

APPENDIX J: Historical Geotechnical Investigations

**CROSS SOUND CABLE PROJECT
Area 6/7 Geotechnical Investigation
New Haven Harbor, New Haven, Connecticut**



Prepared For:

110 Turnpike Road, Suite 300
Westborough, Massachusetts 01581

Prepared By:

Environmental Science Services, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

In association with:



Project No.:

T124-024.2

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October 22, 2002

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Environmental Science Services, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

In association with:

Ocean Surveys, Inc.
91 Sheffield Street
Old Saybrook, Connecticut 06475

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 INTRODUCTION	1
2.0 SURVEY AREAS AND CONTROL INFORMATION	1
2.1 Survey Areas	1
2.2 Horizontal and Vertical Control	2
3.0 SURVEY DESCRIPTION	3
3.1 Summary of Field Investigations	3
3.2 Survey Procedures and Equipment	3
3.2.1 Navigation/Vessel Positioning	3
3.2.2 Jet Probe Survey	4
3.2.3 Rock Drilling and Coring Survey	5
4.0 SURVEY RESULTS	6
4.1 Jet-probe Survey	6
4.1.1 As-laid Cable Route	7
4.1.2 Possible Alternate Cable Route	8
4.2 Rock Drilling and Coring Survey	8
4.2.1 As-laid Cable Route	10
4.2.2 Possible Alternate Cable Route	10

TABLES

Table 2.1	Survey Areas Investigated
Table 2.2	Horizontal Control Monument
Table 2.3	Tide Station Used for Vertical Reference
Table 3.1	Survey Summary
Table 4.1	Area 6/7 Jet Probe Results
Table 4.2	Geotechnical Boring Field Observations
Table 4.3	Summary of Geotechnical Laboratory Analyses

FIGURES

Figure 2-1	Area 6/7 Location
Figure 4-1	Area 6/7 Jet-Probe Locations and Refusal Contours
Figure 4-2	Area 6/7 Jet-Probe Refusal At or Above Required Cable Burial Depth
Figure 4-3	Area 6/7 Boring Locations and Top of Rock Contours
Figure 4-4	Area 6/7 Top of Rock At or Above Required Cable Burial Depth

ATTACHMENTS

Attachment A	Boring Logs
Attachment B	Geotechnical Laboratory Results
Attachment C	Photographic Log CD

1.0 INTRODUCTION

Following cable laying and burial operations for the Cross Sound Cable Project conducted in May 2002, Cross-Sound Cable Company, LLC (CSCC) discovered that there were several areas in New Haven Harbor where the cable system did not achieve a burial elevation of –48 FT (FT) Mean Lower Low Water (MLLW) using the applied burial tool. At CSCC's request, Environmental Science Services, Inc. (ESS) and Ocean Surveys, Inc. (OSI) developed and conducted a Post-Installation Obstruction Survey (July 19, 2002 ESS/OSI report) to better characterize these areas such that remedial burial measures could be identified and proposed to the US Army Corps of Engineers and the Connecticut Department of Environmental Protection. This survey found an area (designated Area 6/7) where the cable system burial was impeded by rock. CSCC requested that ESS and OSI develop and conduct a Geotechnical Investigation in Area 6/7.

The investigation was planned and executed in two overlapping phases, consisting of:

- Jet Probe survey to determine sediment stratigraphy and map extent and elevation of bedrock; and
- Rock Drilling and Coring survey to identify the character and quality of bedrock in order to determine the most appropriate method of removing it and placing the cable at its proper depth.

No attempts were made during the program to remove obstructions encountered or to achieve greater burial of the cable system.

2.0 SURVEY AREAS AND CONTROL INFORMATION

2.1 Survey Areas

Using survey data provided by the cable installation contractor, the Geotechnical Investigation focused on two areas (Area 6/7) where the cable system did not reach the burial depth of –48 FT MLLW due to the presence of a hard surface. Within the area investigated, surveys were conducted across the entire width of the navigation channel. The area investigated is illustrated in Figure 2-1, and summarized in Table 2.1.

Table 2.1: Survey Areas Investigated

Survey Area	Location in Federal Channel (Approximate Center of Area)	Location Relative to Proposed Cable System Turning Points
Area 6/7	1,200 FT ($\pm$) north of Buoy 8	Between TP 12 and TP 14

2.2 Horizontal and Vertical Control

Horizontal positioning of the survey vessels during all phases of this investigation was accomplished by utilizing a survey grade kinematic differential Global Positioning System (DGPS). Differential corrections were received from a shore based station established by OSI and referenced to a United States Army Corps of Engineers (USACE) control monument referred to as point "Power" located on the southwest corner of the WisVest (formerly United Illuminating) pier. The survey was conducted in the Long Island Lambert coordinate system, New York State Plane (Zone 3104), referenced to NAD 83, with all coordinates in FT.

A check of the navigation system was performed daily on point "Power" throughout the course of the geotechnical investigations. A listing of the coordinates and recovery description for point "Power" is provided in Table 2.2.

Table 2.2: Horizontal Control Monument

Control Point	Position*	Description
"Power"	N 408702.6 E 1284420.4	Point marked by a brass USACE disk flush with the concrete deck of a pier belonging to WisVest (formerly United Illuminating Company) on east side of New Haven Harbor, north of the Coast Guard Station and south of the New Haven Terminal dock. Point is located 8.2 FT from the west face and 3.7 FT from the south face of the pier and is overlain by metal grating.

* Coordinates referenced to NY State Plane, Long Island Lambert, Zone 3104, NAD83 in FT

Project vertical reference was MLLW, the NOAA chart datum for the area, and was based on a NOAA tidal station located on the WisVest pier. The OSI survey team obtained real time tidal corrections during the course of all phases of the investigation by utilizing the onboard kinematic DGPS receiver. Prior to the survey investigation and twice a day during the course of the survey, the accuracy of the real-time tidal corrections generated were proven by comparing corrections generated via the kinematic DGPS with water levels observed at a tide board established at the NOAA tidal station. At the conclusion of the survey investigation,

differential tidal data corrections were also verified by reviewing NOAA tidal data released via the Internet on the NOAA website. Table 2.3 provides information on the reference NOAA tidal station.

Table 2.3: Tide Station Used for Vertical Reference

Tide Station	Station No.	Latitude/Longitude	Average Tidal Range
New Haven Harbor, New Haven, CT	8465705 (NOAA data)	41°14'N 72°55'W	6.2 FT

3.0 SURVEY DESCRIPTION

3.1 Summary of Field Investigations

Field operations commenced on August 16, 2002, with the jet-probe survey work, and concluded on October 4, 2002 - the final day of rock drilling and coring operations. Seasonable weather conditions with generally low to moderate sea states were encountered during this period. Occasional storms with higher states delayed work at times. Commercial vessel traffic resulted in delays on several occasions during both jet probe and rock drilling and coring surveys. The survey activities performed are summarized below:

Table 3.1 : Survey Summary

Task	Dates	Vessels
Jet-probe Survey	August 16-September 4	<i>R/V Candu</i>
Rock Drilling and Coring Survey	August 29-October 4	<i>M/V Sandy G and 30' x 90' deck barge</i>

3.2 Survey Procedures and Equipment

3.2.1 Navigation/Vessel Positioning

The navigation and vessel positioning equipment described below was used during all phases of the field program.

Trimble Model MS750 GPS Receiver

All over water tasks included the use of a Trimble MS750 dual frequency RTK DGPS precision positioning and navigation system. This system is Trimble's newest generation real-time kinematic GPS capable of providing centimeter level positioning accuracy. The system consists of two Model MS750 GPS receivers, GPS volute antennas and cables, RS232 output data cables, and Pacific Crest radio links to transfer differential corrections.

The Trimble MS750 provides 9-channel simultaneous satellite tracking with real time display of geodetic position, time, date, and boat track if desired. One MS750i unit is mounted on the survey vessel and continuously receives differential satellite correction factors via radio link from the other MS750 receiver setup as a reference station on a known horizontal control point onshore. The Trimble MS750 accepts the correction factors via radio link and applies the differential corrections to obtain continuous, high accuracy, real time position updates. Centimeter level positioning is computed five times per second ensuring the response and accuracy necessary for precise dynamic applications on moving equipment. The Trimble system is interfaced to the OSI navigation system running HYPACK[®] software for trackline control.

Coastal Oceanographic's HYPACK[®] Navigation Software

Survey vessel horizontal control and position fixing were obtained by utilizing an OSI computer-based data-logging package running Coastal Oceanographic's HYPACK[®] navigation software. The Pentium computer is interfaced with the Trimble MS750 DGPS system onboard the survey vessel. Vessel position data from the Trimble MS750 were updated at 0.2-second intervals and input to the HYPACK[®] navigation system, which processes the geodetic positions into State Plane coordinates. This information was used to guide the survey vessel accurately to pre-selected target locations. The incoming data are logged on disk and processed in real time, allowing the vessel position to be displayed on a video monitor and compared to each pre-plotted target as the survey progresses. Digitized shoreline and the locations of existing structures, buoys, and control points can also be displayed on the monitor in relation to the vessel position. The OSI computer logging system combined with the HYPACK[®] software thus provides an accurate visual representation of survey vessel location in real time, combined with highly efficient data logging capability and post-survey data processing and plotting routines.

3.2.2 Jet Probe Survey

The jet probe survey was designed to map the elevation and extent of the obstruction and characterize sediment overburden in Area 6/7. The jet probe system is comprised of a water pump that provides water forced at 100-150 psi to the tip of a 0.75-1 inch diameter pipe, allowing penetration of the pipe by gravity and manual force and identification of subsurface material types by the operator. Jet probe locations were chosen on either side of the existing cable position, across the width of the federal channel and along possible alternate cable alignments in Area 6/7 to determine sediment stratigraphy and depth of

refusal. Each probe was advanced to a depth of –50 FT MLLW, or until refusal was encountered. A total of 128 jet probes were advanced in Area 6/7. An ESS representative was onboard at all times to oversee and document operations.

3.2.3 Rock Drilling and Coring Survey

The Rock Drilling and Coring survey was conducted to study the depth, extent, lithology, and quality of the bedrock in Area 6/7. Borings were advanced along the existing cable route and along a possible alternate cable route to the west, to a target elevation of –55 FT MLLW. A target depth below the required cable burial depth of –48 FT MLLW was selected to determine how the rock may respond to a variety of potential removal methods. Drilling operations were conducted by Warren George, Inc. (WGI) of Jersey City, New Jersey utilizing a 30 FT x 90 FT spud barge carrying a truck mounted drill rig and pushed by the *M/V Sandy G*, a 60 FT tugboat. An ESS representative was onboard to oversee and document operations. An OSI representative was onboard to provide navigation and horizontal/vertical control. A total of 16 borings were advanced.

The drilling program was very systematic, and followed the same general procedures at each location. The procedures used during the drilling program are summarized below.

- 1) Each morning, navigation positioning was verified at the horizontal control point “Power” on the Wizvest pier. The measured position was recorded.
- 2) The vertical positioning was then verified by taking a water level measurement via DGPS antennae, and comparing it with a tide board established at the NOAA tidal station located on the Wizvest pier.
- 3) Once verification of horizontal and vertical positioning was accomplished, the drilling vessel traveled to the selected boring location.
- 4) The drilling vessel was then guided to each boring location using kinematic DGPS, and was anchored by lowering the barge’s two spuds into the bottom (one on the starboard bow and one on the port stern). All spuds were lowered within the limits of the Federal Channel. Once the vessel was securely anchored into the bottom, an exact kinematic DGPS position and the orientation of the vessel were recorded.
- 5) Once on location, the drillers then lowered sections of 6-inch diameter casing through a moonhole in the barge until the casing encountered a layer of resistance and would not descend further on its own weight. The 6-inch casing was used as a guide for the drilling operations. Flush-joint 4-inch diameter casing was then lowered through the 6-inch casing until a resistant layer was encountered. The ESS representative then measured the height of casing above the barge deck and relayed that number and the length of casing used to the OSI representative. The OSI representative took the total

- length of the 4-inch casing used and from that subtracted: a) the length of casing above the deck; b) the elevation from the top of the deck to the waterline; and c) the tidal elevation above 0 MLLW using the kinematic DGPS suite. The elevation of the bottom of the 4-inch casing was then recorded in reference to MLLW.
- 6) The first split spoon was then advanced to through the 4-inch casing. Elevations of the top and bottom of the spoon were calculated as described above. In accordance with ASTM guidelines, standard penetration tests (SPTs) were conducted for each spoon sample taken. Each spoon was advanced two FT using a 140# hammer or until refusal was encountered. The ESS representative recorded the total blow counts per 6-inches required to advance each spoon. If the total blow counts per 6-inches exceeded 100, a 300# hammer was then used to advance the spoon. If the spoon would not advance using a 300# hammer, it was said to have encountered "refusal." The spoon was then retrieved, split open, photographed, logged and sampled. Sediment character was described using visual observations in reference to its moisture, density, color, grain size, and its major and minor constituents.
 - 7) Following collection of the initial split spoon at each location. The 4-inch casing was driven five (5) FT below the 6-inch casing (or until it encountered refusal). The elevation of the bottom of the 4-inch casing was calculated and a split spoon was advanced two (2) FT below the bottom of the 4-inch casing. Split spoons were then taken every five (5) FT until an elevation of -55 FT MLLW was reached or bedrock was encountered.
 - 8) If bedrock was encountered, drillers followed standard rotary rock coring procedures to a target depth of -55 FT MLLW, or five (5) FT of penetration (whichever was greater). The ESS representative recorded the time required to core each foot. Elevations for the top and bottom of each core run were calculated as described above. The core was then retrieved and stored in a standard core box where it was logged and photographed. The rock was described in reference to its color, rock type, hardness, weathering, degree of fracturing, type of fractures and major mineral types. Preliminary Rock Quality Designations (RQDs) were also calculated and assigned to each core run.
 - 9) At the conclusion of the day, the horizontal and vertical accuracy of the DGPS system was again verified as at the start of the day.

4.0 SURVEY RESULTS

4.1 Jet-probe Survey

Data acquired during the jet probe survey was used to better define the depth and extent of the obstruction in Area 6/7, and the character of sediment above it. Since jet-probes do not recover samples, the data was used to generally describe the nature of the obstruction. This information was used to develop the geotechnical boring program described in Section 4.2.

The typical stratigraphy of sediment above probable bedrock consisted of three layers: 1) an upper layer of soft aqueous sediment; 2) a middle layer of dense fine to medium sand; and 3) a layer of coarse sand and gravel with some cobbles directly above probable bedrock (Table 4.1). Where refusal on probable bedrock was encountered, these three layers constituted approximately three (3) to fifteen (15) FT of sediment above rock.

Jet-probe refusal elevations were compiled to create a contour drawing of refusal elevations in Area 6/7. Contours were generated using a triangulated irregular network (TIN) developed by SoftDesk® 8 running in AutoCAD Version 14. Figure 4-1 shows contours of all refusal elevations acquired during the survey, whether refusal was encountered on probable bedrock (hard refusal) or in dense material. Refusal elevations and the type of refusal encountered are also shown.

Of the five (5) acres that comprise Area 6/7, approximately three (3) acres (approximately 60%), contain probable bedrock at elevations above the cable's target burial depth of -48 FT MLLW (Figure 4-2). Of these three acres, competent rock was encountered as shallow as -39.5 FT MLLW (JPR-9)(Figure 4-1). Although the topography of probable bedrock in this area is variable, the rock surface exists largely at an average elevation of -43 FT MLLW. Outside of these three (3) acres, rock elevations drop off to measured depths as low as -62.4 FT MLLW (JPR-41).

Elevations of probable bedrock measured during this survey were used to design a possible alternate cable route to the west of its existing location, where probable bedrock was found to typically exist closer to the target depth of -48 FT MLLW (Figure 4-1). Below, jet probe results along the as-laid and possible alternate route are described.

4.1.1 As-laid Cable Route

Jet-probes advanced along this route revealed a layer of gravel and cobbles lying directly above probable bedrock in the north from locations JPR-88 to JPR-93, and in the south at location JPR-109. This layer ranged in thickness from 0.3 FT (JPR-90) to 1.9 FT (JPR-91), causing difficult jet-probe advancement and occasional refusal in cobbles. Elsewhere along the route, probes were advanced easily through sand and trace gravel until refusal on probable bedrock was encountered.

Surface contours of competent rock created using jet-probe data show that approximately 470 linear FT (LF) of the as-laid cable route in Area 6/7 contain hard refusal elevations

above -48 FT MLLW. Along this 470 LF segment, the average refusal elevation is approximately -43 FT MLLW, with measured elevations ranging from -42.2 FT MLLW (JPR-107) to -44.7 FT MLLW (JPR-92). At the northern extent of the route, hard refusal was encountered as deep as -56.8 FT MLLW (JPR-79). At its southern extent, hard refusal was encountered as deep as -53.9 FT MLLW (JPR-37).

4.1.2 Possible Alternate Cable Route

Jet-probes advanced along the northern portion of this route encountered a layer of gravel and cobbles directly above probable bedrock. This layer was as thin as 0.2 FT (JPR-14) and as thick as 2.8 FT (JPR-5), causing difficult advancement or refusal of jet probes. In the southern portion of this route, jet probes were easily advanced through soft sediment, sand and trace gravel until probable bedrock was encountered.

Approximately 370 LF of the possible alternate cable route in Area 6/7 contain hard refusal elevations above -48 FT MLLW (Figure 4-1). Similar to the existing route, the average elevation of hard refusal along the possible alternate cable route encountered was approximately -44 FT MLLW. Measured elevations range from -43.3 FT MLLW (JPR-14) to -45.8 FT MLLW (JPR-20). At the northern extent of the route, hard refusal was encountered as deep as -59.4 FT MLLW (JPR-1). At its southern extent, hard refusal was encountered as deep as -53.5 FT MLLW (JPR-111).

4.2 Rock Drilling and Coring Survey

Locations for geotechnical borings were selected using the results of the jet-probe survey described above. Data acquired during the rock drilling and coring survey was used to better define the nature of the material resulting in jet-probe refusal, provide more data on the depth of the obstruction, and characterize the physical properties of the obstruction within Area 6/7. Based on this data, it was determined that the hard refusal encountered during the jet-probe survey was the result of a competent bedrock surface. The bedrock elevations determined during the rock drilling and coring survey and the hard refusal elevations encountered during the jet-probe survey were used to develop a contour drawing of the bedrock surface in Area 6/7 (Figure 4-3). Table 4.2 summarizes the results of the rock drilling and coring survey.

The bedrock elevations determined during the rock drilling and coring survey were generally consistent with the refusal elevations determined during the jet probe survey. Bedrock elevations were determined at 10 of the 16 boring locations and ranged from -41.2 FT

MLLW to -51.4 FT MLLW. Bedrock was not encountered at boring locations BR-1, BR-8, BR-9, and BR-14. Stratigraphy at these locations typically consisted of a variable thickness of organic silts and clay overlying reddish brown sand and gravel with varying amounts of silt and clay (suspected to be glacial till). Bedrock elevations were not determined at boring locations BR-16 (steep angle of suspected bedrock surface did not allow determination of bedrock elevation) and BR-17 (refusal suspected on cobble within glacial till).

Of the five (5) acres that comprise Area 6/7, approximately three (3) acres (approximately 60%) contain bedrock at elevations above the cable's target burial depth of -48 FT MLLW (Figure 4-4).

The bedrock encountered during the rock drilling and coring survey generally consisted of light grey, medium to coarse grained, granodioritic gneiss with variable gneissic foliation. The recovered bedrock cores showed the bedrock to be generally hard and fresh to very slightly weathered. The Rock Quality Designations (RQD) generally characterized the bedrock as fair to good quality (RQD range 50% to 90%). The actual RQD range observed during the survey was from 0% to 100%, however, the lowest RQDs were typically due to the presence of near vertical fractures. Vertical fractures were encountered in certain borings, although the spacing of the vertical fractures could not be determined from the rock drilling and coring program. Fracture spacing was typically close to very close in the recovered bedrock cores. Boring logs are presented in Attachment A.

The bedrock within Area 6/7 has been mapped as the Light House Gneiss (Poppe, et.al., 1998). The Light House Gneiss is described as a pink or gray to red, medium grained, generally well foliated granitic gneiss of Proterozoic age. The description of the Light House Gneiss appears generally consistent with the type of bedrock encountered in Area 6/7.

Geotechnical laboratory analyses were performed by GeoTesting Express of Boxborough, Massachusetts, on select samples of the rock cores acquired during the rock drilling and coring survey. The samples were tested for unconfined compressive strength (including unit weight determination), tensile strength, and moisture content (after wet saw application). Competent, generally unfractured sections of the rock core were selected for laboratory analysis to determine the geotechnical properties of the rock mass. The results of the geotechnical laboratory analyses are summarized in Table 4.3. Laboratory results are presented in Attachment B.

Bedrock conditions, as determined by the rock drilling and coring survey along the as-laid route and the possible alternate route, are discussed below.

4.2.1 As-laid Cable Route

Bedrock conditions encountered during the rock drilling and coring survey were generally consistent with regards to the type and quality of the bedrock, with the exception of the orientation of the bedrock surface along each route. Bedrock elevations determined along the as-laid cable route ranged from -41.2 FT MLLW (BR-7) to -45.1 FT MLLW (BR-2).

Based on the results of the rock drilling and coring survey, it appears that competent bedrock exists at elevations above -48 FT MLLW from between BR-6 and BR-8 (on the southern portion of the existing cable route) to between BR-1 and BR-2 (on the northern portion of the existing cable route).

BR-4, the proposed boring located between BR-3 and BR-5, was not advanced during the rock drilling and coring program.

4.2.2 Possible Alternate Cable Route

As previously stated, the bedrock conditions encountered along both routes were generally consistent, with the exception of the orientation and elevation of the bedrock surface. Bedrock elevations determined along the possible alternate cable route ranged from -41.3 FT MLLW (BR-10) to -51.4 FT MLLW (BR-15).

Based on the results of the survey, competent bedrock exists at elevations greater than -48 FT MLLW in the following two areas:

- along the northern portion of the alternate route from between BR-15 and BR-10 to the south to between BR-13 and BR-11; and
- in the vicinity of BR-12.

TABLES

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-1	8/16/2002 11:02	1282295.14	392887.60	1.1	water surface
				-38.0	mudline
				-50.4	bottom of soft sediments
				-59.4	sand--end of probe--no refusal
JPR-2	8/16/2002 11:15	1282262.41	392844.56	0.8	water surface
				-38.4	mudline
				-48.7	bottom of soft sediment
				-50.1	bottom of sand/gravel
				-52.7	bottom of cobbles/boulders
				-52.8	probable bedrock--REFUSAL
JPR-3	8/16/2002 11:54	1282312.90	392836.36	0.6	water surface
				-37.5	mudline
				-48.7	bottom of soft sediment
				-51.4	bottom of sand
				-51.5	bottom of thin layer of resistance
				-55.4	bottom of soft sediment
				-56.4	sandy material--end of probe--no refusal
JPR-4	8/16/2002 12:55	1282233.43	392796.40	0.4	water surface
				-37.9	mudline
				-41.6	bottom of sand/gravel
				-52.6	dense gravel/cobble layer--slow penetration--end of probe
JPR-5	8/16/2002 13:40	1282281.41	392790.54	0.6	water surface
				-38.2	mudline
				-46.0	bottom of soft sediment
				-48.8	bottom of cobbles/gravel--end of probe--REFUSAL on probable bedrock
JPR-6	8/16/2002 13:53	1282201.65	392750.38	1.1	water surface
				-37.3	mudline
				-40.0	bottom of soft sediment
				-40.4	bottom of gravel layer
				-42.1	bottom of sand (lenses of coarse sand)
				-42.2	bottom of gravel layer--hit bedrock--end of probe--REFUSAL
JPR-7	8/16/2002 14:19	1282249.90	392742.98	1.5	water surface
				-38.5	mudline
				-42.1	bottom of soft sediment
				-42.4	bottom of sand
				-43.4	bottom of gravel
				-44.5	bottom of sand
				-45.8	dense gravel/cobble layer--end of probe--REFUSAL in gravel/cobbles
JPR-8	8/16/2002 14:57	1282299.98	392737.33	2.5	water surface
				-37.2	mudline
				-40.9	bottom of soft sediment
				-42.0	bottom of medium/coarse compact sand
				-46.5	bottom of gravel
				-48.8	bottom of cobbles/gravel--end of probe--REFUSAL
JPR-8A	8/16/2002 15:21	1282299.98	392737.33	-51.1	**strata same as attempt JPR-8**
				-37.2	mudline
				-51.8	bottom of sand
				-52.0	bedrock--end of probe--REFUSAL on probable bedrock
JPR-9	8/16/2002 15:51	1282219.69	392696.94	3.5	water surface
				-38.0	mudline
				-39.2	bottom of soft sediment
				-39.5	bottom of coarse sand--hit bedrock--end of probe--REFUSAL on probable bedrock
JPR-10A	8/17/2002 9:37	1282270.13	392690.56	4.0	water surface
				-38.5	mudline
				-43.1	bottom of soft sediment
				-45.3	bottom of boulder/cobbles
				-45.9	bottom of cobbles, some coarse sand--end of probe--REFUSAL on boulder
JPR-11	8/17/2002 10:39	1282187.67	392650.76	2.7	water surface
				-37.5	mudline
				-42.3	bottom of soft sediment
				-42.9	bottom of gravel/cobbles--end of jet probe--REFUSAL in gravel/cobbles
JPR-12	8/17/2002 10:55	1282237.75	392644.58	2.3	water surface
				-38.5	mudline
				-43.5	bottom of soft sediment
				-43.8	bottom of gravel/cobbles--end of probe--REFUSAL on large boulder (not bedrock)

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-13	8/17/2002 11:13	1282287.46	392637.20	2.1	water surface
				-37.1	mudline
				-43.0	bottom of soft sediment
				-43.5	bottom of gravel/cobbles--end of probe--REFUSAL on bedrock
JPR-14	8/17/2002 11:29	1282208.22	392597.51	1.7	water surface
				-38.1	mudline
				-43.1	bottom of soft sediment
				-43.3	bottom of gravel--end of probe--REFUSAL on bedrock
JPR-15	8/17/2002 11:45	1282257.30	392590.72	1.4	water surface
				-38.0	mudline
				-42.5	bottom of soft sediment
				-43.3	bottom of gravel/cobbles--end of probe--REFUSAL on possible bedrock
JPR-16	8/17/2002 12:52	1282177.58	392550.74	0.5	water surface
				-38.0	mudline
				-41.7	bottom of soft sediment
				-41.9	bottom of coarse sand--end of probe--REFUSAL on possible bedrock
JPR-17	8/17/2002 13:10	1282224.53	392545.11	0.2	water surface
				-38.4	mudline
				-42.7	bottom of soft sediment
				-43.0	bottom of gravel/cobbles--end of probe--REFUSAL on possible bedrock
JPR-18	8/17/2002 13:20	1282274.88	392538.85	0.3	water surface
				-37.2	mudline
				-42.7	bottom of soft sediment
				-44.3	bottom of coarse sand
				-45.2	bottom of gravel--end of probe--REFUSAL on probable bedrock
JPR-19	8/17/2002 14:06	1282146.00	392503.59	0.4	water surface
				-36.5	mudline
				-41.2	bottom of soft sediment
				-51.6	bottom of medium sand
				-54.5	bottom of coarse sand/gravel--end of probe--REFUSAL on probable bedrock
JPR-20	8/17/2002 14:26	1282195.08	392498.74	0.6	water surface
				-38.0	mudline
				-41.2	bottom of soft sediment
				-45.8	bottom of fine sand, coarsening downwards--end of probe--REFUSAL on probable bedrock
JPR-21	8/18/2002 8:37	1282244.25	392492.42	6.0	water surface
				-38.0	mudline
				-39.9	bottom of soft sediment--end of probe--REFUSAL on probable bedrock
JPR-22	8/18/2002 9:05	1282293.88	392485.21	5.8	water surface
				-37.0	mudline
				-42.3	bottom of soft sediment
				-42.6	bottom of sand
				-43.3	bottom of gravel/cobbles--end of probe--REFUSAL on probable bedrock
JPR-23	8/18/2002 9:30	1282162.37	392452.19	5.7	water surface
				-37.5	mudline
				-38.3	bottom of soft sediment
				-49.8	bottom of sand
				-52.3	bottom of coarse sand
				-53.8	bottom of sand/gravel
				-54.0	bottom of gravel/cobbles--end of probe--REFUSAL on probable bedrock
JPR-24	8/18/2002 9:48	1282213.05	392446.29	5.3	water surface
				-38.0	mudline
				-38.7	bottom of soft sediment
				-41.4	bottom of fine/medium sand--end of probe--REFUSAL on probable bedrock
JPR-25	8/18/2002 10:00	1282262.28	392438.82	5.0	water surface
				-37.5	mudline
				-40.6	bottom of soft sediment
				-40.8	bottom of gravel--end of probe--REFUSAL on probable bedrock
JPR-26	8/18/2002 11:30	1282312.35	392433.07	3.2	water surface
				-36.4	mudline
				-42.8	bottom of soft sediment
				-45.5	bottom of gravel/cobbles--end of probe--REFUSAL on probable bedrock
JPR-27	8/18/2002 11:54	1282182.47	392398.18	2.7	water surface
				-37.5	mudline
				-38.3	bottom of soft sediment
				-48.3	bottom of sand/silt
				-48.5	bottom of gravel--end of probe--REFUSAL on probable bedrock

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-28	8/18/2002 12:08	1282231.34	392392.75	2.5	water surface
				-38.0	mudline
				-39.7	bottom of soft sediment
				-40.8	bottom of coarse sand--end of probe--REFUSAL on probable bedrock
JPR-29	8/18/2002 12:18	1282281.31	392386.32	2.3	water surface
				-37.0	mudline
				-40.2	bottom of soft sediment--end of probe--REFUSAL on probable bedrock
JPR-30	8/18/2002 11:40	1282330.38	392380.45	2.0	water surface
				-36.3	mudline
				-40.9	bottom of soft sediment
				-41.3	bottom of sand and gravel/cobbles--end of probe--REFUSAL on probable bedrock
JPR-31	8/18/2002 13:34	1282151.62	392353.54	0.9	water surface
				-38.0	mudline
				-39.0	bottom of soft sediment
				-40.0	bottom of sand and gravel
				-42.4	bottom of sand
				-44.2	bottom of gravel/cobbles--end of probe--REFUSAL on probable bedrock
JPR-32	8/18/2002 13:56	1282200.94	392345.29	0.8	water surface
				-37.5	mudline
				-39.8	bottom of soft sediment
				-43.9	bottom of sand and some gravel--end of probe--REFUSAL on probable bedrock
JPR-33	8/18/2002 14:58	1282250.78	392340.16	0.6	water surface
				-37.5	mudline
				-39.1	bottom of soft sediment
				-41.6	bottom of sand
				-41.9	bottom of gravel/cobbles--end of probe--REFUSAL in gravel/cobbles
JPR-34	8/18/2002 15:25	1282299.88	392334.39	0.8	water surface
				-37.0	mudline
				-41.2	bottom of soft sediment
				-42.3	coarse sand and gravel--end of probe--REFUSAL in coarse sand and gravel
JPR-35	8/19/2002 8:32	1282168.67	392300.68	5.8	water surface
				-37.5	mudline
				-38.2	bottom of soft sediment
				-41.2	bottom of interbedded sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-36	8/19/2002 8:58	1282219.05	392293.66	6.0	water surface
				-37.5	mudline
				-35.2	bottom of soft sediment
				-39.8	bottom of sand and silt
				-40.5	bottom of coarse sand
				-45.5	bottom of coarse sand and gravel
				-54.4	bottom of gravel--end of probe--REFUSAL in gravel
JPR-37	8/19/2002 9:21	1282268.39	392287.49	6.1	water surface
				-37.5	mudline
				-40.9	bottom of soft sediment
				-53.9	bottom of sand and gravel--end of probe--REFUSAL in gravel
JPR-38	8/19/2002 9:51	1282187.69	392247.76	6.2	water surface
				-37.9	mudline
				-42.8	bottom of soft sediment
				-45.3	bottom of sand
				-56.3	bottom of medium sand--end of probe--REFUSAL on large cobble/boulder
JPR-39	8/19/2002 11:03	1282237.35	392241.35	5.0	water surface
				-38.0	mudline
				-39.5	bottom of soft sediment
				-46.5	bottom of soft sand
				-52.5	bottom of interbedded layers of compact medium and coarse sand--end of probe--REFUSAL in compact coarse sand.
JPR-40	8/19/2002 11:22	1282206.18	392194.45	4.7	water surface
				-37.6	mudline
				-47.6	bottom of soft sediment
				-50.1	bottom of medium sand
				-51.8	bottom of compact sand--end of probe--REFUSAL on probable bedrock
JPR-41	8/19/2002 12:19	1282424.21	392922.07	3.6	water surface
				-31.7	mudline
				-43.8	bottom of soft sediment
				-46.0	bottom of compact sand
				-61.4	bottom of medium sand--end of probe--no refusal

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-42	8/19/2002 12:38	1282411.83	392824.23	3.1	water surface
				-31.6	mudline
				-47.9	bottom of soft sediment
				-60.9	bottom of loose sand--end of probe--no refusal
JPR-43	8/19/2002 13:08	1282398.90	392724.00	2.5	water surface
				-32.0	mudline
				-40.7	bottom of soft sediment
				-46.2	bottom of sand
				-51.9	bottom of compact coarse sand
				-53.6	bottom of gravel and sand--end of probe--REFUSAL on probable bedrock
JPR-44	8/19/2002 14:05	1282388.32	392626.07	1.4	water surface
				-32.4	mudline
				-42.9	bottom of soft sediment--end of probe--REFUSAL on probable bedrock
JPR-45	8/19/2002 14:15	1282400.18	392523.40	1.2	water surface
				-32.3	mudline
				-43.0	bottom of soft sediment--end of probe--REFUSAL on probable bedrock
JPR-46	8/19/2002 14:22	1282386.09	392423.89	1.2	water surface
				-32.6	mudline
				-42.6	bottom of soft sediment--end of probe--REFUSAL on probable bedrock
JPR-47	8/19/2002 15:12	1282374.09	392325.50	0.7	water surface
				-33.6	mudline
				-42.5	bottom of soft sediment
				-52.0	bottom of fairly compact sand with little gravel--REFUSAL on probable bedrock
JPR-48	8/19/2002 15:22	1282313.17	392232.13	0.5	water surface
				-36.0	mudline
				-40.8	bottom of soft sediment
				-48.1	bottom of sand
				-61.5	bottom of compact sand--end of probe--no refusal
JPR-49	8-21-02 0914	1282160.51	392383.10	4.4	water surface
				-38.0	mudline
				-42.9	bottom of soft sediment
				-44.9	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-50	8-21-02 0924	1282150.49	312411.38	4.6	water surface
				-37.1	mudline
				-38.9	bottom of soft sediment
				-49.5	bottom of soft sand--end of probe--REFUSAL on probable bedrock
JPR-51	8-21-02 0940	1282138.11	392483.44	4.9	water surface
				-36.6	mudline
				-38.1	bottom of soft sediment
				-55.9	bottom of soft sand--end of probe--REFUSAL on probable bedrock
JPR-52	8-21-02 0953	1282145.36	392540.34	5.2	water surface
				-36.5	mudline
				-37.8	bottom of soft sediment
				-38.4	bottom of sand and gravel
				-41.5	bottom of sand
				-41.8	bottom of sand and gravel
				-54.1	bottom of sand
				-54.3	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-53	8-21-02 1234	1282144.40	392574.40	5.2	water surface
				-36.1	mudline
				-39.3	bottom of soft sediment
				-47.0	bottom of sand
				-47.6	bottom of compact sand--end of probe--REFUSAL in compact sand
JPR-54	8-21-01 1250	1282144.12	392597.20	4.8	water surface
				-36.1	mudline
				-40.2	bottom of soft sediment
				-47.6	bottom of sand
				-50.5	bottom of sand and cobbles--REFUSAL on probable bedrock
JPR-55	8-21-02 1304	1282137.84	392619.15	4.5	water surface
				-36.5	mudline
				-38.5	bottom of soft sediment
				-47.2	bottom of sand
				-49.3	bottom of hard sand--end of probe--REFUSAL on possible bedrock

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-56	8-21-02 1336	1282147.85	392660.94	3.8	water surface
				-36.5	mudline
				-38.2	bottom of soft sediment
				-39.7	bottom of sand
				-40.2	bottom of sand and gravel
				-48.7	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-57	8/20/2002 15:53	1282154.53	392715.11	0.6	water surface
				-36.9	mudline
				-41.1	bottom of soft sediment
				-42.9	bottom of sand and gravel mix
				-43.8	dense gravel--end of probe--REFUSAL in dense gravel
JPR-58	8/20/2002 15:17	1282196.90	392774.59	1.0	water surface
				-37.0	mudline
				-40.8	bottom of soft sediment
				-45.8	bottom of compact sand
				-46.0	bottom of dense gravel--end of probe--REFUSAL on possible bedrock
JPR-59	8/20/2002 14:40	1282161.45	392754.88	1.6	water surface
				-37.1	mudline
				-39.7	bottom of soft sediment
				-40.3	bottom of hard sand
				-41.9	bottom of sand-gravel mix
				-47.1	bottom of dense gravel
				-51.0	bottom of compact sand--end of probe--REFUSAL on probable bedrock
JPR-60	8/20/2002 13:25	1282132.92	392808.28	3.2	water surface
				-36.6	mudline
				-41.4	bottom of soft sediment
				-43.3	bottom of dense gravel--end of probe--REFUSAL on probable bedrock
JPR-61	8/20/2002 13:50	1282181.68	392802.32	2.5	water surface
				-36.6	mudline
				-40.0	bottom of soft sediment
				-41.0	end of probe--REFUSAL in hard gravel/cobbles--not bedrock
JPR-62	8/20/2002 10:59	1282139.95	392857.18	6.0	water surface
				-36.0	mudline
				-40.6	bottom of soft sandy sediments
				-45.0	bottom of sand mixed w/ some gravel
				-47.0	bottom of gravelly mix--till?
				-48.9	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-63	8/20/2002 11:28	1282213.95	392846.43	5.7	water surface
				-37.2	mudline
				-46.4	bottom of sand
				-48.1	bottom of sand/gravel mix
				-48.8	bottom of denser sand/gravel mix
				-50.0	bottom of compact sand--end of probe--REFUSAL on probable bedrock
JPR-64	8-21-02 1011	1282168.81	392354.96	5.5	water surface
				-37.5	mudline
				-39.5	bottom of soft sediment
				-41.5	bottom of sand and gravel
				-43.1	bottom of sand
				-43.6	bottom of sand and gravel
				-46.8	bottom of gravel and cobbles--end of probe--REFUSAL on probable bedrock
JPR-65	8-21-02 1038	1282188.74	392321.97	5.9	water surface
				-37.5	mudline
				-38.6	bottom of soft sediment
				-40.5	bottom of sand and gravel
				-42.1	bottom of sand
				-44.1	bottom of sand and gravel
				-44.8	bottom of gravel and cobbles--end of probe--REFUSAL on probable bedrock
JPR-66	8-21-02 1101	1282192.71	392296.37	6.0	water surface
				-37.5	mudline
				-39.0	bottom of soft sediment
				-43.5	bottom of sand
				-44.5	bottom of gravel
				-50.0	bottom of gravel/cobbles--end of probe--REFUSAL on probable bedrock

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-67	8-21-02 1116	1282202.30	392271.30	6.1	water surface
				-37.5	mudline
				-39.3	bottom of soft sediment
				-40.5	bottom of sand
				-43.9	bottom of sand and gravel
				-50.3	bottom of sand
				-53.7	bottom of hard sand--end of probe--REFUSAL in probable bedrock
JPR-68	8-22-02 1230	1282244.80	392872.25	6.0	water surface
				-38.0	mudline
				-49.4	bottom of soft sediment
				-53.1	bottom of sand--end of probe--REFUSAL on hard surface
JPR-69	8-22-02 1217	1282206.57	392809.82	6.1	water surface
				-37.3	mudline
				-38.9	bottom of soft sediment
				-50.8	bottom of compact sand--end of probe--REFUSAL on probable bedrock
JPR-70	8-22-02 1110	1282178.18	392779.51	5.8	water surface
				-37.0	mudline
				-39.5	bottom of soft sediment
				-43.1	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-71	8-21-02 1603	1282172.88	392717.44	0.9	water surface
				-36.8	mudline
				-40.0	bottom of soft sediment
				-45.0	bottom of interbedded layers of sand and gravel
				-45.5	bottom of hard layer of sand--end of probe--REFUSAL on probable bedrock
JPR-72	8-21-02 1510	1282161.12	392689.83	1.8	water surface
				-36.5	mudline
				-39.2	bottom of soft sediment
				-40.2	bottom of sand
				-42.2	bottom of sand and gravel
				-49.0	bottom of hard sand and some gravel--end of probe--REFUSAL on sand/gravel
JPR-73	8-21-02 1405	1282148.26	392635.48	3.1	water surface
				-36.1	mudline
				-39.5	bottom of soft sediment
				-46.2	bottom of sand
				-46.5	bottom of silt and sand--end of probe--REFUSAL on probable bedrock
JPR-74	8-22-02 1445	1282146.35	392437.20	3.4	water surface
				-36.9	mudline
				-39.0	bottom of soft sediment
				-50.0	bottom of sand and gravel
				-50.7	bottom of gravel and sand--end of probe--REFUSAL gravel and sand
JPR-75	8-22-02 1415	1282188.80	392370.00	3.9	water surface
				-37.7	mudline
				-40.1	bottom of soft sediment
				-43.8	bottom of sand--end of probe--REFUSAL in probable bedrock
JPR-76	8-22-02 1358	1282205.17	392225.71	4.3	water surface
				-37.6	mudline
				-38.9	bottom of soft sediment
				-47.2	bottom of soft sand
				-52.8	bottom of compact sand--end of probe--no refusal
JPR-77	8-21-02 1422	1282132.88	392638.47	3.8	water surface
				-36.5	mudline
				-38.7	bottom of soft sediment
				-45.7	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-78	8-22-02 1128	1282229.30	392771.76	6.2	water surface
				-38.0	mudline
				-40.5	bottom of soft sediment
				-44.1	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-79	8-22-02 1242	1282315.27	392863.76	5.8	water surface
				-37.5	mudline
				-49.2	bottom of soft sediment
				-56.8	bottom of sand--end of probe--no refusal
JPR-80	8-22-02 1036	1282126.05	392758.43	5.1	water surface
				-37.0	mudline
				-38.9	bottom of soft sediment
				-40.1	bottom of sand
				-43.5	bottom of compact sand--end of probe--REFUSAL on probable bedrock

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-81	8-22-02 1019	1282121.15	3922709.84	4.9	water surface
				-37.0	mudline
				-38.9	bottom of soft sediment
				-39.3	bottom of sand
				-39.8	bottom of gravel
				-45.4	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-82	8-22-02 1006	1282113.55	392659.74	4.5	water surface
				-36.5	mudline
				-38.8	bottom of soft sediment
				-48.2	bottom of sand
				-49.0	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-83	8-22-02 0848	1282108.32	392608.01	2.9	water surface
				-36.8	mudline
				-38.6	bottom of soft sediment
				-40.6	bottom of sand and gravel
				-46.6	bottom of sand
				-46.9	bottom of gravel--end of probe--REFUSAL in packed gravel
JPR-84	8-22-02 0935	1282102.52	392560.88	3.9	water surface
				-37.2	mudline
				-39.6	bottom of soft sediment
				-54.5	bottom of sand--end of probe--no refusal in dense gravel
JPR-85	8-22-02 0947	1282095.25	392511.24	4.2	water surface
				-38.3	mudline
				-38.8	bottom of soft sediment
				-55.8	bottom of sand--end of probe--no refusal
JPR-86	8-22-02 1052	1282184.71	392736.71	5.5	water surface
				-37.0	mudline
				-38.2	bottom of soft sediment
				-39.0	bottom of sand
				-39.5	bottom of sand and gravel
				-41.5	bottom of sand
				-43.8	bottom of gravel and sand--end of probe--REFUSAL on probable bedrock
JPR-87	8/30/2002 9:07	128308.28	392819.37	1.8	water surface
				-37.2	mudline
				-48.2	bottom of soft sediment
				-51.7	bottom of sand
				-53.4	bottom of hard sand - REFUSAL on probable bedrock
JPR-88	8/30/2002 9:17	1282332.50	392816.26	1.5	water surface
				-36.0	mudline
				-48.2	bottom of soft sediment
				-54.0	bottom of sand
				-54.6	bottom of gravel - REFUSAL on probable bedrock
JPR-89	8/30/2002 9:34	1282305.19	392795.30	1.3	water surface
				-37.0	mudline
				-46.7	bottom of soft sediment
				-49.2	bottom of coarse sand
				-56.0	bottom of hard sand and gravel - REFUSAL on probable bedrock
JPR-90	8/30/2002 9:53	1282329.39	392792.14	1.2	water surface
				-35.7	mudline
				-45.6	bottom of soft sediment
				-53.8	bottom of sand
				-54.1	bottom of gravel and cobble - REFUSAL on probable bedrock
JPR-91	8/30/2002 10:14	1282303.64	392743.24	1.0	water surface
				-37.0	mudline
				-42.7	bottom of soft sediment
				-44.0	bottom of sand
				-48.2	bottom of sand and gravel
				-49.0	bottom of gravel and cobble
				-50.9	bottom of cobble - REFUSAL on probable bedrock
JPR-92	8/30/2002 10:52	1282328.52	392743.40	1.0	water surface
				-35.5	mudline
				-41.8	bottom of soft sediment
				-44.0	bottom of sand
				-44.7	bottom of gravel - REFUSAL in cobbles

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-93	8/30/2002 11:27	1282303.05	392693.25	1.2	water surface
				-37.0	mudline
				-40.8	bottom of soft sediment
				-42.3	bottom of sand
				-42.9	bottom of gravel and cobble - REFUSAL on possible bedrock
JPR-94	8/30/2002 11:56	1282327.32	392694.07	1.5	water surface
				-35.5	mudline
				-42.6	bottom of soft sediment (no soft sediment - hard sand and gravel encountered immediately)
				-43.4	bottom of sand and gravel - REFUSAL on probable bedrock
JPR-95	8/30/2002 12:26	1282300.51	392643.71	1.9	water surface
				-37.0	mudline
				-43.2	bottom of soft sediment (no soft sediment - hard sand and gravel encountered immediately)
				-44.5	bottom of sand and gravel - REFUSAL on probable bedrock
JPR-96	08/30/02 12:38	1282325.00	392643.30	2.2	water surface
				-35.9	mudline
				-42.6	bottom of soft sediment (so soft sediment - sand encountered immediately)
				-43.2	bottom of sand - REFUSAL on probable bedrock
JPR-97	8/30/2002 12:57	1282299.20	392592.55	2.5	water surface
				-36.5	mudline
				-43.4	bottom of soft sediment
				-44.0	bottom of sand - REFUSAL on probable bedrock
JPR-98	8/30/2002 13:13	1282323.62	392594.33	2.8	water surface
				-36.0	mudline
				-43.9	bottom of soft sediment
				-44.7	bottom of sand - REFUSAL on probable bedrock
JPR-99	8/30/2002 14:11:06	1282306.07	392540.80	4.1	water surface
				-37.0	mudline
				-46.6	bottom of soft sediment
				-46.9	bottom of sand
				-47.1	bottom of gravel - REFUSAL on probable bedrock
JPR-100	8/30/2002 14:32	1282331.37	392547.03	4.3	water surface
				-36.0	mudline
				-47.6	bottom of soft sediment
				-47.8	bottom of sand
				-47.9	bottom of sand and gravel - REFUSAL on probable bedrock
JPR-101	8/30/2002 14:46	1282319.59	392492.44	4.6	water surface
				-36.0	mudline
				-43.3	bottom of soft sediment
				-43.6	bottom of sand - REFUSAL on probable bedrock
JPR-102	8/30/2002 14:54	1282343.84	392499.98	4.7	water surface
				-34.8	mudline
				-42.9	bottom of soft sediment
				-43.8	bottom of sand - REFUSAL on probable bedrock
JPR-103	8/30/2002 16:00	1282338.80	392446.12	5.6	water surface
				-35.6	mudline
				-42.5	bottom of soft sediment
				-43.4	bottom of sand - REFUSAL on probable bedrock
JPR-104	8/30/02 16:15	1282361.72	392454.37	5.6	water surface
				-34.3	mudline
				-44.0	bottom of soft sediment
				-44.6	bottom of sand
				-44.9	bottom of gravel - REFUSAL on probable bedrock
JPR-105	8/30/2002 16:25	1282342.38	392425.45	5.7	water surface
				-35.4	mudline
				-41.8	bottom of soft sediment
				-42.6	bottom of sand - REFUSAL on probable bedrock
JPR-106	9-3-02 1006	1282369.20	392394.80	4.9	water surface
				-33.8	mudline
				-43.6	bottom of soft sediment
				-47.4	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-107	9-3-02 1023	1282317.10	392368.80	4.6	water surface
				-36.2	mudline
				-41.5	bottom of soft sediment
				-42.2	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-108	9-3-02 1049	1282336.60	392353.20	4.0	water surface
				-35.8	mudline
				-42.0	bottom of soft sediment
				-42.4	bottom of boulder/cobble
				-51.6	bottom of sand and gravel--end of probe--REFUSAL on boulder
JPR-109	9-3-02 1146	1282286.80	392327.20	3.0	water surface
				-37.0	mudline
				-41.3	bottom of soft sediment
				-43.0	bottom of gravel/cobbles/boulders--end of probe--REFUSAL in gravel/cobbles/boulders
JPR-110	9-3-02 1206	1282307.60	392313.10	2.4	water surface
				-36.5	mudline
				-41.4	bottom of soft sediment
				-42.5	bottom of sand and gravel--end of probe--REFUSAL in sand and gravel
JPR-111	9-3-02 1238	1282259.00	392285.10	2.0	water surface
				-37.5	mudline
				-41.3	bottom of soft sediment
				-53.5	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-112	9-3-02 1238	1282280.60	392241.90	1.6	water surface
				-37.4	mudline
				-41.4	bottom of soft sediment
				-47.2	bottom of sand and gravel--end of probe--REFUSAL in sand and gravel
JPR-113	9-4-02 0830	1282081.40	392839.00	5.7	water surface
				-37.0	mudline
				-39.2	bottom of soft sediment
				-40.3	bottom of gravel--end of probe--REFUSAL on probable bedrock
JPR-114	9-4-02 0844	1282106.30	392837.10	5.9	water surface
				-37.1	mudline
				-40.1	bottom of soft sediment
				-42.1	bottom of sand and some gravel--end of probe--REFUSAL on rock, possible bedrock
JPR-115	9-4-02 0925	1282069.00	392740.60	6.3	water surface
				-36.5	mudline
				-38.6	bottom of soft sediment
				-46.2	bottom of compact sand
				-46.9	bottom of gravel--end of probe--REFUSAL on probable bedrock
JPR-116	9-4-02 0944	1282092.80	392738.10	6.3	water surface
				-36.8	mudline
				-39.7	bottom of soft sediment
				-42.8	bottom of gravel
				-43.0	bottom of sand
				-43.6	bottom of coarse sand--end of probe--REFUSAL on probable bedrock
JPR-117	9-4-02 1012	1282056.90	392641.70	6.0	water surface
				-36.5	mudline
				-39.3	bottom of soft sediment
				-49.7	bottom of sand
				-50.7	bottom of coarse sand--end of probe--REFUSAL on probable bedrock
JPR-118	9-4-02 1027	1282081.10	392638.40	5.8	water surface
				-36.5	mudline
				-39.4	bottom of soft sediment
				-51.3	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-119	9-4-02 1123	1282025.70	392399.90	4.8	water surface
				-39.2	mudline
				-43.3	bottom of soft sediment
				-48.2	bottom of sand--end of probe--REFUSAL on probable bedrock
JPR-120	9-4-02 1443	1282110.40	392389.40	1.0	water surface
				-37.3	mudline
				-39.6	bottom of soft sediment
				-46.8	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-121	9-4-02 1428	1282061.90	392352.90	1.2	water surface
				-38.9	mudline
				-42.1	bottom of soft sediment
				-43.5	bottom of compact sand--end of probe--REFUSAL on probable bedrock
JPR-122	9-4-02 1416	1282107.00	392352.70	1.3	water surface
				-37.1	mudline
				-39.7	bottom of soft sediment
				-42.9	bottom of sand--end of probe--REFUSAL on probable bedrock

Table 4.1
Cross Sound Cable Project
Area 6/7 Jet Probe Results

Probe	Date/Time	Easting	Northing	Elevation (FT MLLW)	Description
JPR-123	9-4-02 1402	1282015.10	392314.00	1.4	water surface
				-39.4	mudline
				-42.5	bottom of soft sediment
				-43.2	bottom of compact sand--end of probe--REFUSAL on probable bedrock
JPR-124	9-4-02 1342	1282128.40	392302.80	1.7	water surface
				-38.6	mudline
				-40.2	bottom of soft sediment
				-46.9	bottom of sand and gravel--end of probe--REFUSAL on probable bedrock
JPR-125	9-4-02 1552	1282397.40	392383.80	0.6	water surface
				-32.6	mudline
				-42.4	bottom of soft sediment
				-42.5	bottom of gravel--end of probe--REFUSAL on probable bedrock
JPR-126	9-3-02 1643	1282401.10	392421.00	2.6	water surface
				-32.0	mudline
				-41.8	bottom of soft sediment
				-42.1	bottom of gravel--end of probe--REFUSAL on large boulder or possible bedrock
JPR-127	9-3-02 1631	1282414.70	392521.80	2.4	water surface
				-32.0	mudline
				-42.7	bottom of soft sediment
				-43.2	bottom of gravel/cobbles--end of probe--REFUSAL on rock, probable bedrock
JPR-128	9-3-02 1618	1282415.10	392623.10	2.1	water surface
				-32.0	mudline
				-42.6	bottom of soft sediment
				-42.7	bottom of gravel--end of probe--REFUSAL on rock, possible bedrock

Table 4.2
Cross Sound Cable Project
Geotechnical Boring Field Observations

Boring	Easting	Northing	Date/Time	Elevation (FT MLLW)	Description	Geology
BR-1	1282308.4	392766.6	6/10/02	-37.00	Mudline	
			9/13/2002 9:28	-41.94	Top of Spoon (S1)	
			9/13/2002 9:32	-44.10	Bottom of Spoon (S1)	Brown SAND and SHELL HASH
			9/13/2002 9:43	-44.52	Top of Spoon (S2)	
			9/13/2002 9:43	-46.65	Bottom of Spoon (S2)	Brown SAND and SHELL HASH ; Red SAND
			9/13/2002 10:30	-46.37	Top of Spoon (S3)	
			9/13/2002 10:40	-48.64	Bottom of Spoon (S3)	Brownish red SAND and GRAVEL
			9/13/2002 11:02	-49.75	Top of Spoon (S4)	
			9/13/2002 11:10	-51.88	Bottom of Spoon (S4)	Dense brownish red SAND and GRAVEL
BR-2	1282302.4	392727.5	6/10/02	-37.00	Mudline	
			9/19/2002 10:48	-39.61	6" Casing - Hard Surface	
			9/19/2002 10:52	-40.14	Top of Spoon (S1)	
			9/19/2002 10:52	-42.24	Bottom of Spoon (S1)	Brownish red SAND and GRAVEL
			9/19/2002 12:10	-44.68	Top of Spoon (S2)	
			9/19/2002 12:20	-45.32	Bottom of Spoon (S2) - Spoon Refusal	Brown SAND and GRAVEL ; Dense brownish red SAND
			9/19/2002 12:38	-45.05	4" Casing Refusal	
			9/19/2002 13:18	-45.05	Top of Core Run 1 (C1)	
			9/19/2002 14:50	-48.55	Bottom of Core Run 1 (C1)	GRANODIORITIC GNEISS (RQD=47%)
			9/19/2002 15:15	-48.55	Top of Core Run 2 (C2)	
BR-3	1282298.3	392635.4	9/19/2002 16:00	-50.05	Bottom of Core Run 2 (C2)	GRANODIORITIC GNEISS (RQD=100%)
			9/19/2002 16:08	-50.05	Top of Core Run 3 (C3)	
			9/19/2002 17:48	-51.95	Bottom of Core Run 3 (C3)	GRANODIORITIC GNEISS (RQD=66%)
			6/10/02	-37.00	Mudline	
			9/16/2002 10:57	-43.23	6" Casing - Hard Surface	
			9/16/2002 10:57	-43.92	Top of Spoon (S1)	
			9/16/2002 11:26	-44.21	Bottom of Spoon (S1) - Spoon Refusal	Chips of GRANODIORITIC GNEISS
			9/16/2002 12:09	-44.46	4" Casing Refusal	
			9/16/2002 12:43	-44.46	Top of Core Run 1 (C1)	
BR-3B	1282298.8	392617.8	9/16/2002 13:07	-44.96	Bottom of Core Run (C1)	GRANODIORITIC GNEISS (RQD=100%)
			6/10/02	-37.00	Mudline	
			9/23/02 1225	-43.80	Top of Core Run 1 (C1)	GRANODIORITIC GNEISS (RQD=0%)
			9/23/02 1409	-46.80	Top of Core Run 2 (C2)	GRANODIORITIC GNEISS (RQD=43%)
			9/23/02 1527	-50.80	Top of Core Run 3 (C3)	
			9/23/02 1623	-54.80	Bottom of Core Run 3 (C3)	GRANODIORITIC GNEISS (RQD=41%)
			6/10/02	-35.07	Mudline	
			9/12/2002 11:30	-40.80	Top of Spoon (S1)/ 6" Casing Refusal	
BR-5	1282336.6	392417.3	9/12/2002 11:30	-41.80	Bottom of Spoon (S1) - Spoon Refusal	Dense brownish red SAND and GRAVEL
			9/12/2002 11:48	-41.44	4" Casing Refusal	
			9/12/2002 12:18	-41.44	Top of Core Run 1 (C1)	
			9/12/2002 13:56	-46.44	Bottom of Core Run 1 (C1)	GRANODIORITIC GNEISS (RQD=78%)

Table 4.2
Cross Sound Cable Project
Geotechnical Boring Field Observations

Boring	Easting	Northing	Date/Time	Elevation (FT MLLW)	Description	Geology
BR-6	1282298.2	392343.5	6/10/02	-36.70	Mudline	
			9/11/2002 12:09	-41.75	4" Casing Refusal	
			9/11/2002 12:41	-42.04	Rollerbit Refusal	
			9/11/2002 10:50	-40.12	Top of Spoon (S1)	
			9/11/2002 10:50	-42.73	Bottom of Spoon (S1)	Dense brownish red SAND and GRAVEL
			9/11/2002 13:07	-42.00	Top of Core Run (C1)	
BR-7	1282340.1	392395.6	9/11/2002 13:40	-43.54	Bottom of Core Run (C1)	Diorite COBBLE
			6/10/02	-35.50	Mudline	
			9/20/02 07:49	39.88	6" Casing on hard surface	
			9/20/02 07:54	40.72	Top of Spoon (S1)	
			9/20/02 07:59	41.15	Bottom of Spoon (S1)/Spoon Refusal	Dense brownish red SAND and GRAVEL
			9/20/02 08:12	40.68	4" Casing on hard surface	
BR-8	1282280.3	392311.68	9/20/02 08:23	41.15	Top of Core Run (C1)	
			9/20/02 11:44	48.15	Bottom of Core Run (C1)	GRANODIORITIC GNEISS (RQD=55%)
			6/10/02	-37.50	Mudline	
			9/13/2002 12:30	-41.07	Top of Spoon (S1)	
			9/13/2002 12:30	-43.44	Bottom of Spoon (S1)	Brownish red SAND and GRAVEL, some silt
			9/13/2002 13:25	-45.41	Top of Spoon (S2)	
BR-9	1282299.3	392837.2	9/13/2002 13:40	-47.19	Bottom of Spoon (S2)	Dense brownish red SAND, some granitic gneiss fragments
			9/13/2002 14:08	-49.99	Top of Spoon (S3)	
			9/13/2002 14:18	-51.73	Bottom of Spoon (S3)	Dense brownish red SAND and GRAVEL
			6/10/02	-37.66	Mudline	
			9/26/2002 7:07	-46.73	6" casing on hard surface	
			9/26/2002 7:11	-46.23	Top of Spoon (S1)	
BR-10 (try 1)	1282255.8	392700.43	9/26/2002 7:12	-48.13	Bottom of Spoon (S1)	SILT with little gravel, little shell hash
			9/26/2002 7:30	-50.20	4" casing driven into bottom	
			9/26/2002 7:47	-50.17	Top of Spoon (S2)	
			9/26/2002 7:51	-52.28	Bottom of Spoon (S2)	SAND with some shell hash, some gravel
			9/26/2002 8:09	-55.87	Top of Spoon (S3)	
			9/26/2002 8:14	-58.13	Bottom of Spoon (S3)	SAND and GRAVEL with some shell hash
BR-10 (try 2)	1282253.5	392701.4	9/26/2002 8:14	-58.13	Bottom of Spoon (S3)	
			6/10/02	-38.50	Mudline	
			9/30/2002 13:32	-38.83	6" casing on hard surface	
			9/30/2002 13:33	-39.83	Top of Spoon (S1)	
			9/30/2002 13:40	-41.98	Spoon (S1) refusal / Top of C1	Coarse SAND and fine GRAVEL; Dense reddish brown SAND
			9/30/2002 14:10	-41.25	4" casing on hard surface	
BR-10 (try 2)	1282253.5	392701.4	9/30/2002 14:53	-43.88	Bottom of C1	GRANODIORITIC GNEISS (RQD=21%)
			9/30/2002 15:38	-44.88	Bottom of C2	GRANODIORITIC GNEISS (RQD=0%)
			9/30/2002 17:30	-47.88	Bottom of C3	GRANODIORITIC GNEISS (RQD=71%)
			6/10/02	-38.50	Mudline	
			10/2/2002 8:55	-40.40	6" casing on hard surface	
			10/2/2002 10:13	-41.23	4" casing refusal on rock	
BR-10 (try 2)	1282253.5	392701.4	10/2/2002 11:54	-47.23	Bottom of rollerbit advance (through rock) / Top of Run 1 (C1)	
			10/2/2002 14:11	-55.23	Bottom of Run 1 (C1)	GRANODIORITIC GNEISS (RQD=54%)

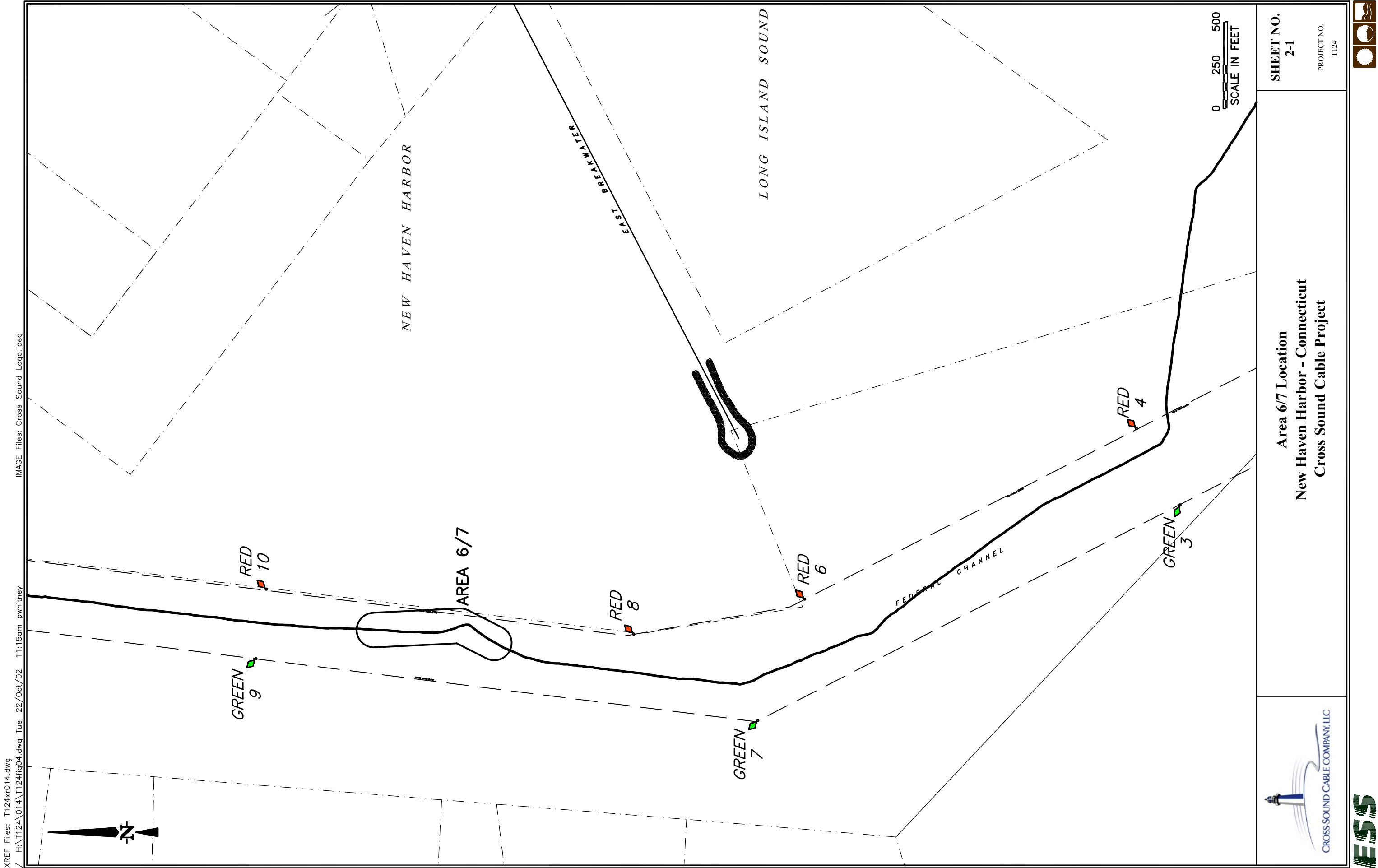
Table 4.2
Cross Sound Cable Project
Geotechnical Boring Field Observations

Boring	Easting	Northing	Date/Time	Elevation (FT MLLW)	Description	Geology
BR-11 (try 1)	1282184.3	392442.34	6/10/02	-37.50	Mudline	
			9/24/2002 8:45	-38.53	Top of Spoon (S1)	
			9/24/2002 8:51	-41.09	Bottom of Spoon (S1)	Grey SAND and GRAVEL; Dense reddish brown SAND
			9/24/2002 9:23	-43.41	Top of Spoon (S2)	
			9/24/2002 9:25	-45.53	Bottom of Spoon (S2)	Dense reddish brown SAND
			9/24/2002 9:52	-44.99	4" Casing on hard surface	
			9/24/2002 10:12	-45.60	Top of Spoon (S3)	
			9/24/2002 10:14	-47.68	Bottom of Spoon (S3)	moved off station by ship traffic--NO RECOVERY
BR-11(try 3)	1282182.5	392434.1	6/10/02	-37.50	Mudline	
			9/25/2002 10:10	-51.28	4" casing refusal / Top of Core Run (C1)	
			9/25/2002 11:10	-55.28	Bottom of Core Run (C1)	GRANODIORITIC GNEISS (RQD=47%)
BR-12	1282221.7	392337.3	6/10/02	-37.75	Mudline	
			9/26/2002 9:37	-39.75	6" casing on hard surface	
			9/26/2002 9:38	-40.21	Top of spoon (S1)	
			9/26/2002 9:39	-42.41	Bottom of spoon (S1)	Coarse SAND and GRAVEL; Dense reddish brown SAND
			9/26/2002 9:52	-44.62	4" casing driven into bottom	
			9/26/2002 10:17	-44.70	Top of spoon (S2)	
			9/26/2002 10:20	-44.81	Spoon (S2) refusal / Top of core (C1)	Fine to medium GRAVEL
			9/26/2002 11:25	-49.81	Bottom of core (C1)	GRANODIORITIC GNEISS (RQD=65%)
			9/26/2002 13:44	-54.81	Bottom of core (C2)	GRANODIORITIC GNEISS (RQD=100%)
BR-13 (try 3)	128224.1	392602.4	6/10/02	-38.44	Mudline	
			10/1/2002 9:14	-40.27	6" casing on hard surface	
			10/1/2002 9:19	-42.05	4" casing driven in / Top of Run 1 (C1)	
			10/1/2002 11:05	-45.05	Bottom of Run 1 (C1)	GRANODIORITIC GNEISS (RQD=35%)
			10/1/2002 11:43	-45.95	Bottom of Run 2 (C2)	GRANODIORITIC (RQD=0%)
BR-13 (try 4)	1282227.5	392604	6/10/02	-38.44	Mudline	
			10/1/2002 13:55	-41.81	6" casing on hard surface	
			10/1/2002 13:52	-42.91	4" casing refusal / Top of Run 1 (C1)	
			10/1/2002 16:35	-53.91	Bottom of Run 1 (C1)	GRANODIORITIC GNEISS (RQD=56%)
BR-14	1282262.7	392771.5	6/10/02	-38.50	Mudline	
			10/3/2002 9:14	-44.37	Top of Spoon (S1)	
			10/3/2002 9:18	-46.29	Bottom of Spoon (S1)	Dense reddish brown SAND
			10/3/2002 9:50	-50.66	4" casing driven into sediment	
			10/3/2002 10:12	-50.30	Top of Spoon (S2)	
			10/3/2002 10:20	-51.78	Bottom of Spoon (S2)	Fine to medium GRAVEL; Dense reddish brown SAND
			10/3/2002 10:45	-55.10	Top of Spoon (S3)	
			10/3/2002 10:52	-55.70	Bottom of Spoon (S3)	Medium angular GRAVEL
BR-15	1282266.6	392737.7	10/3/2002 12:43	-51.35	Rollerbit refusal on bedrock	
BR-16	1282261.6	392716.9	10/3/2002 15:09	?	Could not determine bedrock depth due to its sharp slope. Rollerbit and spoon slid down slope of rock.	
BR-17	1282195.3	392388.4	10/4/2002 11:05	-46.90	4" casing refusal / rollerbit refusal	
			10/4/2002 12:17	-47.90	Bottom of Run 1 (C1)	Recovery 0.1ft. Diorite cobble is only rock recovered.

