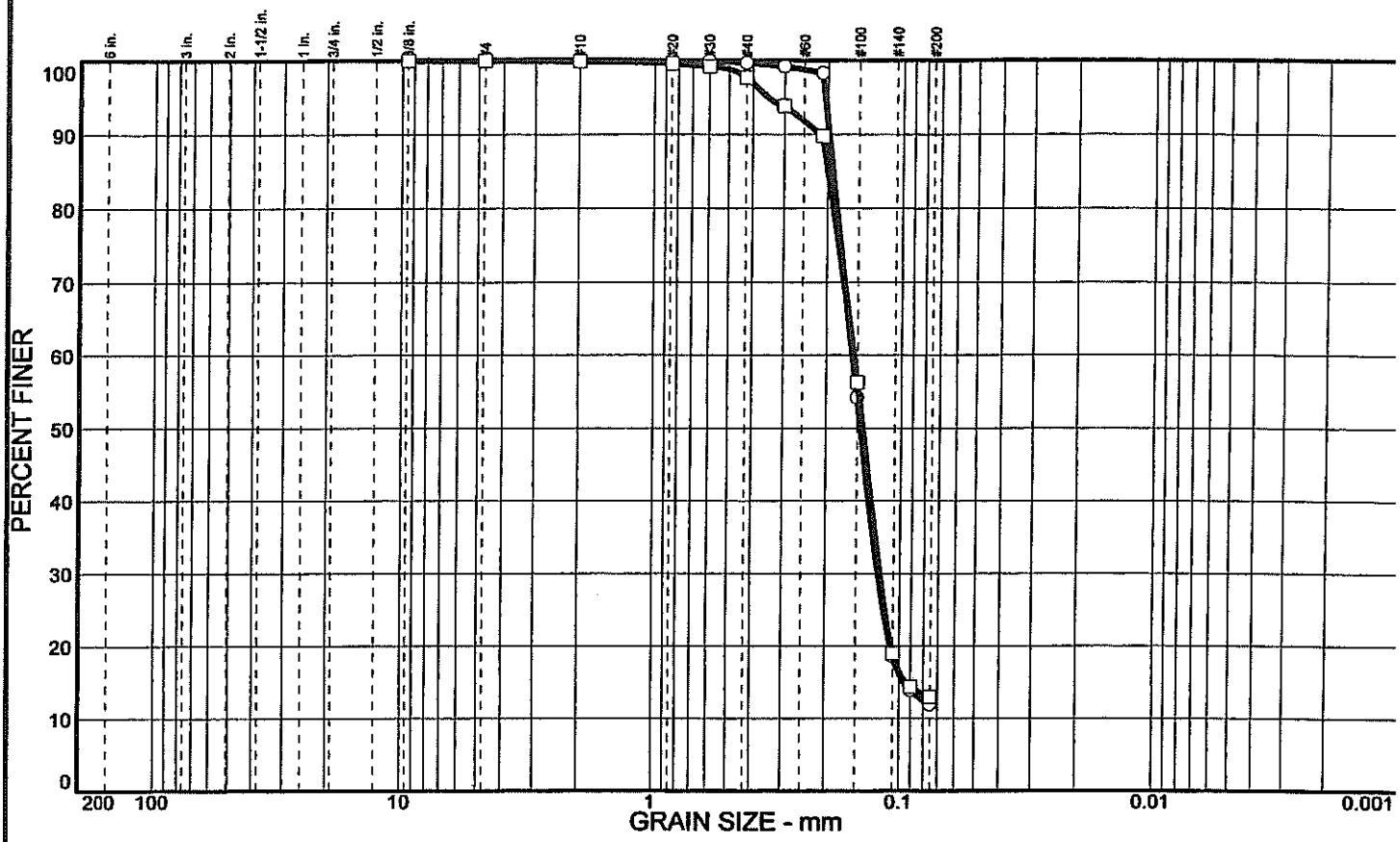
Particle Size Distribution Report DRV-62R2



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			88.1	11.9		SP-SM			
□			87.0	13.0		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
GRAIN SIZE			
D_{60}	0.157	0.155	
D_{30}	0.122	0.121	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	99.9	
#20	99.9	99.6	
#30	99.9	99.2	
#40	99.7	97.7	
#50	99.2	93.9	
#70	98.3	89.8	
#100	54.2	56.3	
#140	18.6	19.0	
#170	13.9	14.4	
#200	11.9	13.0	

SOIL DESCRIPTION

○ Tan/gray/orange fine SAND, little silt.

□ Tan/gray/orange fine SAND, little silt, trace medium sand.

REMARKS:

○

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○ Source: DRV62R2 Sample No.: S-1 Elev./Depth: 11.1'-16.1'

□ Source: DRV62R2 Sample No.: S-2 Elev./Depth: 16.1'-18.3'

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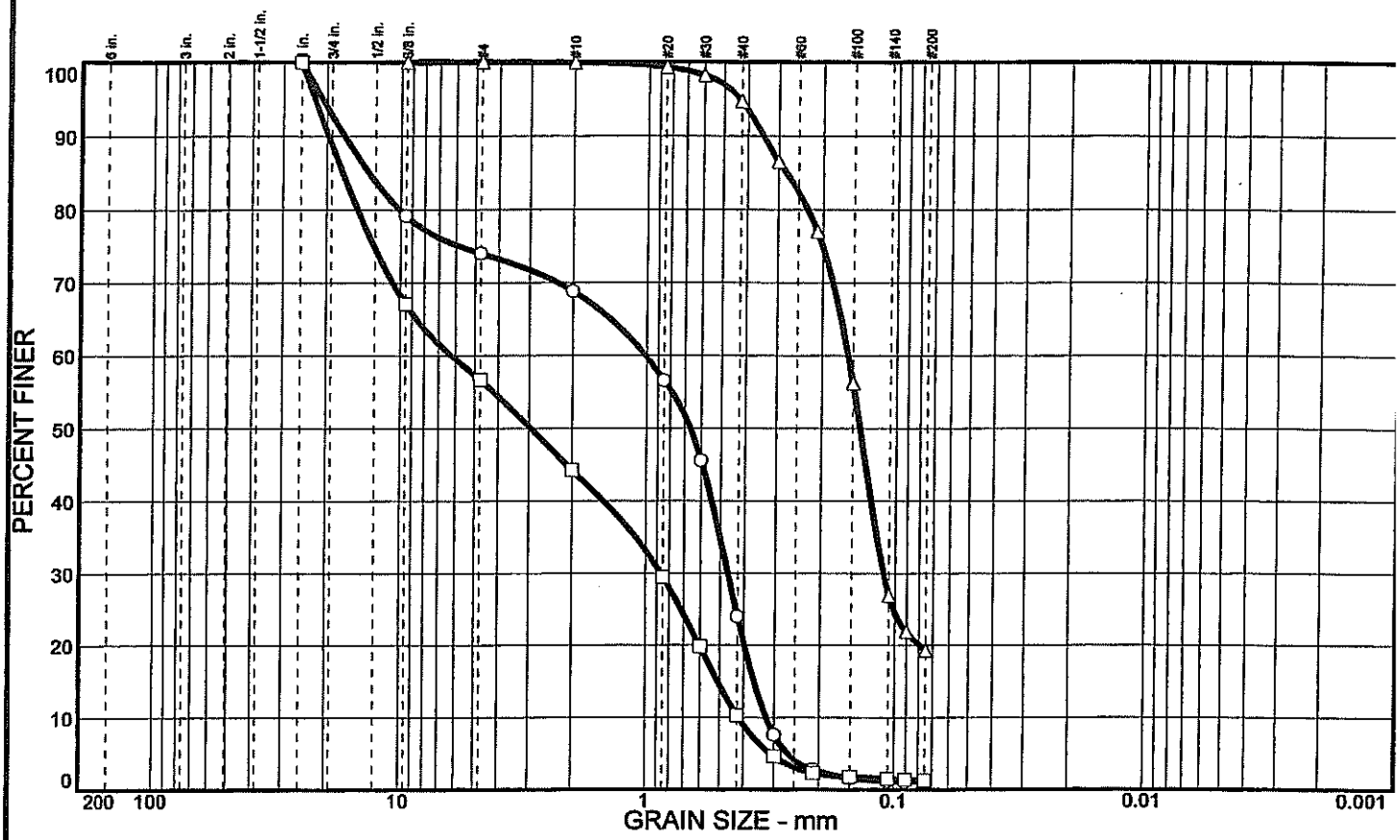
Project: Vibrocoring, Delaware Coast, Port Mahon PED, Contract #DACW-61-98-D 0008, Task Order #8.

Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-63



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		26.0	72.9	1.1		SP			
□		43.3	55.4	1.3		SW			
△			80.7	19.3		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1	100.0	100.0	
3/8	79.2	67.1	100.0
GRAIN SIZE			
D_{60}	1.01	6.20	0.157
D_{30}	0.466	0.868	0.112
D_{10}	0.323	0.419	
COEFFICIENTS			
C_c	0.66	0.29	
C_u	3.14	14.79	

SIEVE number size	PERCENT FINER ○	□	△
#4	74.0	56.7	100.0
#10	68.8	44.3	99.9
#20	56.6	29.5	99.3
#30	45.6	19.8	98.2
#40	24.0	10.3	94.7
#50	7.6	4.6	86.5
#70	2.8	2.3	77.0
#100	1.6	1.8	56.2
#140	1.2	1.5	26.9
#170	1.1	1.4	21.9
#200	1.1	1.3	19.3

SOIL DESCRIPTION

○ Orange/tan medium SAND, some gravel, some fine sand, trace coarse sand, trace silt.

□ Brown/orange fine to coarse SAND and gravel, trace silt.

△ Tan/gray/orange fine SAND, little silt, trace medium sand.

REMARKS:

○

□

△

○ Source: DRV63 Sample No.: S-1 Elev./Depth: 0.0'-4.5'

□ Source: DRV63 Sample No.: S-2 Elev./Depth: 4.7'-8.9'

△ Source: DRV63 Sample No.: S-3 Elev./Depth: 8.9'-9.7'

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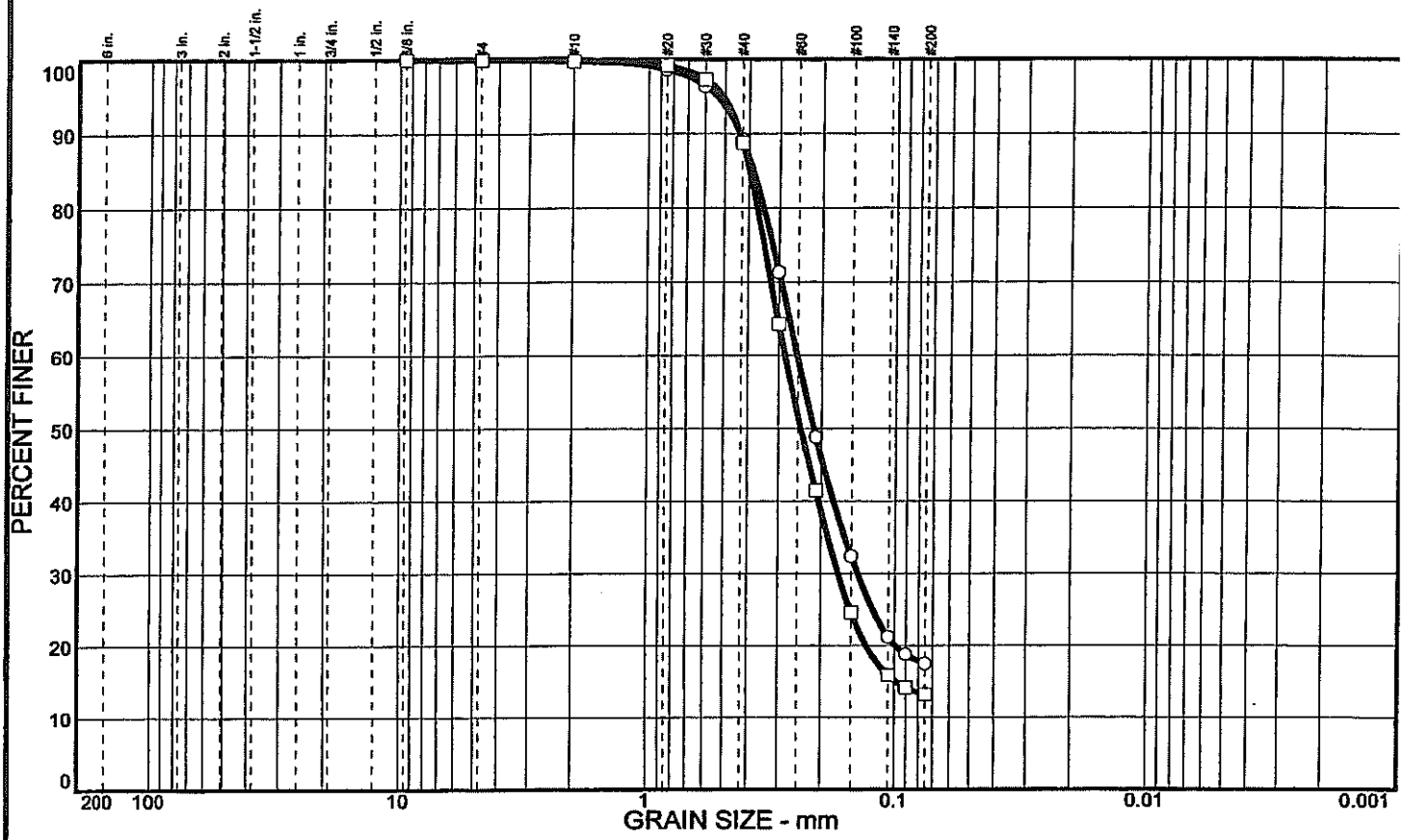
Client: U.S. Army Corps of Engineers

Project: Vibrocoring, New Jersey Coast, Lower Cape May Inlet PED, Contract #DACW-61-98-D-0008, Task Order #8.

Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-63



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			82.5	17.5		SM			
□			86.8	13.2		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
GRAIN SIZE			
D_{60}	0.252	0.283	
D_{30}	0.141	0.170	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	99.8	
#20	98.6	99.2	
#30	96.4	97.3	
#40	89.2	88.8	
#50	71.3	64.3	
#70	48.8	41.5	
#100	32.4	24.6	
#140	21.2	15.9	
#170	18.8	14.2	
#200	17.5	13.2	

SOIL DESCRIPTION

○ Tan/gray/orange fine SAND, little silt, little medium sand.

□ Tan/gray/orange fine SAND, little silt, little medium sand.

REMARKS:

○

□

○ Source: DRV63 Sample No.: S-4 Elev./Depth: 9.7'-14.8'

□ Source: DRV63 Sample No.: S-5 Elev./Depth: 14.8'-19.6'

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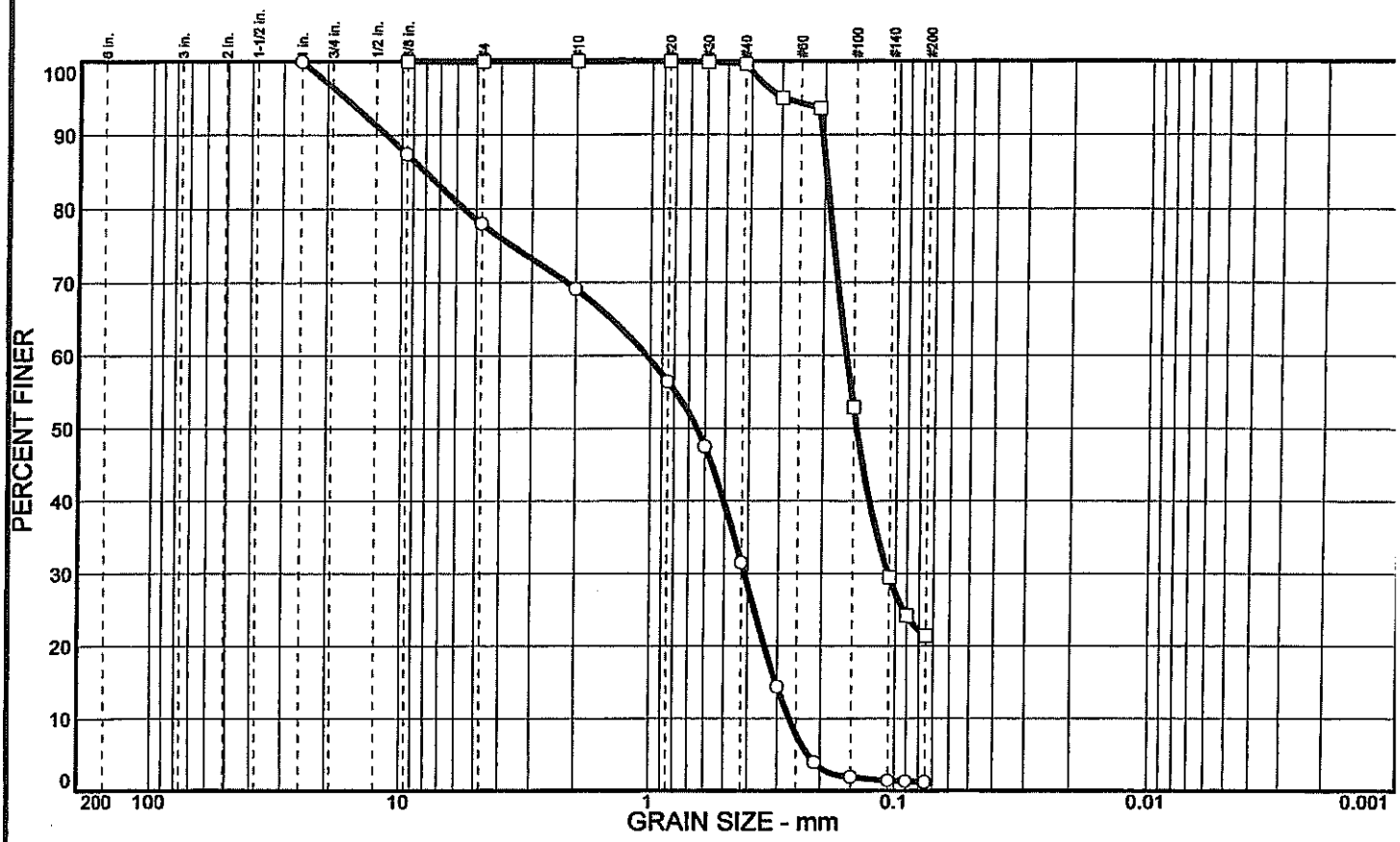
Project: Vibrocoring, Delaware Coast, Port Mahon PED, Contract #DACW-61-98-D-0008, Task Order #8.

Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-64



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		22.0	76.8	1.2		SP			
□			78.6	21.4		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1	100.0		
3/8	87.4	100.0	
GRAIN SIZE			
D_{60}	1.04	0.161	
D_{30}	0.413	0.107	
D_{10}	0.267		
COEFFICIENTS			
C_c	0.61		
C_u	3.88		

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	78.0	100.0	
#10	69.1	100.0	
#20	56.4	100.0	
#30	47.5	99.9	
#40	31.5	99.6	
#50	14.4	95.0	
#70	3.9	93.6	
#100	1.9	52.9	
#140	1.4	29.5	
#170	1.3	24.2	
#200	1.2	21.4	

SOIL DESCRIPTION

○ Brown/orange medium SAND, some fine sand, some gravel, trace coarse sand, trace silt.

□ Light-gray/tan fine SAND, some silt.

REMARKS:

○

□

○ Source: DRV64 Sample No.: S-1 Elev./Depth: 0.0'-4.8'

□ Source: DRV64 Sample No.: S-3 Elev./Depth: 6.3'-10.1'

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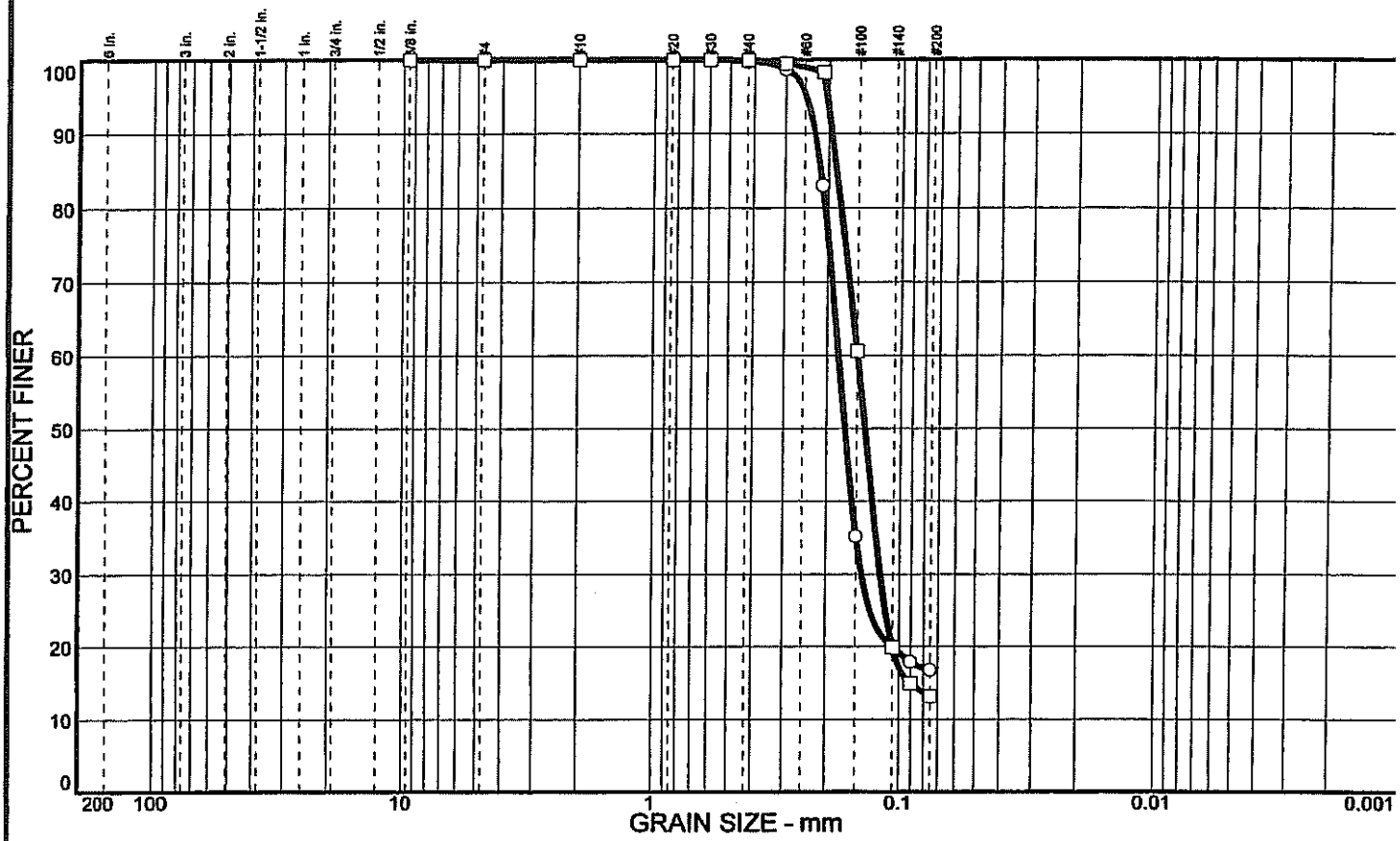
Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-64



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			83.2	16.8		SM			
□			86.8	13.2		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
GRAIN SIZE			
D_{60}	0.179	0.149	
D_{30}	0.142	0.119	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	100.0	
#20	100.0	100.0	
#30	100.0	100.0	
#40	99.8	99.9	
#50	98.7	99.5	
#70	83.0	98.3	
#100	35.2	60.6	
#140	20.1	19.9	
#170	17.9	15.0	
#200	16.8	13.2	

SOIL DESCRIPTION

○ Light-gray/tan fine SAND, little silt.

□ Light-gray/tan fine SAND, little silt.

REMARKS:

○

□

○ Source: DRV64 Sample No.: S-4 Elev./Depth: 10.1'-14.8'

□ Source: DRV64 Sample No.: S-5 Elev./Depth: 14.8'-18.7'

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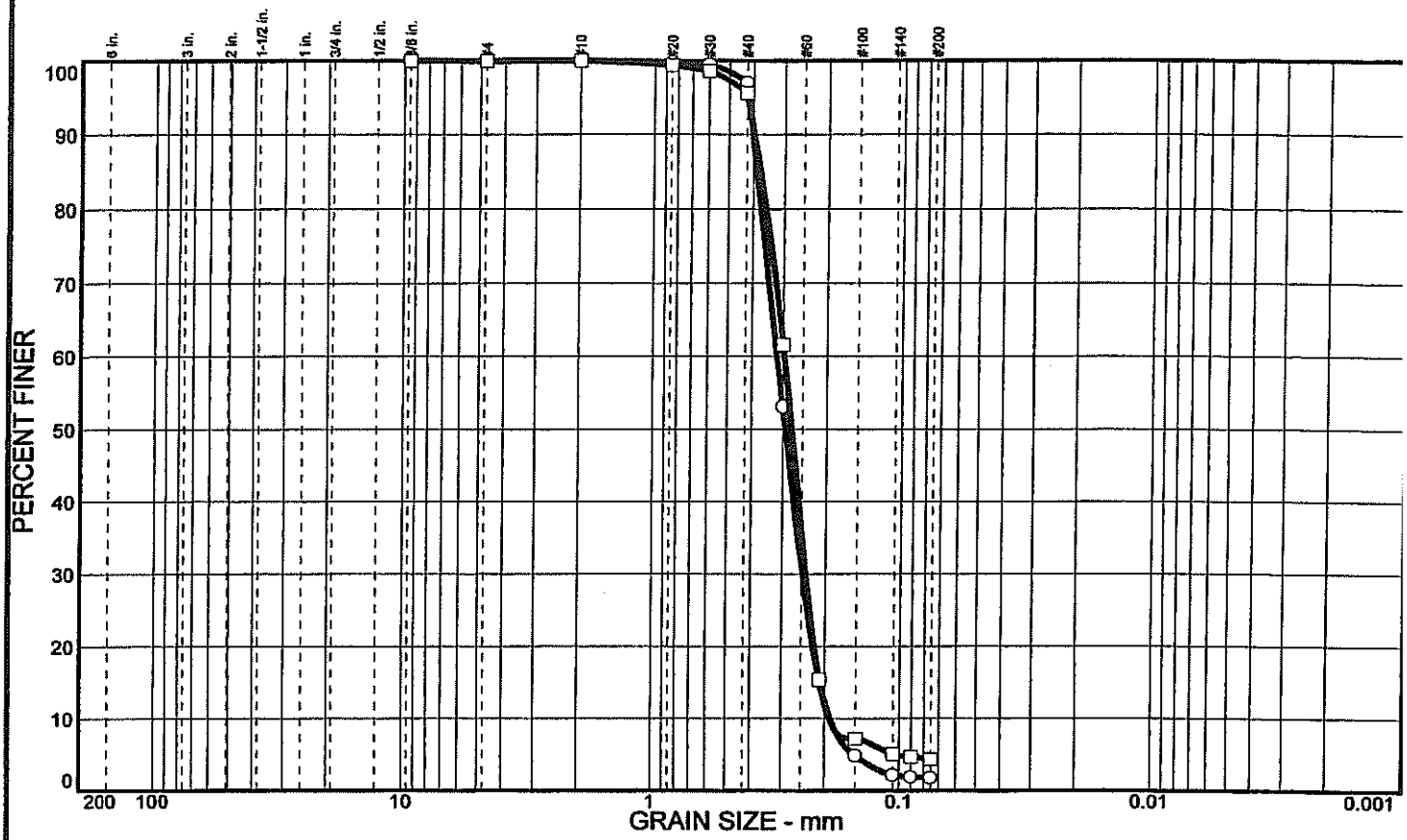
Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-65R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			98.2	1.8		SP			
□			95.6	4.4		SP			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/8	100.0	100.0
GRAIN SIZE		
D_{60}	0.317	0.296
D_{30}	0.247	0.240
D_{10}	0.190	0.192
COEFFICIENTS		
C_c	1.02	1.01
C_u	1.67	1.55

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	100.0	100.0
#10	100.0	100.0
#20	99.8	99.4
#30	99.5	98.6
#40	97.0	95.6
#50	53.1	61.6
#70	15.4	15.4
#100	4.9	7.2
#140	2.2	5.1
#170	1.9	4.7
#200	1.8	4.4

SOIL DESCRIPTION

○ Gray fine SAND, trace medium sand, trace silt.

□ Gray fine SAND, trace medium sand, trace silt.

REMARKS:

○

□

○ Source: DRV65R1 Sample No.: S-1 Elev./Depth: 0.4'-5.0'

□ Source: DRV65R1 Sample No.: S-2 Elev./Depth: 5.0'-8.9'

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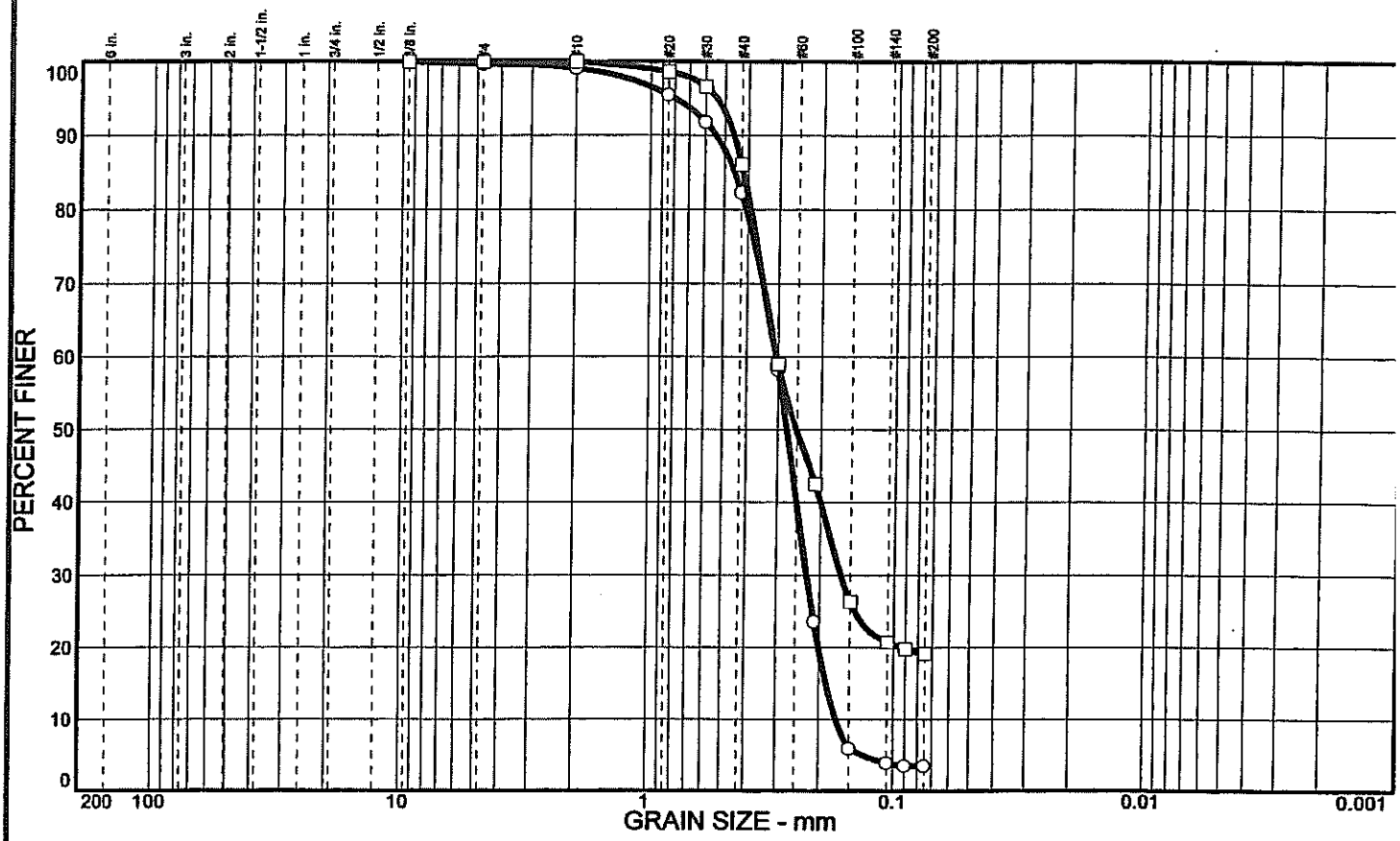
Particle Size Distribution Report DRV-65R2



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		0.3	96.2	3.5		SP			
□			80.8	19.2		SM			

SIEVE Inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.306	0.304	
D_{30}	0.226	0.164	
D_{10}	0.169		
	COEFFICIENTS		
C_c	0.98		
C_u	1.81		

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	99.7	100.0	
#10	99.1	100.0	
#20	95.5	98.6	
#30	91.8	96.6	
#40	82.3	86.1	
#50	58.2	59.0	
#70	23.6	42.5	
#100	5.9	26.4	
#140	3.9	20.8	
#170	3.5	19.8	
#200	3.5	19.2	

SOIL DESCRIPTION

○ Tan fine SAND, little medium sand, trace silt, trace coarse sand.

□ Tan fine SAND, little silt, little medium sand.

REMARKS:

○

□

○ Source: DRV65R2 Sample No.: S-1 Elev./Depth: 11.1'-12.4'

□ Source: DRV65R2 Sample No.: S-2 Elev./Depth: 12.4'-13.9'

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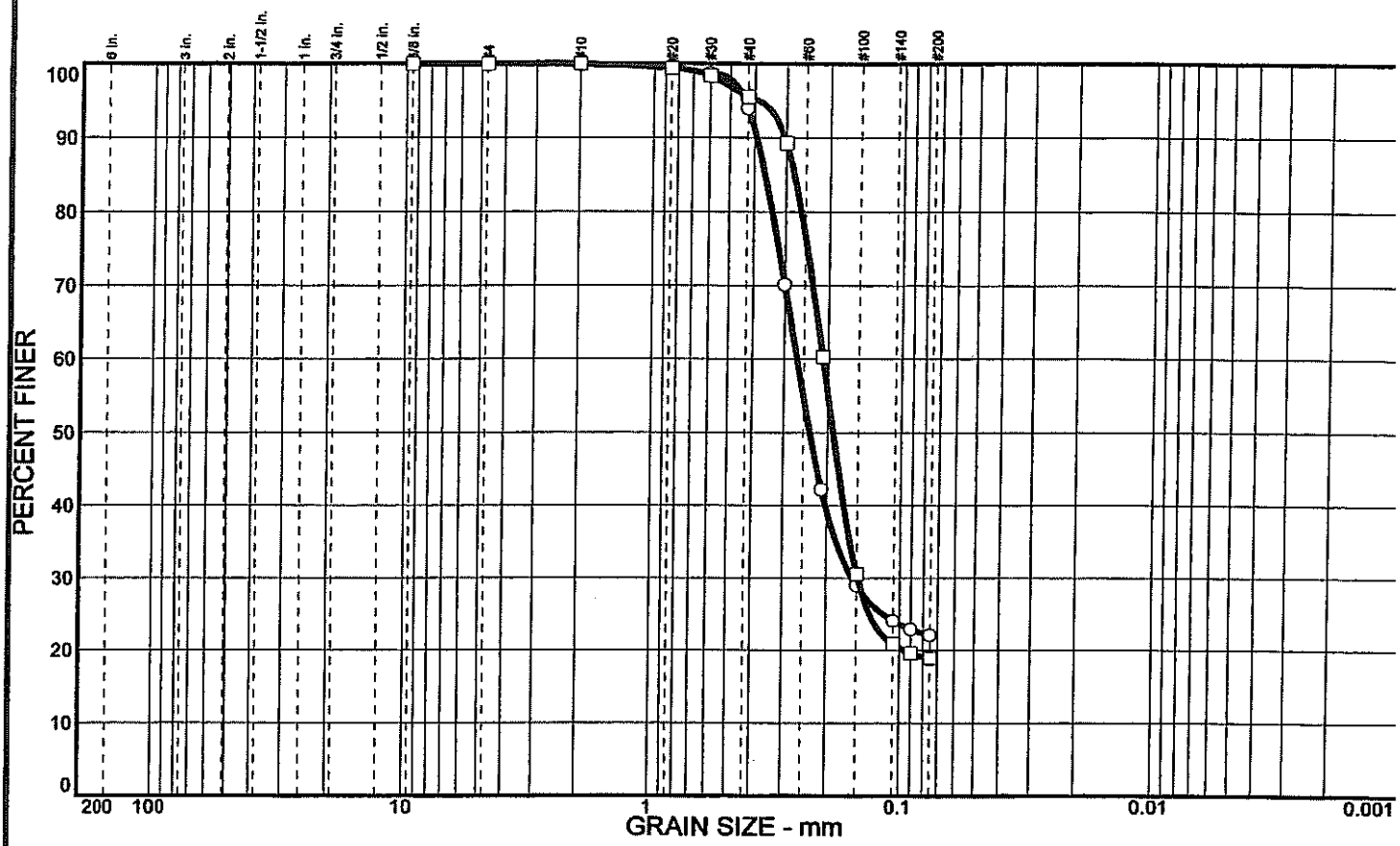
Particle Size Distribution Report DRV-65R2



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			77.9	22.1		SM			
□			81.1	18.9		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/8	100.0	100.0
GRAIN SIZE		
D_{60}	0.266	0.209
D_{30}	0.156	0.148
D_{10}		
COEFFICIENTS		
C_c		
C_u		

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	100.0	100.0
#10	99.9	100.0
#20	99.6	99.4
#30	98.7	98.4
#40	94.0	95.6
#50	70.1	89.3
#70	42.2	60.3
#100	29.0	30.6
#140	24.1	20.9
#170	22.9	19.6
#200	22.1	18.9

SOIL DESCRIPTION

○ Tan/brown fine SAND, some silt, trace medium sand.

□ Gray fine SAND, little silt, trace medium sand.

REMARKS:

○

□

○ Source: DRV65R2 Sample No.: S-3 Elev./Depth: 13.9'-15.9'

□ Source: DRV65R2 Sample No.: S-5 Elev./Depth: 19.0'-22.4'

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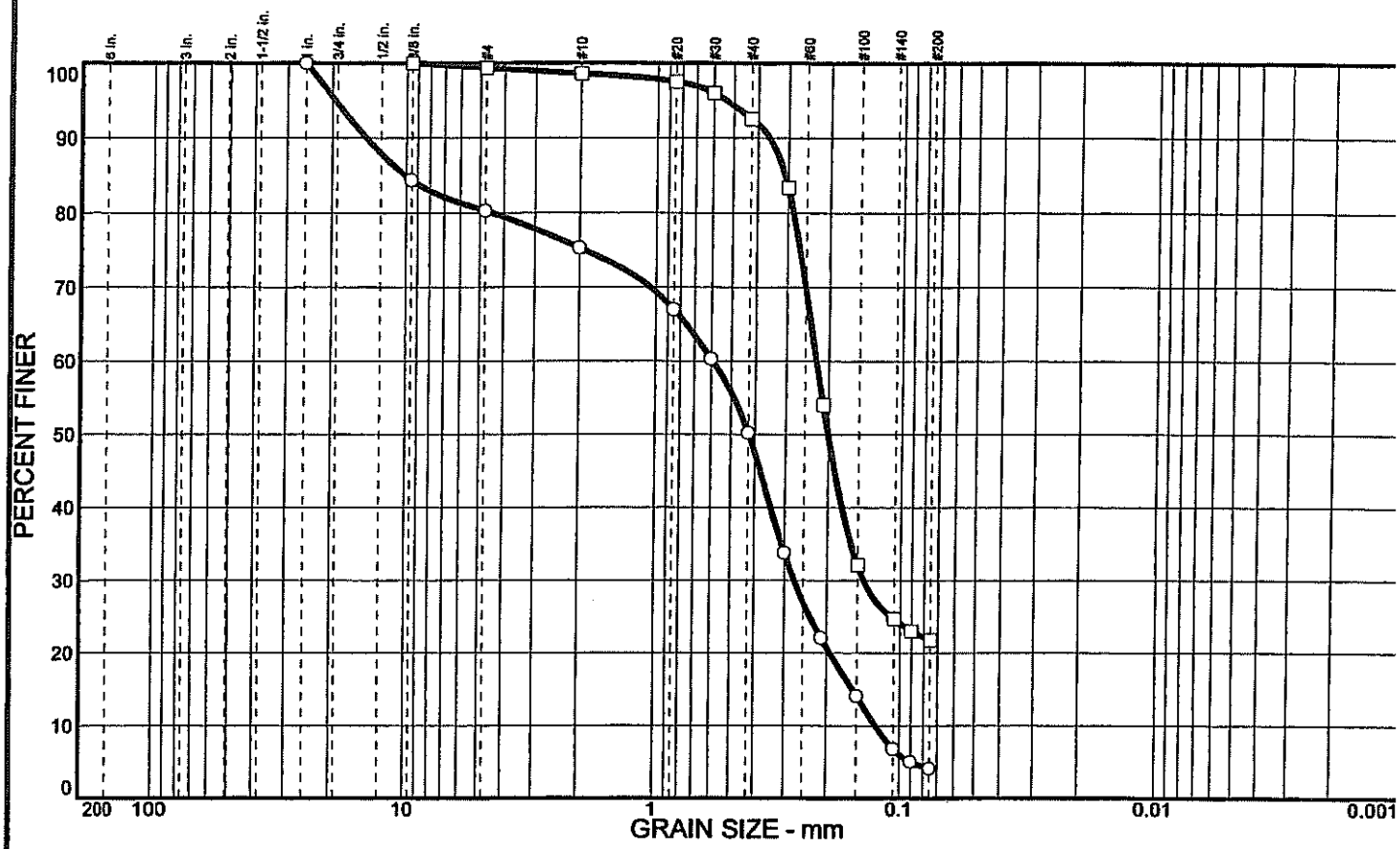
Particle Size Distribution Report DRV-66R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		19.7	76.2	4.1		SP			
□		0.6	77.6	21.8		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
1	100.0	
3/8	84.4	100.0
GRAIN SIZE		
D_{60}	0.592	0.225
D_{30}	0.273	0.142
D_{10}	0.126	
COEFFICIENTS		
C_c	1.00	
C_u	4.71	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	80.3	99.4
#10	75.3	98.6
#20	67.0	97.5
#30	60.3	96.0
#40	50.2	92.5
#50	33.8	83.4
#70	22.1	54.0
#100	14.1	32.1
#140	6.8	24.7
#170	5.0	23.0
#200	4.1	21.8

SOIL DESCRIPTION

○ Gray fine SAND, some medium sand, little gravel, trace coarse sand, trace silt.

□ Tan/brown fine SAND, some silt, trace medium sand, trace coarse sand, trace gravel.

REMARKS:

○

□

○ Source: DRV66R1 Sample No.: S-1 Elev./Depth: 0.0'-0.5'

□ Source: DRV66R1 Sample No.: S-2 Elev./Depth: 0.5'-3.9'

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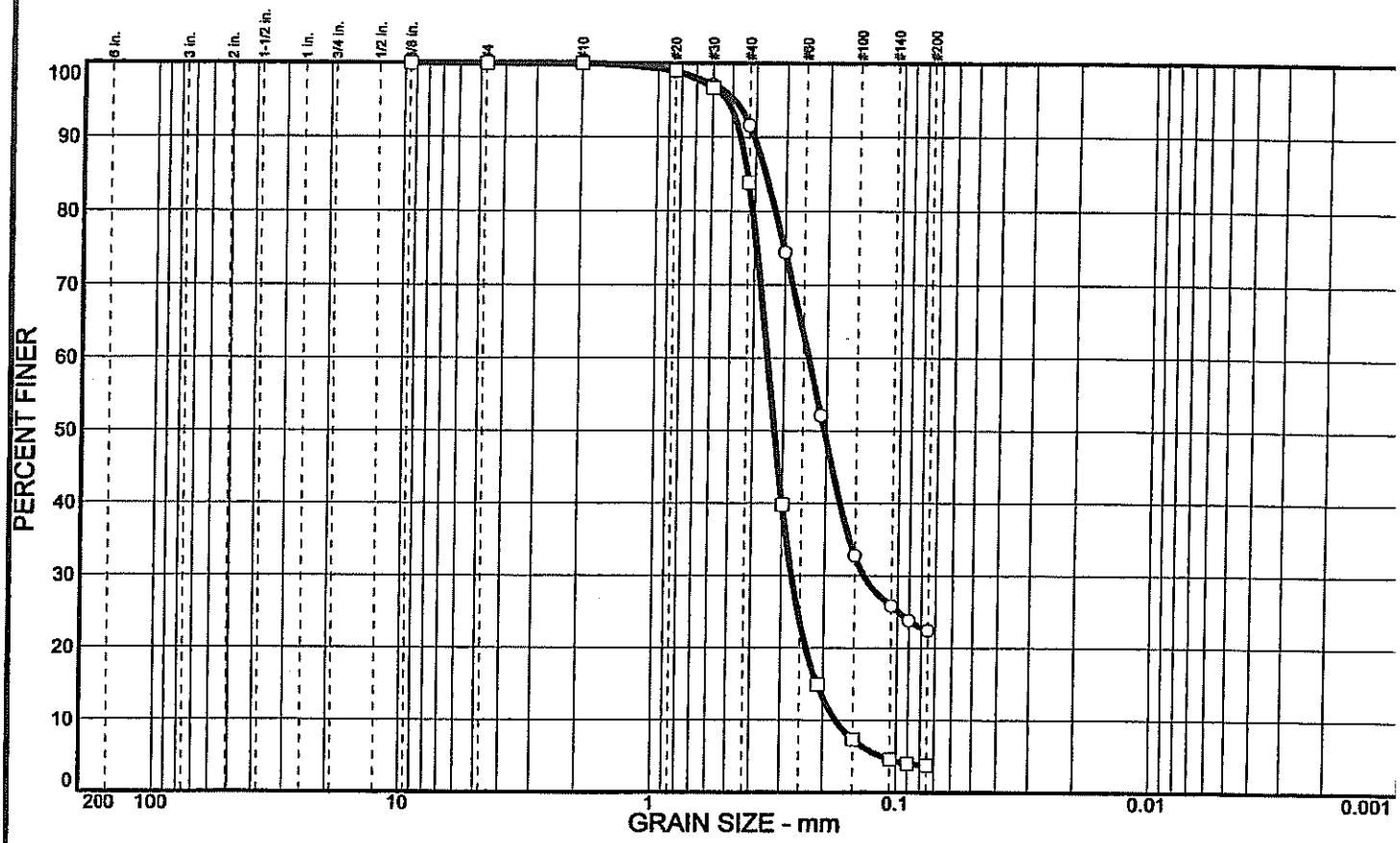
Particle Size Distribution Report DRV-66R1



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			77.6	22.4		SM			
□			96.2	3.8		SP			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
3/8	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.237	0.350	
D_{30}	0.137	0.272	
D_{10}		0.176	
	COEFFICIENTS		
C_c		1.20	
C_u		1.98	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	99.9	100.0	
#20	98.9	99.0	
#30	97.1	96.7	
#40	91.6	83.9	
#50	74.4	39.8	
#70	52.1	14.9	
#100	32.8	7.4	
#140	25.8	4.6	
#170	23.8	4.0	
#200	22.4	3.8	

SOIL DESCRIPTION

○ Dark-gray fine SAND, some silt, trace medium sand.

□ Dark-gray fine SAND, little medium sand, trace silt.

REMARKS:

○

□

○ Source: DRV66R1 Sample No.: S-4 Elev./Depth: 5.0'-10.0'

□ Source: DRV66R1 Sample No.: S-5 Elev./Depth: 10.0'-14.3'

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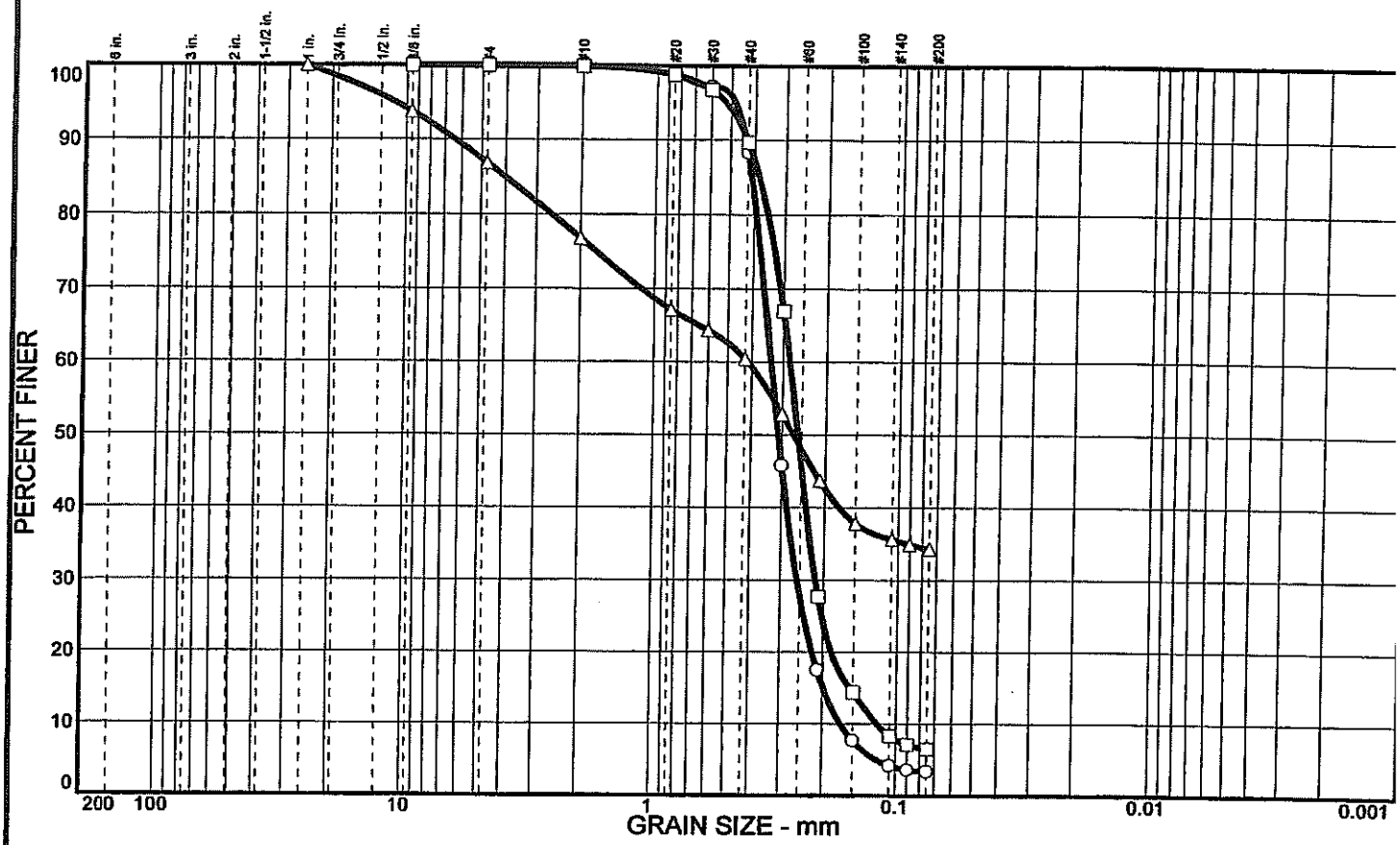
Particle Size Distribution Report DRV-66R2



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			96.6	3.4		SP			
□			93.5	6.5		SP			
△		13.1	52.6	34.3		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1			100.0
3/8	100.0	100.0	93.8
	GRAIN SIZE		
D_{60}	0.335	0.282	0.415
D_{30}	0.256	0.216	
D_{10}	0.169	0.119	
	COEFFICIENTS		
C_c	1.16	1.38	
C_u	1.98	2.36	

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	86.9
#10	100.0	99.9	76.8
#20	99.0	98.8	67.1
#30	97.2	96.8	64.3
#40	88.4	89.7	60.4
#50	45.8	66.9	52.8
#70	17.5	27.7	43.7
#100	7.7	14.4	37.8
#140	4.2	8.3	35.6
#170	3.6	7.1	34.9
#200	3.4	6.5	34.3

SOIL DESCRIPTION

○ Gray/tan fine SAND, little medium sand, trace silt.