Table 4.3
Cross Sound Cable Project
Summary of Geotechnical Laboratory Analyses

Boring #	Sample ID	Depth (FT MLLW)	Moisture Content (%)	Bulk Density (lb/ft³)	Compressive Strength (psi)	Average Splitting Tensile Strength (psi)
BR-3B	C-2	-47.1 to -48.1	0.25	164	15,344	2,822
BR-7	C-1	-45.5 to -46.7	0.54	164	12,087	2,607
BR-10	C-1	-48.4 to -49.7	0.27	163	12,908	4,062
BR-12	C-1	-45.3 to -46.2	0.43	164	19,447	3,766
BR-12	C-2	-51.05 to -52.6	0.37	163	19,587	4,035
BR-13	C-1 upper	-42.9 to -43.6	0.33	163	20,447	3,680
BR-13	C-1 lower	-47.45 to -48.45	0.32	164	14,547	3,113

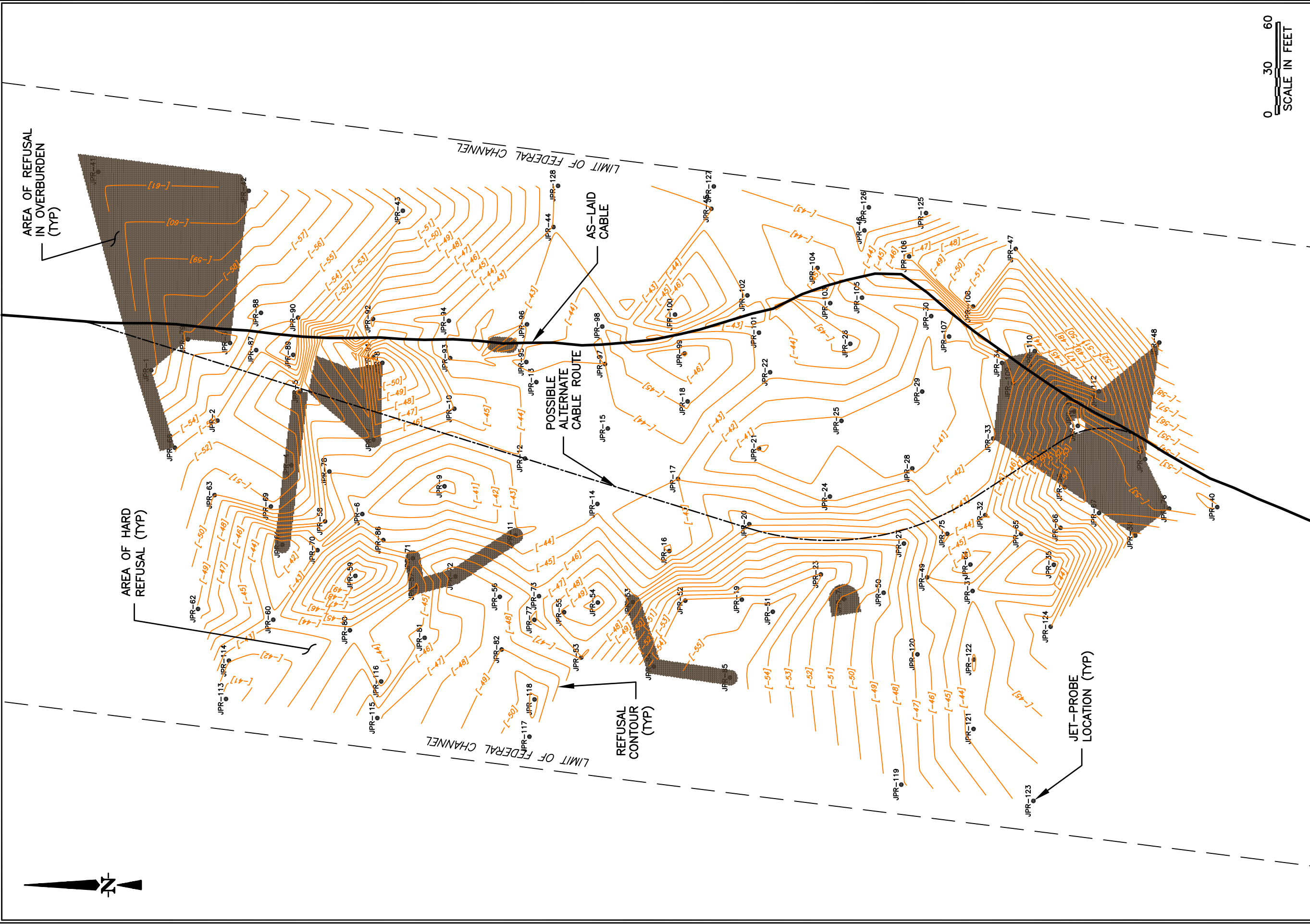
FIGURES

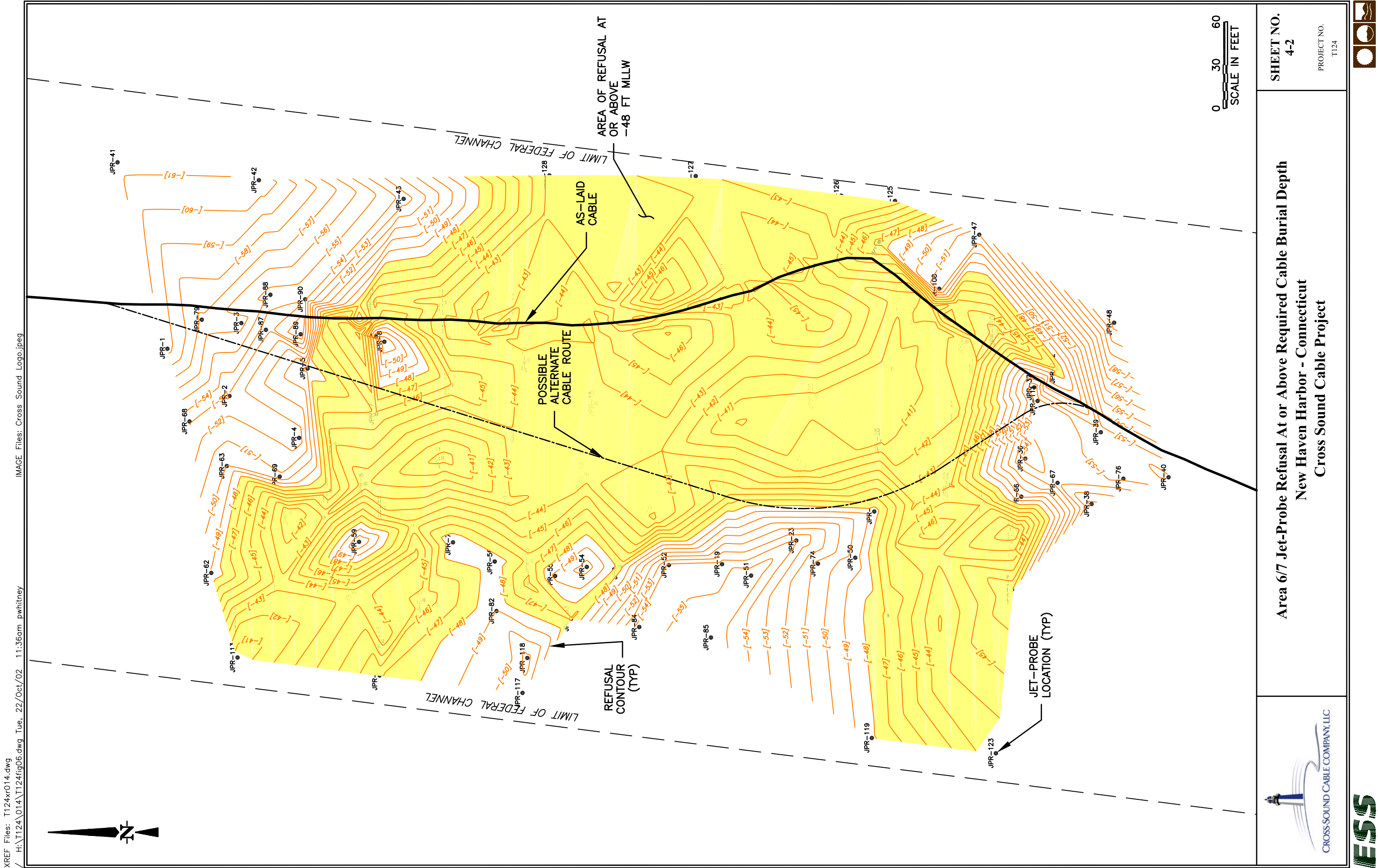


Area 6/7 Location
New Haven Harbor - Connecticut
Cross Sound Cable Project

SHEET NO.
2-1
PROJECT NO.
T124







Area 6/7 Jet-Probe Refusal At or Above Required Cable Burial Depth
New Haven Harbor - Connecticut
Cross Sound Cable Project

SHEET NO.
4-2

PROJECT NO.
TT24





AS-LAID CABLE

**BORING
LOCATION
(TYP)**

TOP OF ROCK DATA FROM BOTH BORINGS AND JET-PROBES USED TO GENERATE CONTOURS.



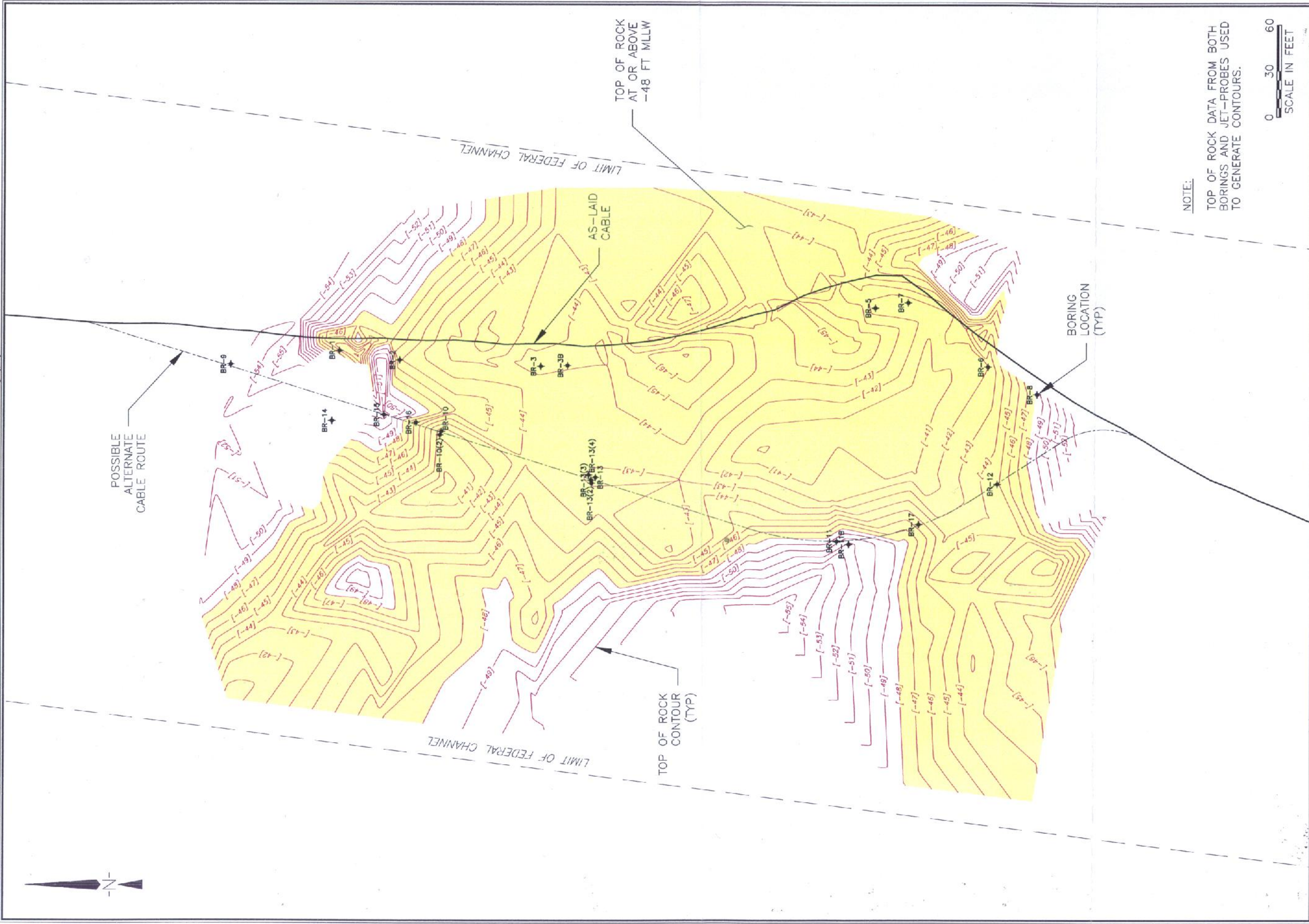
CROSS-SOUND CABLE COMPANY, LLC

Cross Sound Cable Project

4-3

T124





Area 6/7 Top of Rock At or Above Required Cable Burial Depth
New Haven Harbor - Connecticut
Cross Sound Cable Project

SHEET NO.
4-4

PROJECT NO.
T124



ATTACHMENT A

BORING LOGS



ENVIRONMENTAL SCIENCE SERVICES, INC.
ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9-13-02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and wash

Sampling Method: 2" split spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: **BR-1**

Drilling Platform Type: Spud barge

Water Depth (ft.): _____

Weather: Sunny, mid 70's

Seas: _____

Sed./Water Elevation (ft. MLLW): -37.0'

ESS Observer: J Bonsteel

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Lab Data Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density ¹ , color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40	S1	D	7, 6 14, 20	2.0'/2.0'	N/A				Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-45	S2	D	9, 10 20, 20	1.0'/2.0'	N/A				0-1.7' Loose, black, organic SILT 1.7'-2.0' Medium dense, brown, fine SAND AND SHELL HASH, some silt, trace fine rounded gravel		
	S3	D	31, 15 16, 12	0.3'/2.0'	N/A				0-0.5' Loose to medium dense, brown, fine SAND AND SHELL HASH, trace silt 0.5-1.0' Medium dense, reddish brown, fine SAND, trace silt (Till)		
-50	S4	D	29, 100/0.4' 10-300lb hammer	1.4'/2.0'	N/A				Medium dense, reddish brown, fine SAND and fine subangular GRAVEL, trace silt (Till)		
									Very dense, brownish red, fine to coarse SAND and fine subrounded to rounded GRAVEL, some silt, trace coarse rounded gravel (Till)		
									End of exploration: -51.9' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



ENVIRONMENTAL SCIENCE SERVICES, INC.
ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/19/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: **BR-2**

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: Sunny, upper 70's

Seas: _____

Sed./Water Elevation (ft. MLLW): -37.0'

ESS Observer: J Baldwin, J Bonsteel

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents ¹ Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ² .	Graphical Log	Fracture Descriptions
-40	S1	D	29 43 110 33	0.9'/2.0'					Mudline - Based on Multi-beam Hydrography Survey, June 2001 0-0.4' Dense, brownish red, fine to medium SAND, trace coarse subrounded gravel (Till) 0.4'-0.9' Dense, coarse GRAVEL with trace fine to medium dark gray sand (Till)		
-45	S2	D	101/0.65 95/0.1'	0.52'/0.7'					0-0.6' Very dense brown coarse SAND and fine subrounded GRAVEL 0.6'-0.75' Very dense, brownish red, SAND, some silt (Till)		-45.9(m), -46.3(90), -46.8(90), -47.1(85), -47.4(90), -47.6(35), -46.8(20), -47.95(35), -48.25-48.4 rubble
	C1	C	20 min 15 min 11 min	3.3'/3.5'	47%			1 4 4 rubble	Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse-grained, fresh to slightly weathered, close to very close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		
	C2	C	19 min 18min/ 0.5'	0.4'/1.5'	100%			1			-48.85(m)
-50	C3	C	24 min 33min/ 0.9'	1.4'/1.9'	66%			3 1			-50.5(90), -50.9(m), -50.95(25), -51.3(30)
									End of exploration: -52' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/23/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: **BR-3B**

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: _____ Wind 15-20 N

Seas: _____

Sed./Water Elevation (ft. MLLW): -37.0

ESS Observer: J Baldwin, J Hershberger

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40											
-45	C1	D	17 min 9 min 18 min	3.0'/3.1'	0%			6 R 10	Light grey GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse grained, very slightly weathered, very close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		**High angle (10) fractures throughout run; majority of horizontal breaks appear mechanical;
-50	C2	D	13 min 16 min 6 min 17 min	4.0'/4.0'	43%	1534	2822	2 1 5 8			-46.8-47.2(10), -47(90), -48(50)-48.75(90), -48.75-50.6(10), -49.6(m), -49.8(90), -50.2(90), -50.4(m), -50.7(80)
-55	C3	D	13 min 16 min 6 min 7 min	3.9'/4.0'	41%			4 2 3 7			-51.1-51.45(25), -51.6(90), -51.6-51.75(40), -51.8-52.05 rubble, -52.8(80), -52.9-53.5(15), -53.4(80), -54(90), -54.4-54.7 rubble
-55									End of exploration: -54.8' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

²PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

ROCK

ROCK QUALITY DESIGNATION (RQD):

reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9-12-02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-5

Drilling Platform Type: Spud barge

Water Depth (ft.):

Weather: Sunny, low 70's

Seas:

Sed./Water Elevation (ft. MLLW): -35.07'

ESS Observer: J Bonsteel, J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Lab Data Unconfined Compressive Strength Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ¹	Graphical Log	Fracture Descriptions
-35										
								Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-40										
	S1	D	31	0.5'/0.75'				Dense, red, fine SAND and fine subrounded GRAVEL (Till)		
	C1	C	26 min	4.1'/5'	78%		5	Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse-grained fresh to very slightly weathered, close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		-41.4-41.65 rubble, -42.1(m), -42.3 (90), -42.55(m), -42.9(90), -43.15(m), -43.55(90), -44.2(m), -44.6(40), -44.8(m), -44.9(35), -45(75)
			9 min				4			
			18 min				3			
			12 min				4			
-45			29 min				0			
								End of exploration: -46.4' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹ Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):

reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³ FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns-: fracture not separated
m-: mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/11/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: **BR-6**

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: Clear, mid 70's, windy

Seas: _____

Sed./Water Elevation (ft. MLLW): -36.7

ESS Observer: first initial and last name

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Lab Data		# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents ¹ Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ²	Graphical Log	Fracture Descriptions
						Unconfined Compressive Strength	Splitting Tensile Strength				
-35											
									Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-40	S1	D	19	2.0'/2.0'					Medium dense, brownish red, fine to coarse SAND and coarse rounded to subrounded GRAVEL, trace silt (Till)		
			21								
			35								
			51								
	C1	C	7 min	0.98'/1.5'					Cored through COBBLE. Depth of bedrock not determined at this location.		
			29 min/ 0.5'								
									End of exploration: -43.5' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹ Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):

reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³ FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/20/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-7

Drilling Platform Type: Spud Barge

Water Depth (ft.):

Weather: Partly cloudy, winds 10-15

Seas:

Sed./Water Elevation (ft. MLLW): -35.5

ESS Observer: J Baldwin, J Bonsteel

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Lab Data		# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents ¹ Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
						Unconfined Compressive Strength	Splitting Tensile Strength				
-35											
									Mudline - Based on Multi-beam Hydrography Survey, June 2001		
	S1	D	100/0.6'	0.7'/0.6'					0-0.6' Very loose, brown, sandy SILT with some fine to coarse subrounded to rounded gravel 0.6-0.7' Dense, brownish red, SAND and fine to coarse angular to subrounded GRAVEL		
-40	C1	C	31 min	7.4'/7.0+	55%			1			
			17 min					2	Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse-grained, fresh to slightly weathered, close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss) **evidence of near vertical fractures throughout the core		
			21 min					4			
			44 min					3			
-45			21 min			12087	2607	1			
			15 min					4			
			38 min					1			
									End of explortation: -48.2' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:
dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹ Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³ FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/13/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-8

Drilling Platform Type: Spud Barge

Water Depth (ft.):

Weather: Sunny, 80's, breezy

Seas:

Sed./Water Elevation (ft. MLLW): -37.5'

ESS Observer: J Bonsteel

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Lab Data		# of Fractures per foot	Materials Description Soils: moisture, density ¹ , color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
						Unconfined Compressive Strength	Splitting Tensile Strength				
-40	S1	D	46, 16 18, 17	1.1' 2.0'					Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-45	S2	D	30, 27 50, 57	1.4' 2.0'					Dense, brownish red, medium to coarse SAND, trace fine subrounded gravel (Till) **trace weathered lithic material (granitic gneiss)		
-50	S3	D	23, 22 33, 52	2.0' 2.0'					0-0.9' Dense, brownish red, coarse SAND and fine rounded GRAVEL, some silt, trace fine sand 0.9'-2.0' Dense, brownish red, fine SAND, trace coarse sand, trace silt (Till)		
									End of exploration: -51.7' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

¹ Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³ FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 6.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/26/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: **BR-9**

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: Cloudy, Wind 5-10 E

Seas: _____

Sed./Water Elevation (ft. MLLW): -37.66'

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Lab Data Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density ¹ , color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40									Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-45	S1	D	1, 3 1, 2	2.0' 2.0'					Very loose, black SILT, little gravel, little shell hash		
-50	S2	D	2, 5 3, 2	0.9' 2.0'					Very loose to loose, dark grey, medium to coarse SAND, some shell hash, little fine gravel		
-55	S3	D	63, 45 81, 79	2.0' 2.0'					Very dense, grey, medium to coarse SAND and fine to coarse GRAVEL, little shell hash (Till)		
									End of exploration: -58.1' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



ENVIRONMENTAL SCIENCE SERVICES, INC.
ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/30/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: **BR-10 (try 1)**

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: Clear skies, 70's

Seas: _____

Sed./Water Elevation (ft. MLLW): -38.5'

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Lab Data Unconfined Compressive Strength Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density ¹ , color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40	S1	D	10, 20 37, 63	2.0'/2.0'				Mudline - Based on Multi-beam Hydrography Survey, June 2001		
								0-1.2' Medium dense, dark grey, coarse SAND and fine GRAVEL, little shell hash		
								1.2'-2.0' Dense to very dense, reddish brown, fine to medium SAND, trace coarse gravel, trace shell hash		
	C1	C	14 min 34 min/ 0.9'	1.9'/1.9'	21%		1	Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard very slight weathering, close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		-42.25-43.9(15), -43.1(75), -43.7(75), -43.85(70)
							3			
	C2	C	31 min	0.8'/1.0'	0%		4			-44.1(40), -44.3(80), -44.6(80), -44.45-44.7(35)
-45	C3	C	23 25 22	1.2'/3.0'	71%		2			-45.75(35), -46.1(70)
							NA			
							NA			
								End of exploration: -47.9'MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 10/2/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-10 (try 2)

Drilling Platform Type: Spud Barge

Water Depth (ft.):

Weather: Wind 10-15 SW

Seas:

Sed./Water Elevation (ft. MLLW): -38.5'

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Lab Data		# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents ¹ Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
						Unconfined Compressive Strength	Splitting Tensile Strength				
-40									Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-45									Rollerbit advance through rock to -47.9' MLLW. See BR-10 (try 1) for rock description		
-50	C1	C	18 min	7.65'/8.0'	54%			2	Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse-grained, very slight to slightly weathered, close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		-47.55-47.75(30), -47.75-47.95(25), -48.4(m), -49.65(m), -50(90), -50.15-51(15), -51.15(m), -51.9(5), -52.05-52.8(15), -53.65(5), -53.65-53.9(20), -54.55(m)
			17 min			12908	4062	1			
			21 min					1			
			12 min					4			
			12 min					2			
			10 min					3			
			10 min					2			
-55			23 min					4			
									End of exploration: -55.2' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):

reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)

ns- : fracture not separated

m- : mechanical fracture

example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)

Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/25/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-11 (try 1&3)

Drilling Platform Type: Spud Barge

Water Depth (ft.):

Weather: Low 70's, wind 10-15 NE

Seas:

Sed./Water Elevation (ft. MLLW): -37.5'

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents ¹ Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ²	Graphical Log	Fracture Descriptions
-40	S1	D	16, 28 38, 61	1.55'/ 2.6'					Mudline - Based on Multi-beam Hydrography Survey, June 2001 From BR-11 (try 1) 0-0.3' Medium dense, grey coarse SAND and fine subrounded GRAVEL 0.3'-1.55' Dense to very dense, reddish brown, fine SAND, some silt (Till)		
-45	S2	D	11, 10 9, 7	1.4'/2.0'					From BR-11 (try 1) 0-0.3' Medium dense, reddish brown, medium SAND (Till) 0.3'-0.6' Medium dense, dark grey, coarse SAND and fine GRAVEL, some shell hash 0.6'-1.4' Medium dense to loose, reddish brown, fine SAND, some silt (Till)		
-50	S3	D	3, 3 3, 6	0/2.1'					From BR-11 (try 1) **No Recovery		
-55	C1	C	10 min 6 min 5 min 6 min	2.9'/4.0'	47%			3 4 6 NR	From BR-11 (try 3) Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, fresh to moderate weathering, close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss) (-53-54) Slightly to moderately weathered		-51.5(90), -52.25(30), -52.3(90), -53.05-53.2(90), -53.5-53.6(90), -53.85-53.95(90)
									End of exploration: -55.3' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured
²PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 9/26/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-12

Drilling Platform Type: Spud Barge

Water Depth (ft.):

Weather: Cloudy, winds 10-15 NE

Seas:

Sed./Water Elevation (ft. MLLW): -37.75

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density, color, size, major and minor constituents Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40	S1	D	7, 7 9, 20	1.4'/ 2.2'					Mudline - Based on Multi-beam Hydrography Survey, June 2001 0-0.5' Loose, dark grey, coarse SAND and fine to coarse subrounded GRAVEL, little shell hash 0.5'-1.4' Medium dense, reddish brown, medium to coarse SAND and fine to coarse subrounded GRAVEL (Till)		
-45	S2	D	63/0.2'	0.2'/0.2'					Very dense, fine to medium subangular to subrounded GRAVEL		
-45	C1	C	13 min 9 min 8 min 7 min 10 min	4.8'/ 5.0'	65%	1944	3766	1 1 3 2 2	Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse-grained, fresh to slightly weathered, close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		-45.2(85), -46.1(80), - 47.05(90), -47.4(85), - 47.75(90), -47.95(85) - 48.2(75), -48.9(m), -49.2(85)
-50	C2	C	5 min 25 min 17 min 8 min 10 min	3.75'/ 5.0'	100%	1958	4035	1 1 0 0			-50.3(80), -51.05(70), - 52.6(85)
-55									End of exploration: -54.8' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

²PROPORTIONS USED:
Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY
0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:
dry
damp
moist
wet

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



ENVIRONMENTAL SCIENCE SERVICES, INC.
ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 10-1-02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-13 (try 3/4)

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: Wind 15-20 SW

Seas: _____

Sed./Water Elevation (ft. MLLW): -38.44

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density ¹ , color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40									Mudline - Based on Multi-beam Hydrography Survey, June 2001		
	C1	C	21 min	2.55'/3'	35%			R,1	From BR-13 (try 3): Light grey, GRANODIORITIC GNEISS, variable gneissic foliation, hard, medium to coarse-grained, very slightly weathered, very close to close fractures, predominantly quartz, plagioclase feldspar and mafics (hornblende and biotite) (Lighthouse Gneiss)		-42.1-42.35 rubble, -42.35-42.85(10), -43.3-43.85(m), -43.75(75), -43.95-44.65(15)
			15 min			20447	3680	R,2			
			40 min					1			
-45	C2	C	25 min/ 0.9'	0.7'/0.9'	0%			0			-45.1-45.65(15)
	C1	C	16 min	6.0'/7.0'	56%			1	From BR-13 (try 4): Same as above.		-47.61(m), -47.91(m), -48.01-48.41(15), -48.81-49.31(15), -49.41(60), -49.66-50.01(20), -50.11(90), -50.56-51.01(25), -51.46(45), -52.31-52.91(20), -53.51-53.91 rubble
			8 min			14547	3113	6			
			8 min					7			
-50			12 min					5			
			15 min					2			
			36 min					0			
			24 min					R			
-55									End of exploration: -53.9' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

² PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):
reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³ FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide



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ENVIRONMENTAL SCIENTISTS, ENGINEERS AND PLANNERS

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
Telephone: (781) 431-0500
Fax: (781) 431-7434

Client: TEUS

Site: New Haven Harbor

Date(s): 10/3/02

Drilling Company: Warren George, Inc.

Drilling Method: Drive and Wash

Sampling Method: 2" Split Spoon / Rock Coring

ESS Job No.: T124-024.2

Boring No: BR-14

Drilling Platform Type: Spud Barge

Water Depth (ft.): _____

Weather: _____ Wind 0-5 SW, hazy

Seas: _____

Sed./Water Elevation (ft. MLLW): -38.5'

ESS Observer: J Baldwin

Elevation (feet MLLW)	Sample No.	Sample Type	Blows per 6 inches or Core Run (time/ft.)	Recovery/Penetration (ft)	Rock Quality Designation (RQD)	Unconfined Compressive Strength	Lab Data Splitting Tensile Strength	# of Fractures per foot	Materials Description Soils: moisture, density ¹ , color, size, major and minor constituents ² Rock: color, rock type, hardness, weathering degree of fracturing, type of fractures, major mineral types, fracture descriptions ³ .	Graphical Log	Fracture Descriptions
-40									Mudline - Based on Multi-beam Hydrography Survey, June 2001		
-45	S1	D	5, 10 13, 14	2.0'/ 2.0'					0-1.1' Loose, black SILT 1.1'-2.0' Medium dense, reddish brown, fine SAND, little coarse subrounded to subangular gravel (Till)		
-50	S2	D	86, 47 92	0.8'/ 1.5'					0-0.35' Very dense, fine to medium GRAVEL 0.35'-0.8' Dense, reddish brown, fine SAND (Till)		
-55	S3	D	50/0.5'- 300lb hammer	0.3'/					0-0.3' Very dense, medium angular GRAVEL and fine reddish brown SAND (Till)		
									End of exploration: -55.7' MLLW		

LEGEND:

ND: not detected
N/A: not applicable
bgs: below ground surface
NM: not measured

²PROPORTIONS USED:

Trace: <10%
Little: 10-20%
Some: 20-35%
And: 35-50%

SAMPLE TYPES:

D: drive
W: washed
TP: test pit
ST: Shelby Tube
A: auger
HA: hand auger
C: cored

SOIL

GRANULAR SOILS DENSITY

0-4: very loose
5-9: loose
10-29: medium dense
30-49: dense
50+: very dense

MOISTURE:

dry
damp
moist
wet

PLASTIC SOILS DENSITY:

0-2: very soft
3-4: soft
5-8: medium stiff
9-15: stiff
16-30: very stiff
>30: hard

¹Density designation based on blow counts for each 6 inches of penetration using a 140 lb. wt x 30" drop on a 2" O.D. sampler

ROCK

ROCK QUALITY DESIGNATION (RQD):

reported in % = [length of core in pieces 4-inches and longer/length of run] x 100

³FRACTURE DESCRIPTIONS:

fractures recorded as follows:
depth (angle of fracture relative to vertical axis)
ns- : fracture not separated
m- : mechanical fracture
example for 3 fractures: ns-8.25(40), 8.75(70), 10.24(10)
Designations for hardness, weathering, and degree and type of fracturing are outlined in Rock ID Guide

ATTACHMENT B

GEOTECHNICAL LABORATORY RESULTS

GeoTesting Express
1145 Mass Avenue - Boxborough, MA 01719
(978) 635-0424 - Fax (978) 635-0266

LETTER OF TRANSMITTAL

TO:

Mr. Payson Whitney

Environmental Science Services, Inc.

888 Worcester Street

Suite 240

Wellesley, MA 02482

DATE: 10/21/02

GTX NO: 4273

RE: TEUS Cross Sound Cable Project

Pages (excluding transmittal):

We are sending you ☒ Attached ☐ Under separate cover via _____ the following items:
☒ Test results ☐ Proposal ☒ Report ☐ Samples ☐ Specifications ☐ Invoice
☐ Copy of letter ☐ Change order
☐ Other

COPIES	DATE	DESCRIPTION
1	10/21/02	October 2002 Laboratory Test Reports
		7 Unconfined Compressive Strength OF Rock Core Specimens
		7 Splitting Tensile Strength of Rock Core Specimens
		7 Moisture Content of Rock

THESE ITEMS ARE TRANSMITTED as checked below:

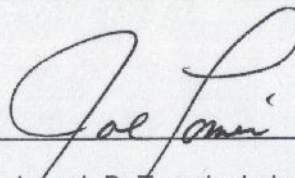
- ☐ For approval ☐ Approved as submitted
☒ For your use ☐ Approved as noted
☒ As requested ☐ Returned for corrections
☐ For review and comment
☐ For bids due _____, 20
☐ _____

- ☐ Resubmit _____ Copies for approval
☐ Submit _____ Copies for distribution
☐ Return

REMARKS

COPY TO _____

SIGNED



Joseph D. Fomei - Laboratory Manager

Geotechnical Test Report

TEUS Cross Sound Cable Project

Prepared for:

Environmental Science Services

Wellesley, MA

Prepared by:



GeoTesting Express, Inc.

Boxborough, MA

October 21, 2002

Bulk Density and Compressive Strength of Rock Core Specimens (ASTM D 2938)

Client: Environmental Science Services
Project Name: TEUS Cross Sound Cable
Project Location: ---

GTX #: 4273
Test Date: 10/15/02
Tested By: md
Checked By: jdt

Boring ID	Sample ID	Depth, ft	Moisture Content, %	Bulk Density, lb/ft ³	Compressive Strength, psi	In conformance with ASTM D 4543
BR-3B	C-2	-47.1 to -48.1	0.25	164	15,344	YES
BR-7	C-1	-45.5 to -46.7	0.54	164	12,087	YES
BR-10	C-1	-48.4 to 49.7	0.27	163	12,908	YES
BR-12	C-1	-45.3 to -46.2	0.43	164	19,447	YES
BR-12	C-2	-51.05 to -52.6	0.37	163	19,587	YES
BR-13	C-1 upper	-42.9 to -43.6	0.33	163	20,447	YES
BR-13	C-1 lower	-47.45 to -48.45	0.32	164	14,547	NO

Notes: Density determined on rock core samples by measuring dimensions and weight and then calculating.
Moisture content determined on post compression test specimens by drying to a constant mass at 110 Celsius.
See attached data sheets for determinations of values listed above.
See attached photographs for specimen break type

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Test Date: 10/15/2002
 Tested By: md
 Checked By: jdt

Client: Environmental Science Services
 GTX #: 4273
 Project Name: TEUS Cross Sound Cable
 Project Location: ---

Sample #: C-1
 Boring #: BR-7
 Depth: 45.5 to 46.7 ft.
 Visual Description: See photograph

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: m13
 Wet Mass & Tare, g: 601.78
 Dry Mass & Tare, g: 598.58
 Mass Tare, g: 8.17
 Moisture Content, %: 0.54
 Oven Dried

BULK DENSITY

	1	2	3	Avg.	Bulk Density
Specimen Length, in:	4.515	4.515	4.515	4.515	163
Specimen Diameter, in:	1.98	1.98	1.978	1.979	Dry Density
Specimen Mass, g:	596	596	596	596	---

DEVIATION FROM STRAIGHTNESS

	Max	Min	Difference
Measurements at 0 Degrees	0	-0.011	0.011
Measurements at 120 Degrees	0	-0.01545	0.01545
Measurements at 240 Degrees	0.01525	0	0.01525

Maximum difference value less than 0.020 in?
YES

FLATNESS TOLERANCES

	-7/8"	-3/4"	-5/8"	-1/2"	-3/8"	-1/4"	-1/8"	0	+1/8"	+1/4"	+3/8"	+1/2"	+5/8"	+3/4"	+7/8"
Measurements at 0 Degrees	-0.0007	-0.00055	-0.0004	-0.00025	-0.00028	-0.0002	-0.00015	0	0.00005	0.0001	0.00015	0.0002	0.00025	0.00025	0.00025
Measurements at 90 Degrees	-0.00045	-0.00015	0	0.00005	0.00005	0.0001	0.00005	0	-0.0001	-0.00015	-0.00025	-0.0004	-0.00055	-0.0007	-0.0009

Difference between max and min readings: 0 degrees 0.00095 90 degrees 0.001

END 2

Measurements at 0 Degrees
 Measurements at 90 Degrees

Difference between max and min readings: 0 degrees 0.00105 90 degrees 0.001

Maximum difference value less than 0.0043 in?
YES

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Client: Environmental Science Services
 GTX #: 4273
 Project Name: TEUS Cross Sound Cable
 Project Location: ---
 Sample #: C-2
 Boring #: BR-3B
 Depth: -47.1 to -48.1 ft.
 Visual Description: See photograph
 Test Date: 10/15/2002
 Tested By: md
 Checked By: jdt

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: np4
 Wet Mass & Tare, g: 599.9 ---
 Dry Mass & Tare, g: 598.4 ---
 Mass Tare, g: 8.13 ---
 Moisture Content, %: 0.25
 Oven Dried

BULK DENSITY

	1	2	3	Avg.	Bulk Density
Specimen Length, in:	4.47	4.46	4.46	4.463	164
Specimen Diameter, in:	1.983	1.983	1.982	1.983	Dry Density
Specimen Mass, g:	594	594	594	594	---

DEVIATION FROM STRAIGHTNESS

	Max	Min	Difference
Measurements at 0 Degrees	0.00725	-0.00575	0.013
Measurements at 120 Degrees	0	-0.0142	0.0142
Measurements at 240 Degrees	0.00425	-0.0064	0.01065

Maximum difference value less than 0.020 in?
YES

FLATNESS TOLERANCES

	-7/8"	-3/4"	-5/8"	-1/2"	-3/8"	-1/4"	-1/8"	0	+1/8"	+1/4"	+3/8"	+1/2"	+5/8"	+3/4"	+7/8"
END 1															
Measurements at 0 Degrees	-0.0001	-0.00005	0.0002	0.00025	0.00015	0.0001	0.0001	0	-0.0001	-0.00015	-0.00015	-0.0003	-0.00045	-0.00065	-0.00095
Measurements at 90 Degrees	-0.0001	-0.00095	-0.0007	-0.0005	-0.0003	-0.0002	-0.00015	0	0	0.00015	0.00015	0.00015	0.00015	0.00015	0.0002

Difference between max and min readings:

90 degrees 0.0012

END 2

Measurements at 0 Degrees	0.0001	-0.00065	-0.0005	-0.0004	-0.00035	-0.00025	-0.00015	0	0	0.00005	0.0001	0.0002	0.0002	0.0002	0.00025
Measurements at 90 Degrees	-0.0008	-0.00065	-0.00045	-0.00035	-0.0003	-0.0003	-0.00015	0	0	0.00005	0.00015	0.00015	-0.0002	0.0003	0.0004

Difference between max and min readings:

90 degrees 0.0012

Maximum difference value less than 0.0043 in?

YES

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Test Date: 10/15/2002
 Tested By: md
 Checked By: jdt

Client: Environmental Science Services
 GTX #: 4273
 Project Name: TEUS Cross Sound Cable
 Project Location: ---

Sample #: C-1 lower
 Boring #: BR-13
 Depth: 42.9 to 43.6 ft
 Visual Description: See photograph

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: k1a
 Wet Mass & Tare, g: 567.68
 Dry Mass & Tare, g: 565.88
 Mass Tare, g: 8.25
 Moisture Content, %: 0.32
 Oven Dried

BULK DENSITY
 1 2 3 Avg.
 Specimen Length, in: 4.42 4.41 4.41 4.413
 Specimen Diameter, in: 1.983 1.983 1.983 1.983
 Specimen Mass, g: 586 586 586 586
 Bulk Density: 163
 Dry Density: ---

DEVIATION FROM STRAIGHTNESS

Measurements at 0 Degrees
 Measurements at 120 Degrees
 Measurements at 240 Degrees
 Maximum difference value less than 0.020 in?
 NO

FLATNESS TOLERANCES

END 1
 Measurements at 0 Degrees
 Measurements at 90 Degrees
 Difference between max and min readings:
 0 degrees 0.0005
 90 degrees 0.00125

END 2

Measurements at 0 Degrees
 Measurements at 90 Degrees
 Difference between max and min readings:
 0 degrees 0.0008
 90 degrees 0.00105

Maximum difference value less than 0.0043 in?
 YES

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Test Date: 10/15/2002
Tested By: md
Checked By: jdt

Environmental Science Services
4273
TEUS Cross Sound Cable

Client:
GTX #:
Project Name:
Project Location:

Sample #: C-1 upper
Boring #: BR-13
Depth: 42.9 to 43.6 ft.
Visual Description: See photograph

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: bo1
Wet Mass & Tare, g: 597.48
Dry Mass & Tare, g: 595.57
Mass Tare, g: 8.14
Moisture Content, %: 0.33
Oven Dried

BULK DENSITY

	1	2	3	Avg.	Bulk Density
Specimen Length, in:	4.5	4.5	4.5	4.500	162
Specimen Diameter, in:	1.982	1.982	1.982	1.982	Dry Density
Specimen Mass, g:	593	593	593	593	---

DEVIATION FROM STRAIGHTNESS

Measurements at 0 Degrees
Measurements at 120 Degrees
Measurements at 240 Degrees

Maximum difference value less than 0.020 in?
YES

FLATNESS TOLERANCES

END 1
Measurements at 0 Degrees
Measurements at 90 Degrees

	-7/8"	-3/4"	-5/8"	-1/2"	-3/8"	-1/4"	-1/8"	0	+1/8"	+1/4"	+3/8"	+1/2"	+5/8"	+3/4"	+7/8"
Measurements at 0 Degrees	0.0001	0.00005	0.00005	0.00005	0	-0.00005	-0.00005	0	0	-0.00005	-0.00015	-0.00015	-0.00025	-0.0004	-0.00045
Measurements at 90 Degrees	0.00035	0.00035	0.00035	0.00035	0.0002	0.0002	0.00005	0	-0.00015	-0.00035	-0.0005	-0.0008	-0.00125	-0.0017	-0.0022

Difference between max and min readings:

0 degrees 0.00055
90 degrees 0.00255

END 2

Measurements at 0 Degrees
Measurements at 90 Degrees

	-0.0018	-0.00155	-0.0011	-0.00075	-0.00045	-0.0003	-0.00015	0	0	0.00005	0.00015	0.0002	0.00035	0.0003	0.00015	0.0002
Measurements at 0 Degrees	-0.0018	-0.00155	-0.0011	-0.00075	-0.00045	-0.0003	-0.00015	0	0	0.00005	0.00015	0.0002	0.00035	0.0003	0.00015	0.0002
Measurements at 90 Degrees	-0.00045	-0.00035	-0.0003	-0.0002	-0.00015	-0.0001	0	0	0.00005	0.00015	0.0002	0.00015	0.0002	0.00015	0.00015	0.0002

Difference between max and min readings:

0 degrees 0.00215
90 degrees 0.00065

Maximum difference value less than 0.0043 in?
YES

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Client: _____
 GTX #: _____
 Project Name: _____
 Project Location: _____

Environmental Science Services
 4273
 TEUS Cross Sound Cable

Test Date: 10/15/2002
 Tested By: md
 Checked By: jdt

Sample #: C-2
 Boring #: BR-12
 Depth: -51.05 to -52.6 ft.
 Visual Description: See photograph

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: _____
 Wet Mass & Tare, g: _____
 Dry Mass & Tare, g: _____
 Mass Tare, g: _____

Moisture Content, %
 0.37

Oven Dried

BULK DENSITY

Specimen Length, in: _____
 Specimen Diameter, in: _____
 Specimen Mass, g: _____

Bulk Density
 163

Dry Density

DEVIATION FROM STRAIGHTNESS

Maximum difference value less than 0.020 in?

YES

FLATNESS TOLERANCES

END 1
 Measurements at 0 Degrees
 Measurements at 90 Degrees

Difference between max and min readings:

90 degrees 0.00165

END 2

Measurements at 0 Degrees
 Measurements at 90 Degrees

Difference between max and min readings:

90 degrees 0.0009

Maximum difference value less than 0.0043 in?

YES

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Test Date: 10/15/2002
 Tested By: md
 Checked By: jdt

Client: Environmental Science Services
 GTX #: 4273
 Project Name: TEUS Cross Sound Cable
 Project Location: ---

Sample #: C-1
 Boring #: BR-12
 Depth: -45.3 to -46.2 ft
 Visual Description: See photograph

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: for4
 Wet Mass & Tare, g: 600.29 ---
 Dry Mass & Tare, g: 597.76 ---
 Mass Tare, g: 8.12 ---
 Moisture Content, %: 0.43
 Oven Dried

BULK DENSITY
 1 2 3 Avg.
 Specimen Length, in: 4.5 4.5 4.51 4.503 164
 Specimen Diameter, in: 1.979 1.98 1.979 1.979 Dry Density
 Specimen Mass, g: 596 596 596 596 ---

DEVIATION FROM STRAIGHTNESS

Measurements at 0 Degrees: 0.0046 Max Min Difference 0.0051
 Measurements at 120 Degrees: 0 -0.01095 0.01095
 Measurements at 240 Degrees: 0.0022 -0.00275 0.00495
 Maximum difference value less than 0.020 in?
 YES

FLATNESS TOLERANCES

END 1
 Measurements at 0 Degrees: -0.0003 -0.0002 -0.00015 -0.0001 -0.0005 0 0.00015 0.00015 0.00015 -0.0002 -0.0002 -0.00035 -0.0004 -0.00045
 Measurements at 90 Degrees: 0.00045 0.00065 0.0006 0.00045 0.00015 0.0001 0.00015 0.00015 0.00015 -0.0004 -0.0006 -0.0007 -0.0009 -0.00105
 Difference between max and min readings: 0 degrees 0.0005 90 degrees 0.0017

END 2

Measurements at 0 Degrees: -0.00155 -0.0011 -0.0008 -0.0006 -0.0004 0 -0.00015 0 0.00015 0.0002 0.00015 0.0001 0.0001 0.0001 -0.00005
 Measurements at 90 Degrees: -0.0006 -0.00045 -0.0004 -0.0003 -0.00015 -0.0001 0 0.00005 0.0001 0.0002 0.0003 0.0003 0.0003 0.0003
 Difference between max and min readings: 0 degrees 0.00175 90 degrees 0.0009

Maximum difference value less than 0.0043 in?
 YES

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D 4543

Client:
GTX #:
Project Name:
Project Location:

Environmental Science Services

4273
TEUS Cross Sound Cable

Sample #:
Boring #:
Depth:
Visual Description:

C-1 try 2
BR-10
-48.4 to -49.7 ft
See photograph

Test Date: 10/15/2002
Tested By: md
Checked By: jdt

Sample Preparation: Air Dried or Oven Dried prior to shearing

MOISTURE CONTENT

Tare ID: np5
Wet Mass & Tare, g: 603.3
Dry Mass & Tare, g: 601.72
Mass Tare, g: 8.14
Moisture Content, % 0.27
Oven Dried

BULK DENSITY

	1	2	3	Avg.	Bulk Density
Specimen Length, in:	4.54	4.54	4.54	4.540	163
Specimen Diameter, in:	1.976	1.976	1.976	1.976	Dry Density
Specimen Mass, g:	598	598	598	598	---

DEVIATION FROM STRAIGHTNESS

Measurements at 0 Degrees
Measurements at 120 Degrees
Measurements at 240 Degrees

Maximum difference value less than 0.020 in?
YES

FLATNESS TOLERANCES

END 1
Measurements at 0 Degrees
Measurements at 90 Degrees

	-7/8"	-3/4"	-5/8"	-1/2"	-3/8"	-1/4"	-1/8"	0	+1/8"	+1/4"	+3/8"	+1/2"	+5/8"	+3/4"	+7/8"
Measurements at 0 Degrees	-0.00025	0	0.00005	0	0	0	0	0	-0.00005	-0.00015	-0.0002	-0.0003	-0.00035	-0.0004	-0.00045
Measurements at 90 Degrees	-0.0006	-0.0004	-0.0001	-0.00005	-0.00005	-0.00005	-0.00005	0	-0.00005	-0.0001	-0.0001	-0.0002	-0.0002	-0.0004	-0.0007

Difference between max and min readings:

0 degrees 0.0005
90 degrees 0.0007

END 2

Measurements at 0 Degrees
Measurements at 90 Degrees

Difference between max and min readings:

0 degrees 0.00045
90 degrees 0.0013

Maximum difference value less than 0.0043 in?
YES



Boring ID: BR-3B Sample ID: C-2 Depth, ft.: -47.1 to -48.1

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002



Boring ID: BR-7 Sample ID: C-1 Depth, ft.: -45.5 to -46.7

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002



Boring ID: BR-10 Sample ID: C-1 Depth, ft.: -48.4 to -49.7

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002



Boring ID: BR-12 Sample ID: C-1 Depth, ft.: -45.3 to -46.2

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002



Boring ID: BR-12 Sample ID: C-2 Depth, ft.: -51.05 to -52.6

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002



Boring ID: BR-13 Sample ID: C-1 upper Depth, ft.: -42.9 to -43.6

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002



Boring ID: BR-13 Sample ID: C-1 lower Depth, ft.: -47.45 to -48.45

Unconfined Compressive Strength of Rock: After Break Photograph

TEUS Cross Sound Cable	Environmental Science Services, Inc.	GTX-4273
		10/16/2002

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
 Project Name: TEUS Cross Sound Cable
 Project Location: ---
 Boring: BR-3B
 Sample ID: C-2
 Depth, ft: -47.1 to -48.1

GTX #: 4273
 Test Date: 10/17/02

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.73	96.6	163.4	3,690	3,395	---
2	1.97	3.05	0.73	96.4	164.7	3,169	2,901	---
3	1.98	3.08	0.73	96.7	163.6	2,830	2,604	---
4	1.98	3.08	0.73	97.0	164.1	3,051	2,807	---
5	1.98	3.08	0.73	97.0	164.0	2,608	2,400	---

AVERAGE SPLITTING TENSILE STRENGTH, PSI:

2,822

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
 Project Name: TEUS Cross Sound Cable
 Project Location: ---
 Boring: BR-7
 Sample ID: C-1
 Depth, ft: -45.5 to -46.7

GTX #: 4273
 Test Date: 10/17/02

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.73	96.2	162.6	3,573	3,288	---
2	1.98	3.08	0.73	95.5	161.4	2,960	2,724	---
3	1.98	3.08	0.73	96.1	162.6	3,769	3,468	---
4	1.98	3.08	0.73	95.9	162.2	3,064	2,819	---
5	1.98	3.08	0.73	95.8	162.0	2,673	2,460	---
6	1.98	3.08	0.73	95.8	162.1	1,891	1,740	slight crack in sample
7	1.98	3.08	0.73	96.0	162.3	3,299	3,036	---
8	1.98	3.08	0.73	95.9	162.2	2,869	2,640	slight crack in sample
9	1.98	3.08	0.73	95.8	162.1	2,073	1,908	slight crack in sample
10	1.98	3.08	0.73	96.1	162.5	2,165	1,992	slight crack in sample

AVERAGE SPLITTING TENSILE STRENGTH, PSI: 2,607

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
 Project Name: TEUS Cross Sound Cable
 Project Location: ---
 Boring: BR-10
 Sample ID: C-1
 Depth, ft: -48.4 to -49.7

GTX #: 4273
 Test Date: 10/17/02

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.71	94.5	164.3	4,225	3,781	---
2	1.98	3.08	0.73	97.8	165.5	4,525	4,164	---
3	1.98	3.08	0.71	93.6	162.8	4,277	3,828	---
4	1.97	3.05	0.73	96.5	164.9	4,381	4,011	---
5	1.98	3.08	0.71	93.7	162.9	4,447	3,980	---
6	1.98	3.08	0.71	94.2	163.8	5,047	4,517	---
7	1.98	3.08	0.71	93.8	163.1	4,747	4,248	---
8	1.98	3.08	0.71	93.9	163.3	4,981	4,458	---
9	1.98	3.08	0.71	93.6	162.7	3,847	3,443	---
10	1.98	3.08	0.71	93.3	162.3	4,681	4,189	---

AVERAGE SPLITTING TENSILE STRENGTH, PSI:

4,062

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
Project Name: TEUS Cross Sound Cable
Project Location: ---

GTX #: 4273
Test Date: 10/17/02

Boring: BR-12
Sample ID: C-1
Depth, ft: -45.3 to -46.2

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.73	97.1	164.3	4,590	4,224	---
2	1.98	3.08	0.73	97.0	164.0	3,885	3,575	---
3	1.98	3.08	0.72	95.2	163.2	3,638	3,302	---
4	1.98	3.08	0.73	97.2	164.4	3,690	3,395	---
5	1.98	3.08	0.73	96.9	163.9	5,177	4,764	---
6	1.98	3.08	0.73	97.2	164.3	4,668	4,295	---
7	1.98	3.08	0.72	95.4	163.5	3,091	2,805	---

AVERAGE SPLITTING TENSILE STRENGTH, PSI: 3,766

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
 Project Name: TEUS Cross Sound Cable
 Project Location: ---
 Boring: BR-12
 Sample ID: C-2
 Depth, ft: -51.05 to -52.6

GTX #: 4273
 Test Date: 10/17/02

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.72	95.2	163.2	4,655	4,225	---
2	1.98	3.08	0.70	93.2	164.4	4,095	3,613	---
3	1.98	3.08	0.72	95.1	163.1	4,434	4,024	---
4	1.98	3.08	0.72	95.5	163.7	4,512	4,095	---
5	1.98	3.08	0.72	95.3	163.5	4,772	4,331	---
6	1.98	3.08	0.72	94.6	162.3	4,342	3,941	---
7	1.98	3.08	0.72	95.1	163.1	4,929	4,473	---
8	1.98	3.08	0.70	93.0	164.1	4,160	3,671	---
9	1.98	3.08	0.70	93.2	164.5	5,073	4,476	---
10	1.98	3.08	0.70	93.2	164.3	3,964	3,498	---

AVERAGE SPLITTING TENSILE STRENGTH, PSI:

4,035

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
Project Name: TEUS Cross Sound Cable
Project Location: ---
Boring: BR-13
Sample ID: C-1 upper
Depth, ft: -42.9 to -43.6

GTX #: 4273
Test Date: 10/17/02

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.70	92.8	163.6	3,586	3,164	---
2	1.97	3.05	0.70	93.0	165.6	4,499	3,950	---
3	1.97	3.05	0.73	96.6	165.0	4,707	4,309	---
4	1.97	3.05	0.70	92.7	165.2	3,756	3,297	---

AVERAGE SPLITTING TENSILE STRENGTH, PSI:

3,680

Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

Splitting Tensile Strength of Instact Rock Core Specimens by ASTM D 3967

Client: Environmental Science Services, Inc.
 Project Name: TEUS Cross Sound Cable
 Project Location: ---
 Boring: BR-13
 Sample ID: C-1 lower
 Depth, ft: -47.45 to -48.45

GTX #: 4273
 Test Date: 10/17/02

Specimen #	Average Diameter in	Area in ²	Thickness in	Mass g	Density pcf	Maximum Applied Load lbs	Splitting Tensile Strength psi	Comment
1	1.98	3.08	0.73	96.7	163.5	3,456	3,180	---
2	1.97	3.05	0.73	96.3	164.4	3,083	2,823	---
3	1.98	3.08	0.73	97.6	165.1	2,791	2,568	---
4	1.98	3.08	0.70	93.4	164.7	2,673	2,359	---
5	1.98	3.08	0.74	97.4	162.4	4,968	4,634	---

AVERAGE SPLITTING TENSILE STRENGTH, PSI: 3,113

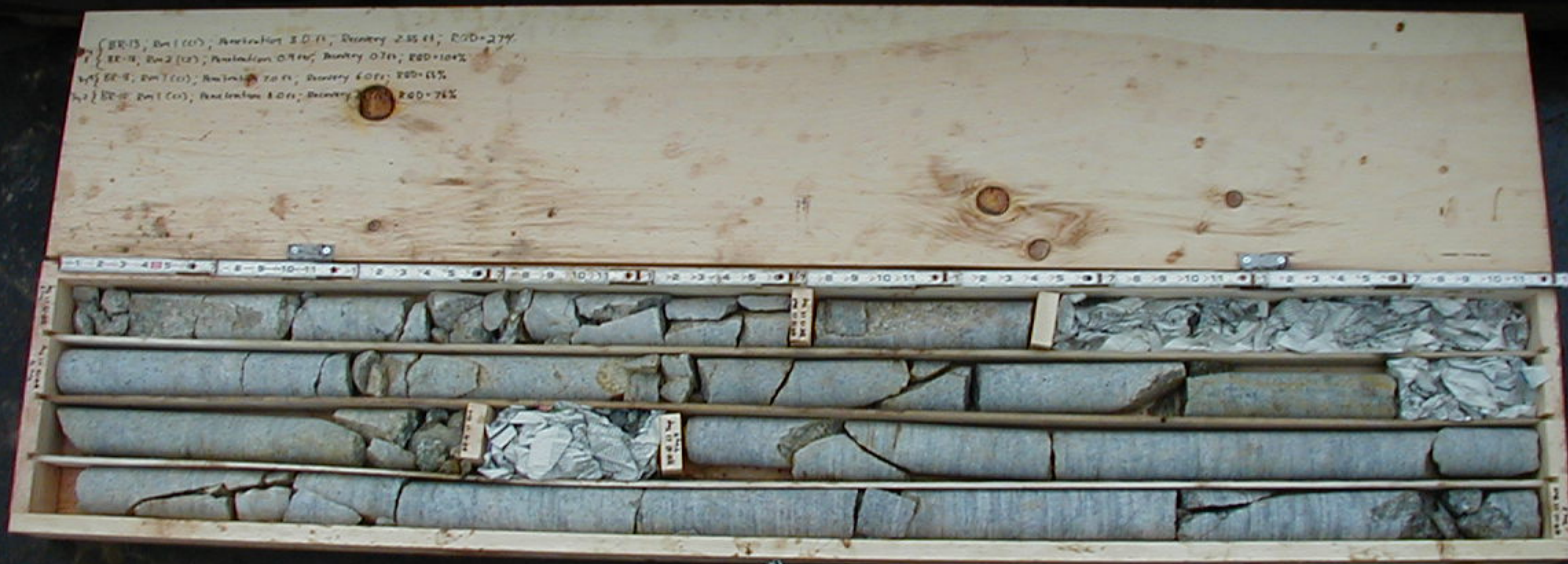
Notes: These results apply only to the sample tested for the specific test conditions. The test procedures employed follow accepted industry practice and the indicated test method. GeoTesting Express has no specific knowledge as to conditioning, origin, sampling procedure or intended use of the material.