□ Gray/tan fine SAND, trace medium sand, trace silt.

△ Gray SILT, some fine sand, little medium sand, little gravel, trace coarse sand

REMARKS:

○

□

△

○ Source: DRV66R2 Sample No.: S-1 Elev./Depth: 11.25'-15.8'

□ Source: DRV66R2 Sample No.: S-2 Elev./Depth: 15.8'-18.3'

△ Source: DRV66R2 Sample No.: S-3 Elev./Depth: 18.3'-19.75'

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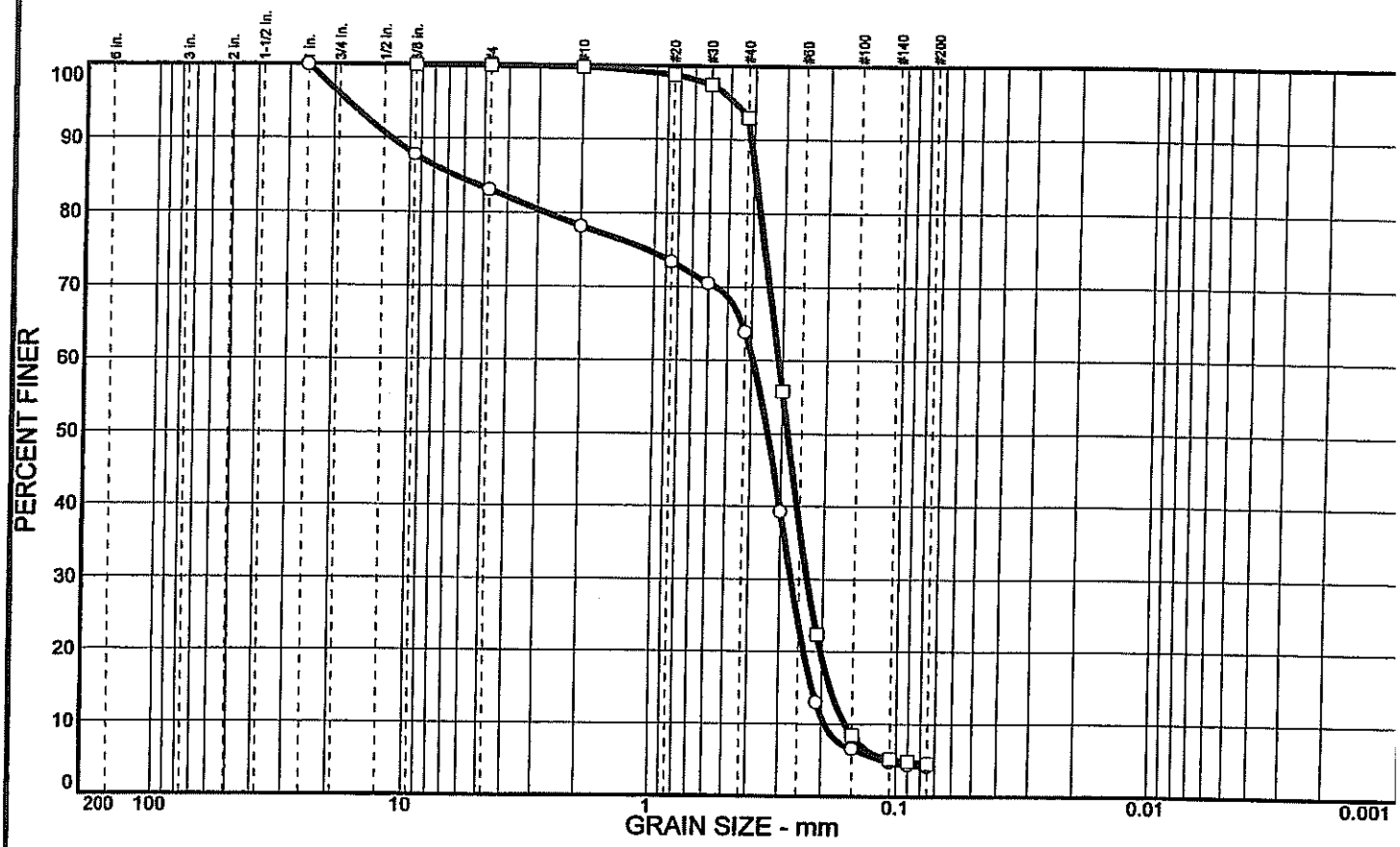
Particle Size Distribution Report DRV-67



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		16.9	78.9	4.2		SP			
□			95.4	4.6		SP			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1	100.0		
3/8	87.8	100.0	
	GRAIN SIZE		
D_{60}	0.394	0.312	
D_{30}	0.269	0.232	
D_{10}	0.194	0.160	
	COEFFICIENTS		
C_c	0.95	1.07	
C_u	2.03	1.95	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	83.1	100.0	
#10	78.2	99.8	
#20	73.4	98.8	
#30	70.5	97.5	
#40	63.9	93.0	
#50	39.3	55.8	
#70	13.0	22.4	
#100	6.6	8.5	
#140	4.8	5.2	
#170	4.4	4.9	
#200	4.2	4.6	

SOIL DESCRIPTION

○ Orange/tan fine SAND, little gravel, little medium sand, trace coarse sand, trace silt.

□ Orange/tan fine SAND, trace medium sand, trace silt.

REMARKS:

○

□

○ Source: DRV67 Sample No.: S-1 Elev./Depth: 0.0'-1.6'

□ Source: DRV67 Sample No.: S-2 Elev./Depth: 1.6'-5.1'

DUFFIELD ASSOCIATES
5400 LIMESTONE ROAD
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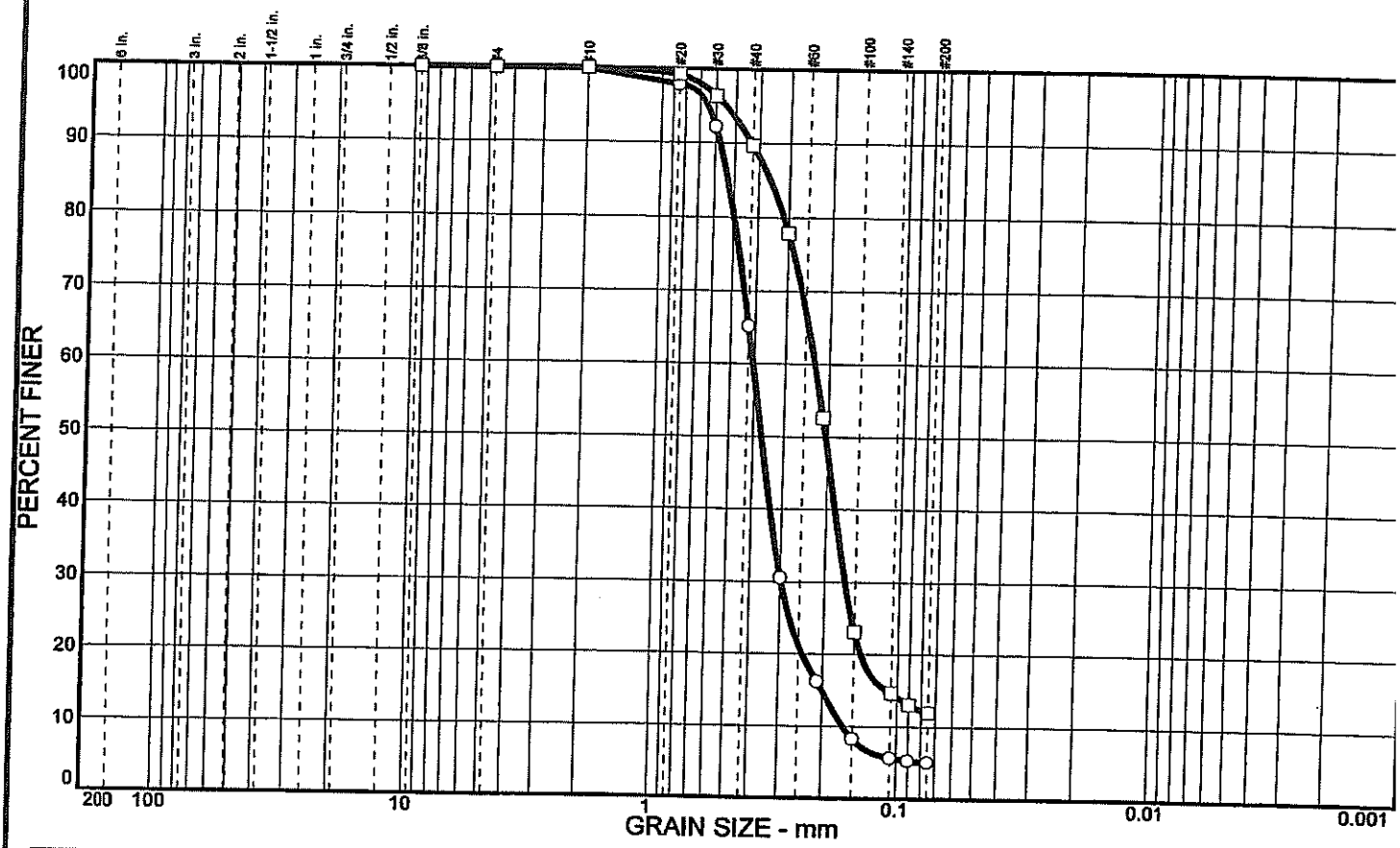
TEL. (302) 239-6634 FAX (302) 239-8485
E-MAIL: DUFFIELD@DUFFNET.COM

Client: U.S. Army Corps of Engineers

Project: Vibrocoring, Delaware Coast, Port Mahon PED, Contract #DACW-61-98-D-0008, Task Order #8.

Project No.: 3769.GI Date/chk'd by: June 1999/WHS

Particle Size Distribution Report DRV-67



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			94.9	5.1		SP-SM			
□			88.0	12.0		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □
3/8	100.0	100.0
GRAIN SIZE		
D_{60}	0.405	0.229
D_{30}	0.297	0.165
D_{10}	0.164	
COEFFICIENTS		
C_c	1.33	
C_u	2.47	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □
#4	100.0	100.0
#10	99.9	100.0
#20	97.9	99.3
#30	92.2	96.4
#40	65.2	89.7
#50	30.6	77.9
#70	16.2	52.6
#100	8.3	23.1
#140	5.7	14.7
#170	5.3	13.1
#200	5.1	12.0

SOIL DESCRIPTION

○ Gray fine SAND, some medium sand, trace silt.

□ Gray fine SAND, little silt, trace medium sand.

REMARKS:

○

□

○ Source: DRV67 Sample No.: S-3 Elev./Depth: 5.1'-6.0'

□ Source: DRV67 Sample No.: S-7 Elev./Depth: 16.2'-17.0'

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Client: U.S. Army Corps of Engineers

Project: Vibrocoring, Delaware Coast, Port Mahon PED, Contract #DACW-61-98-D-0008, Task Order #8.

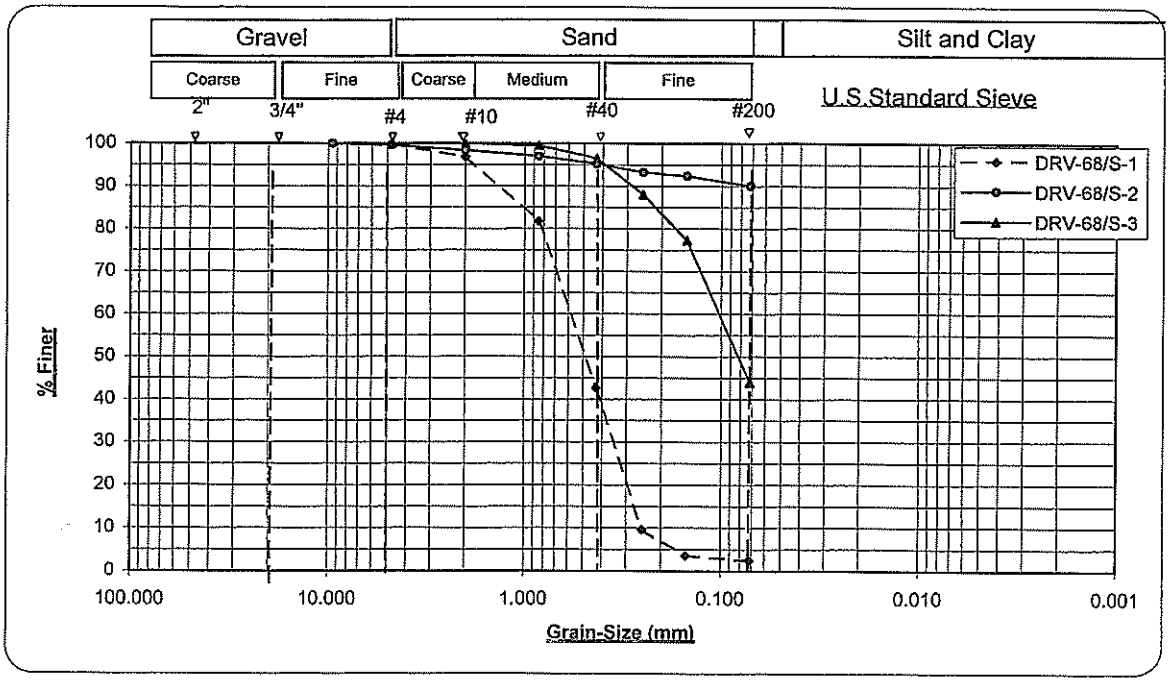
Project No.: 3769.GI Date/chk'd by: June 1999/WHS

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma15		
Job No.	2000g591				Date	22-May-01		
					Cu	2.27	Undefined	Undefined
Dry Wt.	445.40	177.80	449.30		C c	0.80	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-68/S-1	DRV-68/S-2	DRV-68/S-3			DRV-68/S-1	DRV-68/S-2	DRV-68/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70			
3/8"	0.00	0.00	0.00	3/8"	9.50	100.00	100.00	
#4	0.70	0.62	0.00	#4	4.75	99.84	99.65	100.00
#10	13.90	2.89	0.10	#10	2.00	96.88	98.37	99.98
#20	81.40	5.27	2.48	#20	0.850	81.72	97.04	99.45
#40	255.50	8.50	15.67	#40	0.430	42.64	95.22	96.51
#60	402.60	11.92	53.66	#60	0.250	9.61	93.30	88.06
#100	429.40	13.58	102.11	#100	0.150	3.59	92.36	77.27
#200	434.50	17.75	251.76	#200	0.072	2.45	90.02	43.97

ASTMD-422



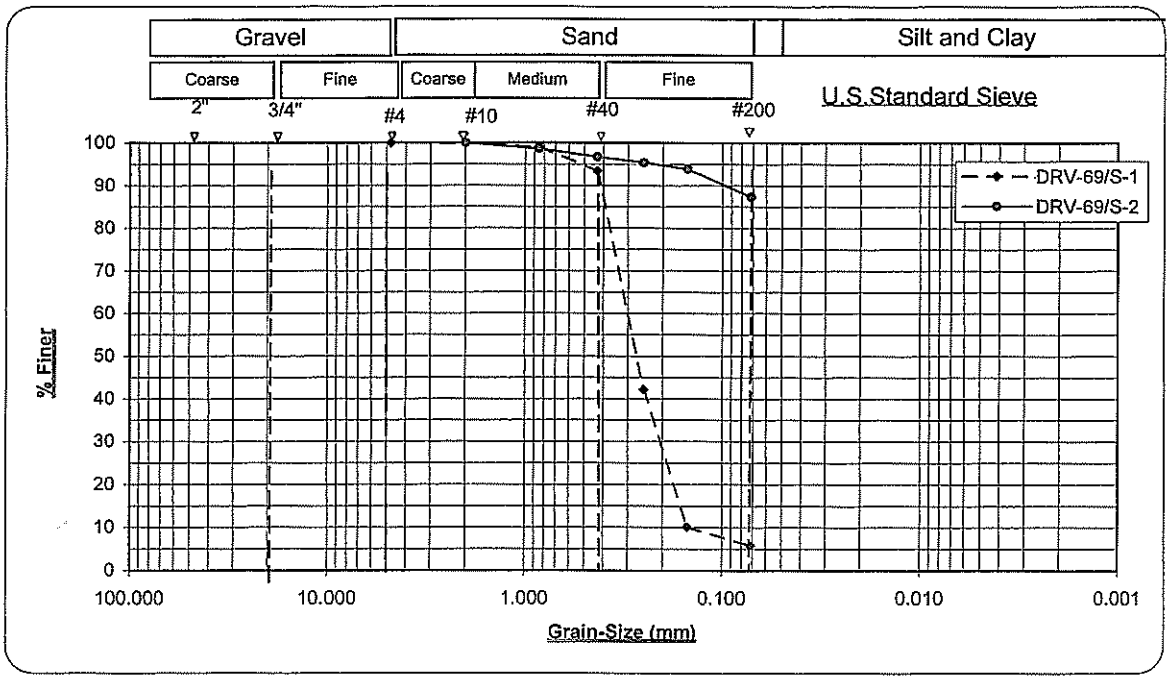
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-68/S-1	00.00-04.50			Light brown poorly graded sand (SP)
DRV-68/S-2	04.50-06.00		N.T	Brown silt (ML?)
DRV-68/S-3	06.00-10.00		N.T	Brown silty sand (SM)
		N.P- Non-Plastic		N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma16		
Job No.	2000g591				Date	22-May-01		
					Cu	19.38	Undefined	
Dry Wt.	427.30	223.30			C c	8.89	Undefined	
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-69/S-1	DRV-69/S-2				DRV-69/S-1	DRV-69/S-2	
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50			
#4	0.00	0.00		#4	4.75	100.00		
#10	0.40	0.00		#10	2.00	99.91	100.00	
#20	3.70	3.13		#20	0.850	99.13	98.60	
#40	28.10	7.38		#40	0.430	93.42	96.70	
#60	247.30	10.36		#60	0.250	42.12	95.36	
#100	383.70	13.77		#100	0.150	10.20	93.83	
#200	402.30	28.25		#200	0.072	5.85	87.35	

ASTMD-422



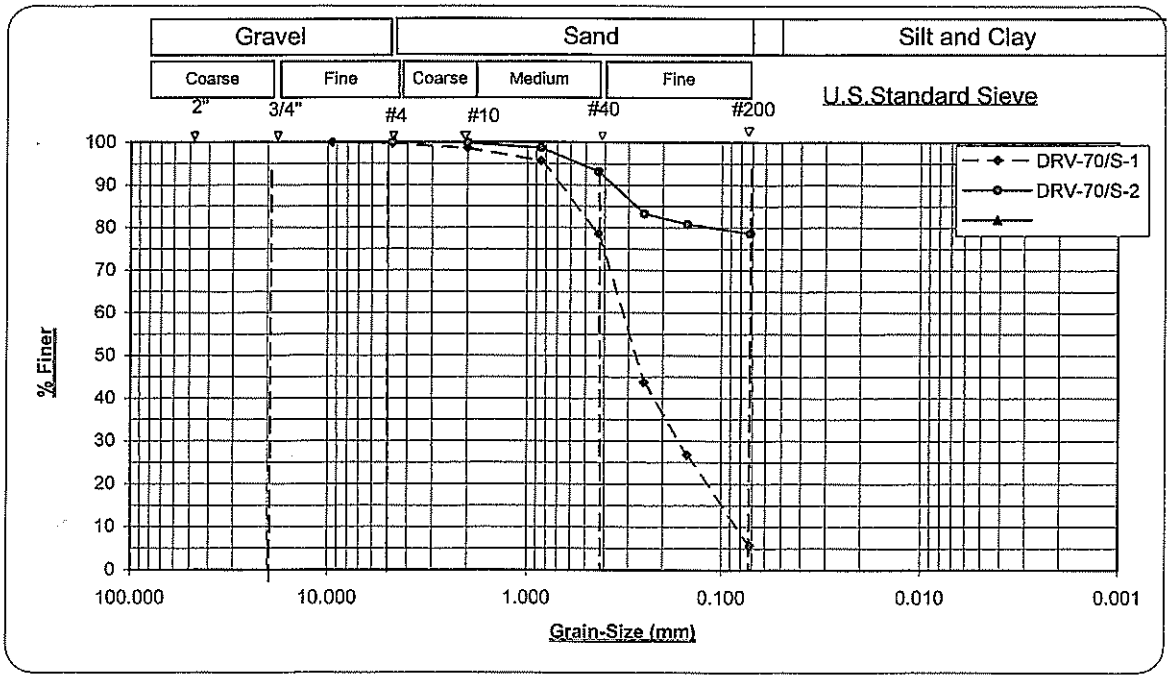
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-69/S-1	02.50-05.00		N.T	Light brown poorly graded sand with silt (SP-SM)
DRV-69/S-2	05.50-10.00		N.T	Brown silt (ML?)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma17		
Job No.	2000g591				Date	22-May-01		
					Cu	3.37	Undefined	
Dry Wt.	431.90	237.50			C c	0.95	Undefined	
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-70/S-1	DRV-70/S-2				DRV-70/S-1	DRV-70/S-2	
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50	100.00		
#4	0.97	0.00		#4	4.75	99.78	100.00	
#10	5.86	0.37		#10	2.00	98.64	99.84	
#20	18.60	3.13		#20	0.850	95.69	98.68	
#40	92.40	16.40		#40	0.430	78.61	93.09	
#60	242.64	39.69		#60	0.250	43.82	83.29	
#100	316.10	45.59		#100	0.150	26.81	80.80	
#200	407.30	50.62		#200	0.072	5.70	78.69	

ASTMD-422



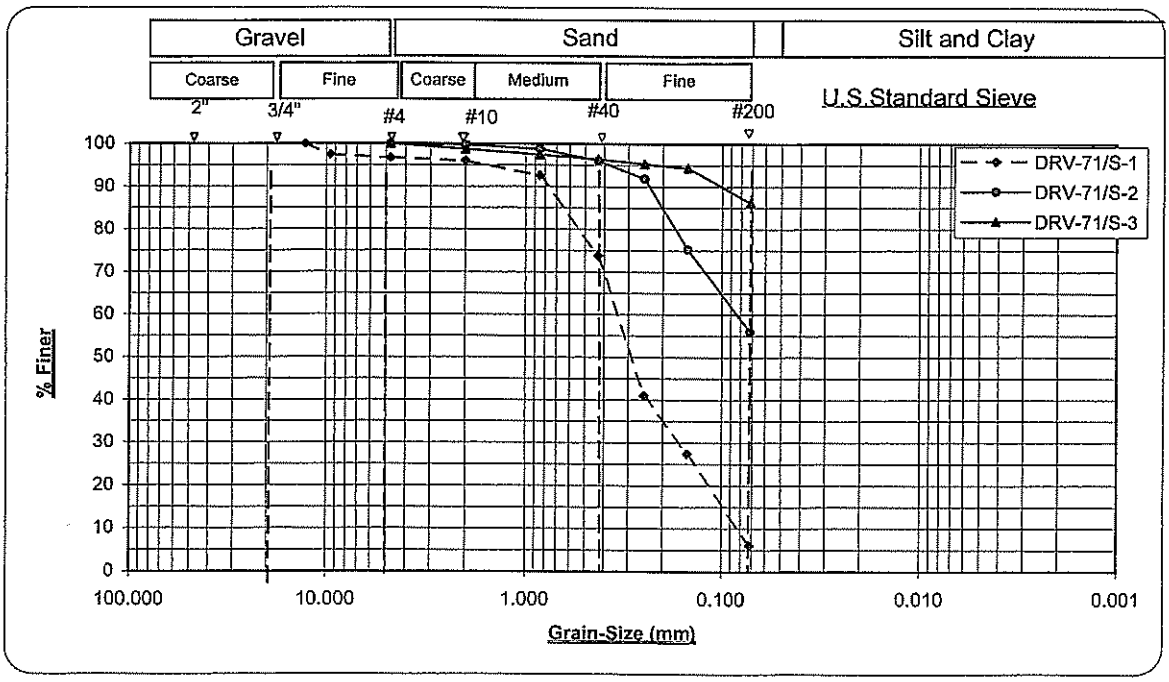
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-70/S-1	00.00-02.50			Gray poorly graded sand with silt (SP-SM)
DRV-70/S-2	02.50-05.00		N.T	Gray sandy silt (ML?)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma18		
Job No.	2000g591				Date	22-May-01		
					Cu	3.68	Undefined	Undefined
Dry Wt.	248.00	272.90	273.90		C c	0.87	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-71/S-1	DRV-71/S-2	DRV-71/S-3			DRV-71/S-1	DRV-71/S-2	DRV-71/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70	100.00		
3/8"	6.30	0.00	0.00	3/8"	9.50	97.46		
#4	8.20	0.00	0.00	#4	4.75	96.69	100.00	100.00
#10	9.90	0.90	3.45	#10	2.00	96.01	99.67	98.74
#20	18.40	3.20	6.89	#20	0.850	92.58	98.83	97.48
#40	64.90	10.80	9.81	#40	0.430	73.83	96.04	96.42
#60	146.20	22.20	12.93	#60	0.250	41.05	91.87	95.28
#100	179.90	67.50	15.40	#100	0.150	27.46	75.27	94.38
#200	232.90	120.20	37.73	#200	0.072	6.09	55.95	86.22

ASTMD-422



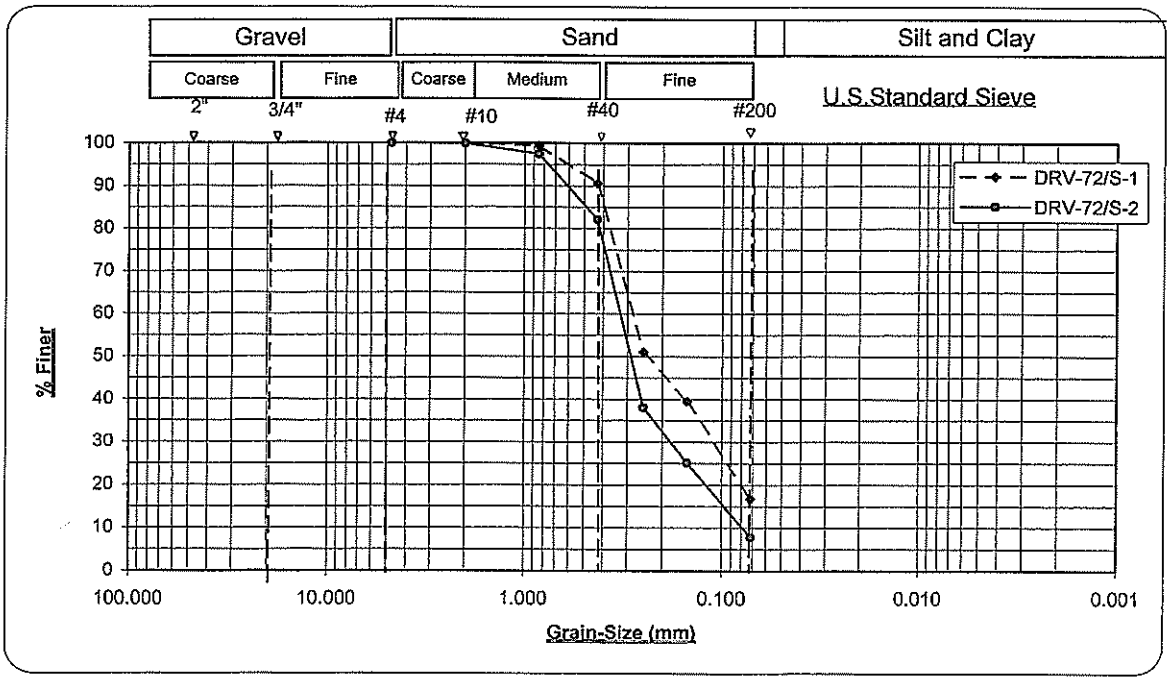
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-71/S-1	00.00-04.30		N.T	Gray poorly graded sand with silt (SP-SM)
DRV-71/S-2	05.00-08.60		N.T	Dark gray sandy silt (ML?)
DRV-71/S-3	10.00-15.00		N.T	Dark gray silt (ML?)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma19		
Job No.	2000g591				Date	22-May-01		
					Cu	Undefined	4.00	Undefined
Dry Wt.	275.20	281.80			C c	Undefined	1.27	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-72/S-1	DRV-72/S-2				DRV-72/S-1	DRV-72/S-2	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50			
#4	0.00	0.00		#4	4.75	100.00	100.00	
#10	0.10	0.28		#10	2.00	99.96	99.90	
#20	1.60	7.10		#20	0.850	99.42	97.48	
#40	26.00	50.31		#40	0.430	90.55	82.15	
#60	134.80	174.50		#60	0.250	51.02	38.08	
#100	166.40	210.98		#100	0.150	39.53	25.13	
#200	229.10	259.69		#200	0.072	16.75	7.85	

ASTMD-422



Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-72/S-1	00.00-05.00		N.T	Dark gray silty sand (SM)
DRV-72/S-2	05.00-10.00		N.T	Dark gray poorly graded sand with silt (SP-SM)

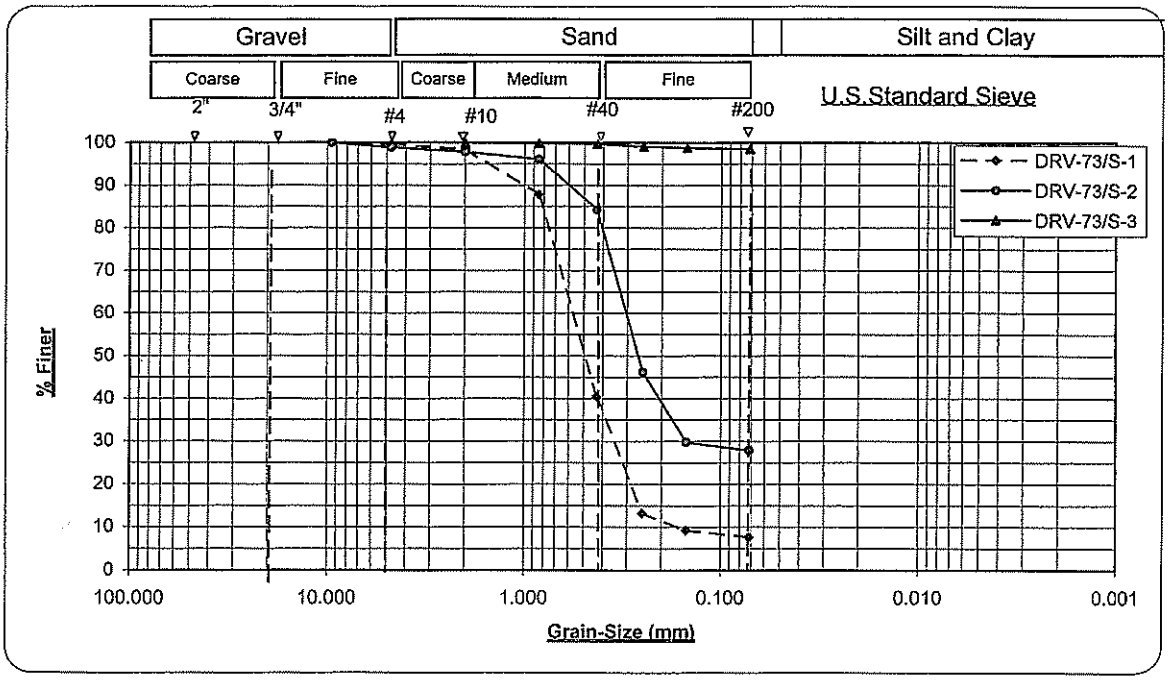
N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma20		
Job No.	2000g591				Date	22-May-01		
					Cu	162.50	200.00	362.50
Dry Wt.	275.40	372.50	140.40		C c	2.16	0.14	1.04
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-73/S-1	DRV-73/S-2	DRV-73/S-3			DRV-73/S-1	DRV-73/S-2	DRV-73/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70			
3/8"	0.00	0.00	0.00	3/8"	9.50	100.00	100.00	
#4	1.03	4.10	0.00	#4	4.75	99.63	98.90	
#10	4.20	8.16	0.00	#10	2.00	98.47	97.81	100.00
#20	33.68	14.49	0.19	#20	0.850	87.77	96.11	99.86
#40	163.86	58.50	0.43	#40	0.430	40.50	84.30	99.69
#60	238.96	200.46	1.29	#60	0.250	13.23	46.19	99.08
#100	249.81	261.56	1.70	#100	0.150	9.29	29.78	98.79
#200	254.23	268.90	2.06	#200	0.072	7.69	27.81	98.53

ASTMD-422



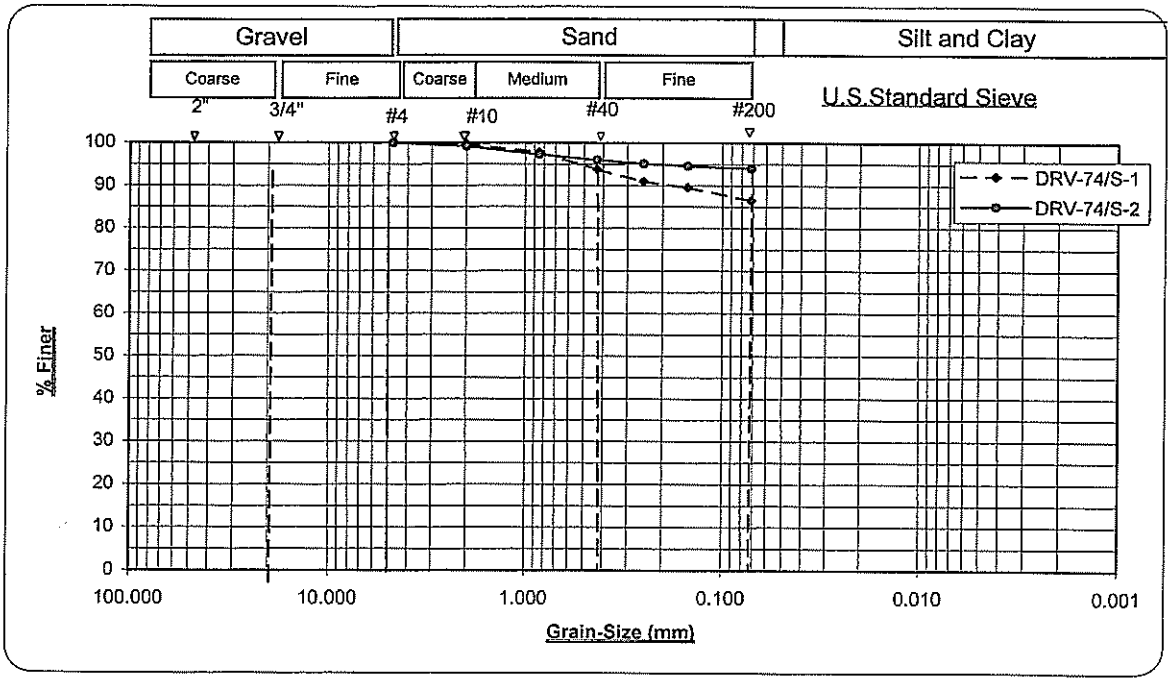
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-73/S-1	00.00-03.00	.	N.T	Dark gray poorly graded sand with silt (SP-SM)
DRV-73/S-2	05.00-08.00		N.T	Dark gray silty sand (SM)
DRV-73/S-3	10.00-15.00		N.T	Gray-brown silt (ML?)
		N.P- Non-Plastic		N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma21		
Job No.	2000g591				Date	22-May-01		
					Cu	Undefined	Undefined	Undefined
Dry Wt.	260.70	222.10			C c	Undefined	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-74/S-1	DRV-74/S-2				DRV-74/S-1	DRV-74/S-2	
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0:00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50			
#4	0.00	0.00		#4	4.75	100.00	100.00	
#10	0.70	1.90		#10	2.00	99.73	99.14	
#20	5.70	6.10		#20	0.850	97.81	97.25	
#40	16.20	8.90		#40	0.430	93.79	95.99	
#60	23.70	10.80		#60	0.250	90.91	95.14	
#100	27.10	11.90		#100	0.150	89.60	94.64	
#200	35.20	13.30		#200	0.072	86.50	94.01	

ASTMD-422



Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-74/S-1	00.00-05.0	.	N.T	Dark gray silt (ML?)
DRV-74/S-2	07.60-10.00		N.T	Dark gray silt (ML?)

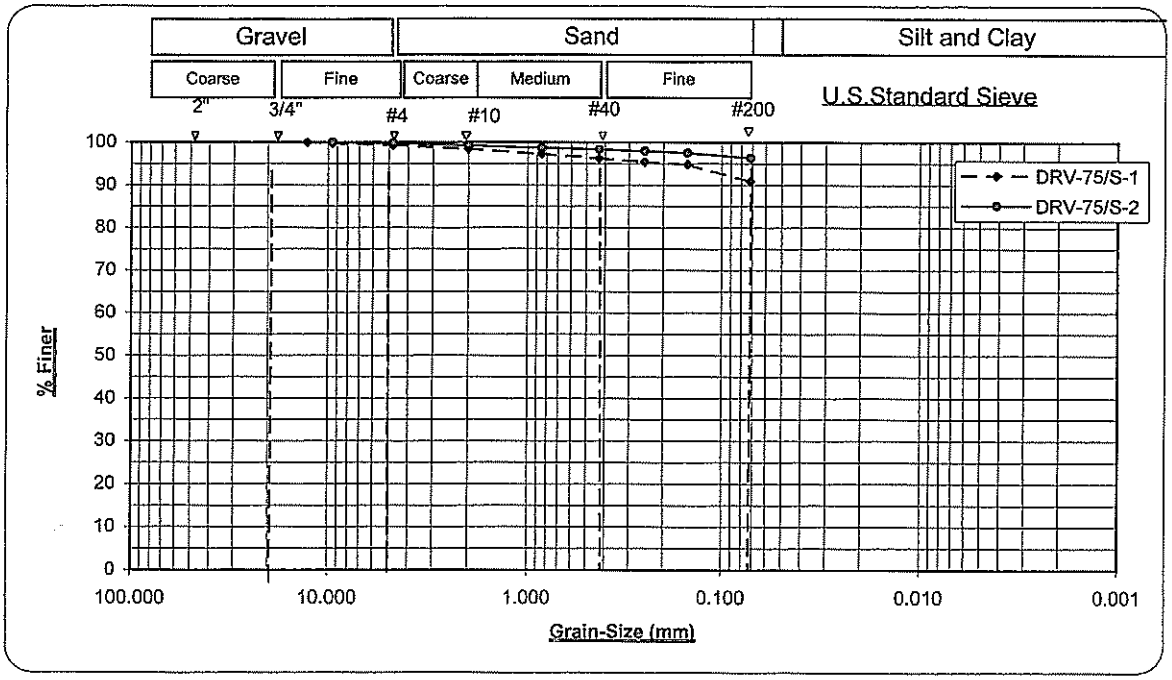
N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma22a		
Job No.	2000g591				Date	22-May-01		
					Cu	Undefined	Undefined	Undefined
Dry Wt.	231.20	2221.90			C c	Undefined	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-75/S-1	DRV-75/S-2				DRV-75/S-1	DRV-75/S-2	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70	100.00		
3/8"	0.59	0.00		3/8"	9.50	99.74	100.00	
#4	1.50	5.30		#4	4.75	99.35	99.76	
#10	3.50	16.50		#10	2.00	98.49	99.26	
#20	6.30	27.50		#20	0.850	97.28	98.76	
#40	8.70	37.20		#40	0.430	96.24	98.33	
#60	10.50	44.70		#60	0.250	95.46	97.99	
#100	11.90	55.00		#100	0.150	94.85	97.52	
#200	21.10	80.90		#200	0.072	90.87	96.36	

ASTMD-422



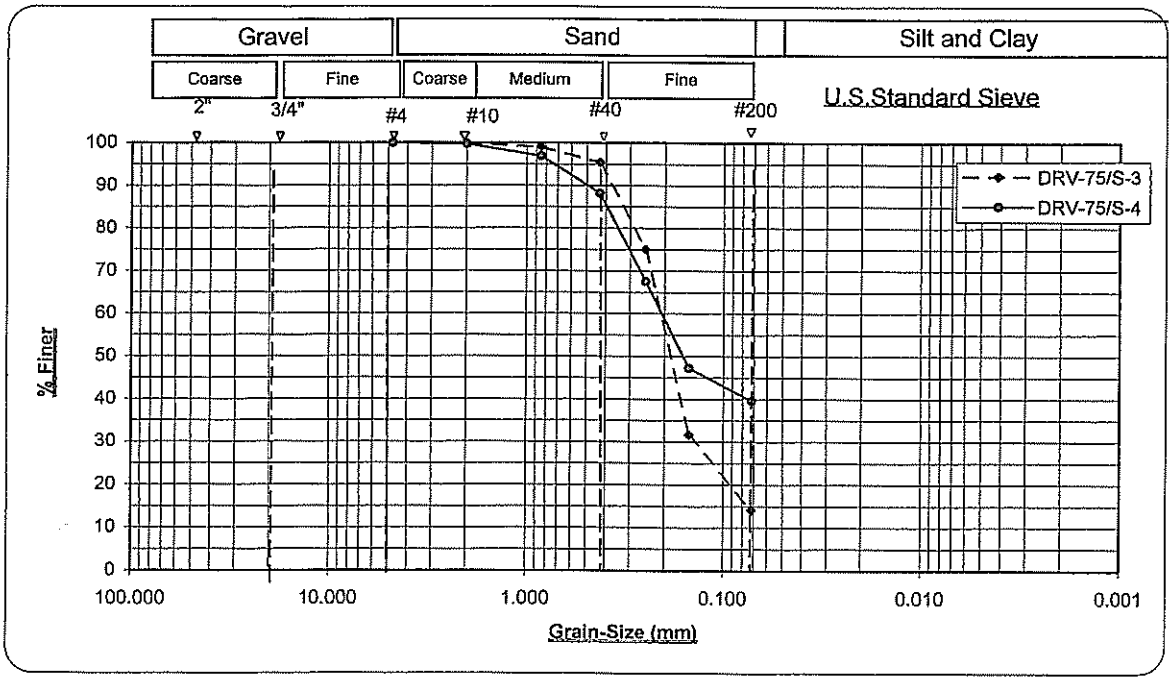
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-75/S-1	00.50-02.00		N.T	Dark gray silt (ML?)
DRV-75/S-2	02.00-05.00		N.T	Dark gray silt (ML?)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma23		
Job No.	2000g591				Date	22-May-01		
					Cu	Undefined	Undefined	Undefined
Dry Wt.	337.30	211.90			C c	Undefined	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-75/S-3	DRV-75/S-4				DRV-75/S-3	DRV-75/S-4	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50			
#4	0.00	0.00		#4	4.75	100.00	100.00	
#10	0.35	0.66		#10	2.00	99.90	99.69	
#20	3.23	6.68		#20	0.850	99.04	96.85	
#40	15.42	25.05		#40	0.430	95.43	88.18	
#60	84.09	68.82		#60	0.250	75.07	67.52	
#100	230.63	111.87		#100	0.150	31.62	47.21	
#200	289.47	128.05		#200	0.072	14.18	39.57	

ASTMD-422



Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-75/S-3	05.00-07.00		N.T	Dark gray silty sand (SM)
DRV-75/S-4	07.00-10.00		N.T	Dark gray silty sand (SM)

N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma24		
Job No.	2000g591				Date	24-May-01		
					Cu	Undefined	Undefined	Undefined
Dry Wt.	198.90	258.40	241.00		C c	Undefined	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-76/S-1	DRV-76/S-2	DRV-76/S-3			DRV-76/S-1	DRV-76/S-2	DRV-76/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70	100.00		
3/8"	2.40	0.00	0.00	3/8"	9.50	98.79		
#4	5.90	0.00	0.00	#4	4.75	97.03	100.00	100.00
#10	13.10	0.10	6.00	#10	2.00	93.41	99.96	97.51
#20	21.60	1.00	11.60	#20	0.850	89.14	99.61	95.19
#40	28.60	4.30	15.70	#40	0.430	85.62	98.34	93.49
#60	37.80	25.30	39.20	#60	0.250	81.00	90.21	83.73
#100	95.40	172.40	183.20	#100	0.150	52.04	33.28	23.98
#200	129.80	220.60	212.10	#200	0.072	34.74	14.63	11.99

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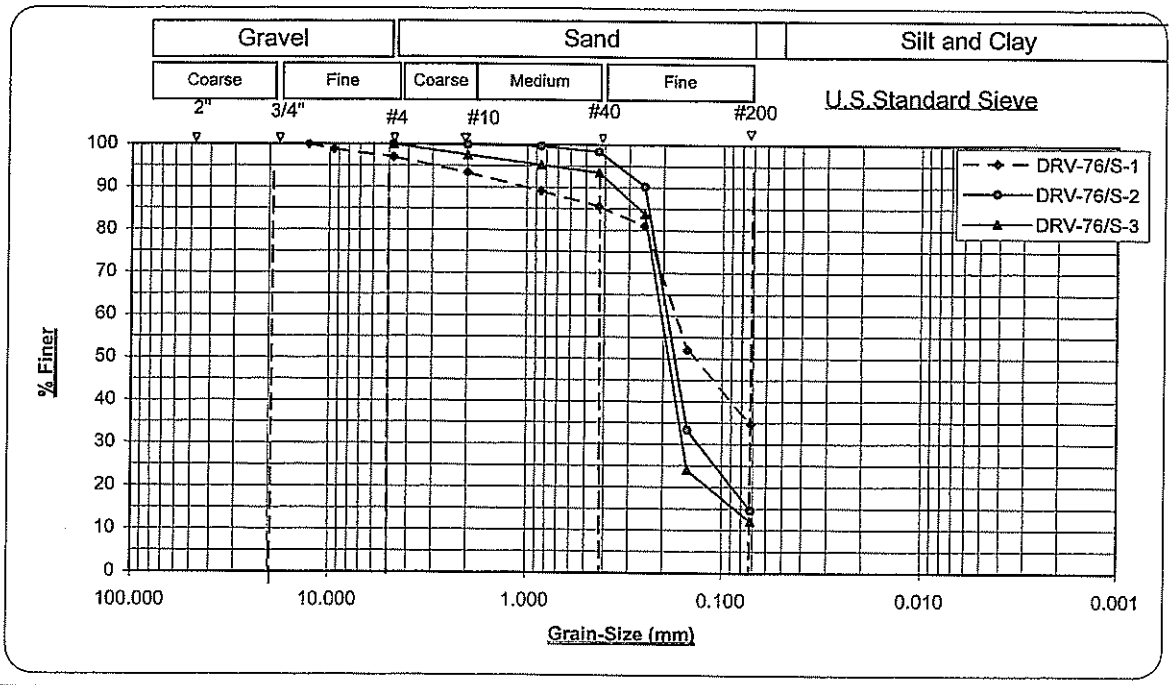

Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-76/S-1	00.25-02.50		N.T	Brown silty sand (SM)
DRV-76/S-2	02.50-05.00		N.T	Brown silty sand (SM)
DRV-76/S-3	07.50-10.00		N.T	Gray poorly graded sand with silt (SP-SM)

N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma25		
Job No.	2000g591				Date	24-May-01		
					Cu	6.82	2.62	5.63
Dry Wt.	313.30	245.80	314.90		C c	0.76	1.10	0.71
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-77R1/S-1	DRV-77R1/S-2	DRV-77R1/S-3			DRV-77R1/S-1	DRV-77R1/S-2	DRV-77R1/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			100.00
3/4	0.00	0.00	17.70	3/4	19.00			94.38
1/2"	0.00	0.00	29.50	1/2"	12.70	100.00		90.63
3/8"	12.40	0.00	35.80	3/8"	9.50	96.04	100.00	88.63
#4	36.80	2.10	68.20	#4	4.75	88.25	99.15	78.34
#10	91.10	5.70	112.90	#10	2.00	70.92	97.68	64.15
#20	164.70	13.90	188.30	#20	0.850	47.43	94.34	40.20
#40	235.90	56.20	262.70	#40	0.430	24.70	77.14	16.58
#60	278.90	156.30	303.60	#60	0.250	10.98	36.41	3.59
#100	293.90	213.40	307.30	#100	0.150	6.19	13.18	2.41
#200	307.80	239.40	309.10	#200	0.072	1.76	2.60	1.84