ATTACHMENT C

PHOTOGRAPHIC LOG CD

Core Boxes Before Transit

BR-13, Run 1 (10); Penetration 3.0 ft; Density 2.35 g/cc; RSD=27%
BR-14, Run 2 (12); Penetration 0.9 ft; Density 0.7 g/cc; RSD=104%
BR-15, Run 3 (10); Penetration 2.0 ft; Density 1.0 g/cc; RSD=65%
BR-16, Run 4 (10); Penetration 1.0 ft; Density 1.0 g/cc; RSD=74%



BP 10-2250m 2, 50 cm Penetration, 1.7 m Recovery, RSD=100%
{ BP 11, 5000m 1, 50 cm Penetration, 3.5 m Recovery, RSD=36%
{ BP 12, 5000m 2, 50 cm Penetration, 0.7 m Recovery, RSD=87%
{ BP 13, 5000m 3, 50 cm Penetration, 1.5 m Recovery, RSD=89%
{ BP 14, 5000m 4, 50 cm Penetration, 0.3 m Recovery, RSD=0%
{ BP 15, 5000m 5, 50 cm Penetration, 1.7 m Recovery, RSD=74%



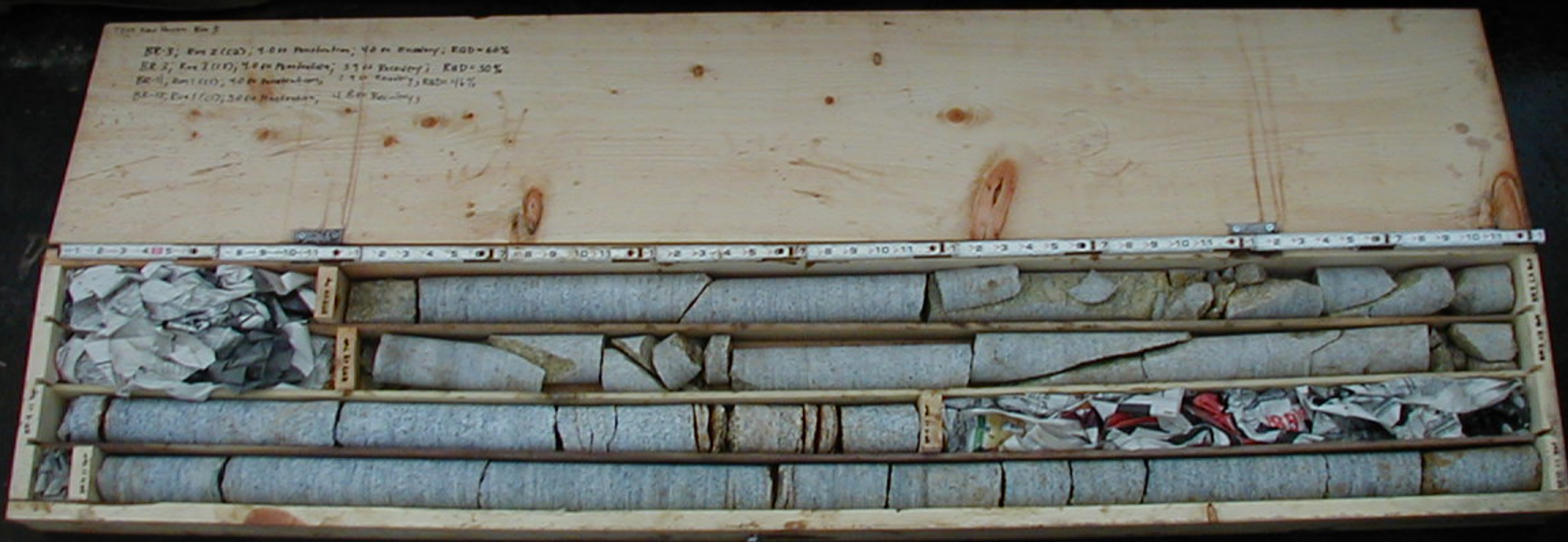
710.64-5-10-10

Boring #22; Run 1 (C1); 5.5 ft. Borehole; 5.3 ft. Borehole; KGD=72%
Boring #22; Run 2 (C2); 1.5 ft. Borehole; 0.4 ft. Borehole; KGD=0%
Boring #22; Run 3 (C3); 1.5 ft. Borehole; 1.4 ft. Borehole; KGD=51%
Boring #22; Run 4 (C4); 1.5 ft. Borehole; 1.4 ft. Borehole; KGD=67%
Boring #22; Run 5 (C5); 1.5 ft. Borehole; 1.4 ft. Borehole; KGD=0%



1915 East River, Box 3

EE-3, Box 2 (10), 1.0 m Penetration, 4.0 m Recovery, RGD = 40%
EE-3, Box 2 (11), 1.0 m Penetration, 3.7 m Recovery, RGD = 30%
EE-3, Box 1 (10), 1.0 m Penetration, 1.9 m Recovery, RGD = 16%
EE-3, Box 1 (11), 1.0 m Penetration, 1.8 m Recovery, RGD = 16%



Core Photos

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-2

Rock Core Recovery: 5.1 ft

Preliminary RQD: Run 1 = 72%

Run 2 = 0%

Run 3 = 58%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-2

Rock Core Recovery: 5.1 ft

Preliminary RQD: Run 1 = 72%
Run 2 = 0%
Run 3 = 58%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-2

Rock Core Recovery:

5.1 ft

Preliminary RQD:

Run 1 = 72%

Run 2 = 0%

Run 3 = 58%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-2

Rock Core Recovery:

5.1 ft

Preliminary RQD:

Run 1 = 72%

Run 2 = 0%

Run 3 = 58%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BP-2

Rock Core Recovery: 5.1 ft

Preliminary RQD:

Run 1 = 72%

Run 2 = 0%

Run 3 = 58%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$$\begin{array}{ccc} c_1 & c_2 & c_3 \\ 3' & + & 4' + 3.9' = 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} R_{m1}(c_1) = 0\% \\ R_{m2}(c_2) = 60\% \\ R_{m3}(c_3) = 50\% \end{array}$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & + & 4' & + & 3.9' = 10.9 \text{ ft} \end{array}$

Preliminary RQD:

$\begin{array}{l} \text{Run 1 (c1)} = 0\% \\ \text{Run 2 (c2)} = 60\% \\ \text{Run 3 (c3)} = 50\% \end{array}$



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & + 4' & + 3.9' = 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} \text{Run 1 (c1)} = 0\% \\ \text{Run 2 (c2)} = 60\% \\ \text{Run 3 (c3)} = 50\% \end{array}$$

Core segment chosen
for Testing



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & 4' & 3.9' \end{array} = 10.9 \text{ ft}$

Preliminary RQD:

$\begin{array}{l} R_{un}1(c1) = 0\% \\ R_{un}2(c2) = 60\% \\ R_{un}3(c3) = 50\% \end{array}$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3
c1 c2 c3

Rock Core Recovery:

3' + 4' + 3.9' = 10.9 ft

Preliminary RQD:

Run 1 (c1) = 0%
Run 2 (c2) = 60%
Run 3 (c3) = 50%

9 5 F 1 2 3 4 5 6 7 8 9 6 F 1

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-5

Rock Core Recovery:

$$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & + & 4' & + & 3.9' & = & 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} R_{QD1}(c1) = 0\% \\ R_{QD2}(c2) = 60\% \\ R_{QD3}(c3) = 50\% \end{array}$$



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & + 4' & + 3.9' = 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} \text{Run 1 (c1)} = 0\% \\ \text{Run 2 (c2)} = 60\% \\ \text{Run 3 (c3)} = 50\% \end{array}$$

BR-3 10'

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & 4' & 3.9' = 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} \text{Run 1 (c1)} = 0\% \\ \text{Run 2 (c2)} = 60\% \\ \text{Run 3 (c3)} = 50\% \end{array}$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$$\begin{array}{ccc} c1 & c2 & c3 \\ 3' & + 4' & + 3.9' = 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} R_{m1}(c1) = 0\% \\ R_{m2}(c2) = 60\% \\ R_{m3}(c3) = 50\% \end{array}$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-3

Rock Core Recovery:

$$\begin{array}{ccc} c_1 & c_2 & c_3 \\ 3' & + 4' & + 3.9' = 10.9 \text{ ft} \end{array}$$

Preliminary RQD:

$$\begin{array}{l} \text{Run 1 (c1)} = 0\% \\ \text{Run 2 (c2)} = 60\% \\ \text{Run 3 (c3)} = 50\% \end{array}$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-5

Rock Core Recovery:

c1	c2	c3
3'	4'	3.9'

$$3' + 4' + 3.9' = 10.9 \text{ ft}$$

Preliminary RQD:

$$\begin{aligned} R_{m1}(c1) &= 0\% \\ R_{m2}(c2) &= 60\% \\ R_{m3}(c3) &= 50\% \end{aligned}$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-5

Rock Core Recovery: 4.1 ft.

Preliminary RQD: 82%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-5

Rock Core Recovery:

4.1 ft.

Preliminary RQD:

82%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-5

Rock Core Recovery: 4.1 ft.

Preliminary RQD: 82%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-S

Rock Core Recovery: 4.1 ft.

Preliminary RQD: 82%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-6

Rock Core Recovery: 0.84 ft.

Preliminary RQD: 62%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%

Core segment chosen
for Testing



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%

5-6 ft



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%

6-7 ft



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-7

Rock Core Recovery: 7.4 ft

Preliminary RQD: 67%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:	<u>BR-10</u>
Rock Core Recovery:	<u>7.5 ft</u>
Preliminary RQD:	<u>76%</u>



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:	<u>BR-10</u>
Rock Core Recovery:	<u>7.5 ft</u>
Preliminary RQD:	<u>76%</u>

Core segment chosen
for Testing



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-10

Rock Core Recovery: 7.5 ft

Preliminary RQD: 76%

BR-11 c1 Top

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-11

Rock Core Recovery: 2.9 ft

Preliminary RQD: 46%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-11

Rock Core Recovery: 2.9 ft

Preliminary RQD: 46%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-11

Rock Core Recovery: 2.9 ft

Preliminary RQD: 46%

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\overset{c1}{4.8'} + \overset{c2}{3.8} = 8.6 \text{ ft}$$

Preliminary RQD:

$$\text{Run 1 (c1)} = 92\%$$

$$\text{Run 2 (c2)} = 98\%$$

Core segment chosen
for Testing



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\overset{c1}{4.8'} + \overset{c2}{3.8} = 8.6 \text{ ft}$$

Preliminary RQD:

$$\text{Run 1 (c1)} = 92\%$$

$$\text{Run 2 (c2)} = 98\%$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\begin{array}{r} c1 \\ 4.8' + \end{array} \begin{array}{r} c2 \\ 3.8' \end{array} = 8.6 \text{ ft}$$

Preliminary RQD:

$$\text{RQD } 1 (c1) = 92\%$$

$$\text{RQD } 2 (c2) = 98\%$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\begin{array}{r} c1 \\ 4.8' \end{array} + \begin{array}{r} c2 \\ 3.8' \end{array} = 8.6 \text{ ft}$$

Preliminary RQD:

$$\text{Run 1 (c1)} = 92\%$$

$$\text{Run 2 (c2)} = 98\%$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\begin{array}{c} c1 \\ 4.8' \end{array} + \begin{array}{c} c2 \\ 3.8' \end{array} = 8.6 \text{ ft}$$

Preliminary RQD:

$$\text{Run 1 (c1)} = 92\%$$

$$\text{Run 2 (c2)} = 98\%$$

Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\overset{c1}{4.8'} + \overset{c2}{3.8} = 8.6 \text{ ft}$$

Preliminary RQD:

$$R_{m1}(c1) = 92\%$$

$$R_{m2}(c2) = 98\%$$

Core segment chosen
for Testing



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\frac{c1}{4.8'} + \frac{c2}{3.8} = 8.6 \text{ ft}$$

Preliminary RQD:

$$\frac{R_{m1}(c1)}{R_{m2}(c2)} = 92\%$$

$$R_{m2}(c2) = 98\%$$



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number:

BR-12

Rock Core Recovery:

$$\begin{array}{r} c1 \\ 4.8' + 3.8' = 8.6 \text{ ft} \\ c2 \end{array}$$

Preliminary RQD:

$$\begin{array}{r} R_{c1} (c1) = 92\% \\ R_{c2} (c2) = 98\% \end{array}$$

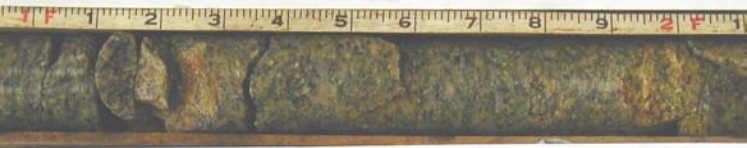


Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-13

Rock Core Recovery: 6.0 ft

Preliminary RQD: 65%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-13

Rock Core Recovery: 6.0 ft

Preliminary RQD: 65%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-13

Rock Core Recovery: 6.0 ft

Preliminary RQD: 65%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-13

Rock Core Recovery: 6.0 ft

Preliminary RQD: 65%



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-13

Rock Core Recovery: 6.0 ft

Preliminary RQD: 65%

Core segment chosen
for Testing



Cross Sound Cable Project
New Haven Harbor—Area 6/7

Boring Number: BR-13

Rock Core Recovery: 6.0 ft

Preliminary RQD: 65%

Boring Number: BR-17

Rock Core Recovery: 0.1 ft

Preliminary RQD: 0%



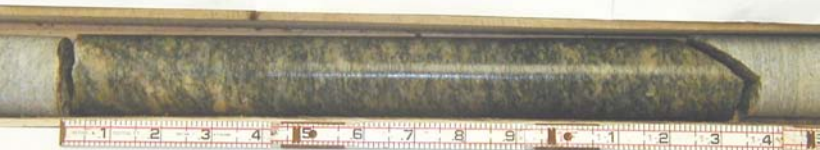
Core Samples Tested

Box, Quantity 2000, 200-275
Box, Quantity 2000, 200-275
Box, Quantity 2000, 200-275
Box, Quantity 2000, 200-275



Cross Sound Cable Project
New Haven Harbor – Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number:	BB-10 + Tag 2 + (C1)
Elevation of Top of Sample:	-48.4' MLLW
Elevation of Bottom of Sample:	-49.7' MLLW
Total length of Sample:	1.3 ft.



Box 2
 Box 2, Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)
 Box 2, Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)
 Box 2, Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)
 Box 2, Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Box 2
 Box 2 (100), 5.00m (100m), 4.00m (40m), 4.00m (40m)

Cross Sound Cable Project
New Haven Harbor – Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number:	<u>82-D (1)</u>
Elevation of Top of Sample:	<u>-45.3' MLLW</u>
Elevation of Bottom of Sample:	<u>-46.2' MLLW</u>
Total length of Sample:	<u>0.9 ft</u>



Cross Sound Cable Project
New Haven Harbor - Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number: 88-12 (C2)
Elevation of Top of Sample: -61.05' MSL
Elevation of Bottom of Sample: -52.4' MSL
Total length of Sample: 8.65 ft



Box 8-45
Type 11-11-11
Type 11-11-11

Test hole data: Box 8-45

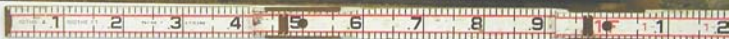
ER-15, Run 1 (C), Resolution 2.55 ft, Recovery 2.55 ft, RSD=27%
ER-16, Run 2 (C), Resolution 0.76 ft, Recovery 0.76 ft, RSD=100%
ER-17, Run 3 (C), Resolution 2.0 ft, Recovery 2.0 ft, RSD=0%
ER-18, Run 4 (C), Resolution 1.0 ft, Recovery 1.0 ft, RSD=76%

Core Sample Labels Project
Box 8-45
Core Sample Labels Project

Boxing Location: Box 8-45, 11-11-11
Boxing Date: 11-11-11
Boxing Time: 11:11 AM

Cross Sound Cable Project
New Haven Harbor – Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number:	<u>BR-13 : Try 4 : (C1)</u>
Elevation of Top of Sample:	<u>-47.45' MLLW</u>
Elevation of Bottom of Sample:	<u>-48.45' MLLW</u>
Total length of Sample:	<u>1.0 ft</u>



Test Area: Room - Em 45

ER-13, Em 1 (C); Australian S.D. 13; Density 2.55 g; RGD=27%
ER-12, Em 2 (C); Australian S.D. 12; Density 2.70; RGD=100%
ER-5, Em 7 (C); Australian S.D. 5; Density 2.05; RGD=15%
ER-4, Em 6 (C); Australian S.D. 4; Density 2.00; RGD=74%

Core Head Label Project
Name: Patrick Starbuck - 10/10/07
Core Sample/Tube Head Markings on the Core

Sample Number: 10/10/07
Location of Top of Sample: 10/10/07
Location of Bottom of Sample: 10/10/07
Core Sample in Transport: 10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

10/10/07

Cross Sound Cable Project
New Haven Harbor – Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number:	<u>B2-13: Try 4: (4)</u>
Elevation of Top of Sample:	<u>-42.9' MLLW</u>
Elevation of Bottom of Sample:	<u>-43.6' MLLW</u>
Total length of Sample:	<u>0.7 ft</u>



Figure 1: Sample Question

RE-1: Run 2 (24h), 0.2 m Resolution; 0.2 m Bandwidth; 24h + 40%

$$2.2 \times 10^{-4} \text{ mol } \text{O}_2 \text{ / } 1 \text{ g wet biomass, } 17 \text{ at } 40^\circ\text{C}; \text{ } \text{KOD} = 30\%$$

2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 26

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Strongly Dislike _____ 60-80 cents

Variable	Mean	SD
Age (years)	31.2	4.5
Gender (male/female)	15/15	-
Education (years)	12.5	1.2
Occupation (white/blue)	10/5	-
Marital status (single/married)	12/8	-
Income (€1000/month)	1.5	0.5
Health status (good/bad)	12/8	-
Smoking status (yes/no)	5/10	-
Alcohol consumption (yes/no)	10/5	-
Exercise frequency (times/week)	2.5	1.5
Stress level (low/high)	10/5	-
Family size (number of children)	1.5	0.5
Work hours (hours/week)	35	5
Commuting time (minutes)	30	10
Living space (m ²)	60	10
Neighborhood safety (yes/no)	10/5	-
Access to public transport (yes/no)	10/5	-
Proximity to parks (yes/no)	10/5	-
Quality of air (good/bad)	10/5	-
Availability of services (yes/no)	10/5	-
Community involvement (yes/no)	10/5	-
Overall life satisfaction (1-5)	3.5	0.5

1. *Journal of Management Education* 20(1): 10-19
 2. *Journal of Management Education* 20(1): 20-29

Cross Sound Cable Project
New Haven Harbor – Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number:	<u>BE-BB (2)</u>
Elevation of Top of Sample:	<u>-47.1' MLLW</u>
Elevation of Bottom of Sample:	<u>-48.1' MLLW</u>
Total length of Sample:	<u>1.0 ft</u>



Cross Sound Cable Project
New Haven Harbor – Area 6/7
Core Samples from Drill Borings to be Tested

Boring Number:	<u>B2-7 (c1)</u>
Elevation of Top of Sample:	<u>-45.5' MLLW</u>
Elevation of Bottom of Sample:	<u>-46.7' MLLW</u>
Total length of Sample:	<u>1.2 ft.</u>



Split Spoon Photos

BR-1 51



BR-1 ~~52~~
52



BR-1 54
~~53~~

20440
15
20-56





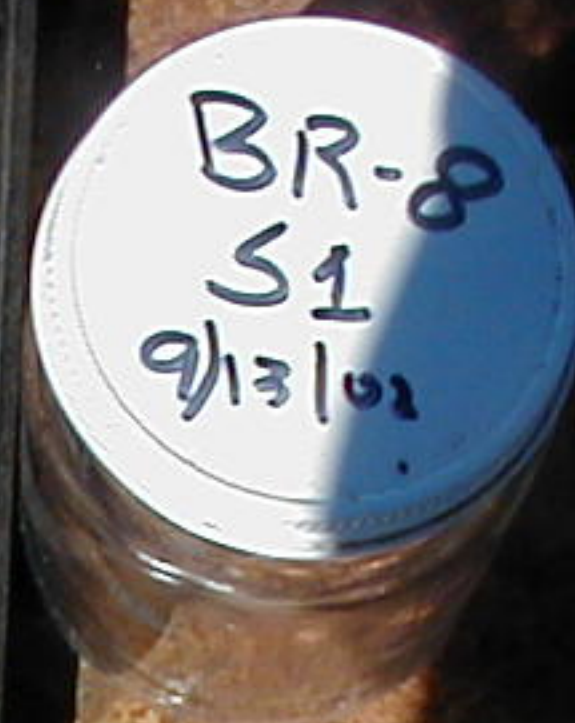
BR-2
S2
9-19-02





BR-3
51
9/14/02





BR-8
S1
9/13/02



BR-8
53
9/13/02

BR-8
53
9/13/02



BR-9
SI
9-26-02



BR-9
S2
9-26-02



BR-10
S1
9-30-02





BK-11
S2
9-29-02





2097b
13
21-28A

1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7

1 2 3 4 5 6 7 8 9 10 11 12

BR-12
52
9-26-02

BR-11
S1
10-3-02



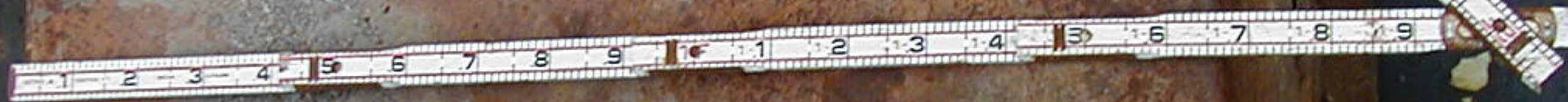


BR-14
SZ
10-2-01

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

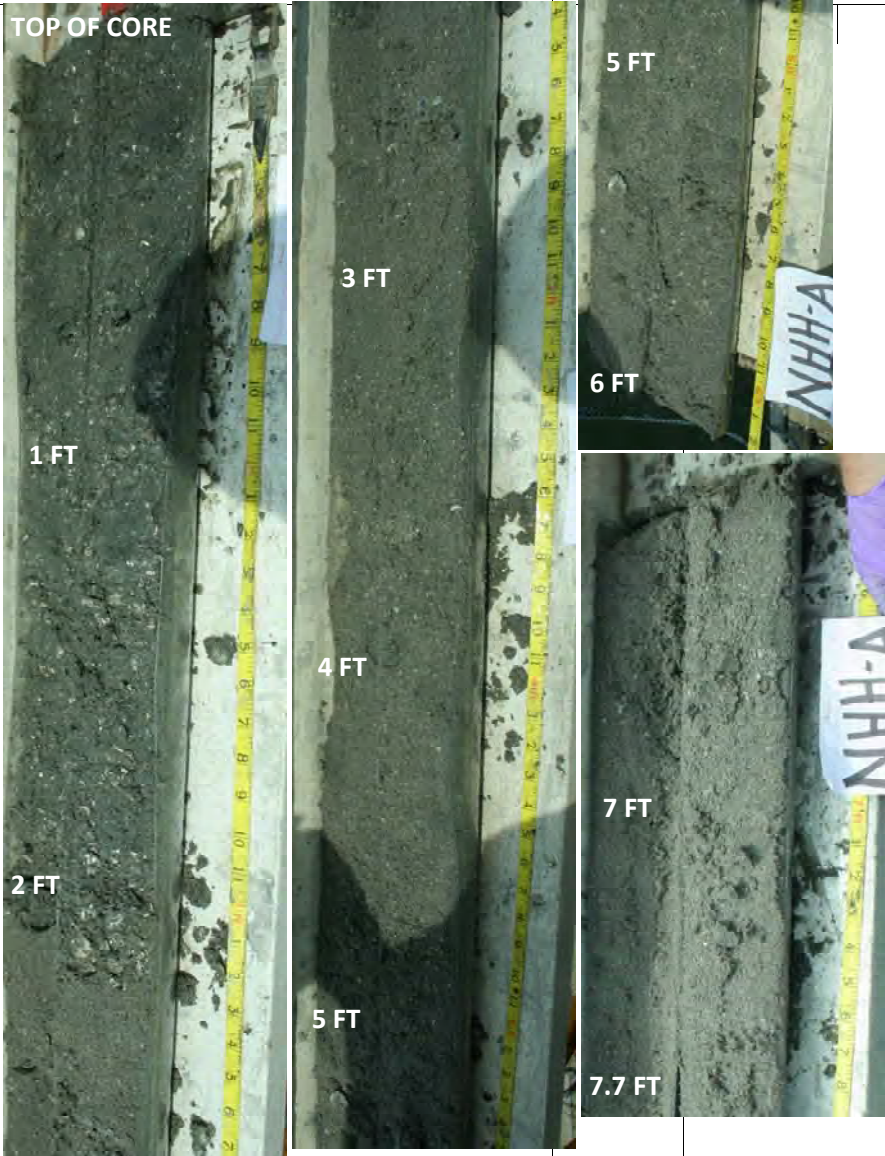
BP-14
S3
10-3-02



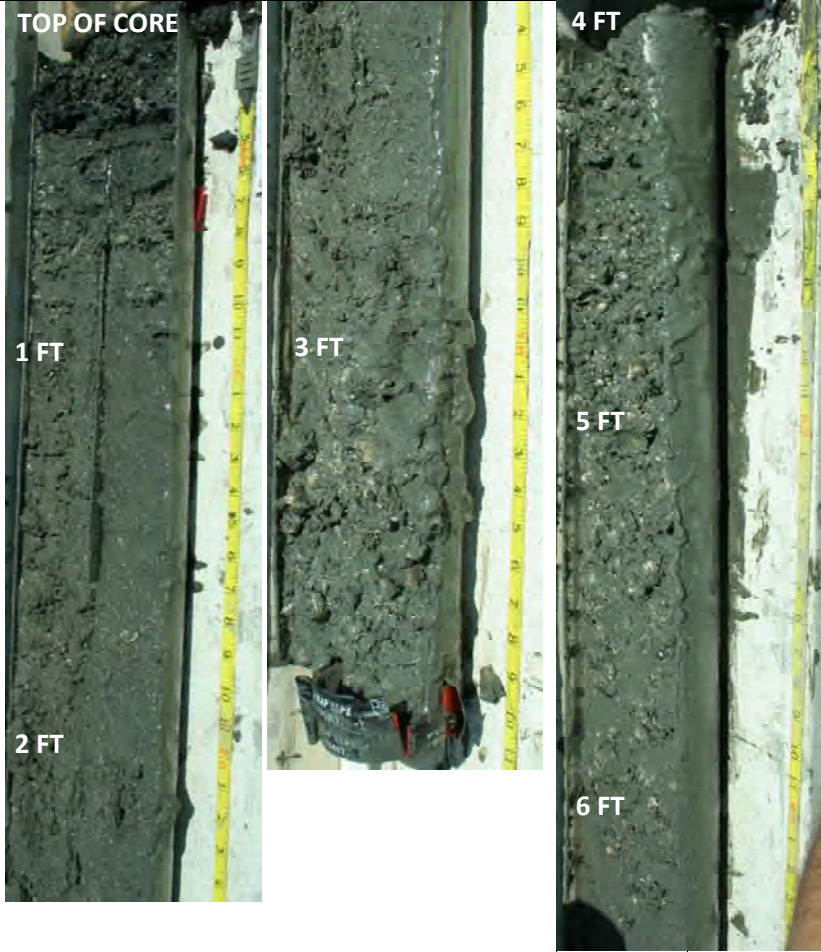
NHH - A: 0-2.2' (GS and Chem), 2.2-9.9' (GS) only

- **B:** 0-4.2 (Chemistry and GS)
- **C:** 0-2.8 (chemical and GS), 2.8 – 8.0' (Chemical and GS)
- **D:** 0-4.8' (Chemical and GS), 4.8-10.3 (Chemical and GS)
- **E:** 0-6.5' (Chemical and GS), 6.5-8.1 (Chemical and GS)
- **F:** 0-3.2' (Chemical and GS), 3.2-10.5 (Chemical and GS)
- **G:** 0-4.3' (Chemical and GS), 4.3-13.7 (Chemical and GS)
- **H:** 0-5.4' (Chemical and GS), 5.4-7.7' (Chemical and GS)
- **I:** 0-.7' (Chemical and GS), .7-2.5' (Chemical and GS)
- **J:** 0-5.4' (Chemical and GS)
- **K:** 0-5.5' (Chemical and GS), 5.5-8.2 (GS only)
- **L:** 0- 6.7' (Chemical and GS)
- **M:** 0-6.8' (Chemical and GS)
- **N:** 0-6' (Chemical and GS), 6-7.5' (GS)
- **O:** 0-8.3 (Chemical and GS), 8.7-10.9 (GS)
- **P:** 0-5.8' (Chemical and GS), 5.8-12.3 (Chemical and GS)
- **Q:** 0-5.3' (Chemical and GS), 5.3-29.4' (Chemical and GS)
- **R:** 0-4.2' (Chemical and GS), 4.2-7.7' (Chemical and GS)
- **S:** 0-6' (Chemical and GS), 6.0-6.4' (Chemical and GS)
- **T:** 0-4.8' (Chemical and GS), 4.8-16.3' (Chemical and GS)
- **U:** 0-5.8' (Chemical and GS), 5.8-30' (Chemical and GS)
- **V:** 0-4.8' (Chemical and GS), 4.8-8.6 (Chemical and GS)
- **W:** 0-5.5' (Chemical and GS), 5.5-8.2 (GS)
- **X:** 0-5.2' (Chemical and GS [Dup]), 5.2-8.0 (Chemical and GS)
- **Y:** 0-5.9' (Chemical and GS), 5.9-8.5' (GS only)
- **Z:** 0-5.0 (Chemical and GS), 5.0-8.7' (Chemical and GS)

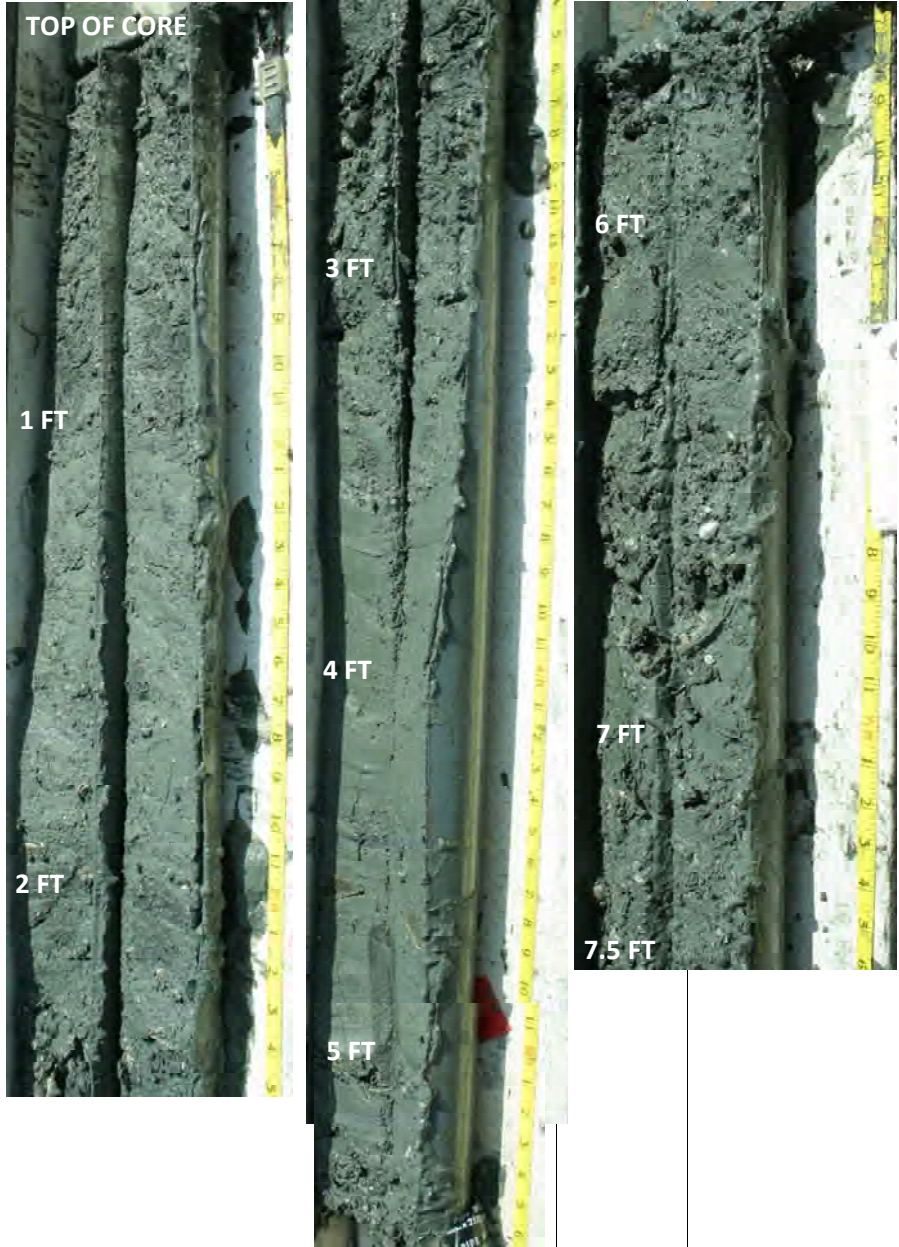
All included

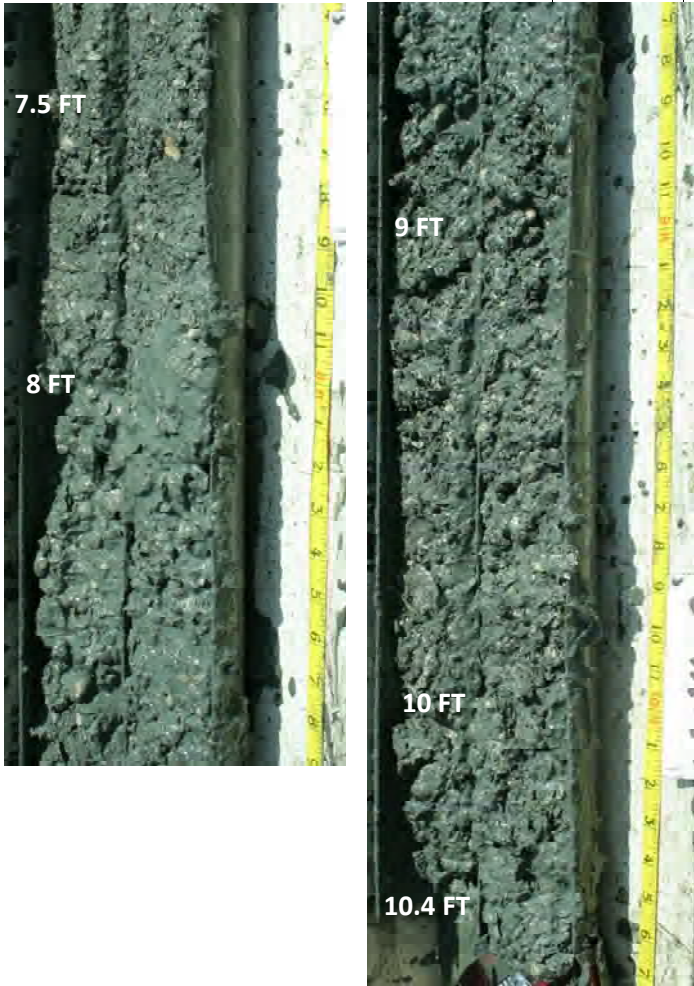
Core ID: NHH-A			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/7/2017
Client:	USACE	X: 955707.36	Time: 13:10
Subcontractor:	Ocean Surveys Inc.	Y: 641917.44	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 13
Weather:	Partly Cloudy, 75°F		Recovery (ft): 11
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-28.7
Photo:		Notes:	
		0 - 2.2' - Dark grey fine/ medium sand with trace silt and shells. SW-SM 2.2' - 6.2' - Tan fine/ medium sand with shells. SP 6.2' - 7.7' - Tan fine/ medium sand. SP	
Comments: Samples collected at 0-2.2' (chemistry / GS) and 2.2-9.9' (GS only)			

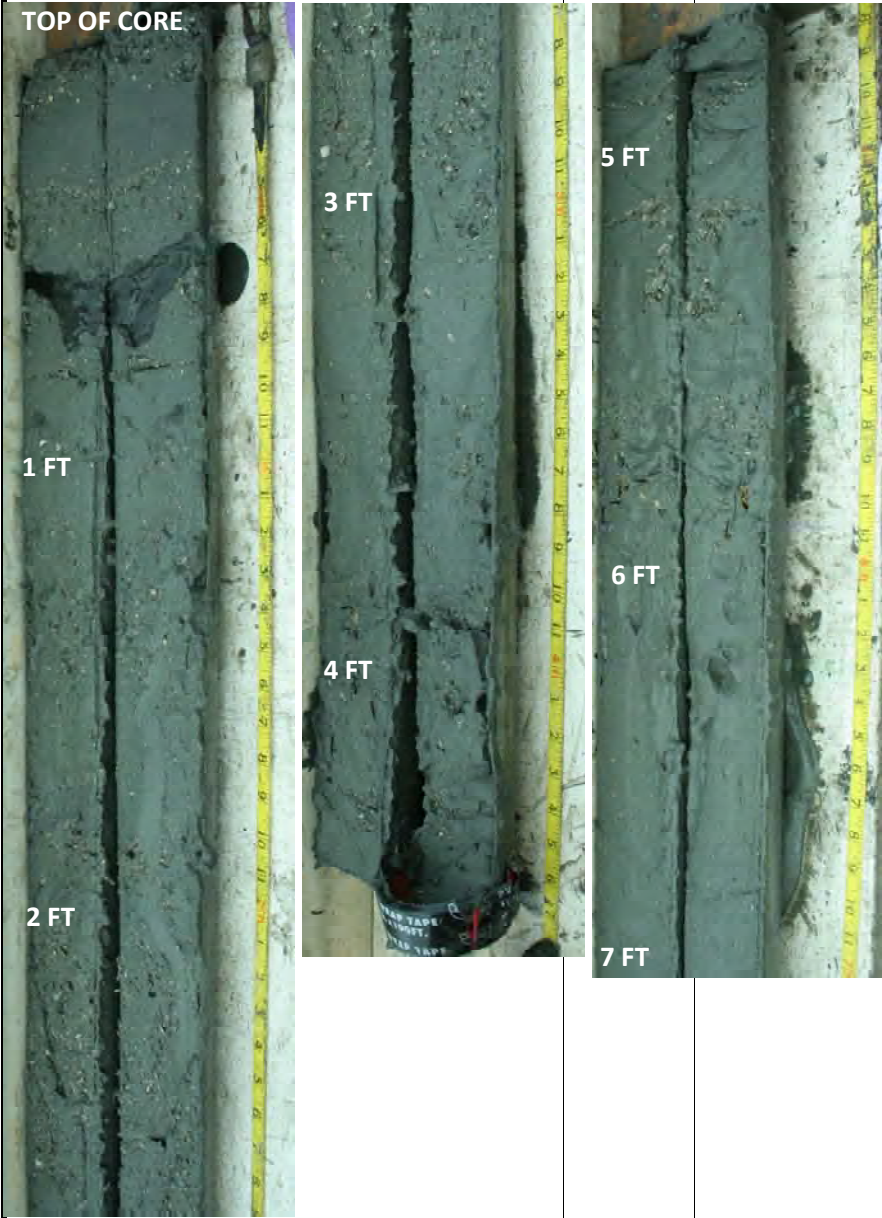
Core ID: NHH-A			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/7/2017
Client:	USACE	X: 955707.36	Time: 13:10
Subcontractor:	Ocean Surveys Inc.	Y: 641917.44	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 13
Weather:	Partly Cloudy, 75°F		Recovery (ft): 11
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-28.7
Photo:		Notes:	
		7.7' - 11.0' - Tan fine/ medium sand. SP	
Comments:			

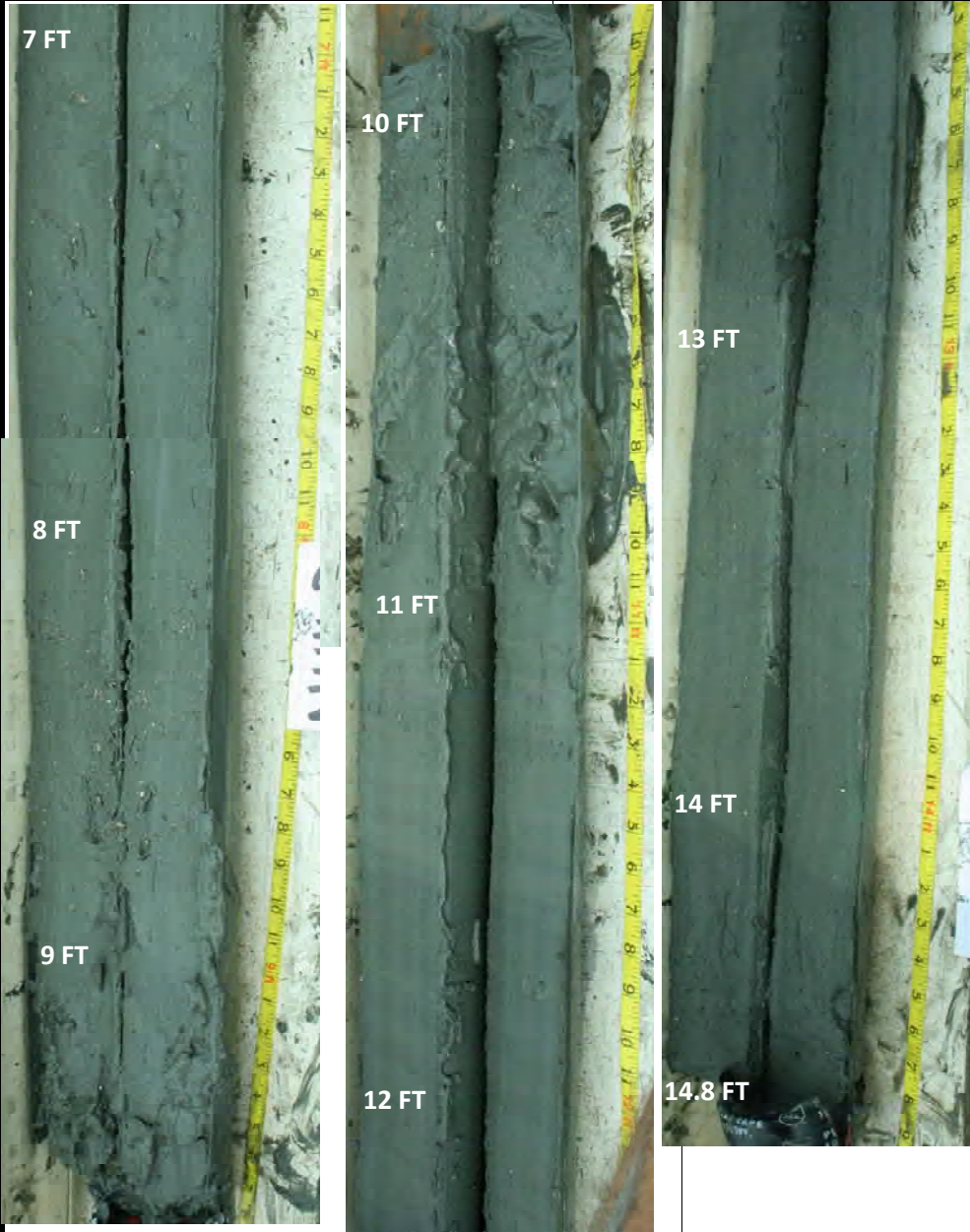
Core ID: NHH-B			
Project:	New Haven Harbor FNP	Coordinates (CT FT)	Date: 8/11/2017
Client:	USACE	X: 955995.61	Time: 11:43
Subcontractor:	Ocean Surveys Inc.	Y: 642051.34	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 9
Weather:	Sunny, 77°F		Recovery (ft): 8.8
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -39.8
Photo:			Notes:
		0-0.3' - Black silty fine sand with shell hash. SM 0.3-3.2' - Dark grey silty fine sand with some shell hash. SM 3.2-6.4' - Dark grey silty fine to medium sand with shell hash. SM	
Comments: Samples collected at 0-4.2' (chemistry / GS).			

Core ID: NHH-B			
Project:	New Haven Harbor FNP	Coordinates (CT FT)	Date: 8/11/2017
Client:	USACE	X: 955995.61	Time: 11:43
Subcontractor:	Ocean Surveys Inc.	Y: 642051.34	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 9
Weather:	Sunny, 77°F		Recovery (ft): 8.8
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -39.8
Photo:		Notes:	
		6.0-6.4' - Dark grey silty fine to medium sand with shell hash. SM 6.4-7.9' - Dark grey sandy silt. SM 7.9-8.6' - Dark brown fine to medium sand with silt. SW-SM 8.6-8.8' - Dark brown medium to coarse sand with shells. SW	
Comments:			

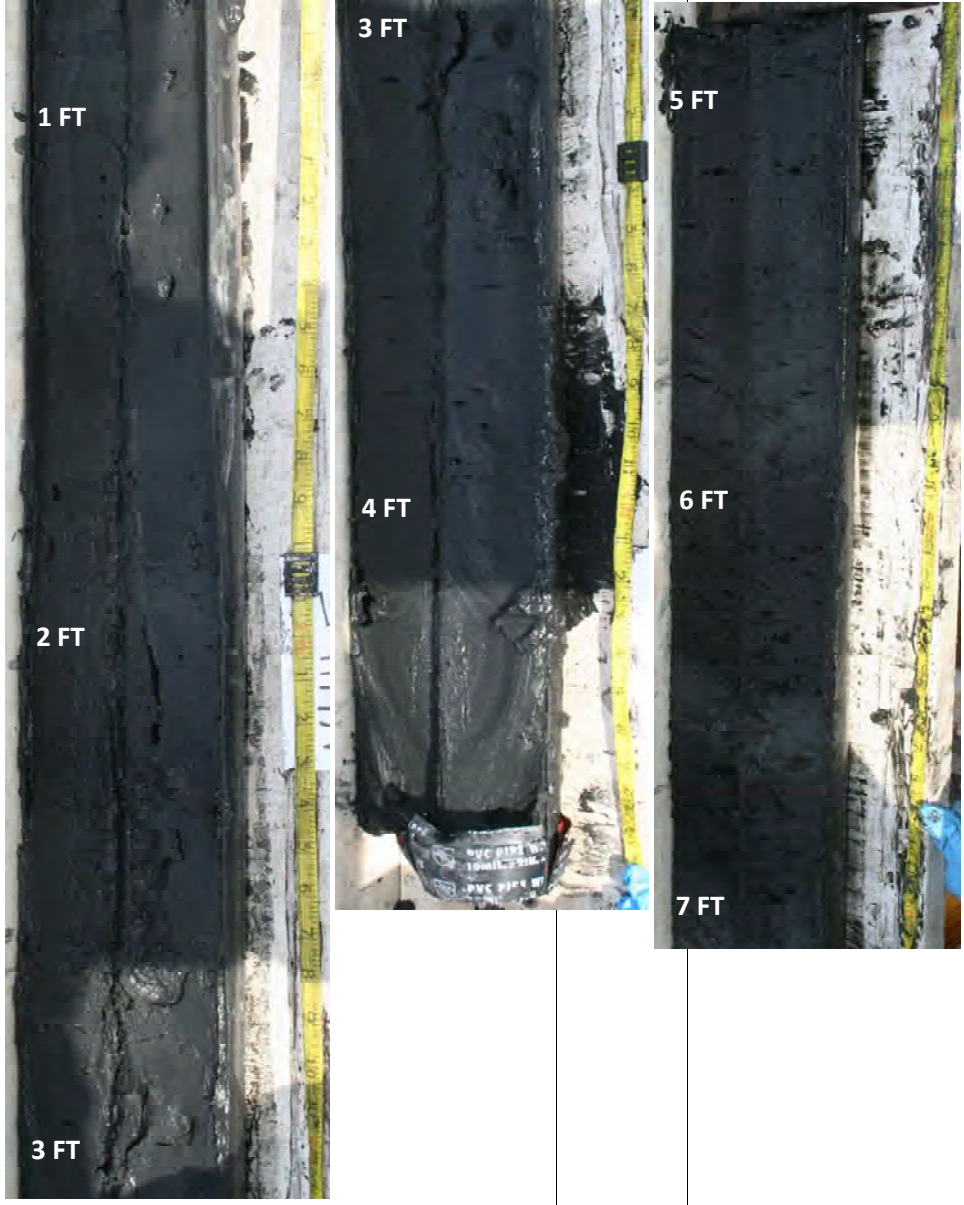
Core ID: NHH-C			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 956248.06	Time: 10:13
Subcontractor:	Ocean Surveys Inc.	Y: 642180.93	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 15
Weather:	Sunny, 77°F		Recovery (ft): 15.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.3
Photo:		Notes:	
		0-0.8' - Dark grey silty sand with shell hash. SM 0.8-2.2' - Dark grey silty fine to medium sand. SM 2.2-2.8' - Dark grey silty fine to medium sand with many shells. SM 2.8-5.4' - Dark grey fine to medium sandy silt with bands of shells. ML 5.4-7.5' - Dark grey fine to medium sandy silt with shells. ML	
Comments: Samples collected at 0-2.8' (chemistry / GS) and 2.8-8.0' (chemistry /GS)			

Core ID: NHH-C			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 956248.06	Time: 10:13
Subcontractor:	Ocean Surveys Inc.	Y: 642180.93	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 15
Weather:	Sunny, 77°F		Recovery (ft): 15.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.3
Photo:		Notes:	
		7.5-8.0' - Dark grey fine to medium sandy silt with shells. ML 8.0-10.4' - Dark grey silt with lots of shell hash and some sand. ML	
Comments:			

Core ID: NHH-D			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954353.17	Time: 14:51
Subcontractor:	Ocean Surveys Inc.	Y: 651157.56	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 19.5
Weather:	Sunny, 77°F		Recovery (ft): 19.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -18
Photo:		Notes:	
		0-4.8' - Dark grey silty clay with intermittent shell hash. CL 4.8-5.4' - Medium grey clay with shell hash. CL. 5.4-7.0 - Dark grey silt with some fine to medium sand. ML.	
Comments: Samples collected at 0-4.8' (chemistry / GS) and 4.8-10.3' (chemistry/ GS)			

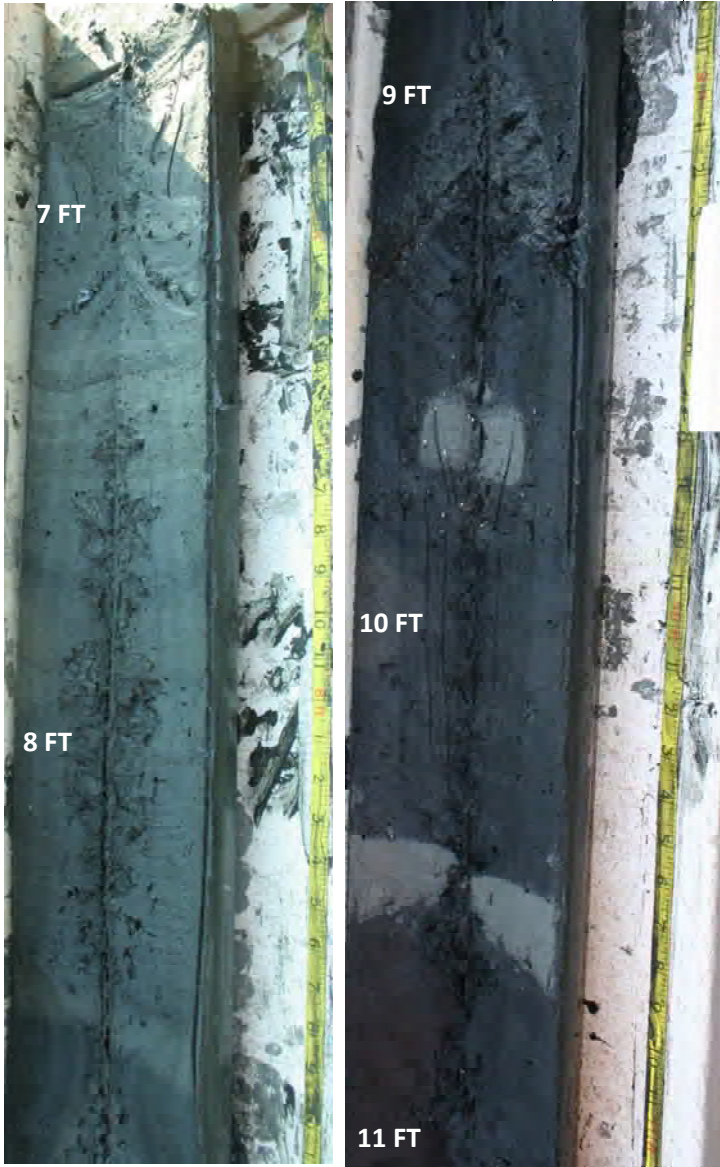
Core ID: NHH-D			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954353.17	Time: 14:51
Subcontractor:	Ocean Surveys Inc.	Y: 651157.56	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 19.5
Weather:	Sunny, 77°F		Recovery (ft): 19.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -18
Photo:		Notes:	
		7.0-14.8' - Dark grey silt with some fine to medium sand. ML.	
Comments:			

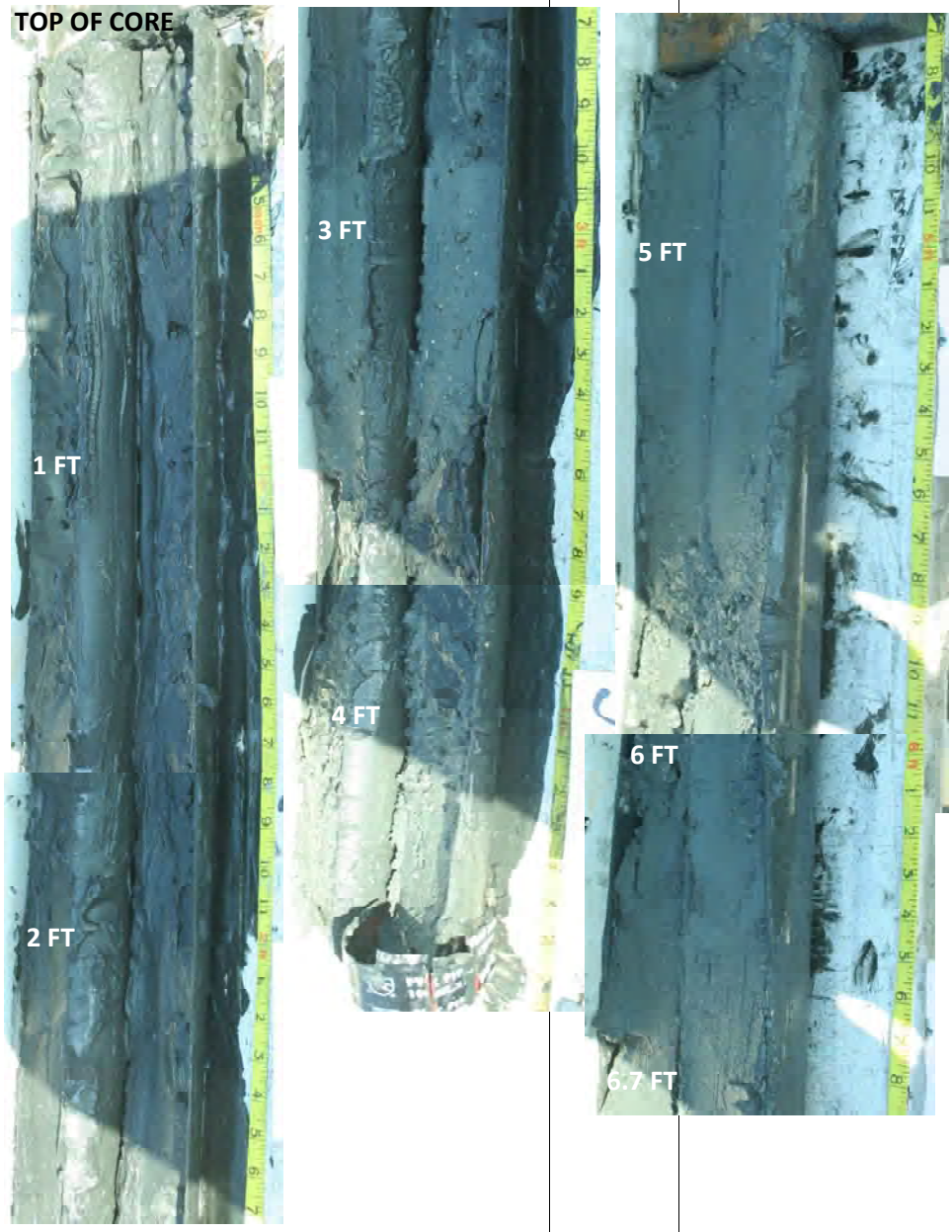
Core ID: NHH-D			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954353.17	Time: 14:51
Subcontractor:	Ocean Surveys Inc.	Y: 651157.56	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 19.5
Weather:	Sunny, 77°F		Recovery (ft): 19.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -18
Photo:		Notes:	
			
			
		14.8-19.5' - Dark grey silt with some fine to medium sand. ML	
Comments:			

Core ID: NHH-E			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/14/2017
Client:	USACE	X: 954719.81	Time: 8:14
Subcontractor:	Ocean Surveys Inc.	Y: 651097.16	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Cloudy, 79°F		Recovery (ft): 9.8
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.9
Photo:		Notes:	
		0-4.8' - Dark black fine silt. ML 4.8-5.8' - Dark grey silt. ML 5.8-6.5' - Darker grey silt. ML 6.5-7.1' - Black fine silt. ML	
Comments: Top horizon (0-0.8') photo did not save on camera. Samples collected at 0-6.5' (chemistry / GS) and 6.5-8.1' (chemistry/ GS)			

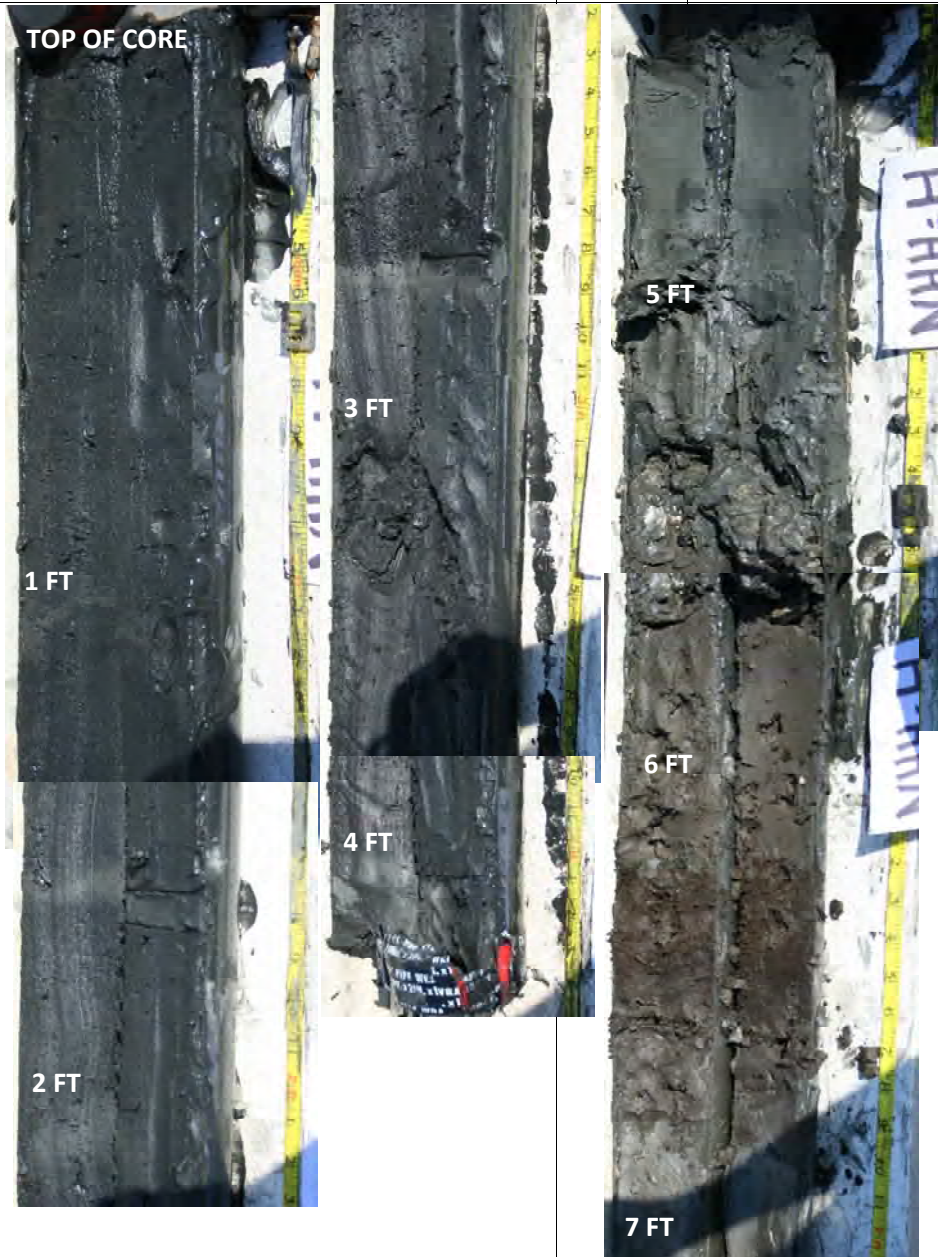
Core ID: NHH-E			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/14/2017
Client:	USACE	X: 954719.81	Time: 8:14
Subcontractor:	Ocean Surveys Inc.	Y: 651097.16	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Cloudy, 79°F		Recovery (ft): 9.8
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.9
Photo:			Notes:
		7.0-9.8' - Dark grey fine silt. ML	
Comments: Top horizon (0-0.8') photo did not save on camera.			

Core ID: NHH-F			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954918.3	Time: 16:25
Subcontractor:	Ocean Surveys Inc.	Y: 651077.63	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 17
Weather:	Sunny, 77°F		Recovery (ft): 16.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -17.7
Photo:		Notes:	
		0-6.6' - Dark black to dark grey fine silt with some sand (fine to coarse). Very soft to soft, wet to moist. ML	
Comments: Samples collected at 0-3.2' (chemistry / GS [dup]) and 3.2-10.5' (chemistry/ GS)			

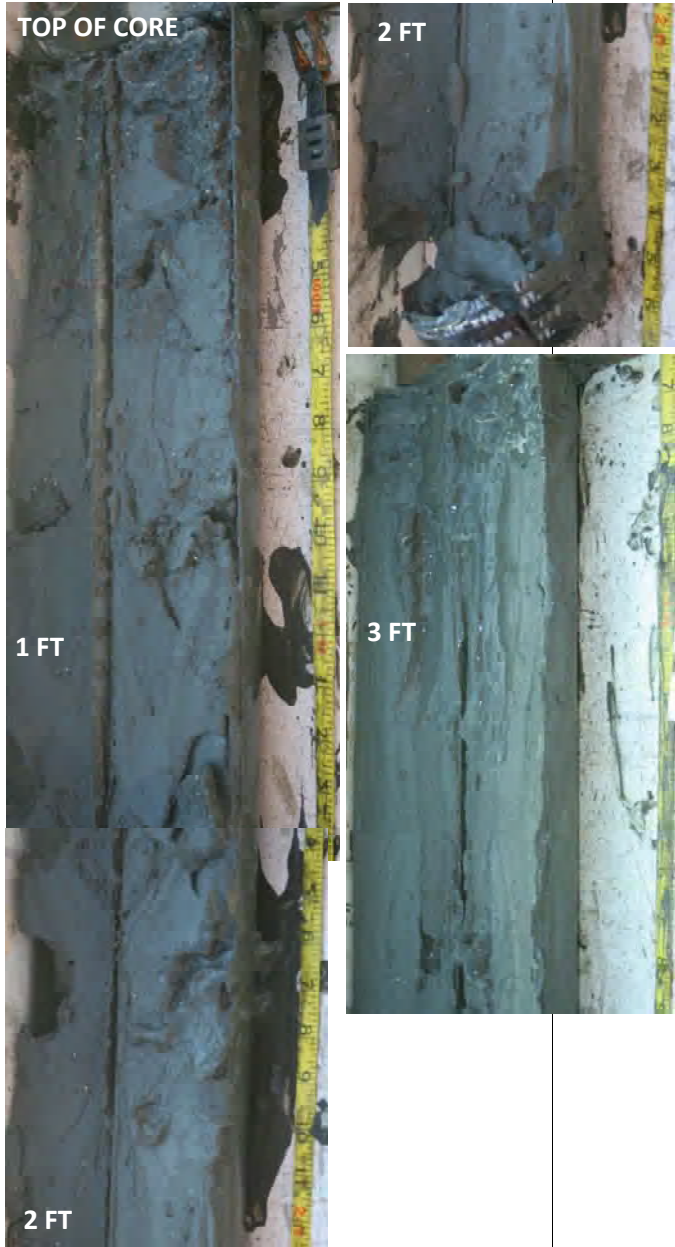
Core ID: NHH-F			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954918.3	Time: 16:25
Subcontractor:	Ocean Surveys Inc.	Y: 651077.63	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 17
Weather:	Sunny, 77°F		Recovery (ft): 16.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -17.7
Photo:			Notes:
			6.6-11.5' - Dark black to dark grey fine silt with some sand (fine to coarse). Very soft to soft, wet to moist. ML Lense of grey clay at 10.5'. CL No plasticity to low plasticity with depth.
Comments:			

Core ID: NHH-G			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954957.69	Time: 8:17
Subcontractor:	Ocean Surveys Inc.	Y: 656295.81	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 20
Weather:	Sunny, 77°F		Recovery (ft): 19.6
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -15.9
Photo:		Notes:	
 TOP OF CORE 1 FT 2 FT 3 FT 4 FT 5 FT 6.7 FT		0-2.8' - Black to dark grey sandy silt. ML 2.8-3.7' - Dark grey sandy silt. ML 3.7-4.3' - Darker grey sandy silt with intermittent shell hash. ML Not plastic. 4.3-5.7' - Dark grey silt with some sand. ML 5.7-6.2' - Grey sandy silt with shell hash. ML 6.2-6.7' - Dark grey silt with some sand and trace clay. ML	
Comments: Samples collected at 0-4.3' (chemistry / GS) and 4.3-13.7' (chemistry/ GS)			

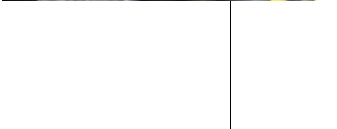
Core ID: NHH-G			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/11/2017
Client:	USACE	X: 954957.69	Time: 8:17
Subcontractor:	Ocean Surveys Inc.	Y: 656295.81	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 20
Weather:	Sunny, 77°F		Recovery (ft): 19.6
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -15.9
Photo:		Notes:	
		12 FT 6.7-9.6' - Dark grey silt with some sand and trace clay and shell hash. ML 9.6-14.7' - Dark grey compact silt with occasional shell hash. ML Not plastic to low plasticity. 13 FT 14 FT 14.7 FT	
Comments:			

Core ID: NHH-H			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955073	Time: 15:35
Subcontractor:	Ocean Surveys Inc.	Y: 656256.7	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.3
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -36.2
Photo:			Notes:
		0-1.6' - Black soft silt.. ML 1.6-1.7' - Lense of dark grey clay. CL 1.7-2.7' - Dark black silt with some sand. ML 2.7-4.1' - Dark black silt with some sand. ML 4.1-5.7' - Soft grey silt. ML 5.3-5.6' - Oyster shells 5.7-6.7' - Compact brown silt with some sand. ML 6.7-7.0' - Transition between brown silt and grey clay. ML/CL	
Comments: Samples collected at 0-5.4' (chemistry / GS [dup]) and 5.4-7.7' (chemistry/ GS)			

Core ID: NHH-H			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955073	Time: 15:35
Subcontractor:	Ocean Surveys Inc.	Y: 656256.7	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.3
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -36.2
Photo:			Notes:
		7.0-7.8' - Dark grey clay streaked with light brown silt. ML/CL 7.8-8.2' - Brown silt with fine sand. ML 8.2-9.3 Reddish fine to medium sand. SW	
Comments:			

Core ID: NHH-I			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955525.41	Time: 17:33
Subcontractor:	Ocean Surveys Inc.	Y: 656249.42	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 18
Weather:	Sunny, 79°F		Recovery (ft): 17.5
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-21.3
Photo:		Notes:	
		0-0.7' - Grey soft silt with some sand. ML 0.7-6.0' - Dark grey silty clay. CL	
			
Comments: Samples collected at 0-0.7' (chemistry / GS) and 0.7-2.5' (chemistry/ GS)			

Core ID: NHH-I			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955525.41	Time: 17:33
Subcontractor:	Ocean Surveys Inc.	Y: 656249.42	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 18
Weather:	Sunny, 79°F		Recovery (ft): 17.5
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-21.3
Photo:		Notes:	
			
			
		6.0-12.5' - Dark grey silty clay. CL	
Comments:			

Core ID: NHH-J			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955130.54	Time: 11:09
Subcontractor:	Ocean Surveys Inc.	Y: 662186.32	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): 21.3
Photo:		Notes:	
   		 0-4.7' - Dark grey to black soft silt with some sand. Very soft, wet. ML Not plastic.	
Comments: Samples collected at 0-5.4' (chemistry / GS)			

Core ID: NHH-J			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955130.54	Time: 11:09
Subcontractor:	Ocean Surveys Inc.	Y: 662186.32	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): 21.3
Photo:			Notes:
   		4.7-9.7' - Dark grey to black soft silt with some sand. ML Low plasticity. 7.4' - Chunk of wood	
Comments:			

Core ID: NHH-K			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955275.32	Time: 13:58
Subcontractor:	Ocean Surveys Inc.	Y: 662195.02	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.1
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-35.8
Photo:		Notes:	
		0-4.8' - Black soft silt. ML 4.8-5.8' - Grey clay intertwined with reddish brown silt. CL/ML	
Comments: Samples collected at 0-5.5' (chemistry / GS) and 5.5-8.2' (GS only)			

Core ID: NHH-K			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955275.32	Time: 13:58
Subcontractor:	Ocean Surveys Inc.	Y: 662195.02	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.1
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.8
Photo:			Notes:
		5.8-6.1' - Reddish brown fine to medium sand. SW 6.1-7.3' - Reddish brown medium to coarse sand. SW 7.3-8.3' - Reddish brown fine to medium sand. SW 8.3-9.1' - Reddish brown fine sand. SP	
Comments:			

Core ID: NHH-L			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955734.84	Time: 12:50
Subcontractor:	Ocean Surveys Inc.	Y: 662225.81	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.8
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -21.7
Photo:		Notes:	
		 0-4.8' - Black soft silt with some fine to medium sand. ML	
Comments: Samples collected at 0-6.7' (chemistry / GS)			

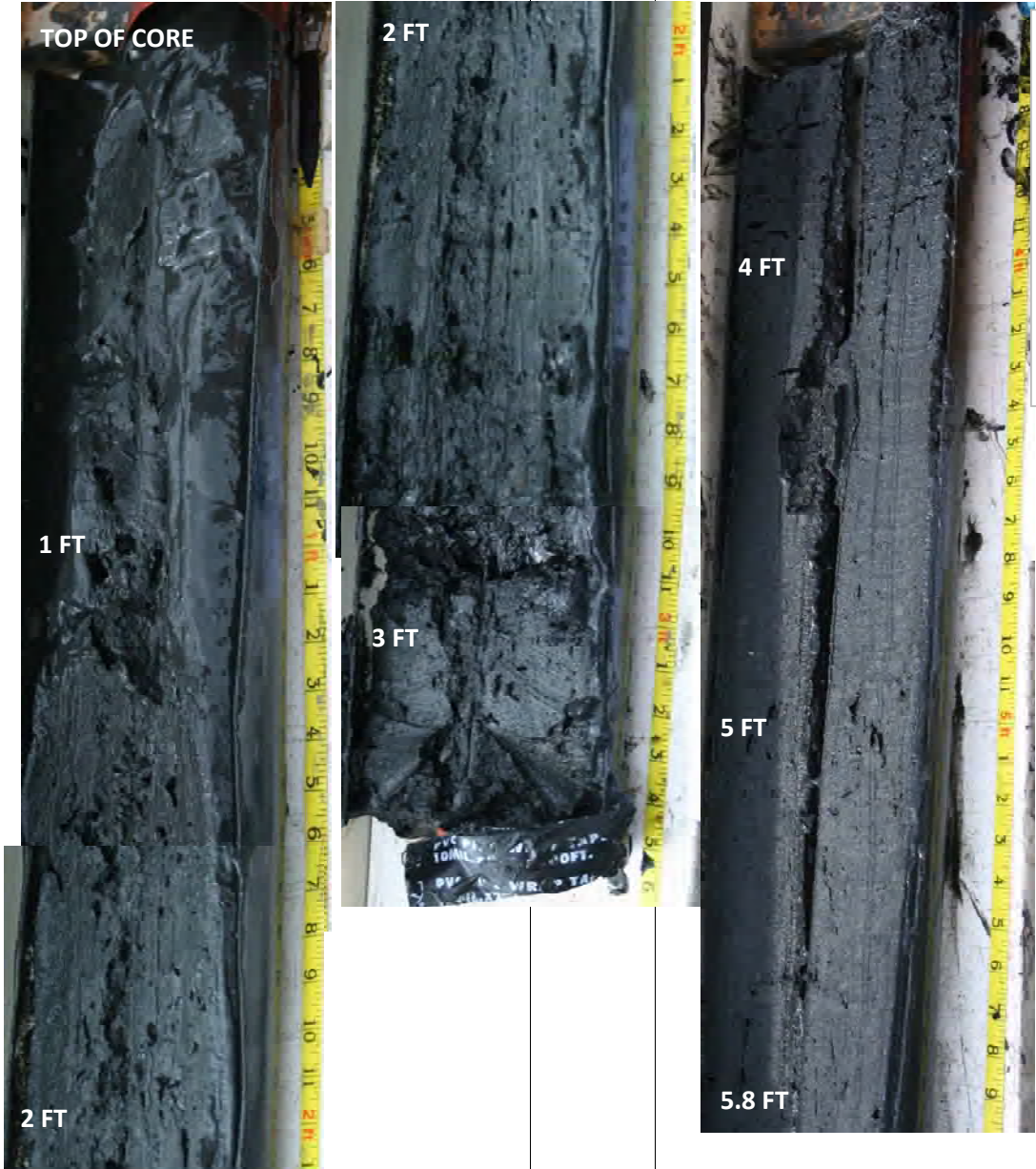
Core ID: NHH-L			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 955734.84	Time: 12:50
Subcontractor:	Ocean Surveys Inc.	Y: 662225.81	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.8
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-21.7
Photo:		Notes:	
 		 4.8-7.8' - Black soft silt with some fine to medium sand. ML 7.8-9.8' - Dark grey clay. CL	
			
Comments:			

Core ID: NHH-M			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955479.97	Time: 15:56
Subcontractor:	Ocean Surveys Inc.	Y: 665130.38	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -30.4
Photo:		Notes:	
			
			
		0.0-4.8' - Dark black silt. Very soft, wet, not plastic. ML Not plastic.	
Comments: Samples collected at 0-6.8' (chemistry / GS)			

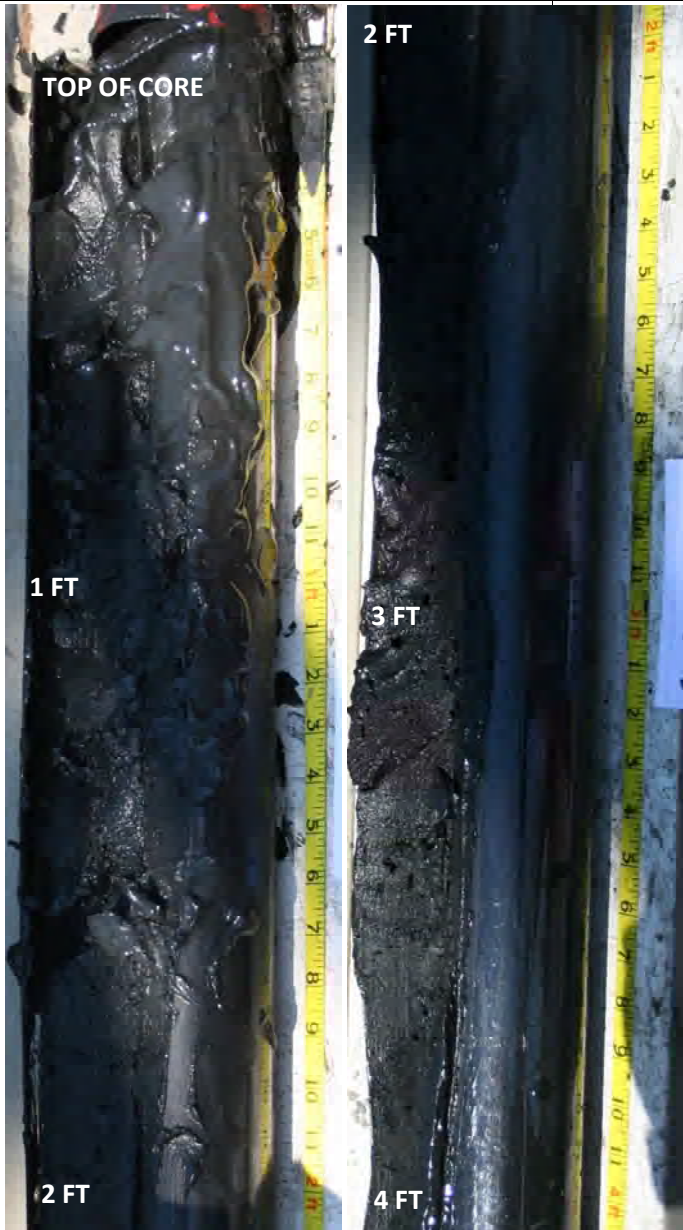
Core ID: NHH-M			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955479.97	Time: 15:56
Subcontractor:	Ocean Surveys Inc.	Y: 665130.38	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-30.4
Photo:		Notes:	
			
		4.8-8.8' - Dark black silt. Very soft/ wet. Not plastic. ML 8.8-9.7' - Reddish fine to medium sand. SW Low plasticity	
Comments:			

Core ID: NHH-N			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955867.55	Time: 12:55
Subcontractor:	Ocean Surveys Inc.	Y: 665076.75	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.3
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -36.5
Photo:		Notes:	
			
		0.0-4.3' - Dark black silt. ML	
Comments: Samples collected at 0-6.0' (chemistry / GS) and 6.0-7.5' (GS only)			

Core ID: NHH-N			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955867.55	Time: 12:55
Subcontractor:	Ocean Surveys Inc.	Y: 665076.75	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.3
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-36.5
Photo:		Notes:	
		4.3-5.5' - Dark black silt. ML 5.5-6.0' - Black soft silt with shell hash. Medium to coarse sand at transition zone, with slight petroleum-like odor. ML 6.0-9.3' - Tan/reddish fine/medium sand. Sand color transitions from darker to lighter deeper in the core. SW	
Comments:			

Core ID: NHH-O			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 956251.13	Time: 14:30
Subcontractor:	Ocean Surveys Inc.	Y: 665020.32	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 13
Weather:	Partly Sunny, 72°F		Recovery (ft): 13.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -33.1
Photo:		Notes:	
		0.0-5.8' - Dark black silt. ML	
Comments: Samples collected at 0-8.3' (chemistry / GS) and 8.7-10.9' (GS only)			

Core ID: NHH-O			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 956251.13	Time: 14:30
Subcontractor:	Ocean Surveys Inc.	Y: 665020.32	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 13
Weather:	Partly Sunny, 72°F		Recovery (ft): 13.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -33.1
Photo:		Notes:	
		5.8-8.3' - Dark black silt. ML 8.3-8.7' - Dark (black) coarse sand and gravel. SP 8.7-13.0' - Reddish brown fine sand. SP 13.0-13.3' - Transition zone reddish brown fine sand/ reddish brown clay. SP/CL 13.3 - 13.4' - Reddish brown clay. CL	
Comments:			

Core ID: NHH-P			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955176.17	Time: 12:00
Subcontractor:	Ocean Surveys Inc.	Y: 667304.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.3
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -16
Photo:		Notes:	
		 0.0-5.8' - Black silt, very soft to soft. Wet, not plastic. ML	
Comments: Samples collected at 0-5.8' (chemistry / GS) and 5.8-12.3' (chemistry/ GS)			

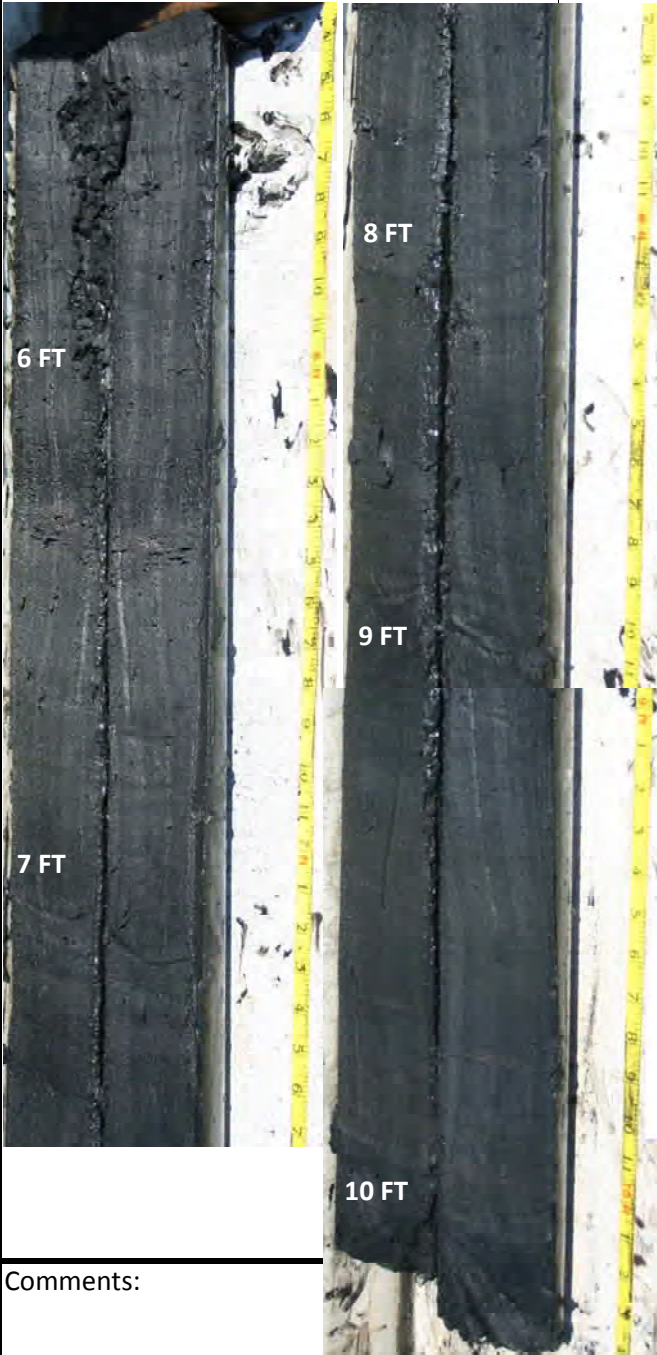
Core ID: NHH-P				
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017	
Client:	USACE	X: 955176.17	Time: 12:00	
Subcontractor:	Ocean Surveys Inc.	Y: 667304.47	Core Diameter (in): 3.5	
Sampling Personnel:	(AECOM)		No. of Attempts: 1	
Logged by:	Steve Howe		Penetration (ft): 30	
Weather:	Sunny, 75°F		Recovery (ft): 29.3	
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -16	
Photo:			Notes:	
				5.8-8.9' - Black silt, very soft to soft. Wet, not plastic. ML 8.9-9.0' - Band of brown/ tan fine/ medium sand. SW 9.0-9.5' - Black silt. ML 9.5-9.6' - Band of brown/ tan fine/ medium sand. SW 9.6-12.3' - Black silt w/ shell hash at transition. ML 12.3-13.2' - Tan/ brown fine/ medium sand with some grey silt. SM/SW
Comments:				

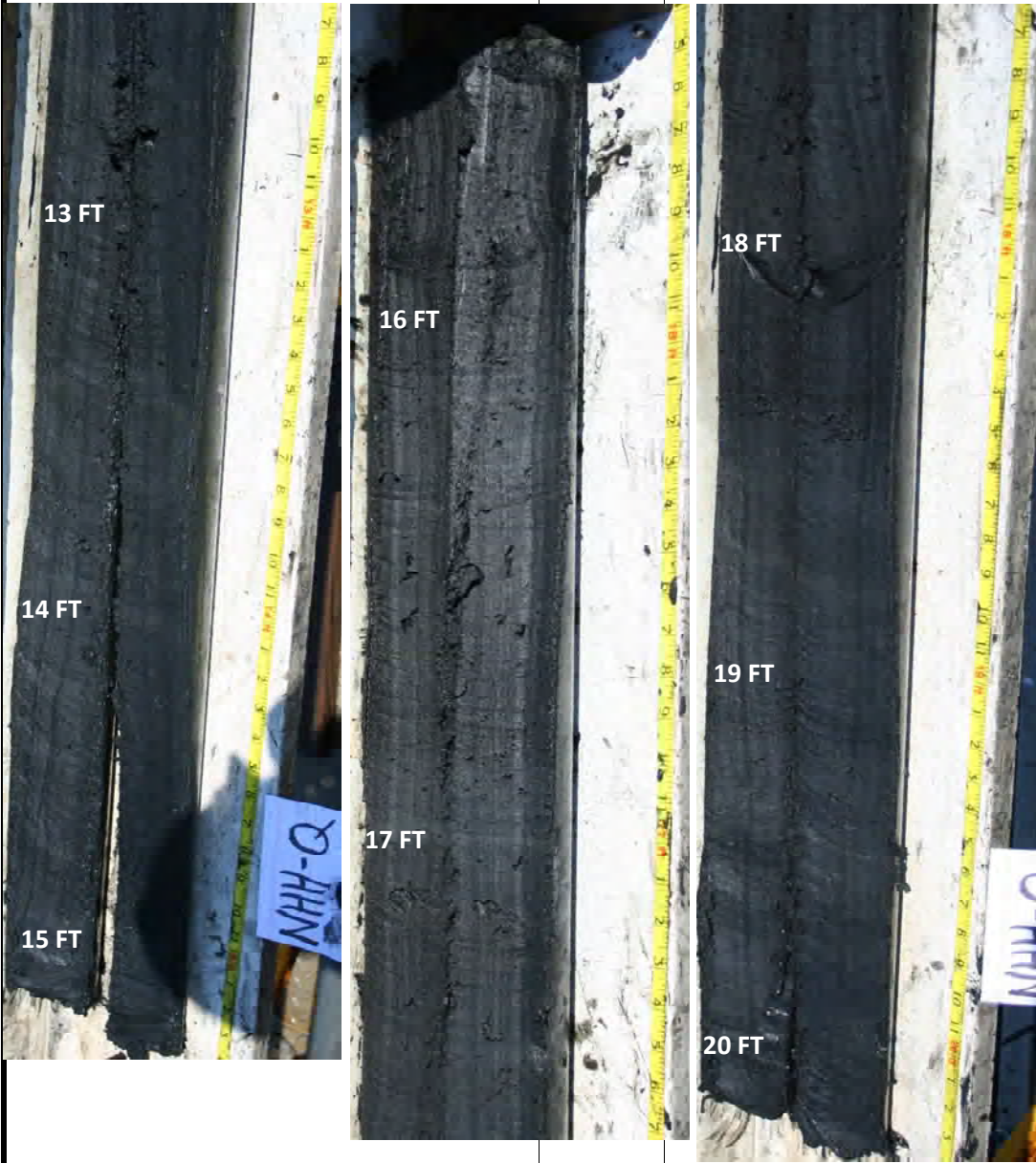
Core ID: NHH-P				
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017	
Client:	USACE	X: 955176.17	Time: 12:00	
Subcontractor:	Ocean Surveys Inc.	Y: 667304.47	Core Diameter (in): 3.5	
Sampling Personnel:	(AECOM)		No. of Attempts: 1	
Logged by:	Steve Howe		Penetration (ft): 30	
Weather:	Sunny, 75°F		Recovery (ft): 29.3	
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -16	
Photo:			Notes:	
				13.2-15.2' - Brown medium sand. SP 15.2-15.8' - Brownish to grey silty fine sand. SM 15.8-18.3' - Brown silty fine sand with dark grey band at transition. Dense, moist. SM 18.3-19.5' - Reddish brown silt, trace very fine sand and clay. Medium stiffness, moist, low plasticity. ML
Comments:				

Core ID: NHH-P			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955176.17	Time: 12:00
Subcontractor:	Ocean Surveys Inc.	Y: 667304.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.3
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -16
Photo:			Notes:
		19.5-21.9' - Reddish clayey silt ML/CL 21.9-22.1' - Tan to brown fine sand. SP 22.1-22.3' - Tannish brown clayey silt. ML/CL 22.3-22.7' - Tannish brown fine to medium sand. SW 22.7-23.8' - Tannish brown medium to coarse sand. SW 23.8-23.9' - Dark grey band in medium to coarse sand. SW 23.9-24.3' - Tannish brown medium to coarse sand. SW	
Comments:			

Core ID: NHH-P			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955176.17	Time: 12:00
Subcontractor:	Ocean Surveys Inc.	Y: 667304.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.3
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -16
Photo:			Notes:
		24.3-25.4' - Tannish brown medium to coarse sand. SW 25.4-26.1' - Tannish brown silty fine sand. SM 26.1-27.1' - Brownish coarse sand with some silt and gravel. SM 27.1-27.8' - Brownish medium to coarse sand. SW 27.8-28.3' - Brownish red fine sand with clay. CL 28.3-29.3' - Brownish coarse sand with silt and gravel. SM	
Comments:			

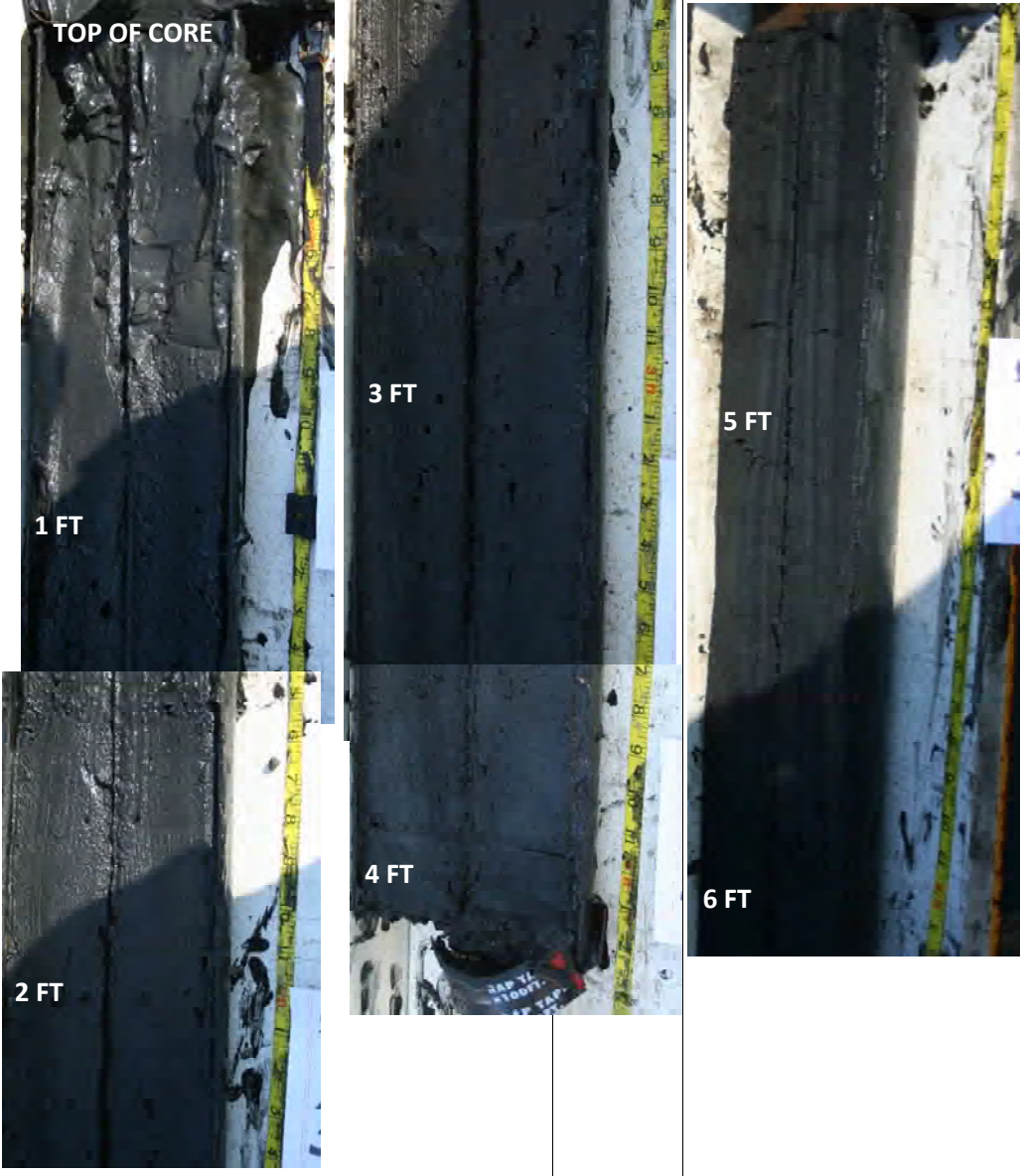
Core ID: NHH-Q			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955500.09	Time: 14:04
Subcontractor:	Ocean Surveys Inc.	Y: 667254.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -12.2
Photo:		Notes:	
		0.0-5.2' - Black fine silt. Moist to 2.0'. ML	
Comments: Samples collected at 0-5.3' (chemistry / GS) and 5.3-29.4' (chemistry/ GS)			

Core ID: NHH-Q			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955500.09	Time: 14:04
Subcontractor:	Ocean Surveys Inc.	Y: 667254.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -12.2
Photo:		Notes:	
		5.2-12.5' - Black silt. ML	
Comments:			

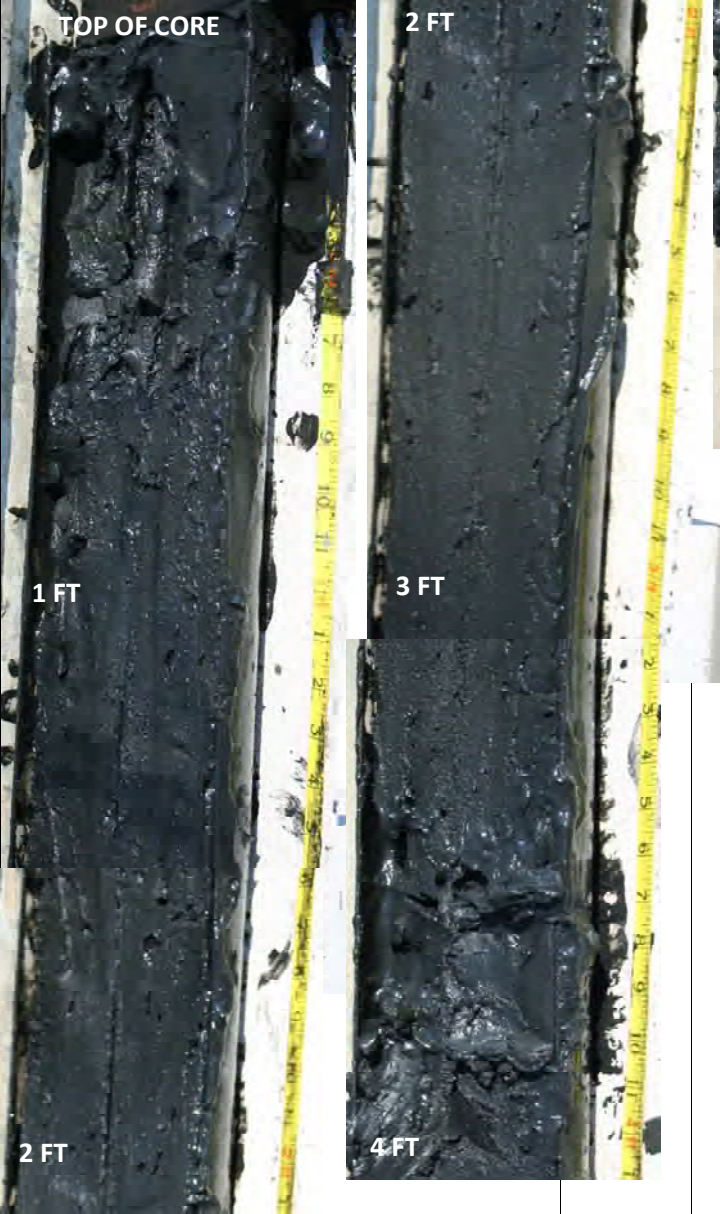
Core ID: NHH-Q			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955500.09	Time: 14:04
Subcontractor:	Ocean Surveys Inc.	Y: 667254.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -12.2
Photo:		Notes:	
		12.5-20.3' - Black silt. ML	
Comments:			

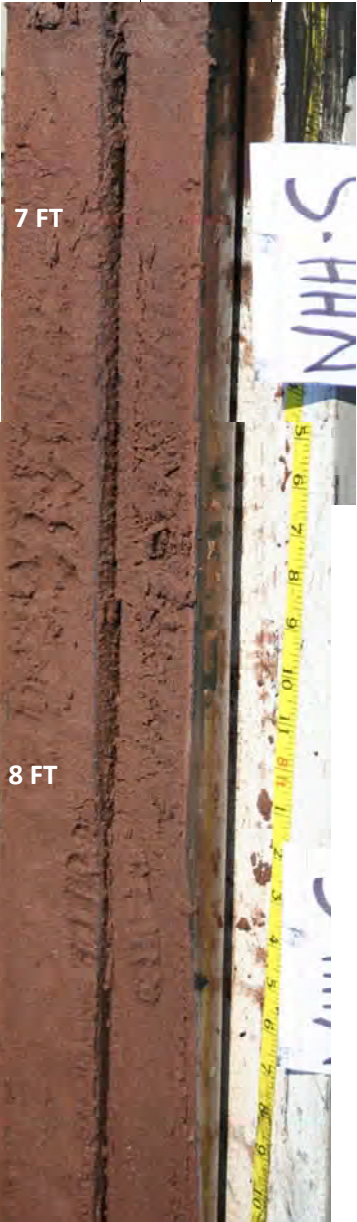
Core ID: NHH-Q			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955500.09	Time: 14:04
Subcontractor:	Ocean Surveys Inc.	Y: 667254.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -12.2
Photo:		Notes:	
			
21 FT 22 FT 23 FT 24 FT		25 FT 26 FT 20.3-26.2' - Black silt. ML 26.2-Grey fine to medium sand. SW 26.2-26.8' - Black fine silt. SP	
Comments:			

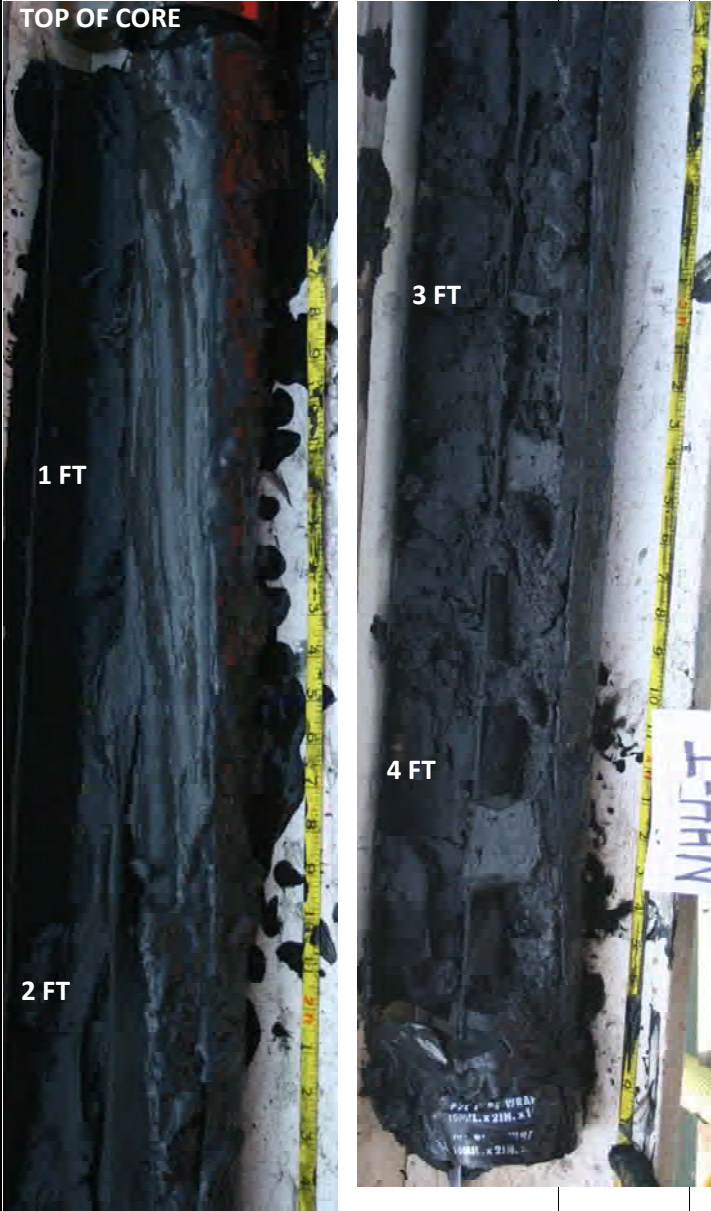
Core ID: NHH-Q			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955500.09	Time: 14:04
Subcontractor:	Ocean Surveys Inc.	Y: 667254.47	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -12.2
Photo:			Notes:
		26.8' - Sand seam Grey fine to medium sand. SW 26.8-27.6' - Black silt. ML 27.6' - Sand seam Grey fine to medium sand. SW 27.6-29.3' - Black silt. ML 29.3-29.4' - Brownish black silt. ML	
Comments:			

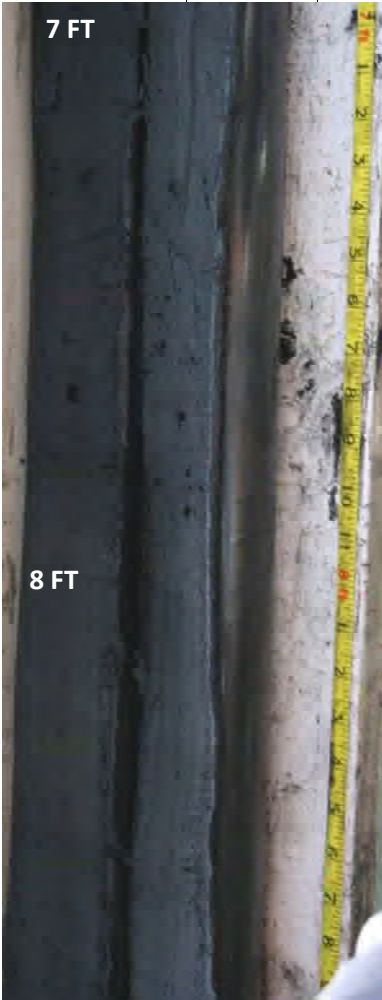
Core ID: NHH-R			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 956066.76	Time: 8:10
Subcontractor:	Ocean Surveys Inc.	Y: 667161.69	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 9.5
Weather:	Sunny, 79°F		Recovery (ft): 9.2
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -36.3
Photo:		Notes:	
		0.0-6.0' - Black soft silt with some clay. ML/CL	
Comments: Samples collected at 0-4.2' (chemistry / GS) and 4.2-7.7' (chemistry/ GS)			

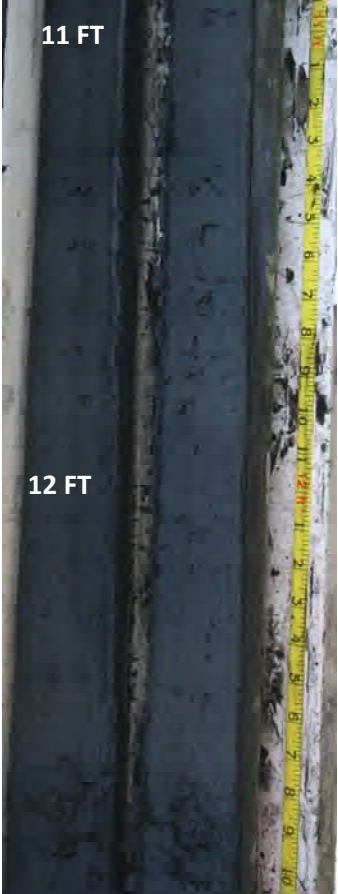
Core ID: NHH-R			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 956066.76	Time: 8:10
Subcontractor:	Ocean Surveys Inc.	Y: 667161.69	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 9.5
Weather:	Sunny, 79°F		Recovery (ft): 9.2
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -36.3
Photo:		Notes:	
		6.0-9.2' - Black soft silt with some clay. ML/CL	
Comments:			

Core ID: NHH-S			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 956558.51	Time: 9:39
Subcontractor:	Ocean Surveys Inc.	Y: 667100.36	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.5
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -37.6
Photo:		Notes:	
		0.0-4.5' - Black soft silt with some fine to coarse sand. Very soft, wet. ML Not plastic.	
Comments: Samples collected at 0-6.0' (chemistry / GS) and 6.0-6.4' (chemistry/ GS)			

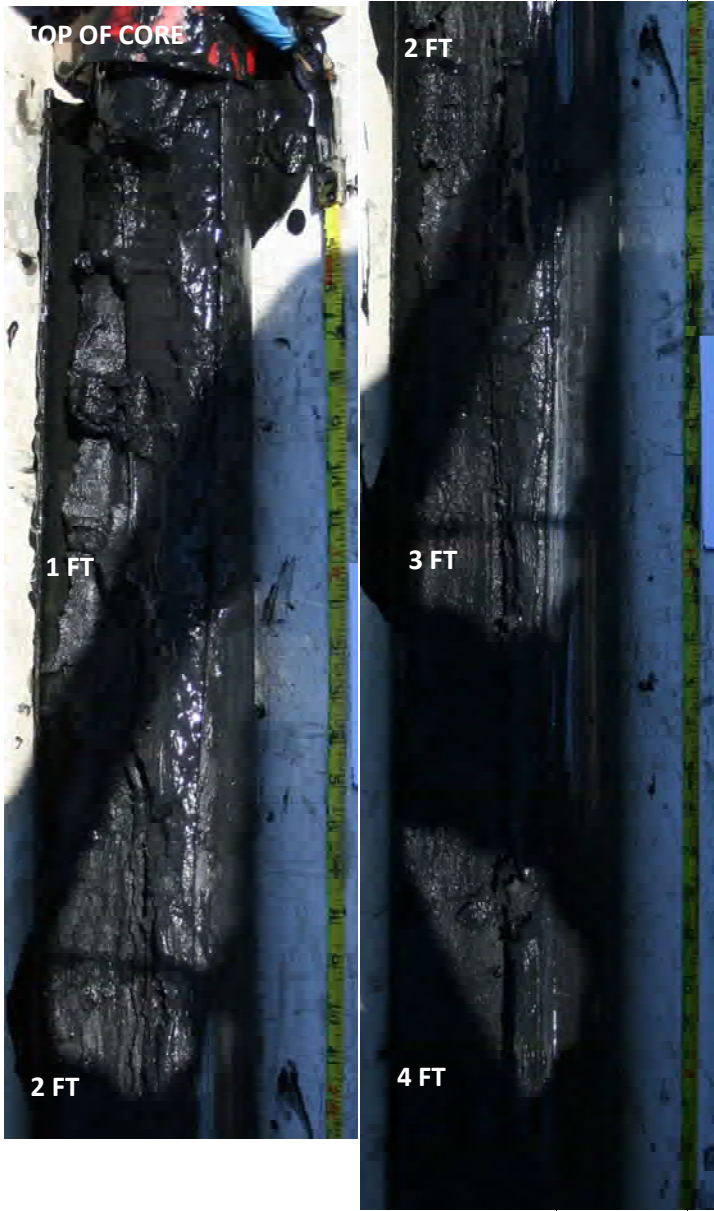
Core ID: NHH-S			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/10/2017
Client:	USACE	X: 956558.51	Time: 9:39
Subcontractor:	Ocean Surveys Inc.	Y: 667100.36	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 79°F		Recovery (ft): 9.5
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-37.6
Photo:		Notes:	
 		  4.5-6.0' - Black soft silt with some fine to coarse sand. Soft, wet. ML Not plastic 6.0-9.5' - Reddish fine sand. Very hard, moist. SP	
Comments:			

Core ID: NHH-T			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955476.02	Time: 17:19
Subcontractor:	Ocean Surveys Inc.	Y: 667998.66	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 20
Weather:	Partly Sunny, 72°F		Recovery (ft): 19.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -8.7
Photo:		Notes:	
		0.0-4.8' - Black silt. Very soft, wet. ML Not plastic.	
Comments: Samples collected at 0-4.8' (chemistry / GS) and 4.8-16.3' (chemistry/ GS)			

Core ID: NHH-T			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955476.02	Time: 17:19
Subcontractor:	Ocean Surveys Inc.	Y: 667998.66	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 20
Weather:	Partly Sunny, 72°F		Recovery (ft): 19.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -8.7
Photo:			Notes:
			 4.8-9.8' - Black silt. Very soft to soft. Wet to moist. ML Not plastic to low plasticity.
Comments:			

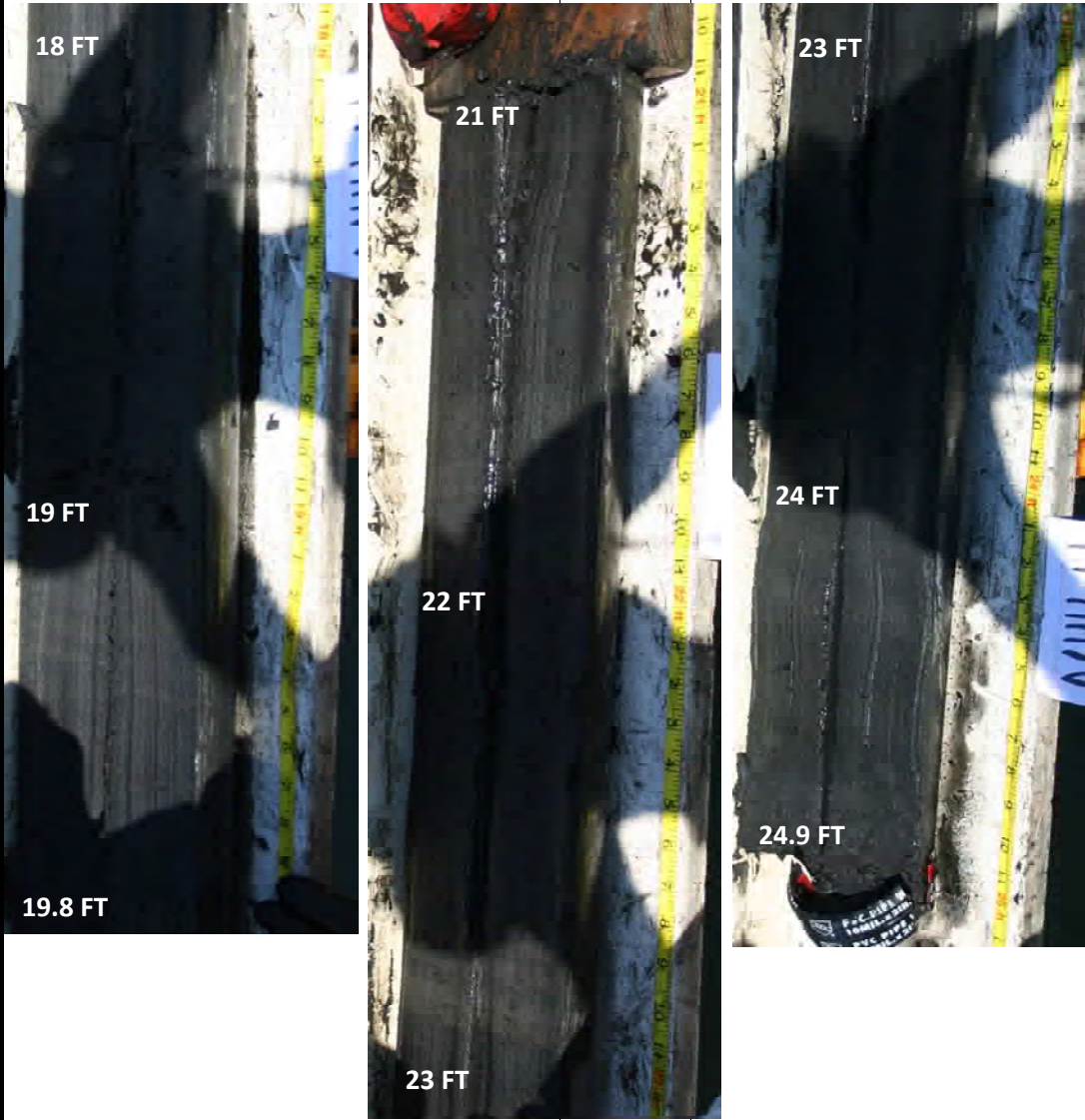
Core ID: NHH-T			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955476.02	Time: 17:19
Subcontractor:	Ocean Surveys Inc.	Y: 667998.66	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 20
Weather:	Partly Sunny, 72°F		Recovery (ft): 19.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -8.7
Photo:		Notes:	
			
			9.0-13.8' - Black silt. Very soft to soft. Wet to moist. ML Not plastic to low plasticity.
Comments:			

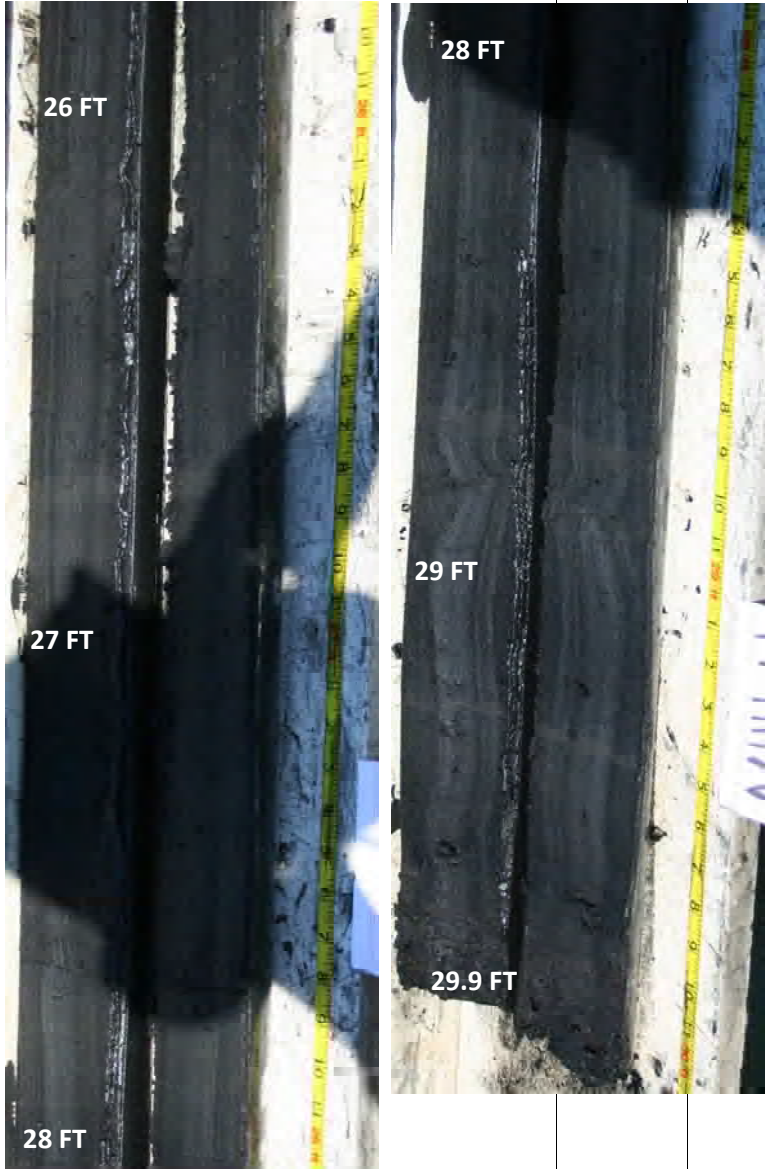
Core ID: NHH-T			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 955476.02	Time: 17:19
Subcontractor:	Ocean Surveys Inc.	Y: 667998.66	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 20
Weather:	Partly Sunny, 72°F		Recovery (ft): 19.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -8.7
Photo:		Notes:	
			
			
		15.0-19.7' - Black silt. Very soft to soft. Wet to moist. ML Not plastic to low plasticity.	
Comments: Photo for horizon 13.8-15.0 did not save.			

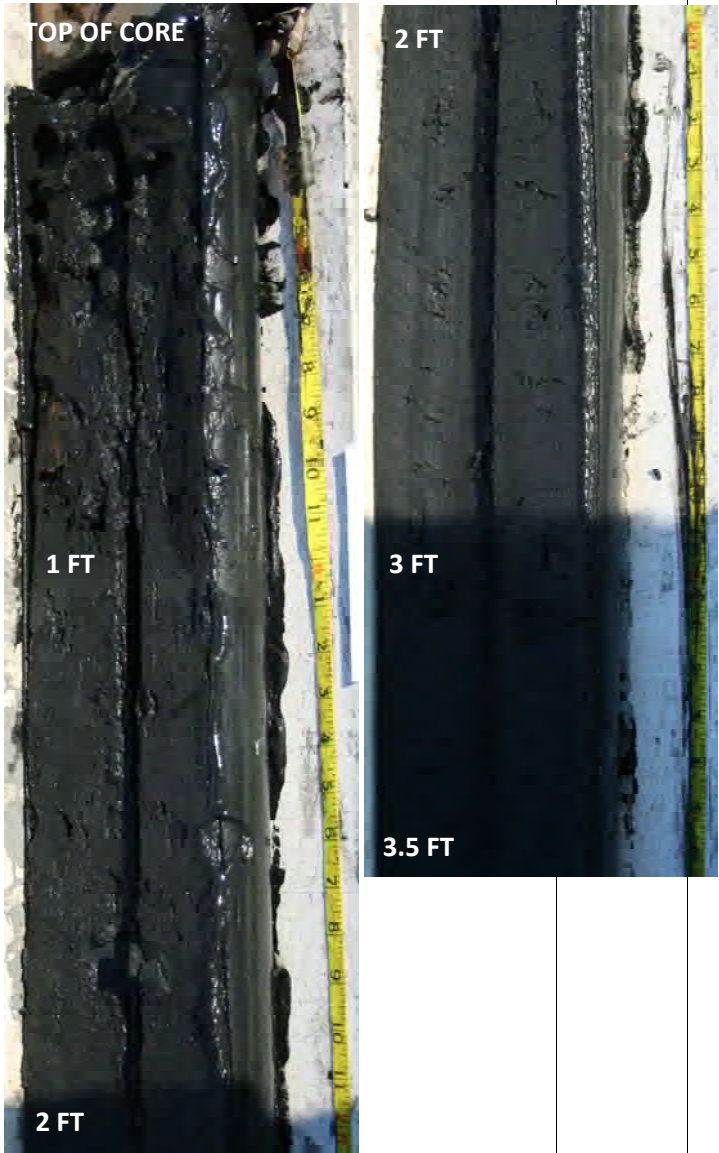
Core ID: NHH-U			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 8:37
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.9
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -11.8
Photo:		Notes:	
		 0.0-5.8' - Black silt. Moist to 1.5'. ML	
Comments: Samples collected at 0-5.8' (chemistry / GS) and 5.8-30.0' (chemistry/ GS)			

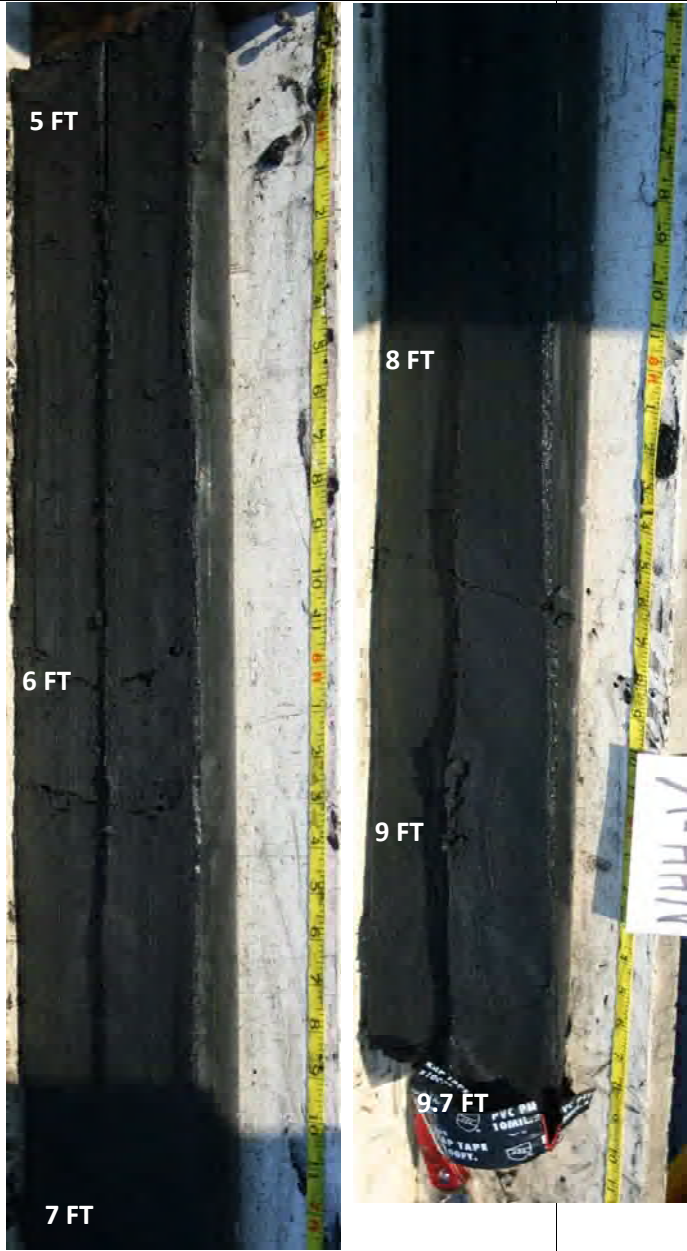
Core ID: NHH-U			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 8:37
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.9
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -11.8
Photo:		Notes:	
			
		5.8-13.0' - Black silt. ML	
Comments:			

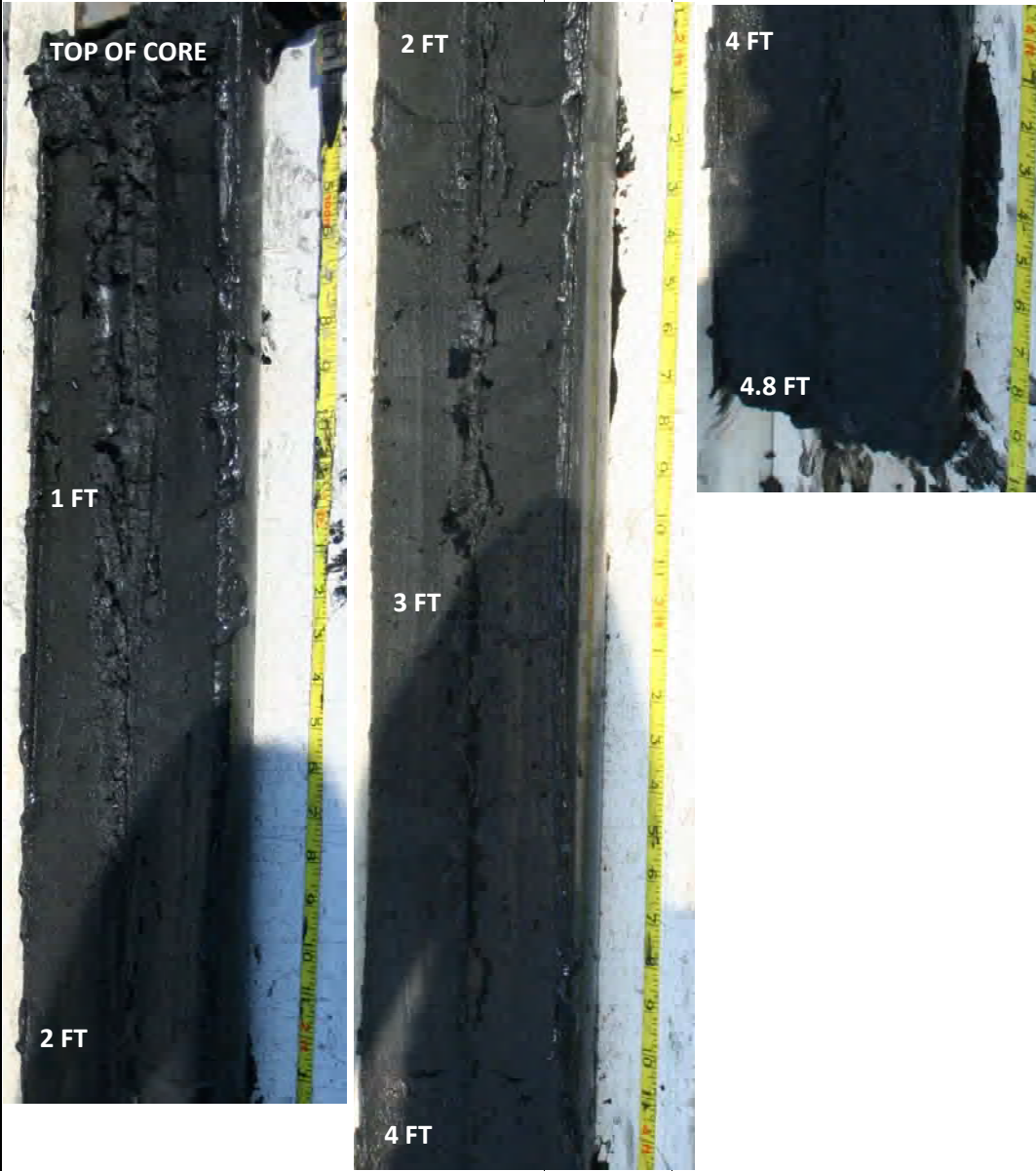
Core ID: NHH-U			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 8:37
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.9
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -11.8
Photo:		Notes:	
			
		13.0-18.0' - Black silt. ML	
Comments:			

Core ID: NHH-U			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 8:37
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.9
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -11.8
Photo:		Notes:	
		18.0-24.9' - Black silt. ML	
Comments: Photo for horizon 20.0-21.0' did not save.			

Core ID: NHH-U			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 8:37
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 30
Weather:	Sunny, 75°F		Recovery (ft): 29.9
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -11.8
Photo:		Notes:	
		24.9-29.9' - Black silt. ML	
Comments:			

Core ID: NHH-V			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 17:25
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 75°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -11.8
Photo:		Notes:	
		0.0-3.5' - Black silt. Moist to 0.8'. ML	
Comments: Photo for horizon 4.0-5.0' did not save. Samples collected at 0-4.8' (chemistry / GS) and 4.8-8.6' (chemistry/ GS)			

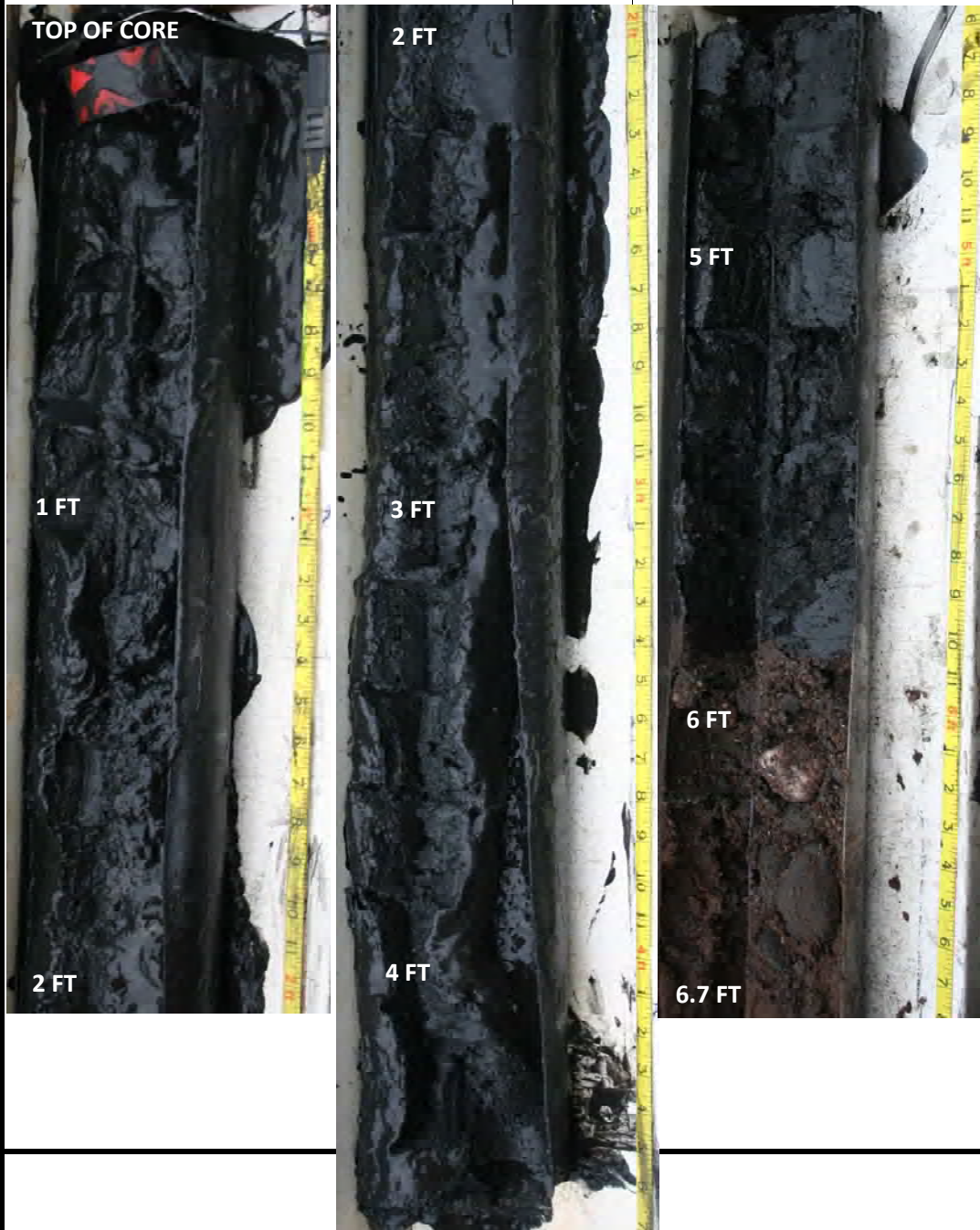
Core ID: NHH-V			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 955696.43	Time: 17:25
Subcontractor:	Ocean Surveys Inc.	Y: 667963.55	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 75°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-11.8
Photo:		Notes:	
		5.0-9.7' - Black silt. ML	
Comments:			

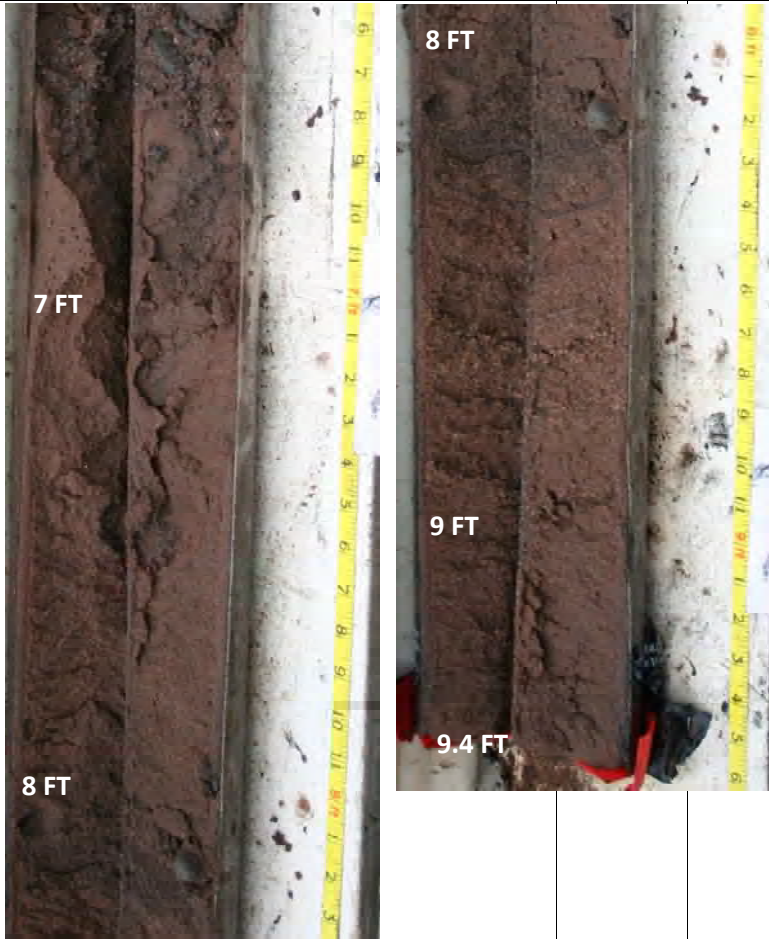
Core ID: NHH-W			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 956642.29	Time: 16:12
Subcontractor:	Ocean Surveys Inc.	Y: 667836.21	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 75°F		Recovery (ft): 9.8
Sampling Equipment:	Vibracore	Water Depth (ft, MLLW):	-35.5
Photo:		Notes:	
		0.0-4.8' - Black silt. Very soft, wet. ML Not plastic	
Comments: Samples collected at 0-5.5' (chemistry / GS) and 5.5-8.2' (GS only)			

Core ID: NHH-W			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/9/2017
Client:	USACE	X: 956642.29	Time: 16:12
Subcontractor:	Ocean Surveys Inc.	Y: 667836.21	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Sunny, 75°F		Recovery (ft): 9.8
Sampling Equipment:	Vibrocure		Water Depth (ft, MLLW): -35.5
Photo:		Notes:	
			
		4.8-5.5' - Black silt. ML 5.5-6.8' - Reddish fine sand with some silt. Very hars, moist. Poorly graded. SM 6.8-8.2' - Reddish fine sand. Very hard, moist, poorly graded. SP 8.2-9.3' - Reddish clayey silt. ML/CL 9.3-9.8' - Reddish fine sand. SP	
Comments:			

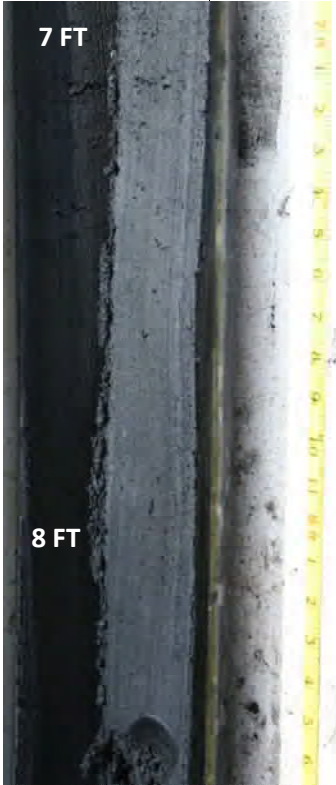
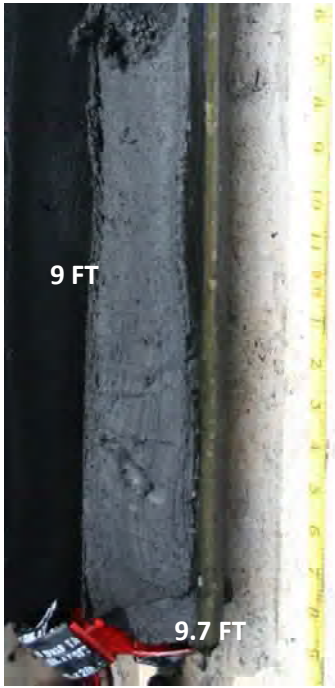
Core ID: NHH-X			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 956695.36	Time: 8:43
Subcontractor:	Ocean Surveys Inc.	Y: 669144.51	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -19
Photo:		Notes:	
			
		0.0-4.7' - Black silt. Very soft. Wet, not plastic. Faint petroleum-like odor. ML	
Comments: Samples collected at 0-5.2' (chemistry / GS [dup]) and 5.2-8.0' (chemistry/ GS)			

Core ID: NHH-X			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 956695.36	Time: 8:43
Subcontractor:	Ocean Surveys Inc.	Y: 669144.51	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -19
Photo:		Notes:	
			
			
		4.7-5.2' - Black silt. ML 5.2-8.0' - Dark tan/ brown fine sand. Very hard/ moist. SP 8.0-9.7' - Tannish brown coarse sand. SP	
Comments:			