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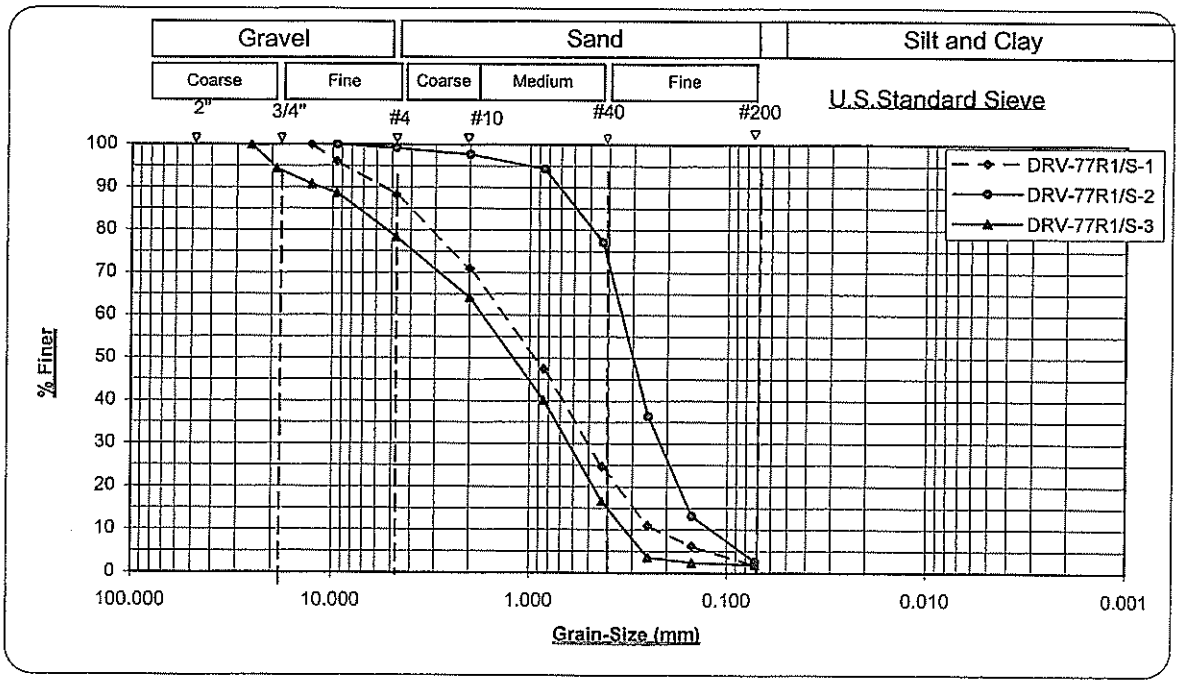


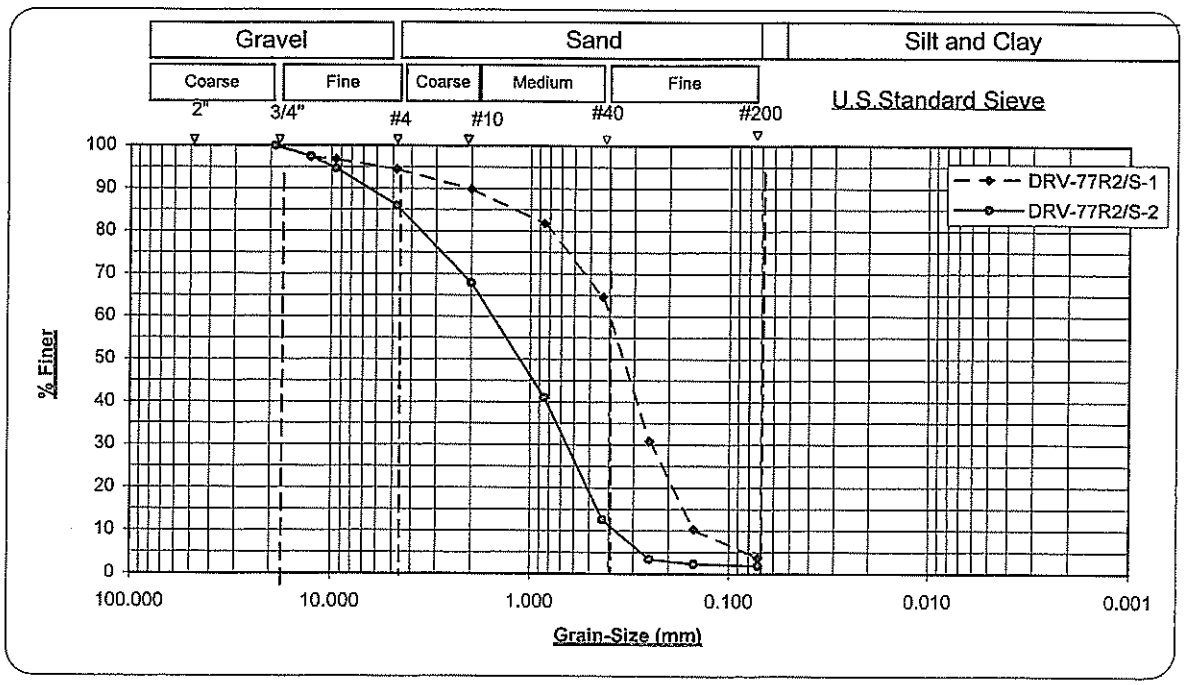
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-77R1/S-1	00.00-01.00		N.T	Brownish gray poorly graded sand (SP)
DRV-77R1/S-2	01.00-03.50		N.T	Brownish gray poorly graded sand (SP)
DRV-77R1/S-3	03.50-05.60		N.T	Brownish gray poorly graded sand with gravel (SP)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma26		
Job No.	2000g591				Date	22-May-01		
					Cu	25.00	4.47	
Dry Wt.	308.40	373.80			C c	9.77	0.65	
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-77R2/S-1	DRV-77R2/S-2				DRV-77R2/S-1	DRV-77R2/S-2	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00	100.00	100.00	
1/2"	8.30	9.60		1/2"	12.70	97.31	97.43	
3/8"	9.90	20.20		3/8"	9.50	96.79	94.60	
#4	17.00	52.50		#4	4.75	94.49	85.96	
#10	31.40	120.40		#10	2.00	89.82	67.79	
#20	56.00	220.40		#20	0.850	81.84	41.04	
#40	109.10	326.70		#40	0.430	64.62	12.60	
#60	213.40	360.90		#60	0.250	30.80	3.45	
#100	276.50	365.20		#100	0.150	10.34	2.30	
#200	296.90	366.80		#200	0.072	3.73	1.87	

ASTMD-422



Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-77R2/S-1	03.60-07.60		N.T	Gray poorly graded sand (SP)
DRV-77R2/S-2	08.60-12.40		N.T	Gray poorly graded sand (SP)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma27		
Job No.	2000g591				Date	24-May-01		
					Cu	Undefined	Undefined	Undefined
Dry Wt.	471.00	324.00	391.30		C c	Undefined	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-78/S-1	DRV-78/S-2	DRV-78/S-3			DRV-78/S-1	DRV-78/S-2	DRV-78/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10	100.00		
1"	42.40	0.00	0.00	1"	25.40	91.00		
3/4	53.90	0.00	0.00	3/4	19.00	88.56		
1/2"	104.60	0.00	0.00	1/2"	12.70	77.79		
3/8"	134.60	0.00	0.00	3/8"	9.50	71.42		
#4	199.80	0.00	0.00	#4	4.75	57.58		
#10	249.70	0.00	0.00	#10	2.00	46.99		100.00
#20	281.10	0.00	1.30	#20	0.850	40.32		99.67
#40	333.30	0.00	2.30	#40	0.430	29.24	100.00	99.41
#60	384.20	1.10	3.70	#60	0.250	18.43	99.66	99.05
#100	401.60	4.80	8.50	#100	0.150	14.73	98.52	97.83
#200	417.30	177.50	219.60	#200	0.072	11.40	45.22	43.88

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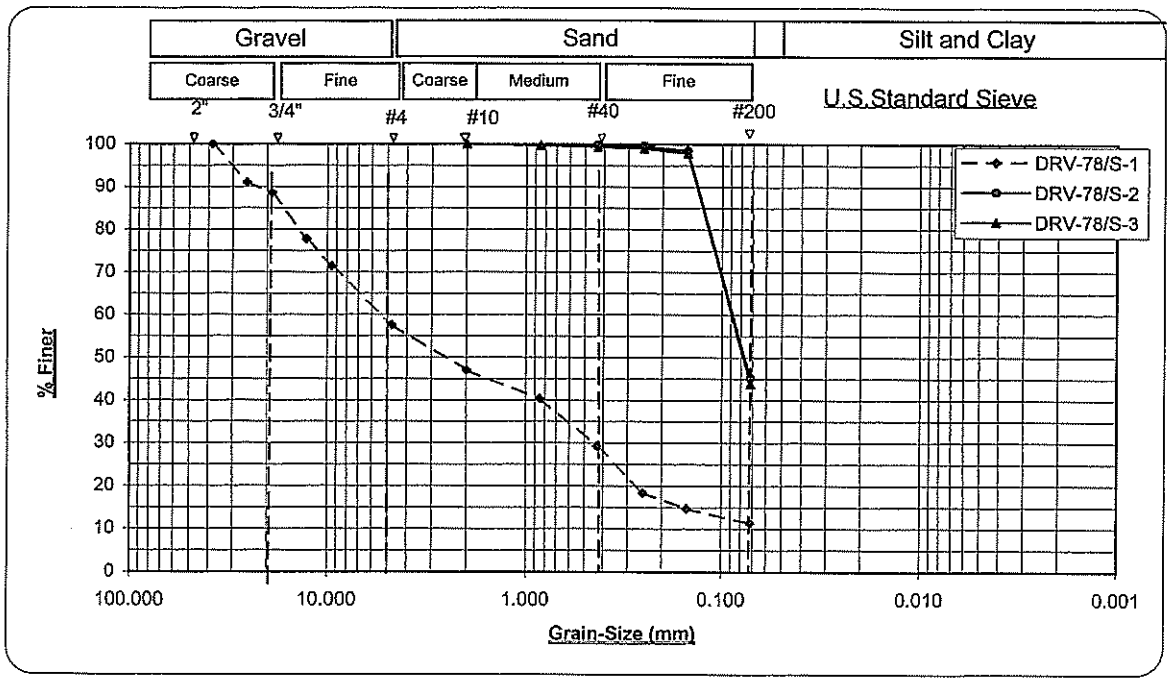

Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-78/S-1	00.00-01.00		N.T	Gray poorly graded sand with silt and gravel (SP-SM)
DRV-78/S-2	02.00-05.00		N.T	Gray silty sand (SM)
DRV-78/S-3	05.00-10.00		N.T	Gray silty sand (SM)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma28		
Job No.	2000g591				Date	24-May-01		
					Cu	2.64	1.94	2.50
Dry Wt.	415.10	305.00	233.80		C c	1.32	0.86	0.82
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-79/S-1	DRV-79/S-2	DRV-79/S-3			DRV-79/S-1	DRV-79/S-2	DRV-79/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70			
3/8"	0.00	0.00	0.00	3/8"	9.50			100.00
#4	0.00	0.00	5.90	#4	4.75	100.00	100.00	97.48
#10	1.00	4.80	20.30	#10	2.00	99.76	98.43	91.32
#20	5.70	15.20	67.50	#20	0.850	98.63	95.02	71.13
#40	34.40	62.80	157.60	#40	0.430	91.71	79.41	32.59
#60	145.70	191.20	216.90	#60	0.250	64.90	37.31	7.23
#100	314.90	273.90	224.60	#100	0.150	24.14	10.20	3.93
#200	404.30	295.60	226.60	#200	0.072	2.60	3.08	3.08

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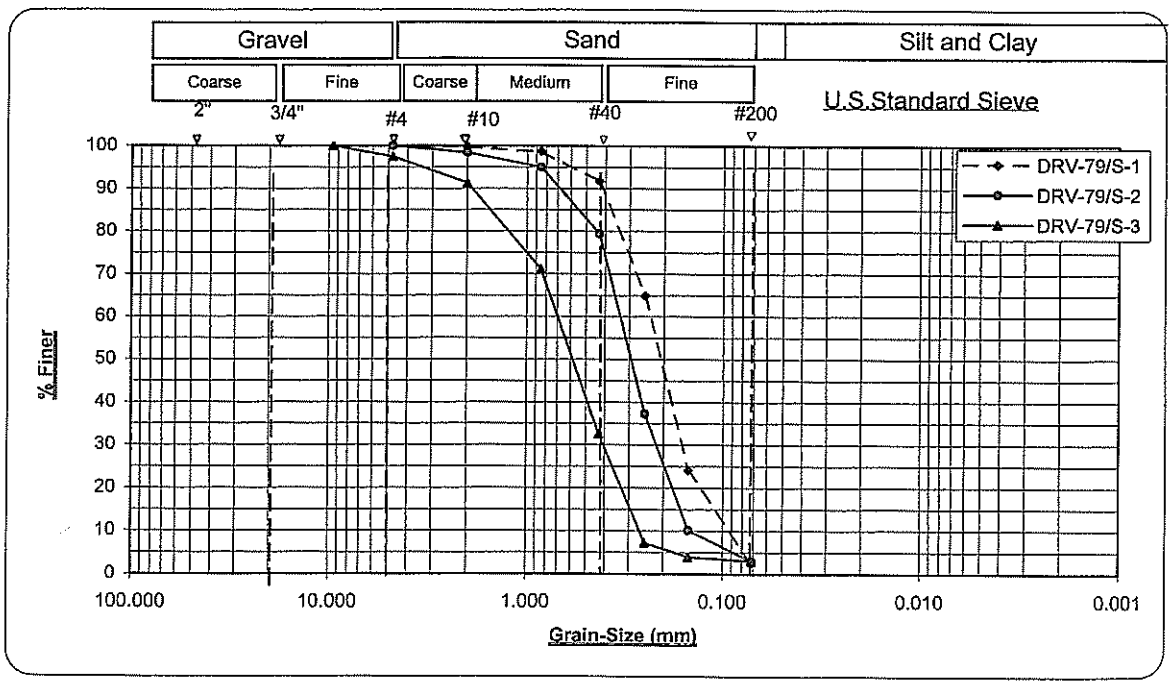

Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-79/S-1	00.00-01.25		N.T	Gray poorly graded sand (SP)
DRV-79/S-2	01.25-05.00		N.T	Gray poorly graded sand (SP)
DRV-79/S-3	08.00-09.00		N.T	Gray poorly graded sand (SP)

N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma29		
Job No.	2000g591				Date	22-May-01		
					Cu	3.20	3.75	
Dry Wt.	425.40	333.40			C c	1.13	0.94	
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-80/S-1	DRV-80/S-2				DRV-80/S-1	DRV-80/S-2	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50			
#4	0.00	0.00		#4	4.75	100.00	100.00	
#10	2.50	7.50		#10	2.00	99.41	97.75	
#20	15.00	28.70		#20	0.850	96.47	91.39	
#40	87.20	68.30		#40	0.430	79.50	79.51	
#60	240.40	159.70		#60	0.250	43.49	52.10	
#100	349.30	245.50		#100	0.150	17.89	26.36	
#200	409.60	311.40		#200	0.072	3.71	6.60	

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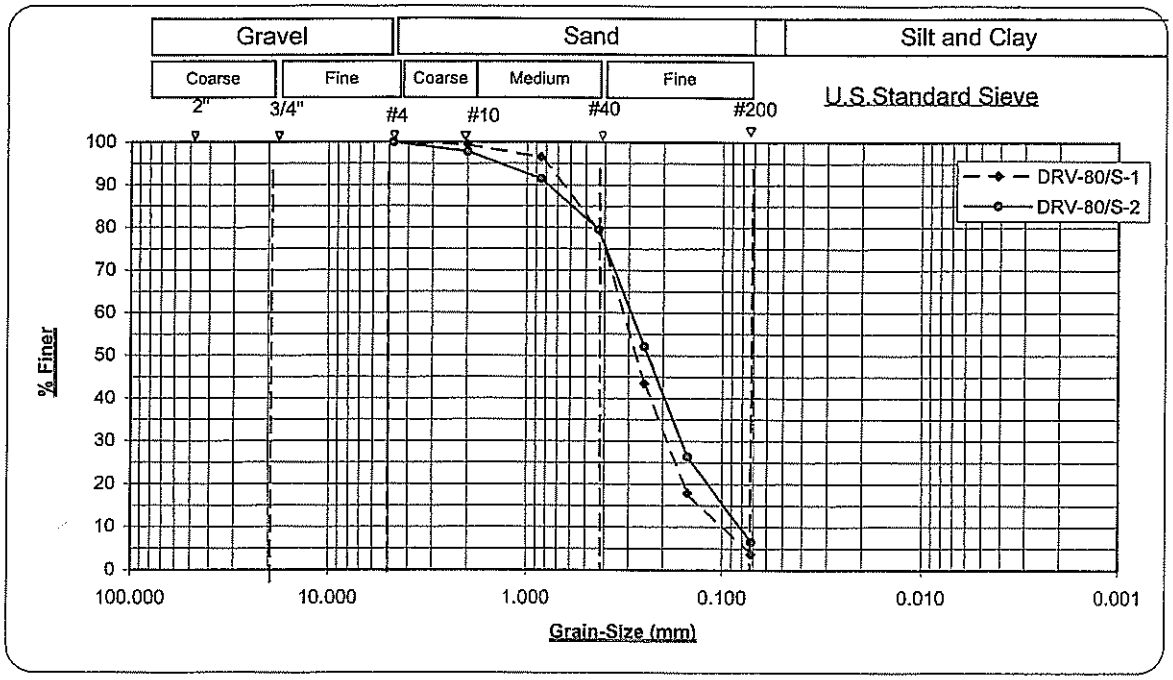


Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-80/S-1	00.00-05.00		N.T	Gray poorly graded sand (SP)
DRV-80/S-2	05.00-10.00		N.T	Gray poorly graded sand with silt (SP-SM))

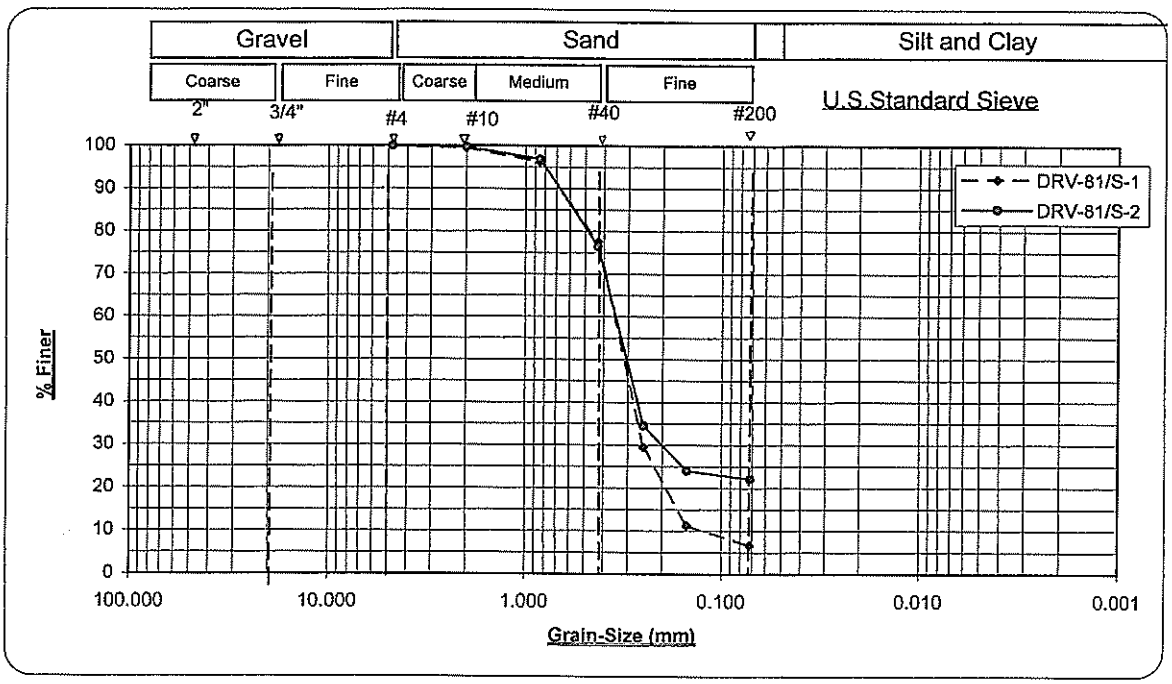
N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma30		
Job No.	2000g591				Date	22-May-01		
					Cu	3.50	Undefined	
Dry Wt.	443.60	390.80			C c	0.41	Undefined	
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-81/S-1	DRV-81/S-2				DRV-81/S-1	DRV-81/S-2	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00			
1/2"	0.00	0.00		1/2"	12.70			
3/8"	0.00	0.00		3/8"	9.50			
#4	0.00	0.00		#4	4.75	100.00	100.00	
#10	1.90	1.30		#10	2.00	99.57	99.67	
#20	16.90	12.30		#20	0.850	96.19	96.85	
#40	99.50	92.00		#40	0.430	77.57	76.46	
#60	312.90	256.00		#60	0.250	29.46	34.49	
#100	393.30	296.80		#100	0.150	11.34	24.05	
#200	414.10	304.40		#200	0.072	6.65	22.11	

ASTMD-422



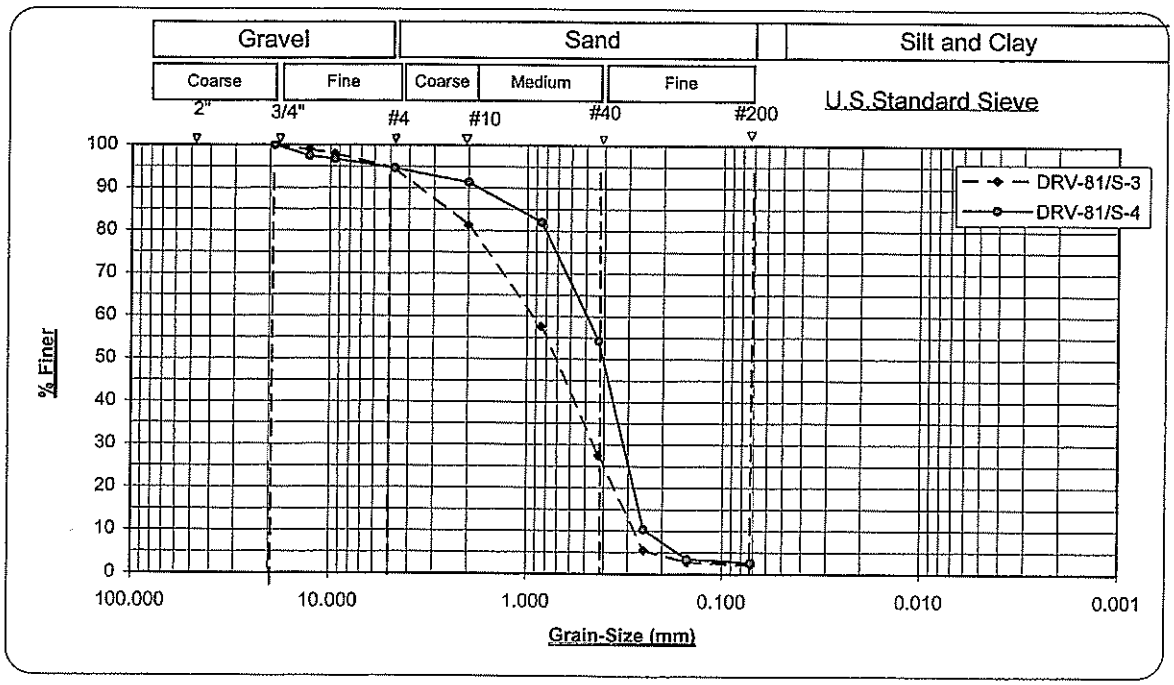
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-81/S-1	00.00-01.75		N.T	Gray poorly graded sand with silt (SP-SM)
DRV-81/S-2	01.75-03.30		N.T	Gray silty sand (SM)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma31		
Job No.	2000g591				Date	22-May-01		
					Cu	3.21	2.08	
Dry Wt.	437.80	393.30			C c	0.80	0.75	
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-81/S-3	DRV-81/S-4				DRV-81/S-3	DRV-81/S-4	0
3"	0.00	0.00		3"	76.00			
2"	0.00	0.00		2"	50.80			
1.5"	0.00	0.00		1.5"	38.10			
1"	0.00	0.00		1"	25.40			
3/4	0.00	0.00		3/4	19.00	100.00	100.00	
1/2"	4.10	10.10		1/2"	12.70	99.06	97.43	
3/8"	9.00	13.10		3/8"	9.50	97.94	96.67	
#4	23.60	21.20		#4	4.75	94.61	94.61	
#10	81.80	34.10		#10	2.00	81.32	91.33	
#20	185.50	70.70		#20	0.850	57.63	82.02	
#40	317.10	180.00		#40	0.430	27.57	54.23	
#60	413.50	352.70		#60	0.250	5.55	10.32	
#100	425.20	379.50		#100	0.150	2.88	3.51	
#200	428.30	382.60		#200	0.072	2.17	2.72	

ASTMD-422



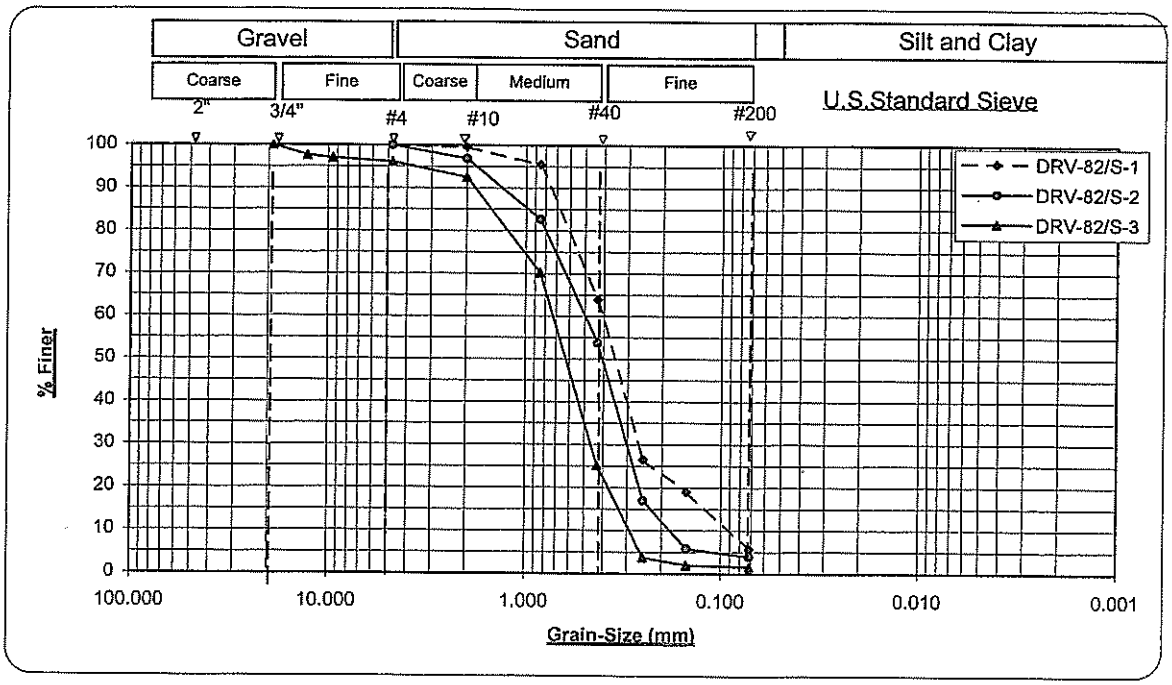
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-81/S-3	05.00-08.40		N.T	Gray poorly graded sand (SP)
DRV-81/S-4	10.00-15.00		N.T	Gray poorly graded sand (SP)
		N.P- Non-Plastic	N.T-	Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma32		
Job No.	2000g591				Date	24-May-01		
					Cu	3.22	1.77	1.78
Dry Wt.	453.60	369.90	411.00		C c	1.24	0.75	0.88
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-82/S-1	DRV-82/S-2	DRV-82/S-3			DRV-82/S-1	DRV-82/S-2	DRV-82/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			100.00
1/2"	0.00	0.00	9.80	1/2"	12.70			97.62
3/8"	0.00	0.00	12.20	3/8"	9.50			97.03
#4	0.00	0.00	16.10	#4	4.75	100.00	100.00	96.08
#10	1.90	11.70	30.70	#10	2.00	99.58	96.84	92.53
#20	20.30	63.90	122.30	#20	0.850	95.52	82.73	70.24
#40	163.60	171.20	307.50	#40	0.430	63.93	53.72	25.18
#60	333.50	307.00	395.70	#60	0.250	26.48	17.00	3.72
#100	367.30	348.40	402.60	#100	0.150	19.03	5.81	2.04
#200	427.80	355.20	404.40	#200	0.072	5.69	3.97	1.61

ASTMD-422



Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-82/S-1	00.00-02.50		N.T	Gray poorly graded sand with silt (SP-SM)
DRV-82/S-2	02.50-05.00		N.T	Gray poorly graded sand (SP)
DRV-82/S-3	05.00-10.00		N.T	Gray poorly graded sand (SP)

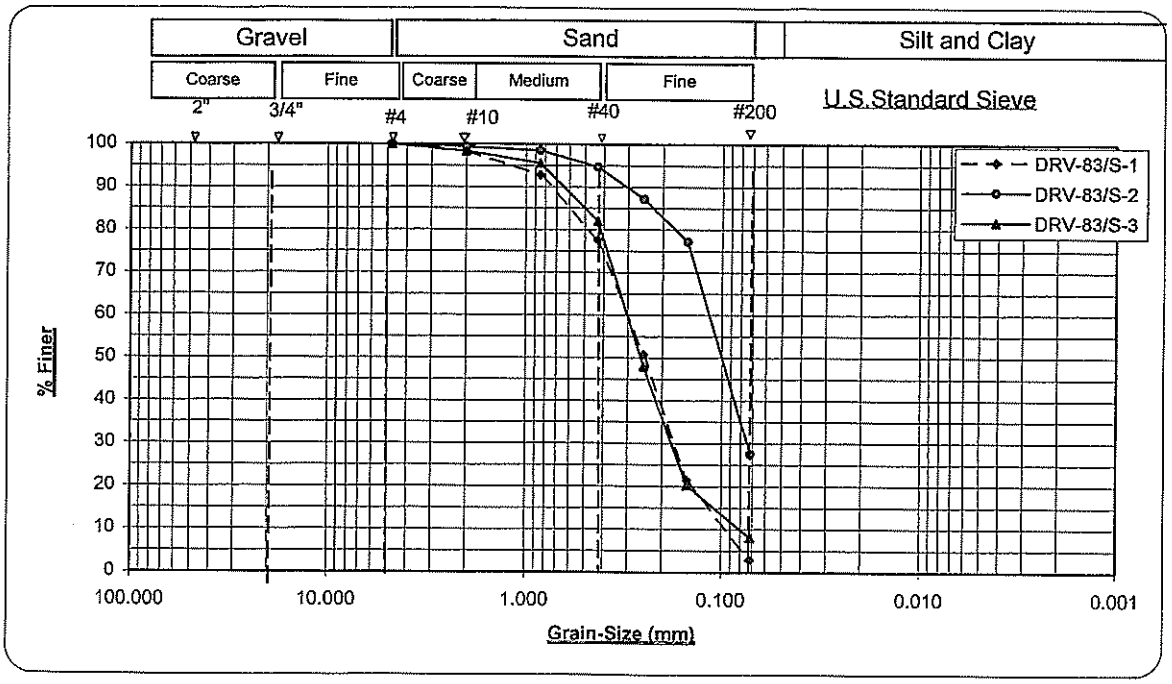
N.P- Non-Plastic N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma33		
Job No.	2000g591				Date	24-May-01		
					Cu	3.00	Undefined	3.75
Dry Wt.	307.20	271.60	372.20		C c	1.08	Undefined	1.35
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-83/S-1	DRV-83/S-2	DRV-83/S-3			DRV-83/S-1	DRV-83/S-2	DRV-83/S-3
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70			
3/8"	0.00	0.00	0.00	3/8"	9.50			
#4	0.00	0.00	0.00	#4	4.75	100.00	100.00	100.00
#10	4.80	1.60	6.20	#10	2.00	98.44	99.41	98.33
#20	22.10	4.00	16.70	#20	0.850	92.81	98.53	95.51
#40	68.80	14.50	67.20	#40	0.430	77.60	94.66	81.95
#60	151.30	34.70	193.70	#60	0.250	50.75	87.22	47.96
#100	241.10	61.80	296.60	#100	0.150	21.52	77.25	20.31
#200	298.20	196.70	342.20	#200	0.072	2.93	27.58	8.06

ASTMD-422



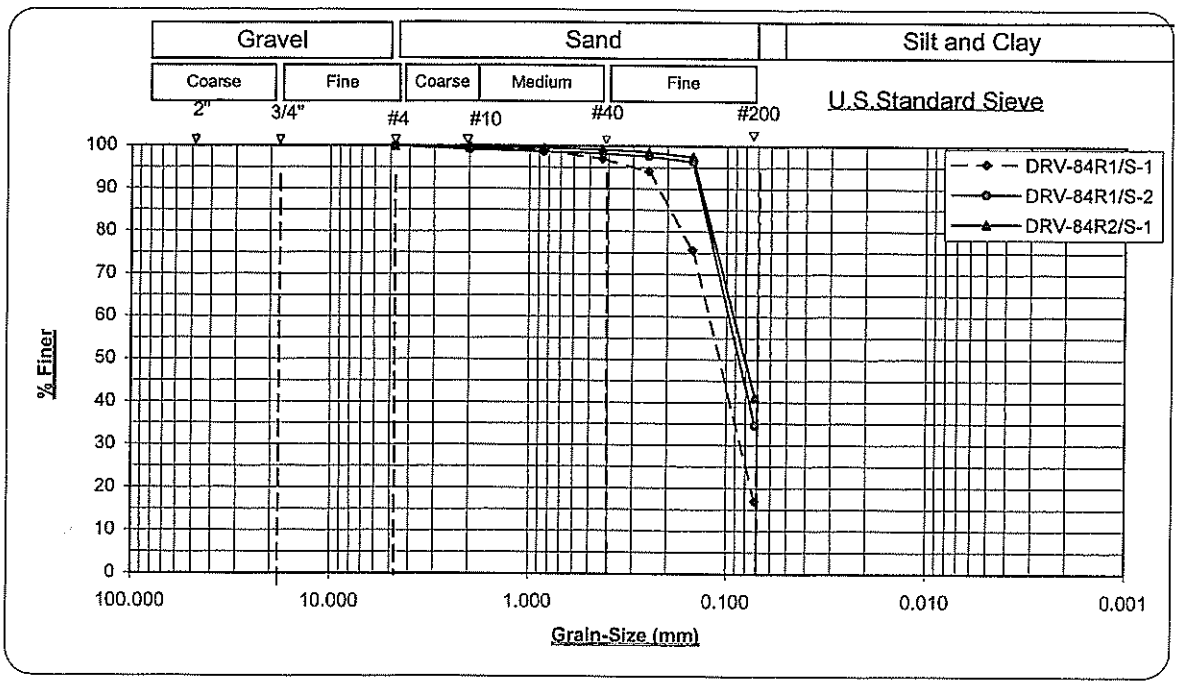
Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-83/S-1	00.00-00.80		N.T	Gray poorly graded sand (SP)
DRV-83/S-2	00.80-05.00		N.T	Gray silty sand (SM)
DRV-83/S-3	07.50-10.00		N.T	Gray poorly graded sand with silt (SP-SM)
		N.P- Non-Plastic		N.T- Not Tested

GeoSystems Consultants Inc.

Fort Washington , Pa.

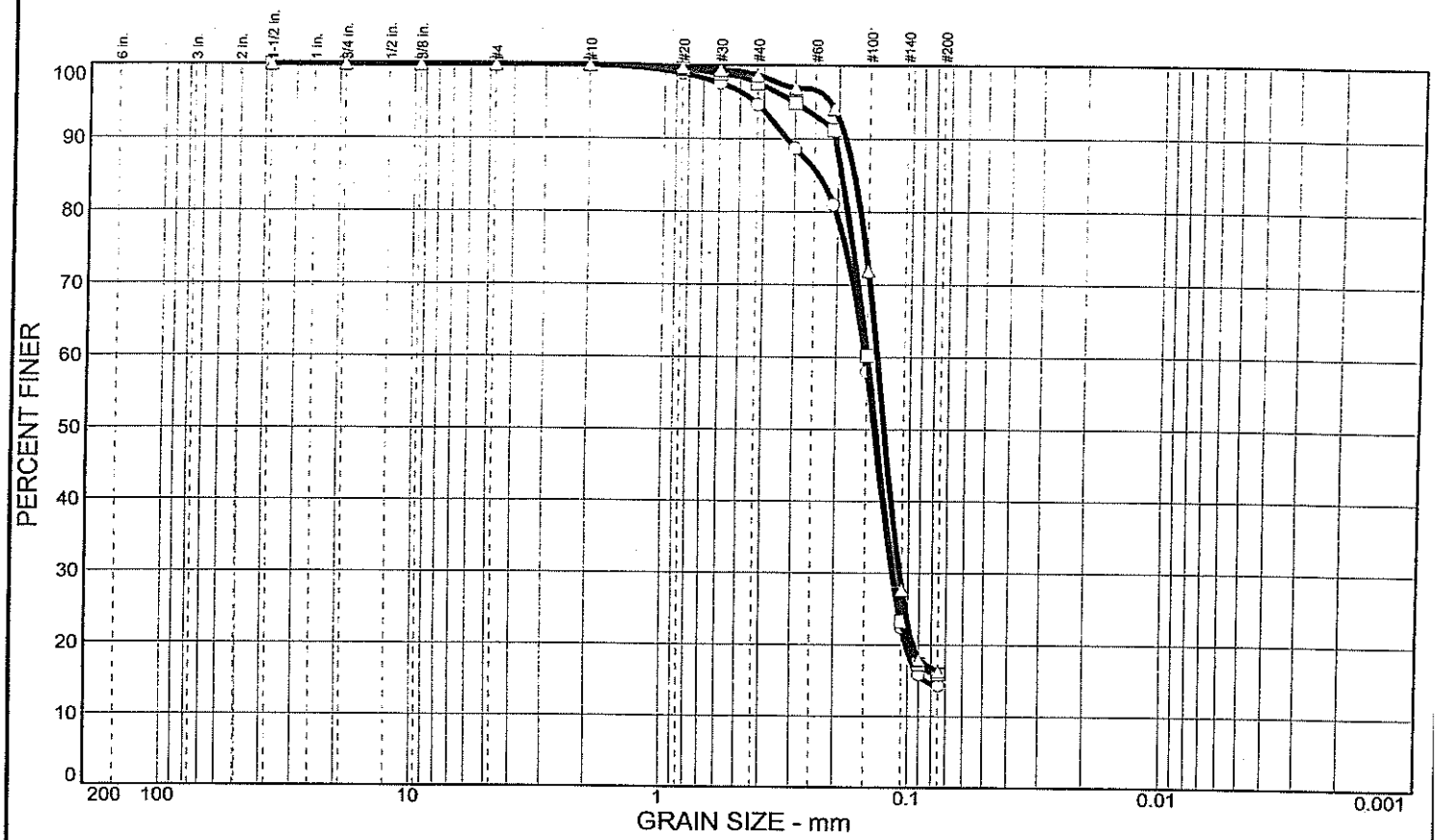
Job Name:	SAIC:USACE/Vibrocore Sample				File No	2000591ma34		
Job No.	2000g591				Date	24-May-01		
					Cu	Undefined	Undefined	Undefined
Dry Wt.	225.90	398.60	329.20		C c	Undefined	Undefined	Undefined
Sieve	Weight	Weight	Weight	Sieve	Sieve	%	%	%
No.	Retained	Retained	Retained	No.	Size , mm	Finer	Finer	Finer
Sample No	DRV-84R1/S-1	DRV-84R1/S-2	DRV-84R2/S-1			DRV-84R1/S-1	DRV-84R1/S-2	DRV-84R2/S-1
3"	0.00	0.00	0.00	3"	76.00			
2"	0.00	0.00	0.00	2"	50.80			
1.5"	0.00	0.00	0.00	1.5"	38.10			
1"	0.00	0.00	0.00	1"	25.40			
3/4	0.00	0.00	0.00	3/4	19.00			
1/2"	0.00	0.00	0.00	1/2"	12.70			
3/8"	0.00	0.00	0.00	3/8"	9.50			
#4	0.00	0.00	0.00	#4	4.75	100.00	100.00	100.00
#10	0.00	3.30	1.10	#10	2.00	100.00	99.17	99.67
#20	2.30	5.10	1.80	#20	0.850	98.98	98.72	99.45
#40	6.80	6.80	2.80	#40	0.430	96.99	98.29	99.15
#60	13.30	9.60	4.70	#60	0.250	94.11	97.59	98.57
#100	55.00	14.70	8.40	#100	0.150	75.65	96.31	97.45
#200	187.70	260.80	193.50	#200	0.072	16.91	34.57	41.22

ASTMD-422



Boring/Sample No.	Depth	Water	LL/PL	Description
	Ft.	Content, %	%	
DRV-84R1/S-1	00.00-05.00	Run-1	N.T	Gray silty sand (SM)
DRV-84R1/S-2	05.00--09.80	Run-1	N.T	Gray silty sand (SM)
DRV-84R2/S-1	07.50-12.50	Run-2	N.T	Gray silty sand (SM)
		N.P- Non-Plastic	N.T-	Not Tested

PARTICLE SIZE DISTRIBUTION REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			85.6	14.4		SM			
□			84.1	15.9		SM			
△			83.7	16.3		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2"	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
3/8"	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.153	0.150	0.137
D_{30}	0.116	0.115	0.108
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	98.9	99.5	99.7
#30	97.6	98.9	99.4
#40	94.7	97.5	98.7
#50	88.7	94.9	96.9
#70	81.0	91.2	94.1
#100	58.0	60.3	71.9
#140	22.4	23.3	27.7
#170	15.9	17.4	17.9
#200	14.4	15.9	16.3

SOIL DESCRIPTION

○ Tan/brown/orange fine SAND, little silt/clay, trace medium sand.

□ Tan/brown/orange fine SAND, little silt/clay, trace medium sand.

△ Tan/gray/orange fine SAND, little silt/clay, trace medium sand.

REMARKS:

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○ Source: DRV-85	Sample No.: 1	Elev./Depth: 0.0'-5.0'
□ Source: DRV-85	Sample No.: 2	Elev./Depth: 5.0'-10.0'
△ Source: DRV-85	Sample No.: 3	Elev./Depth: 10.0'-15.0'

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Client: U.S. Army Corps of Engineers' Philadelphia District

Project: Vibrational Coring - Delaware River Main Channel, Delaware
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

Project No.: 5939.GB.02 Date/Chk'd by: January 2005/

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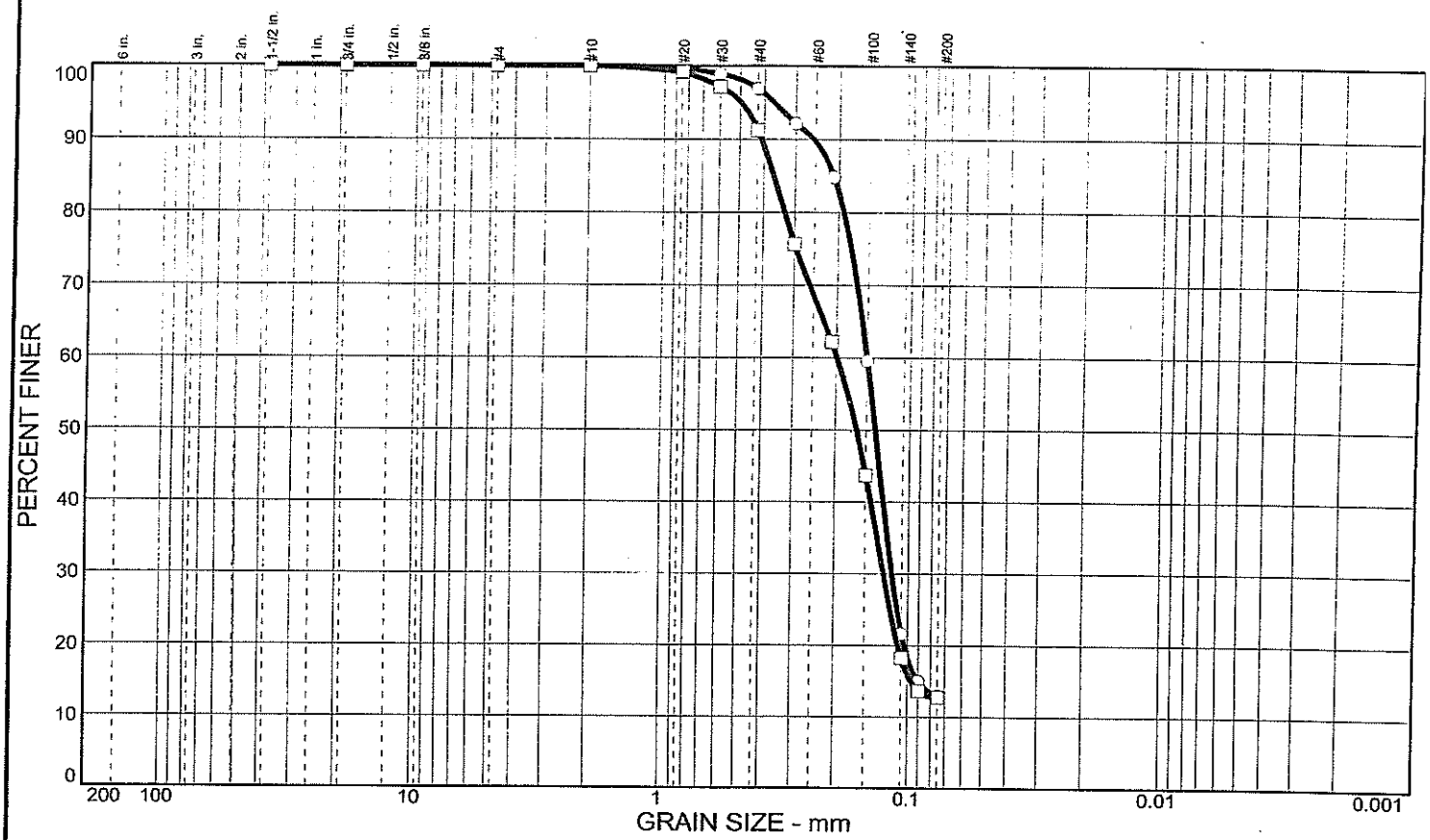

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			87.1	12.9		SM			
□			87.2	12.8		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1-1/2"	100.0	100.0	
3/4"	100.0	100.0	
3/8"	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.151	0.199	
D_{30}	0.117	0.126	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	100.0	100.0	
#20	99.8	99.2	
#30	98.9	97.2	
#40	96.9	91.2	
#50	92.1	75.6	
#70	84.8	62.2	
#100	59.6	43.7	
#140	21.6	18.3	
#170	15.0	13.7	
#200	12.9	12.8	

SOIL DESCRIPTION

○ Tan/gray/orange fine SAND, little silt/clay, trace medium sand.

□ Dark-gray fine SAND, little silt/clay, trace medium sand.

REMARKS:

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○ Source: DRV-85 Sample No.: 4 Elev./Depth: 15.0'-16.0'

□ Source: DRV-85 Sample No.: 6 Elev./Depth: 16.8'-20.0'

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Project: Vibrational Coring - Delaware River Main Channel, Delaware
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

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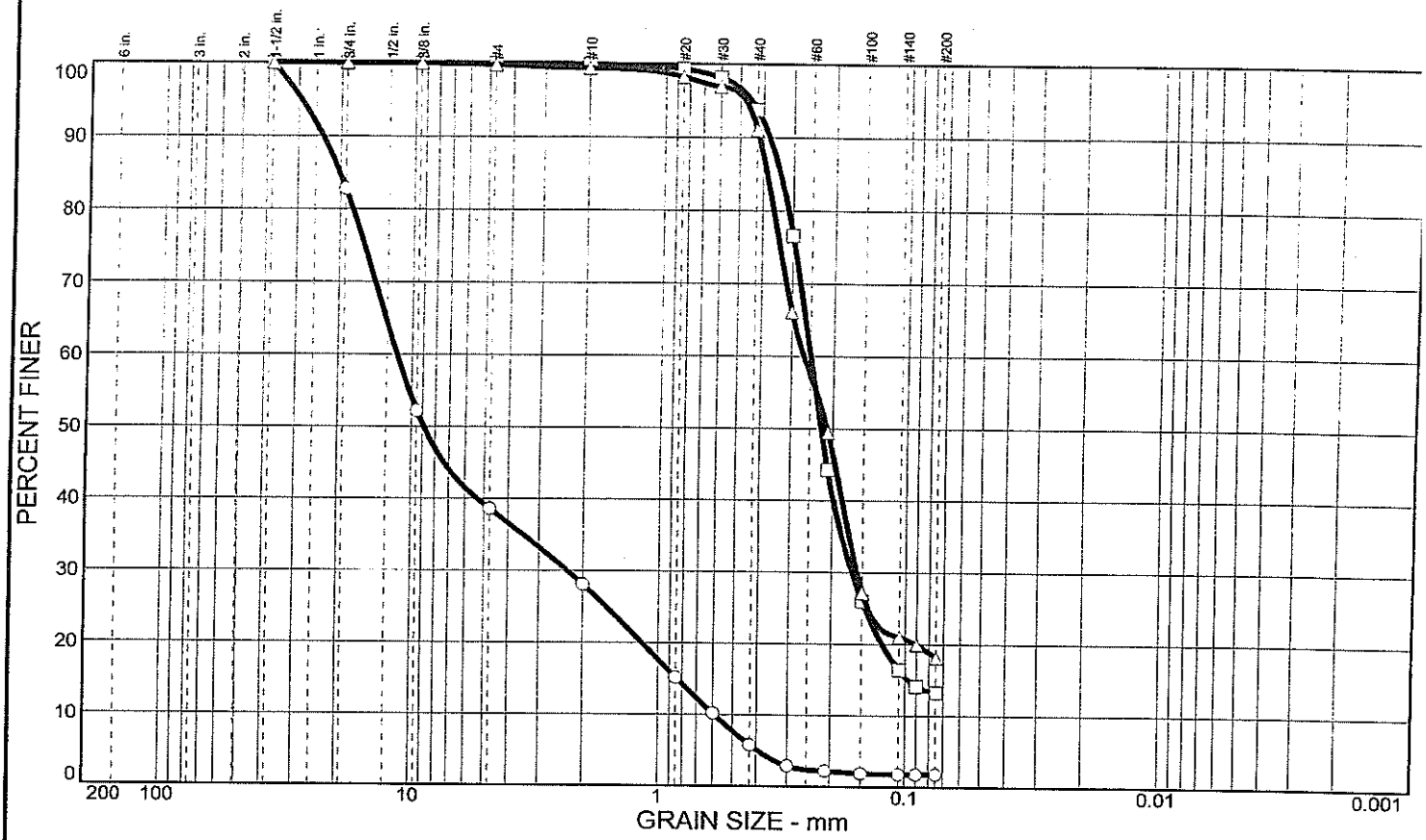

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		61.4	36.8	1.8		GP			
□			86.7	13.3		SM			
△		0.2	81.7	18.1		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2"	100.0	100.0	100.0
3/4"	82.8	100.0	100.0
3/8"	52.2	100.0	100.0
GRAIN SIZE			
D_{60}	11.5	0.250	0.266
D_{30}	2.30	0.165	0.158
D_{10}	0.591		
COEFFICIENTS			
C_c	0.78		
C_u	19.51		

SIEVE number size	PERCENT FINER ○	□	△
#4	38.6	100.0	99.8
#10	28.1	99.9	99.4
#20	15.2	99.4	98.2
#30	10.2	98.2	96.9
#40	5.8	93.8	91.0
#50	2.9	76.6	66.1
#70	2.2	44.3	49.4
#100	1.9	26.0	27.1
#140	1.8	16.4	21.0
#170	1.8	14.1	20.0
#200	1.8	13.3	18.1

SOIL DESCRIPTION

○ Brown/gray GRAVEL, some medium sand, little coarse sand, trace fine sand, trace silt/clay.