Core ID: NHH-Y			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 956935.61	Time: 10:34
Subcontractor:	Ocean Surveys Inc.	Y: 668934.77	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.5
Photo:			Notes:
		0.0-5.9' - Black silt. ML 5.9-6.7' - Reddish brown coarse sand with cobbles. SP	
Comments: Samples collected at 0-5.9' (chemistry / GS) and 5.9-8.5' (GS only)			

Core ID: NHH-Y			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 956935.61	Time: 10:34
Subcontractor:	Ocean Surveys Inc.	Y: 668934.77	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.4
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.5
Photo:			Notes:
		6.7-6.8' - Reddish brown coarse sand. SP 6.8-9.5' - Reddish fine to medium sand with occasional cobbles. SW	
Comments:			

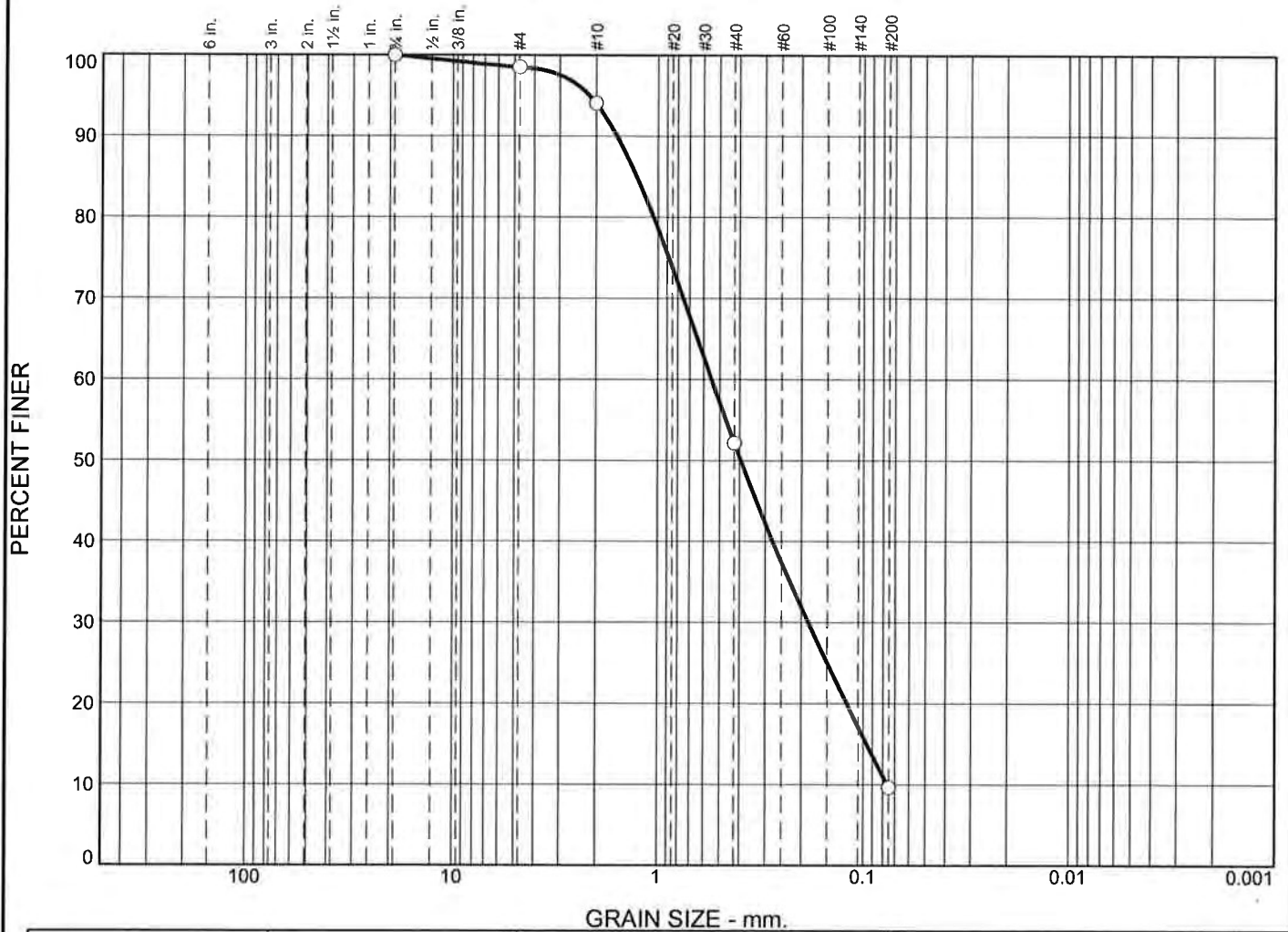
Core ID: NHH-Z			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 957127.56	Time: 11:43
Subcontractor:	Ocean Surveys Inc.	Y: 668767.57	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.3
Photo:		Notes:	
		0.0-4.8' - Black silt. ML	
Comments: Samples collected at 0-5.0' (chemistry / GS) and 5.0-8.7' (chemistry/ GS)			

Core ID: NHH-Z			
Project:	New Haven Harbor FNP	Coordinates (CT ft)	Date: 8/8/2017
Client:	USACE	X: 957127.56	Time: 11:43
Subcontractor:	Ocean Surveys Inc.	Y: 668767.57	Core Diameter (in): 3.5
Sampling Personnel:	(AECOM)		No. of Attempts: 1
Logged by:	Steve Howe		Penetration (ft): 10
Weather:	Partly Sunny, 72°F		Recovery (ft): 9.7
Sampling Equipment:	Vibracore		Water Depth (ft, MLLW): -35.3
Photo:		Notes:	
			
			
		4.8-5.3' - Black silt. ML 5.3-5.5' - Reddish brown fine to medium sand. SW 5.5-7.6' - Firm/compact black silt. ML 7.6-9.8' - Firm/compact black silt. Trace medium to fine sand. ML	
Comments:			

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
☐ 0.0	0.0	1.5	4.5	41.8	42.6	9.6				
☒ Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐			1.2684	0.5477	0.3951	0.1852	0.0959	0.0762	0.82	7.18

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-A-TOP Sample Number: L1728229-06 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-A-TOP**Sample Number:** L1728229-06**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 37.23

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.23	0.00	0.75	0.00	0.00	100.0
		#4	0.56	0.00	98.5
		#10	1.66	0.00	94.0
		#40	15.59	0.00	52.2
		#200	15.83	0.00	9.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.5	1.5	4.5	41.8	42.6	88.9			9.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0762	0.0959	0.1201	0.1852	0.3951	0.5477	1.0508	1.2684	1.5808	2.1573

Fineness Modulus	C _u	C _c
1.93	7.18	0.82

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-A-BOTTOM**Sample Number:** L1728229-07**USCS Classification:** SP**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 37.96

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.96	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.67	0.00	98.2
		#40	10.22	0.00	71.3
		#200	25.83	0.00	3.3

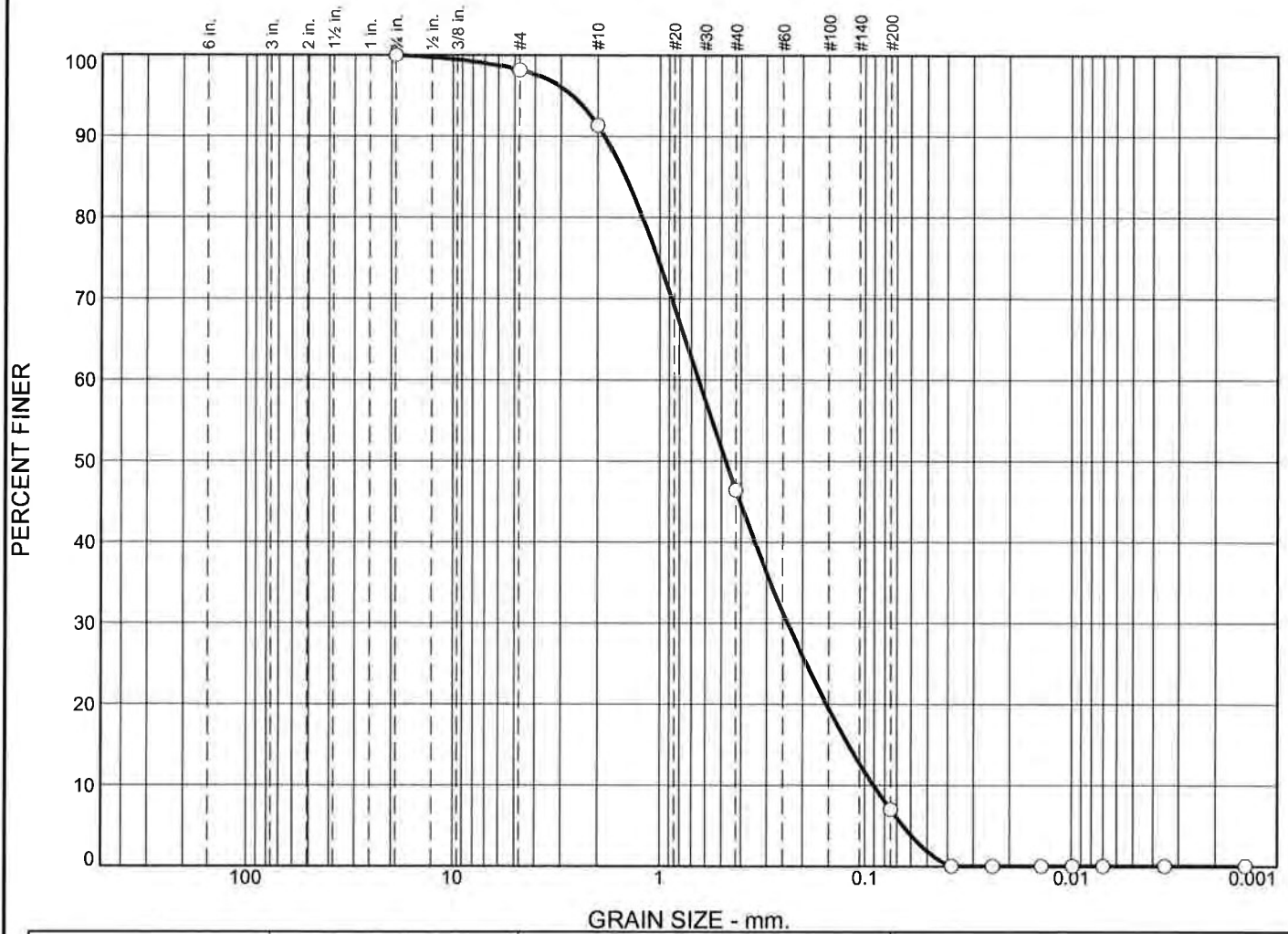
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.8	26.9	68.0	96.7			3.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0874	0.0979	0.1099	0.1387	0.2277	0.2994	0.5871	0.7334	0.9591	1.3739

Fineness Modulus	C _u	C _c
1.34	3.43	0.74

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
☐	0.0	0.0	1.9	6.8	44.9	39.4	7.0	0.0			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				1.4734	0.6451	0.4759	0.2368	0.1198	0.0905	0.96	7.13

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-A-TOP Sample Number: L1731355-17 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-A-TOP

Sample Number: L1731355-17

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 46.40
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
46.40	0.00	0.75	0.00	0.00	100.0
		#4	0.87	0.00	98.1
		#10	3.15	0.00	91.3
		#40	20.84	0.00	46.4
		#200	18.28	0.00	7.0

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 7.0
 Weight of hydrometer sample = 42.00
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.0
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.0
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.0
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.0
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.0
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.0
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.0

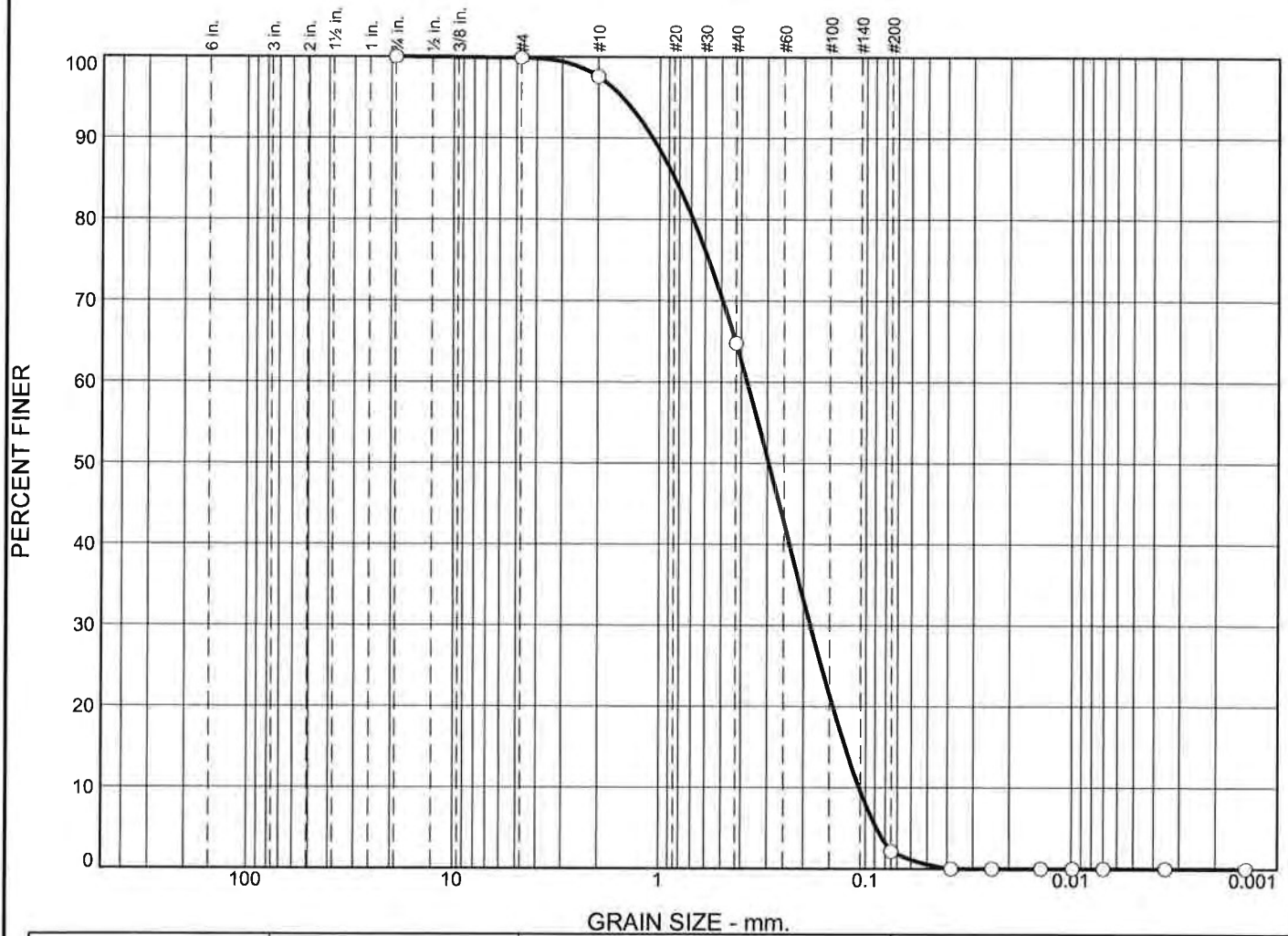
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	6.8	44.9	39.4	91.1	7.0	0.0	7.0

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0652	0.0905	0.1198	0.1537	0.2368	0.3430	0.4759	0.6451	1.2180	1.4734	1.8550	2.6526

Fineness Modulus	C _u	C _c
2.16	7.13	0.96

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-A-BOTTOM

Sample Number: L1731355-18

USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 44.68
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
44.68	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.9
		#10	1.03	0.00	97.6
		#40	14.67	0.00	64.7
		#200	27.96	0.00	2.1

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 2.1

Weight of hydrometer sample = 44.88

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	R _m	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.0
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.0
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.0
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.0
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.0
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.0
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.0

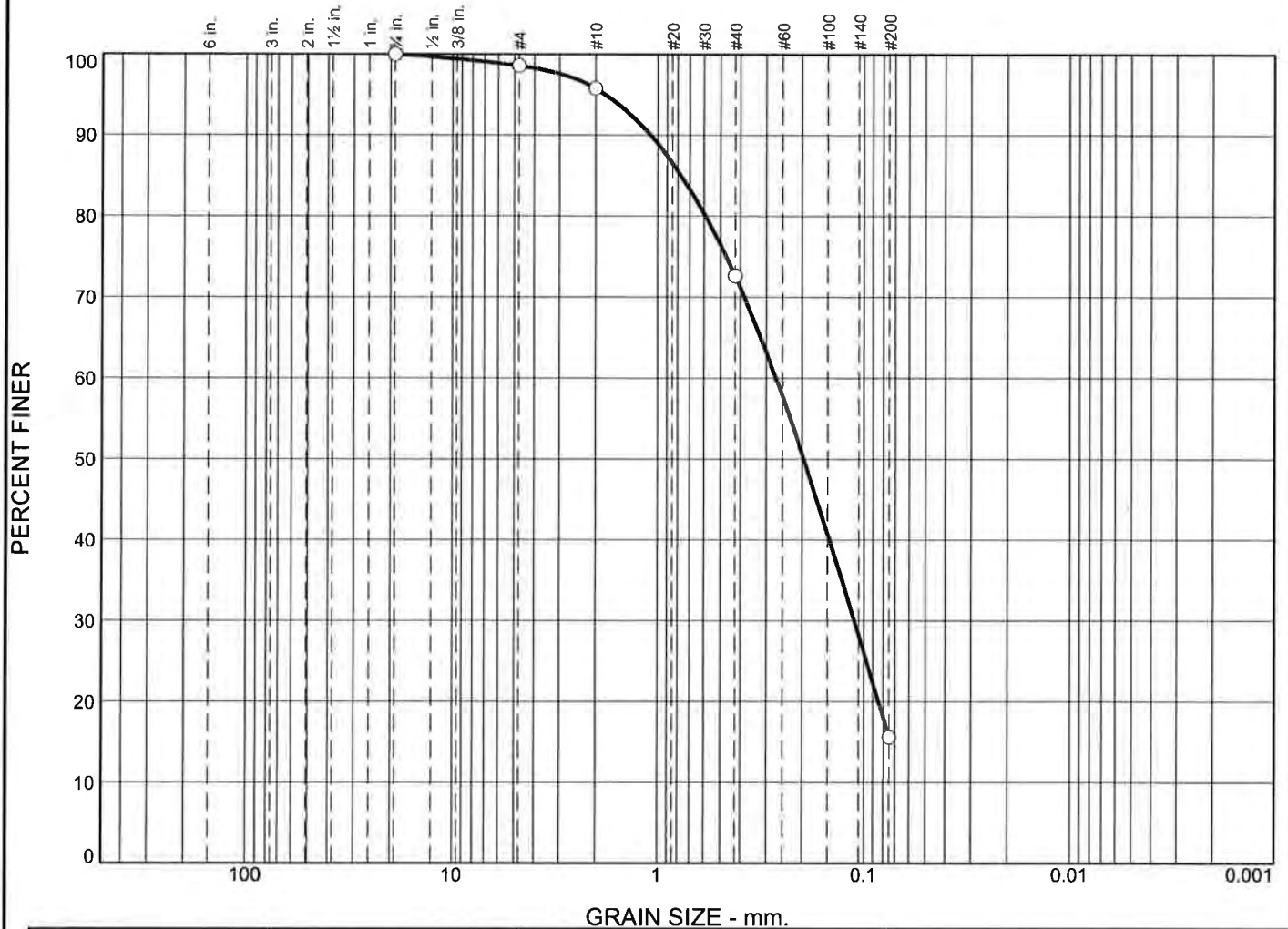
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	2.3	32.9	62.6	97.8	2.1	0.0	2.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0882	0.1075	0.1259	0.1447	0.1858	0.2346	0.2954	0.3759	0.6869	0.8423	1.0808	1.5221

Fineness Modulus	C _u	C _c
1.62	3.50	0.85

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"	% Gravel		% Sand			% Fines					
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay				
☐ 0.0	0.0	1.4	2.8	23.2	57.0	15.6					
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.7721	0.2693	0.1966	0.1110				

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-B Sample Number: L1728229-05 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-B

Sample Number: L1728229-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 37.01

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.01	0.00	0.75	0.00	0.00	100.0
		#4	0.53	0.00	98.6
		#10	1.03	0.00	95.8
		#40	8.57	0.00	72.6
		#200	21.10	0.00	15.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.4	1.4	2.8	23.2	57.0	83.0			15.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0845	0.1110	0.1966	0.2693	0.5897	0.7721	1.0825	1.7818

Fineness
Modulus

1.30

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-B

Sample Number: WG1031751-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 36.31

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.31	0.00	0.75	0.00	0.00	100.0
		#4	0.86	0.00	97.6
		#10	0.84	0.00	95.3
		#40	8.42	0.00	72.1
		#200	19.05	0.00	19.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.4	2.4	2.3	23.2	52.4	77.9			19.7

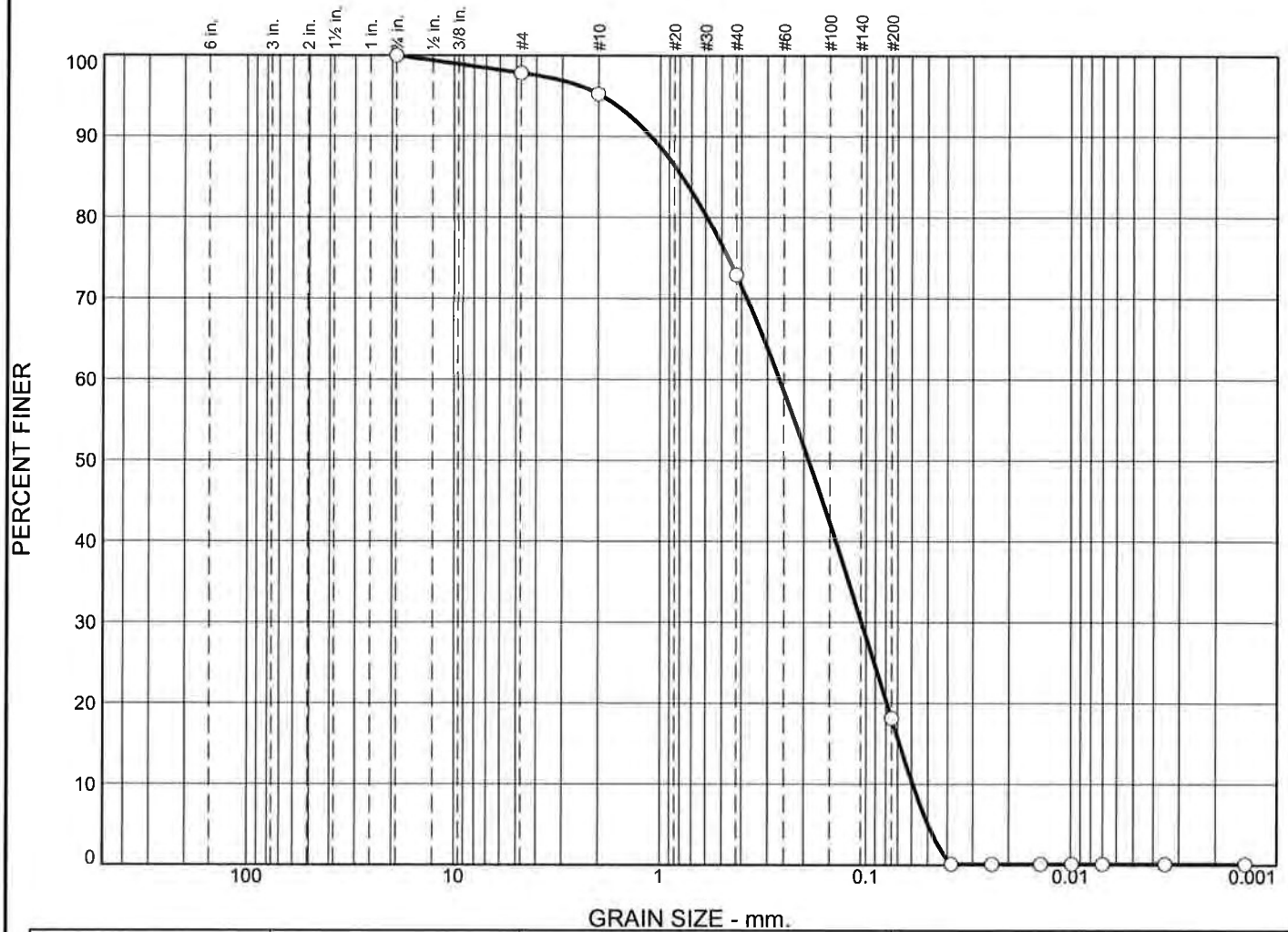
D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0758	0.1022	0.1905	0.2673	0.6101	0.8034	1.1305	1.9009

Fineness

Modulus

1.32

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	2.2	2.6	22.3	54.8	18.0		0.1		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.7790	0.2625	0.1899	0.1050	0.0686	0.0591	0.71	4.44

Material Description									USCS	AASHTO
☐										

Project No. Project: ☐ Source of Sample: NHH-B Sample Number: L1731355-16 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-B

Sample Number: L1731355-16

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 39.56
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
39.56	0.00	0.75	0.00	0.00	100.0
		#4	0.86	0.00	97.8
		#10	1.04	0.00	95.2
		#40	8.81	0.00	72.9
		#200	21.67	0.00	18.1

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 18.1

Weight of hydrometer sample = 39.06

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.1
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

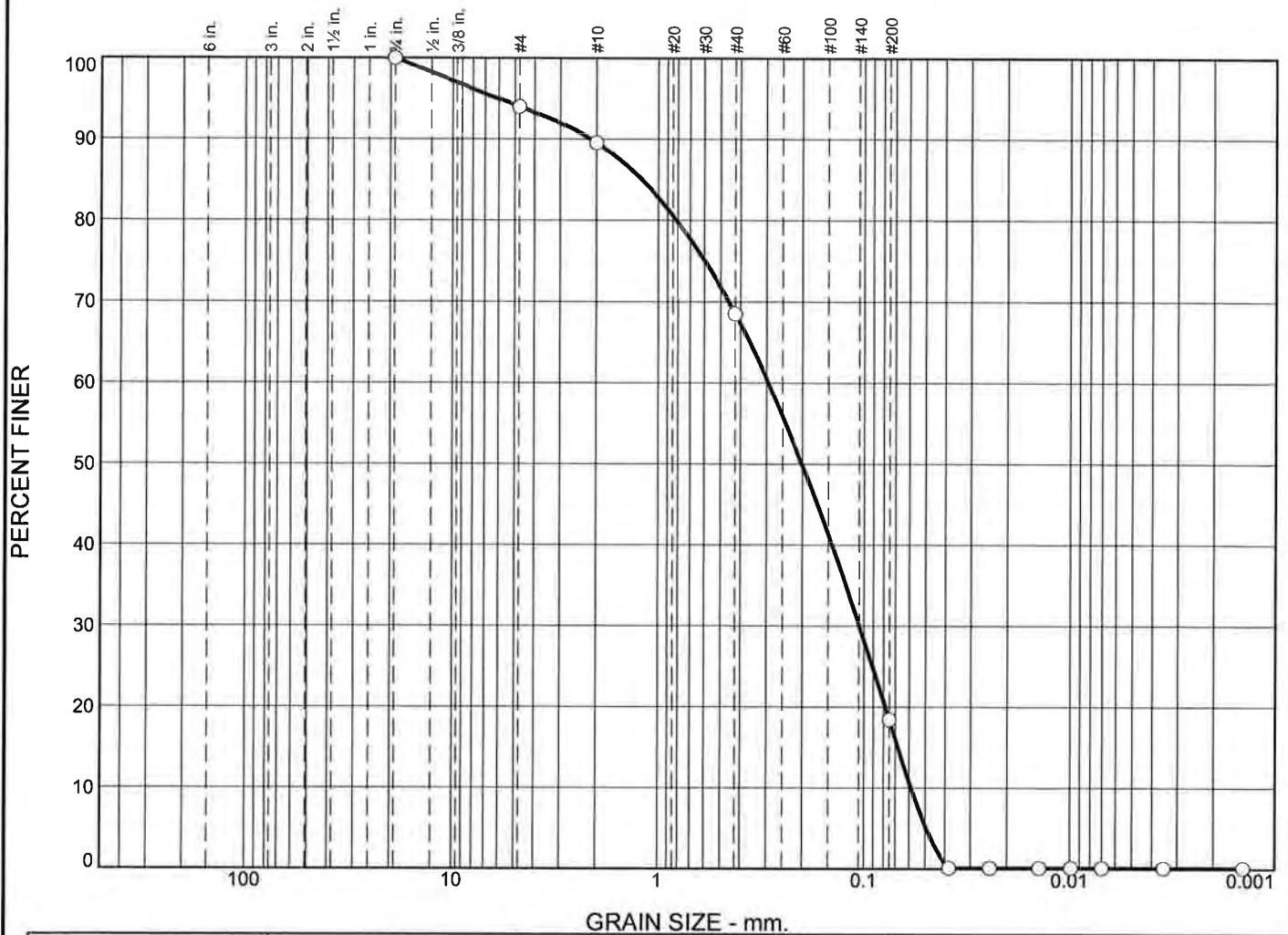
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.2	2.2	2.6	22.3	54.8	79.7	18.0	0.1	18.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0498	0.0591	0.0686	0.0790	0.1050	0.1404	0.1899	0.2625	0.5886	0.7790	1.1123	1.9356

Fineness Modulus	C _u	C _c
1.30	4.44	0.71

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	6.0	4.5	21.0	50.1	18.3		0.1	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				1.2093	0.2941	0.2020	0.1054	0.0679	0.0586	0.64	5.02

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-B Sample Number: WG1040348-1 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-B

Sample Number: WG1040348-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 38.38
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
38.38	0.00	0.75	0.00	0.00	100.0
		#4	2.32	0.00	94.0
		#10	1.70	0.00	89.5
		#40	8.08	0.00	68.5
		#200	19.20	0.00	18.4

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 18.4
 Weight of hydrometer sample = 39.18
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.1
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

Fractional Components

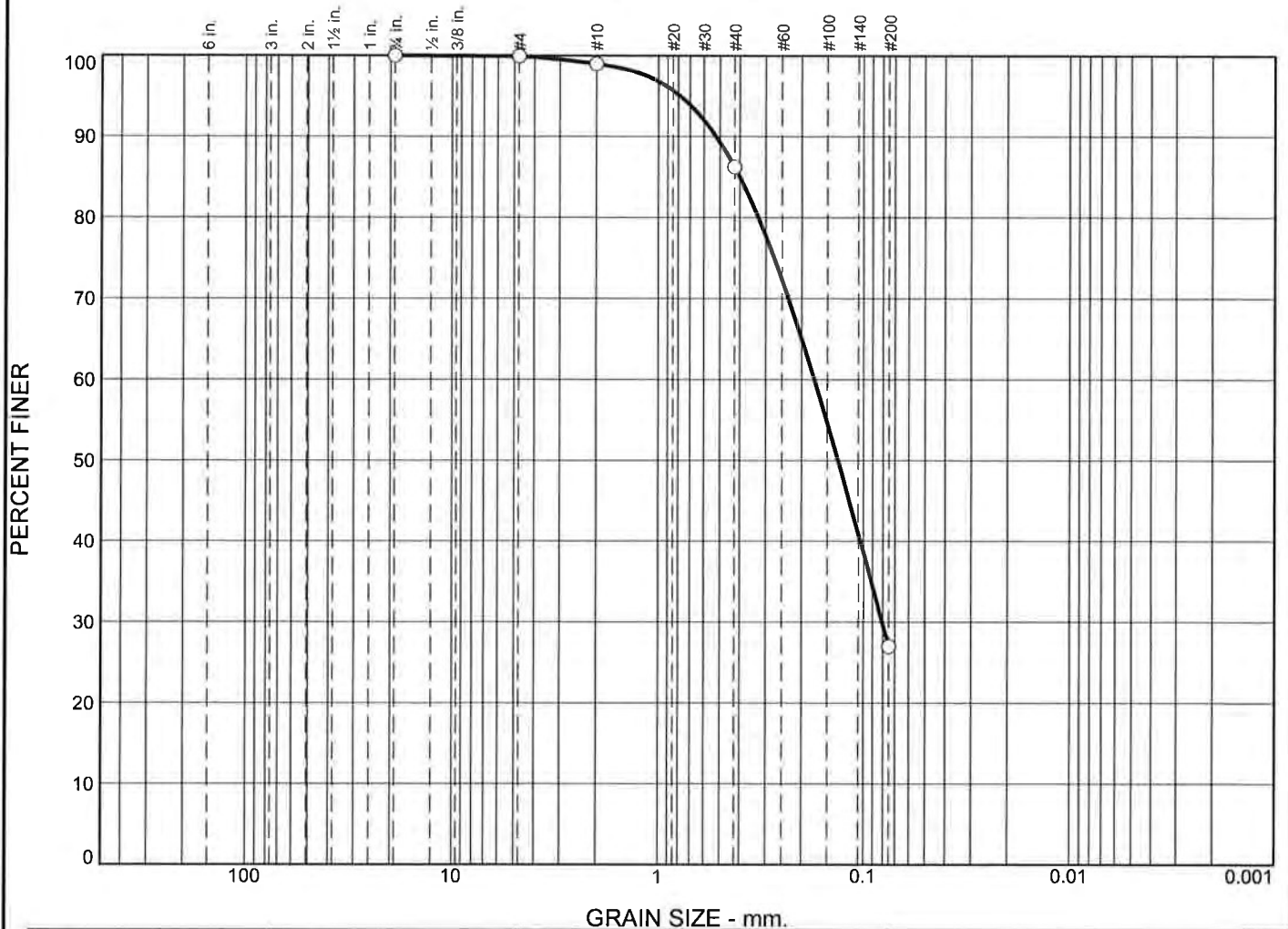
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.0	6.0	4.5	21.0	50.1	75.6	18.3	0.1	18.4

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0495	0.0586	0.0679	0.0784	0.1054	0.1441	0.2020	0.2941	0.8156	1.2093	2.1428	6.0786

Fineness Modulus	C _u	C _c
1.57	5.02	0.64

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.1	0.9	12.8	59.2	27.0			
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.4012	0.1736	0.1330	0.0807				

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-C-TOP Sample Number: L1728229-03 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-C-TOP

Sample Number: L1728229-03

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 32.53

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
32.53	0.00	0.75	0.00	0.00	100.0
		#4	0.03	0.00	99.9
		#10	0.30	0.00	99.0
		#40	4.15	0.00	86.2
		#200	19.27	0.00	27.0

Fractional Components

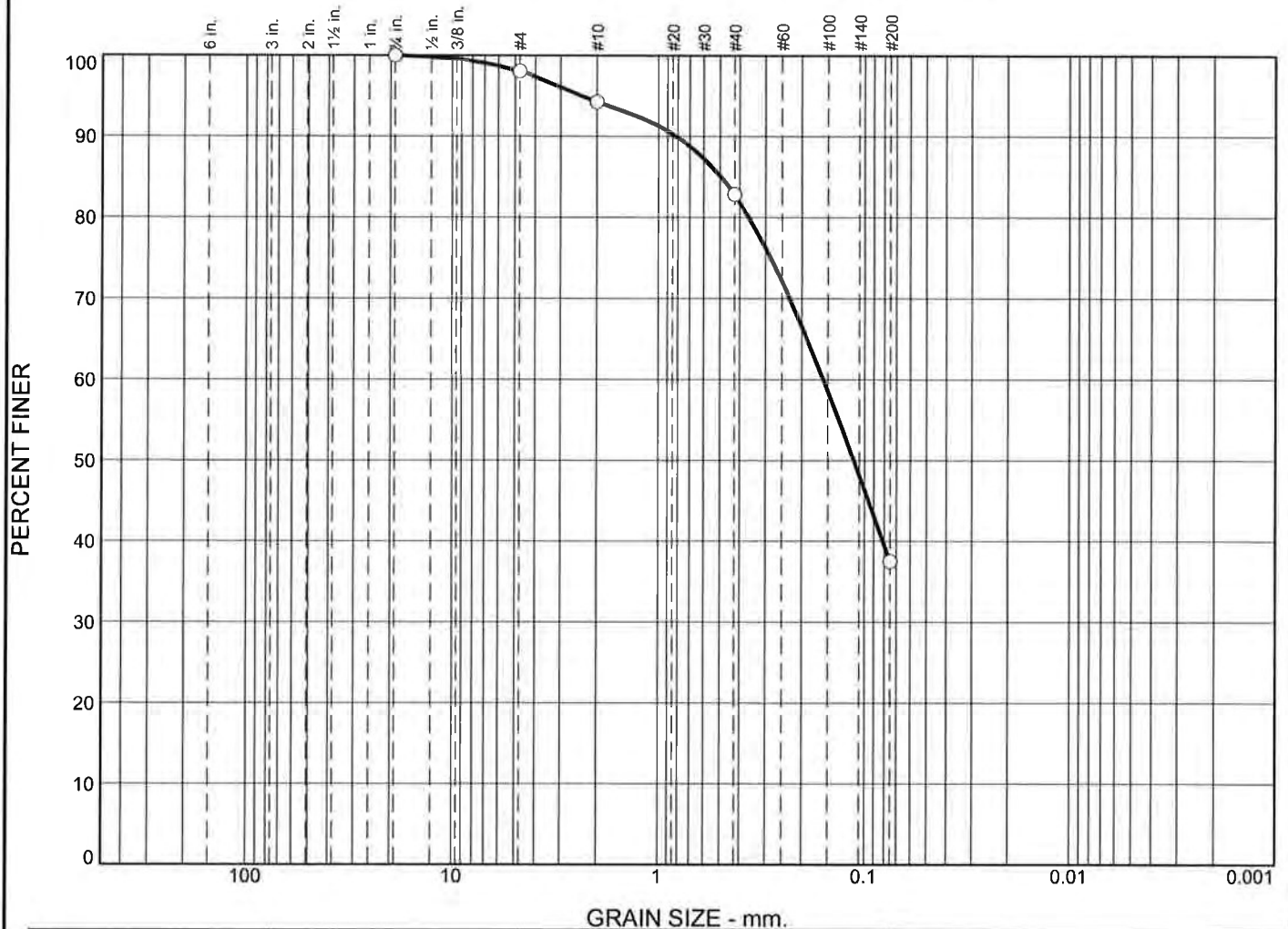
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.9	12.8	59.2	72.9			27.0

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0807	0.1330	0.1736	0.3263	0.4012	0.5222	0.7822

**Fineness
Modulus**

0.79

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
☐ 0.0	0.0	2.0	3.8	11.4	45.3	37.5				
☒ Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐			0.4952	0.1576	0.1123					

Material Description							USCS	AASHTO
☐								

Project No. Client: Project: ☐ Source of Sample: NHH-C-BOTTOM Sample Number: L1728229-04 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-C-BOTTOM**Sample Number:** L1728229-04**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 29.67

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
29.67	0.00	0.75	0.00	0.00	100.0
		#4	0.59	0.00	98.0
		#10	1.12	0.00	94.2
		#40	3.40	0.00	82.8
		#200	13.43	0.00	37.5

Fractional Components

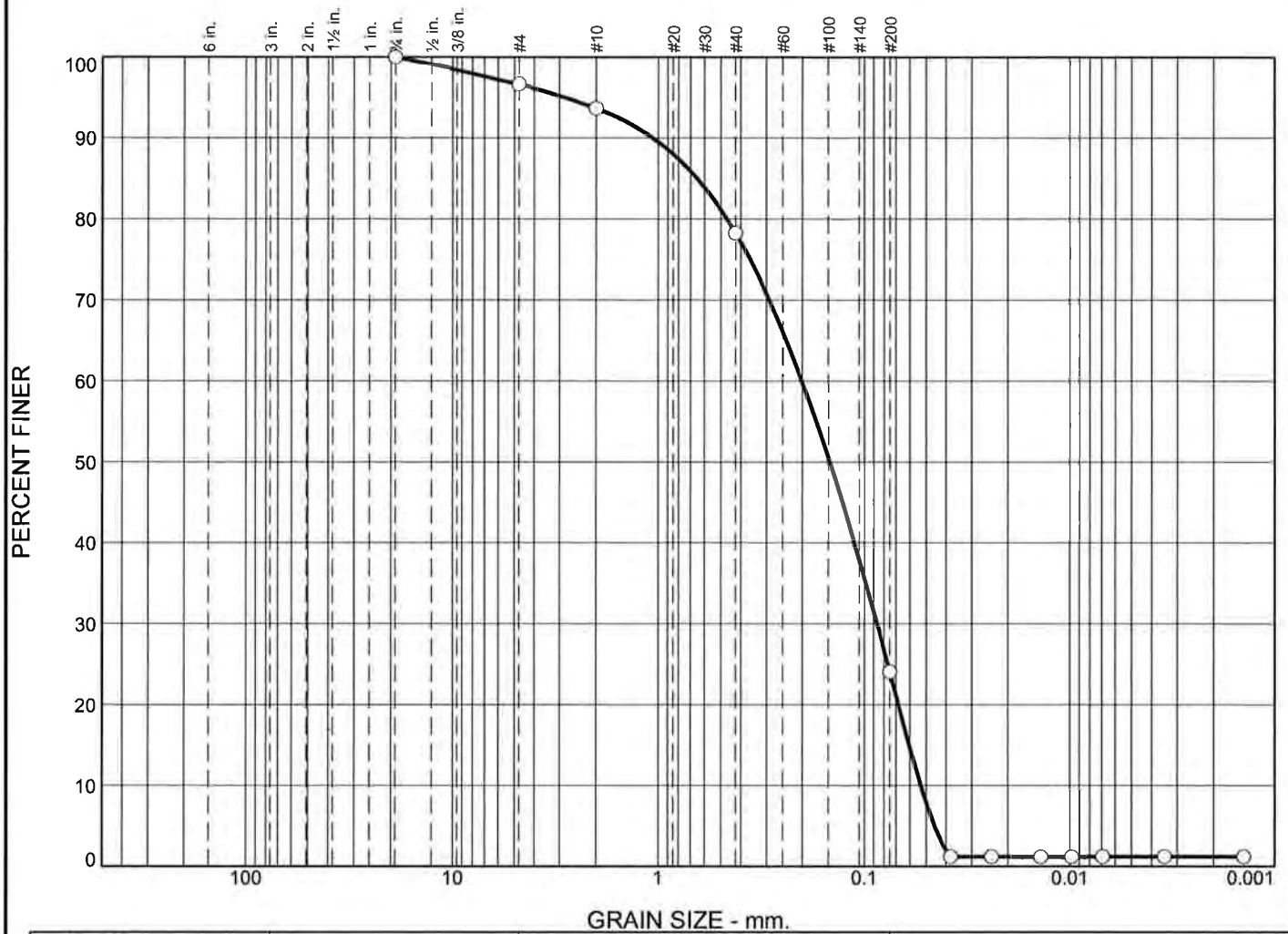
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.0	2.0	3.8	11.4	45.3	60.5			37.5

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.1123	0.1576	0.3617	0.4952	0.8211	2.3776

**Fineness
Modulus**

0.93

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	3.4	3.0	15.3	54.2	22.9		1.2		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.6519	0.2020	0.1478	0.0866	0.0604	0.0532	0.70	3.80

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-C-TOP Sample Number: L1731355-14 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-C-TOP

Sample Number: L1731355-14

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 38.05
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
38.05	0.00	0.75	0.00	0.00	100.0
		#4	1.30	0.00	96.6
		#10	1.12	0.00	93.6
		#40	5.85	0.00	78.3
		#200	20.62	0.00	24.1

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 24.1
 Weight of hydrometer sample = 37.87
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0380	1.2
5.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0240	1.2
15.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0139	1.2
30.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0098	1.2
60.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0069	1.2
240.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0035	1.2
1440.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0014	1.2

Fractional Components

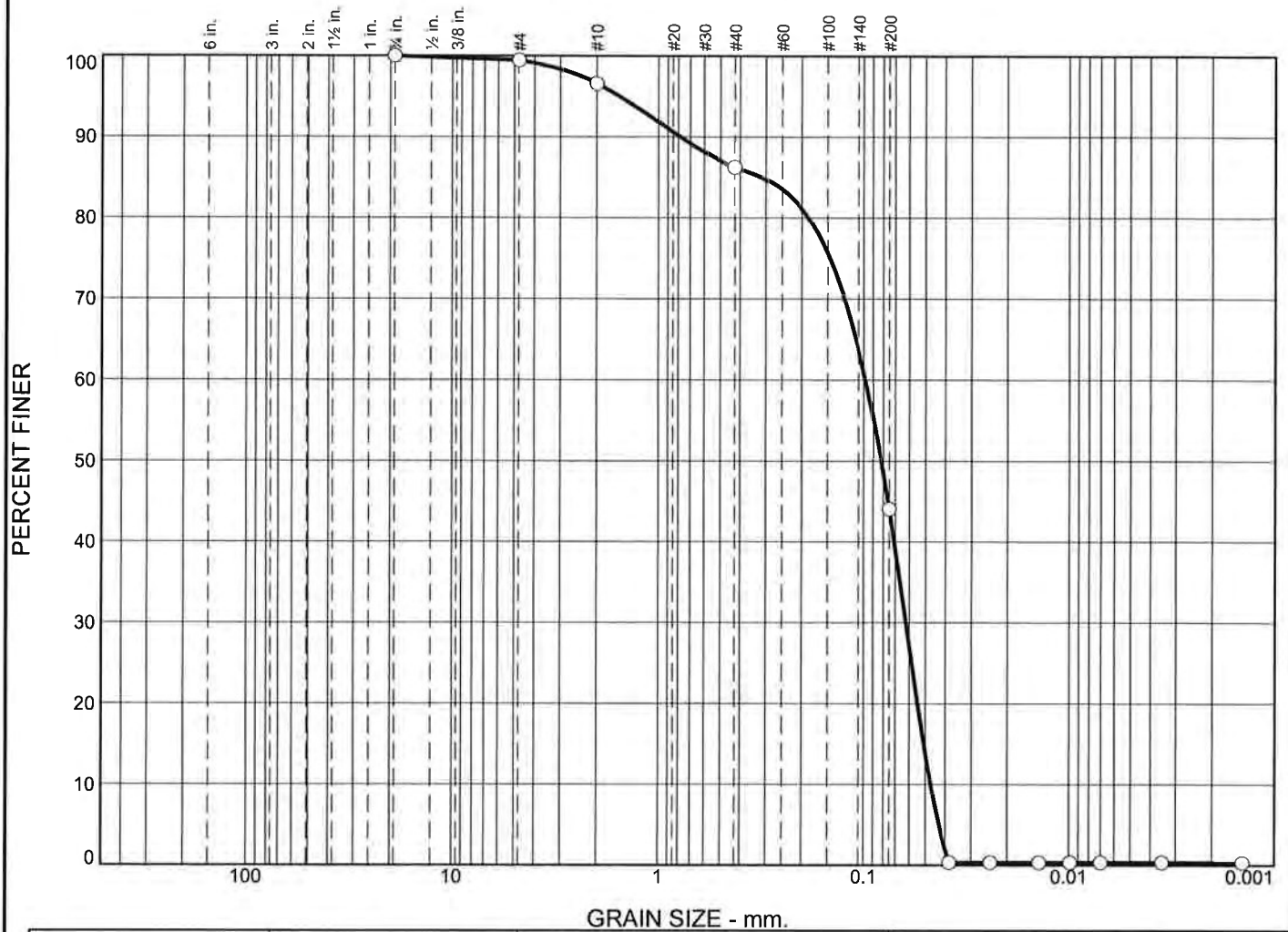
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.4	3.4	3.0	15.3	54.2	72.5	22.9	1.2	24.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0456	0.0532	0.0604	0.0681	0.0866	0.1118	0.1478	0.2020	0.4676	0.6519	1.0666	2.8396

Fineness Modulus	C _u	C _c
1.15	3.80	0.70

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	0.6	2.8	10.4	42.1	43.8		0.3	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.3206	0.0981	0.0820	0.0622	0.0509	0.0472	0.84	2.08

Material Description									USCS	AASHTO
☐										

Project No. Project: ☐ Source of Sample: NHH-C-BOTTOM Sample Number: L1731355-15 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-C-BOTTOM

Sample Number: L1731355-15

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 34.00
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
34.00	0.00	0.75	0.00	0.00	100.0
		#4	0.19	0.00	99.4
		#10	0.98	0.00	96.6
		#40	3.52	0.00	86.2
		#200	14.33	0.00	44.1

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 44.1
 Weight of hydrometer sample = 33.37
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.3
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.3
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.3
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.3
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.3
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.3
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.3

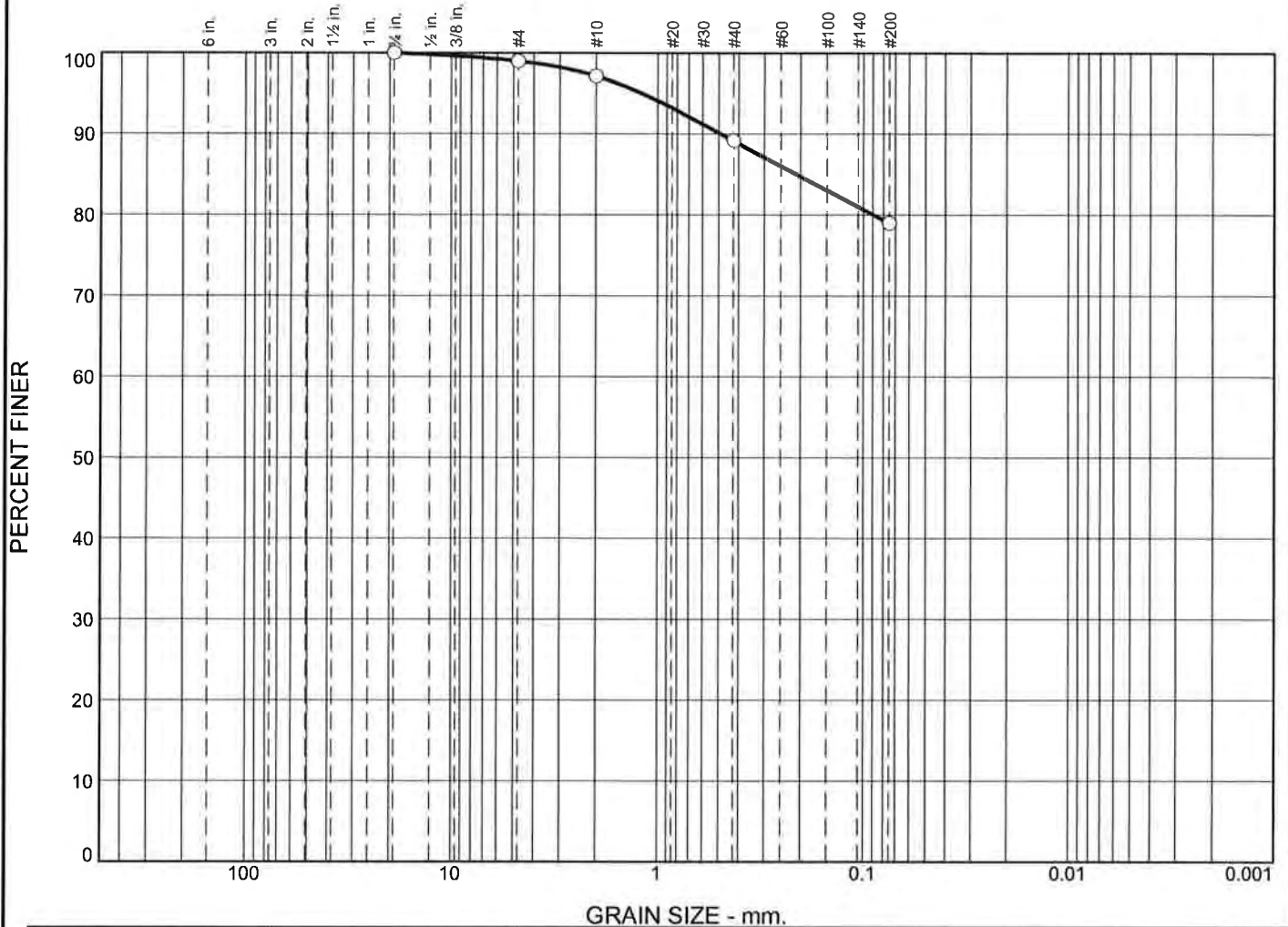
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.6	0.6	2.8	10.4	42.1	55.3	43.8	0.3	44.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0431	0.0472	0.0509	0.0546	0.0622	0.0709	0.0820	0.0981	0.1863	0.3206	0.7827	1.5493

Fineness Modulus	C _u	C _c
0.62	2.08	0.84

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	1.0	1.9	8.0	10.1	79.0				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c C _u
				0.2111						

Material Description								USCS	AASHTO

Project No. Client: Project: ☐ Source of Sample: NHH-D-TOP Sample Number: L1728229-08 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-D-TOP

Sample Number: L1728229-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 25.41

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.41	0.00	0.75	0.00	0.00	100.0
		#4	0.26	0.00	99.0
		#10	0.47	0.00	97.1
		#40	2.03	0.00	89.1
		#200	2.58	0.00	79.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	1.9	8.0	10.1	20.0			79.0

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.0894	0.2111	0.4908	1.2000

Fineness Modulus
0.48

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-D-BOTTOM**Sample Number:** L1728229-09**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 22.58

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.58	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.28	0.00	98.5
		#40	0.92	0.00	94.4
		#200	1.79	0.00	86.5

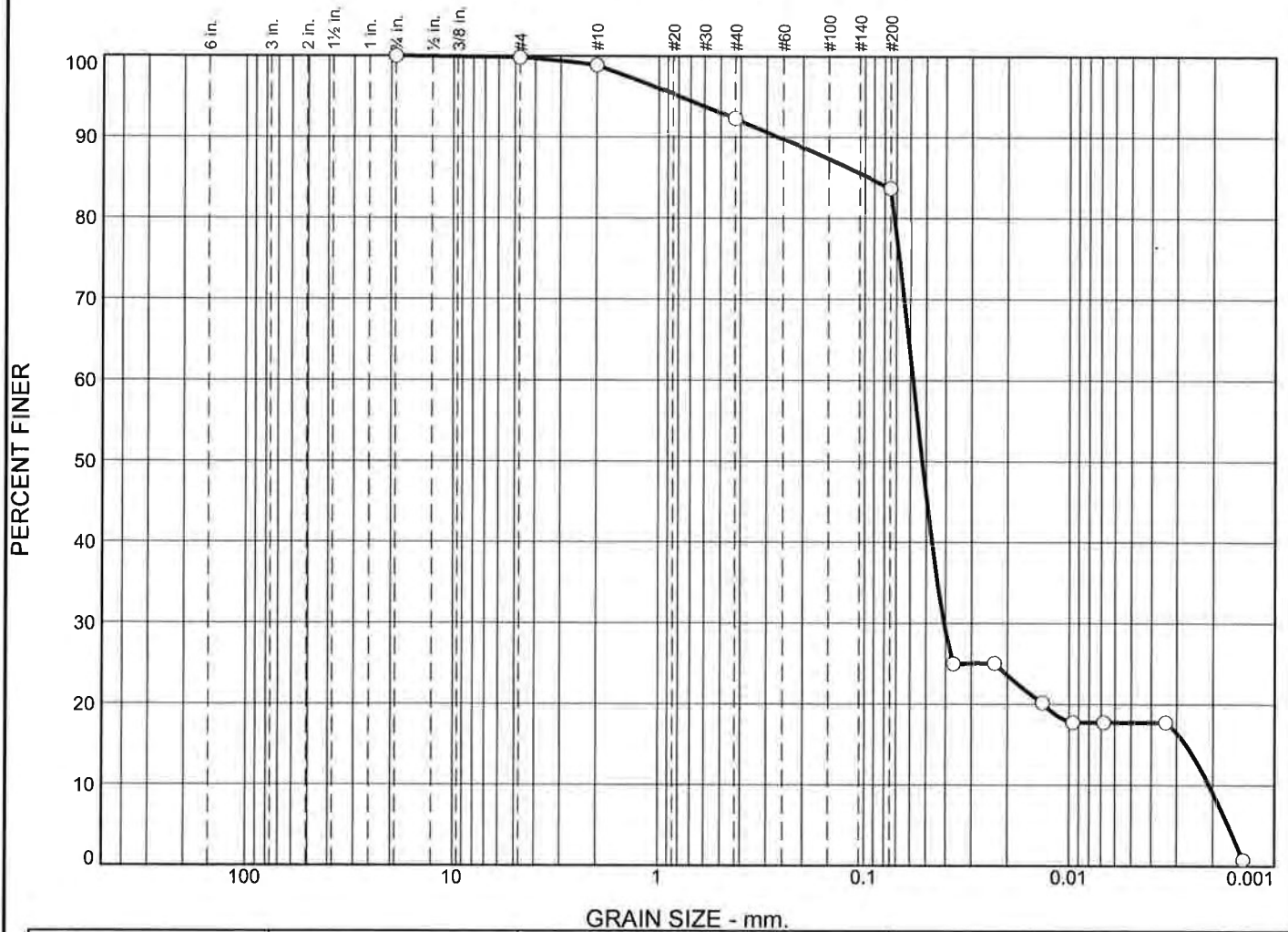
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	1.2	4.1	7.9	13.2			86.5

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.1522	0.5014

Fineness Modulus
0.26

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
☐	0.0	0.0	0.2	0.9	6.7	8.5	65.9	17.8			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0966	0.0579	0.0523	0.0407	0.0027	0.0021	13.72	27.78

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-D-TOP Sample Number: L1731355-19 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-D-TOP

Sample Number: L1731355-19

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 28.06
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
28.06	0.00	0.75	0.00	0.00	100.0
		#4	0.05	0.00	99.8
		#10	0.27	0.00	98.9
		#40	1.86	0.00	92.2
		#200	2.40	0.00	83.7

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 83.7
 Weight of hydrometer sample = 27.72
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0050	1.0052	0.0134	5.0	15.0	0.0367	25.0
5.00	21.4	1.0050	1.0052	0.0134	5.0	15.0	0.0232	25.0
15.00	21.4	1.0040	1.0042	0.0134	4.0	15.2	0.0135	20.2
30.00	21.4	1.0035	1.0037	0.0134	3.5	15.4	0.0096	17.8
60.00	21.4	1.0035	1.0037	0.0134	3.5	15.4	0.0068	17.8
240.00	21.4	1.0035	1.0037	0.0134	3.5	15.4	0.0034	17.8
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

Fractional Components

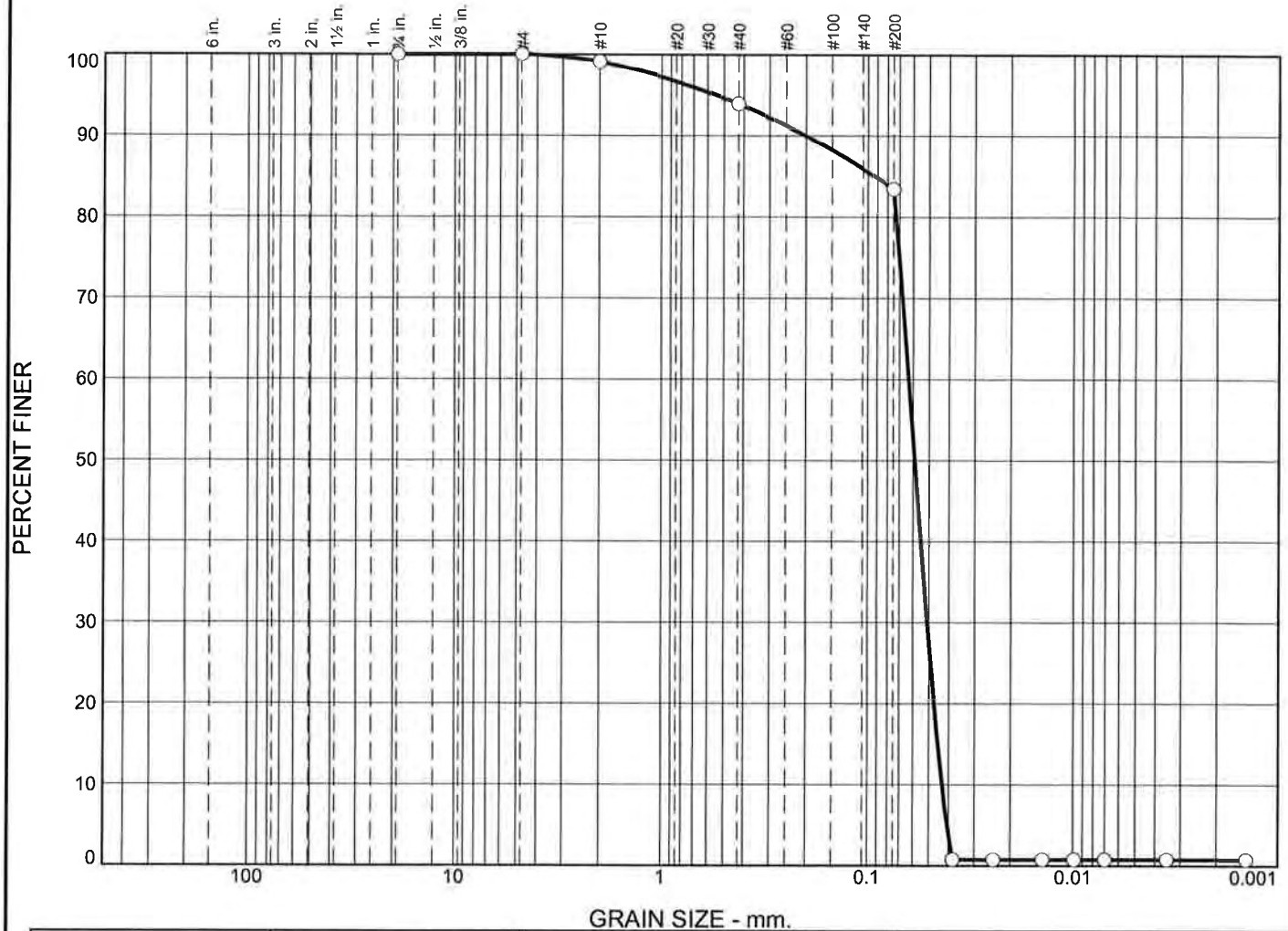
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.9	6.7	8.5	16.1	65.9	17.8	83.7

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0017	0.0021	0.0027	0.0133	0.0407	0.0467	0.0523	0.0579	0.0717	0.0966	0.2639	0.7903

Fineness Modulus	C _u	C _c
0.33	27.78	13.72

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-D-BOTTOM

Sample Number: L1731355-20

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 28.14
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
28.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.25	0.00	99.1
		#40	1.47	0.00	93.9
		#200	2.94	0.00	83.4

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 83.4
 Weight of hydrometer sample = 28.34
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.8
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.8
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.8
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.8
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.8
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.8
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.9	5.2	10.5	16.6	82.6	0.8	83.4

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0407	0.0431	0.0452	0.0472	0.0510	0.0548	0.0587	0.0629	0.0729	0.0930	0.2019	0.5466

Fineness Modulus	C _u	C _c
0.27	1.46	0.96

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-TOP

Sample Number: 11728340-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.91

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.91	0.00	0.75	0.00	0.00	100.0
		#4	0.20	0.00	99.0
		#10	0.16	0.00	98.2
		#40	0.07	0.00	97.8
		#200	0.21	0.00	96.8

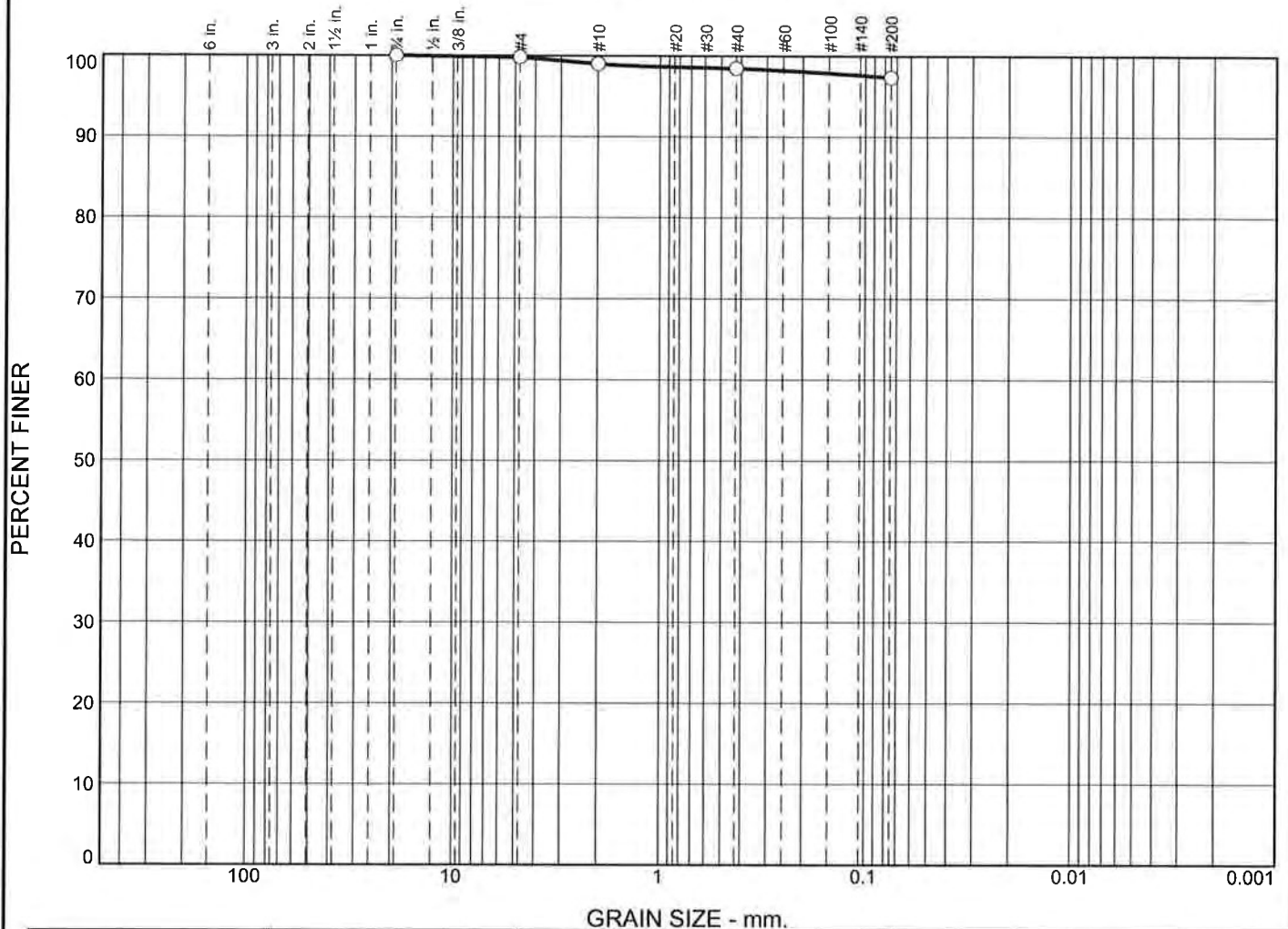
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	0.8	0.4	1.0	2.2			96.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.12

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	0.2	0.8	0.5	1.1	97.4			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-E-TOP Sample Number: WG1032082-1 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-TOP

Sample Number: WG1032082-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.07

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.07	0.00	0.75	0.00	0.00	100.0
		#4	0.04	0.00	99.8
		#10	0.16	0.00	99.0
		#40	0.11	0.00	98.5
		#200	0.22	0.00	97.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.8	0.5	1.1	2.4			97.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.08

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-BOTTOM

Sample Number: L1728340-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.64

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.64	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	100.0
		#40	0.07	0.00	99.6
		#200	0.43	0.00	97.6

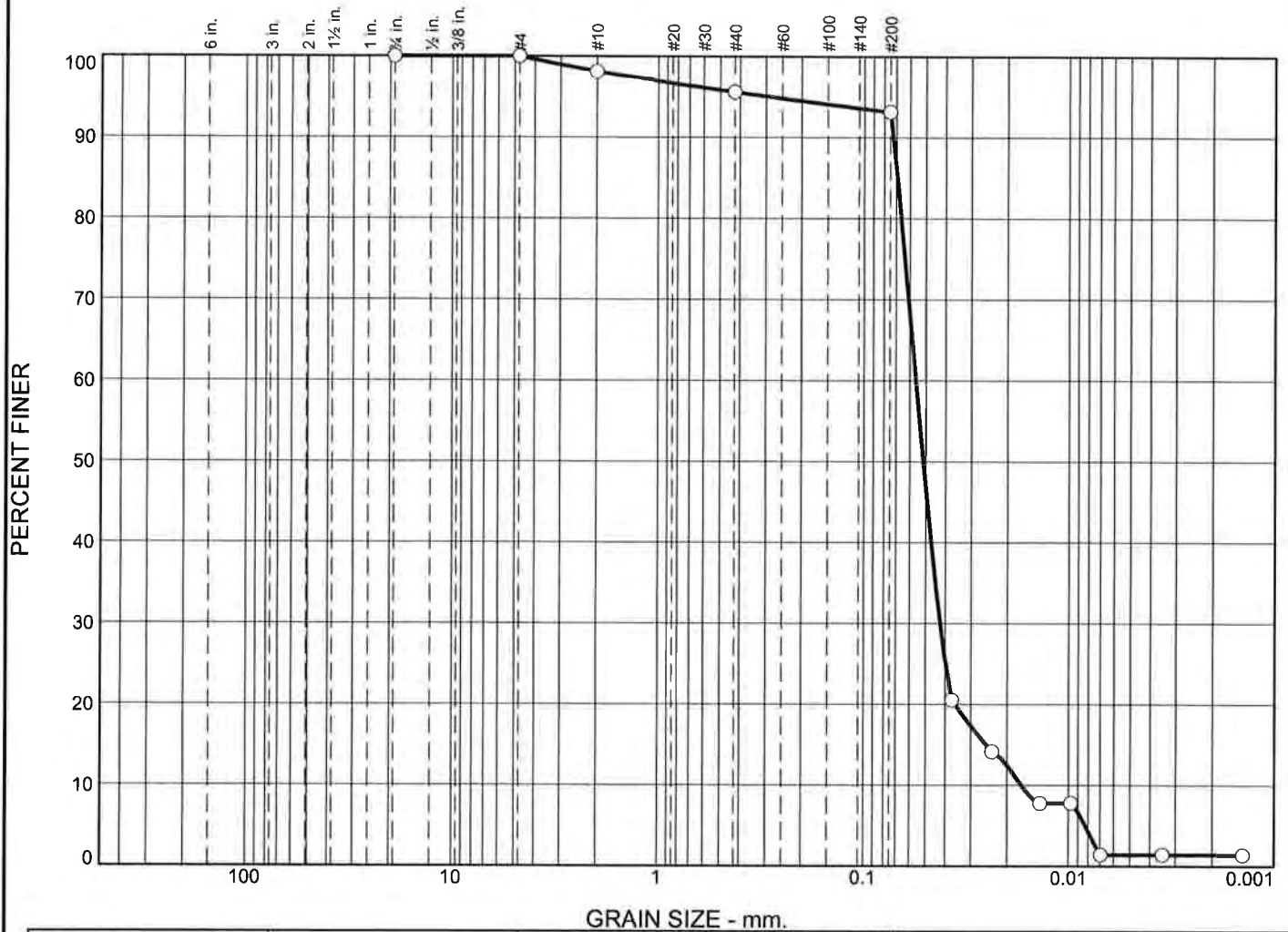
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.4	2.0	2.4			97.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.02

Particle Size Distribution Report



GRAIN SIZE - mm.

GRAVEL SIZE mm:											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	1.9	2.5	2.5	91.7		1.4	
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.0692	0.0559	0.0514	0.0424	0.0252	0.0171	1.89	3.28

Material Description

USCS

AASHTO

Project No.

Client:

Remarks:

Project:

Source of Sample: NHH-E-TOP

Sample Number: L1731355-24

Date: ○

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-E-TOP

Sample Number: L1731355-24

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 24.81
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.81	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.47	0.00	98.1
		#40	0.62	0.00	95.6
		#200	0.61	0.00	93.1

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 93.1
 Weight of hydrometer sample = 23.46
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0030	1.0032	0.0133	3.0	15.5	0.0372	20.5
5.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0237	14.2
15.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0138	7.8
30.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0098	7.8
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.4
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.4
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.9	2.5	2.5	6.9	91.7	1.4	93.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0083	0.0171	0.0252	0.0358	0.0424	0.0470	0.0514	0.0559	0.0662	0.0692	0.0726	0.2834

Fineness Modulus	C _u	C _c
0.19	3.28	1.89

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-E-BOTTOM

Sample Number: L1731355-25

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.90
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.90	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.14	0.00	99.4
		#40	2.57	0.00	88.7
		#200	1.48	0.00	82.5

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 82.5
 Weight of hydrometer sample = 23.35
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0381	1.3
5.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0241	1.3
15.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0139	1.3
30.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0098	1.3
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.3
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.3
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.6	10.7	6.2	17.5	81.2	1.3	82.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0403	0.0428	0.0449	0.0470	0.0508	0.0547	0.0587	0.0630	0.0734	0.1891	0.5398	1.1490

Fineness Modulus	C _u	C _c
0.43	1.47	0.96

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-TOP

Sample Number: L1728229-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.02

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.02	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.6
		#10	0.06	0.00	99.3
		#40	0.18	0.00	98.3
		#200	0.38	0.00	96.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	0.3	1.0	2.0	3.3			96.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.08

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-REP-TOP

Sample Number: L1728229-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.26
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.26	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.17	0.00	99.2
		#40	0.18	0.00	98.3
		#200	0.33	0.00	96.6

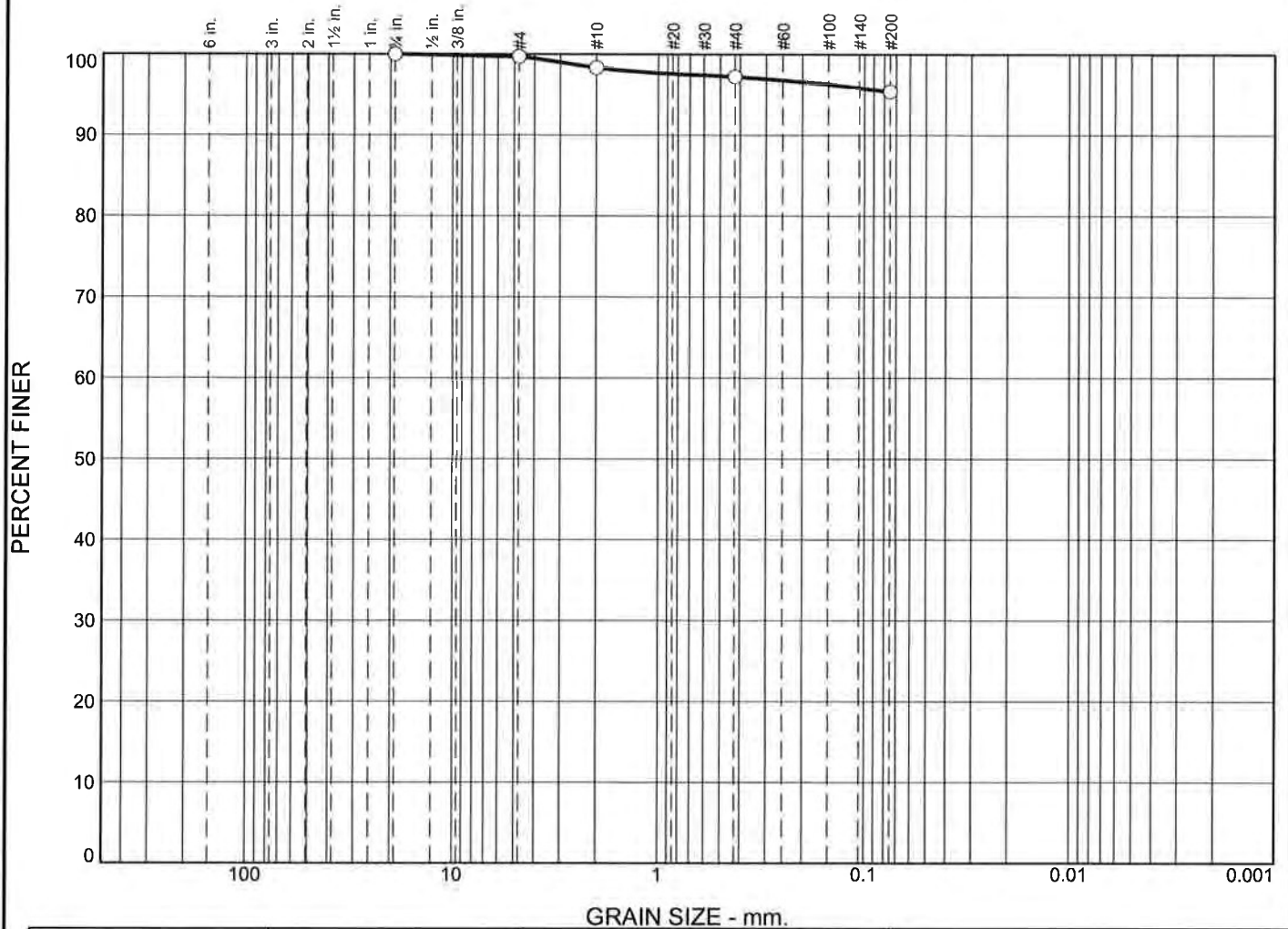
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.8	0.9	1.7	3.4			96.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.08

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel			% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	0.3	1.4	1.1	1.8	95.4			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											

Material Description	USCS	AASHTO
☐		

Project No. Client: Project: ☐ Source of Sample: NHH-F-BOTTOM Sample Number: L1728229-12 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-BOTTOM**Sample Number:** L1728229-12**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 19.78

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.78	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.27	0.00	98.3
		#40	0.22	0.00	97.2
		#200	0.36	0.00	95.4

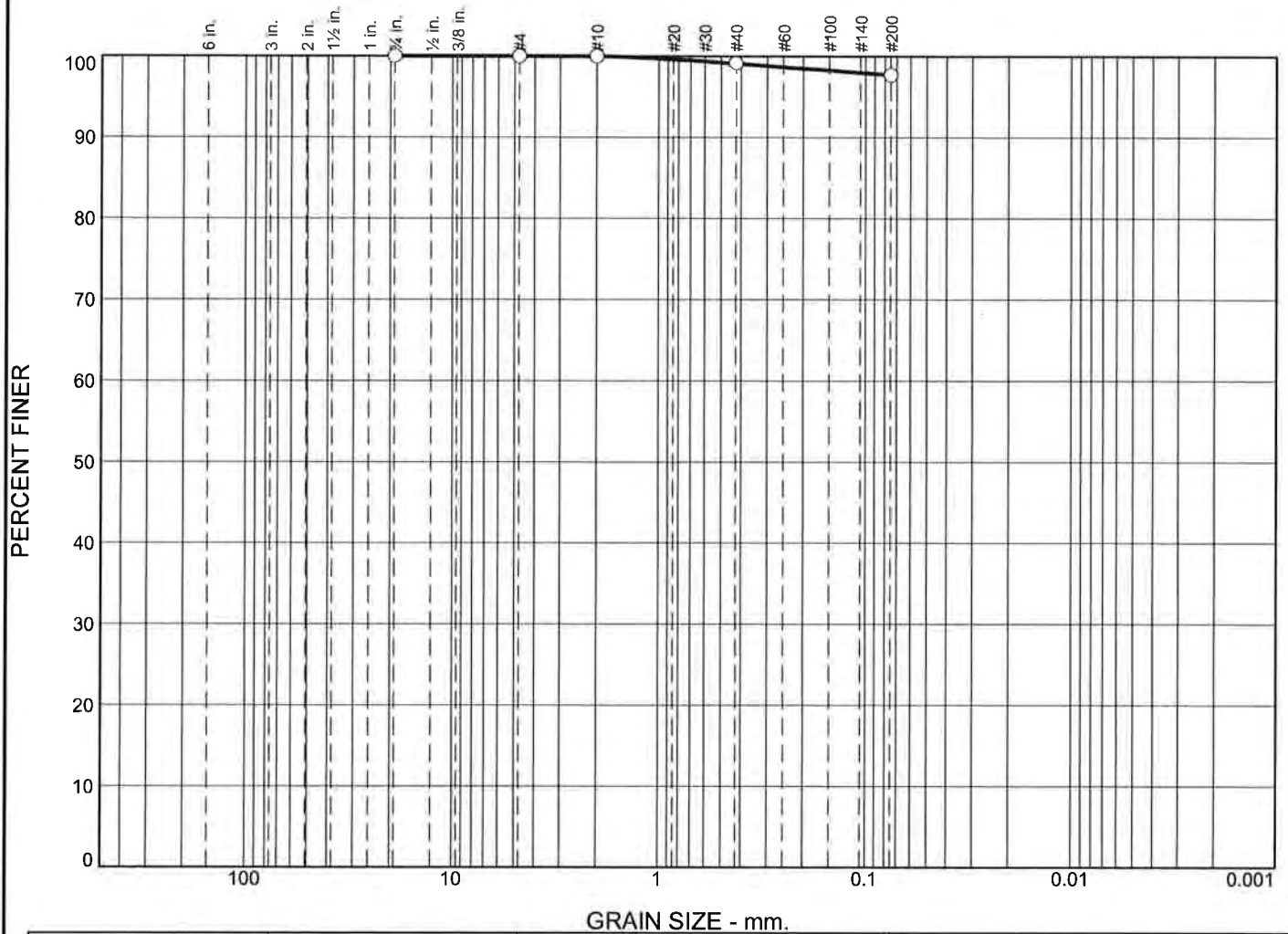
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	1.4	1.1	1.8	4.3			95.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.13

Particle Size Distribution Report



GRAIN SIZE - mm.												
% +3"		% Gravel		% Sand			% Fines					
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay			
☐	0.0		0.0	0.0	0.0	0.9	1.4	97.7				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
☐												

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-F-BOTTOM Sample Number: WG1031751-2 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-BOTTOM

Sample Number: WG1031751-2

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.09

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.09	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.17	0.00	99.1
		#200	0.27	0.00	97.7

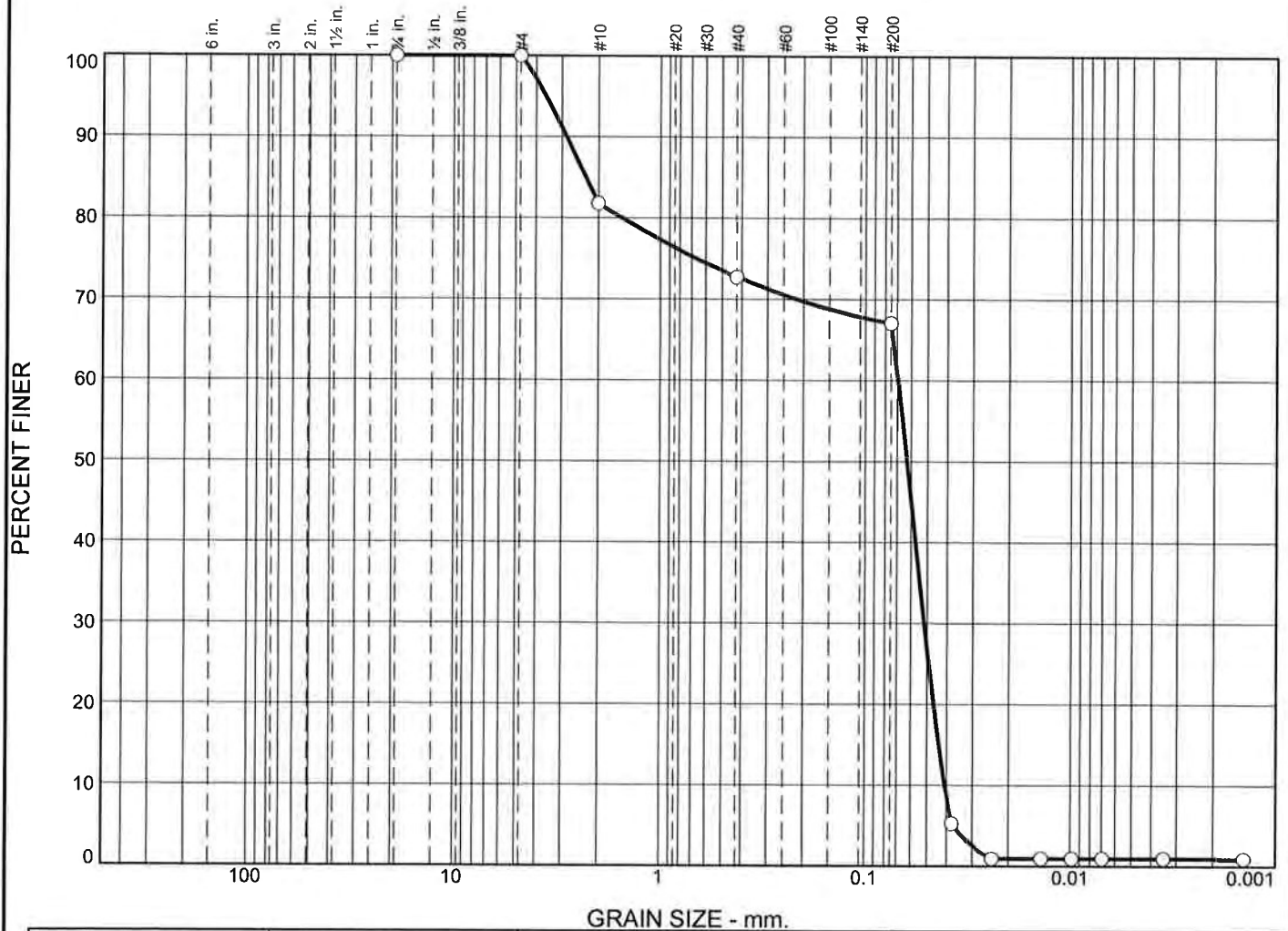
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	1.4	2.3			97.7

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.04

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	18.2	9.0	5.7	66.1		1.0		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				2.3018	0.0693	0.0627	0.0517	0.0439	0.0410	0.94	1.69

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-F-TOP Sample Number: L1731355-21 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-TOP

Sample Number: L1731355-21

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.44

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.44	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	4.27	0.00	81.8
		#40	2.11	0.00	72.8
		#200	1.34	0.00	67.1

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 67.1

Weight of hydrometer sample = 24.69

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0378	5.3
5.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0241	1.0
15.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0139	1.0
30.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0098	1.0
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.0
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.0
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	18.2	9.0	5.7	32.9	66.1	1.0	67.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0369	0.0410	0.0439	0.0465	0.0517	0.0569	0.0627	0.0693	1.5385	2.3018	2.8497	3.5743

Fineness Modulus	C _u	C _c
1.22	1.69	0.94

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	1.0	8.8	6.2	74.0		10.0	
☐											
☐											
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.1073	0.0605	0.0557	0.0467	0.0390	0.0033	10.84	18.18
☐											
☐											

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-F-REP-TOP Sample Number: L1731355-22 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-REP-TOP

Sample Number: L1731355-22

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 24.20
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.20	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.24	0.00	99.0
		#40	2.13	0.00	90.2
		#200	1.49	0.00	84.0

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 84.0
 Weight of hydrometer sample = 23.14
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0375	13.0
5.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0237	13.0
15.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0137	13.0
30.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0097	13.0
60.00	21.8	1.0015	1.0017	0.0133	1.5	15.9	0.0069	10.0
240.00	21.8	1.0015	1.0017	0.0133	1.5	15.9	0.0034	10.0
1440.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0014	7.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.0	8.8	6.2	16.0	74.0	10.0	84.0

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0033	0.0390	0.0419	0.0467	0.0512	0.0557	0.0605	0.0721	0.1073	0.4065	1.0558

Fineness Modulus	C _u	C _c
0.38	18.18	10.84

Alpha Analytical

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-BOTTOM

Sample Number: L1731355-23

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.52
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.52	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.55	0.00	97.7
		#40	0.62	0.00	95.0
		#200	0.50	0.00	92.9

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 92.9
 Weight of hydrometer sample = 22.75
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0378	8.0
5.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0239	8.0
15.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0138	8.0
30.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0098	8.0
60.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0069	8.0
240.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0034	8.0
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.3	2.7	2.1	7.1	84.9	8.0	92.9

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0021	0.0390	0.0415	0.0437	0.0476	0.0513	0.0551	0.0590	0.0678	0.0704	0.0732	0.4177

Fineness Modulus	C _u	C _c
0.22	1.51	0.99

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-BOTTOM

Sample Number: WG1046682-2

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.48
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.48	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.32	0.00	98.4
		#40	0.51	0.00	95.9
		#200	0.41	0.00	93.9

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 93.9
 Weight of hydrometer sample = 23.26
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0381	1.4
5.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0241	1.4
15.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0139	1.4
30.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0098	1.4
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.4
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.4
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.4

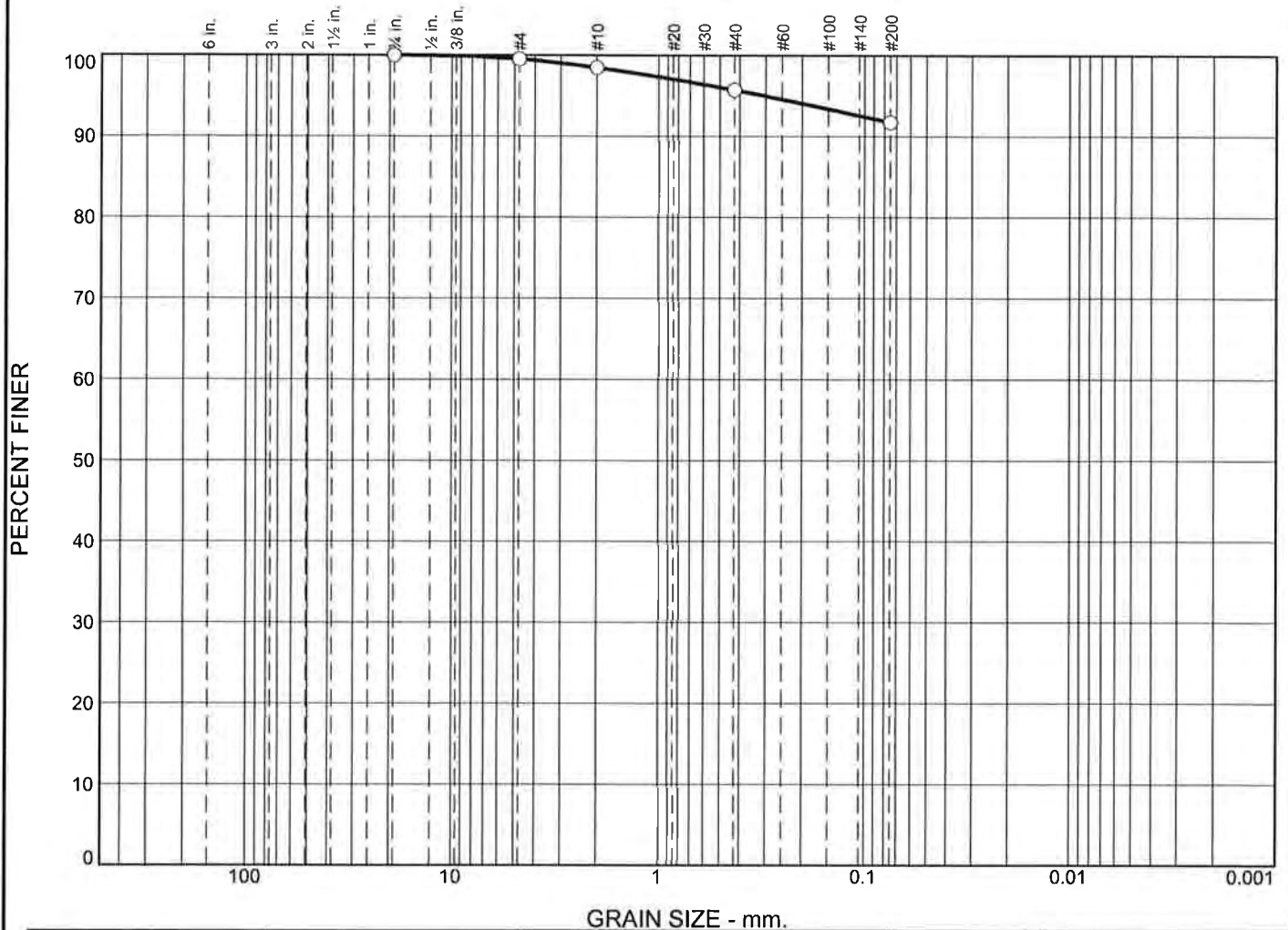
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.6	2.5	2.0	6.1	92.5	1.4	93.9

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0400	0.0422	0.0442	0.0460	0.0494	0.0528	0.0562	0.0598	0.0679	0.0703	0.0728	0.2042

Fineness Modulus	C _u	C _c
0.17	1.42	0.97

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.5	1.0	2.8	4.0	91.7			
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○											

Material Description									USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-G-TOP Sample Number: L1728229-01 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-G-TOP

Sample Number: L1728229-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.81

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.81	0.00	0.75	0.00	0.00	100.0
		#4	0.10	0.00	99.5
		#10	0.22	0.00	98.5
		#40	0.57	0.00	95.7
		#200	0.83	0.00	91.7

Fractional Components

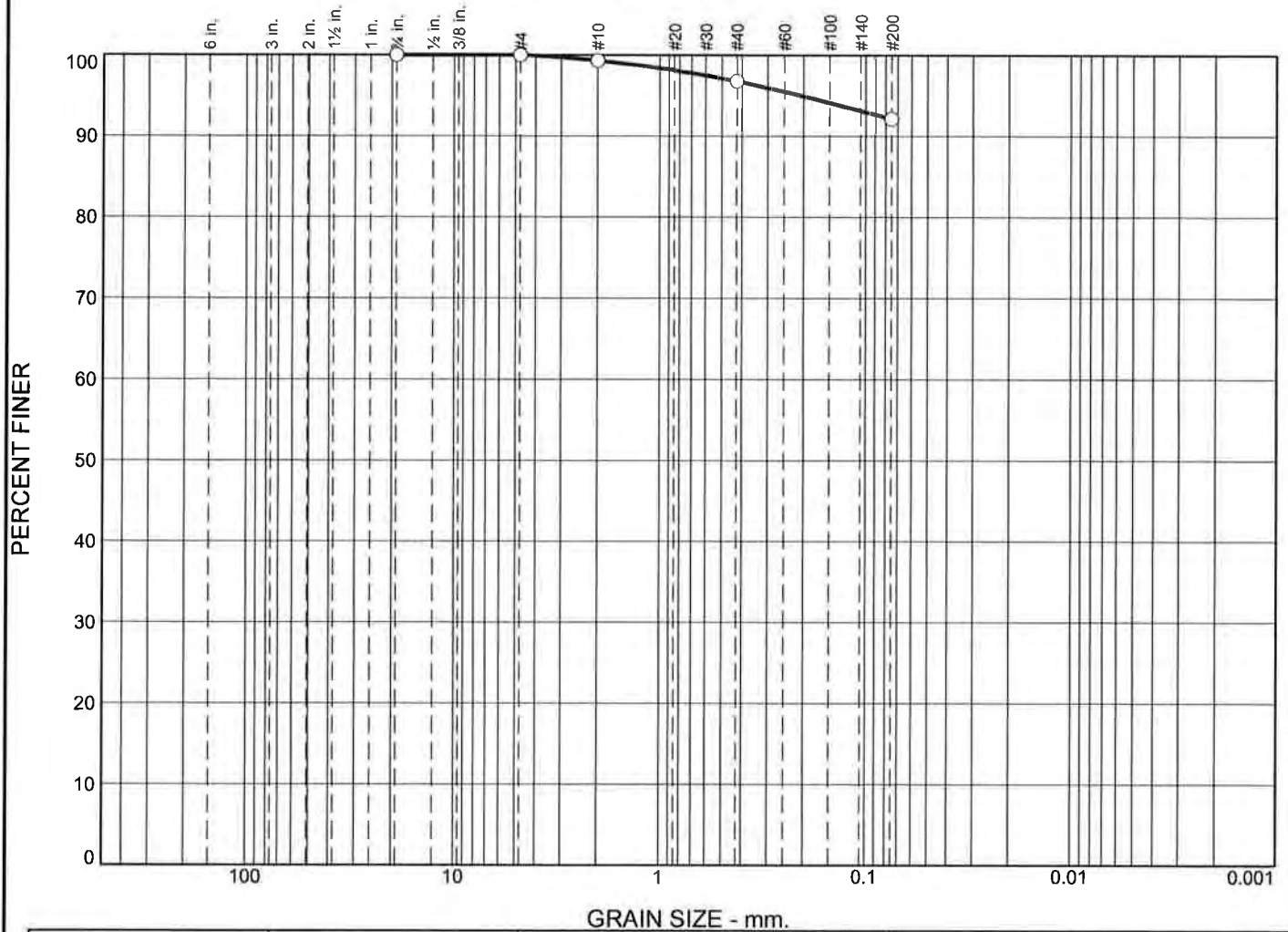
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	1.0	2.8	4.0	7.8			91.7

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
									0.3027

Fineness
Modulus

0.19

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-G-BOTTOM

Sample Number: L1728229-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.20

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.20	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.16	0.00	99.3
		#40	0.59	0.00	96.8
		#200	1.08	0.00	92.1

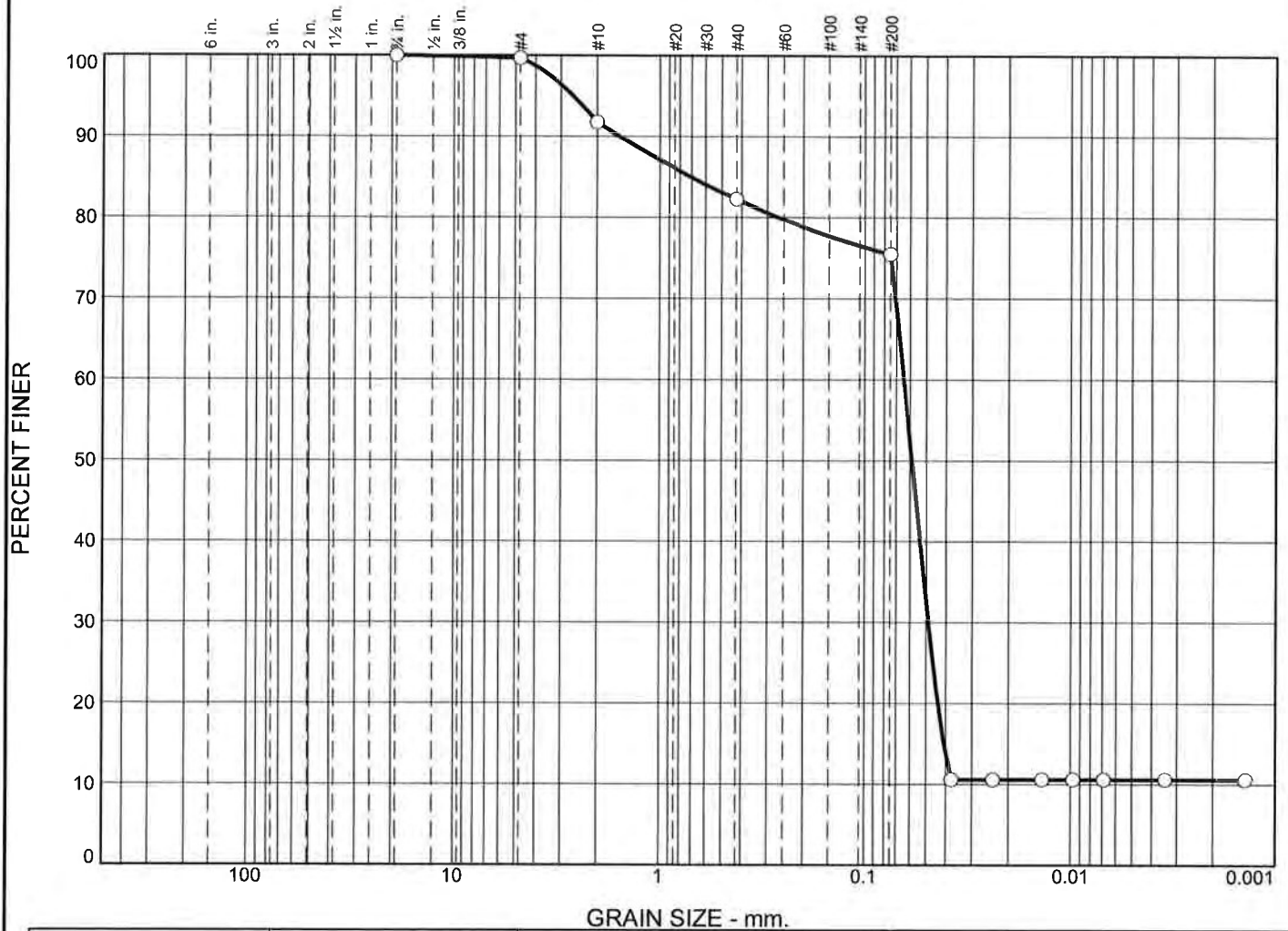
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	2.5	4.7	7.9			92.1

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
									0.2076

Fineness Modulus
0.14

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-G-TOP

Sample Number: L1731355-12

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 24.89
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.89	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.7
		#10	1.98	0.00	91.7
		#40	2.36	0.00	82.2
		#200	1.69	0.00	75.5

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 75.5
 Weight of hydrometer sample = 24.76
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	10.6
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	10.6
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	10.6
30.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0097	10.6
60.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0069	10.6
240.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0034	10.6
1440.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0014	10.6

Fractional Components

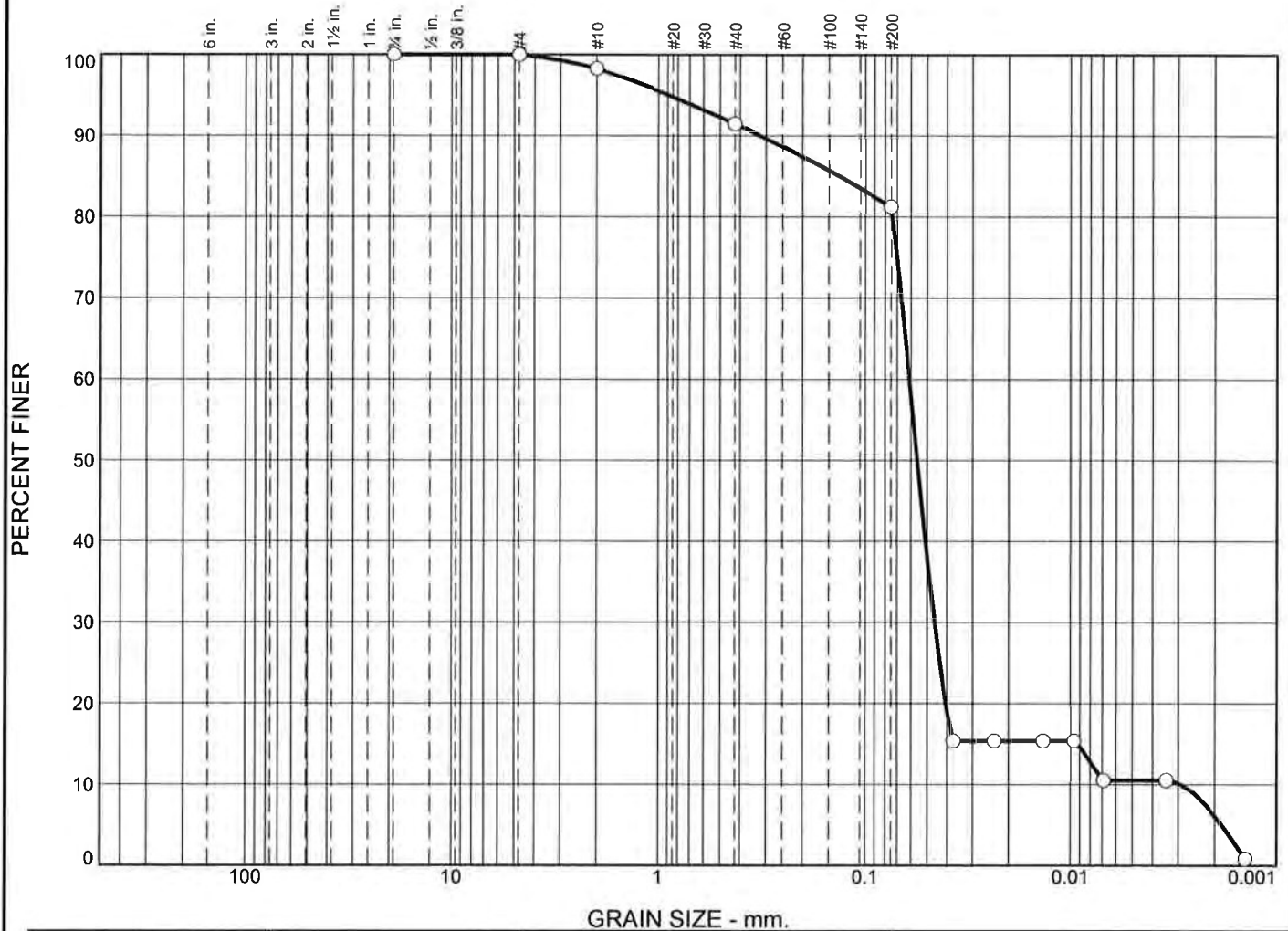
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	8.0	9.5	6.7	24.2	64.9	10.6	75.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0409	0.0437	0.0488	0.0537	0.0588	0.0643	0.2655	0.7068	1.5634	2.6115

Fineness Modulus
0.76

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	1.7	6.8	10.3	70.7		10.5	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.1352	0.0611	0.0559	0.0461	0.0093	0.0029	11.91	20.94

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-G-BOTTOM Sample Number: L1731355-13 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-G-BOTTOM

Sample Number: L1731355-13

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 26.12

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
26.12	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.45	0.00	98.3
		#40	1.78	0.00	91.5
		#200	2.68	0.00	81.2

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 81.2

Weight of hydrometer sample = 26.82

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0373	15.4
5.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0236	15.4
15.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0136	15.4
30.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0096	15.4
60.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0069	10.5
240.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0034	10.5
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

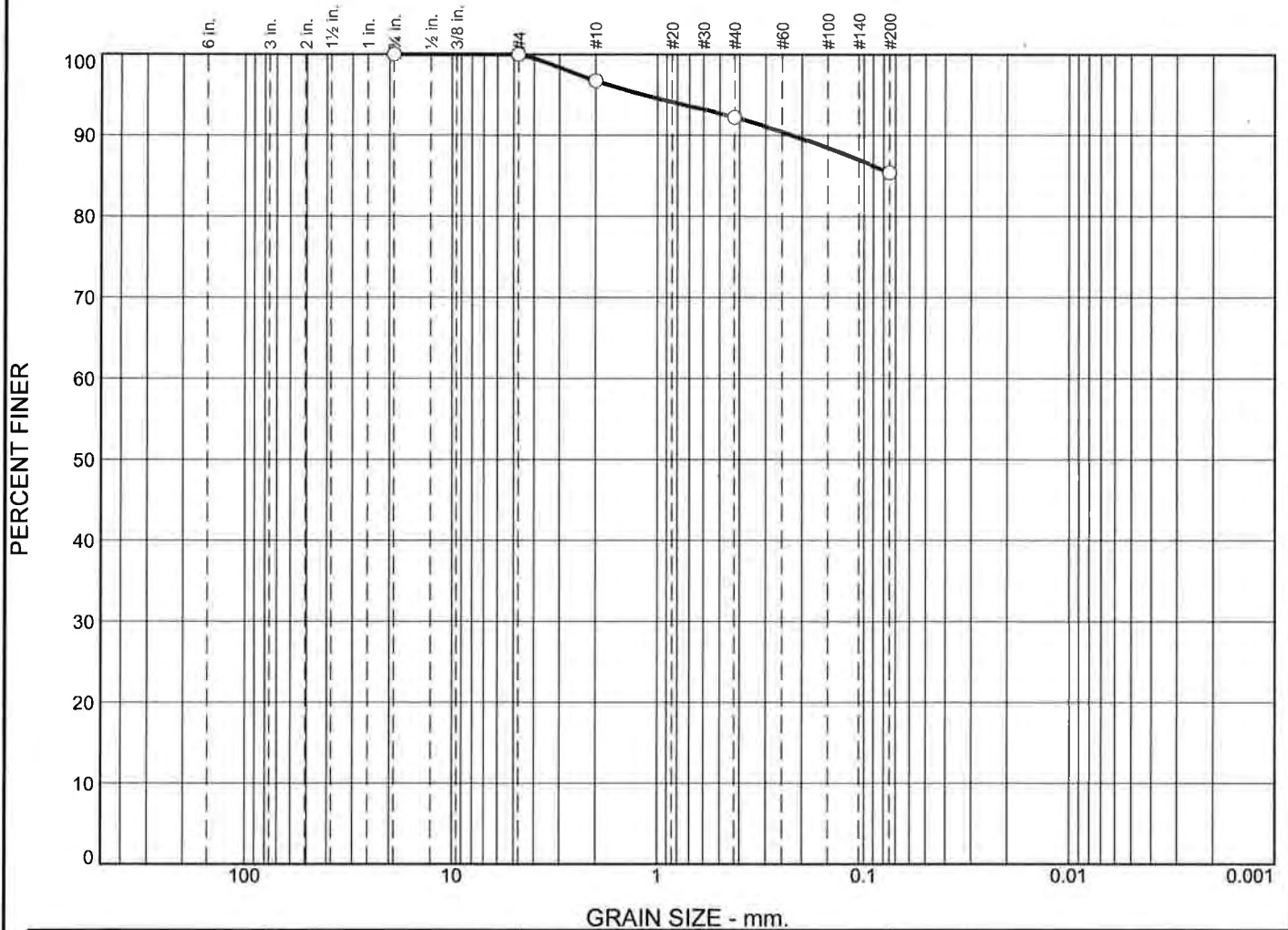
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.7	6.8	10.3	18.8	70.7	10.5	81.2

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0019	0.0029	0.0093	0.0407	0.0461	0.0510	0.0559	0.0611	0.0740	0.1352	0.3216	0.8919

Fineness Modulus	C _u	C _c
0.37	20.94	11.91

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	3.3	4.5	6.8	85.4			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-H-TOP Sample Number: L1728048-09 Date: ☐ Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-H-TOP

Sample Number: L1728048-09

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.50
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.50	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.77	0.00	96.7
		#40	1.06	0.00	92.2
		#200	1.60	0.00	85.4

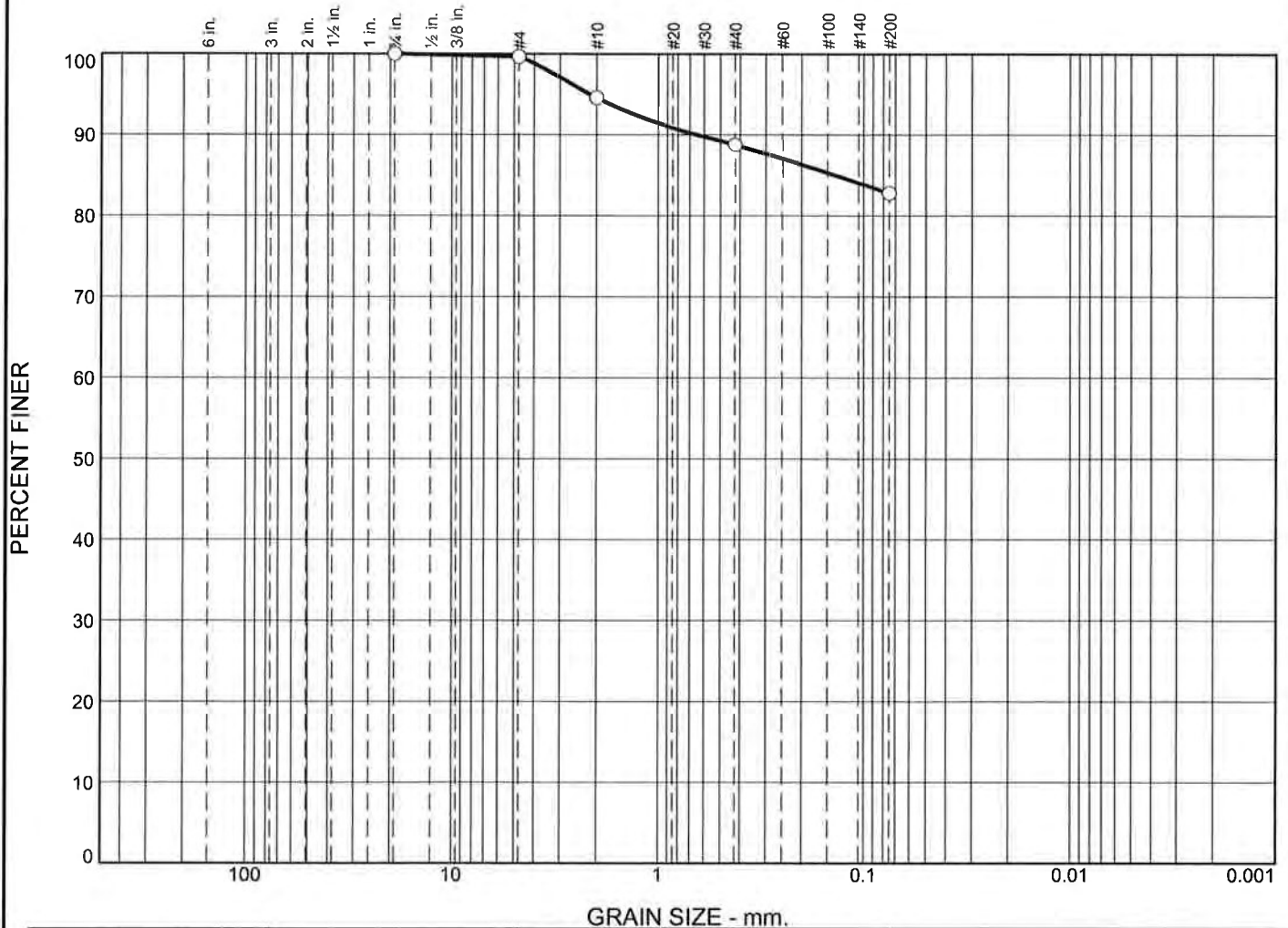
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.3	4.5	6.8	14.6			85.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.2245	1.1850

Fineness Modulus
0.35

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0	0.0	0.4	5.0	5.9	5.9	82.8			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c C _u
☐				0.1381						

Material Description								USCS	AASHTO
☐									

Project No. Client: Project: ☐ Source of Sample: NHH-H-REP-TOP Sample Number: L1728048-10 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-H-REP-TOP

Sample Number: L1728048-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.85
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.85	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.6
		#10	1.11	0.00	94.6
		#40	1.27	0.00	88.7
		#200	1.30	0.00	82.8

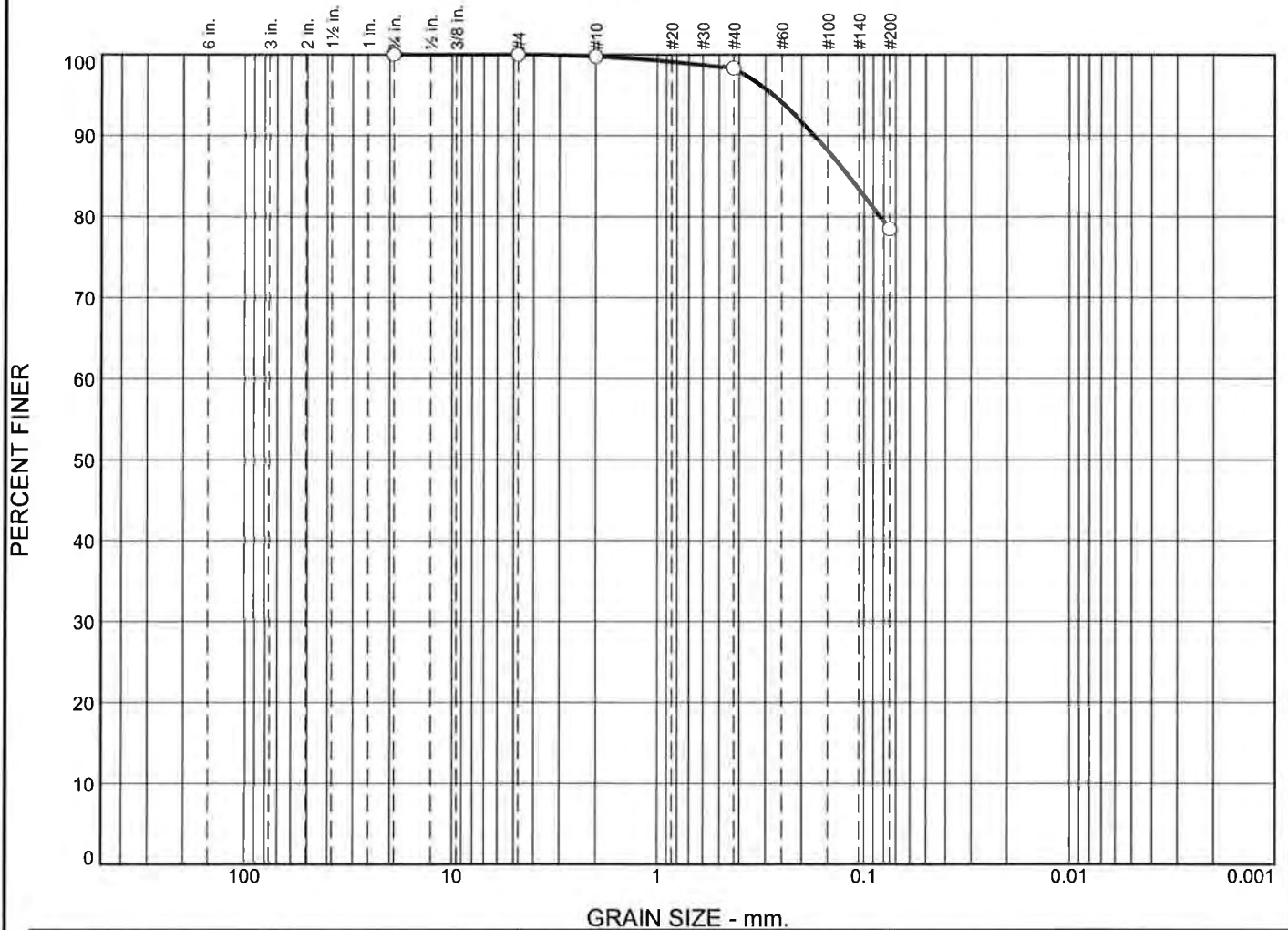
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	5.0	5.9	5.9	16.8			82.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							0.1381	0.6512	2.1554

Fineness Modulus
0.50

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
○ 0.0	0.0	0.0	0.2	1.5	19.9	78.4				
×	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c C _u
○				0.1192						

Material Description								USCS	AASHTO
○									

Project No. Client: Project: ○ Source of Sample: NHH-H-BOTTOM Sample Number: L1728048-11 Date: ○	Remarks:
Alpha Analytical Mansfield, MA	

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-H-BOTTOM

Sample Number: L1728048-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 30.31

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
30.31	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.07	0.00	99.8
		#40	0.45	0.00	98.3
		#200	6.02	0.00	78.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	1.5	19.9	21.6			78.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.0837	0.1192	0.1746	0.2756

**Fineness
Modulus**

0.18

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0	0.0	0.0	9.5	6.9	8.4	67.0		8.2	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
☐				0.5788	0.0646	0.0590	0.0491	0.0413	0.0377	0.99
☐										1.71

Material Description								USCS	AASHTO
☐									

Project No. Client: Project: ☐ Source of Sample: NHH-H-TOP Sample Number: L1731355-07 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-H-TOP

Sample Number: L1731355-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 25.58
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.58	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	2.44	0.00	90.5
		#40	1.76	0.00	83.6
		#200	2.15	0.00	75.2

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 75.2

Weight of hydrometer sample = 26.39

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	9.9
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	9.9
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	9.9
30.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0097	9.9
60.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0069	9.9
240.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0035	5.3
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

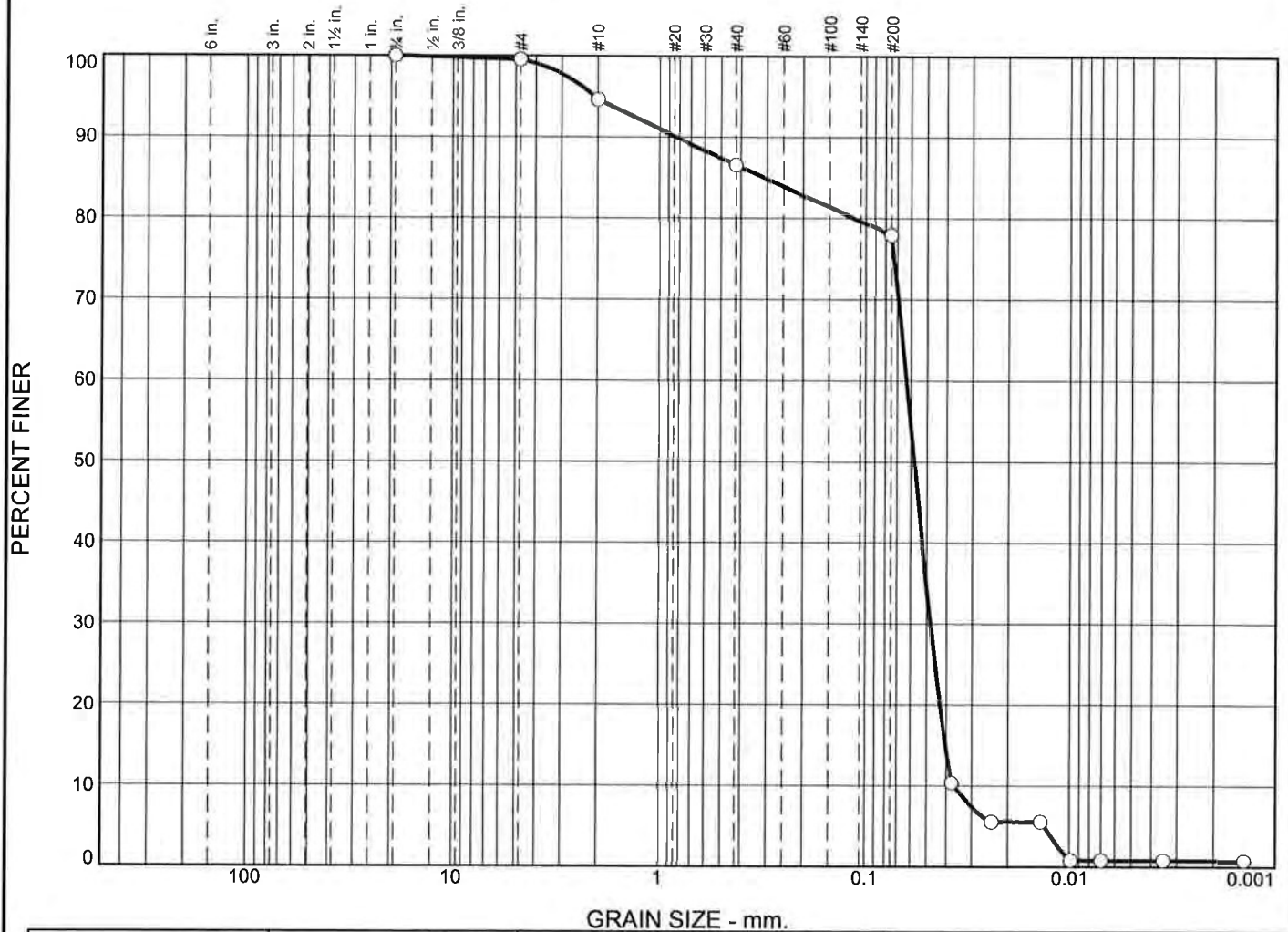
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	9.5	6.9	8.4	24.8	67.0	8.2	75.2

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0033	0.0377	0.0413	0.0441	0.0491	0.0540	0.0590	0.0646	0.1992	0.5788	1.7950	2.8135

Fineness Modulus	C _u	C _c
0.73	1.71	0.99

Particle Size Distribution Report



GRAIN SIZE - mm:											
% +3"			% Gravel			% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.5	4.9	8.1	8.6	77.1		0.8	
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.3141	0.0630	0.0576	0.0480	0.0405	0.0366	1.00	1.72

Material Description								USCS	AASHTO
○									

Project No. Project: ○ Source of Sample: NHH-H-REP-TOP Sample Number: L1731355-08 Date: ○ Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-H-REP-TOP

Sample Number: L1731355-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 26.43

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
26.43	0.00	0.75	0.00	0.00	100.0
		#4	0.12	0.00	99.5
		#10	1.31	0.00	94.6
		#40	2.13	0.00	86.5
		#200	2.27	0.00	77.9

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 77.9

Weight of hydrometer sample = 25.98

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	10.4
5.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0240	5.6
15.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0139	5.6
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.8
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.8
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.8
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	4.9	8.1	8.6	21.6	77.1	0.8	77.9

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0132	0.0366	0.0405	0.0432	0.0480	0.0527	0.0576	0.0630	0.1146	0.3141	0.8351	2.0818

Fineness Modulus	C _u	C _c
0.58	1.72	1.00

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	0.4	6.0	24.1	69.0		0.5	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.1946	0.0687	0.0631	0.0535	0.0466	0.0441	0.94	1.56

Material Description	USCS	AASHTO
☐		

Project No. Project: ☐ Source of Sample: NHH-H-BOTTOM Sample Number: L1731355-09 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-H-BOTTOM

Sample Number: L1731355-09

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 35.26
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
35.26	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.13	0.00	99.6
		#40	2.13	0.00	93.6
		#200	8.50	0.00	69.5

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 69.5

Weight of hydrometer sample = 37.37

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.5
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.5
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.5
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.5
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.5
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.5
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.5

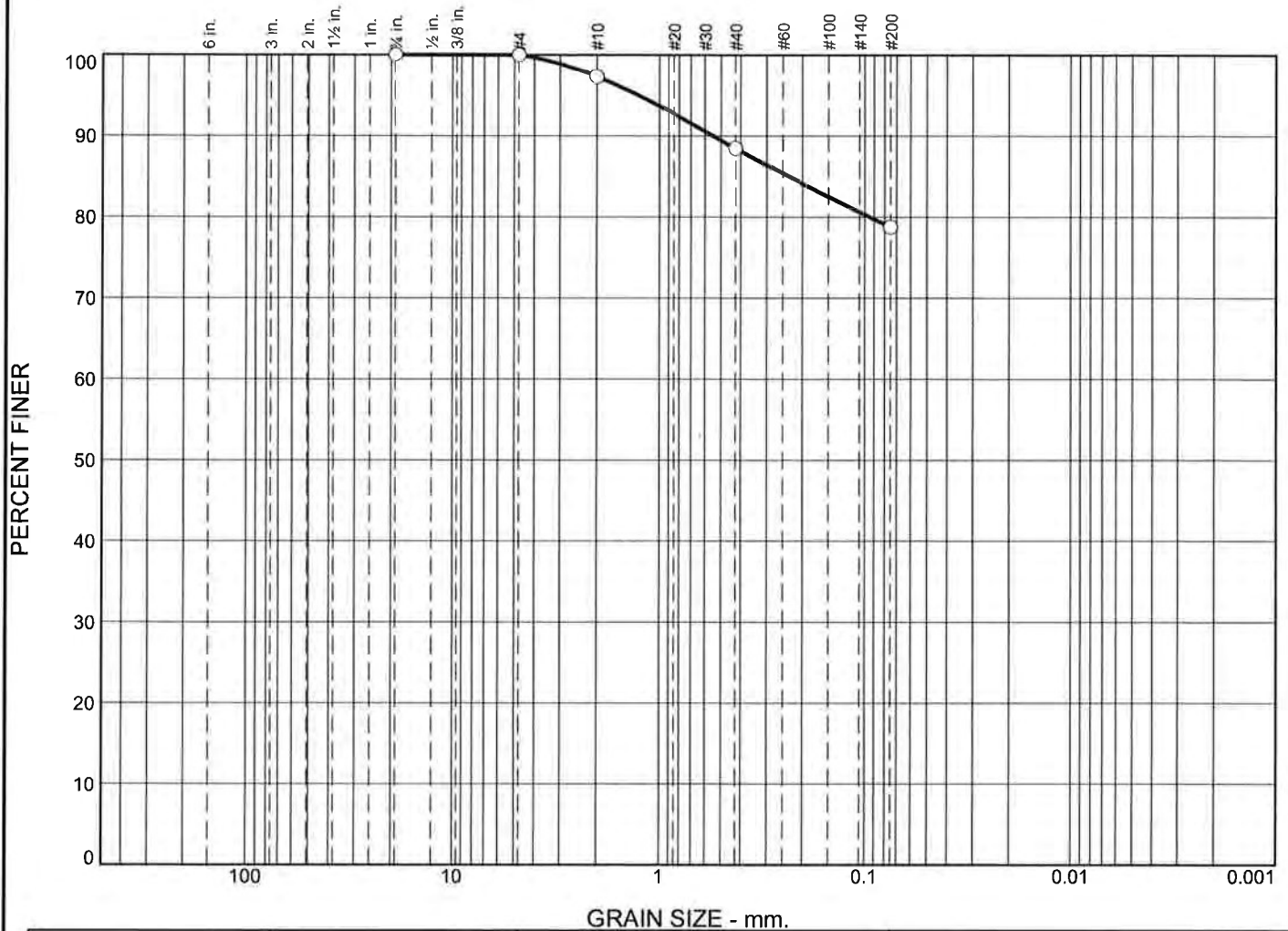
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.4	6.0	24.1	30.5	69.0	0.5	69.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0414	0.0441	0.0466	0.0489	0.0535	0.0581	0.0631	0.0687	0.1376	0.1946	0.2939	0.5424

Fineness Modulus	C _u	C _c
0.35	1.56	0.94

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	2.7	8.8	9.8	78.7			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.2352							

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-I-TOP Sample Number: L1728048-12 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-I-TOP

Sample Number: L1728048-12

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.05

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.05	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.62	0.00	97.3
		#40	2.04	0.00	88.5
		#200	2.24	0.00	78.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.7	8.8	9.8	21.3			78.7

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.0947	0.2352	0.5466	1.2621

Fineness Modulus
0.48

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-I-BOTTOM

Sample Number: L1728048-13

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.11

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.11	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.39	0.00	98.2
		#40	1.07	0.00	93.1
		#200	1.00	0.00	88.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.8	5.1	4.8	11.7			88.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.1439	0.7552

Fineness Modulus
0.29

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	4.3	11.4	9.5	74.1		0.7	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.4745	0.0661	0.0611	0.0523	0.0459	0.0436	0.95	1.52

Material Description									USCS	AASHTO
☐										

Project No. Project: ☐ Source of Sample: NHH-I-TOP Sample Number: L1731355-10 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-I-TOP

Sample Number: L1731355-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 27.16
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
27.16	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	1.16	0.00	95.7
		#40	3.11	0.00	84.3
		#200	2.57	0.00	74.8

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 74.8

Weight of hydrometer sample = 26.99

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.7
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.7
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.7
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.7
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.7
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.7
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.7