□ Orange/brown/tan fine SAND, little silt/clay, trace medium sand.

△ Gray/orange fine SAND, little silt/clay, trace medium sand.

REMARKS:

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○ Source: DRV-86 Sample No.: 1 Elev./Depth: 0.0'-2.0'

□ Source: DRV-86 Sample No.: 2 Elev./Depth: 2.0'-5.0'

△ Source: DRV-86 Sample No.: 3 Elev./Depth: 5.0'-7.5'

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Project: Vibrational Coring - Delaware River Main Channel, Delaware
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Project No.: 76339.GB.02 Date/Chk'd by: January 2005/

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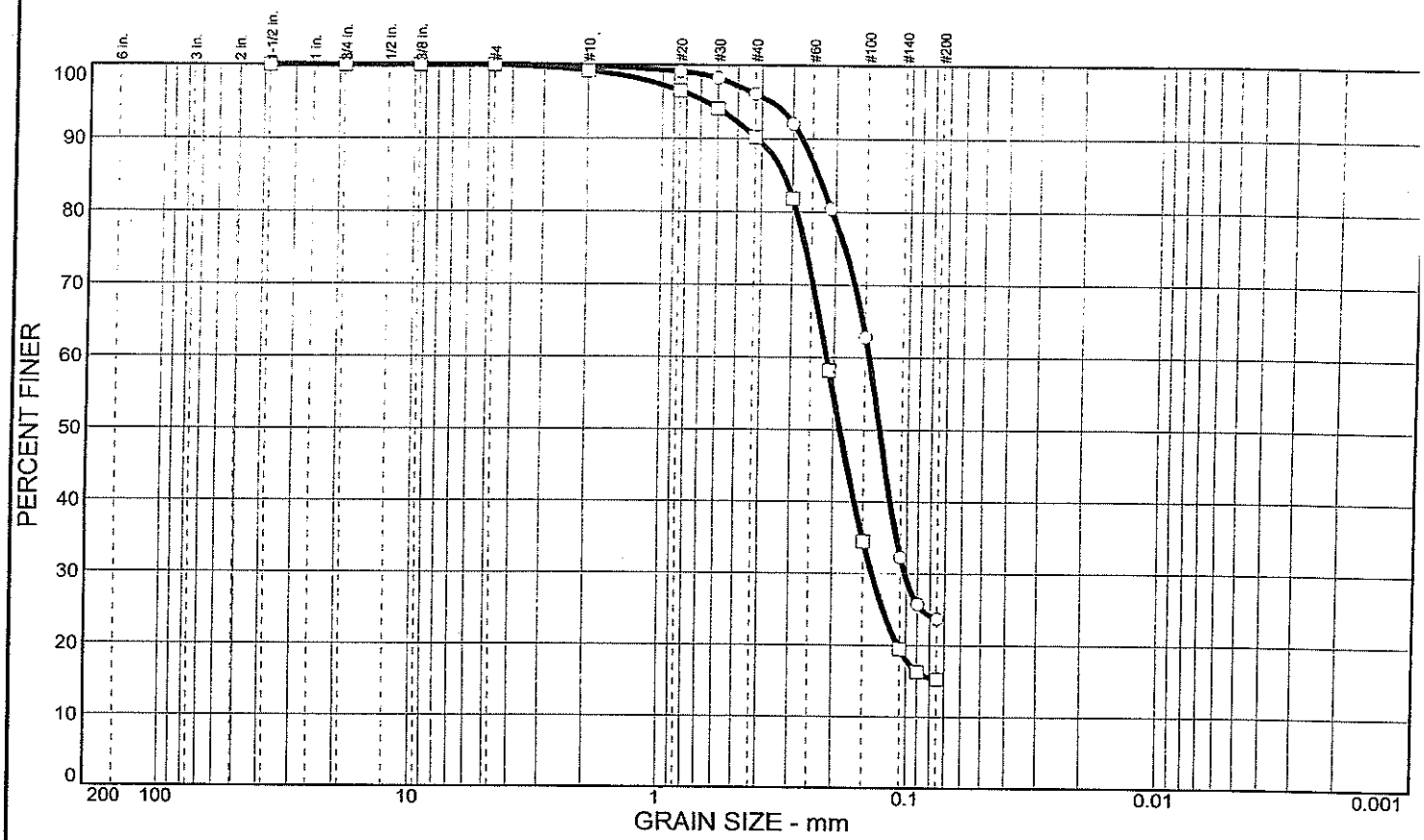

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			76.3	23.7		SM			
□			84.7	15.3		SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1-1/2"	100.0	100.0	
3/4"	100.0	100.0	
3/8"	100.0	100.0	
GRAIN SIZE			
D_{60}	0.145	0.215	
D_{30}	0.102	0.138	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	100.0	
#10	99.8	99.2	
#20	99.1	96.5	
#30	98.2	94.1	
#40	96.1	90.2	
#50	92.0	81.8	
#70	80.4	58.2	
#100	62.8	34.5	
#140	32.3	19.5	
#170	25.7	16.3	
#200	23.7	15.3	

SOIL DESCRIPTION

○ Orange/brown/tan fine SAND, some silt/clay, trace medium sand.

□ Brown/orange fine SAND, little silt/clay, trace medium sand, trace coarse sand.

REMARKS:

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○ Source: DRV-86 Sample No.: 4 Elev./Depth: 7.5'-10.0'

□ Source: DRV-86 Sample No.: 5 Elev./Depth: 10.0'-15.0'

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Project: Vibrational Coring - Delaware River Main Channel, Delaware
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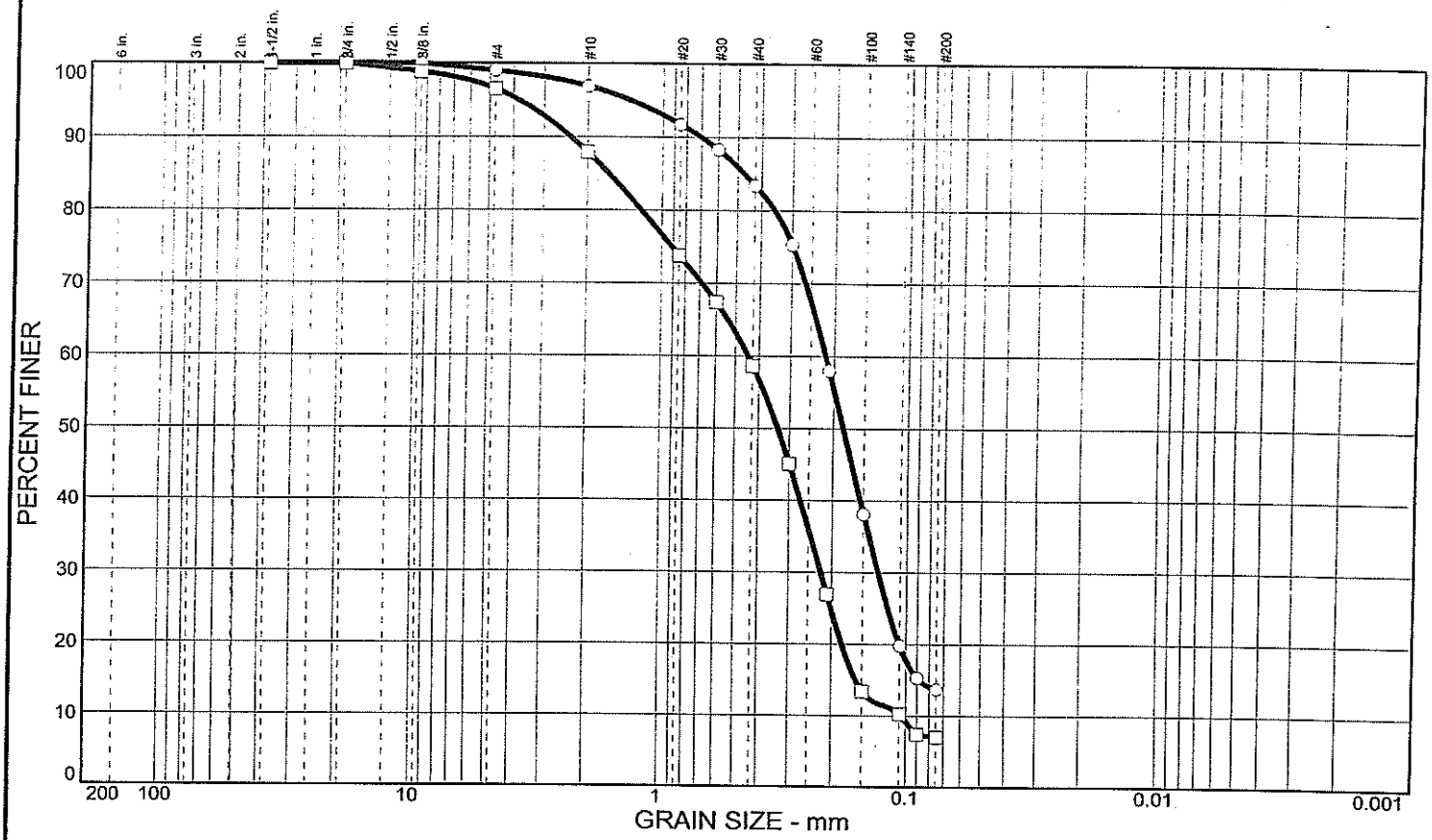

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		1.0	85.3	13.7		SM			
□		3.5	89.5	7.0		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1-1/2	100.0	100.0	
3/4"	100.0	100.0	
3/8"	100.0	98.9	
	GRAIN SIZE		
D_{60}	0.218	0.444	
D_{30}	0.131	0.223	
D_{10}		0.104	
	COEFFICIENTS		
C_c		1.07	
C_u		4.26	

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	99.0	96.5	
#10	96.9	87.9	
#20	91.7	73.8	
#30	88.3	67.4	
#40	83.4	58.6	
#50	75.3	45.1	
#70	58.0	27.0	
#100	38.1	13.4	
#140	19.8	10.3	
#170	15.3	7.4	
#200	13.7	7.0	

SOIL DESCRIPTION

○ Dark-gray fine SAND, little silt/clay, little medium sand, trace coarse sand, trace gravel.

□ Dark-gray fine SAND, some medium sand, trace coarse sand, trace silt/clay, trace shell fragments, trace organic matter.

REMARKS:

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○ Source: DRV-86 Sample No.: 6 Elev./Depth: 15.4'-16.7'

□ Source: DRV-86 Sample No.: 7 Elev./Depth: 16.7'-19.5'

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Project: Vibrational Coring - Delaware River Main Channel, Delaware
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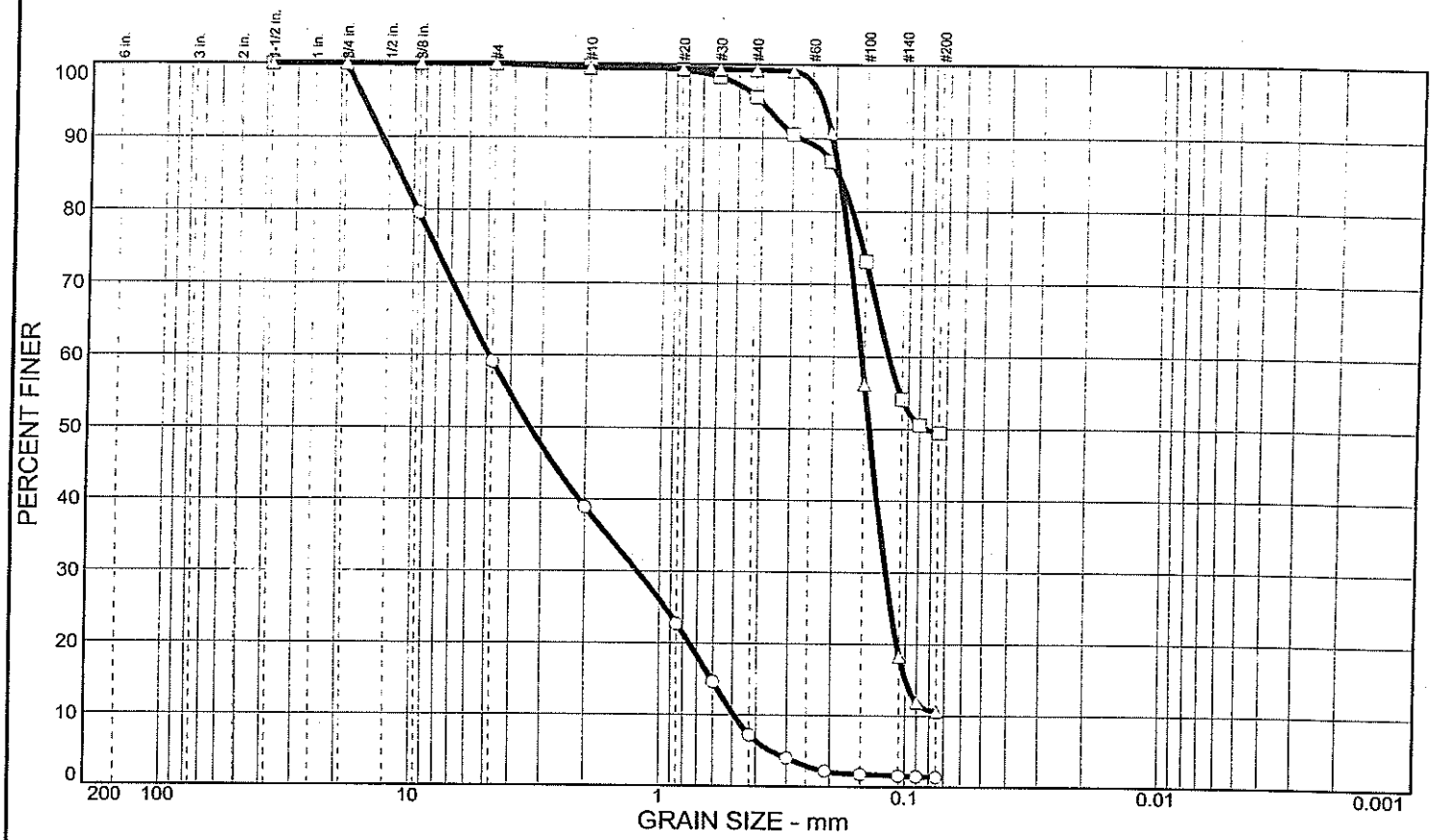

	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		40.9	57.7	1.4		SP			
□			50.5	49.5		SM			
△			89.3	10.7		SP-SM			

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
3/8"	79.6	100.0	100.0
	GRAIN SIZE		
D_{60}	4.91	0.120	0.155
D_{30}	1.23		0.121
D_{10}	0.493		
	COEFFICIENTS		
C_c	0.63		
C_u	9.95		

SIEVE number size	PERCENT FINER ○	□	△
#4	59.1	100.0	100.0
#10	38.9	99.8	99.4
#20	22.7	99.3	99.4
#30	14.6	98.3	99.3
#40	7.2	95.6	99.3
#50	4.0	90.5	99.2
#70	2.2	86.9	90.7
#100	1.8	73.2	56.2
#140	1.6	54.2	18.3
#170	1.5	50.6	11.9
#200	1.4	49.5	10.7

SOIL DESCRIPTION

○ Dark-gray medium to coarse SAND and gravel, trace fine sand, trace silt/clay.

□ Tan/orange fine to medium SAND and silt/clay.

△ Orange/tan fine SAND, little silt/clay, trace coarse sand.

REMARKS:

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△

○ Source: DRV-87 Sample No.: 1 Elev./Depth: 0.0'-1.1'

□ Source: DRV-87 Sample No.: 2 Elev./Depth: 1.1'-2.1'

△ Source: DRV-87 Sample No.: 3 Elev./Depth: 2.1'-5.0'

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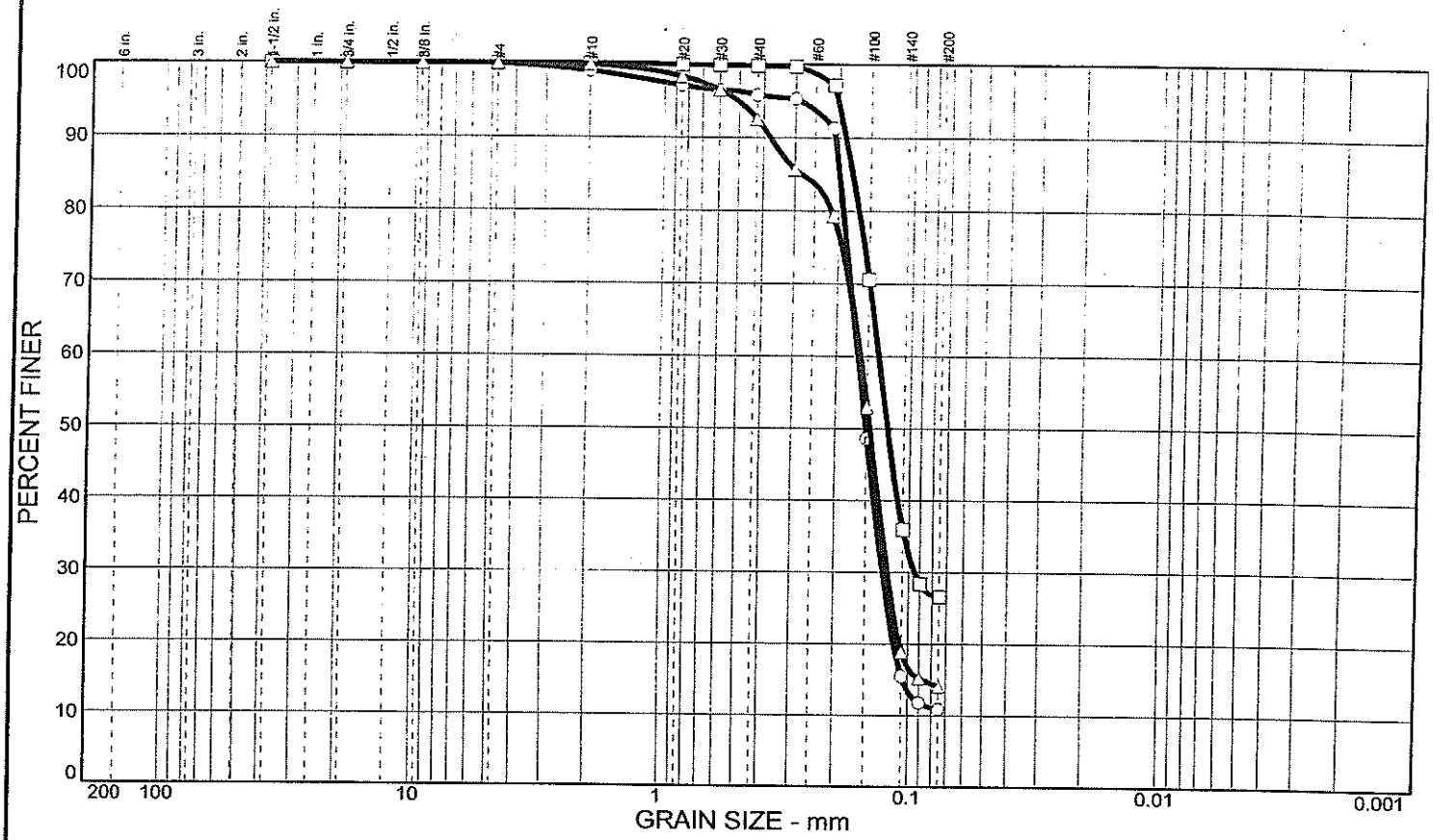
Client: U.S. Army Corps of Engineers' Philadelphia District

Project: Vibrational Coring - Delaware River Main Channel, Delaware
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

Project No.: 7969.GB.02 Date/Chk'd by: January 2005/

PARTICLE SIZE DISTRIBUTION REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			89.1	10.9		SP-SM			
□			73.4	26.6		SM			
△			85.9	14.1		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
3/8"	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.164	0.136	0.161
D_{30}	0.128	0.0948	0.122
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	99.0	100.0	99.9
#20	97.1	99.9	98.3
#30	96.5	99.9	96.5
#40	95.8	99.8	92.5
#50	95.3	99.7	85.7
#70	91.3	97.2	79.3
#100	48.6	70.6	53.0
#140	15.5	36.0	18.9
#170	11.8	28.4	15.3
#200	10.9	26.6	14.1

SOIL DESCRIPTION

○ Orange/tan fine SAND, little silt/clay, trace medium sand, trace coarse sand.

□ Orange/tan fine SAND, some silt/clay.

△ Brown-gray fine SAND, little silt/clay, trace medium sand.

REMARKS:

○

□

△

○ Source: DRV-87 Sample No.: 4 Elev./Depth: 5.0'-10.0'

□ Source: DRV-87 Sample No.: 5 Elev./Depth: 10.0'-11.5'

△ Source: DRV-87 Sample No.: 6 Elev./Depth: 11.5'-13.8'

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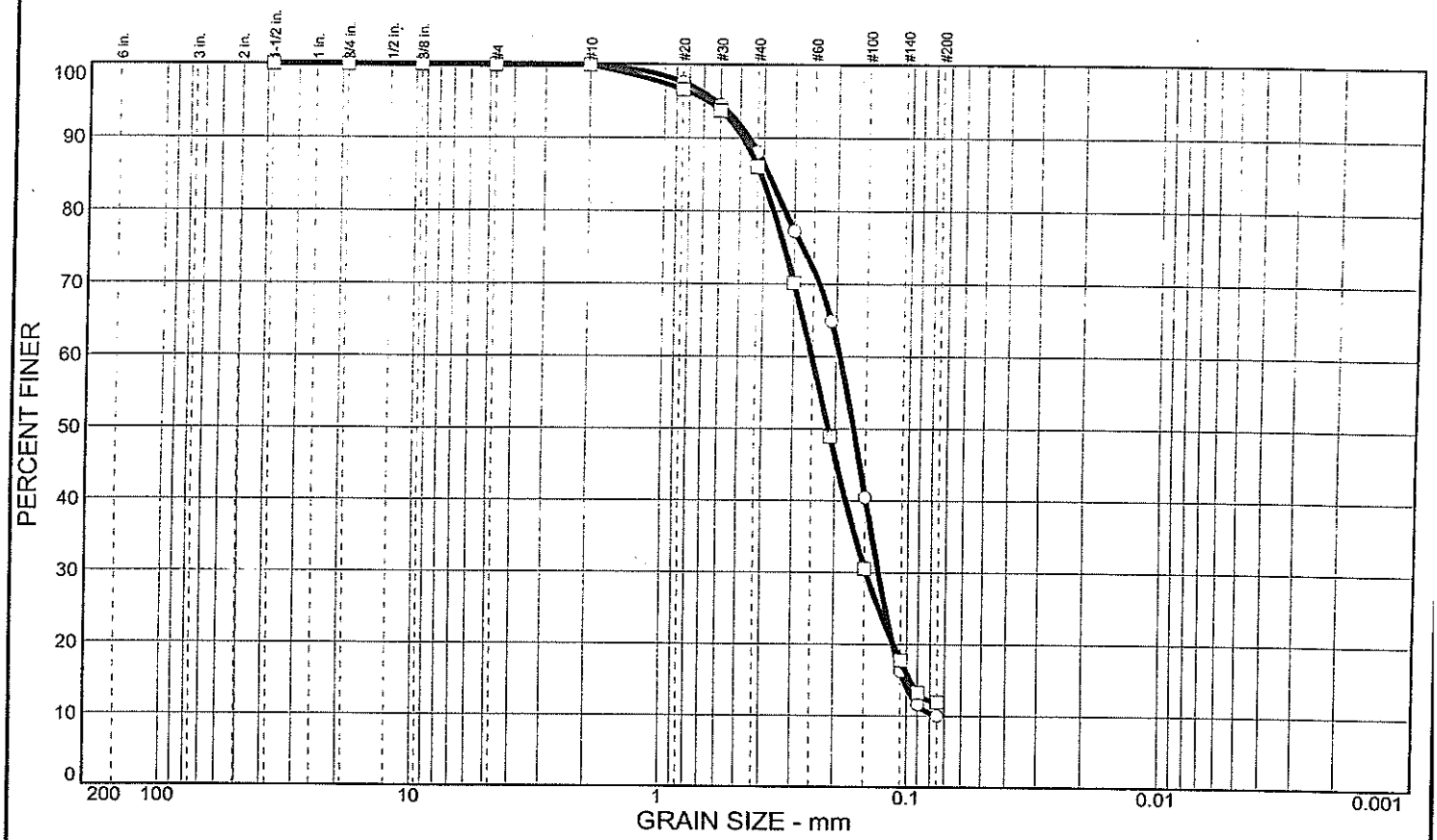
Client: U.S. Army Corps of Engineers' Philadelphia District

Project: Vibrational Coring - Delaware River Main Channel, Delaware
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

Project No.: 5739.GB.02 Date/Chk'd by: January 2005/

PARTICLE SIZE DISTRIBUTION REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			89.9	10.1		SP-SM			
□		0.1	87.9	12.0		SP-SM			

SIEVE inches size	PERCENT FINER ○	PERCENT FINER □	
1-1/2"	100.0	100.0	
3/4"	100.0	100.0	
3/8"	100.0	100.0	
	GRAIN SIZE		
D_{60}	0.194	0.252	
D_{30}	0.132	0.148	
D_{10}			
	COEFFICIENTS		
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	PERCENT FINER □	
#4	100.0	99.9	
#10	99.9	99.9	
#20	97.6	96.6	
#30	94.5	93.7	
#40	88.0	86.1	
#50	77.2	70.1	
#70	64.9	48.9	
#100	40.5	30.6	
#140	16.3	17.8	
#170	11.6	13.3	
#200	10.1	12.0	

SOIL DESCRIPTION

○ Dark-gray fine SAND, little medium sand, trace silt/clay.

□ Dark-gray fine SAND, little medium sand, little silt/clay.

REMARKS:

○

□

○ Source: DRV-87 Sample No.: 7 Elev./Depth: 13.8'-15.0'

□ Source: DRV-87 Sample No.: 8 Elev./Depth: 15.0'-19.5'

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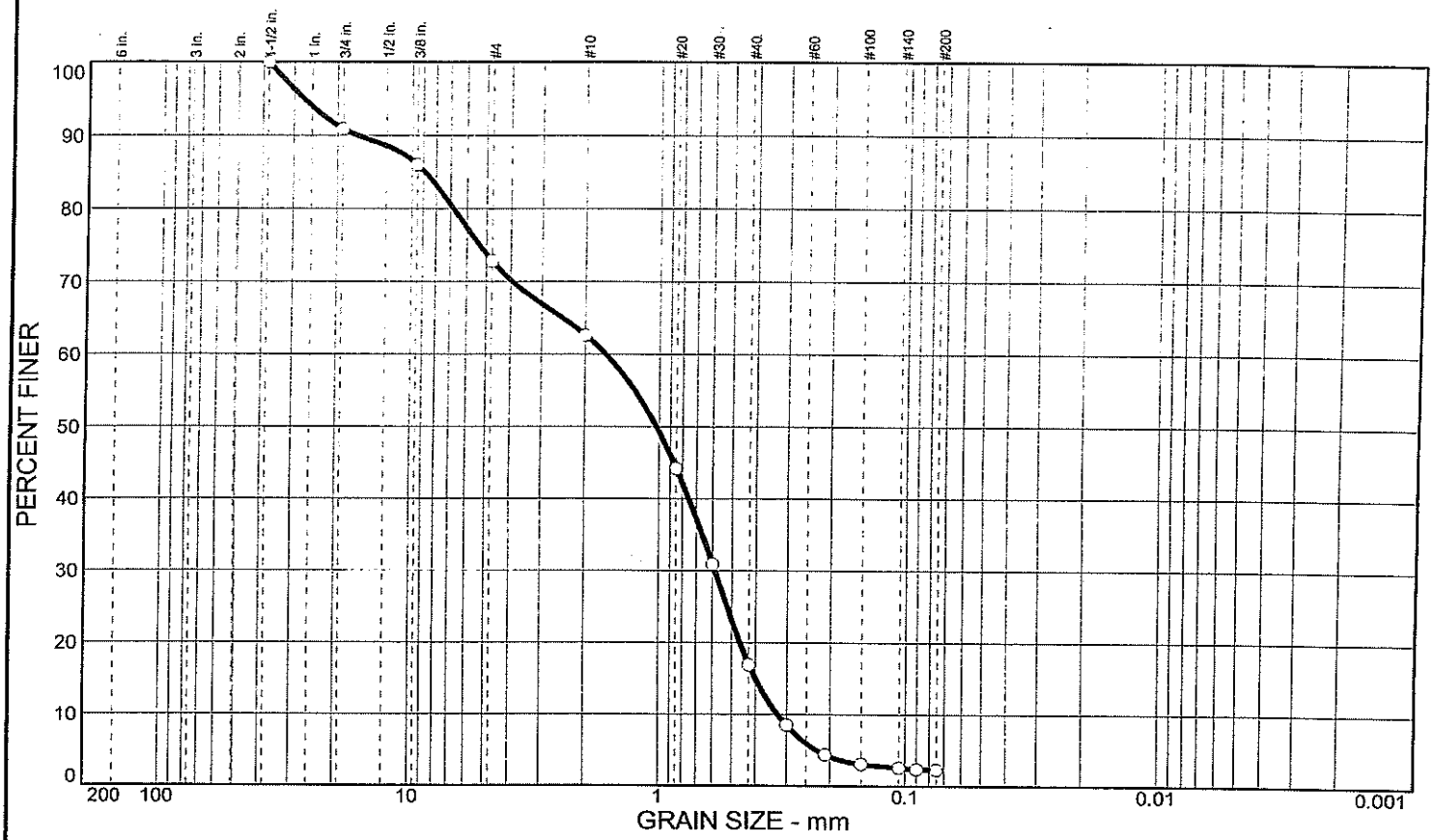
PARTICLE SIZE DISTRIBUTION REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		27.2	70.5	2.3		SP			

SIEVE inches size	PERCENT FINER ○		
1-1/2	100.0		
3/4"	90.9		
3/8"	86.0		
	GRAIN SIZE		
D_{60}	1.66		
D_{30}	0.587		
D_{10}	0.326		
	COEFFICIENTS		
C_c	0.64		
C_u	5.09		

SIEVE number size	PERCENT FINER ○		
#4	72.8		
#10	62.6		
#20	44.2		
#30	30.9		
#40	16.9		
#50	8.5		
#70	4.4		
#100	3.1		
#140	2.6		
#170	2.4		
#200	2.3		

SOIL DESCRIPTION

○ Gray/dark-gray medium SAND, some gravel, little fine sand, trace coarse sand, trace silt/clay.

REMARKS:

○

○ Source: DRV-88 R2 Sample No.: 1 Elev./Depth: 0.0'-5.0'

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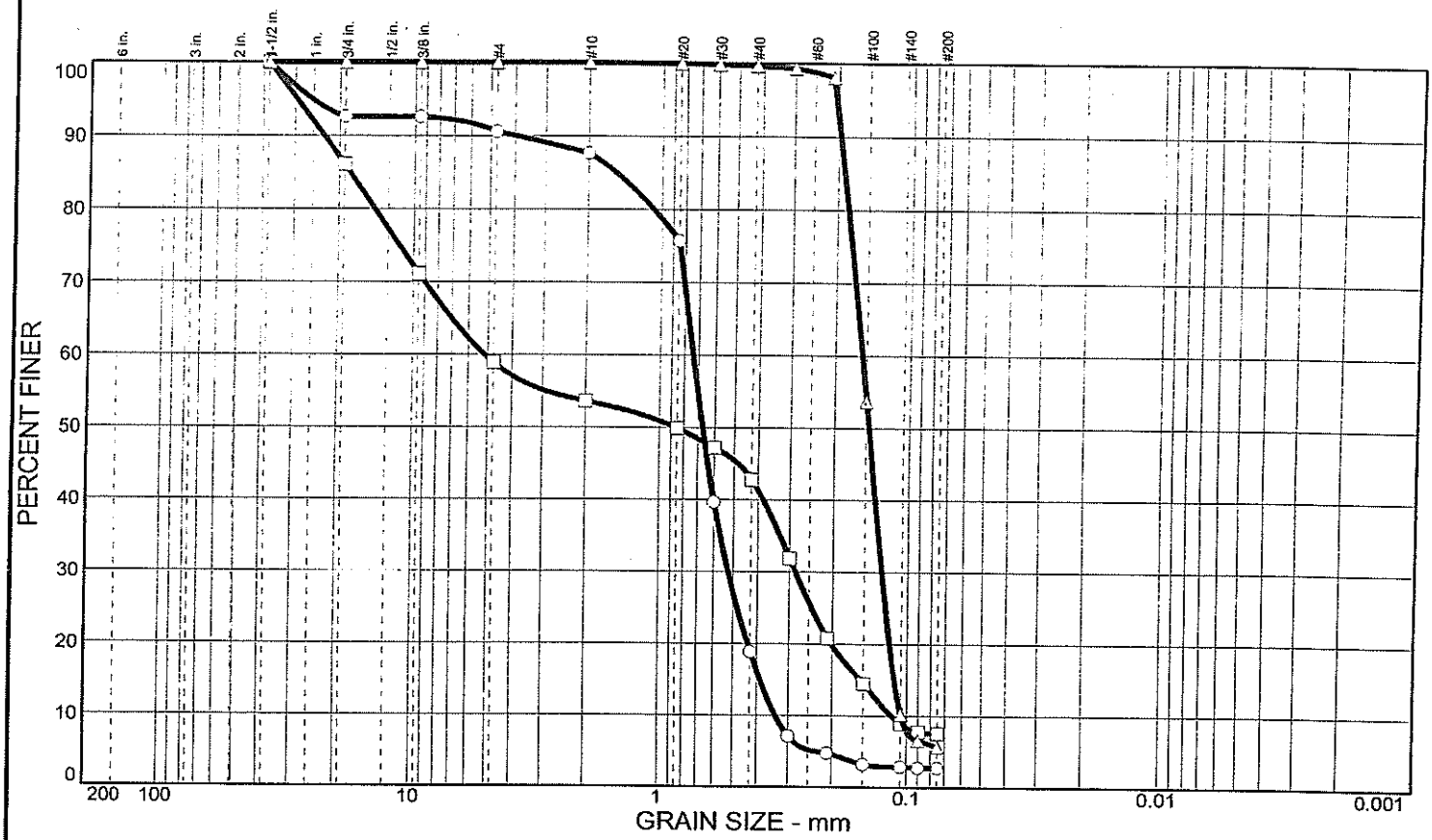
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

Project No.: 7939.GB.02 Date/Chk'd by: January 2005/

PARTICLE SIZE DISTRIBUTION REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		9.4	87.8	2.8		SP			
□		41.1	51.3	7.6		SP-SM			
△			94.3	5.7		SP-SM			

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2"	100.0	100.0	100.0
3/4"	92.6	86.1	100.0
3/8"	92.6	71.1	100.0
GRAIN SIZE			
D_{60}	0.738	5.17	0.157
D_{30}	0.525	0.284	0.128
D_{10}	0.338	0.116	0.106
COEFFICIENTS			
C_c	1.11	0.14	0.99
C_u	2.19	44.76	1.48

SIEVE number size	PERCENT FINER ○	□	△
#4	90.6	58.9	100.0
#10	87.7	53.6	100.0
#20	75.7	49.9	99.9
#30	39.7	47.2	99.8
#40	18.9	42.8	99.6
#50	7.1	31.9	99.3
#70	4.8	20.8	98.1
#100	3.2	14.5	53.7
#140	2.9	8.9	10.2
#170	2.8	7.8	6.6
#200	2.8	7.6	5.7

SOIL DESCRIPTION

○ Dark-brown medium SAND, little fine sand, trace gravel, trace coarse sand, trace silt/clay.

□ Brown fine to coarse SAND and gravel, trace silt/clay.

△ Brown fine SAND, trace silt/clay.

REMARKS:

○

□

△

○ Source: DRV-88 R3 Sample No.: 1 Elev./Depth: 3.7'-8.7'

□ Source: DRV-88 R3 Sample No.: 2 Elev./Depth: 8.7'-10.7'

△ Source: DRV-88 R3 Sample No.: 3 Elev./Depth: 10.7'-13.7'

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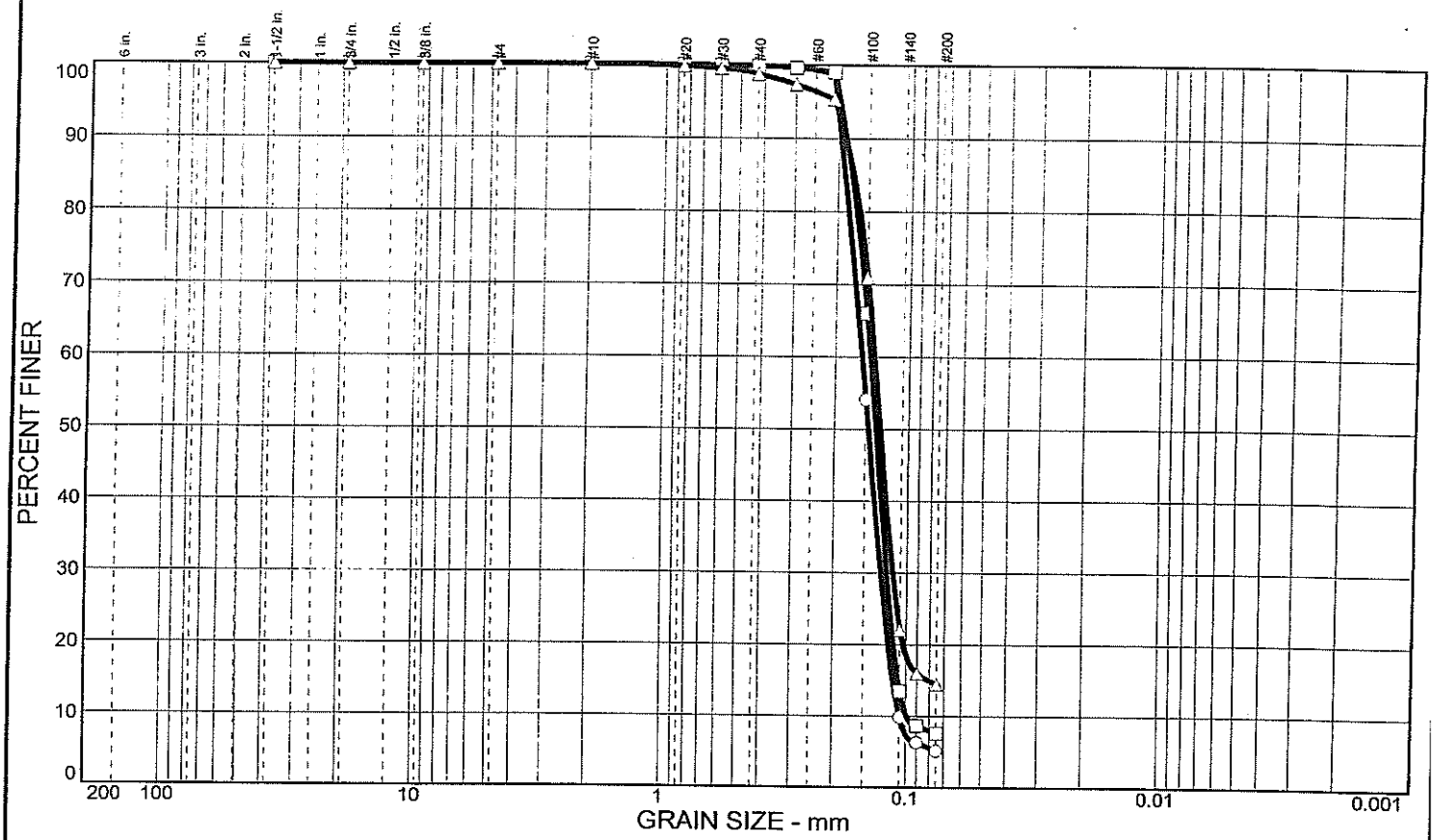
Project: Vibrational Coring - Delaware River Main Channel, Delaware
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

Project No.: 5739.GB.02 Date/Chk'd by: January 2005/

PARTICLE SIZE DISTRIBUTION REPORT



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			94.9	5.1		SP-SM			
□			92.4	7.6		SP-SM			
△			85.5	14.5		SM			

SIEVE inches size	PERCENT FINER ○	□	△
1-1/2"	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
3/8"	100.0	100.0	100.0
GRAIN SIZE			
D_{60}	0.156	0.144	0.139
D_{30}	0.128	0.121	0.114
D_{10}	0.106	0.0990	
COEFFICIENTS			
C_c	0.99	1.03	
C_u	1.47	1.46	

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	100.0	100.0
#10	100.0	100.0	100.0
#20	99.9	100.0	99.8
#30	99.9	99.9	99.5
#40	99.8	99.8	98.7
#50	99.7	99.6	97.3
#70	98.8	99.1	95.4
#100	54.0	66.0	70.9
#140	9.9	13.5	22.1
#170	6.3	8.7	16.0
#200	5.1	7.6	14.5

SOIL DESCRIPTION

○ Yellow-green fine SAND, trace silt/clay.

□ Orange-brown fine SAND, trace silt/clay.

△ Orange/brown fine SAND, little silt/clay, trace medium sand.

REMARKS:

○

□

△

○ Source: DRV-88 R3 Sample No.: 4 Elev./Depth: 13.7'-18.7'

□ Source: DRV-88 R3 Sample No.: 5 Elev./Depth: 18.7'-22.0'

△ Source: DRV-88 R3 Sample No.: 6 Elev./Depth: 22.0'-22.7'

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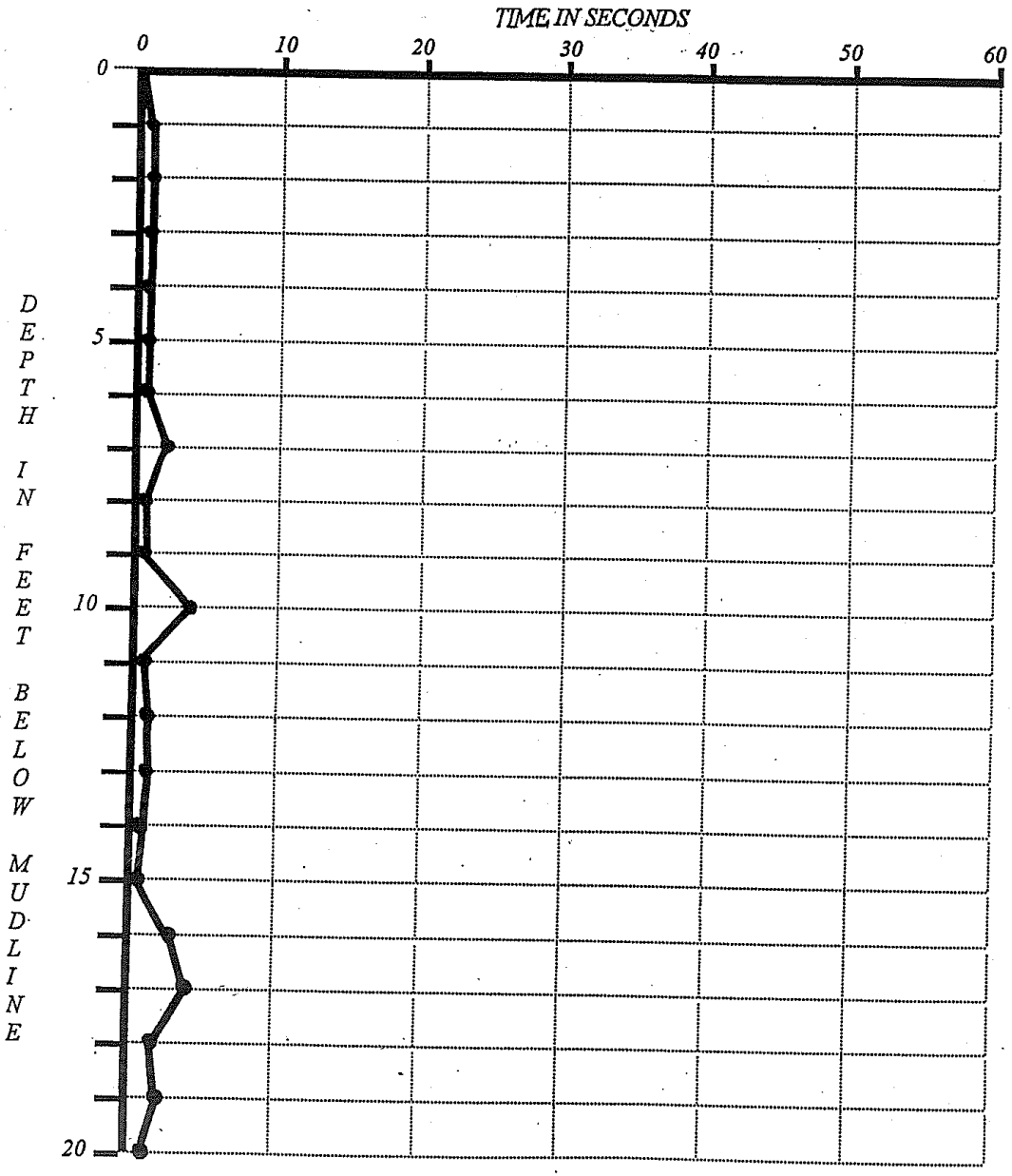
Contract No. DACW61-01-D-0004, Task Order 027, Modification No. 1

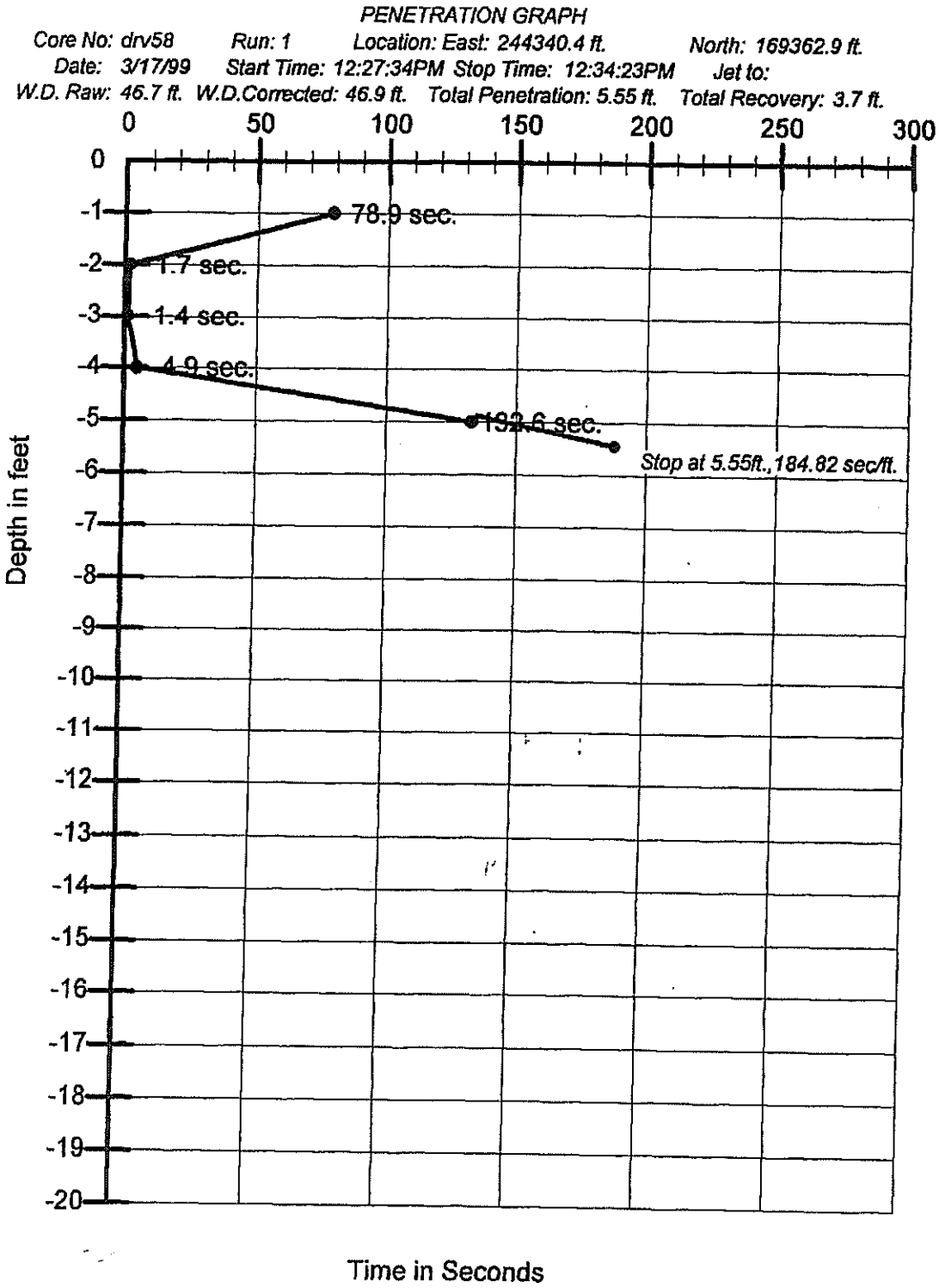
Project No.: 5739.GB.02 Date/Chk'd by: January 2005/

Penetration Graphs

PENETRATION GRAPH

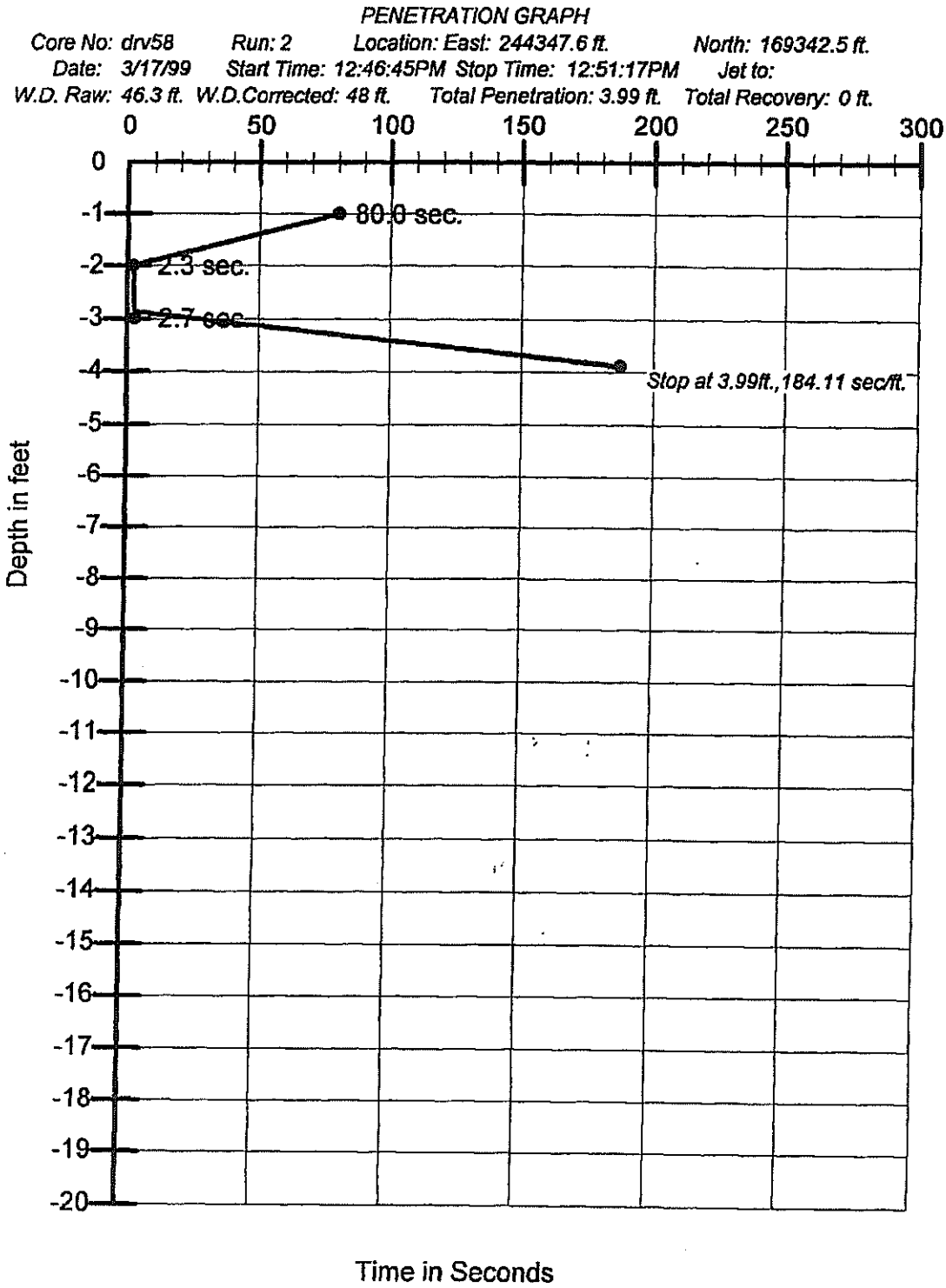
CORE NO. DRV-28 LOCATION: LATITUDE N 39° 20' 42.624" LONGITUDE W 075° 25' 57.993"
DATE: 8/30/95 START TIME: 1600 STOP TIME: 1602
WATER DEPTH MEASURED 50.0' CORRECTED MLW 47.3'
Total Penetration 20.0' Total Recovery 20.0'

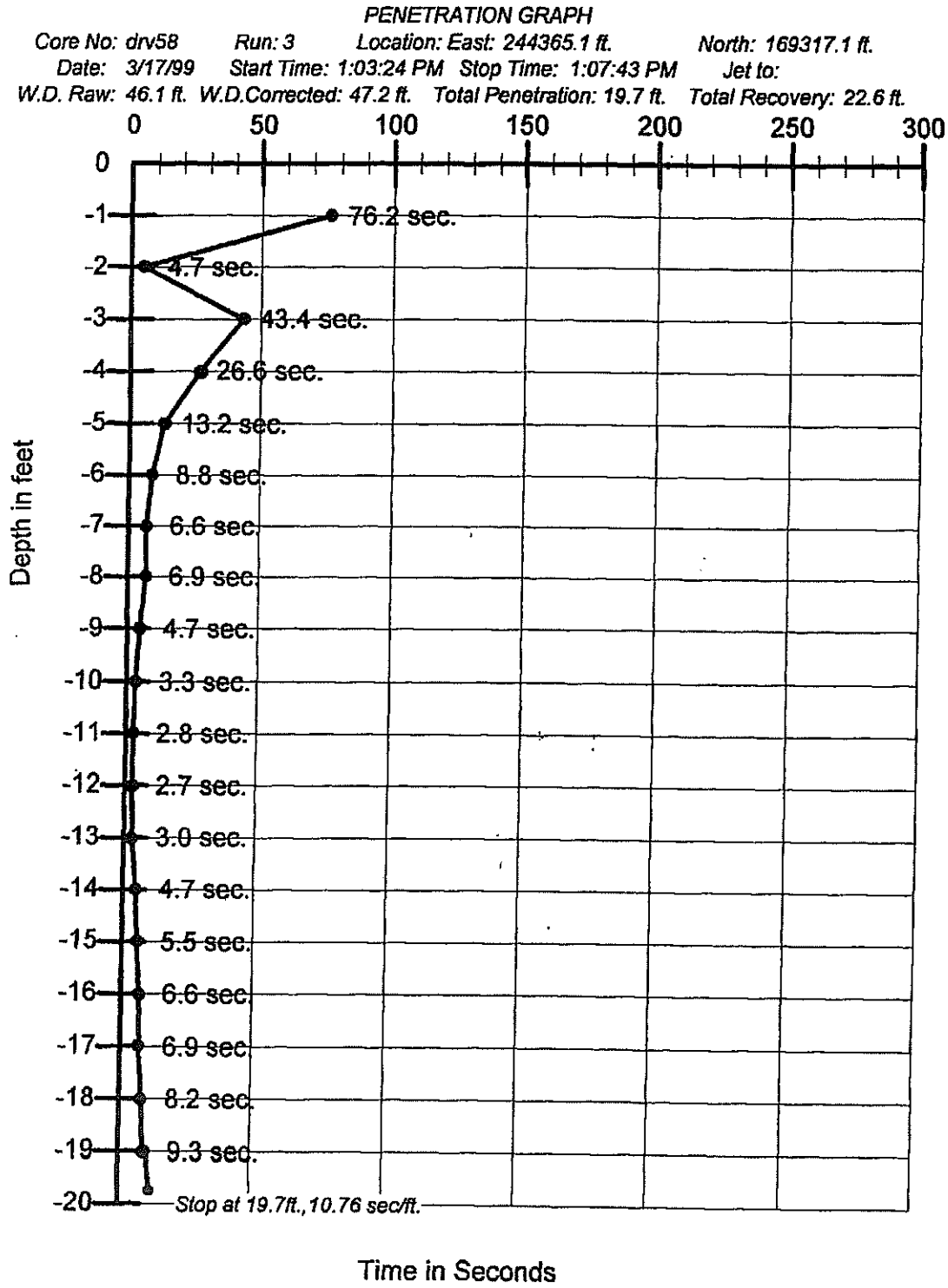


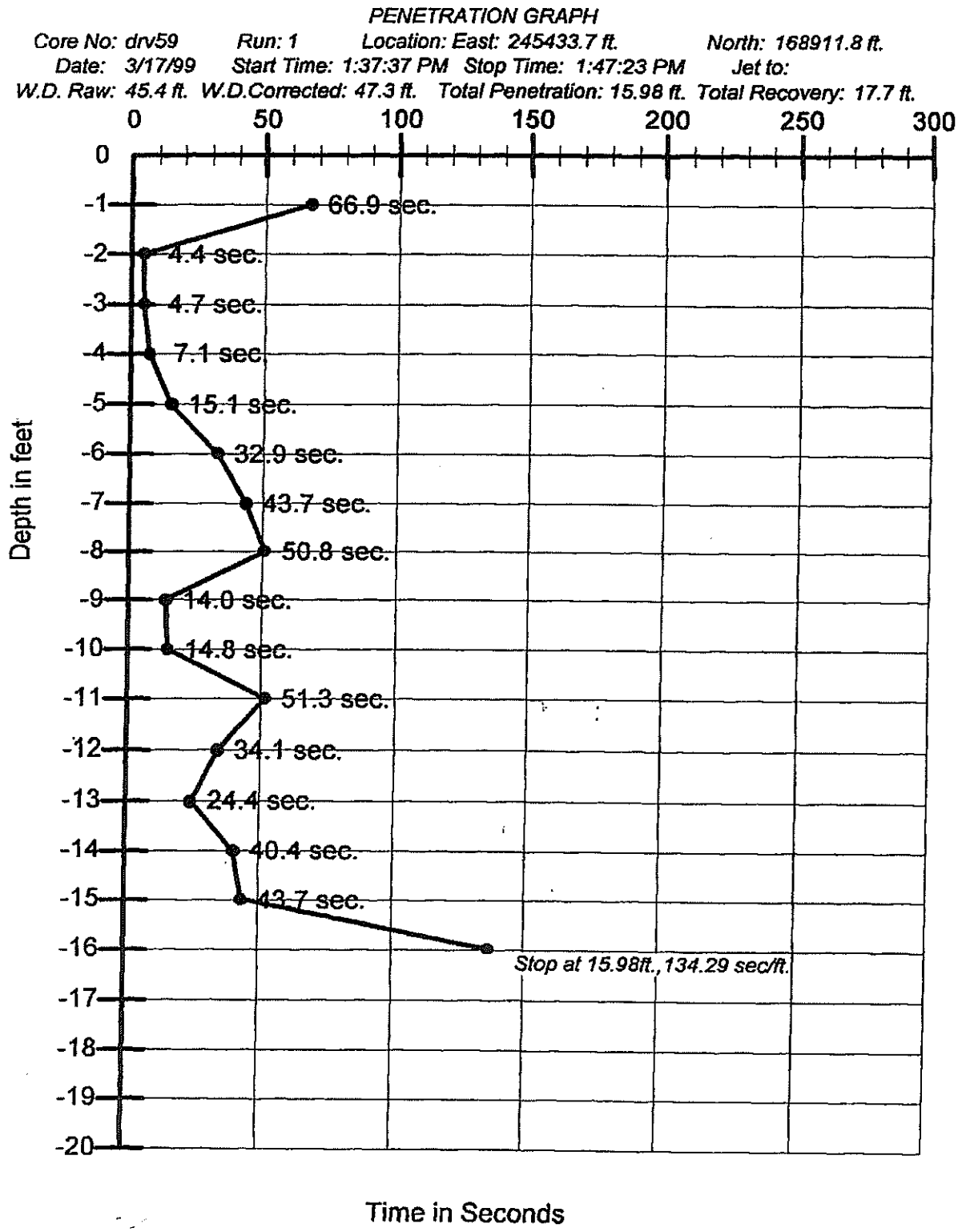


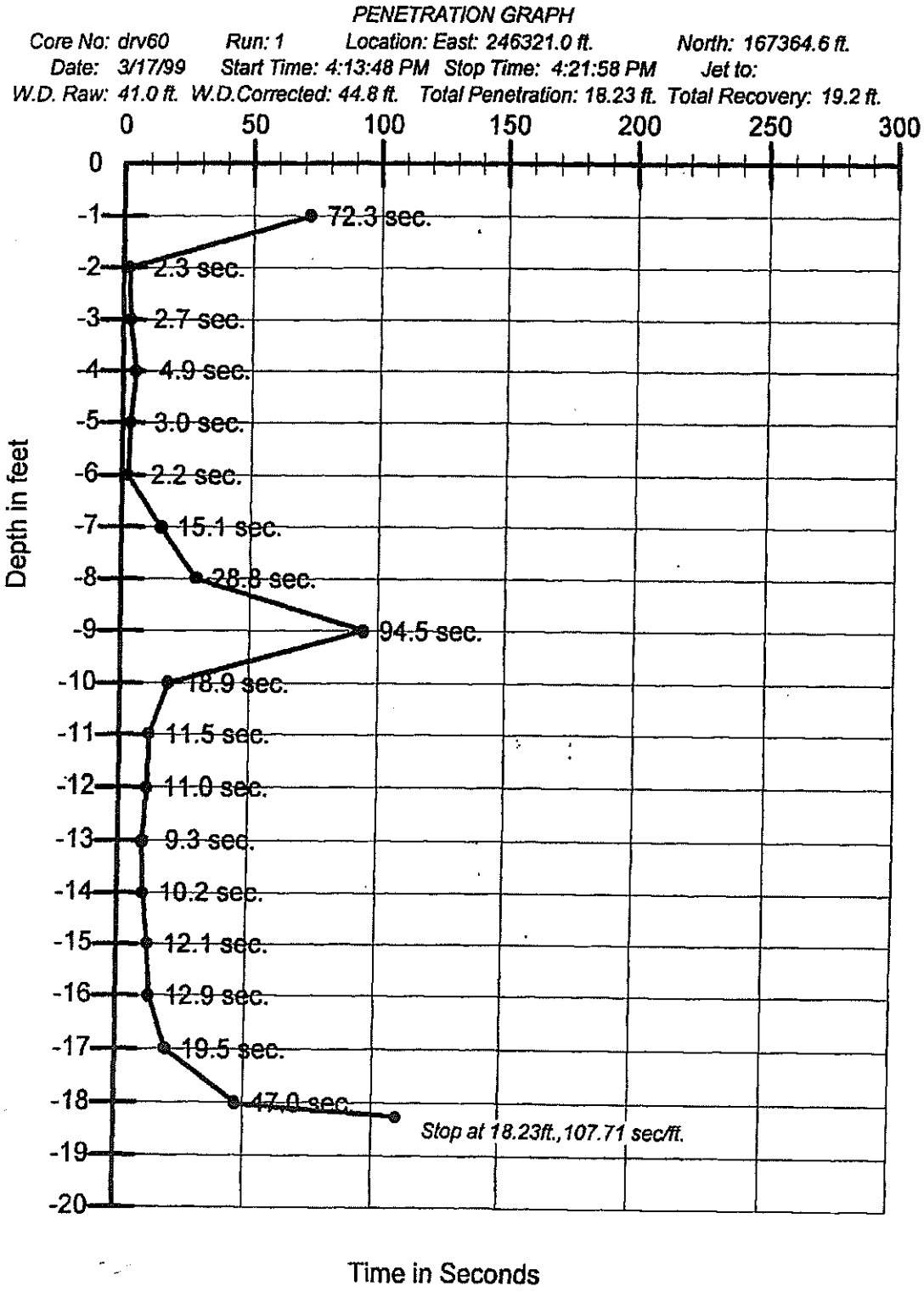
U.S. Army Corps of Engineers
Contract Number DACW-61-98-D-0008
Task Order 8
Vibrocore – Delaware Coast
Port Mahon PED

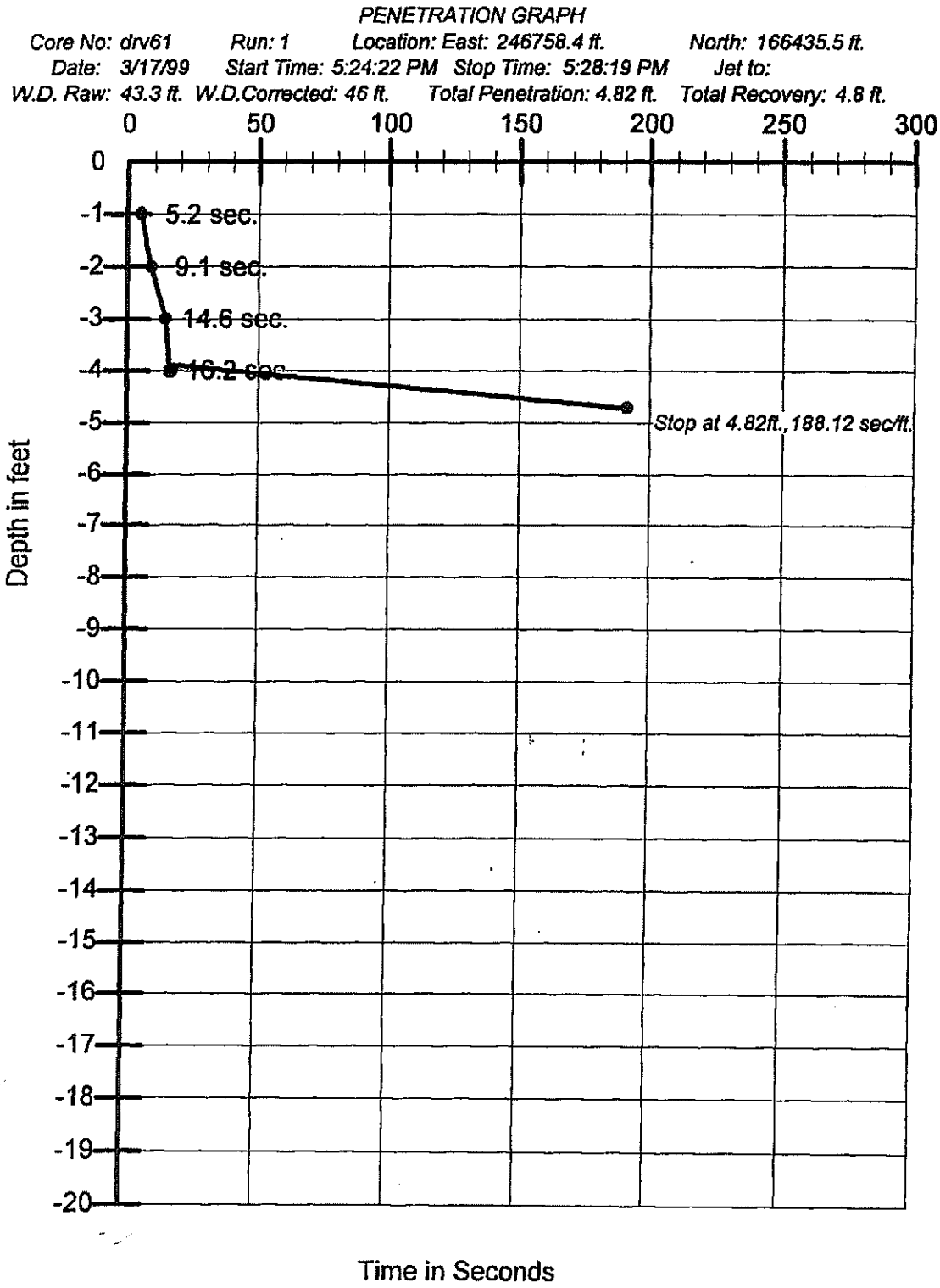
Duffield Associates
3769.GI
June 1999
D-1


PENETRATION GRAPH
Core No: drv58 Run: 2 Location: East: 244347.6 ft. North: 169342.5 ft.
Date: 3/17/99 Start Time: 12:46:45PM Stop Time: 12:51:17PM Jet to:
W.D. Raw: 46.3 ft. W.D.Corrected: 48 ft. Total Penetration: 3.99 ft. Total Recovery: 0 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
80.0 sec.
2.3 sec.
2.7 sec.
Stop at 3.99ft.,184.11 sec/ft.
Depth in feet
Time in Seconds


PENETRATION GRAPH
Core No: drv58 Run: 3 Location: East: 244365.1 ft. North: 169317.1 ft.
Date: 3/17/99 Start Time: 1:03:24 PM Stop Time: 1:07:43 PM Jet to:
W.D. Raw: 46.1 ft. W.D.Corrected: 47.2 ft. Total Penetration: 19.7 ft. Total Recovery: 22.6 ft.
0 50 100 150 200 250 300
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
Depth in feet
76.2 sec.
4.7 sec.
43.4 sec.
26.6 sec.
13.2 sec.
8.8 sec.
6.6 sec.
6.9 sec.
4.7 sec.
3.3 sec.
2.8 sec.
2.7 sec.
3.0 sec.
4.7 sec.
5.5 sec.
6.6 sec.
6.9 sec.
8.2 sec.
9.3 sec.
Stop at 19.7ft., 10.76 sec/ft.
Time in Seconds

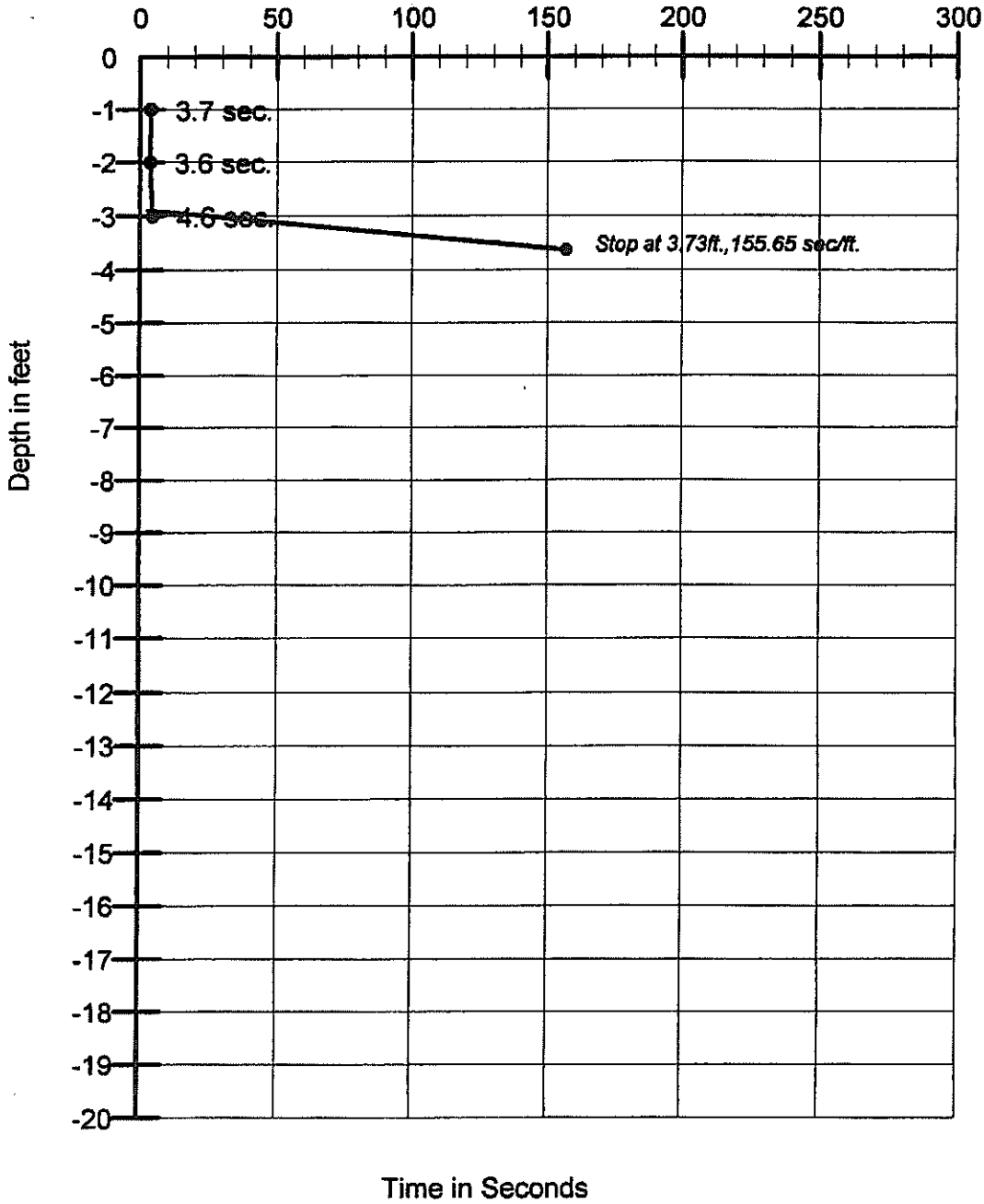

PENETRATION GRAPH
Core No: drv59 Run: 1 Location: East: 245433.7 ft. North: 168911.8 ft.
Date: 3/17/99 Start Time: 1:37:37 PM Stop Time: 1:47:23 PM Jet to:
W.D. Raw: 45.4 ft. W.D.Corrected: 47.3 ft. Total Penetration: 15.98 ft. Total Recovery: 17.7 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Depth in feet
66.9 sec.
4.4 sec.
4.7 sec.
7.1 sec.
15.1 sec.
32.9 sec.
43.7 sec.
50.8 sec.
14.0 sec.
14.8 sec.
51.3 sec.
34.1 sec.
24.4 sec.
40.4 sec.
43.7 sec.
Stop at 15.98ft., 134.29 sec/ft.
Time in Seconds

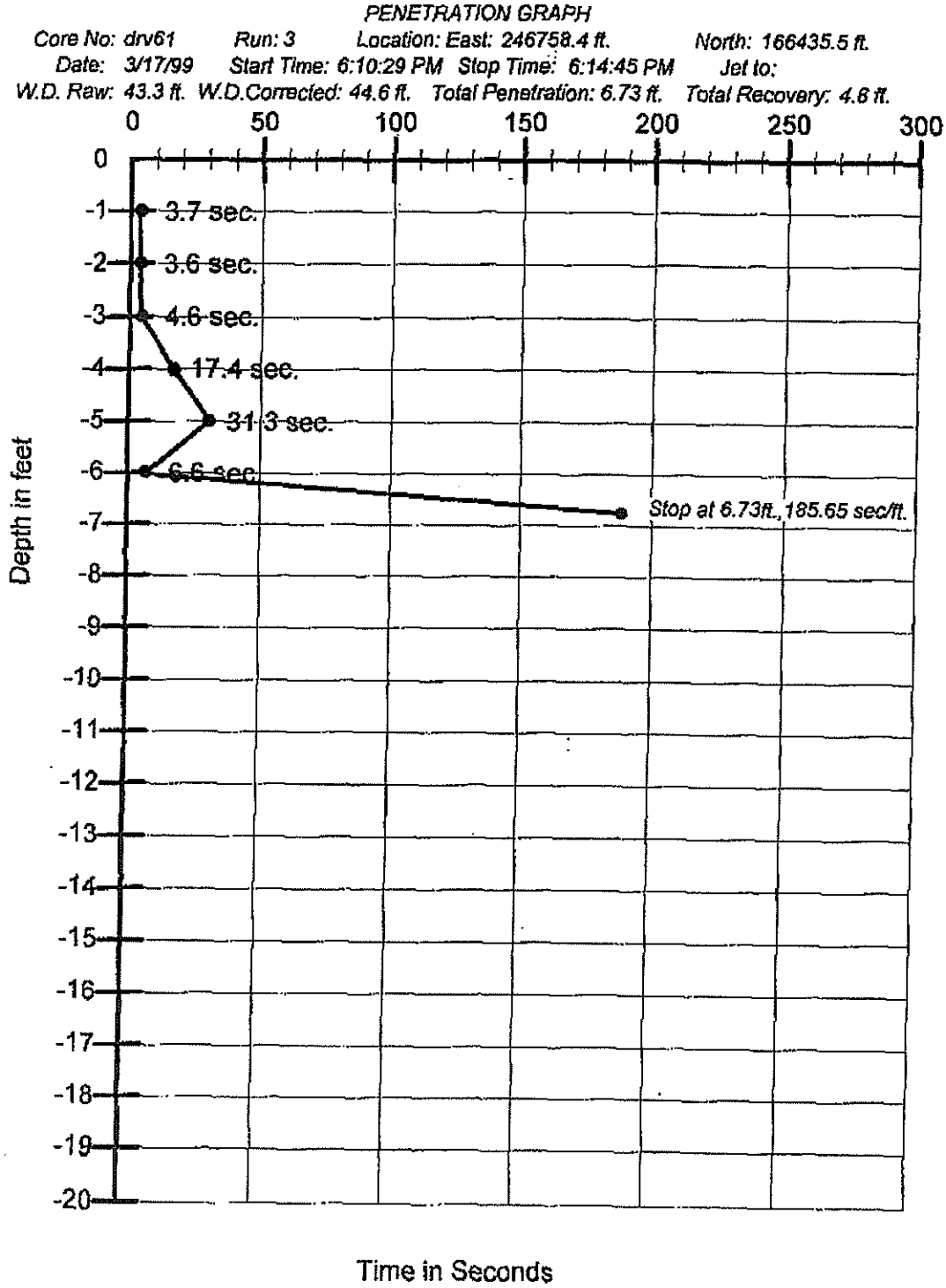

PENETRATION GRAPH
Core No: drv60 Run: 1 Location: East: 246321.0 ft. North: 167364.6 ft.
Date: 3/17/99 Start Time: 4:13:48 PM Stop Time: 4:21:58 PM Jet to:
W.D. Raw: 41.0 ft. W.D.Corrected: 44.8 ft. Total Penetration: 18.23 ft. Total Recovery: 19.2 ft.
0 50 100 150 200 250 300
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
Depth in feet
72.3 sec.
2.3 sec.
2.7 sec.
4.9 sec.
3.0 sec.
2.2 sec.
15.1 sec.
28.8 sec.
94.5 sec.
18.9 sec.
11.5 sec.
11.0 sec.
9.3 sec.
10.2 sec.
12.1 sec.
12.9 sec.
19.5 sec.
47.0 sec.
Stop at 18.23ft.,107.71 sec/ft.
Time in Seconds

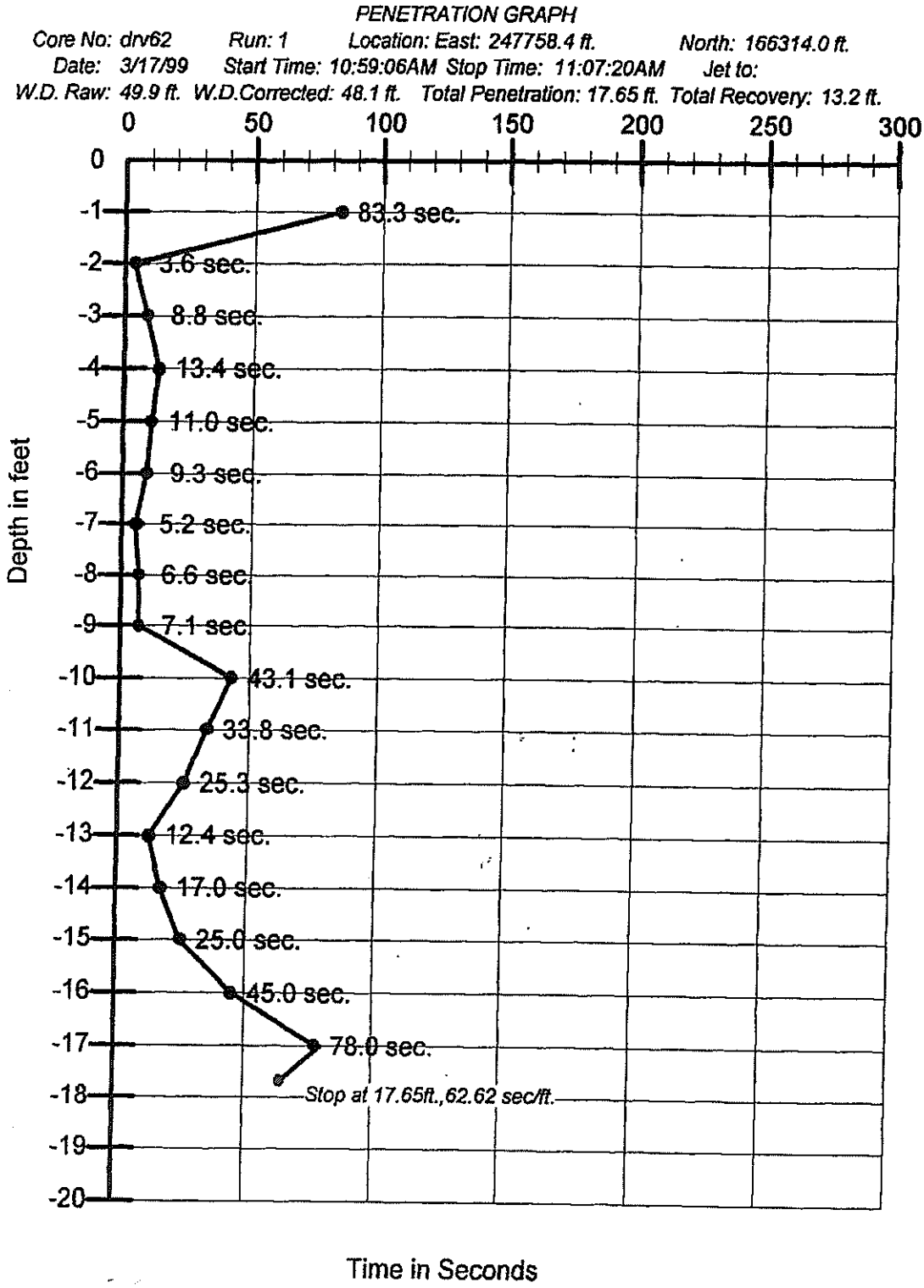

PENETRATION GRAPH
Core No: drv61 Run: 1 Location: East: 246758.4 ft. North: 166435.5 ft.
Date: 3/17/99 Start Time: 5:24:22 PM Stop Time: 5:28:19 PM Jet to:
W.D. Raw: 43.3 ft. W.D.Corrected: 46 ft. Total Penetration: 4.82 ft. Total Recovery: 4.8 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
5.2 sec.
9.1 sec.
14.6 sec.
16.2 sec.
Stop at 4.82ft., 188.12 sec/ft.
Depth in feet
Time in Seconds

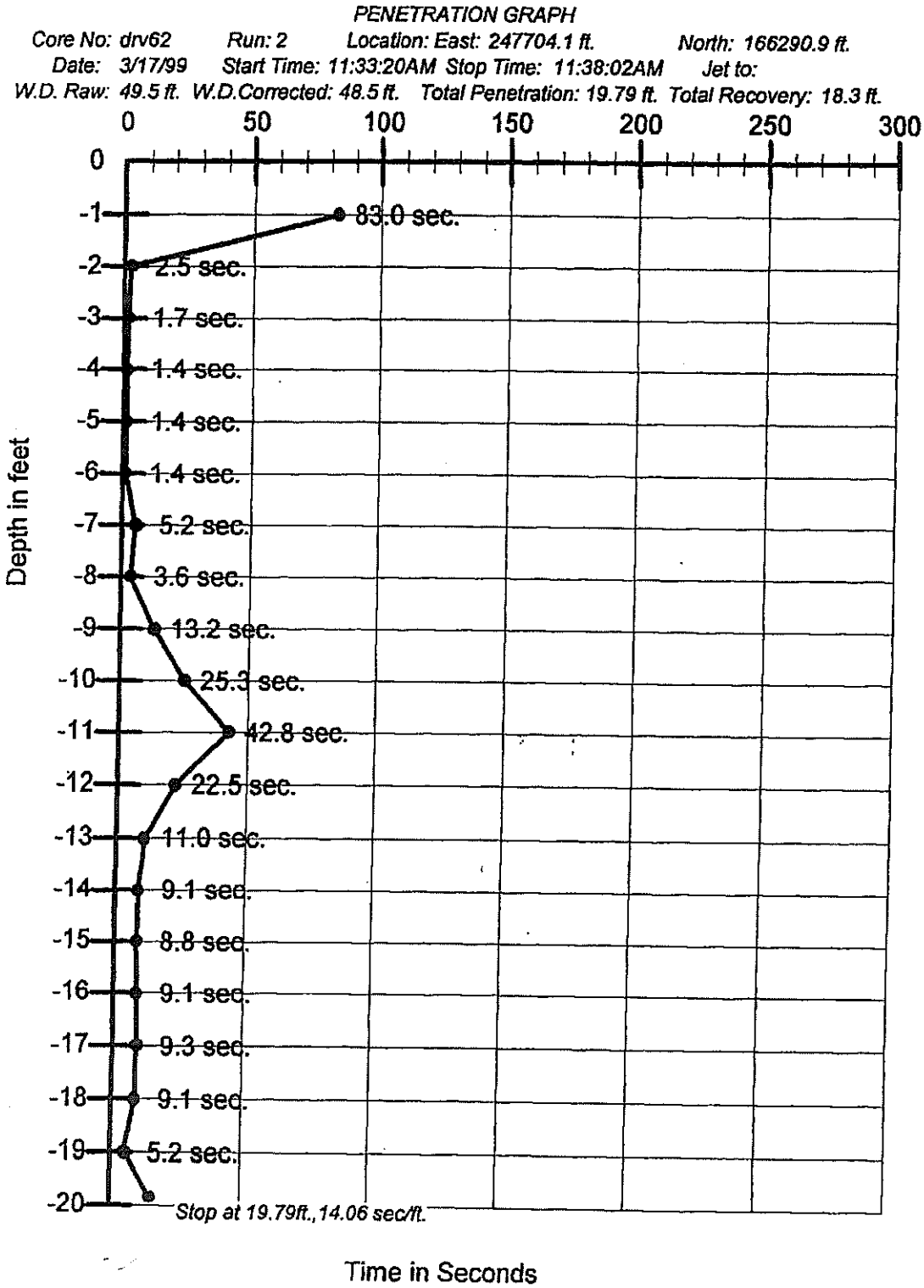
PENETRATION GRAPH

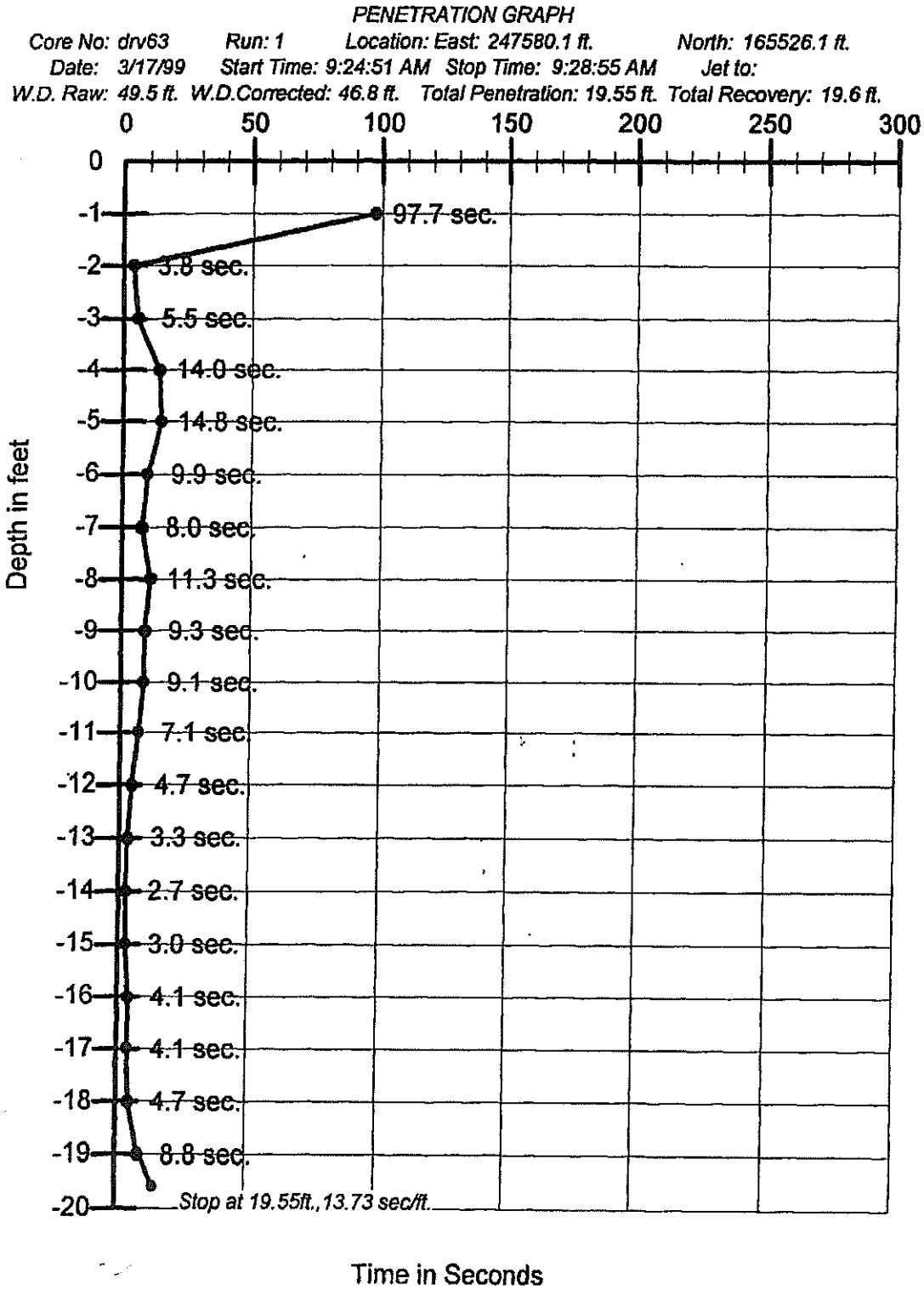
Core No: drv61 Run: 2 Location: East: 246775.4 ft. North: 166455.9 ft.
Date: 3/17/99 Start Time: 5:49:26 PM Stop Time: 5:51:28 PM Jet to:
W.D. Raw: 44.3 ft. W.D.Corrected: 46.4 ft. Total Penetration: 3.73 ft. Total Recovery: 0.8 ft.