Fractional Components

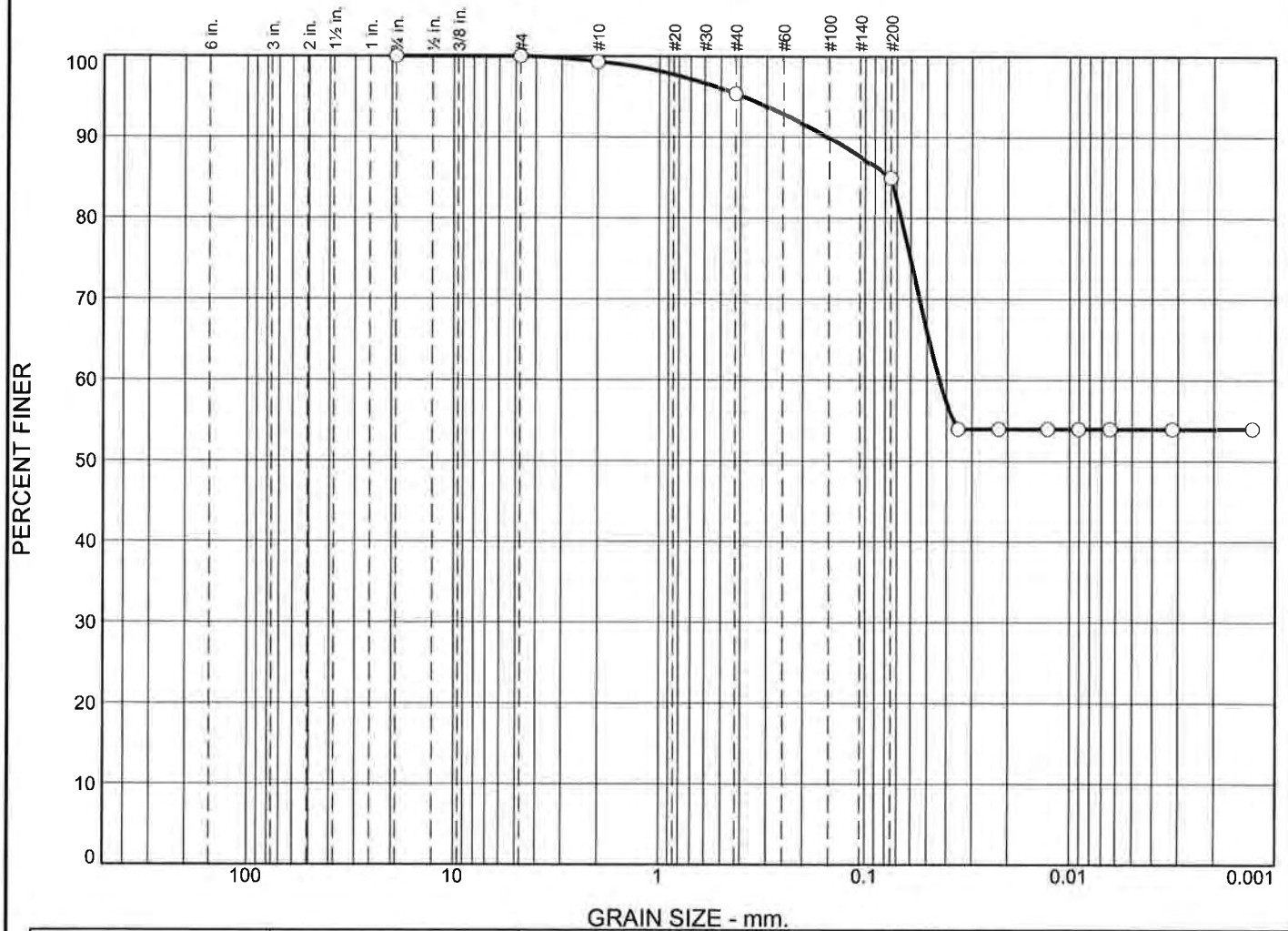
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	4.3	11.4	9.5	25.2	74.1	0.7	74.8

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0410	0.0436	0.0459	0.0481	0.0523	0.0566	0.0611	0.0661	0.2098	0.4745	0.9665	1.8310

Fineness Modulus	C _u	C _c
0.64	1.52	0.95

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-I-BOTTOM

Sample Number: L1731355-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 25.12
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.12	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.17	0.00	99.3
		#40	1.00	0.00	95.3
		#200	2.61	0.00	85.0

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 85.0
 Weight of hydrometer sample = 25.72
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0350	53.9
5.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0222	53.9
15.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0128	53.9
30.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0090	53.9
60.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0064	53.9
240.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0032	53.9
1440.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0013	53.9

Fractional Components

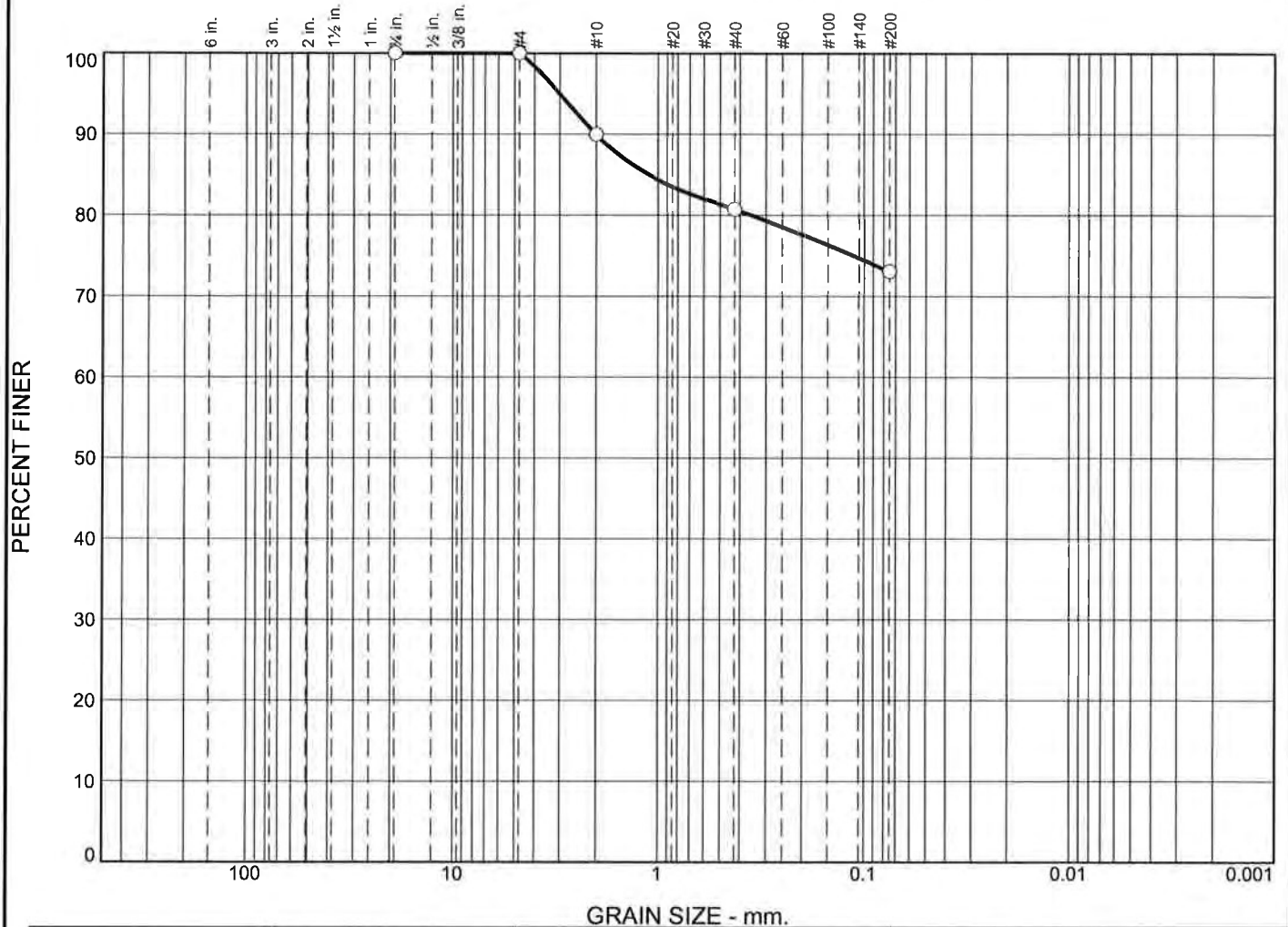
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	4.0	10.3	15.0	31.1	53.9	85.0

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							0.0433	0.0669	0.0755	0.1535	0.3922

Fineness Modulus

0.22

Particle Size Distribution Report



GRAIN SIZE - mm.												
% +3"		% Gravel		% Sand			% Fines					
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay			
○	0.0		0.0	0.0	10.1	9.2	7.6	73.1				
×	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
○				1.1161								
Material Description									USCS		AASHTO	
○												

Project No. Project: ○ Source of Sample: NHH-J Sample Number: L1728048-05 Date: ○	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-J

Sample Number: L1728048-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.49

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.49	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	1.96	0.00	89.9
		#40	1.80	0.00	80.7
		#200	1.49	0.00	73.1

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	10.1	9.2	7.6	26.9			73.1

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.3543	1.1161	2.0102	3.0105

Fineness Modulus

0.85

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-J

Sample Number: L1731355-03

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 24.00

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.00	0.00	0.75	0.00	0.00	100.0
		#4	0.59	0.00	97.5
		#10	1.58	0.00	91.0
		#40	1.11	0.00	86.3
		#200	1.73	0.00	79.1

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 79.1

Weight of hydrometer sample = 23.42

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0380	6.3
5.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0240	6.3
15.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0139	6.3
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.9
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.9
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.9
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.9

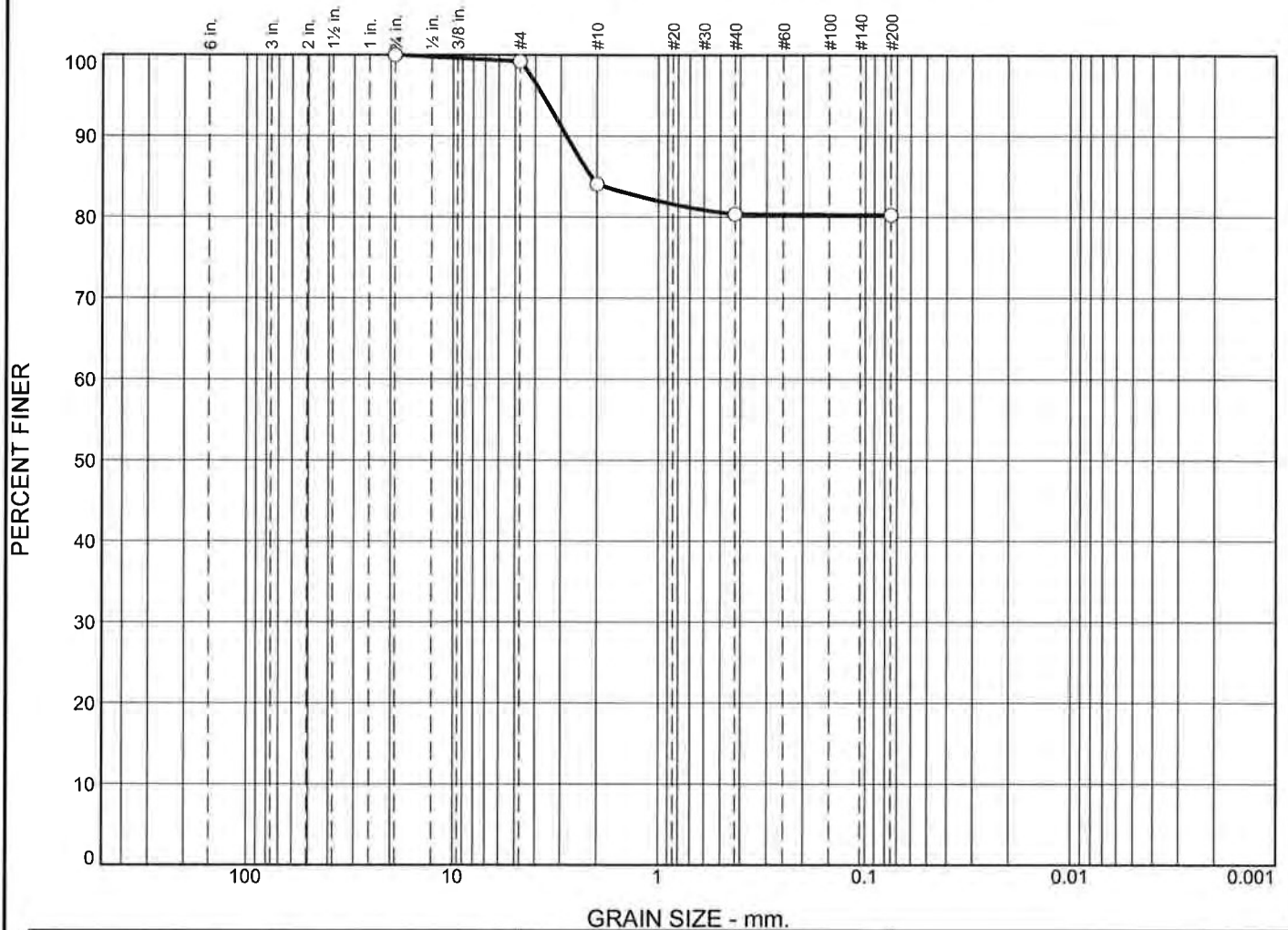
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.5	2.5	6.5	4.7	7.2	18.4	78.2	0.9	79.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0128	0.0404	0.0431	0.0454	0.0498	0.0542	0.0587	0.0635	0.0903	0.2955	1.3770	3.0807

Fineness Modulus	C _u	C _c
0.66	1.57	0.97

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.8	15.2	3.7	80.3				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				2.1307							

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-K-TOP Sample Number: L1728048-07 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-K-TOP

Sample Number: L1728048-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.76

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.76	0.00	0.75	0.00	0.00	100.0
		#4	0.19	0.00	99.2
		#10	3.60	0.00	84.0
		#40	0.88	0.00	80.3
		#200	0.02	0.00	80.3

Fractional Components

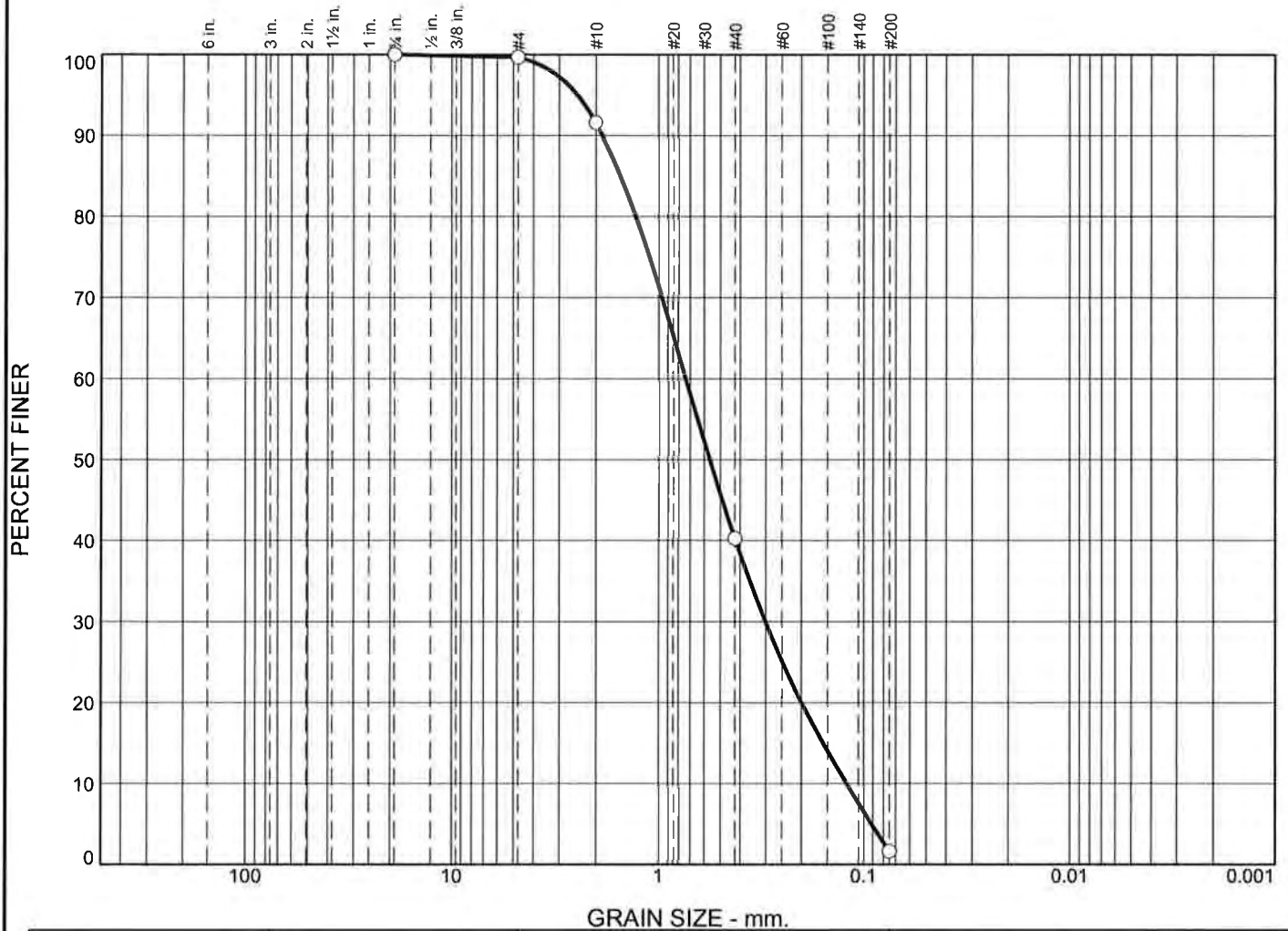
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.8	0.8	15.2	3.7		18.9			80.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							2.1307	2.8177	3.6595

**Fineness
Modulus**

0.91

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.3	8.1	51.3	38.7	1.6				
☐											
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				1.5260	0.7362	0.5625	0.3012	0.1575	0.1211	1.02	6.08
☐											

Material Description									USCS	AASHTO
☐									SW	

Project No. Project: ☐ Source of Sample: NHH-K-BOTTOM Sample Number: L1728048-08 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-K-BOTTOM**Sample Number:** L1728048-08**USCS Classification:** SW**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 39.15

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
39.15	0.00	0.75	0.00	0.00	100.0
		#4	0.13	0.00	99.7
		#10	3.17	0.00	91.6
		#40	20.09	0.00	40.3
		#200	15.12	0.00	1.6

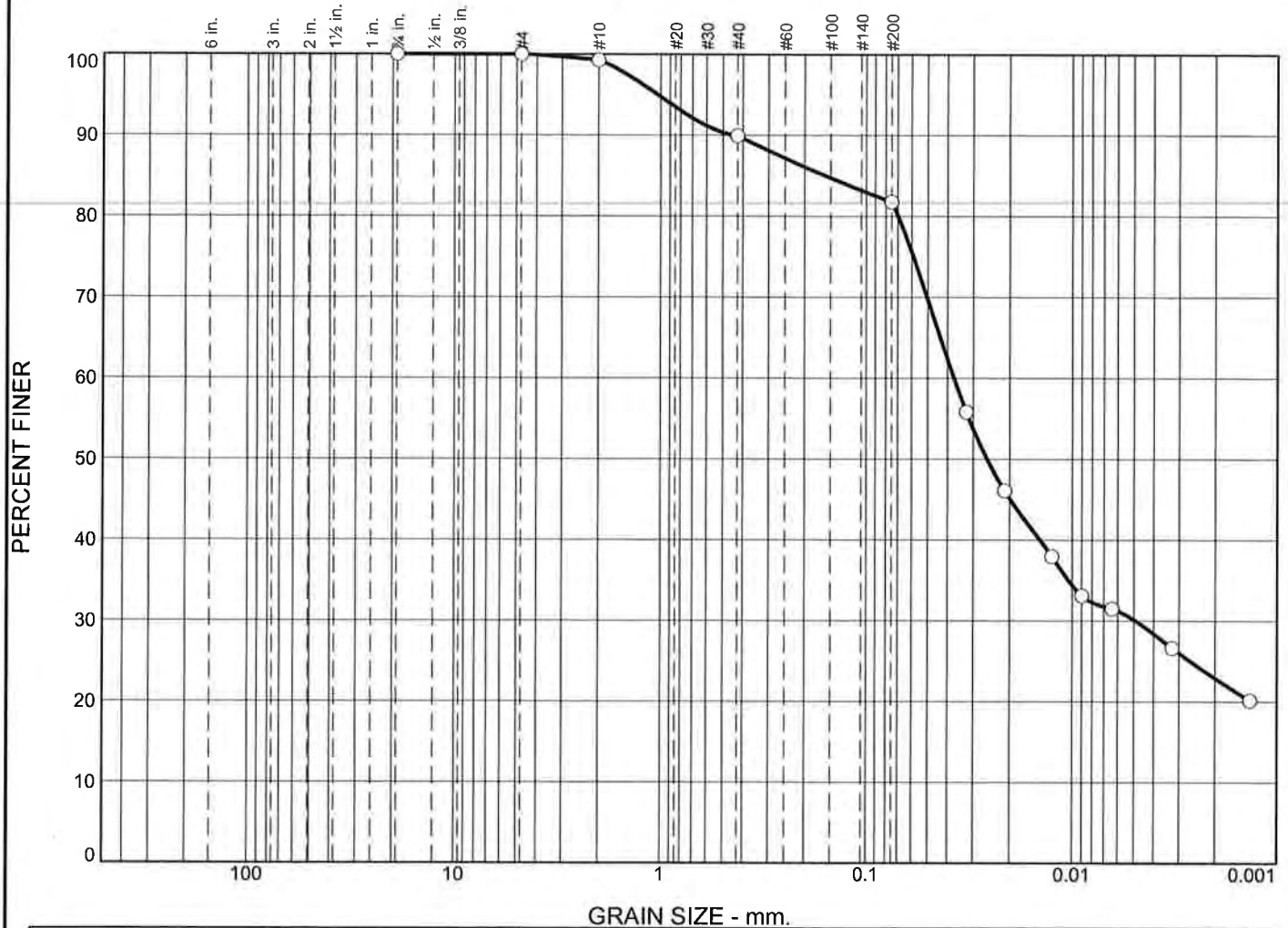
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	8.1	51.3	38.7	98.1			1.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.1211	0.1575	0.2000	0.3012	0.5625	0.7362	1.2921	1.5260	1.8578	2.4533

Fineness Modulus	C _u	C _c
2.33	6.08	1.02

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	0.0	0.7	9.4	8.1	51.6	30.2			

Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
			0.1592	0.0372	0.0257	0.0049				

Material Description								USCS	AASHTO

Project No. Client: Project: ☐ Source of Sample: NHH-K-TOP Sample Number: L1731355-05 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/5/2017

Location: NHH-K-TOP

Sample Number: L1731355-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 32.70

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
32.70	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.24	0.00	99.3
		#40	3.06	0.00	89.9
		#200	2.66	0.00	81.8

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 81.8

Weight of hydrometer sample = 40.51

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0170	1.0172	0.0133	17.0	11.8	0.0324	55.8
5.00	21.8	1.0140	1.0142	0.0133	14.0	12.6	0.0212	46.1
15.00	21.8	1.0115	1.0117	0.0133	11.5	13.3	0.0125	38.0
30.00	21.8	1.0100	1.0102	0.0133	10.0	13.6	0.0090	33.1
60.00	21.8	1.0095	1.0097	0.0133	9.5	13.8	0.0064	31.5
240.00	21.8	1.0080	1.0082	0.0133	8.0	14.2	0.0032	26.7
1440.00	21.8	1.0060	1.0062	0.0133	6.0	14.7	0.0013	20.2

Fractional Components

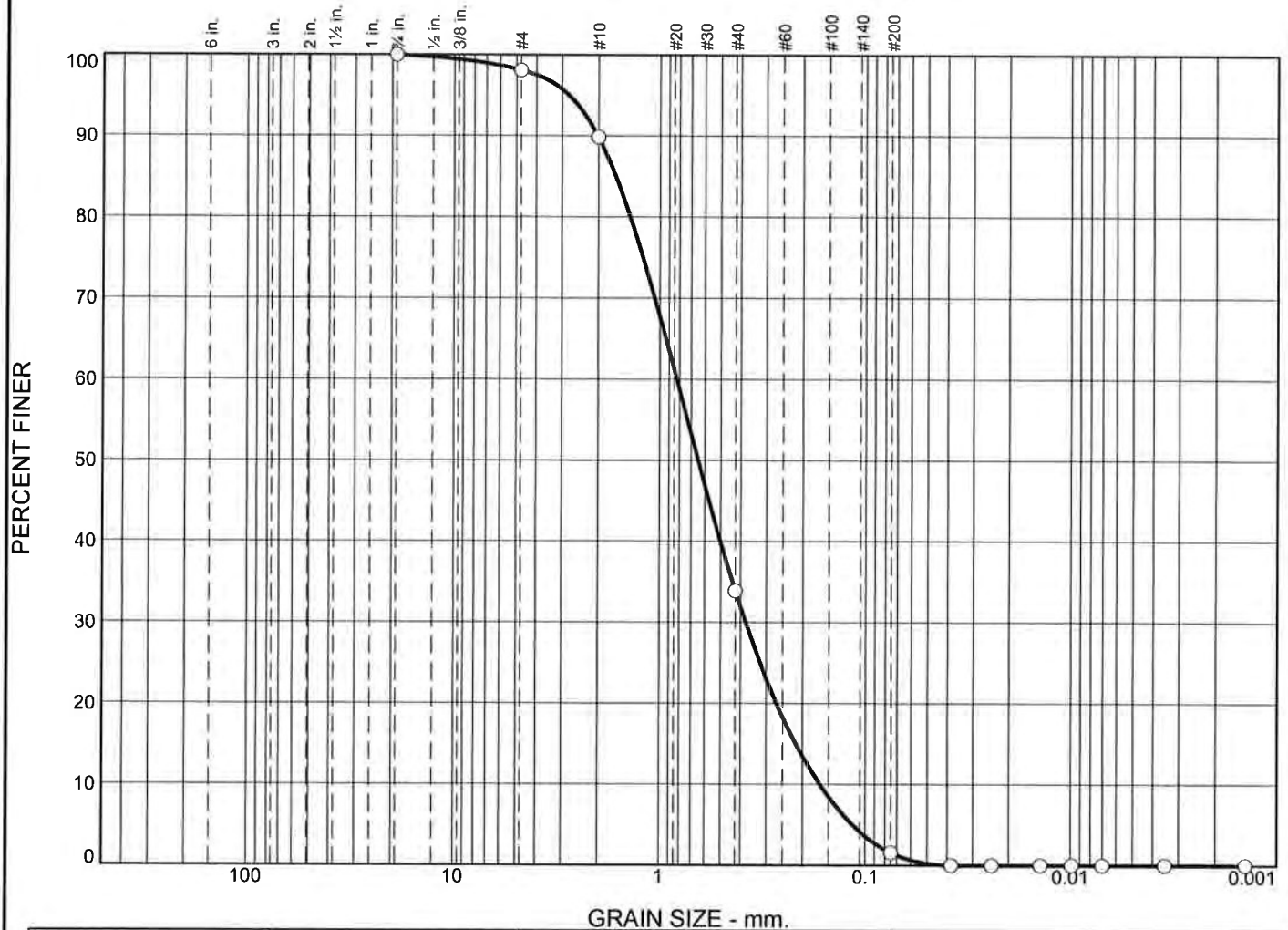
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	9.4	8.1	18.2	51.6	30.2	81.8

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.0049	0.0143	0.0257	0.0372	0.0699	0.1592	0.4470	1.0347

Fineness Modulus

0.41

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	1.9	8.2	56.0	32.3	1.6		0.0	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				1.6467	0.8251	0.6464	0.3785	0.2156	0.1655	1.05	4.99

Material Description								USCS	AASHTO
☐								SP	

Project No. Project: ☐ Source of Sample: NHH-K-BOTTOM Sample Number: L1731355-06 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-K-BOTTOM**Sample Number:** L1731355-06**USCS Classification:** SP**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 44.07

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
44.07	0.00	0.75	0.00	0.00	100.0
		#4	0.85	0.00	98.1
		#10	3.62	0.00	89.9
		#40	24.66	0.00	33.9
		#200	14.25	0.00	1.6

Hydrometer Test Data**Hydrometer test uses material passing #200****Percent passing #200 based upon complete sample = 1.6****Weight of hydrometer sample = 44.72****Automatic temperature correction****Composite correction (fluid density and meniscus height) at 20 deg. C = 0****Meniscus correction only = 0.0****Specific gravity of solids = 2.65****Hydrometer type = 151H****Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.0
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.0
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.0
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.0
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.0
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.0
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.0

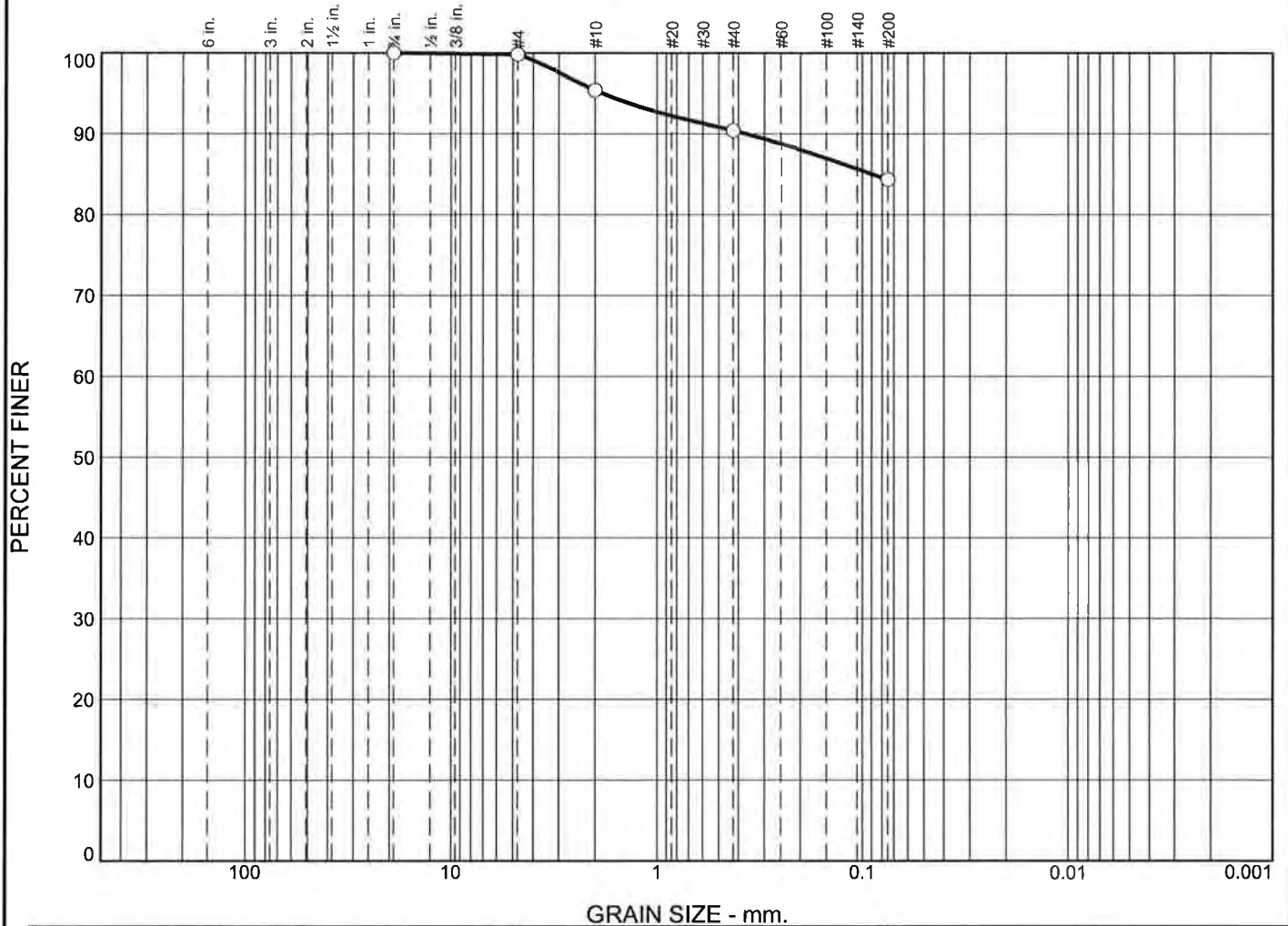
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	8.2	56.0	32.3	96.5	1.6	0.0	1.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.1150	0.1655	0.2156	0.2674	0.3785	0.5021	0.6464	0.8251	1.3996	1.6467	2.0135	2.7798

Fineness Modulus	C _u	C _c
2.57	4.99	1.05

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	0.2	4.4	5.0	6.1	84.3				

Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
			0.0894							

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-L Sample Number: L1728048-06 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-L

Sample Number: L1728048-06

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.56

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.56	0.00	0.75	0.00	0.00	100.0
		#4	0.04	0.00	99.8
		#10	0.96	0.00	95.4
		#40	1.07	0.00	90.4
		#200	1.31	0.00	84.3

Fractional Components

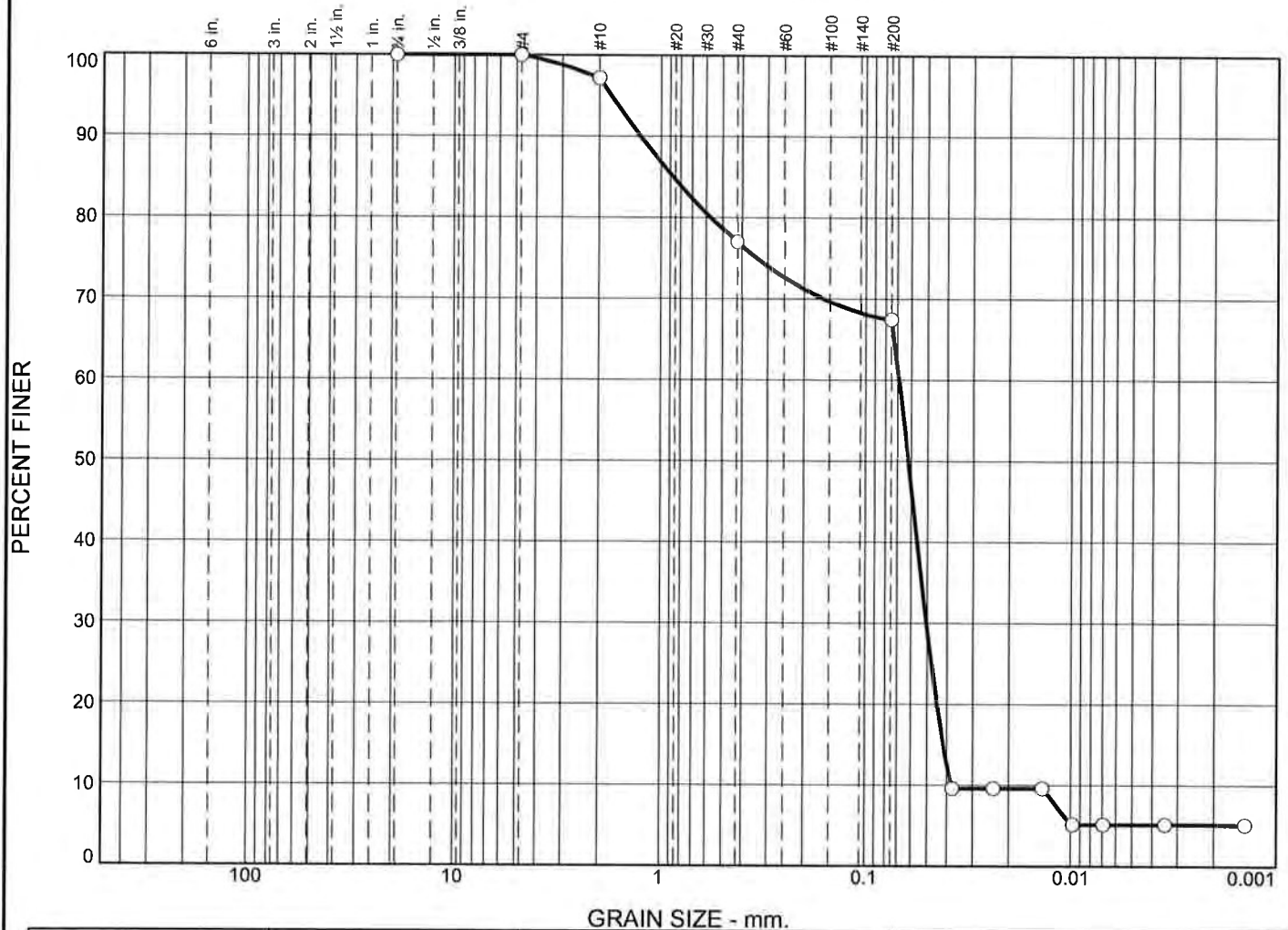
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	4.4	5.0	6.1	15.5			84.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							0.0894	0.3697	1.8570

**Fineness
Modulus**

0.43

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	2.8	20.2	9.6	62.2		5.2		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.8713	0.0688	0.0619	0.0504	0.0418	0.0380	0.97	1.81

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-L Sample Number: L1731355-04 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-L

Sample Number: L1731355-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 25.64

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.64	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.73	0.00	97.2
		#40	5.16	0.00	77.0
		#200	2.46	0.00	67.4

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 67.4

Weight of hydrometer sample = 24.42

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	9.6
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	9.6
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	9.6
30.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0098	5.2
60.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0069	5.2
240.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0035	5.2
1440.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0014	5.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.8	20.2	9.6	32.6	62.2	5.2	67.4

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0380	0.0418	0.0449	0.0504	0.0560	0.0619	0.0688	0.5697	0.8713	1.2593	1.7513

Fineness Modulus	C _u	C _c
0.89	1.81	0.97

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-M

Sample Number: L1731354-12

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.14
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.10	0.00	99.5
		#200	0.33	0.00	98.0

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 98.0
 Weight of hydrometer sample = 21.14
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0080	1.0082	0.0134	8.0	14.2	0.0357	60.9
5.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0230	46.0
15.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0133	46.0
30.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0094	46.0
60.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0066	46.0
240.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0033	46.0
1440.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0014	46.0

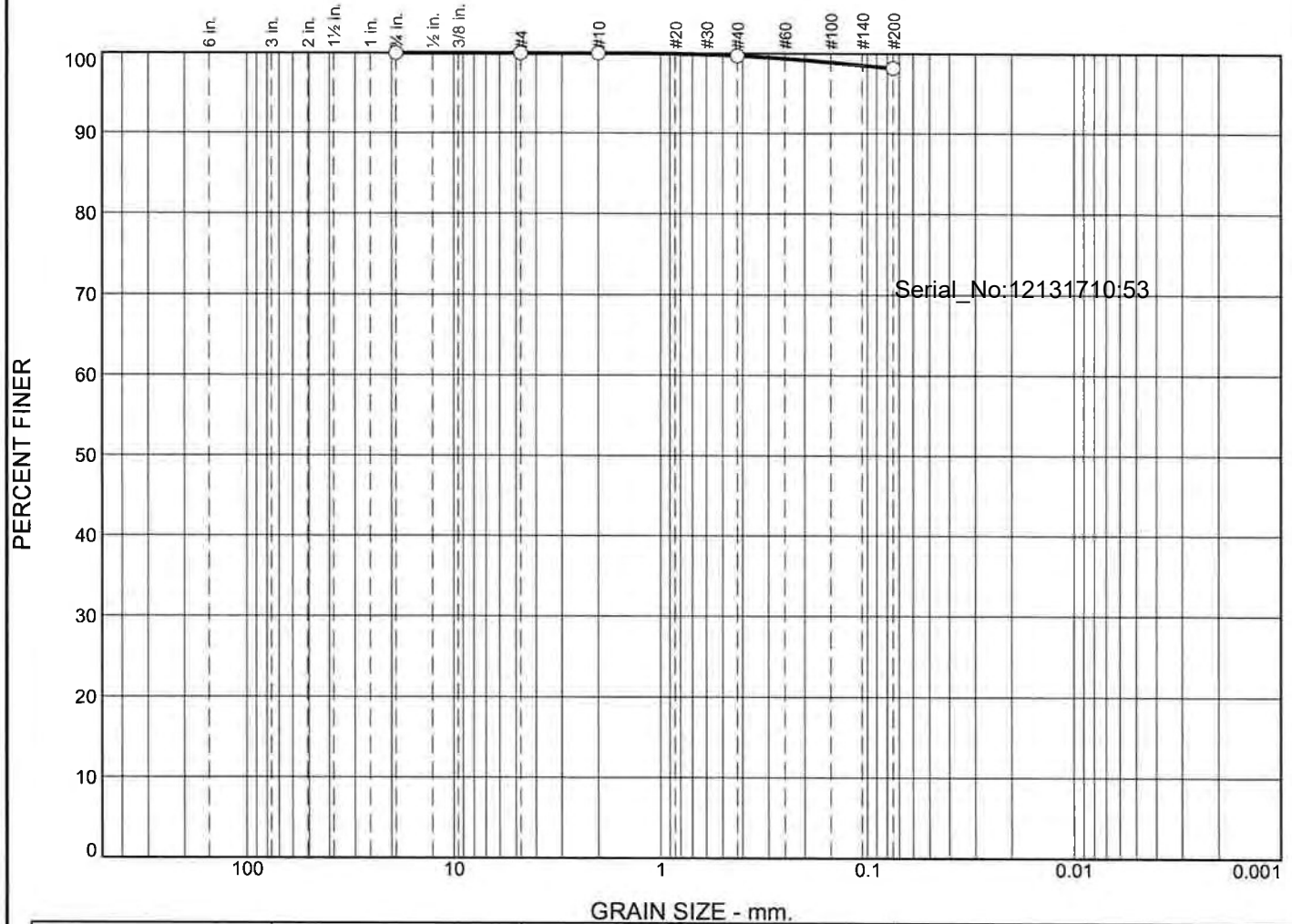
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.5	1.5	2.0	52.0	46.0	98.0

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.0272	0.0350	0.0513	0.0564	0.0624	0.0696

Fineness Modulus
0.02

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	0.0	0.3	1.5	98.2			
☐											
☐											
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											
☐											
☐											

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-M Sample Number: L1727561-12 Date: ☐ Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-M

Sample Number: L1727561-12

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.58
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.58	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.05	0.00	99.7
		#200	0.27	0.00	98.2

Serial_No:12131710:53

Fractional Components

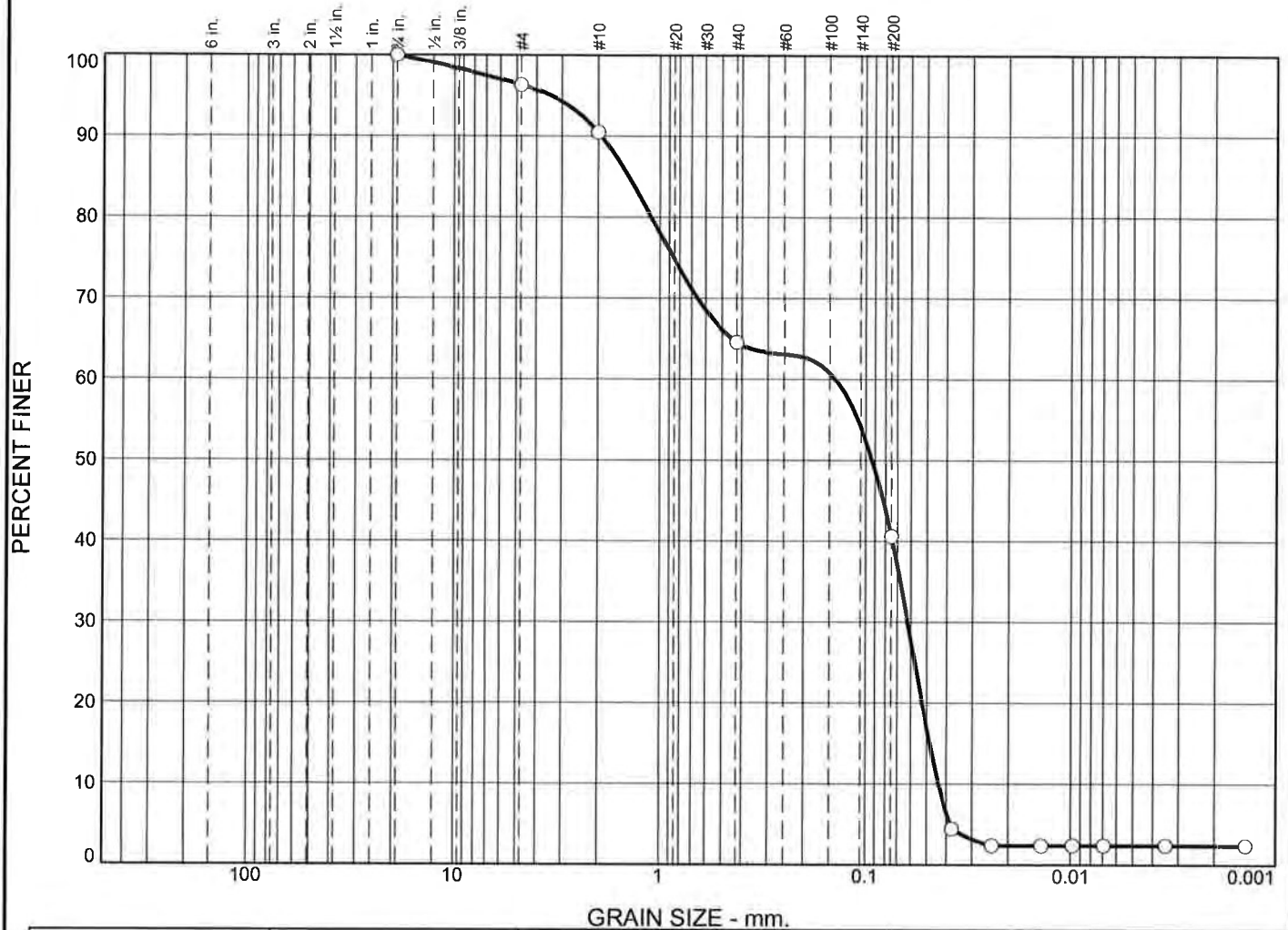
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.3	1.5	1.8			98.2

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95

Fineness Modulus
0.02

Alpha Analytical

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
0.0		0.0	3.7	5.8	26.0	23.9	38.2		2.4	
Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
			1.4255	0.1415	0.0930	0.0623	0.0484	0.0438	0.63	3.23

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-N-TOP Sample Number: L1731354-08 Date: ☐ Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-N-TOP

Sample Number: L1731354-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 31.86
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
31.86	0.00	0.75	0.00	0.00	100.0
		#4	1.19	0.00	96.3
		#10	1.85	0.00	90.5
		#40	8.26	0.00	64.5
		#200	7.62	0.00	40.6

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 40.6

Weight of hydrometer sample = 31.86

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0376	4.5
5.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0240	2.4
15.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0138	2.4
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	2.4
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	2.4
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	2.4
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	2.4

Fractional Components

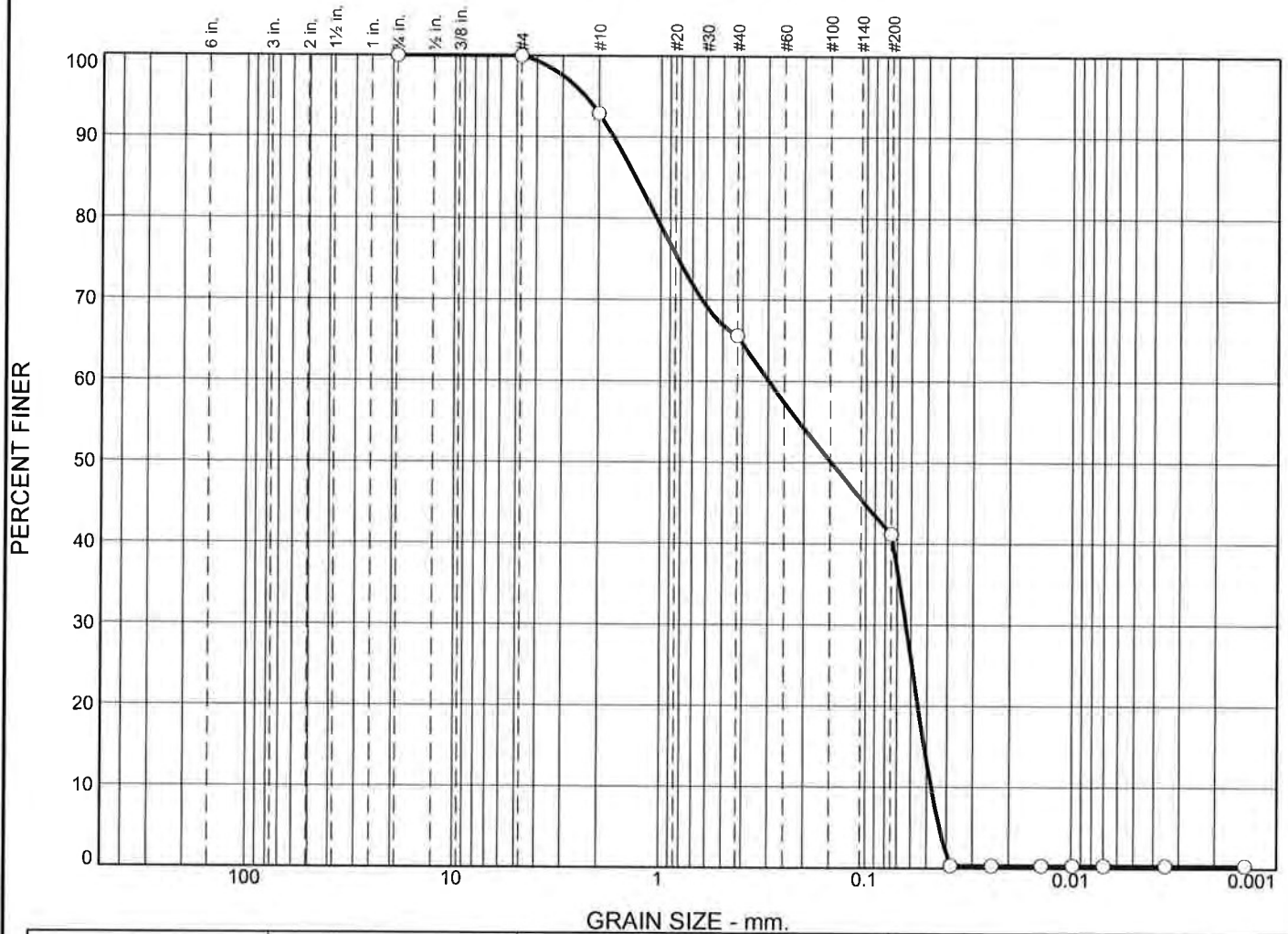
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.7	3.7	5.8	26.0	23.9	55.7	38.2	2.4	40.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0384	0.0438	0.0484	0.0528	0.0623	0.0741	0.0930	0.1415	1.1031	1.4255	1.9330	3.4267

Fineness Modulus	C _u	C _c
1.39	3.23	0.63

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	7.1	27.3	24.4	40.9		0.3	
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				1.3166	0.2974	0.1486	0.0635	0.0513	0.0474	0.29	6.27

Material Description							USCS	AASHTO
☐								

Project No. Project: ☐ Source of Sample: NHH-N-TOP Sample Number: WG1046269-1 Date: ☐ Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-N-TOP

Sample Number: WG1046269-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 34.14

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
34.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	2.43	0.00	92.9
		#40	9.33	0.00	65.6
		#200	8.32	0.00	41.2

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 41.2

Weight of hydrometer sample = 34.14

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	0.3
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.3
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.3
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.3
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.3
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.3
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	7.1	27.3	24.4	58.8	40.9	0.3	41.2

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0432	0.0474	0.0513	0.0552	0.0635	0.0736	0.1486	0.2974	1.0453	1.3166	1.6890	2.3309

Fineness Modulus	C _u	C _c
1.43	6.27	0.29

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-N-BOTTOM

Sample Number: L1731354-09

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 41.75

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
41.75	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.91	0.00	97.8
		#200	34.47	0.00	15.3

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 15.3

Weight of hydrometer sample = 41.75

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0379	0.7
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

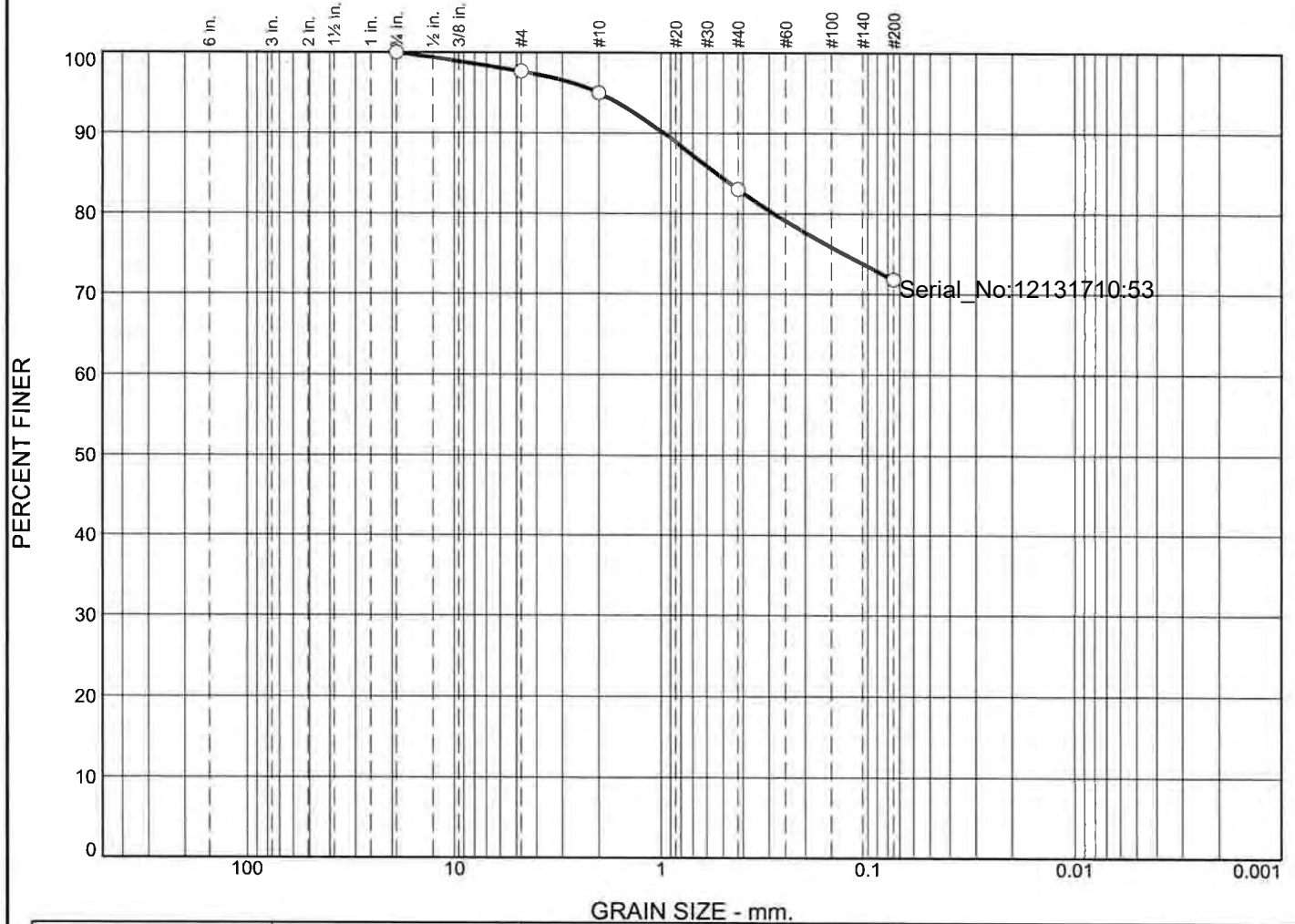
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	2.2	82.5	84.7	15.2	0.1	15.3

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0523	0.0640	0.0745	0.0845	0.1050	0.1274	0.1529	0.1831	0.2683	0.2990	0.3369	0.3869

Fineness Modulus	C _u	C _c
0.68	2.86	0.94

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	2.4	2.6	12.0	11.2	71.8				
☒ Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
			0.5398							

Material Description							USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-N-TOP Sample Number: L1727561-08 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-N-TOP

Sample Number: L1727561-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.78
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.78	0.00	0.75	0.00	0.00	100.0
		#4	0.47	0.00	97.6
		#10	0.52	0.00	95.0
		#40	2.37	0.00	83.0
		#200	2.22	0.00	71.8

Serial_No:12131710:53

Fractional Components

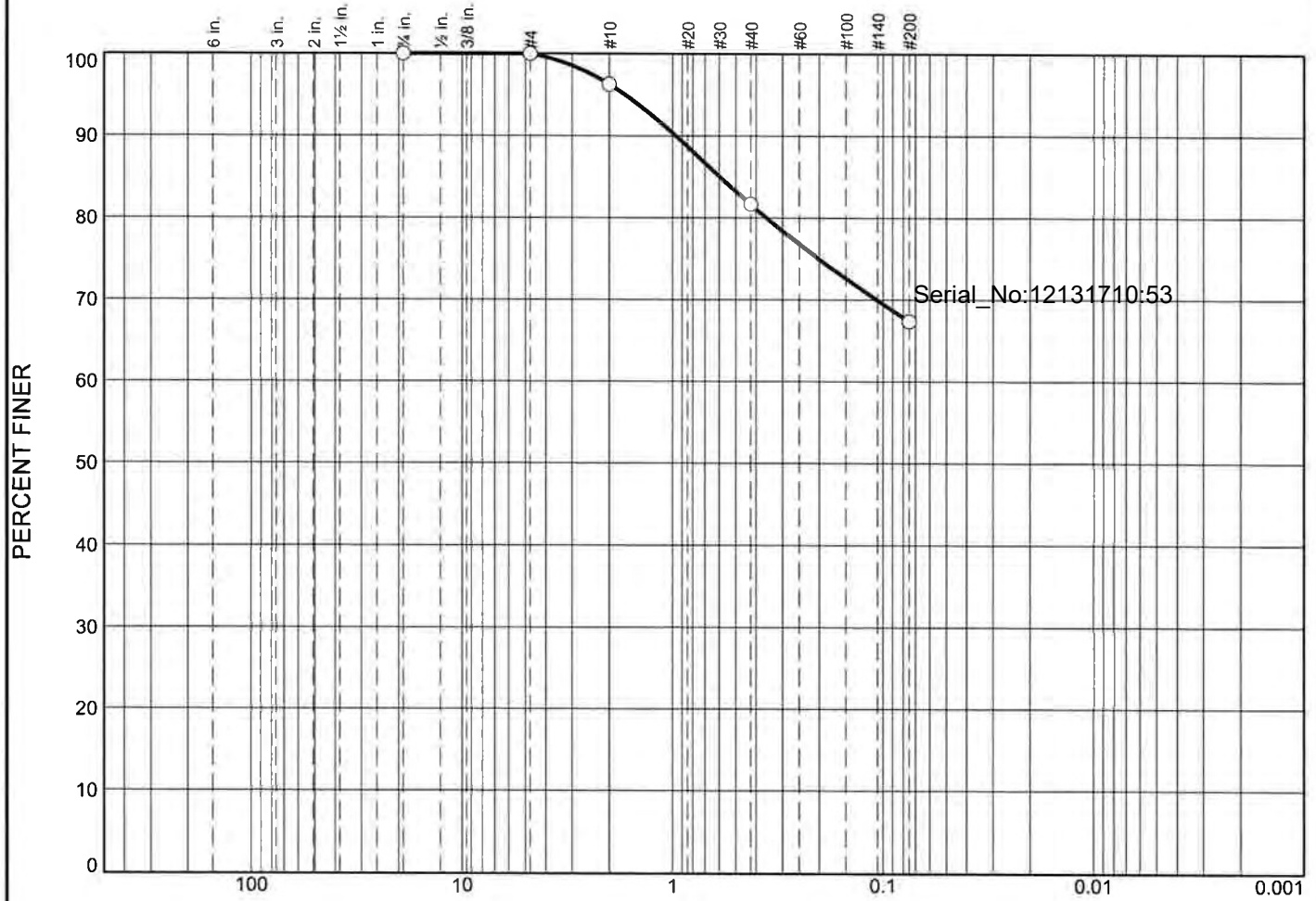
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.4	2.4	2.6	12.0	11.2	25.8			71.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.2850	0.5398	0.9688	2.0020

Fineness Modulus
0.74

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	0.0	3.7	14.7	14.3	67.3			
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.5930							

Material Description								USCS	AASHTO

Project No.	Client:
Project:	
Source of Sample: NHH-N-TOP	Sample Number: WG1030340-1
Date:	
Alpha Analytical	
Mansfield, MA	

Remarks:
Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-N-TOP

Sample Number: WG1030340-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.91
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.91	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.89	0.00	96.3
		#40	3.50	0.00	81.6
		#200	3.42	0.00	67.3

Serial_No:12131710:53

Fractional Components

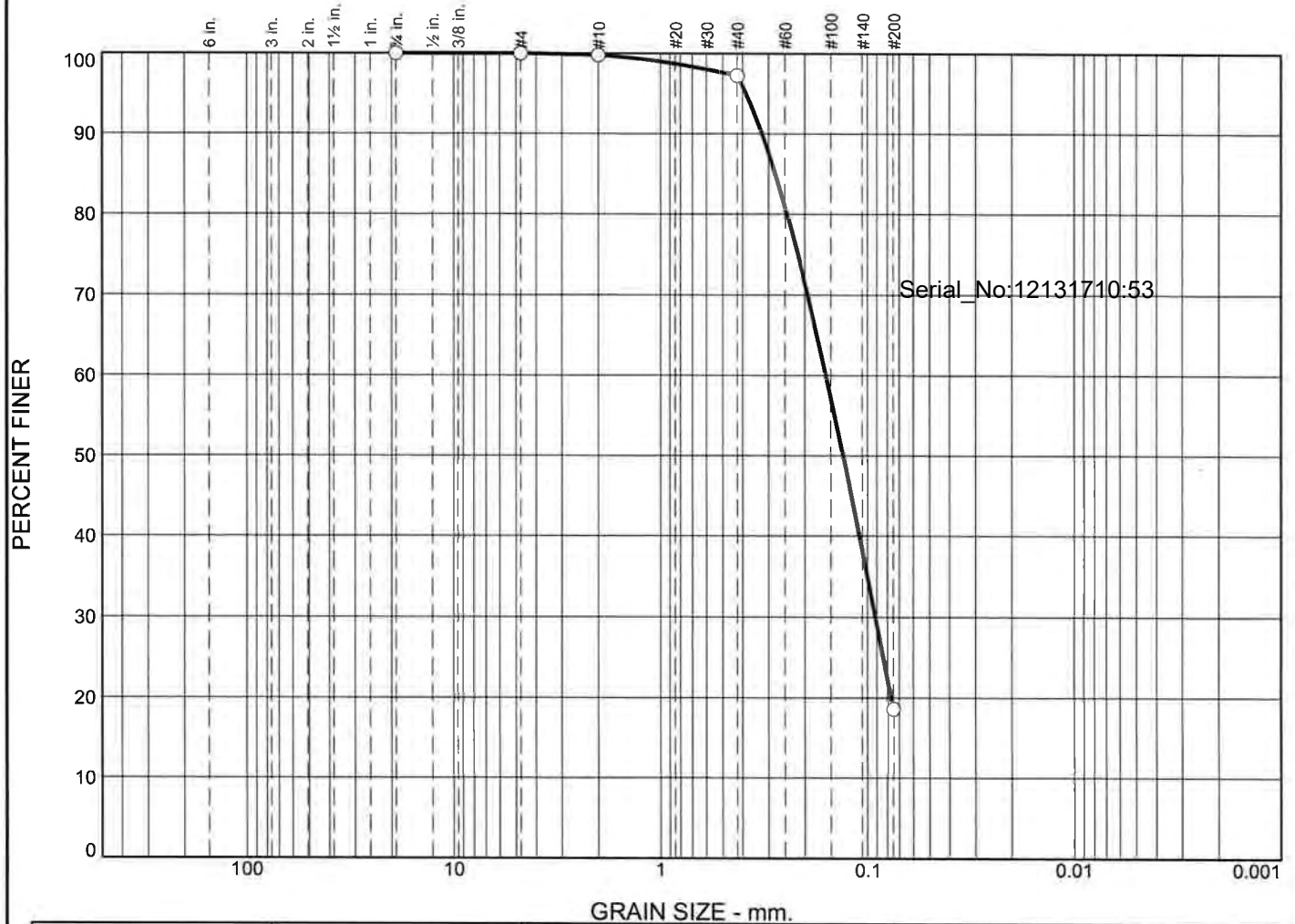
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.7	14.7	14.3	32.7			67.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.3579	0.5930	0.9663	1.6803

Fineness Modulus
0.75

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	0.2	2.6	78.6	18.6			
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.2784	0.1583	0.1308	0.0915				

Material Description							USCS	AASHTO

Project No.	Client:
Project:	
Source of Sample: NHH-N-BOTTOM	Sample Number: L1727561-09
Date: ☐	
Alpha Analytical	
Mansfield, MA	

Remarks:
Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-N-BOTTOM

Sample Number: L1727561-09

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 36.32

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.32	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.08	0.00	99.8
		#40	0.93	0.00	97.2
		#200	28.56	0.00	18.6

Serial_No:12131710:53

Fractional Components

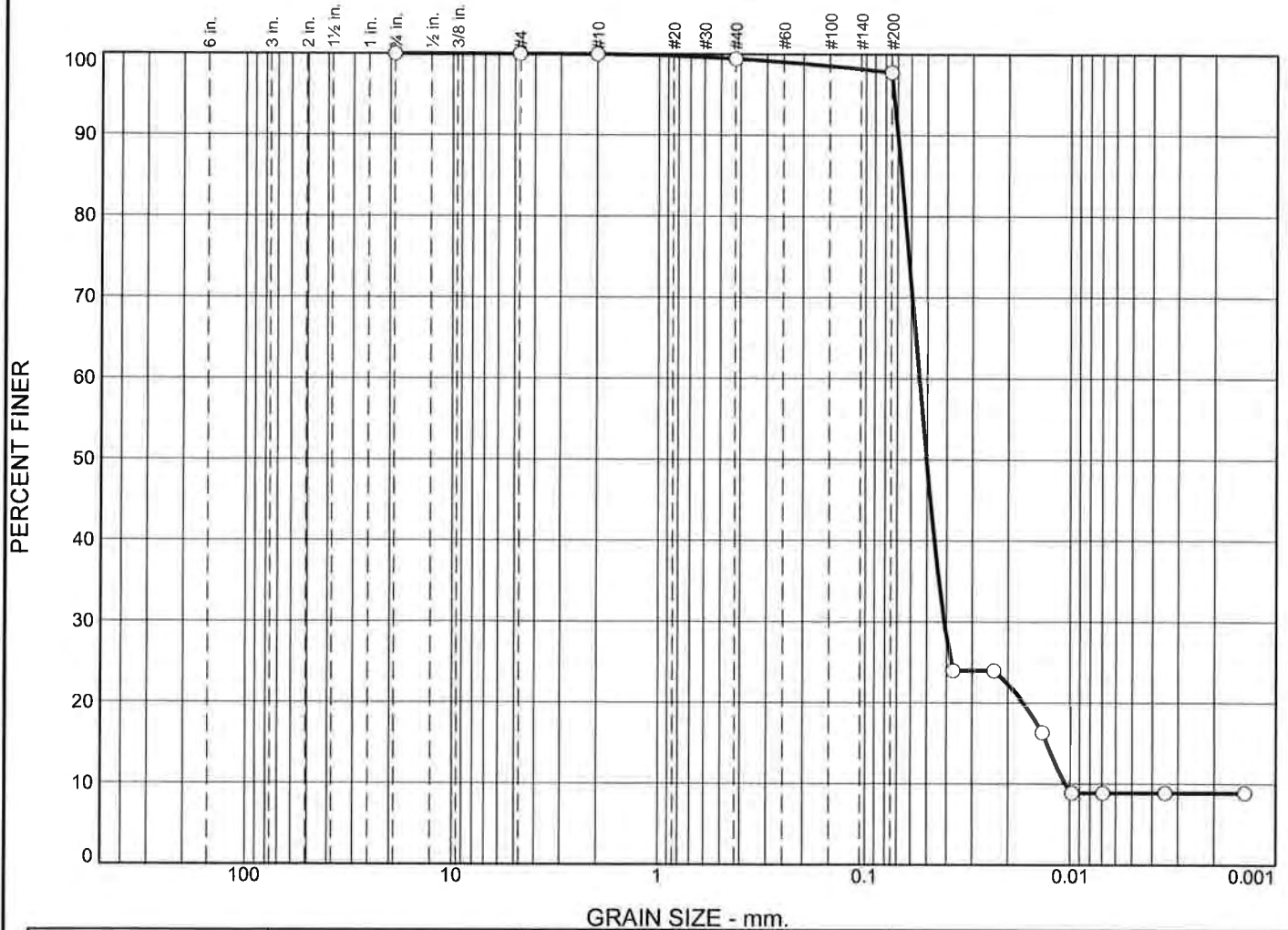
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	2.6	78.6	81.4			18.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0769	0.0915	0.1308	0.1583	0.2445	0.2784	0.3225	0.3853