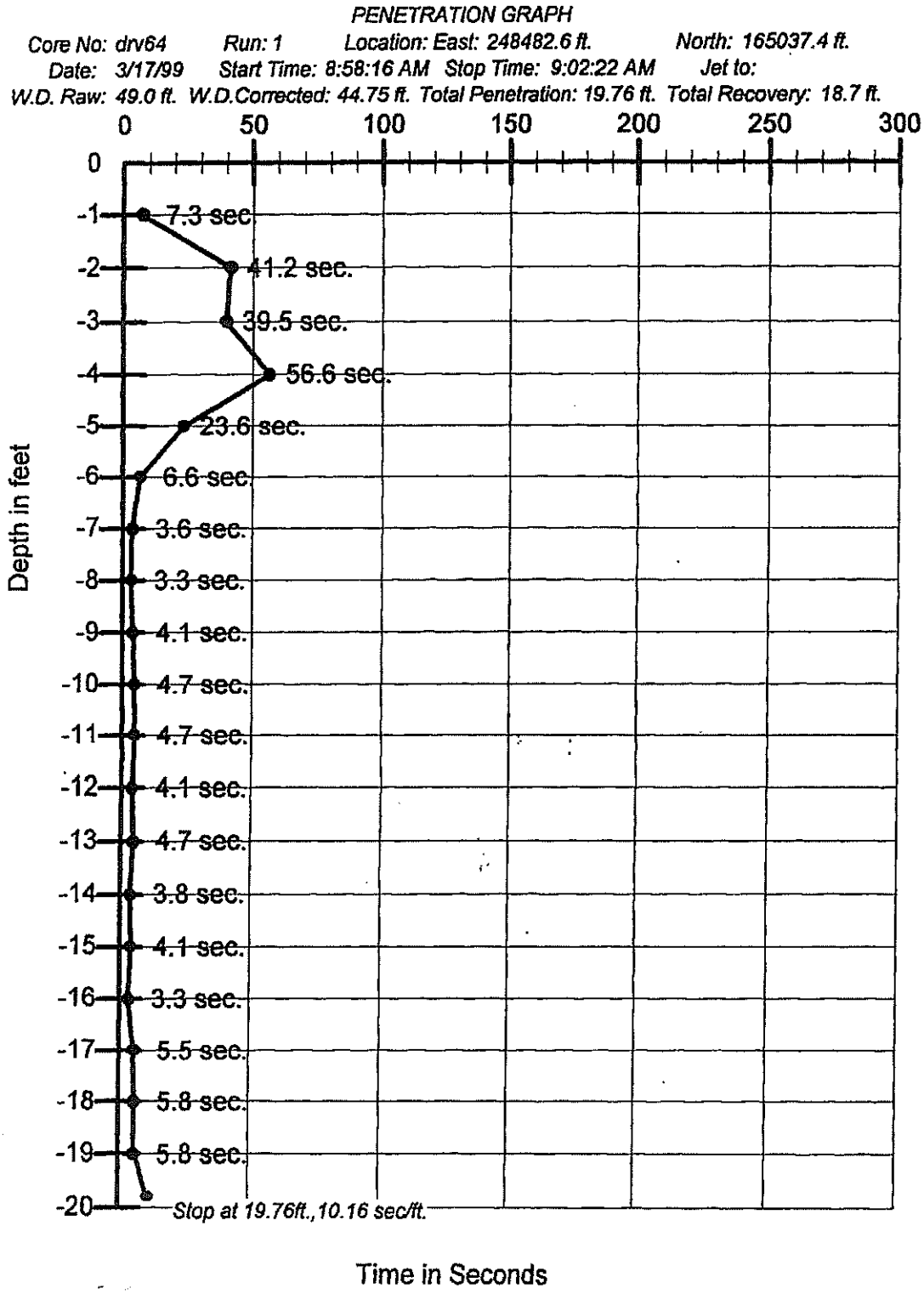


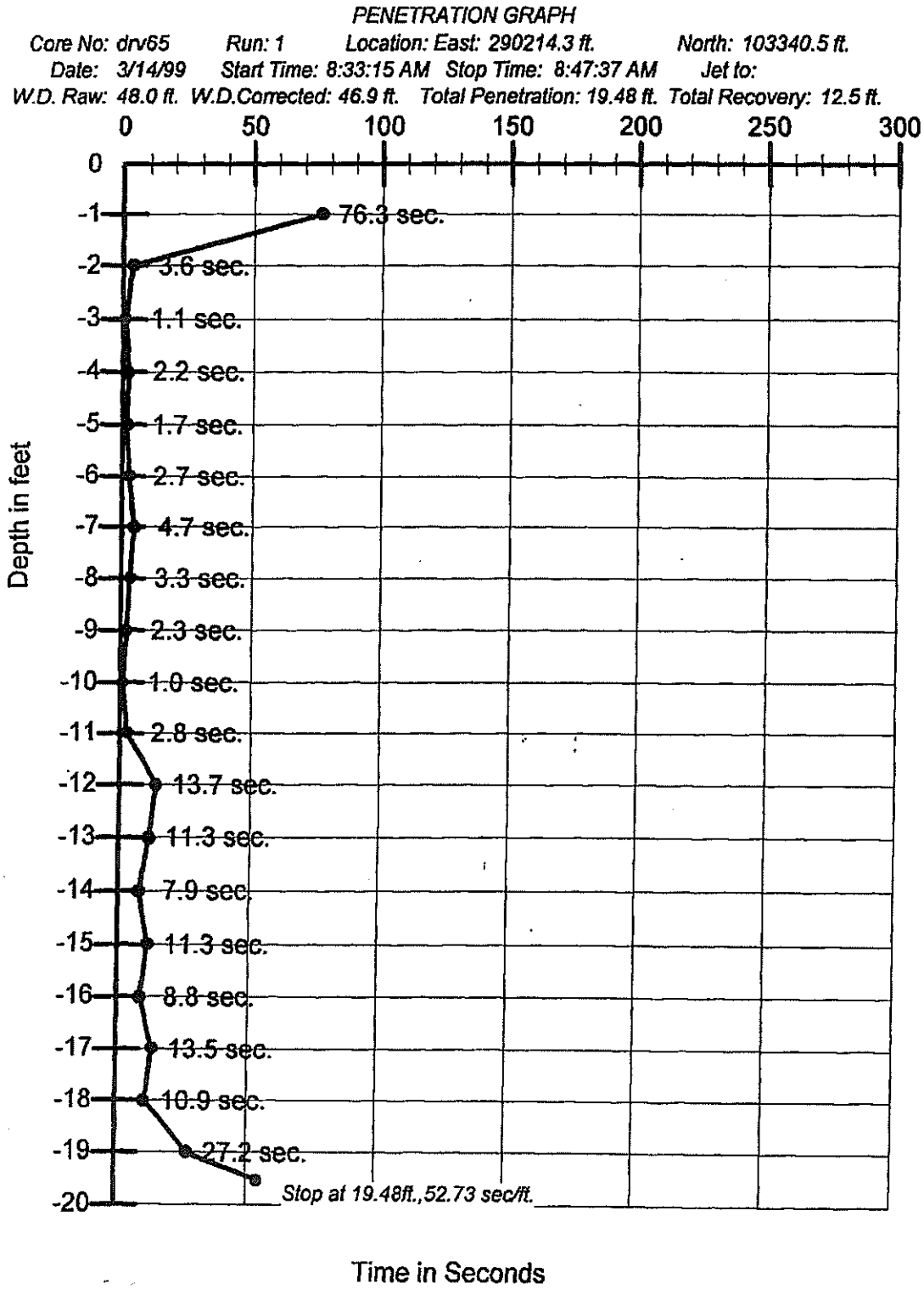

PENETRATION GRAPH
Core No: drv61 Run: 3 Location: East: 246758.4 ft. North: 166435.5 ft.
Date: 3/17/99 Start Time: 6:10:29 PM Stop Time: 6:14:45 PM Jet to:
W.D. Raw: 43.3 ft. W.D.Corrected: 44.6 ft. Total Penetration: 6.73 ft. Total Recovery: 4.6 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
3.7 sec.
3.6 sec.
4.6 sec.
17.4 sec.
31.3 sec.
6.6 sec.
Stop at 6.73ft., 185.65 sec/ft.
Depth in feet
Time in Seconds

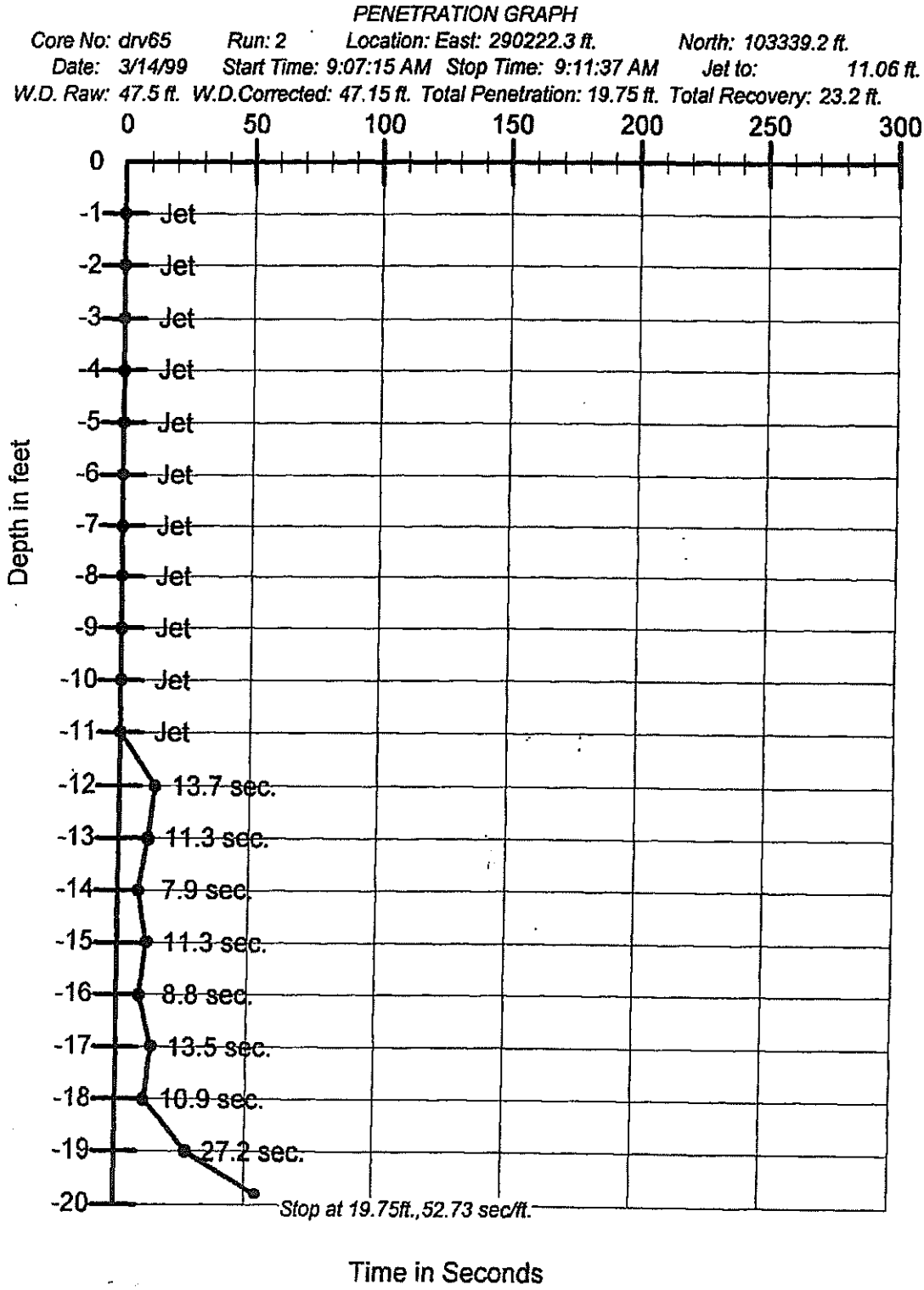

PENETRATION GRAPH
Core No: drv62 Run: 1 Location: East: 247758.4 ft. North: 166314.0 ft.
Date: 3/17/99 Start Time: 10:59:06AM Stop Time: 11:07:20AM Jet to:
W.D. Raw: 49.9 ft. W.D.Corrected: 48.1 ft. Total Penetration: 17.65 ft. Total Recovery: 13.2 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Depth in feet
83.3 sec.
3.6 sec.
8.8 sec.
13.4 sec.
11.0 sec.
9.3 sec.
5.2 sec.
6.6 sec.
7.1 sec.
43.1 sec.
33.8 sec.
25.3 sec.
12.4 sec.
17.0 sec.
25.0 sec.
45.0 sec.
78.0 sec.
Stop at 17.65ft.,62.62 sec/ft.
Time in Seconds

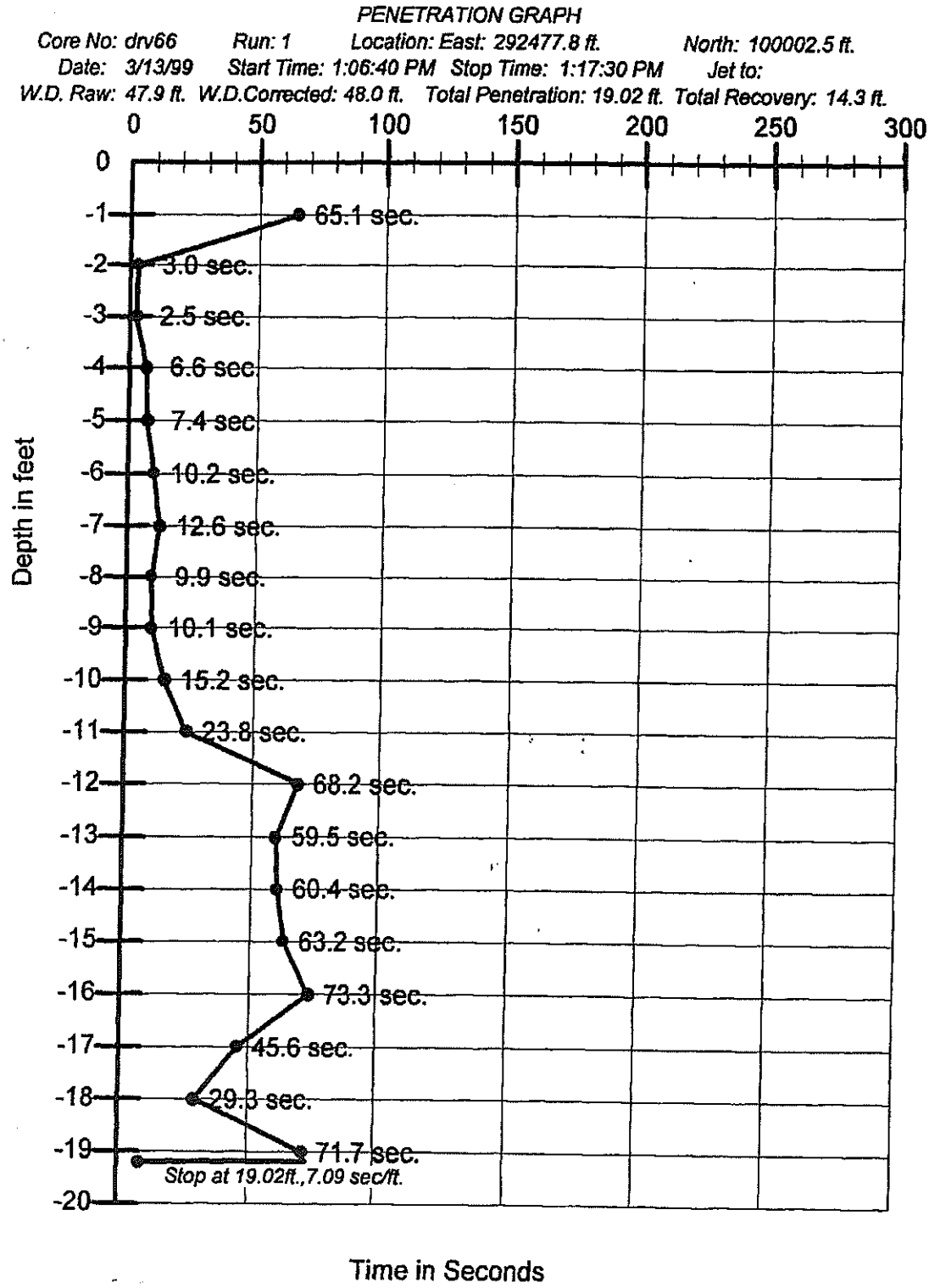

PENETRATION GRAPH
Core No: drv62 Run: 2 Location: East: 247704.1 ft. North: 166290.9 ft.
Date: 3/17/99 Start Time: 11:33:20AM Stop Time: 11:38:02AM Jet to:
W.D. Raw: 49.5 ft. W.D.Corrected: 48.5 ft. Total Penetration: 19.79 ft. Total Recovery: 18.3 ft.
0 50 100 150 200 250 300
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
Depth in feet
83.0 sec.
2.5 sec.
1.7 sec.
1.4 sec.
1.4 sec.
1.4 sec.
5.2 sec.
3.6 sec.
13.2 sec.
25.3 sec.
42.8 sec.
22.5 sec.
11.0 sec.
9.1 sec.
8.8 sec.
9.1 sec.
9.3 sec.
9.1 sec.
5.2 sec.
Stop at 19.79ft.,14.06 sec/ft.
Time in Seconds

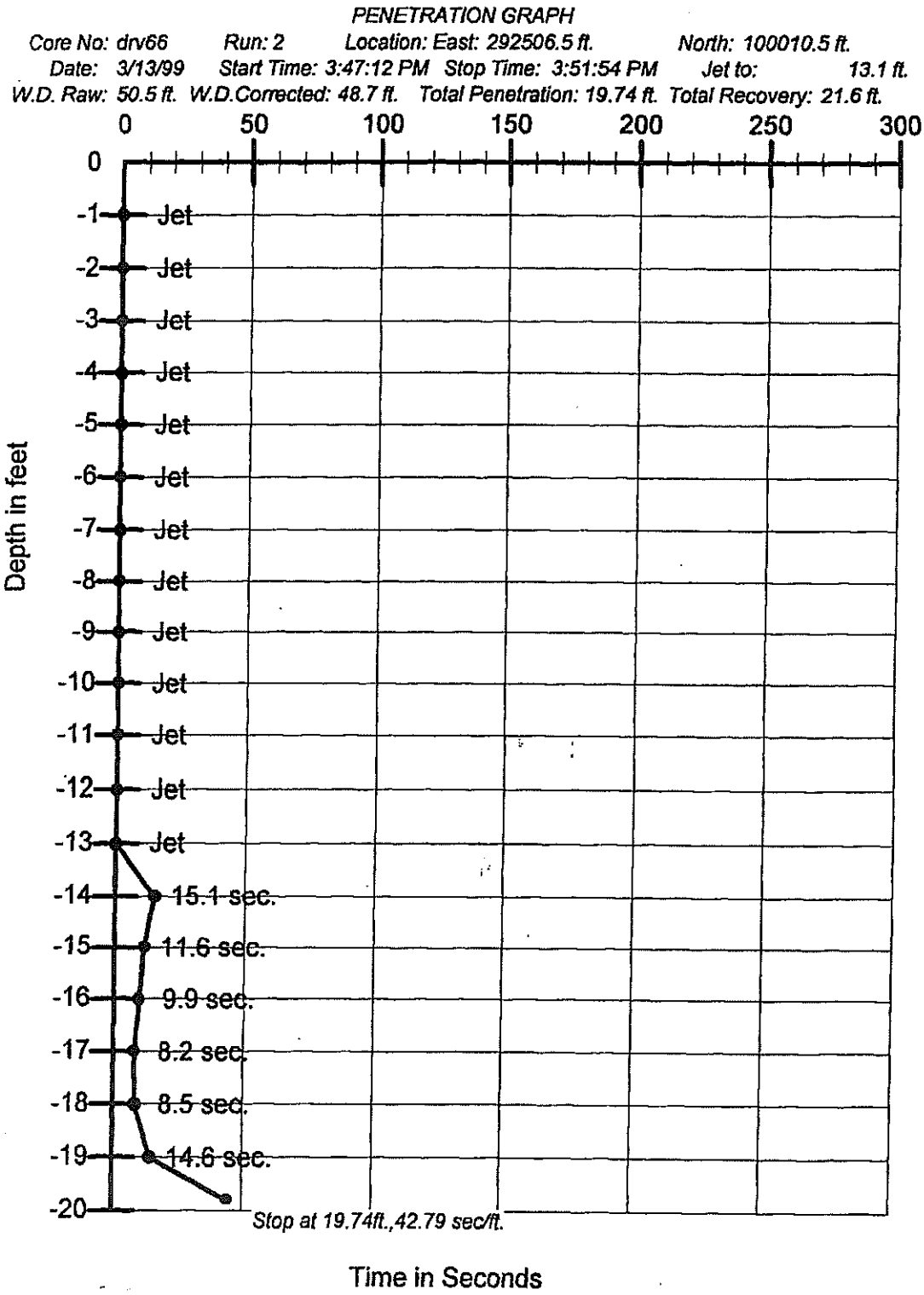

PENETRATION GRAPH
Core No: drv63 Run: 1 Location: East: 247580.1 ft. North: 165526.1 ft.
Date: 3/17/99 Start Time: 9:24:51 AM Stop Time: 9:28:55 AM Jet to:
W.D. Raw: 49.5 ft. W.D.Corrected: 46.8 ft. Total Penetration: 19.55 ft. Total Recovery: 19.6 ft.
0 50 100 150 200 250 300
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
Depth in feet
97.7 sec.
3.8 sec.
5.5 sec.
14.0 sec.
14.8 sec.
9.9 sec.
8.0 sec.
11.3 sec.
9.3 sec.
9.1 sec.
7.1 sec.
4.7 sec.
3.3 sec.
2.7 sec.
3.0 sec.
4.1 sec.
4.1 sec.
4.7 sec.
8.8 sec.
Stop at 19.55ft., 13.73 sec/ft.
Time in Seconds

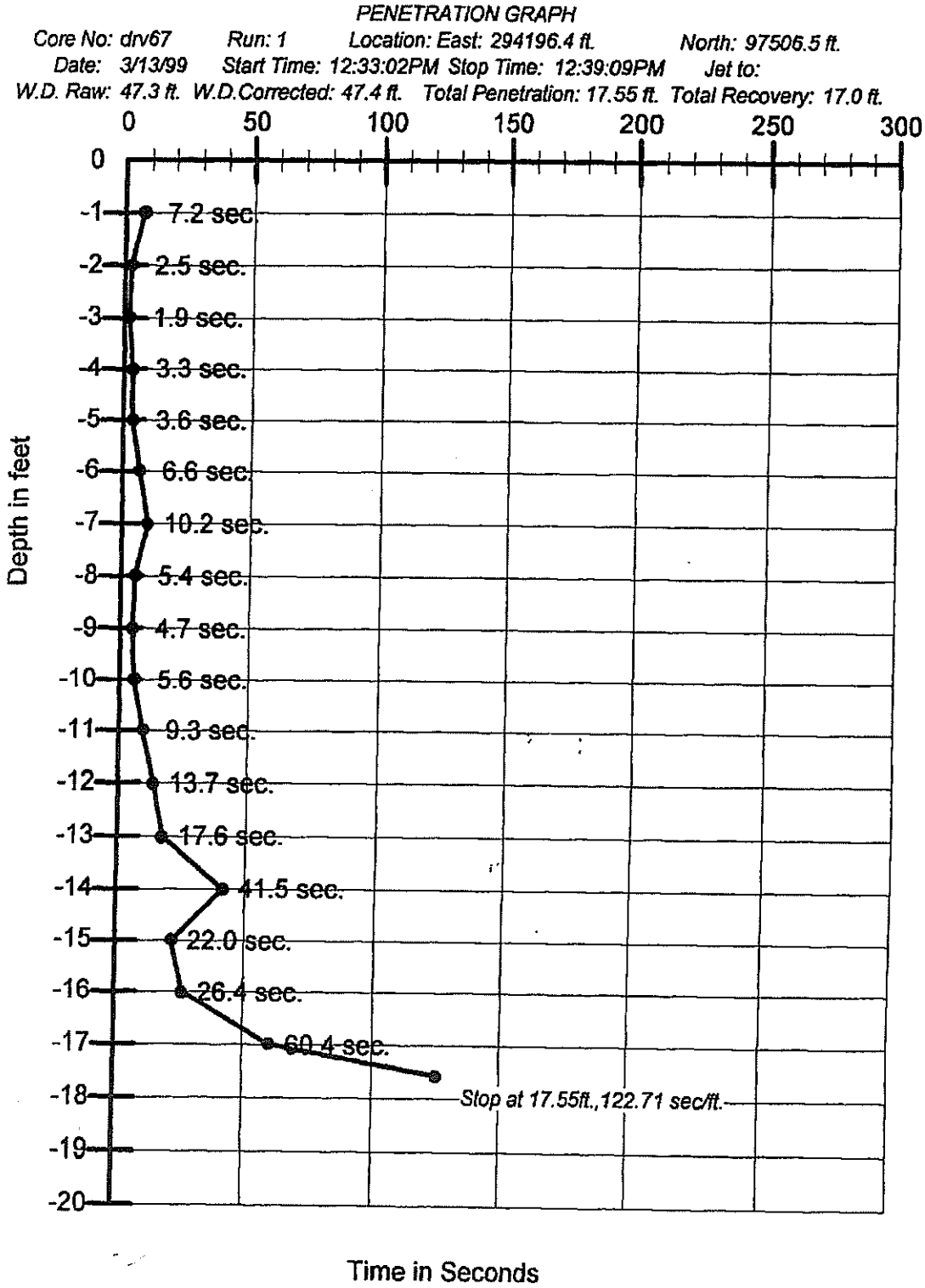

PENETRATION GRAPH
Core No: drv64 Run: 1 Location: East: 248482.6 ft. North: 165037.4 ft.
Date: 3/17/99 Start Time: 8:58:16 AM Stop Time: 9:02:22 AM Jet to:
W.D. Raw: 49.0 ft. W.D.Corrected: 44.75 ft. Total Penetration: 19.76 ft. Total Recovery: 18.7 ft.
0 50 100 150 200 250 300
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
7.3 sec.
41.2 sec.
39.5 sec.
56.6 sec.
23.6 sec.
6.6 sec.
3.6 sec.
3.3 sec.
4.1 sec.
4.7 sec.
4.7 sec.
4.1 sec.
4.7 sec.
3.8 sec.
4.1 sec.
3.3 sec.
5.5 sec.
5.8 sec.
5.8 sec.
Stop at 19.76ft.,10.16 sec/ft.
Depth in feet
Time in Seconds


PENETRATION GRAPH
Core No: drv65 Run: 1 Location: East: 290214.3 ft. North: 103340.5 ft.
Date: 3/14/99 Start Time: 8:33:15 AM Stop Time: 8:47:37 AM Jet to:
W.D. Raw: 48.0 ft. W.D.Corrected: 46.9 ft. Total Penetration: 19.48 ft. Total Recovery: 12.5 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Depth in feet
76.3 sec.
3.6 sec.
1.1 sec.
2.2 sec.
1.7 sec.
2.7 sec.
4.7 sec.
3.3 sec.
2.3 sec.
1.0 sec.
2.8 sec.
13.7 sec.
11.3 sec.
7.9 sec.
11.3 sec.
8.8 sec.
13.5 sec.
10.9 sec.
27.2 sec.
Stop at 19.48ft.,52.73 sec/ft.
Time in Seconds


PENETRATION GRAPH
Core No: drv65 Run: 2 Location: East: 290222.3 ft. North: 103339.2 ft.
Date: 3/14/99 Start Time: 9:07:15 AM Stop Time: 9:11:37 AM Jet to: 11.06 ft.
W.D. Raw: 47.5 ft. W.D.Corrected: 47.15 ft. Total Penetration: 19.75 ft. Total Recovery: 23.2 ft.
0
50
100
150
200
250
300
Depth in feet
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Jet
13.7 sec.
11.3 sec.
7.9 sec.
11.3 sec.
8.8 sec.
13.5 sec.
10.9 sec.
27.2 sec.
Stop at 19.75ft.,52.73 sec/ft.
Time in Seconds


PENETRATION GRAPH
Core No: drv66 Run: 1 Location: East: 292477.8 ft. North: 100002.5 ft.
Date: 3/13/99 Start Time: 1:06:40 PM Stop Time: 1:17:30 PM Jet to:
W.D. Raw: 47.9 ft. W.D.Corrected: 48.0 ft. Total Penetration: 19.02 ft. Total Recovery: 14.3 ft.
0 50 100 150 200 250 300
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20
Depth in feet
65.1 sec.
3.0 sec.
2.5 sec.
6.6 sec.
7.4 sec.
10.2 sec.
12.6 sec.
9.9 sec.
10.1 sec.
15.2 sec.
23.8 sec.
68.2 sec.
59.5 sec.
60.4 sec.
63.2 sec.
73.3 sec.
45.6 sec.
29.3 sec.
71.7 sec.
Stop at 19.02ft.,7.09 sec/ft.
Time in Seconds


PENETRATION GRAPH
Core No: drv66 Run: 2 Location: East: 292506.5 ft. North: 100010.5 ft.
Date: 3/13/99 Start Time: 3:47:12 PM Stop Time: 3:51:54 PM Jet to: 13.1 ft.
W.D. Raw: 50.5 ft. W.D.Corrected: 48.7 ft. Total Penetration: 19.74 ft. Total Recovery: 21.6 ft.
0
50
100
150
200
250
300
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
Depth in feet
Jet
15.1 sec.
11.6 sec.
9.9 sec.
8.2 sec.
8.5 sec.
14.6 sec.
Stop at 19.74ft.,42.79 sec/ft.
Time in Seconds



U.S. Army Corps of Engineers
Contract Number DACW-61-98-D-0008
Task Order 8
Vibrocore – Delaware Coast
Port Mahon PED

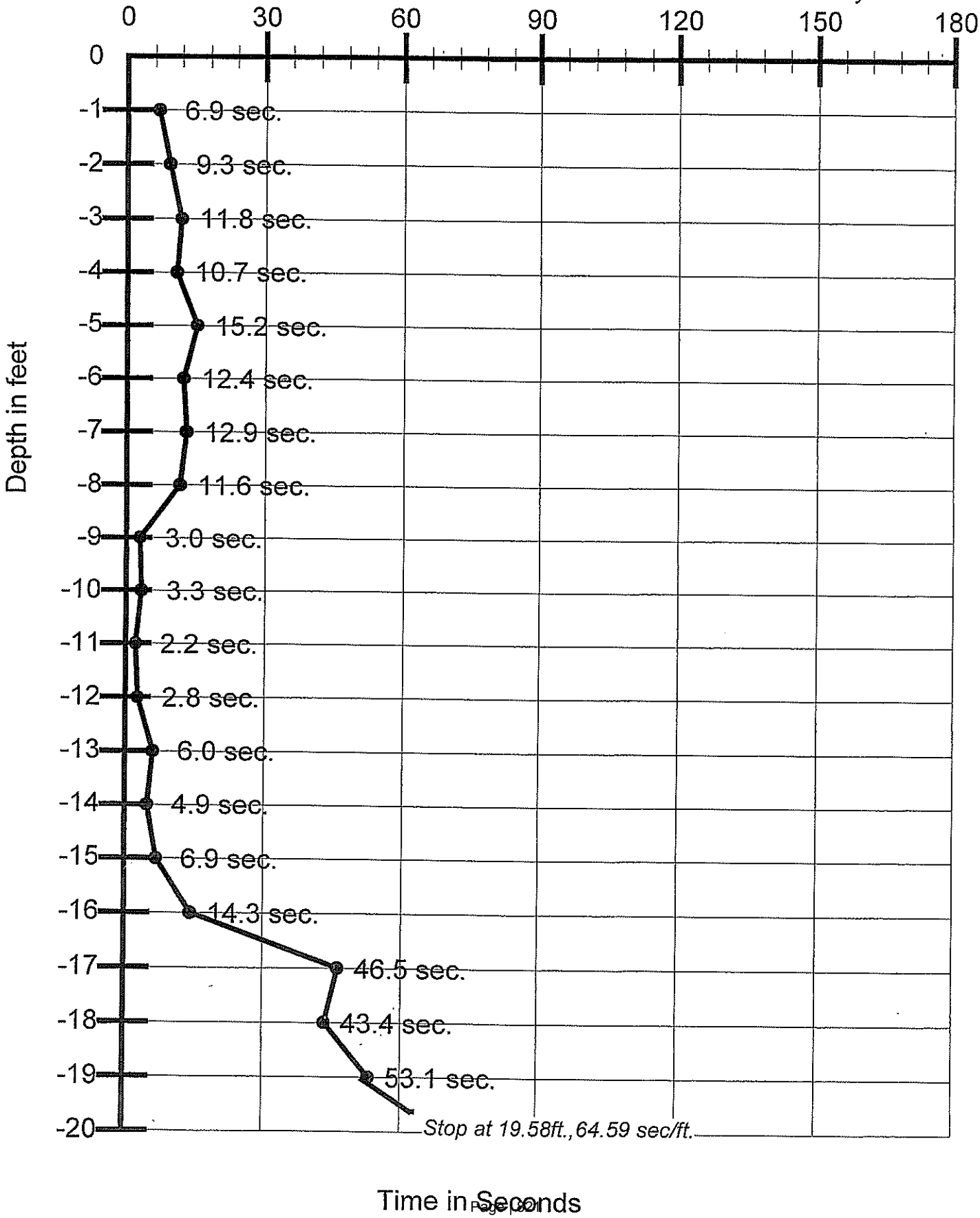
Duffield Associates
3769.GI
June 1999
D-17

PENETRATION GRAPH

Core No: drv68 Run:1 Location: East:260031.90 ft. North152613.54 ft.

Date: 4/27/2001 Start Time:10:50:17AM Stop Time:10:56:02AM Jet to:

W.D. Raw: 50.4 ft. W.D.Corrected: 49.5 ft. Total Penetration:19.58 ft. Total Recovery:0.0 ft.

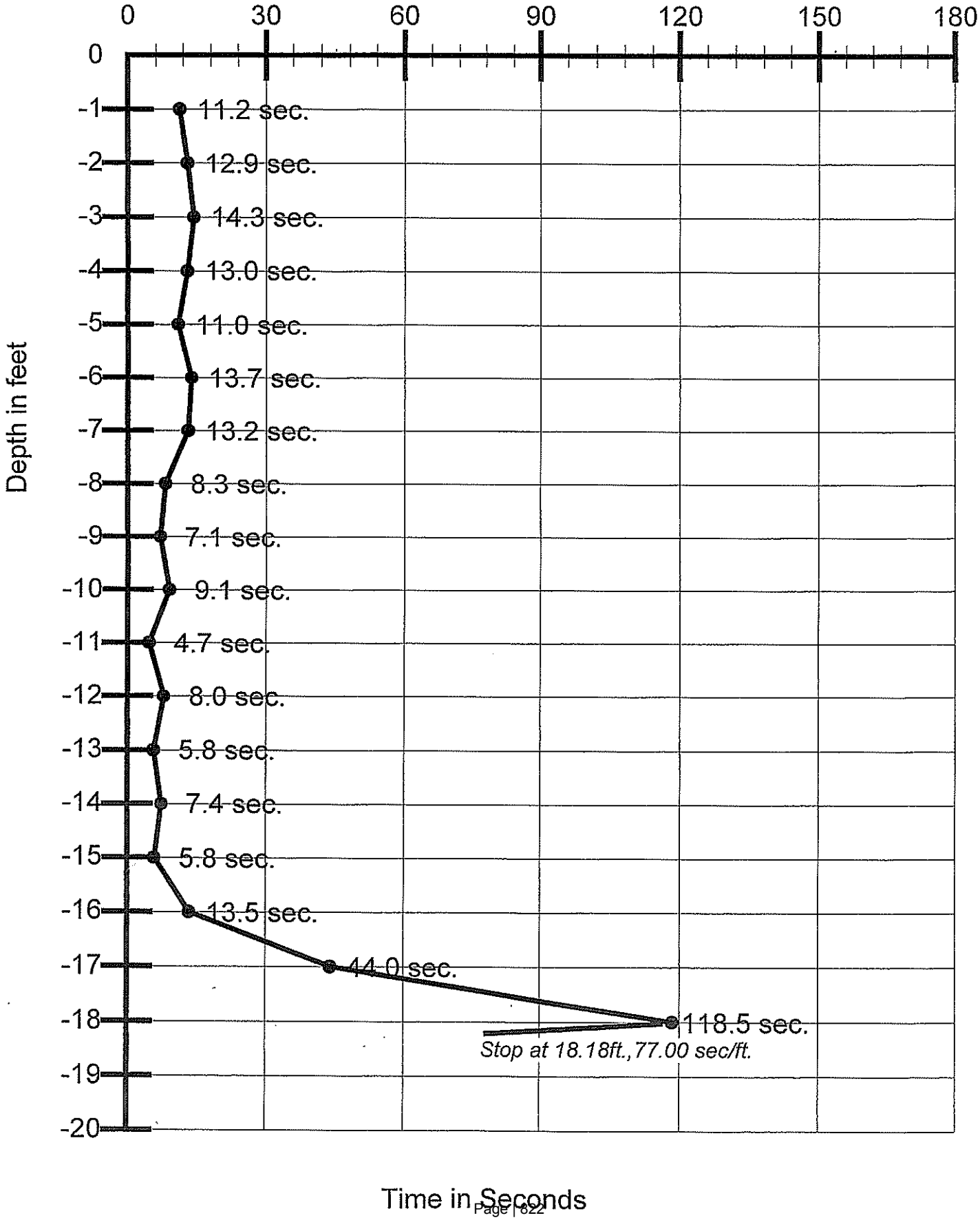


PENETRATION GRAPH

Core No: drv68 Run:2 Location: East:260020.89 ft. North152617.28 ft.

Date: 4/27/2001 Start Time:1:04:36 PM Stop Time:1:12:58 PM Jet to:

W.D. Raw: 52.0 ft. W.D.Corrected: 49.4 ft. Total Penetration:18.18 ft. Total Recovery:19.7 ft.

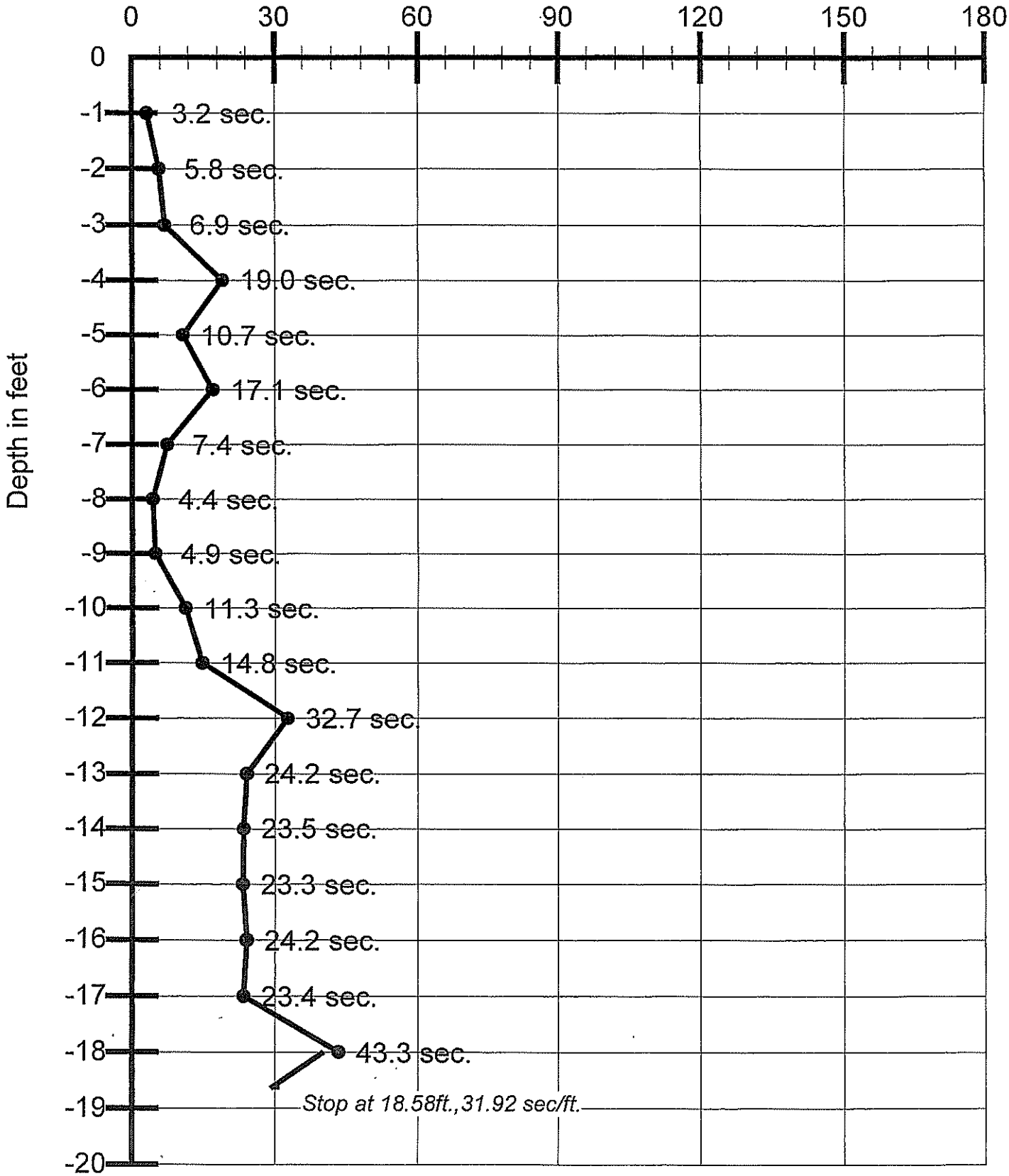


PENETRATION GRAPH

Core No: drv69 Run:1 Location: East:262635.19 ft. North149544.77 ft.

Date: 4/27/2001 Start Time:2:14:23 PM Stop Time:2:22:10 PM Jet to:

W.D. Raw: 53.8 ft. W.D.Corrected: 51.7 ft. Total Penetration:18.58 ft. Total Recovery:20.0 ft.

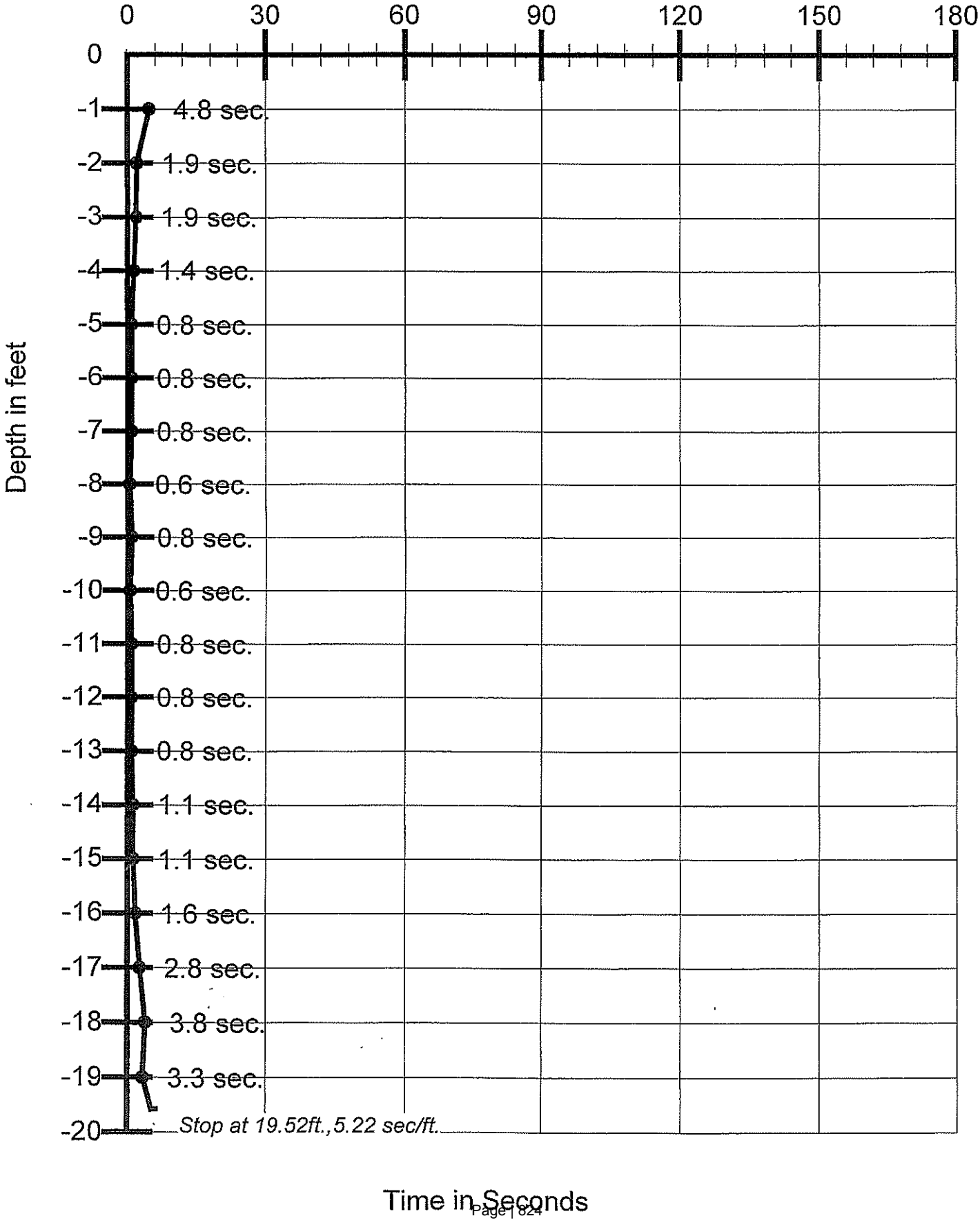


PENETRATION GRAPH

Core No: drv70 Run:1 Location: East:267384.25 ft. North141101.48 ft.

Date: 4/27/2001 Start Time:3:00:10 PM Stop Time:3:01:58 PM Jet to:

W.D. Raw: 49.7 ft. W.D.Corrected: 48.3 ft. Total Penetration:19.52 ft. Total Recovery:18.6 ft.

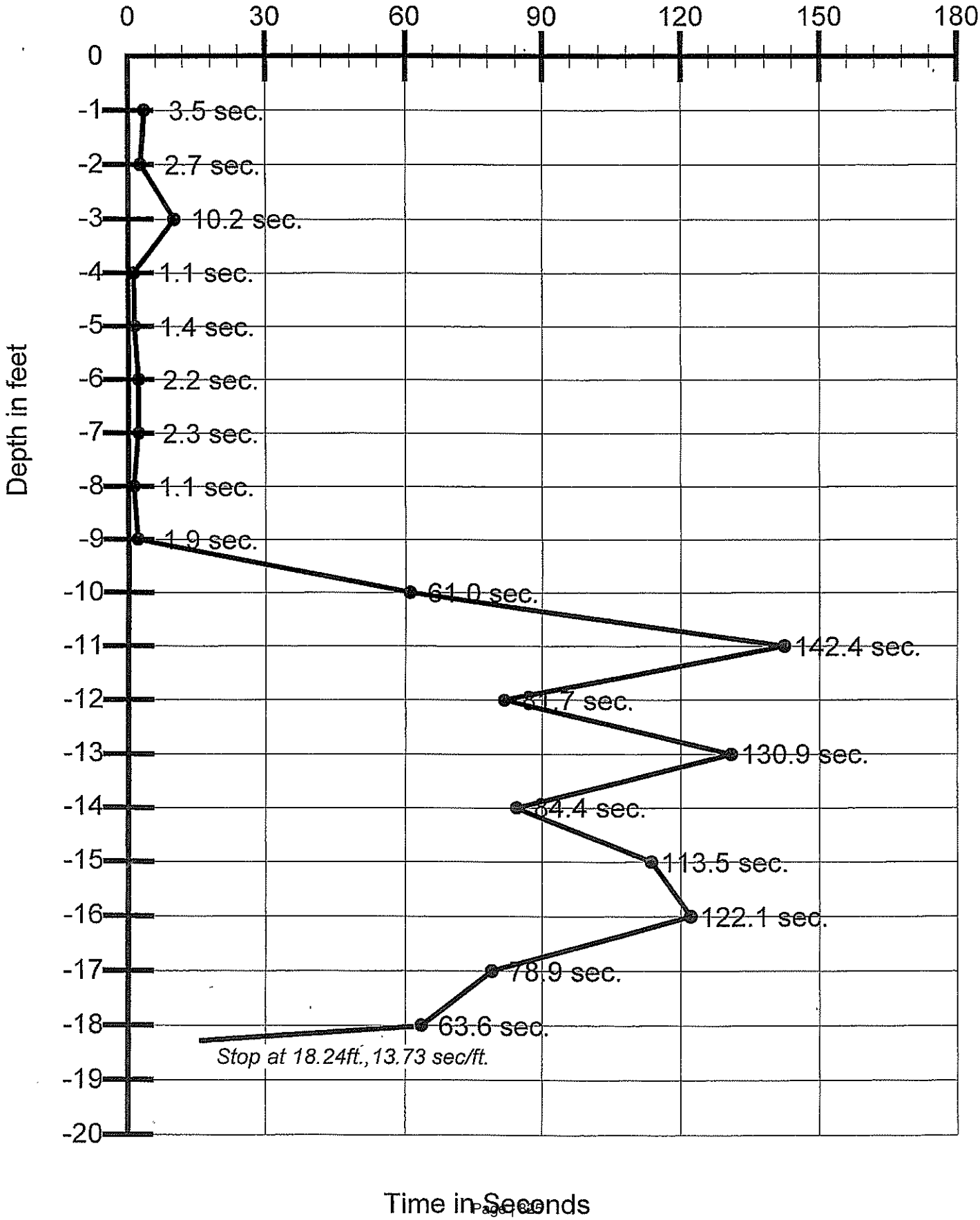


PENETRATION GRAPH

Core No: drv71 Run:1 Location: East:272958.36 ft. North129134.81 ft.

Date: 4/27/2001 Start Time:3:39:02 PM Stop Time:3:54:55 PM Jet to:

W.D. Raw: 49.1 ft. W.D.Corrected: 48.5 ft. Total Penetration:18.24 ft. Total Recovery:20.0 ft.

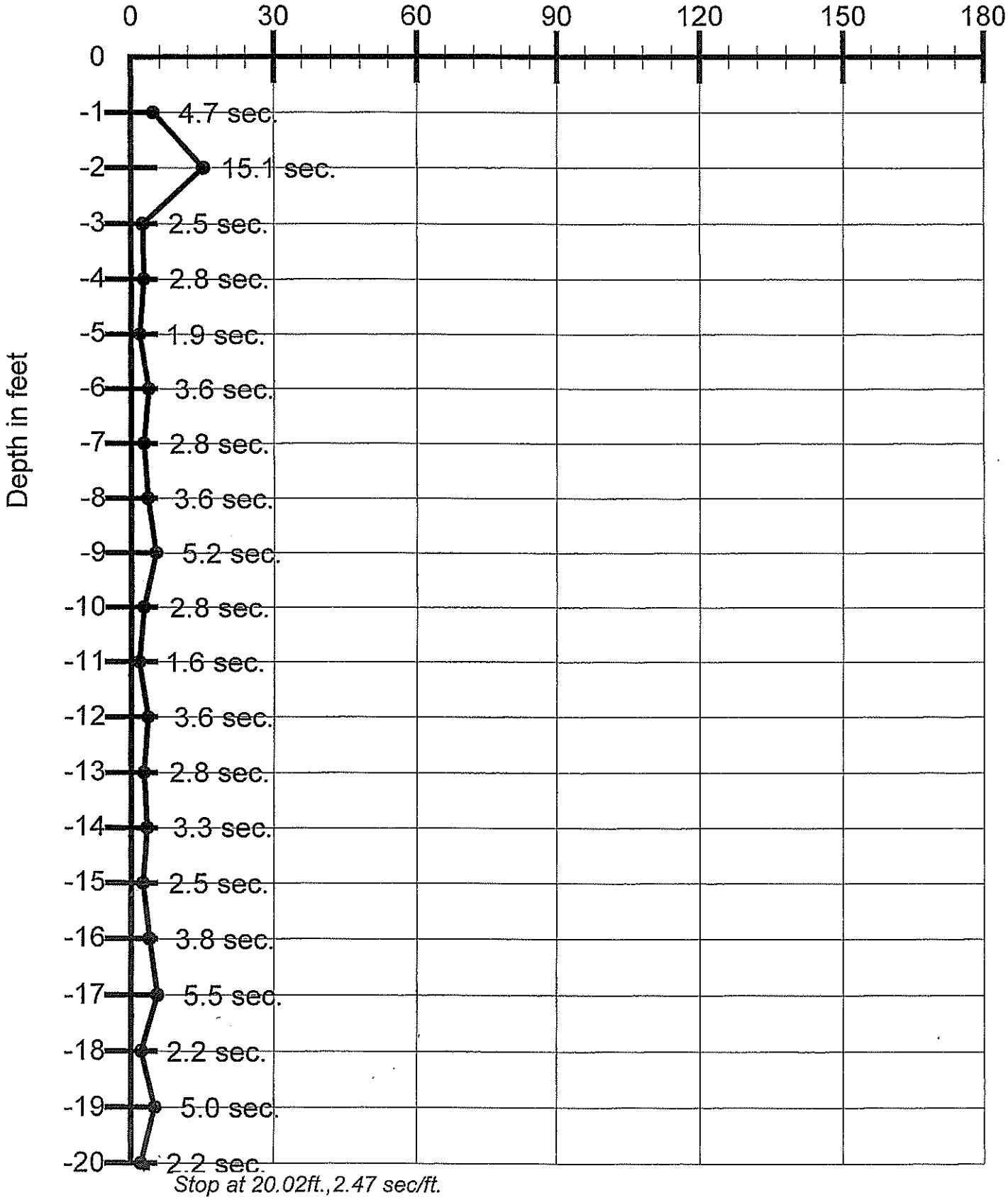


PENETRATION GRAPH

Core No: drv72 Run:1 Location: East:273824.08 ft. North125867.14 ft.

Date: 4/27/2001 Start Time:4:35:00 PM Stop Time:4:36:23 PM Jet to:

W.D. Raw: 48.9 ft. W.D.Corrected: 49.4 ft. Total Penetration:20.02 ft. Total Recovery:19.6 ft.



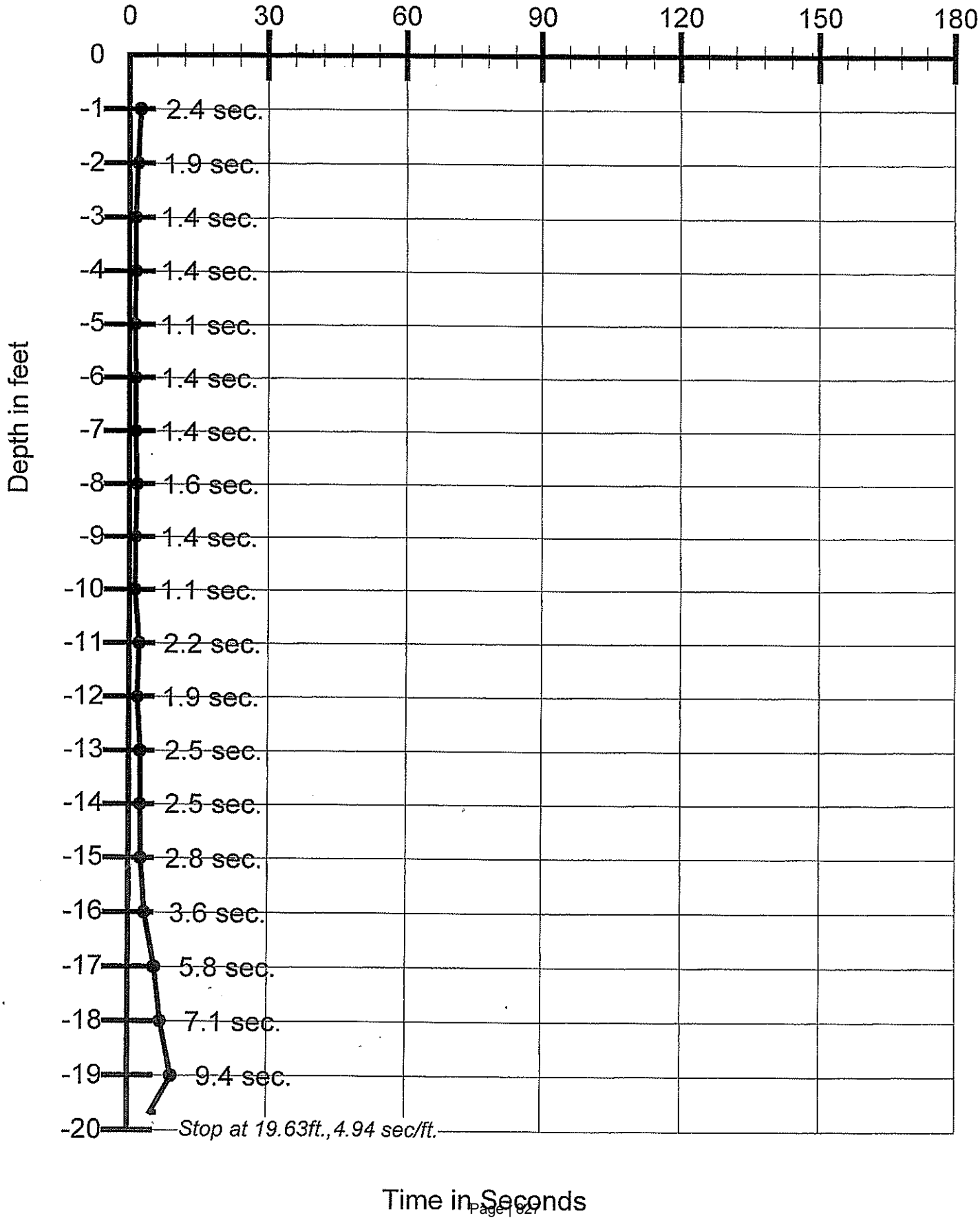
Stop at 20.02ft.,2.47 sec/ft.

PENETRATION GRAPH

Core No: drv73 Run:1 Location: East:281652.66 ft. North115856.99 ft.

Date: 4/29/2001 Start Time:2:55:52 PM Stop Time:2:57:37 PM Jet to:

W.D. Raw: 50.3 ft. W.D.Corrected: 48.4 ft. Total Penetration:19.63 ft. Total Recovery:19.6 ft.

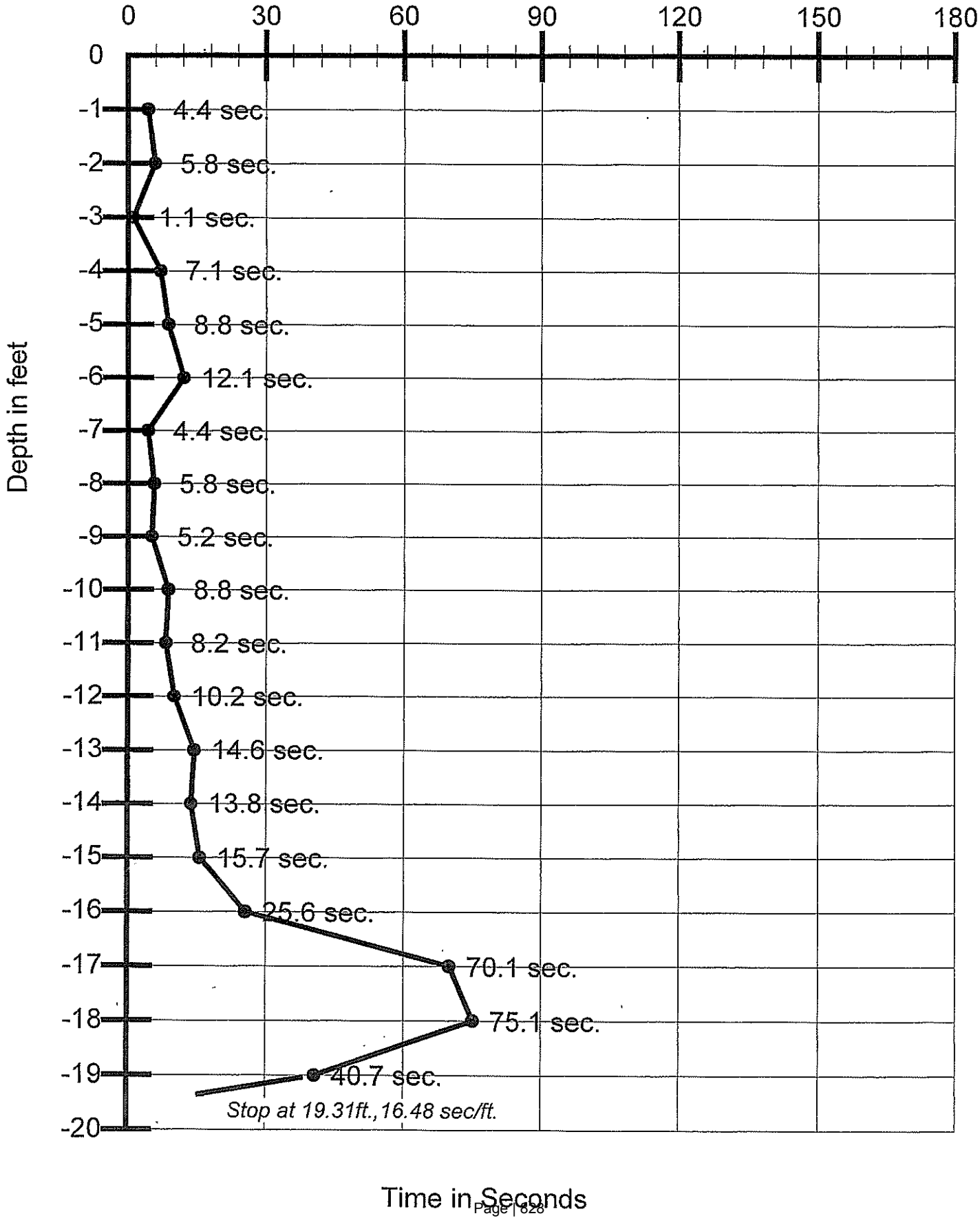


PENETRATION GRAPH

Core No: drv74 Run:1 Location: East:283487.05 ft. North112490.32 ft.

Date: 4/29/2001 Start Time:2:12:14 PM Stop Time:2:18:10 PM Jet to:

W.D. Raw: 47.9 ft. W.D.Corrected: 46.1 ft. Total Penetration:19.31 ft. Total Recovery:20.0 ft.

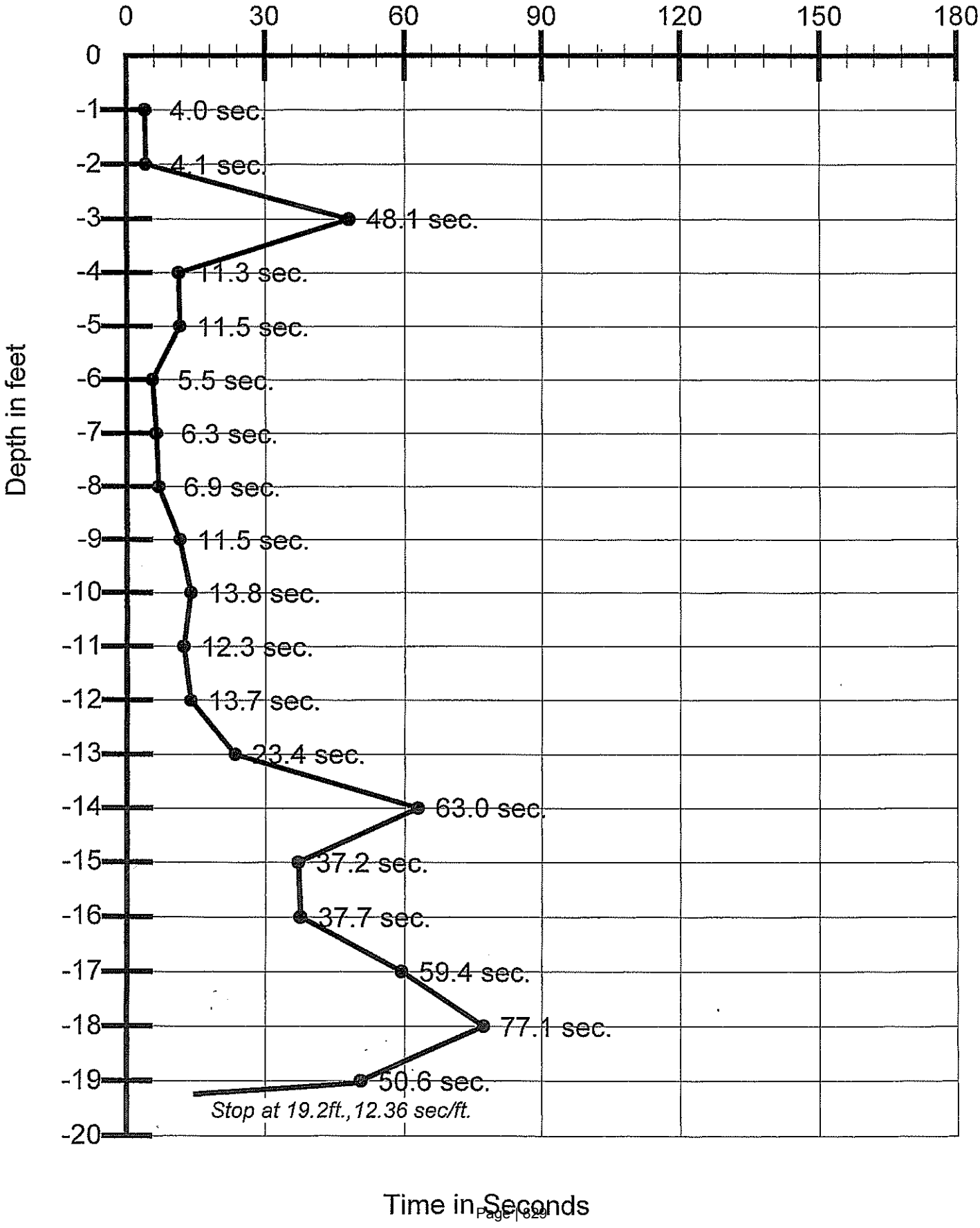


PENETRATION GRAPH

Core No: drv75 Run:1 Location: East:289014.55 ft. North105208.27 ft.

Date: 4/29/2001 Start Time:1:26:38 PM Stop Time:1:35:48 PM Jet to:

W.D. Raw: 48.7 ft. W.D.Corrected: 47.5 ft. Total Penetration:19.2 ft. Total Recovery:20.0 ft.

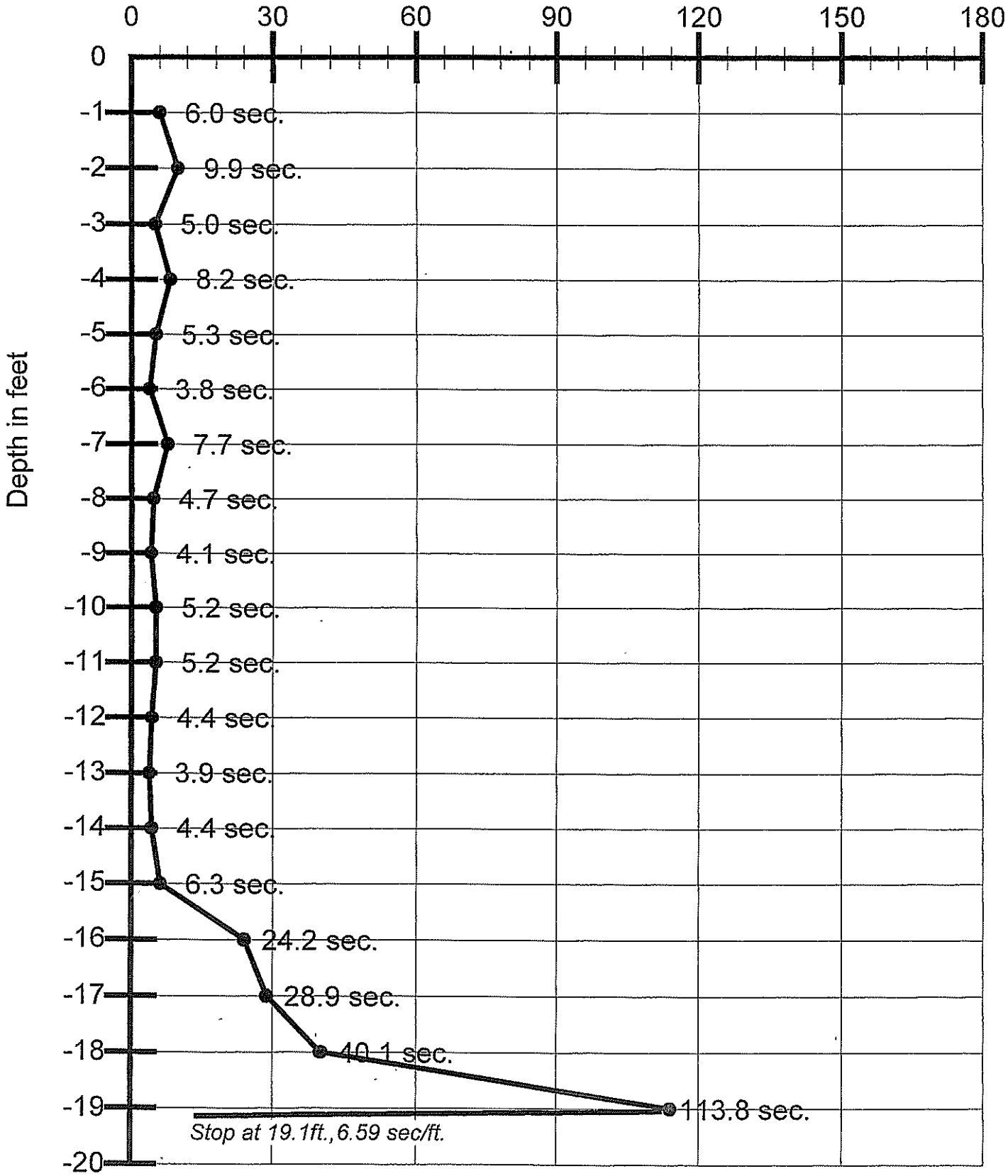


PENETRATION GRAPH

Core No: drv76 Run:1 Location: East:296732.81 ft. North93100.24 ft.

Date: 4/29/2001 Start Time:12:42:47PM Stop Time:12:48:42PM Jet to:

W.D. Raw: 46.6 ft. W.D.Corrected: 45.5 ft. Total Penetration:19.1 ft. Total Recovery:19.6 ft.

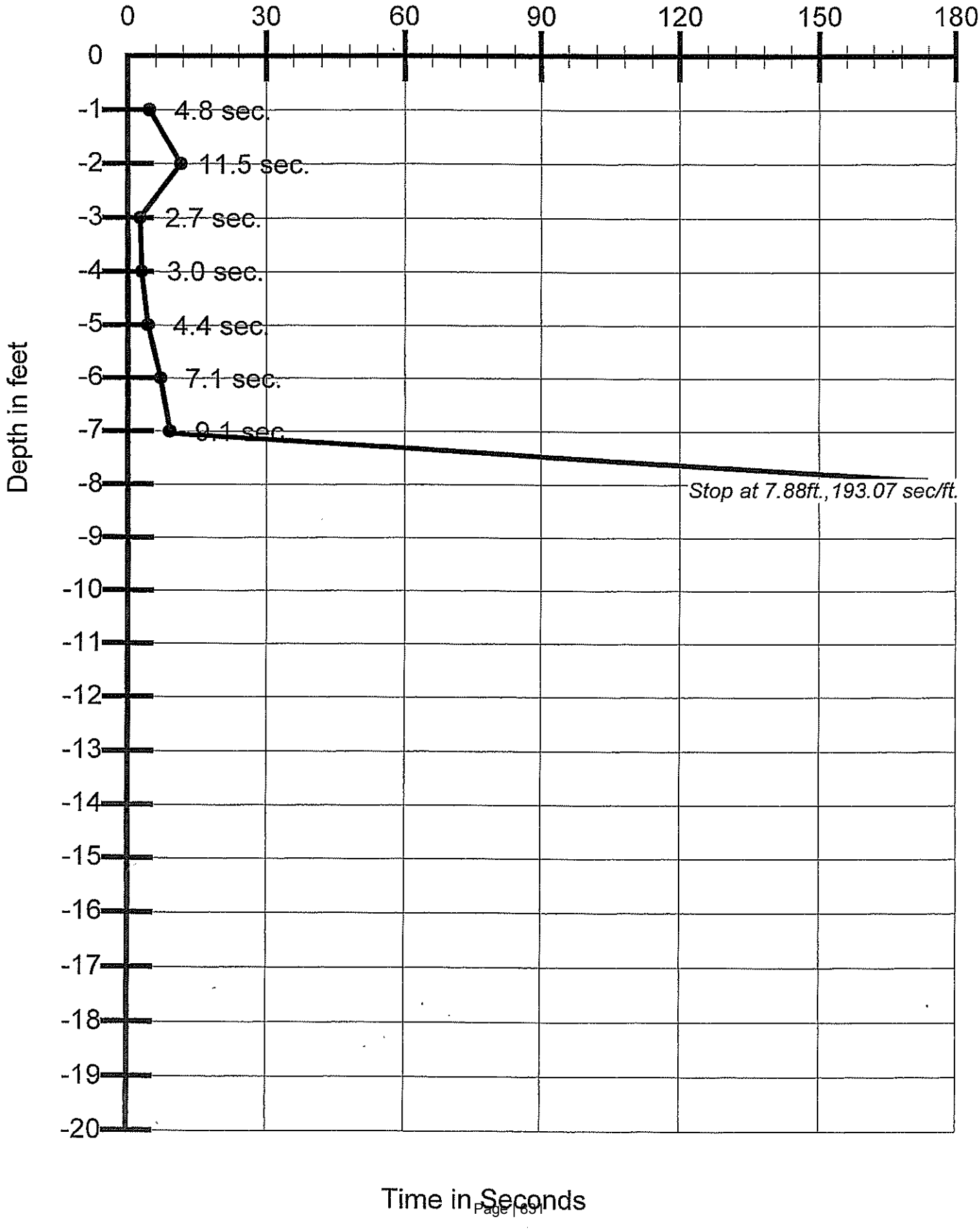


PENETRATION GRAPH

Core No: drv77 Run:1 Location: East:297984.99 ft. North90759.06 ft.

Date: 4/29/2001 Start Time:10:22:22AM Stop Time:10:27:30AM Jet to:

W.D. Raw: 45.3 ft. W.D.Corrected: 45.7 ft. Total Penetration:7.88 ft. Total Recovery:5.6 ft.

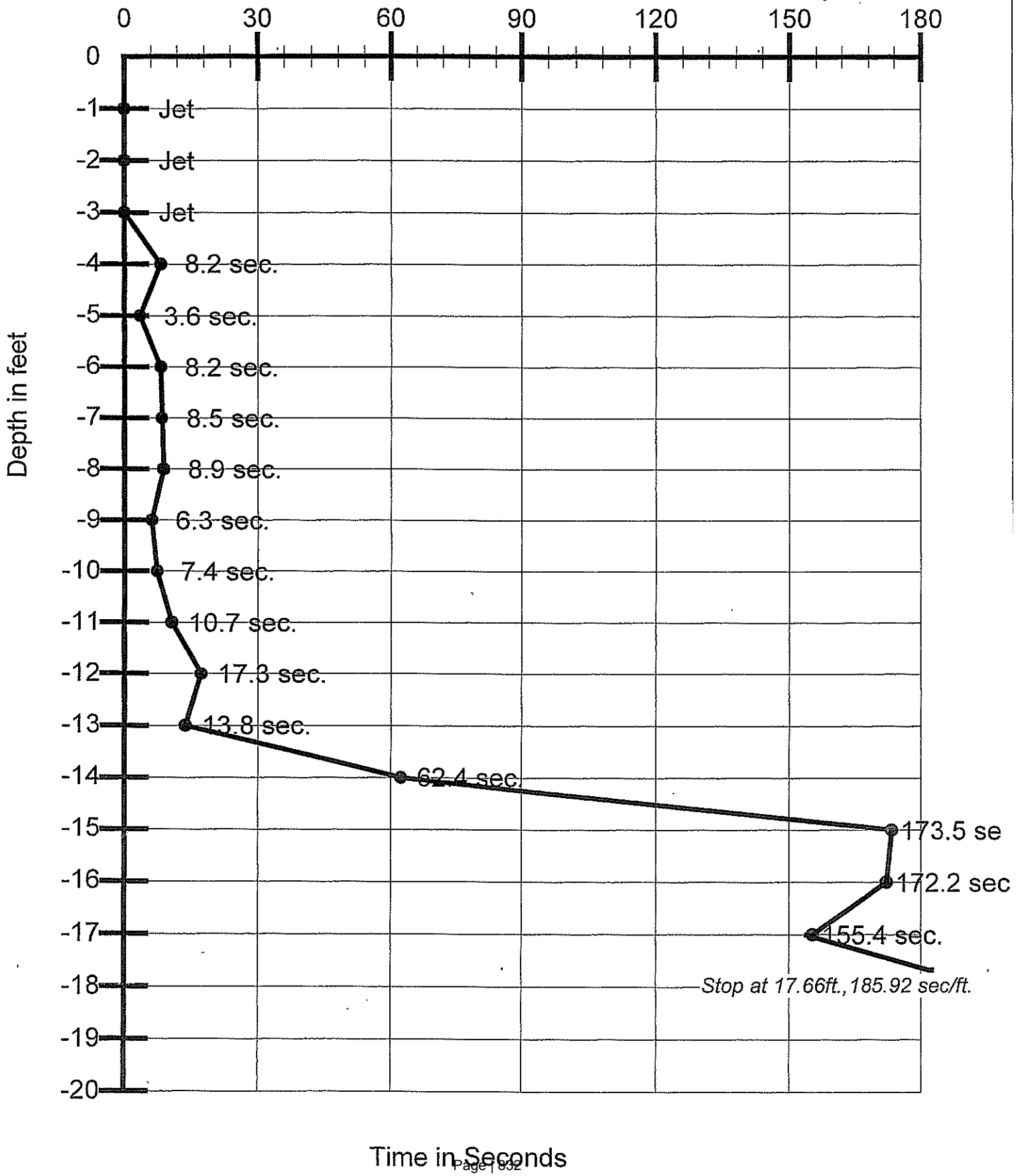


PENETRATION GRAPH

Core No: drv77 Run:2 Location: East:298025.75 ft. North90774.60 ft.

Date: 4/29/2001 Start Time:11:22:12AM Stop Time:11:37:52AM Jet to: 3.6 ft.

W.D. Raw: 45.5 ft. W.D.Corrected: 44.9 ft. Total Penetration:17.66 ft. Total Recovery:19.4 ft.

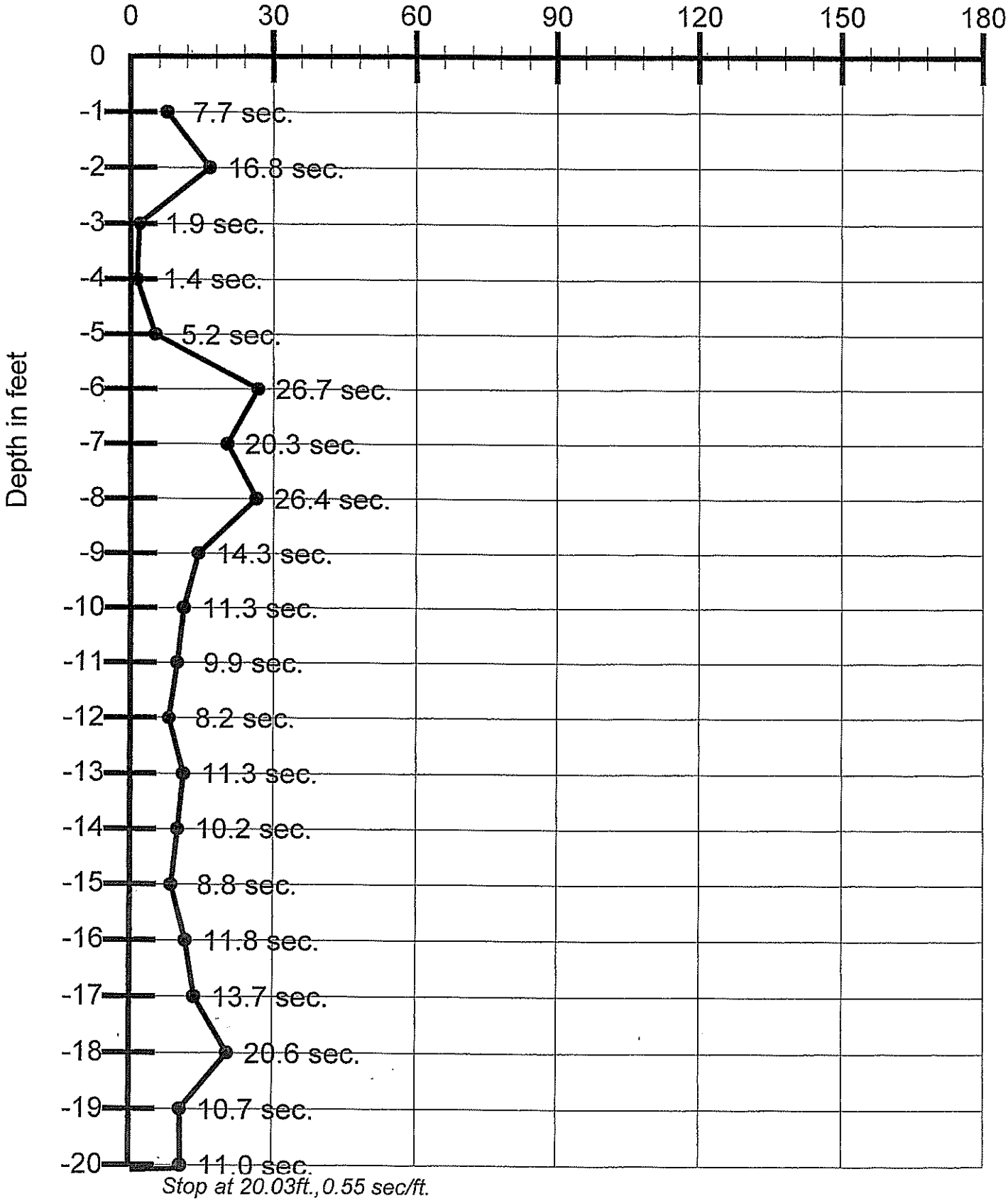


PENETRATION GRAPH

Core No: drv78 Run:1 Location: East:300727.30 ft. North84547.37 ft.

Date: 4/29/2001 Start Time:9:30:23 AM Stop Time:9:34:36 AM Jet to:

W.D. Raw: 43.2 ft. W.D.Corrected: 44.6 ft. Total Penetration:20.03 ft. Total Recovery:19.4 ft.



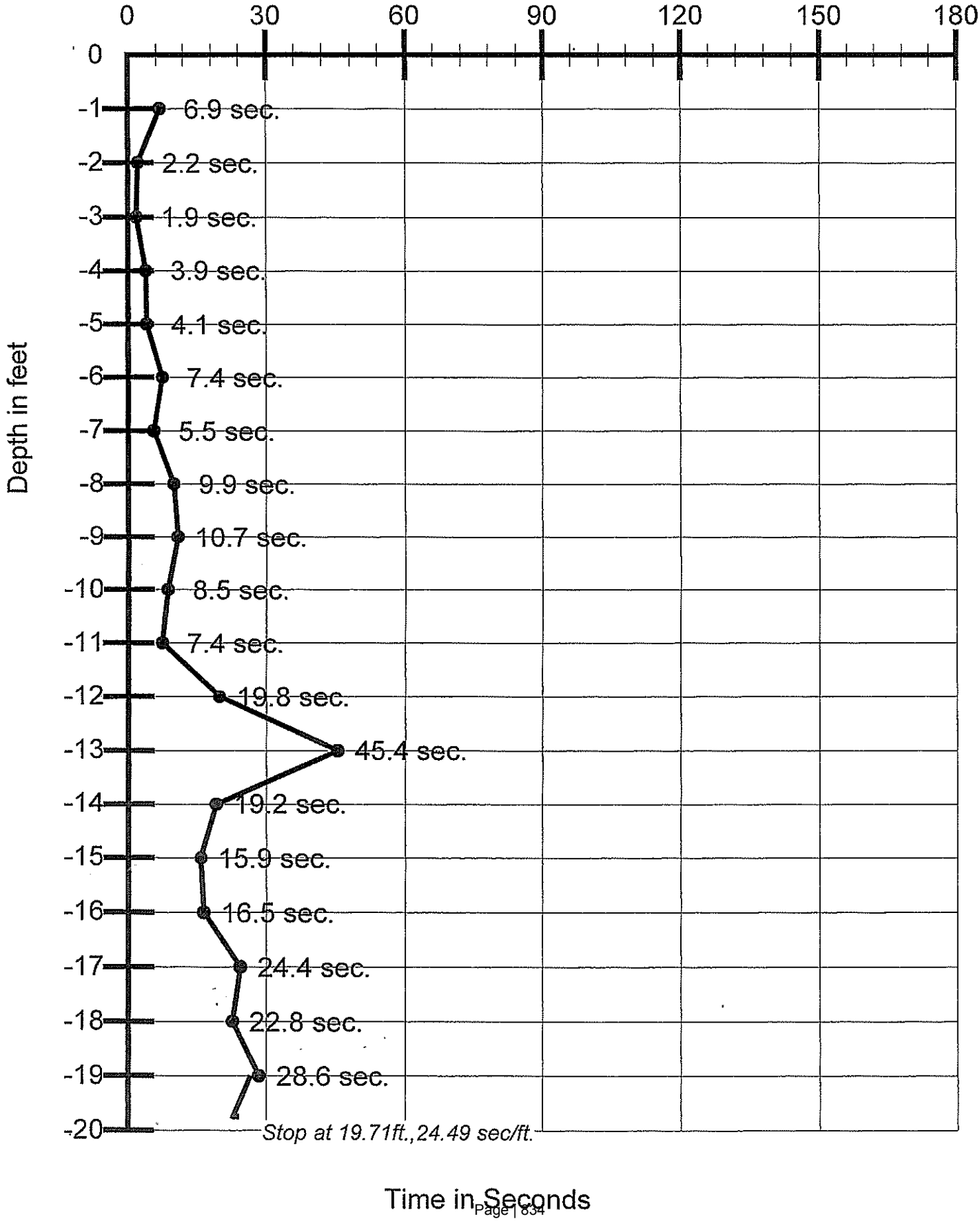
Stop at 20.03ft., 0.55 sec/ft.

PENETRATION GRAPH

Core No: drv79 Run:1 Location: East:302929.33 ft. North80027.07 ft.

Date: 4/26/2001 Start Time:2:30:14 PM Stop Time:2:35:02 PM Jet to:

W.D. Raw: 47.8 ft. W.D.Corrected: 49.7 ft. Total Penetration:19.71 ft. Total Recovery:19.3 ft.

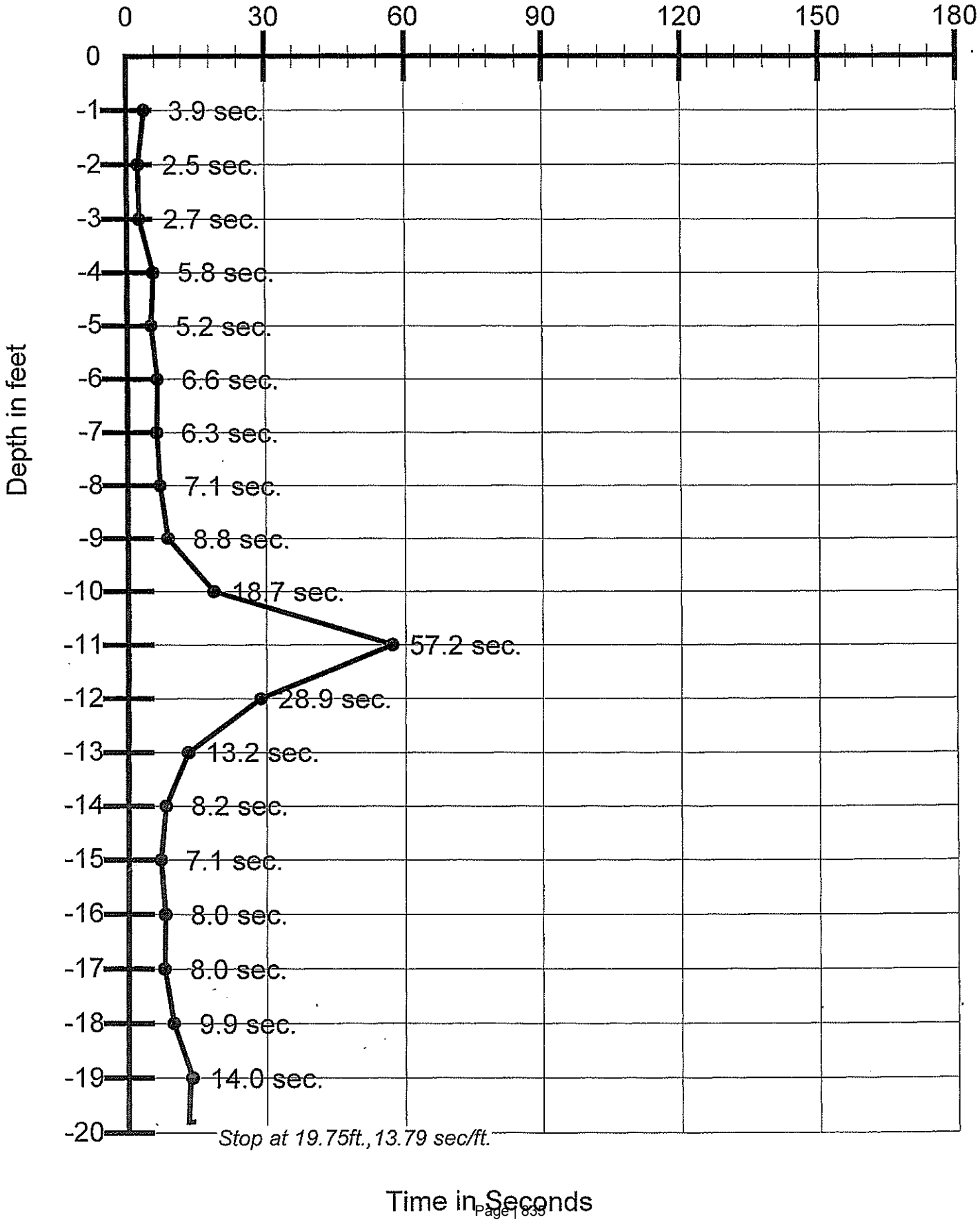


PENETRATION GRAPH

Core No: drv80 Run:1 Location: East:303843.29 ft. North76192.38 ft.

Date: 4/26/2001 Start Time:1:41:32 PM Stop Time:1:46:51 PM Jet to:

W.D. Raw: 49.4 ft. W.D.Corrected: 50.4 ft. Total Penetration:19.75 ft. Total Recovery:19.3 ft.

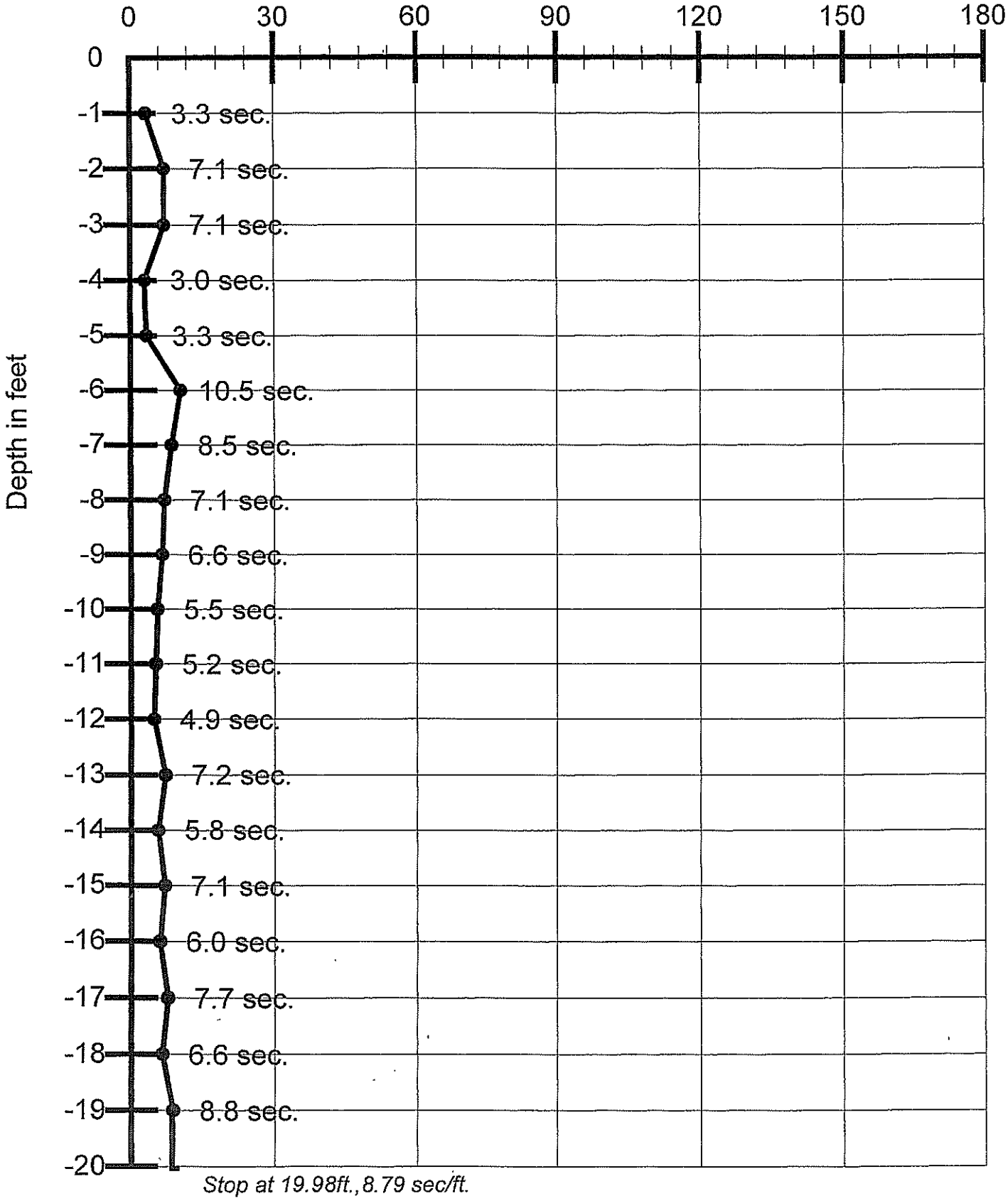


PENETRATION GRAPH

Core No: drv81 Run:1 Location: East:308486.80 ft. North64884.20 ft.

Date: 4/26/2001 Start Time:12:12:02PM Stop Time:12:14:16PM Jet to:

W.D. Raw: 49.2 ft. W.D.Corrected: 48.5 ft. Total Penetration:19.98 ft. Total Recovery:20.0 ft.

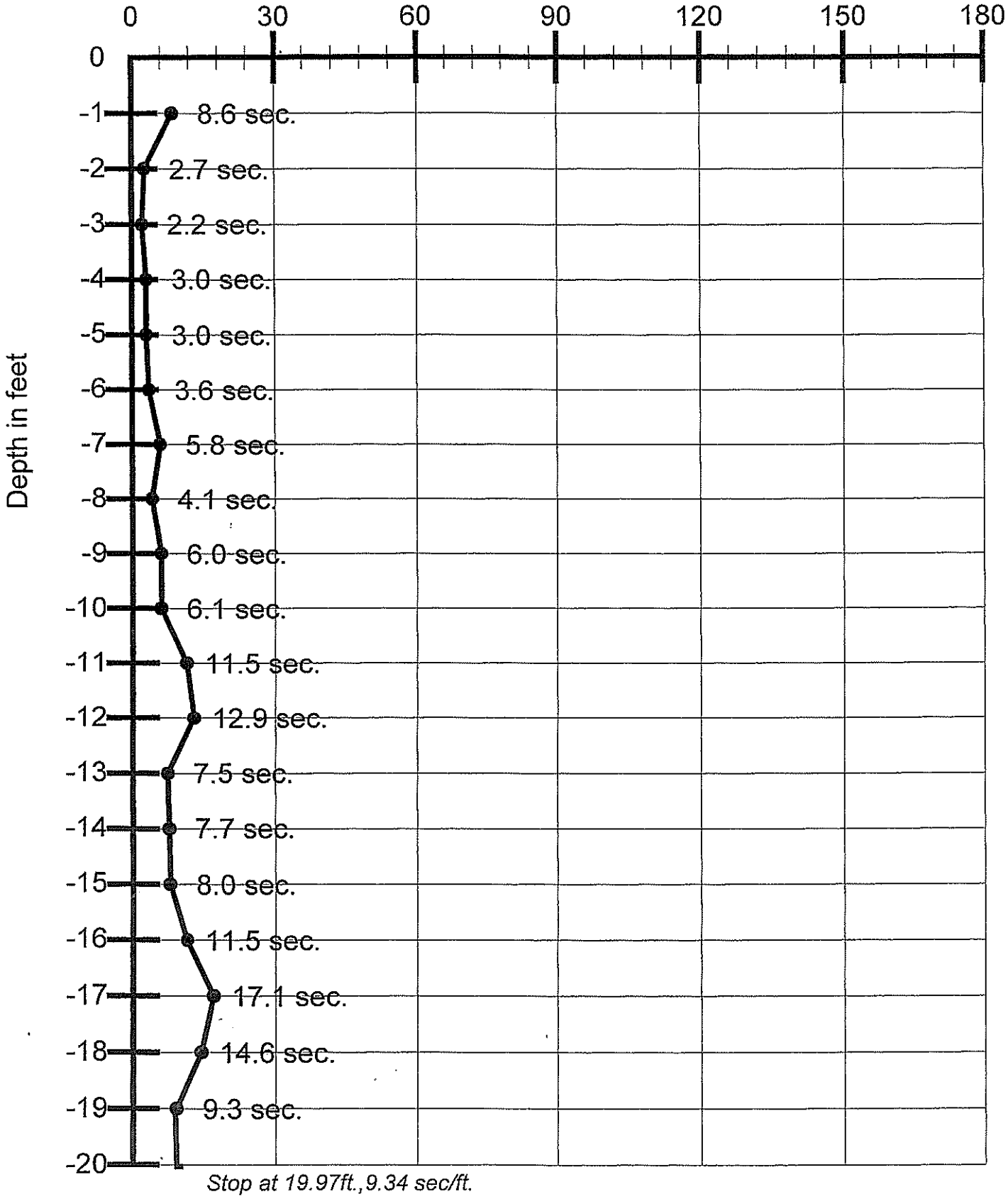


PENETRATION GRAPH

Core No: drv82 Run:1 Location: East:310253.10 ft. North61346.63 ft.

Date: 4/26/2001 Start Time:9:33:07 AM Stop Time:9:35:45 AM Jet to:

W.D. Raw: 47.8 ft. W.D.Corrected: 46.1 ft. Total Penetration:19.97 ft. Total Recovery:18.6 ft.

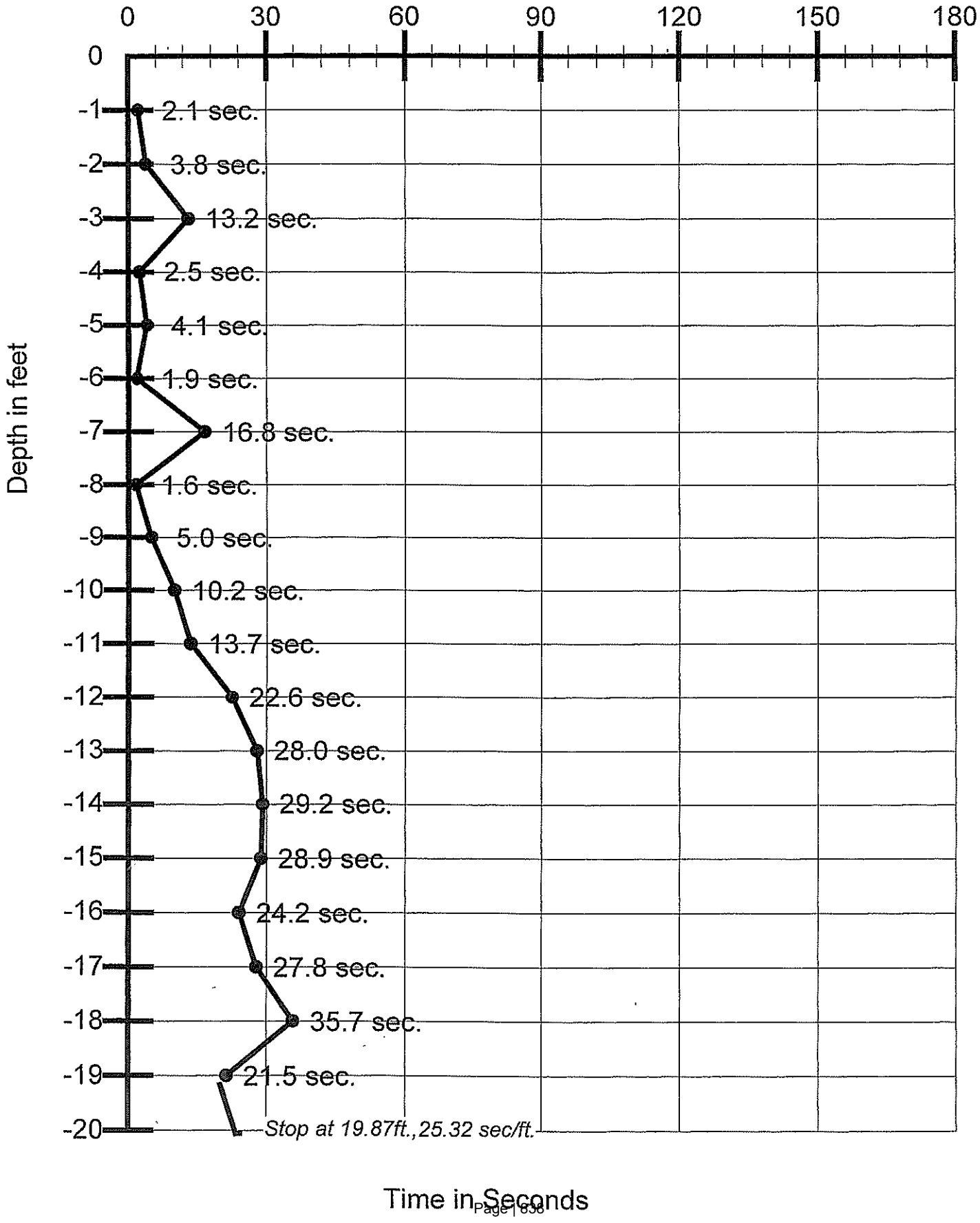


PENETRATION GRAPH

Core No: drv83 Run:1 Location: East:320563.29 ft. North35764.50 ft.

Date: 4/25/2001 Start Time:4:36:38 PM Stop Time:4:42:10 PM Jet to:

W.D. Raw: 47.2 ft. W.D.Corrected: 50.0 ft. Total Penetration:19.87 ft. Total Recovery:18.4 ft.

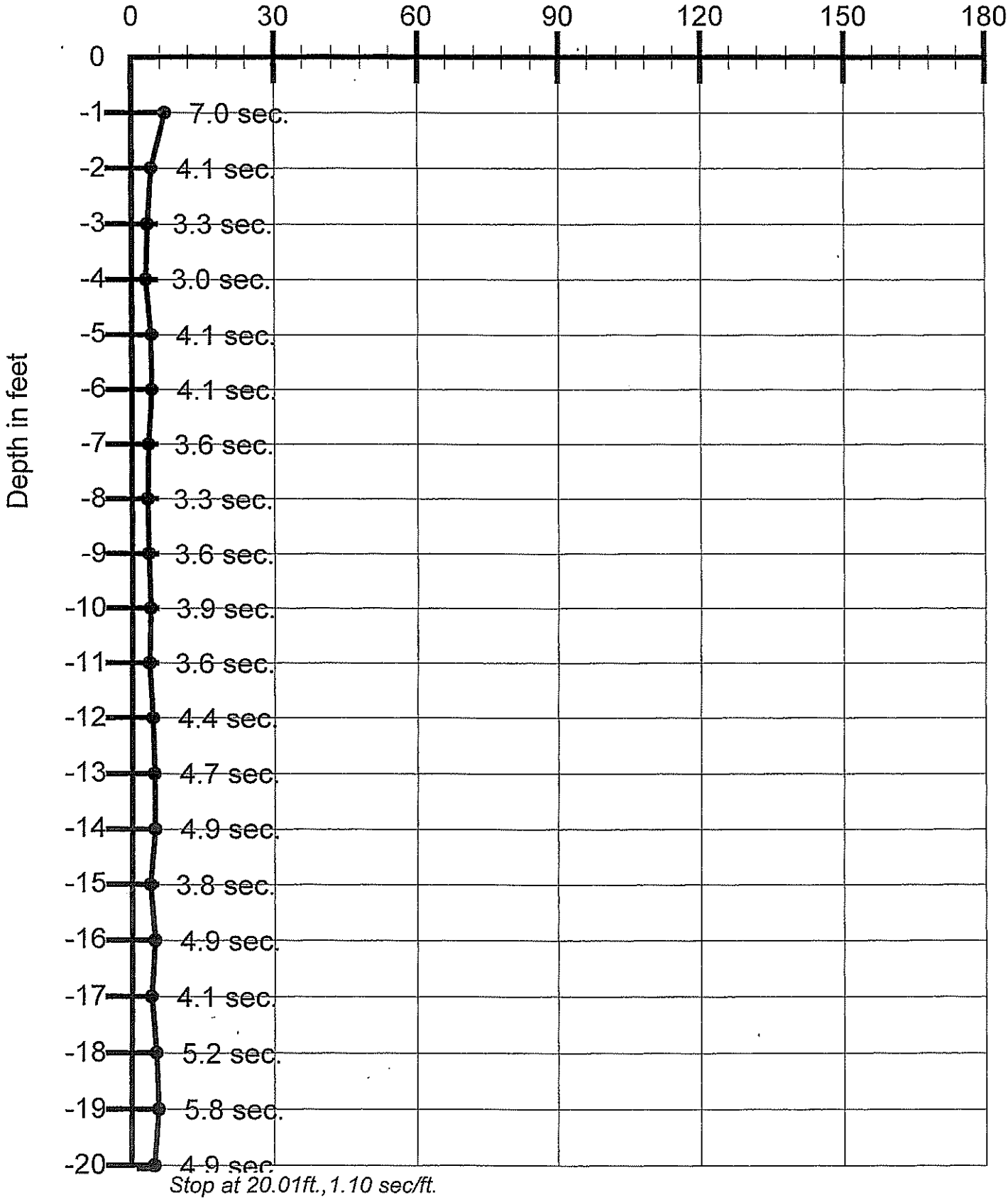


PENETRATION GRAPH

Core No: DRV84 Run:1 Location: East:321289.97 ft. North34273.33 ft.

Date: 4/25/2001 Start Time:12:46:50PM Stop Time:12:49:31PM Jet to:

W.D. Raw: 49.7 ft. W.D.Corrected: 50.7 ft. Total Penetration:20.01 ft. Total Recovery:9.8 ft.



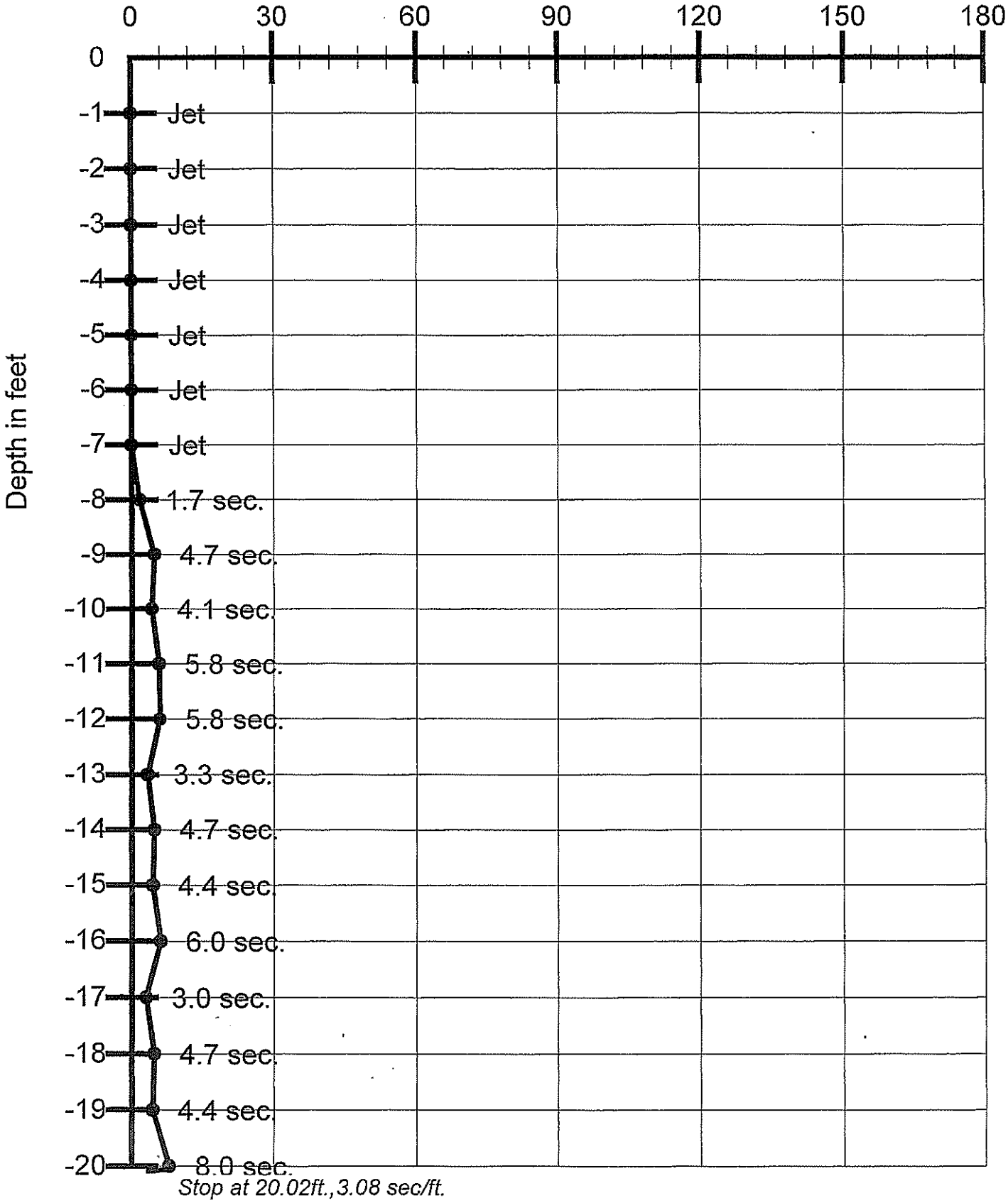
Stop at 20.01ft.,1.10 sec/ft.

PENETRATION GRAPH

Core No: drv84 Run:2 Location: East:321280.89 ft. North34269.51 ft.

Date: 4/25/2001 Start Time:3:38:02 PM Stop Time:3:42:06 PM Jet to: 7.5 ft.

W.D. Raw: 46.7 ft. W.D.Corrected: 50.2 ft. Total Penetration:20.02 ft. Total Recovery:5.1 ft.

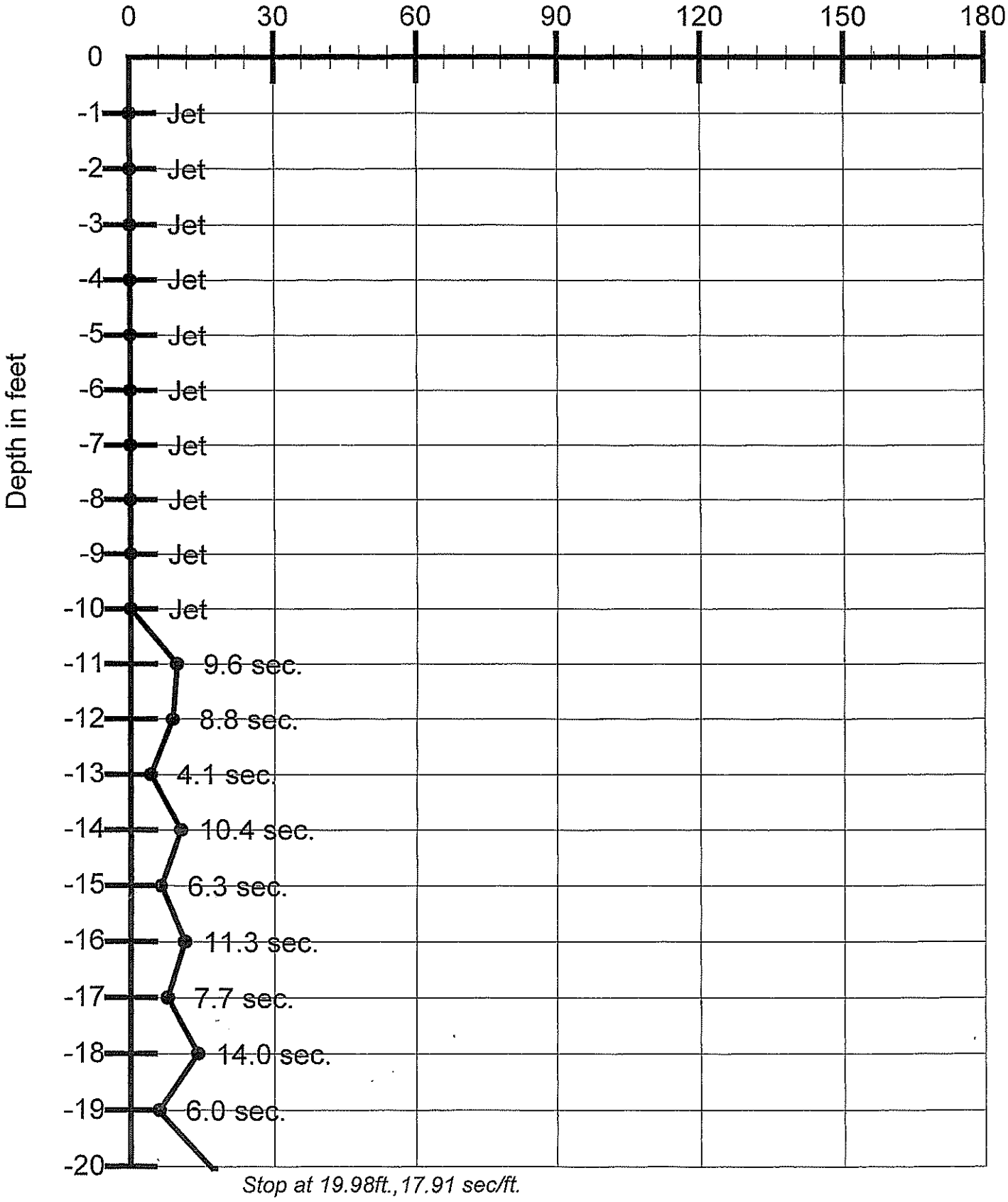


PENETRATION GRAPH

Core No: drv84 Run:3 Location: East:321264.94 ft. North34280.48 ft.

Date: 4/25/2001 Start Time:4:00:51 PM Stop Time:4:04:23 PM Jet to: 10.0 ft.

W.D. Raw: 45.8 ft. W.D.Corrected: 49.0 ft. Total Penetration:19.98 ft. Total Recovery:4.8 ft.



Penetration Graph for Core No. DRV-85, Run 1

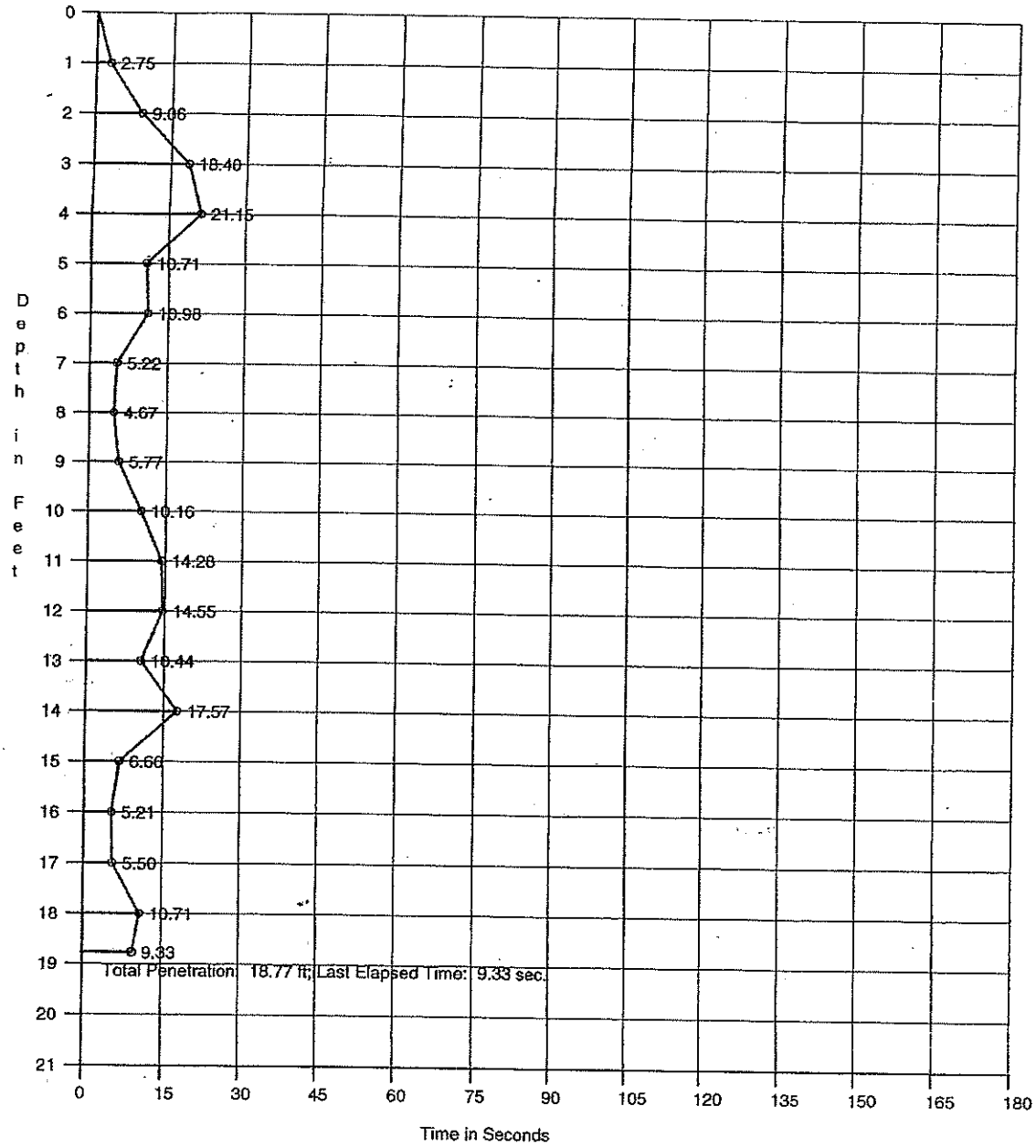
Date: 8/16/04
Start Time: 12:50:35 PM
End Time: 12:53:48 PM

Penetration: 18.77 ft
Recovery: 19.0
W. D. Corrected: 51.9
W. D. Raw: 53.7

Easting: 244497.07
Northing: 170028.99
Coord. System: NJ NAD 83

Lat: 39 17.8148'N
Long: 075 22.5028'W
Datum: WGS-84

Comment:



Penetration Graph for Core No. DRV-86, Run 1

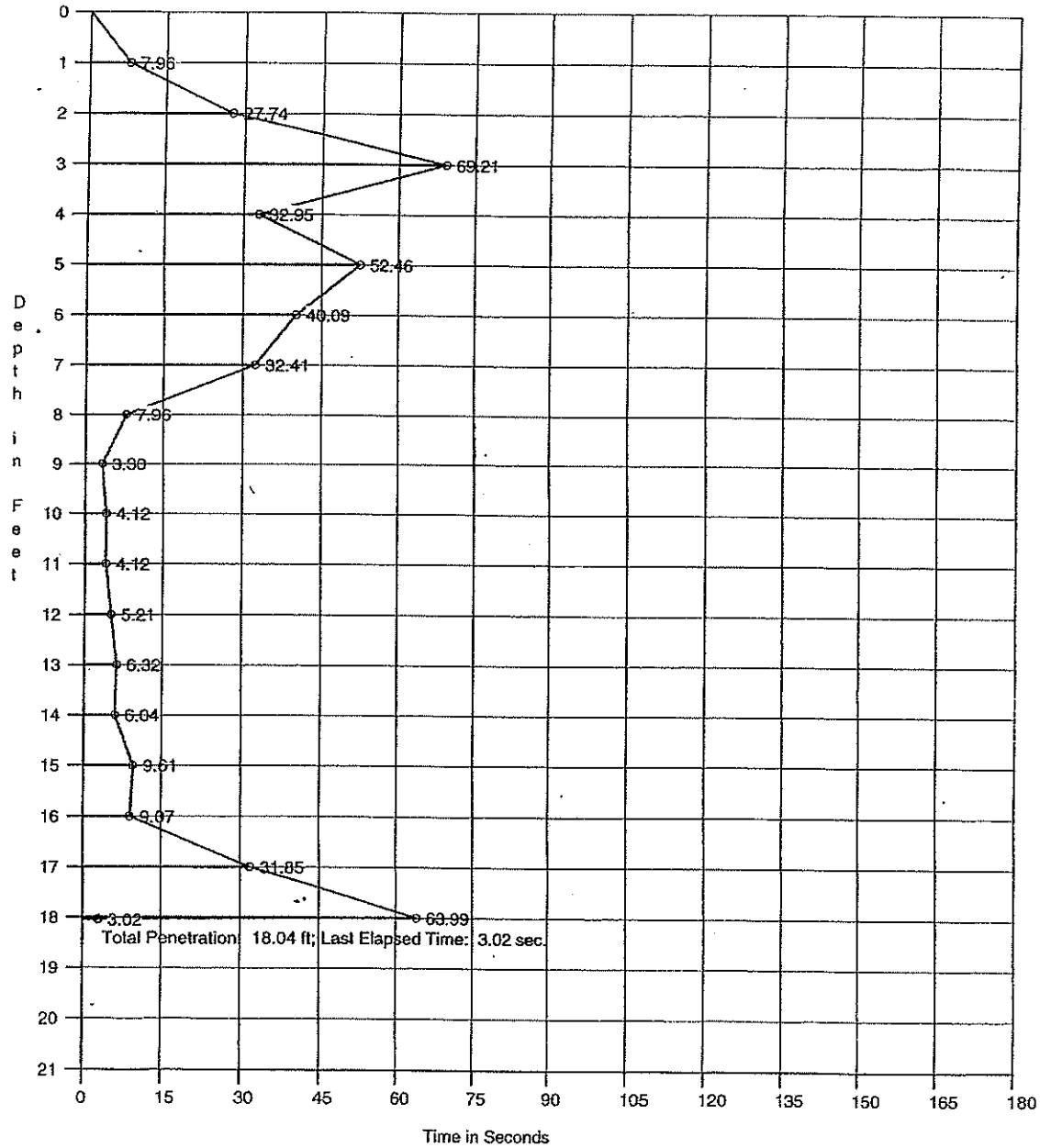
Date: 8/16/04
Start Time: 1:14:13 PM
End Time: 1:21:10 PM

Penetration: 18.04 ft
Recovery: 19.5
W. D. Corrected: 48.3
W. D. Raw: 49.6

Easting: 244653.08
Northing: 168799.79
Coord. System: NJ NAD 83

Lat: 39 17.6125'N
Long: 075 22.4671'W
Datum: WGS-84

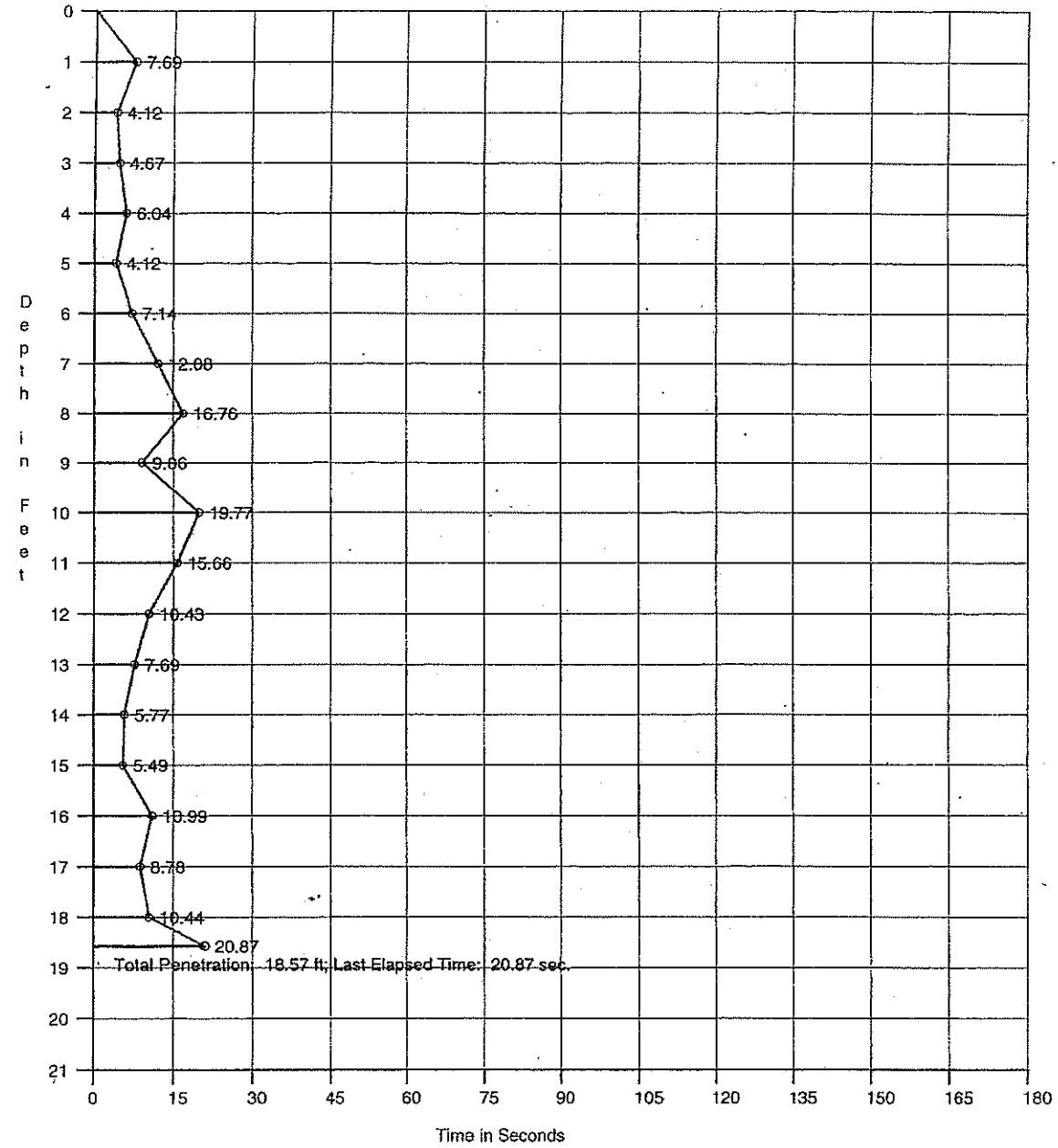
Comment:



Penetration Graph for Core No. DRV-87, Run 1

Date: 8/16/04	Penetration: 18.57 ft	Easting: 246212.69	Lat: 39 17.5107'N
Start Time: 1:42:12 PM	Recovery: 19.5	Northing: 168166.53	Long: 075 22.1352'W
End Time: 1:45:19 PM	W. D. Corrected: 48.5	Coord. System: NJ NAD 83	Datum: WGS-84
	W. D. Raw: 45.4		

Comment:



Penetration Graph for Core No. DRV-88, Run 1

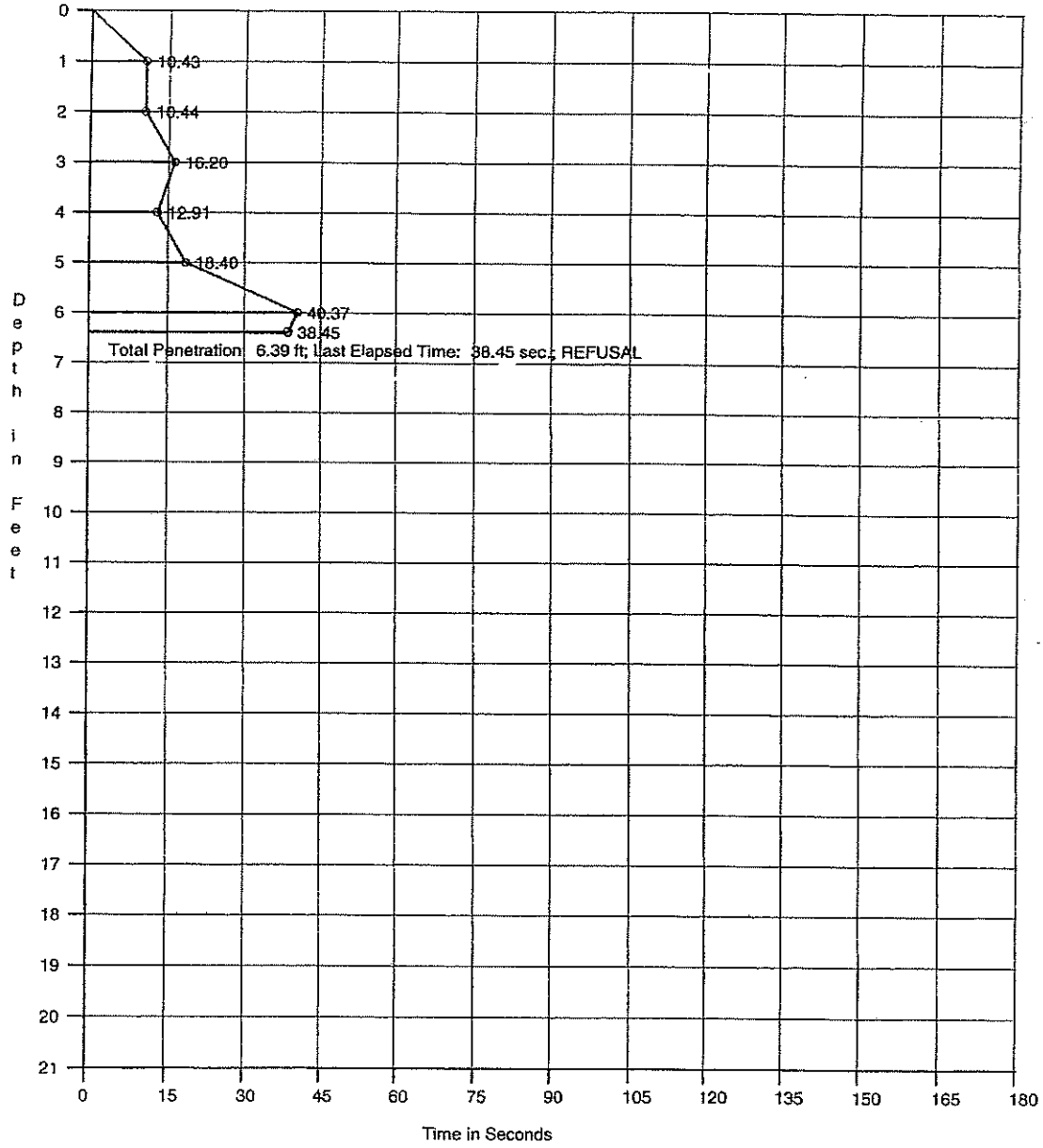
Date: 8/16/04
Start Time: 2:02:32 PM
End Time: 2:04:59 PM

Penetration: 6.39 ft
Recovery: 7.2
W. D. Corrected: 49.4
W. D. Raw: 49.8

Easting: 247030.58
Northing: 167292.77
Coord. System: NJ NAD 83

Lat: 39 17.3680'N
Long: 075 21.9600'W
Datum: WGS-84

Comment: Air Hose problem



Penetration Graph for Core No. DRV-88, Run 2

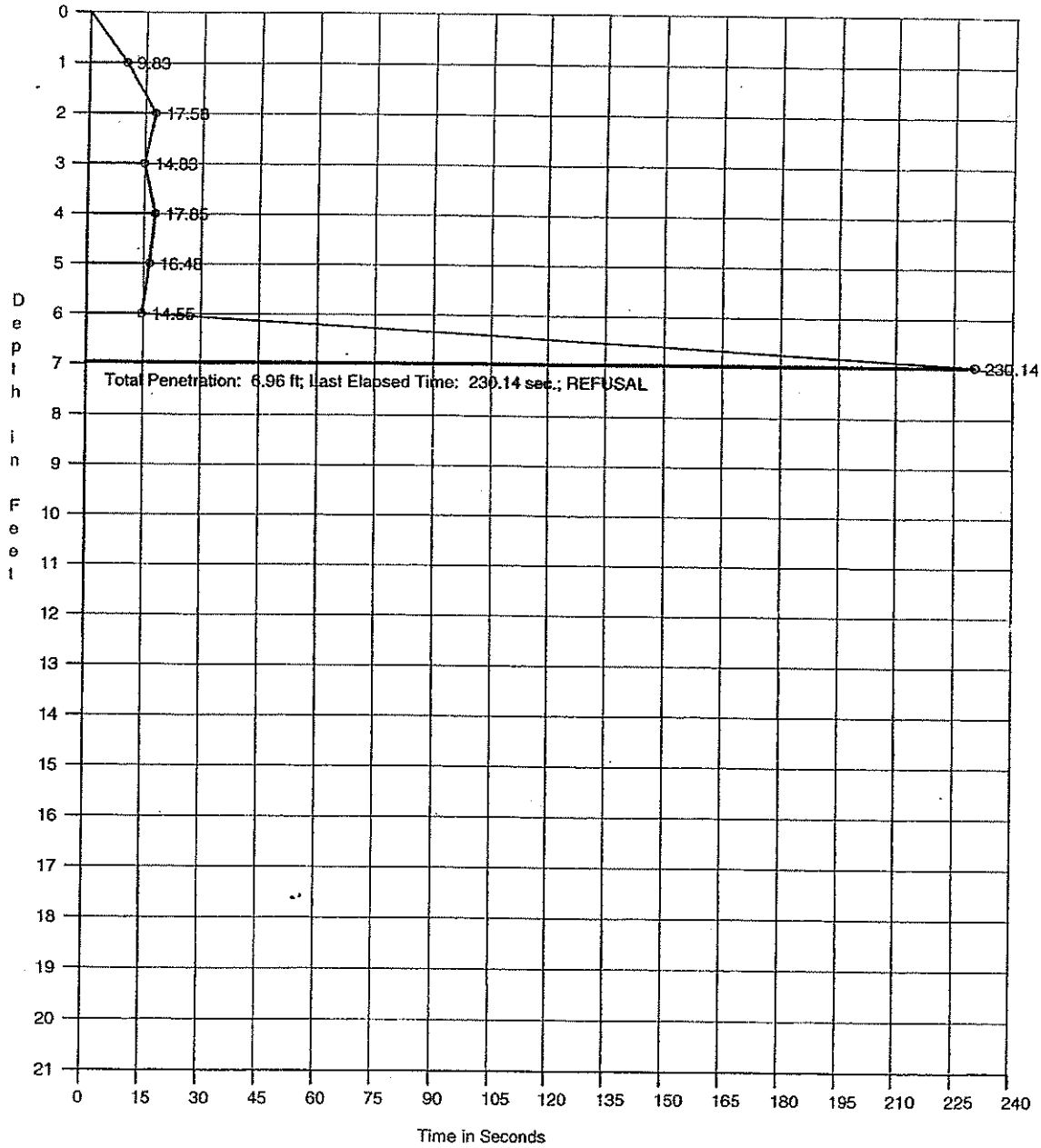
Date: 8/16/04
Start Time: 3:27:33 PM
End Time: 3:32:54 PM

Penetration: 6.96 ft
Recovery: 7.8
W. D. Corrected: 50.6
W. D. Raw: 49.4

Easting: 246988.08
Northing: 167283.32
Coord. System: NJ NAD 83

Lat: 39 17.3668'N
Long: 075 21.9691'W
Datum: WGS-84

Comment:



Penetration Graph for Core No. DRV-88, Run 3

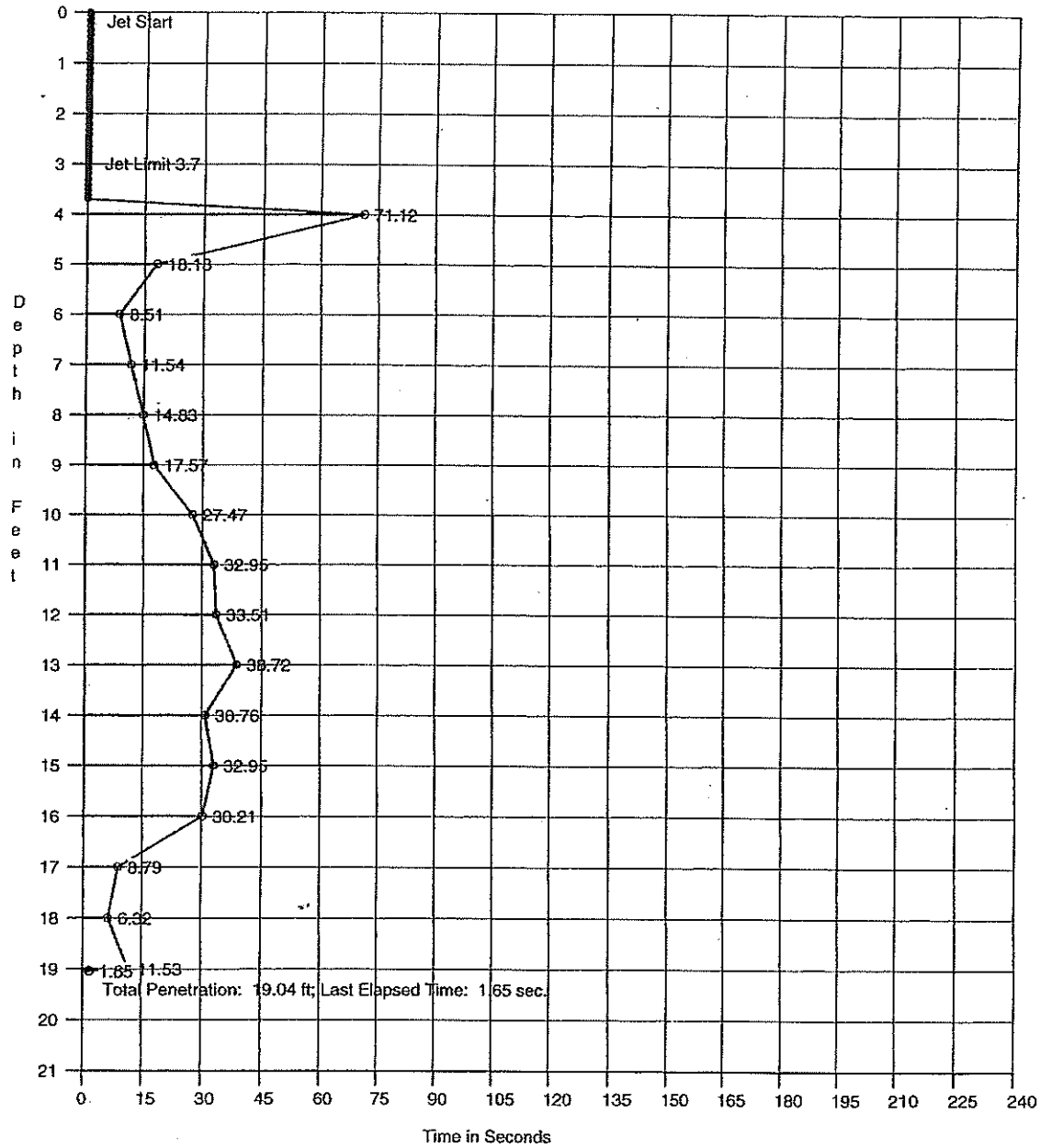
Date: 8/16/04
Start Time: 5:24:07 PM
End Time: 5:30:53 PM

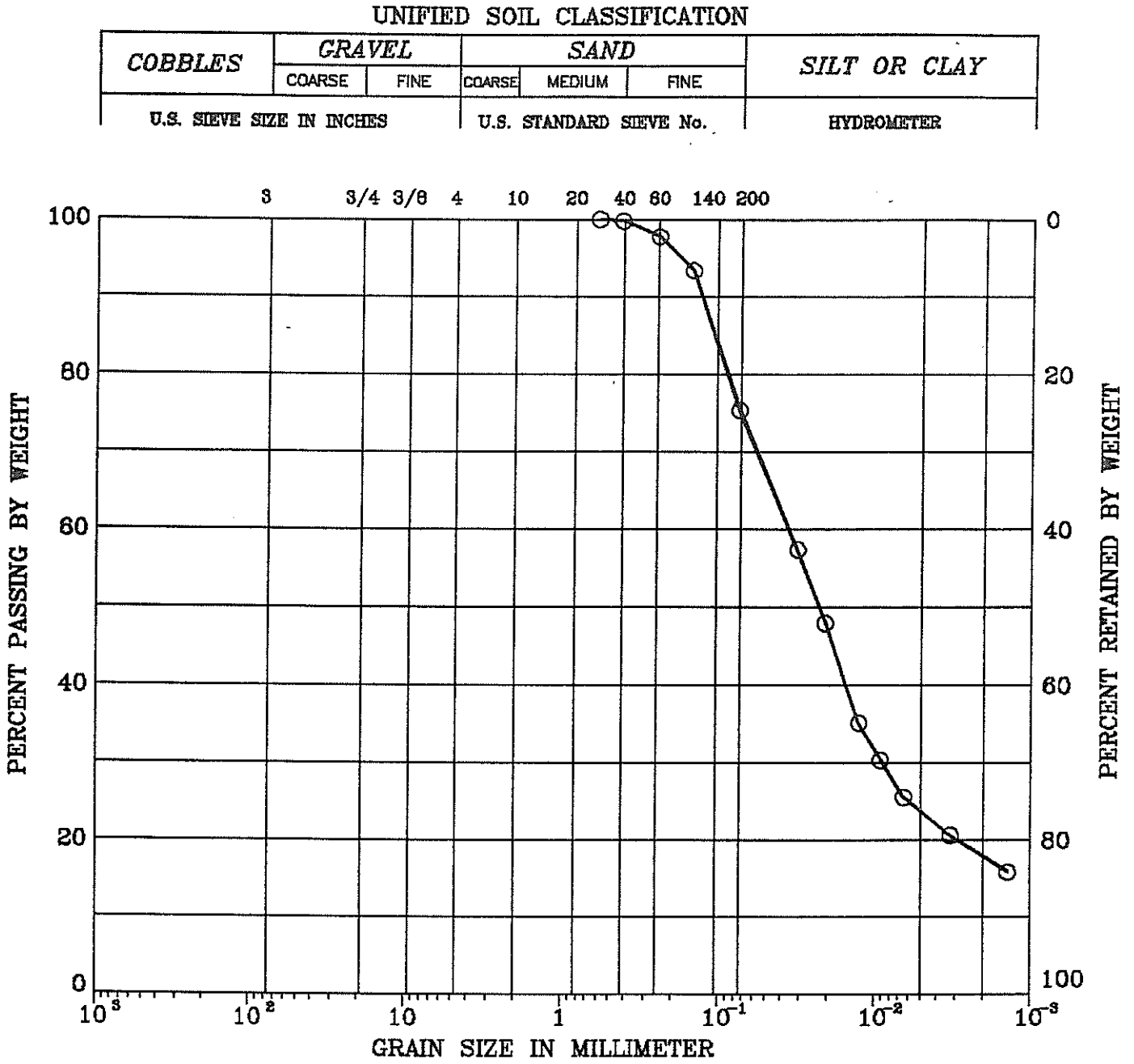
Penetration: 19.04 ft
Recovery: 19.7
W. D. Corrected: 50.6
W. D. Raw: 48.1

Easting: 246981.23
Northing: 167315.34
Coord. System: NJ NAD 83

Lat: 39 17.3717'N
Long: 075 21.9705'W
Datum: WGS-84

Comment:





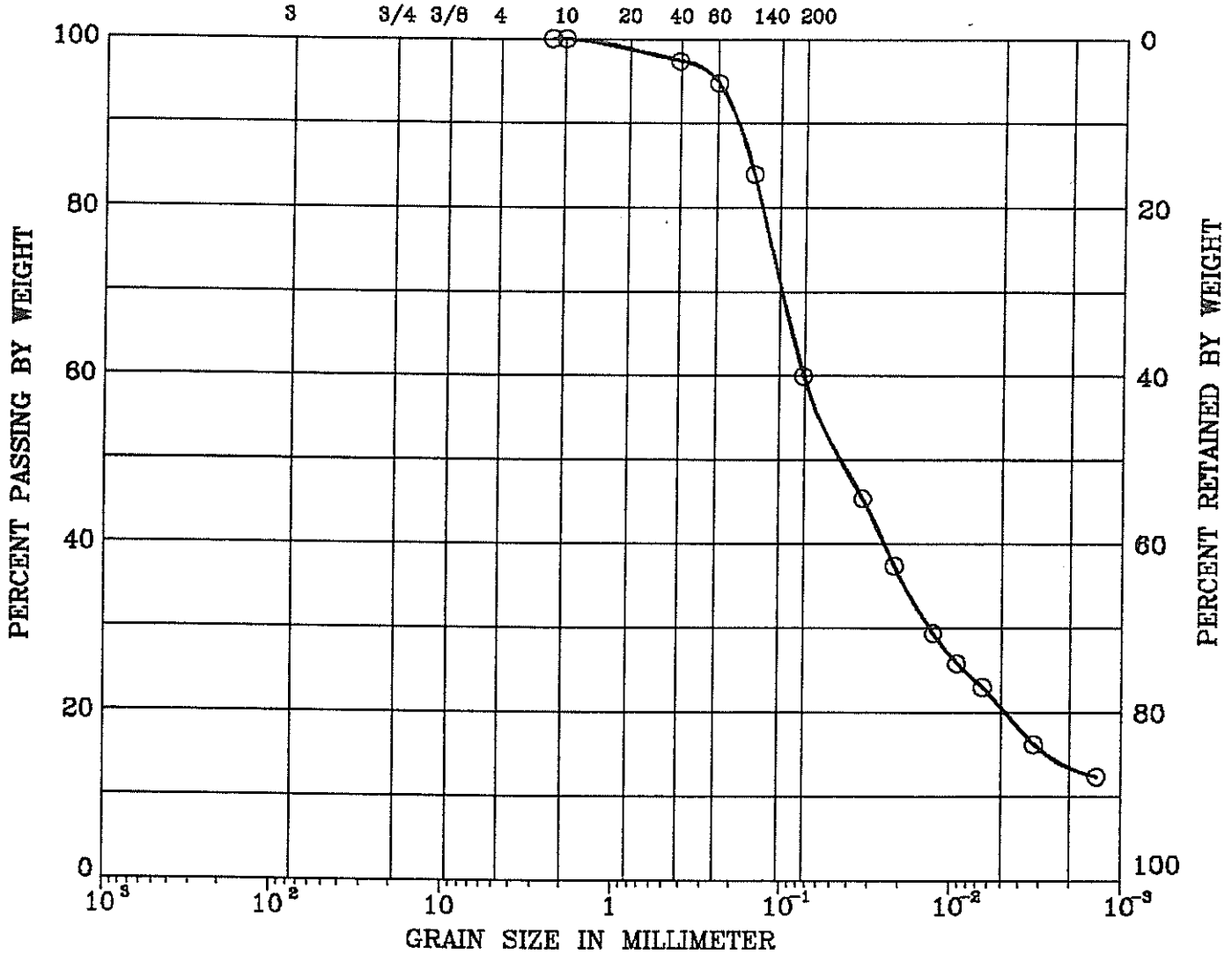
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	AF1G12.5		51	20	GRAY ORGANIC SILT (OH)

Remark :

Project No.92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/19/92

UNIFIED SOIL CLASSIFICATION

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



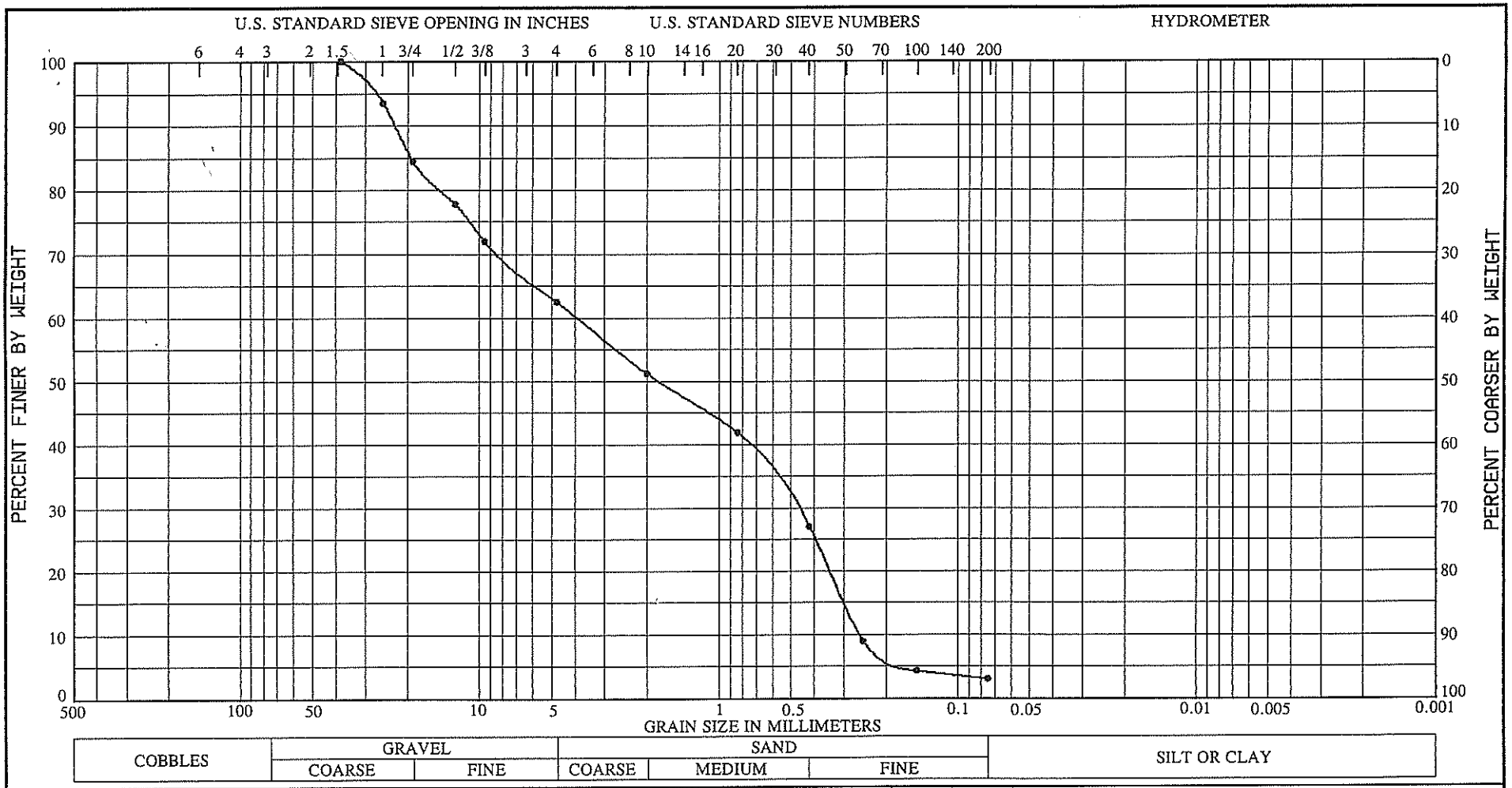
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	AF1G17.5		32	9	DARK GRAY ORGANIC CLAY (OL)

Remark :

Project No. 92161	GEOTECHNICAL ANALYSIS OF SEDIMENT SAMPLES
Valley Forge Laboratories, Inc.	GRAIN SIZE DISTRIBUTION 12/18/92

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



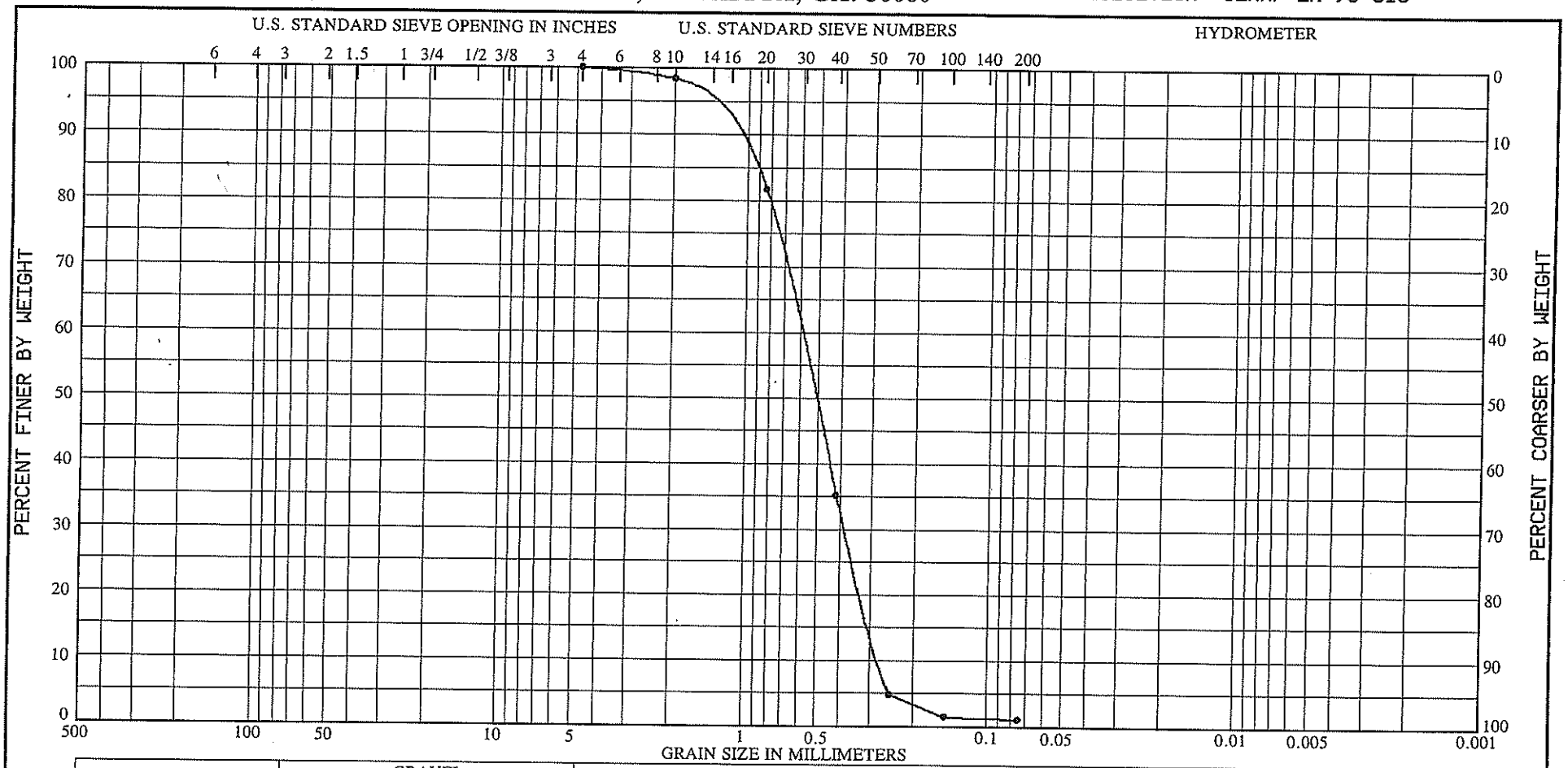
Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
3	10.7-11.3	GRAY, GRAVELLY POORLY GRADED SAND (SP),				
		WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1302
Boring No. DRV-37
Date 09/10/96

GRADATION CURVES

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30060

WORK ORDER: 8015
REQUISITION: CENAP-EN-96-813



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Sample No.	Elev (Ft)	(VISUAL) Classification	Nat w%	LL	PL	PI
4	13.6-13.9	BROWN, POORLY GRADED SAND (SP), WITH A TRACE OF MICA.				

Project DELAWARE RIVER
VIBRA-CORE SAMPLES
Lab No. 184/1302
Boring No. DRV-37
Date 09/10/96

GRADATION CURVES