Fineness Modulus
0.58

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
	% +3"		% Gravel			% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	0.0	0.6	1.7	88.8		8.9	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0668	0.0546	0.0503	0.0411	0.0130	0.0106	2.93	5.17

Material Description								USCS	AASHTO
☐									

Project No. Client: Project: ☐ Source of Sample: NHH-O-TOP Sample Number: L1731354-10 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-O-TOP

Sample Number: L1731354-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.80

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.80	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	100.0
		#40	0.11	0.00	99.4
		#200	0.35	0.00	97.7

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 97.7

Weight of hydrometer sample = 20.80

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	24.0
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	24.0
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	16.4
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	8.9
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	8.9
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.9
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.9

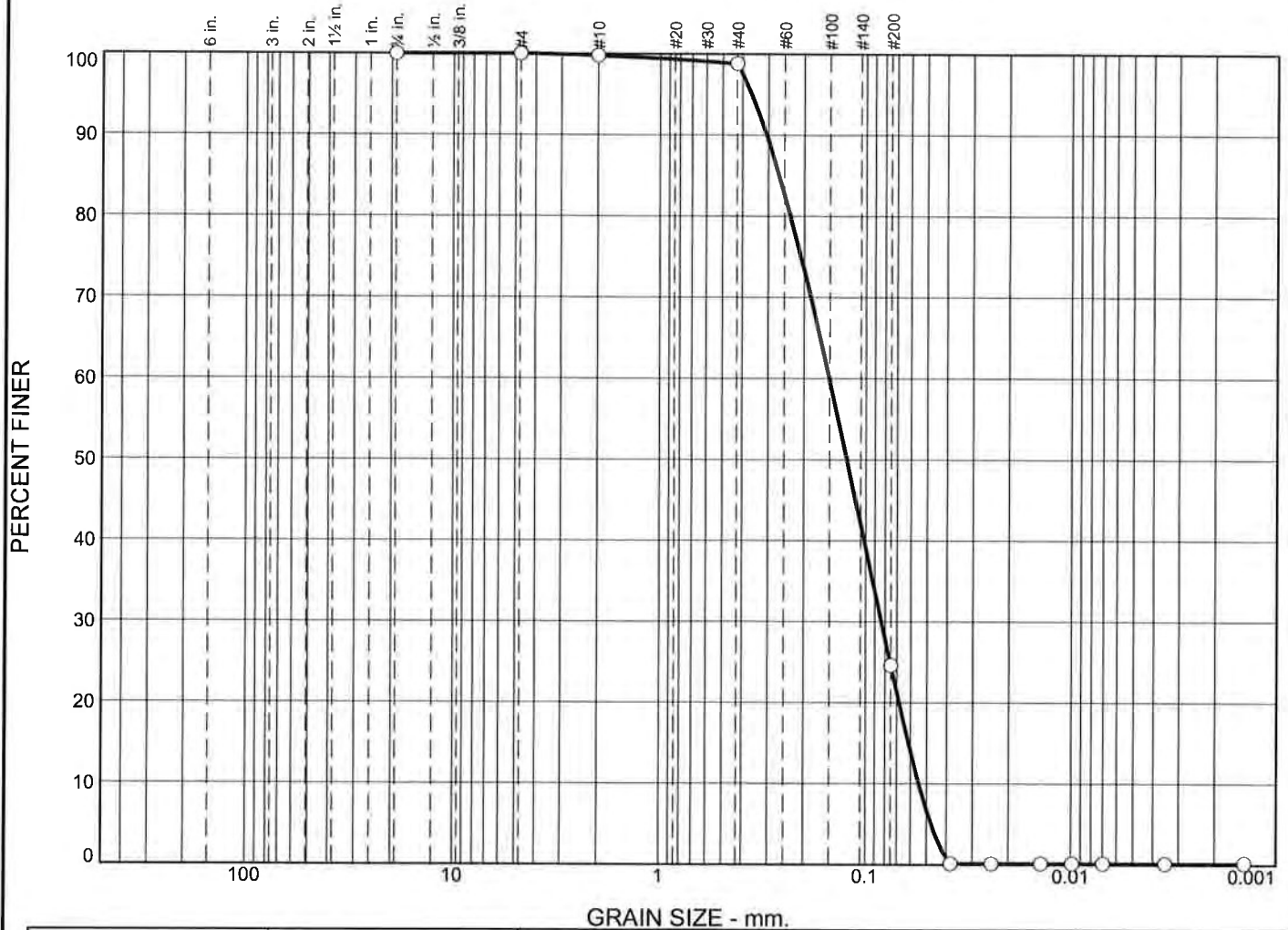
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.6	1.7	2.3	88.8	8.9	97.7

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0106	0.0130	0.0169	0.0411	0.0459	0.0503	0.0546	0.0641	0.0668	0.0698	0.0730

Fineness Modulus	C _u	C _c
0.03	5.17	2.93

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
0.0	0.0	0.0	0.2	1.0	74.2	24.4		0.2		
Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
			0.2653	0.1507	0.1235	0.0835	0.0613	0.0545	0.85	2.77

Material Description								USCS	AASHTO

Project No. Client: Project: ☐ Source of Sample: NHH-O-BOTTOM Sample Number: L1731354-11 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-O-BOTTOM

Sample Number: L1731354-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 41.28
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
41.28	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.09	0.00	99.8
		#40	0.40	0.00	98.8
		#200	30.63	0.00	24.6

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 24.6

Weight of hydrometer sample = 41.28

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	0.2
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.2
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.2
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.2
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.2
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.2
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.2

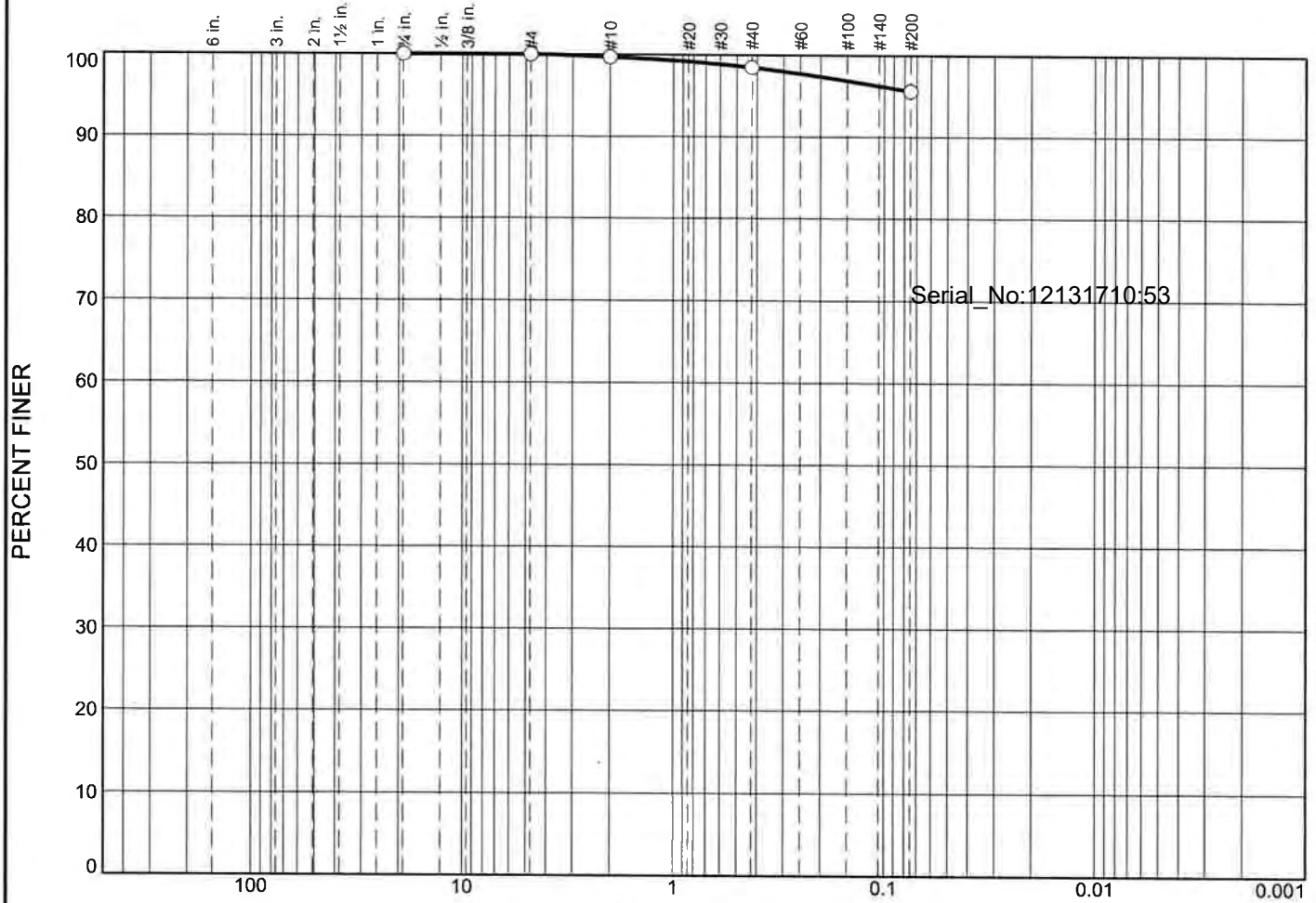
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	1.0	74.2	75.4	24.4	0.2	24.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0474	0.0545	0.0613	0.0683	0.0835	0.1016	0.1235	0.1507	0.2336	0.2653	0.3057	0.3613

Fineness Modulus	C _u	C _c
0.52	2.77	0.85

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"	% Gravel		% Sand			% Fines					
	Coarse	Fine	Coarse	Medium	Fine	Silt		Clay			
0.0	0.0	0.0	0.3	1.2	2.9	95.6					
⊗	Colloids	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○											

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-O-TOP Sample Number: L1727561-10 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks:
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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-O-TOP

Sample Number: L1727561-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.14
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.05	0.00	99.7
		#40	0.21	0.00	98.5
		#200	0.49	0.00	95.6

Serial_No:12131710:53

Fractional Components

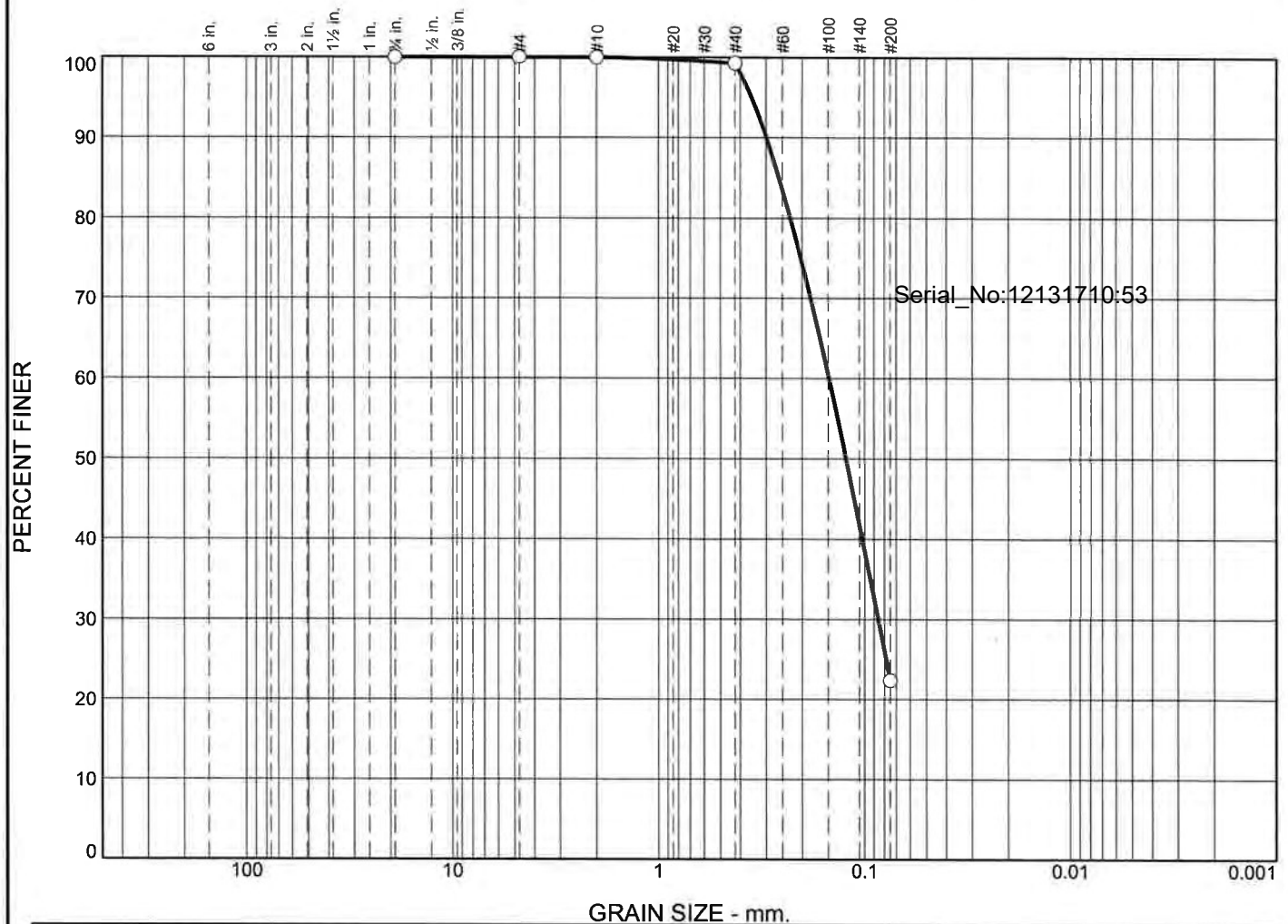
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.3	1.2	2.9	4.4			95.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.07

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	0.0	0.0	0.7	76.9	22.4			
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.2594	0.1487	0.1229	0.0857				

Material Description								USCS	AASHTO

Project No. Project: ○ Source of Sample: NHH-O-BOTTOM Sample Number: L1727561-11 Date: ○	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-O-BOTTOM

Sample Number: L1727561-11

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 36.67
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.67	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.26	0.00	99.3
		#200	28.19	0.00	22.4

Serial_No:12131710:53

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.7	76.9	77.6			22.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0857	0.1229	0.1487	0.2286	0.2594	0.2988	0.3531

Fineness Modulus
0.50

Alpha Analytical

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-P-TOP

Sample Number: L1727787-03

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.42
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.42	0.00	0.75	0.00	0.00	100.0
		#4	0.07	0.00	99.6
		#10	0.57	0.00	96.7
		#40	0.40	0.00	94.6
		#200	0.82	0.00	90.4

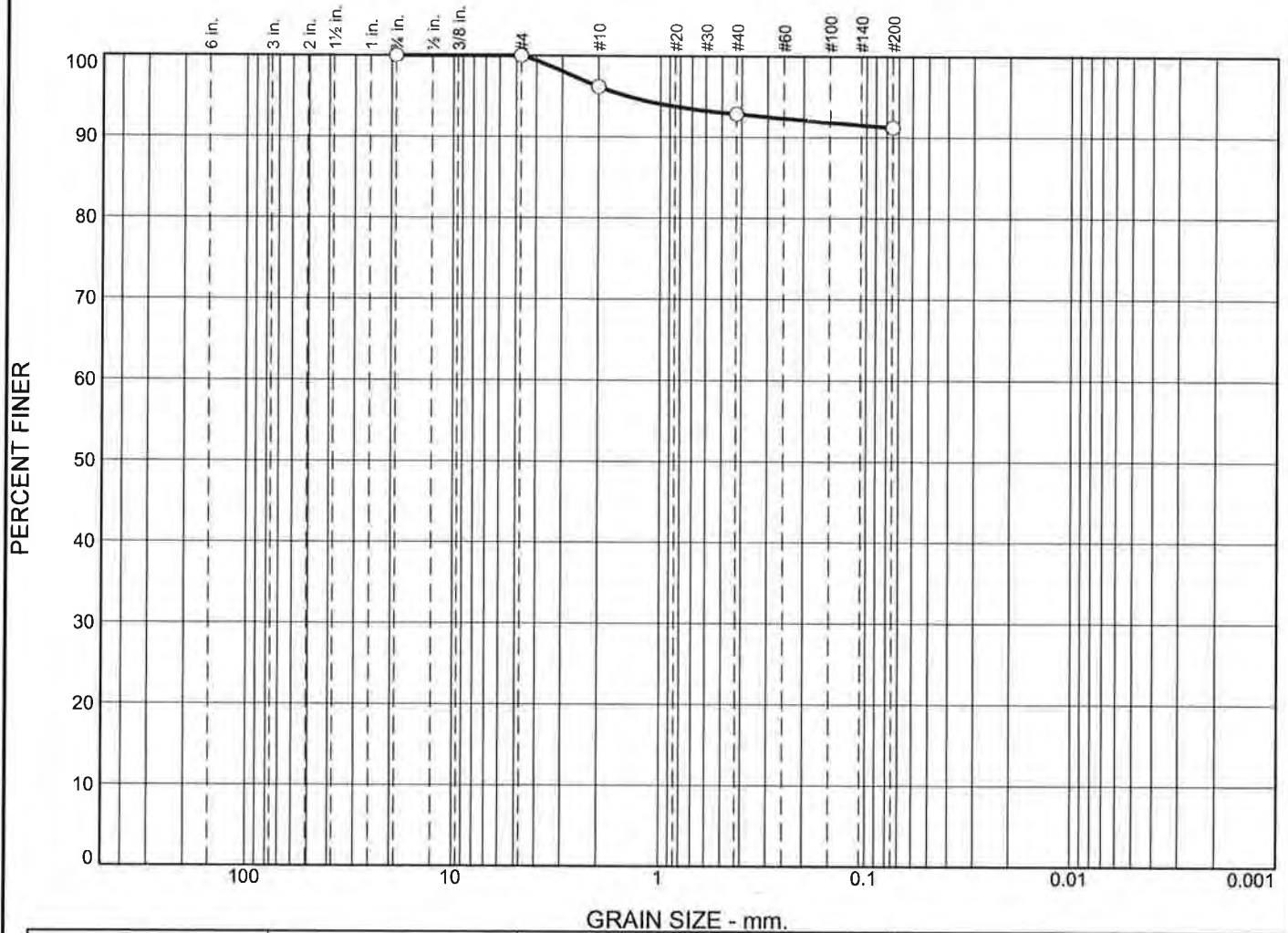
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	2.9	2.1	4.2	9.2			90.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
									0.5998

Fineness Modulus
0.26

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	3.8	3.3	1.7	91.2				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-P-BOTTOM Sample Number: L1727787-04 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-P-BOTTOM

Sample Number: L1727787-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.65
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.65	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.67	0.00	96.2
		#40	0.59	0.00	92.9
		#200	0.29	0.00	91.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.8	3.3	1.7	8.8			91.2

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
									1.4330

Fineness Modulus
0.31

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-P-TOP

Sample Number: L1731354-17

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.41

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.41	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.09	0.00	99.6
		#200	0.35	0.00	98.1

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 98.1

Weight of hydrometer sample = 23.41

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	21.4
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	21.4
15.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0136	21.4
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.2
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.2
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.2
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.2

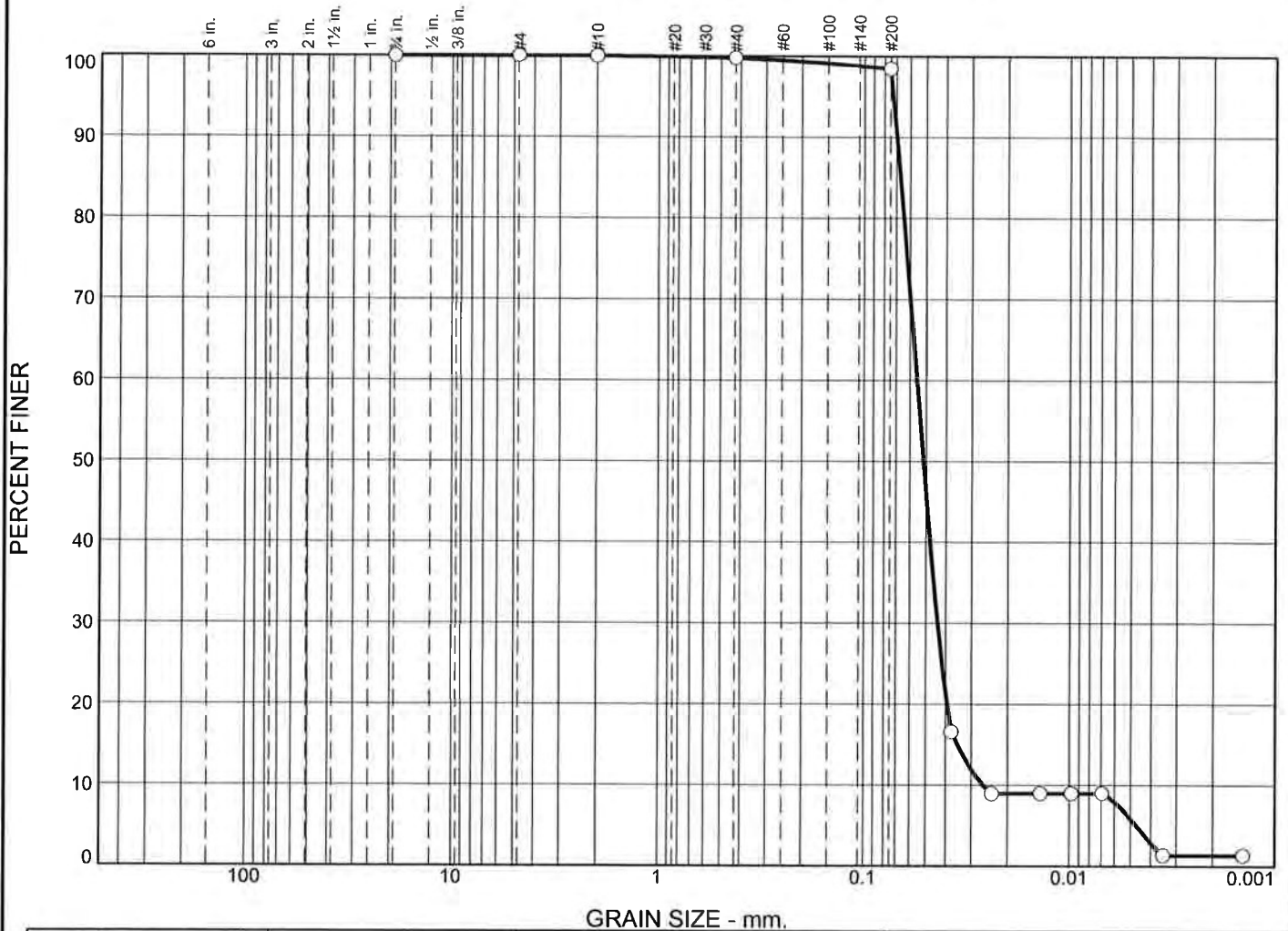
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.4	1.5	1.9	96.9	1.2	98.1

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0106	0.0115	0.0123	0.0133	0.0420	0.0465	0.0506	0.0548	0.0641	0.0668	0.0696	0.0728

Fineness Modulus	C _u	C _c
0.02	4.78	2.81

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-P-BOTTOM

Sample Number: L1731354-18

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.72

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.72	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.05	0.00	99.8
		#200	0.27	0.00	98.5

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 98.5

Weight of hydrometer sample = 20.72

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0376	16.6
5.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0240	9.0
15.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0138	9.0
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	9.0
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	9.0
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.4
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	1.3	1.5	92.7	5.8	98.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0047	0.0263	0.0351	0.0394	0.0438	0.0477	0.0516	0.0556	0.0644	0.0669	0.0697	0.0727

Fineness Modulus	C _u	C _c
0.02	2.11	1.31

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-Q-TOP

Sample Number: L1727787-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 16.96
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
16.96	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.12	0.00	99.3
		#40	0.22	0.00	98.0
		#200	0.23	0.00	96.6

Fractional Components

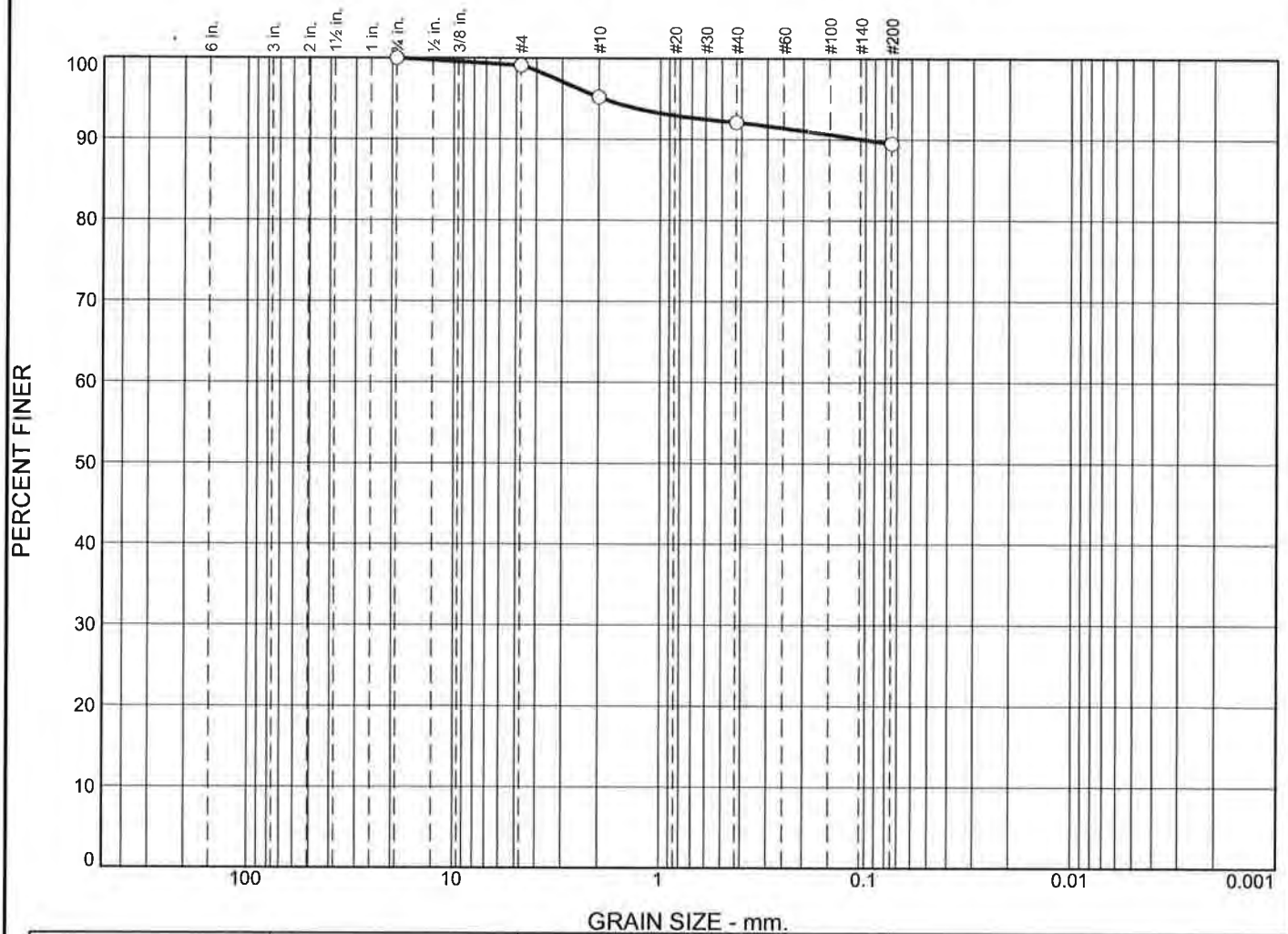
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	1.3	1.4	3.4			96.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

**Fineness
Modulus**

0.09

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel			% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	0.9	3.9	3.1	2.6	89.5			
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○											

Material Description								USCS	AASHTO

Project No. Project: ○ Source of Sample: NHH-Q-BOTTOM Sample Number: L1727787-06 Date: ○	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-Q-BOTTOM

Sample Number: L1727787-06

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.98
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.98	0.00	0.75	0.00	0.00	100.0
		#4	0.18	0.00	99.1
		#10	0.78	0.00	95.2
		#40	0.62	0.00	92.1
		#200	0.52	0.00	89.5

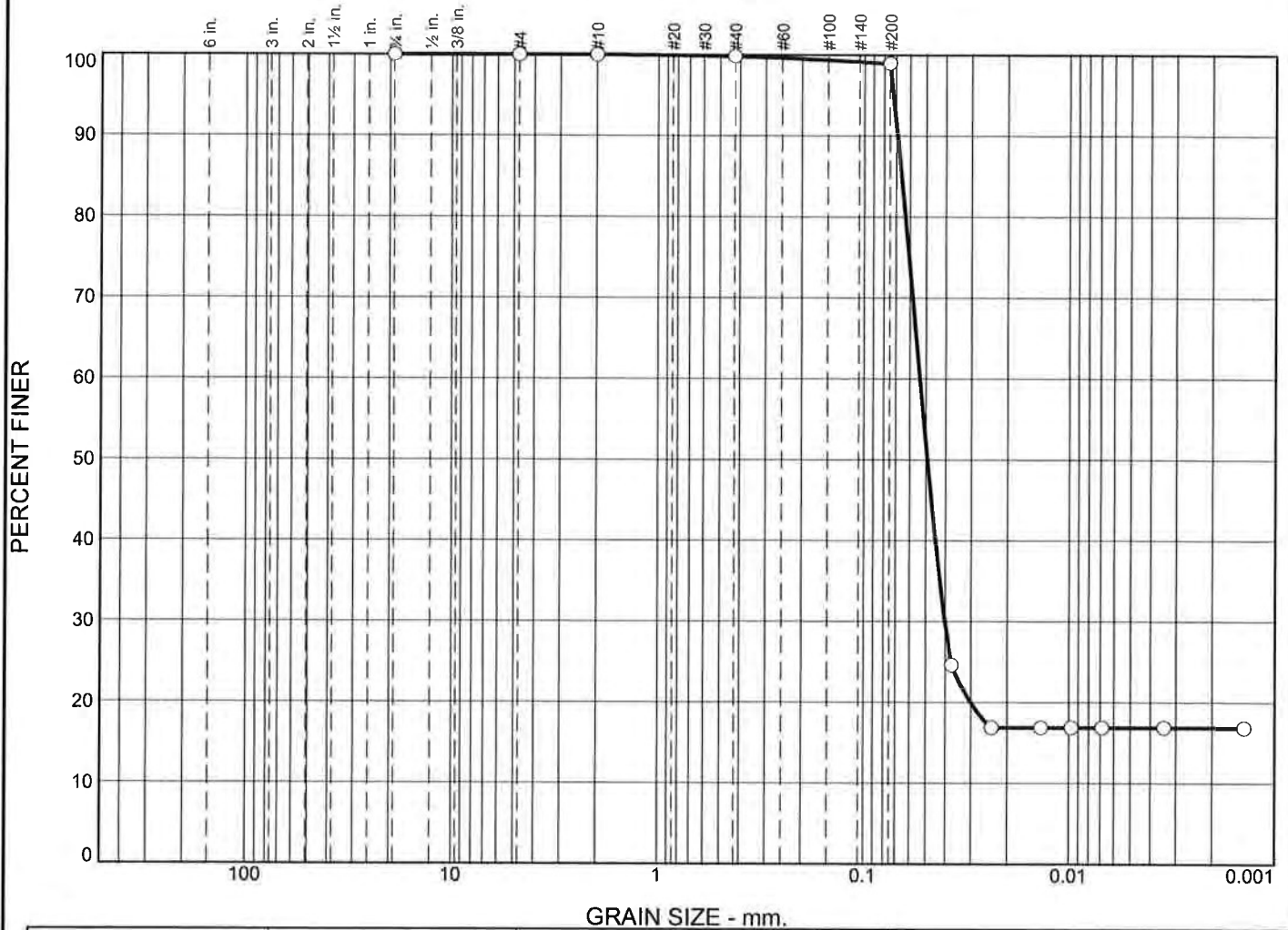
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.9	0.9	3.9	3.1	2.6	9.6			89.5

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.1020	1.9050

Fineness Modulus
0.37

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Q-TOP

Sample Number: L1731354-19

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.49

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.49	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.04	0.00	99.8
		#200	0.18	0.00	98.9

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 98.9

Weight of hydrometer sample = 20.49

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	24.6
5.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0238	16.9
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	16.9
30.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0097	16.9
60.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0069	16.9
240.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0034	16.9
1440.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0014	16.9

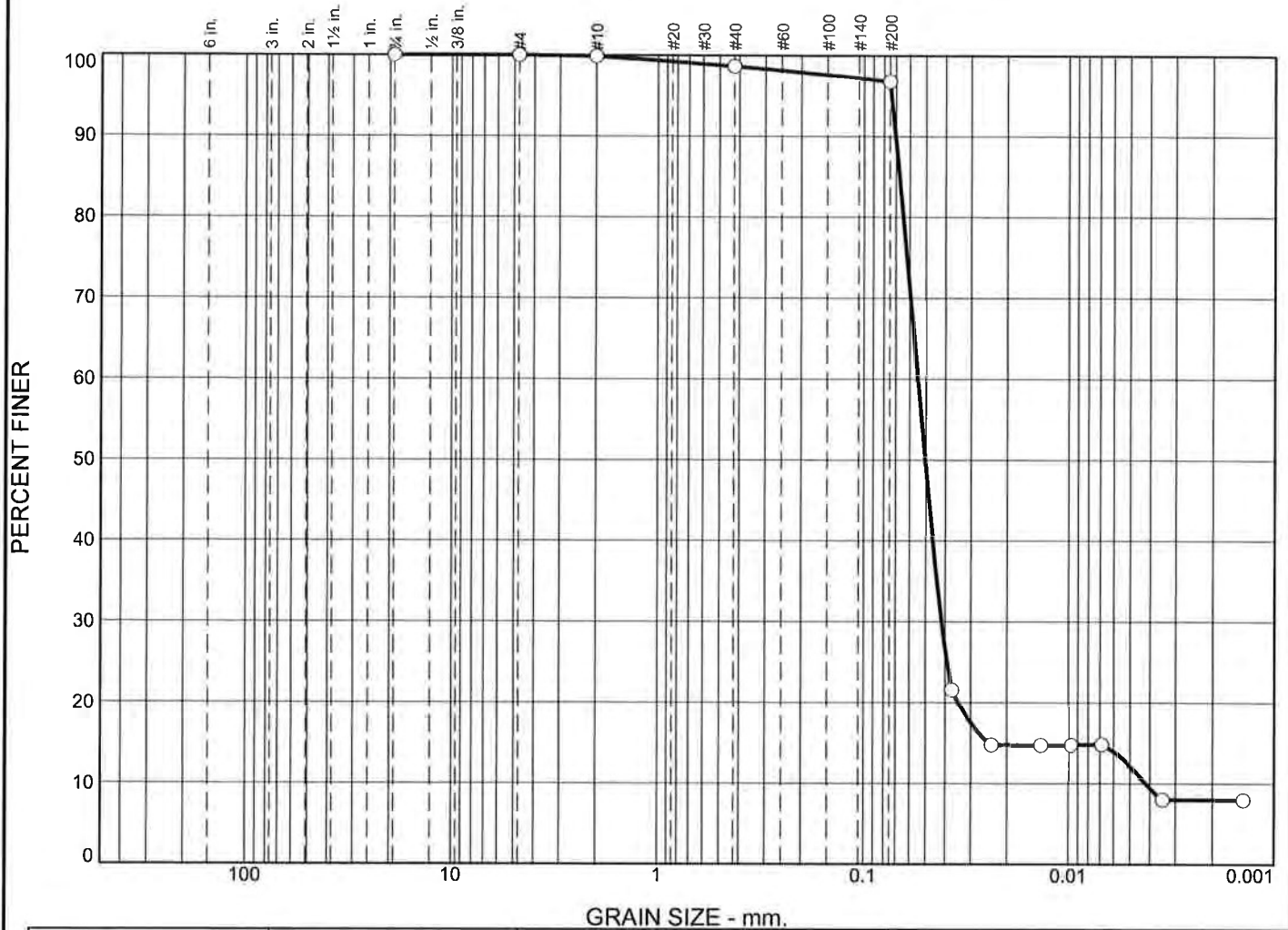
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.1	82.0	16.9	98.9

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0300	0.0402	0.0448	0.0491	0.0535	0.0630	0.0658	0.0688	0.0721

Fineness Modulus
0.01

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Q-BOTTOM

Sample Number: L1731354-20

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 22.85

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.85	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.03	0.00	99.9
		#40	0.28	0.00	98.6
		#200	0.42	0.00	96.8

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 96.8

Weight of hydrometer sample = 22.85

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	21.6
5.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0238	14.8
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	14.8
30.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0097	14.8
60.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0069	14.8
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.0
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.0

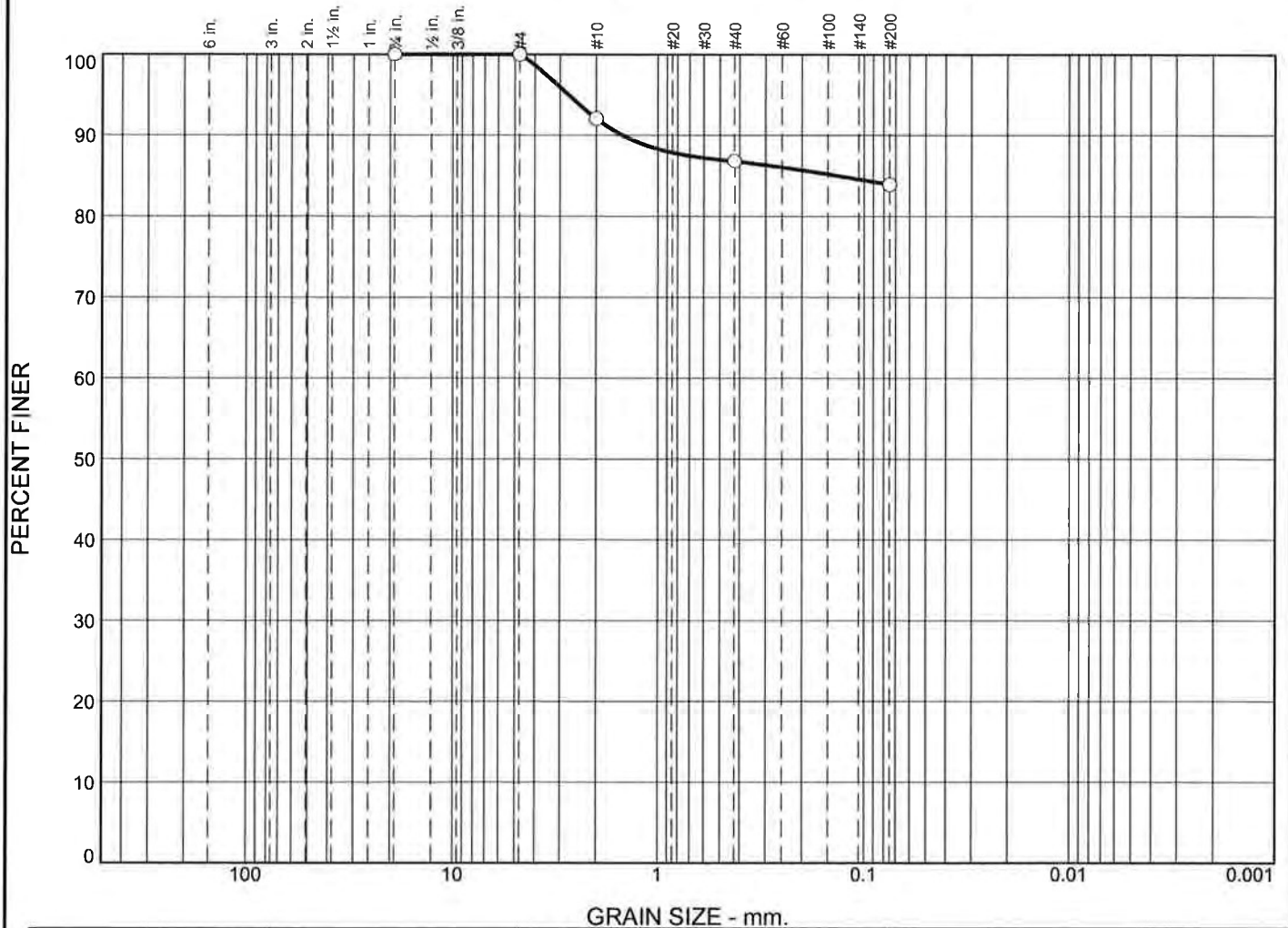
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.3	1.8	3.2	84.7	12.1	96.8

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0042	0.0243	0.0345	0.0417	0.0461	0.0504	0.0547	0.0644	0.0672	0.0702	0.0737

Fineness Modulus	C _u	C _c
0.06	13.02	7.57

Particle Size Distribution Report



GRAIN SIZE - mm.												
% +3"			% Gravel		% Sand			% Fines				
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	0.0	7.9	5.3	2.9	83.9				
☐												
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
☐				0.1353								
☐												
Material Description									USCS		AASHTO	
☐												

Project No. Project: ☐ Source of Sample: NHH-R-TOP Sample Number: L1728048-01 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-R-TOP**Sample Number:** L1728048-01**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 17.78

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.78	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	1.41	0.00	92.1
		#40	0.94	0.00	86.8
		#200	0.51	0.00	83.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	7.9	5.3	2.9	16.1			83.9

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							0.1353	1.4863	2.7283

Fineness Modulus
0.59

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-R-TOP

Sample Number: WG1031205-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.23

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.23	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.29	0.00	98.3
		#40	0.18	0.00	97.3
		#200	0.25	0.00	95.8

Fractional Components

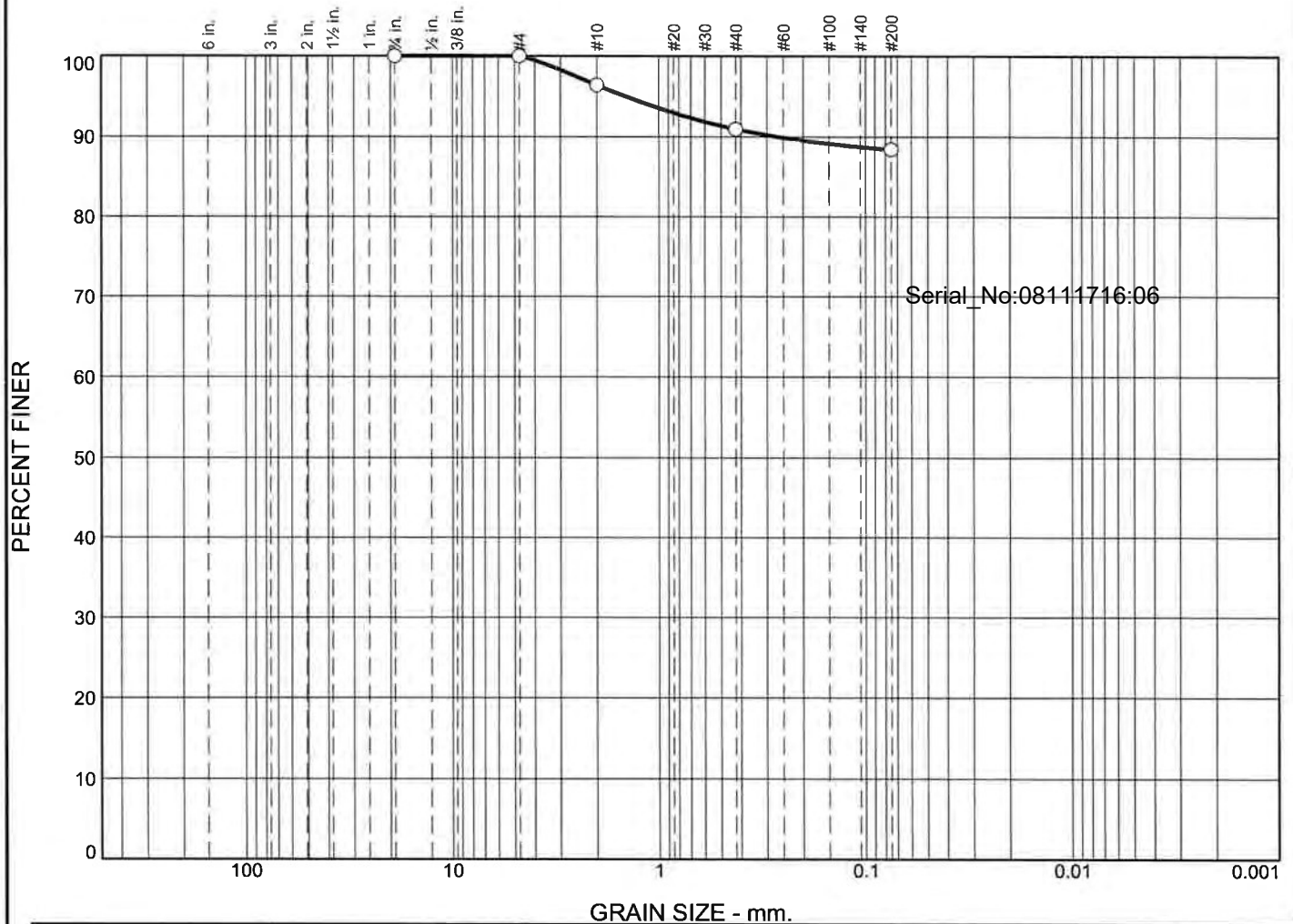
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.7	1.0	1.5	4.2			95.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus

0.13

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	0.0	3.6	5.4	2.6	88.4				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c C _u
☐										

Material Description							USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-R-BOTTOM Sample Number: L1728048-02 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-R-BOTTOM

Sample Number: L1728048-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.45
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.45	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.70	0.00	96.4
		#40	1.06	0.00	91.0
		#200	0.49	0.00	88.4

Serial_No:08111716:06

Fractional Components

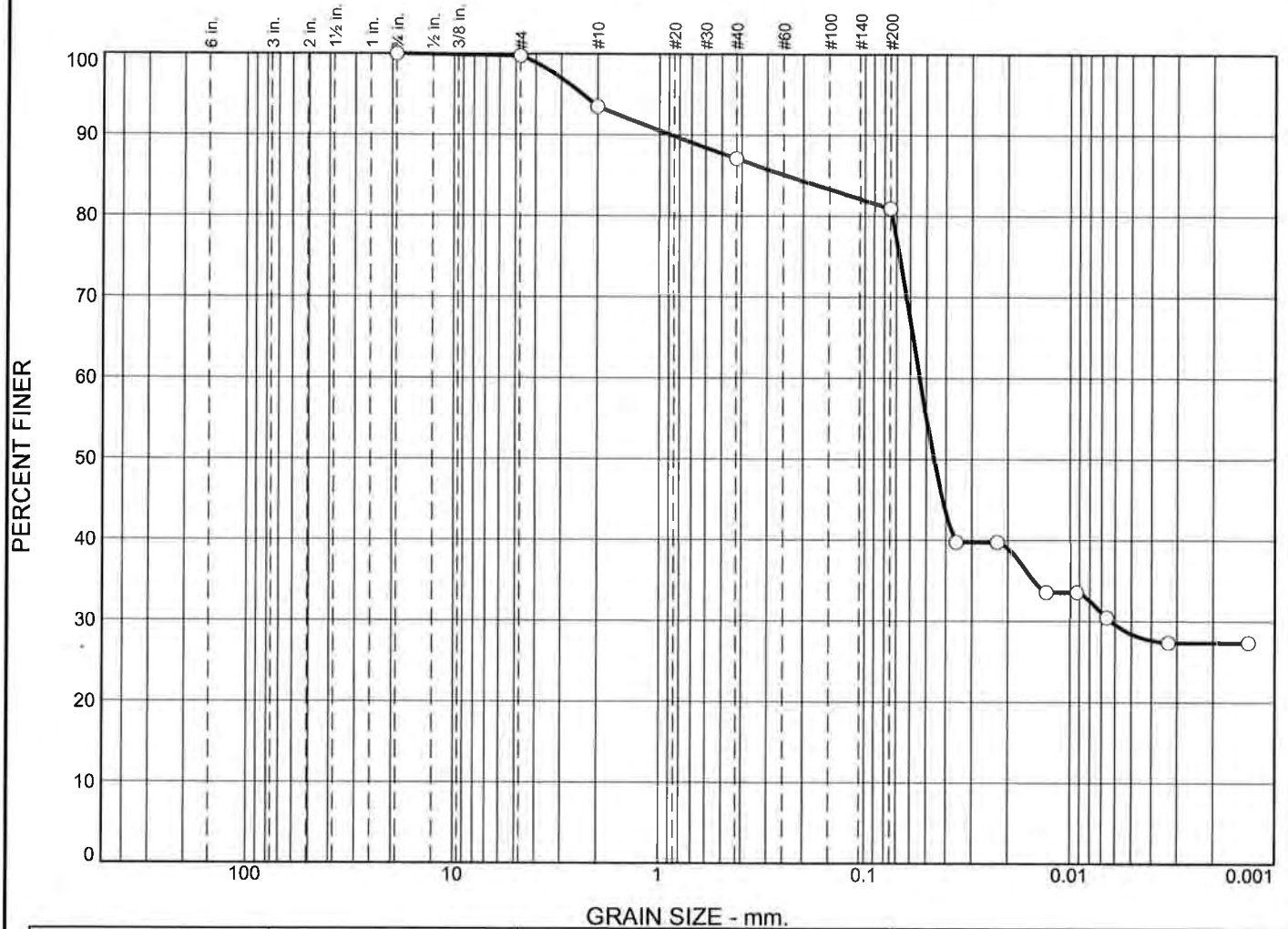
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.6	5.4	2.6	11.6			88.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.2658	1.4543

Fineness Modulus
0.37

Alpha Analytical

Particle Size Distribution Report

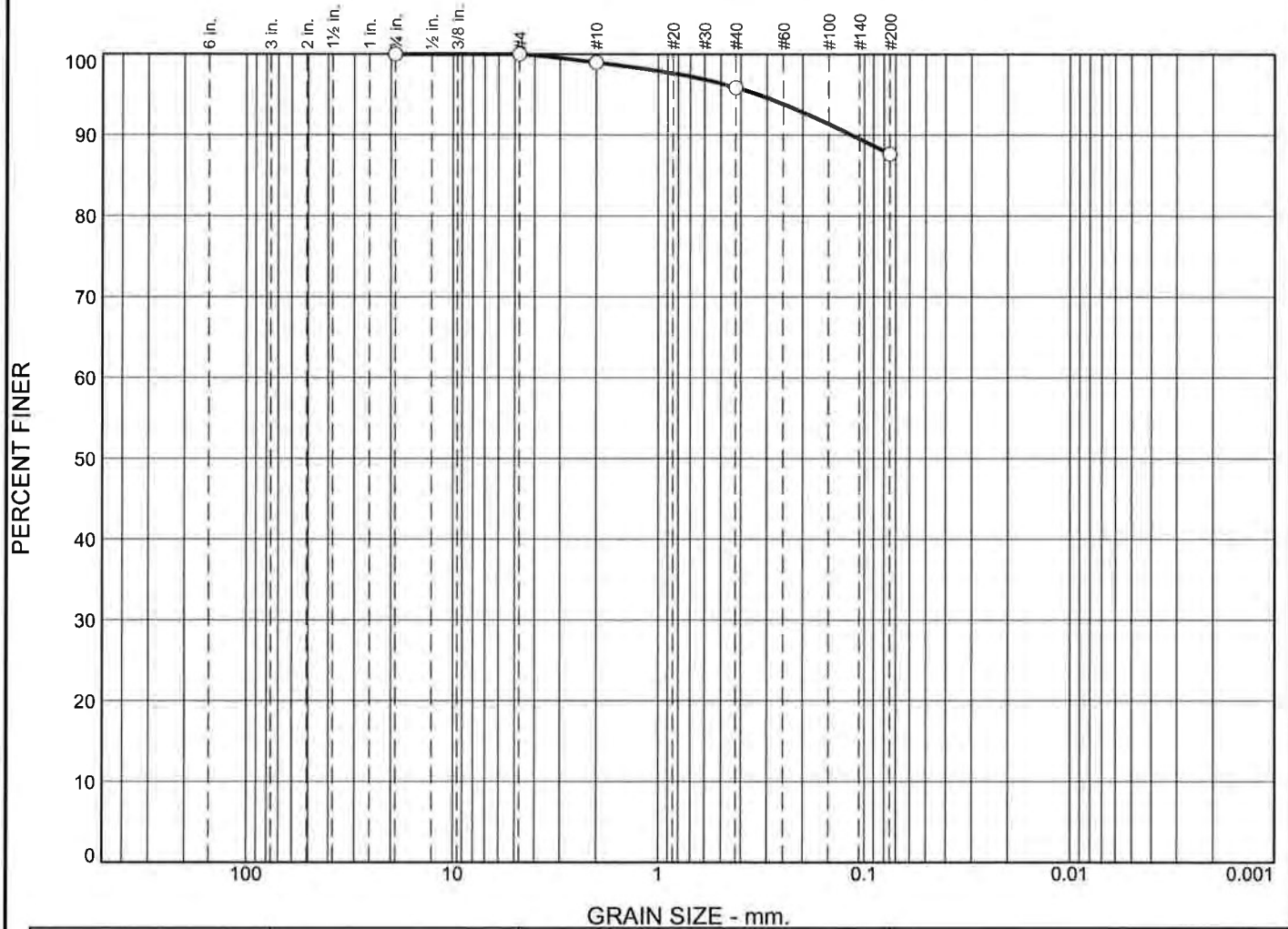


% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.2	6.3	6.4	6.1	52.6		28.4		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.2446	0.0539	0.0458	0.0063				

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-R-TOP Sample Number: L1731354-25 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	0.0	1.0	3.1	8.3	87.6				

Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u

Project No. Client: Project: ☐ Source of Sample: NHH-S-TOP Sample Number: L1728048-03 Date: ☐		Remarks: Figure
Alpha Analytical Mansfield, MA		

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-S-TOP**Sample Number:** L1728048-03**Sieve Test Data**

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 18.46
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
18.46	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.19	0.00	99.0
		#40	0.57	0.00	95.9
		#200	1.52	0.00	87.6

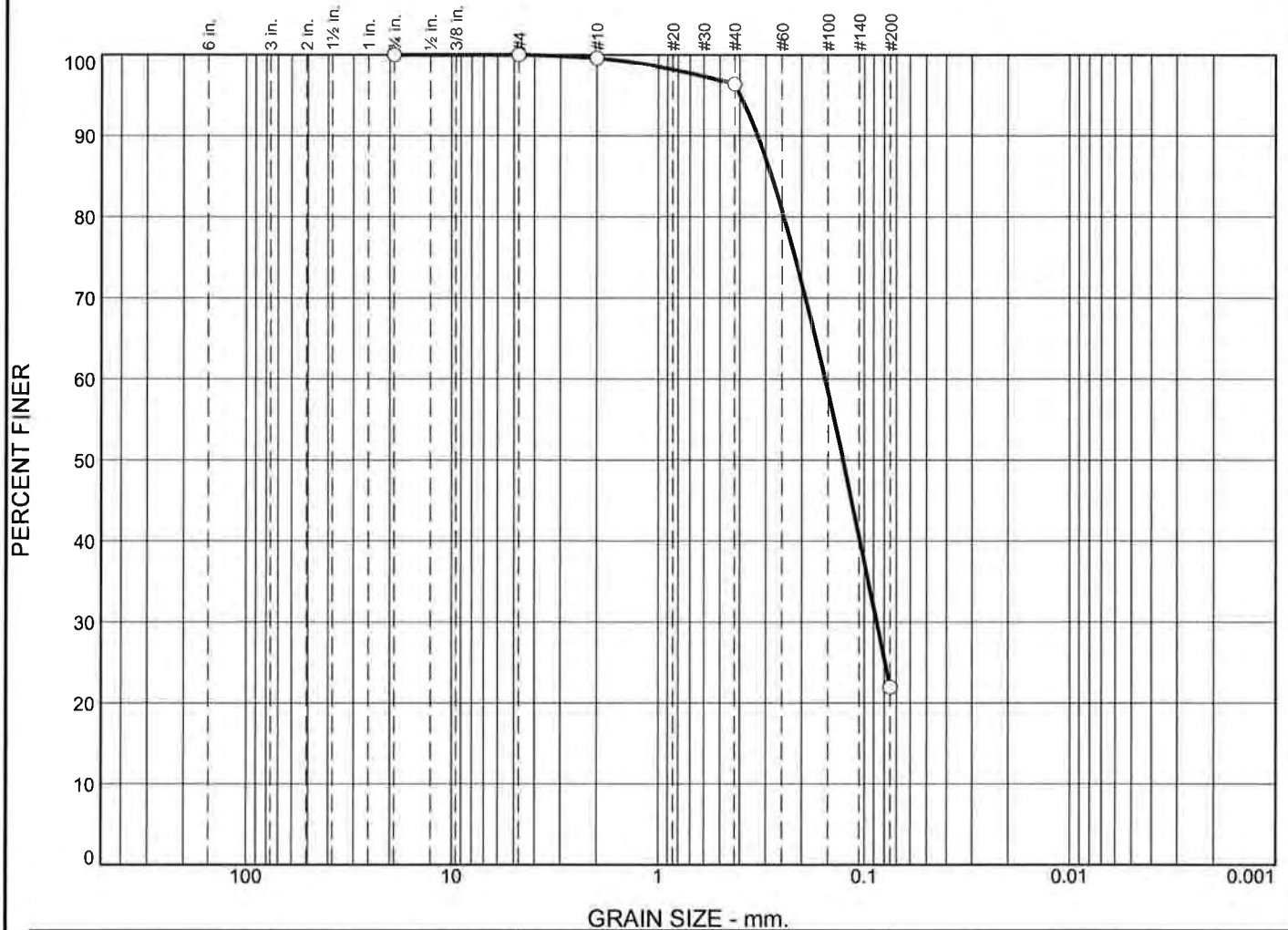
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.0	3.1	8.3	12.4			87.6

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.1156	0.3320

Fineness Modulus
0.20

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	0.4	3.3	74.3	22.0				
☐											
☐											
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.2810	0.1550	0.1268	0.0869				
☐											
☐											
Material Description									USCS		AASHTO
☐											

Project No. Project: ☐ Source of Sample: NHH-S-BOTTOM Sample Number: L1728048-04 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-S-BOTTOM**Sample Number:** L1728048-04**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 37.37

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.37	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.15	0.00	99.6
		#40	1.22	0.00	96.3
		#200	27.79	0.00	22.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.4	3.3	74.3	78.0			22.0

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0869	0.1268	0.1550	0.2449	0.2810	0.3288	0.3989

Fineness Modulus

0.59

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
0.0	0.0	4.9	14.7	9.3	9.5	60.9	0.7			

Colloids	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
			2.5709	0.0734	0.0650	0.0519	0.0425	0.0385	0.95	1.91

Material Description							USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-S-TOP Sample Number: L1731355-01 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-S-TOP

Sample Number: L1731355-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 22.55

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.55	0.00	0.75	0.00	0.00	100.0
		#4	1.11	0.00	95.1
		#10	3.32	0.00	80.4
		#40	2.09	0.00	71.1
		#200	2.13	0.00	61.6

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 61.6

Weight of hydrometer sample = 23.38

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	9.2
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	9.2
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	9.2
30.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0098	4.9
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.7
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.7
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.7

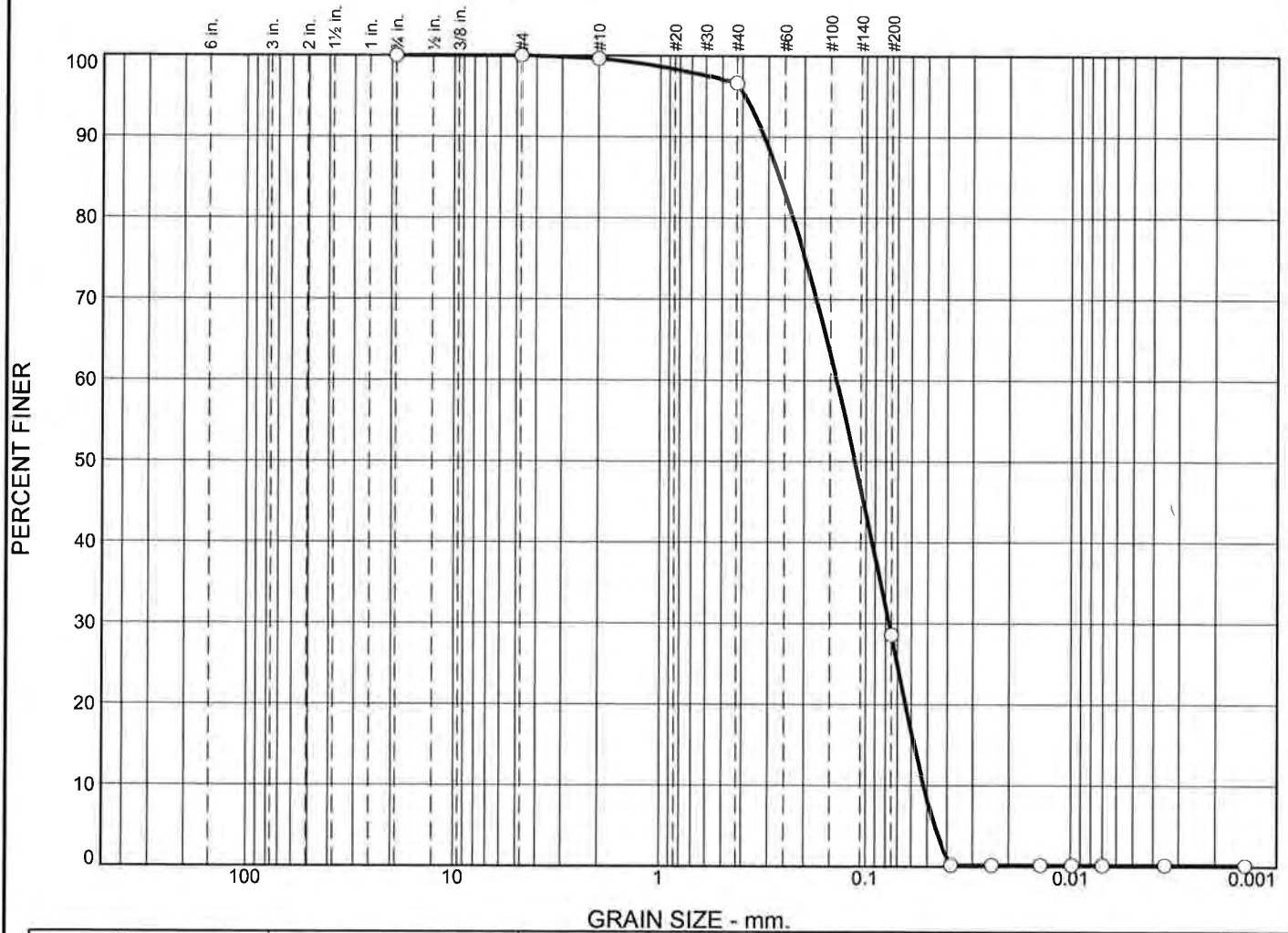
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.9	4.9	14.7	9.3	9.5	33.5	60.9	0.7	61.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0099	0.0385	0.0425	0.0458	0.0519	0.0581	0.0650	0.0734	1.8893	2.5709	3.3895	4.7204

Fineness Modulus	C _u	C _c
1.39	1.91	0.95

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	0.4	3.0	68.0	28.4		0.2		
☐											
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.2651	0.1400	0.1134	0.0770	0.0580	0.0522	0.81	2.68
☐											

Material Description								USCS	AASHTO
☐									

Project No. Client: Project: ☐ Source of Sample: NHH-S-BOTTOM Sample Number: L1731355-02 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-S-BOTTOM

Sample Number: L1731355-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 42.67
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
42.67	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.15	0.00	99.6
		#40	1.30	0.00	96.6
		#200	29.02	0.00	28.6

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 28.6
 Weight of hydrometer sample = 42.78
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.2
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.2
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.2
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.2
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.2
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.2
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.4	3.0	68.0	71.4	28.4	0.2	28.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0460	0.0522	0.0580	0.0639	0.0770	0.0931	0.1134	0.1400	0.2284	0.2651	0.3148	0.3899

Fineness Modulus	C _u	C _c
0.52	2.68	0.81

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-T-TOP

Sample Number: L1731354-13

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 22.07
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.07	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.00	0.00	100.0
		#200	0.22	0.00	99.0

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 99.0
 Weight of hydrometer sample = 22.07
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0040	1.0042	0.0134	4.0	15.2	0.0370	30.1
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	22.9
15.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0136	22.9
30.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0096	22.9
60.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0068	22.9
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.5
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	81.8	17.2	99.0

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0037	0.0046	0.0056	0.0368	0.0425	0.0472	0.0519	0.0621	0.0650	0.0682	0.0718

Fineness Modulus	C _u	C _c
0.01	13.87	6.99

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-T-BOTTOM

Sample Number: L1731354-14

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.08

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.08	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.14	0.00	99.3
		#200	0.30	0.00	97.9

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 97.9

Weight of hydrometer sample = 21.08

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0070	1.0072	0.0134	7.0	14.4	0.0360	53.5
5.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0230	46.1
15.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0133	46.1
30.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0094	46.1
60.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0066	46.1
240.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0034	16.3
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.8

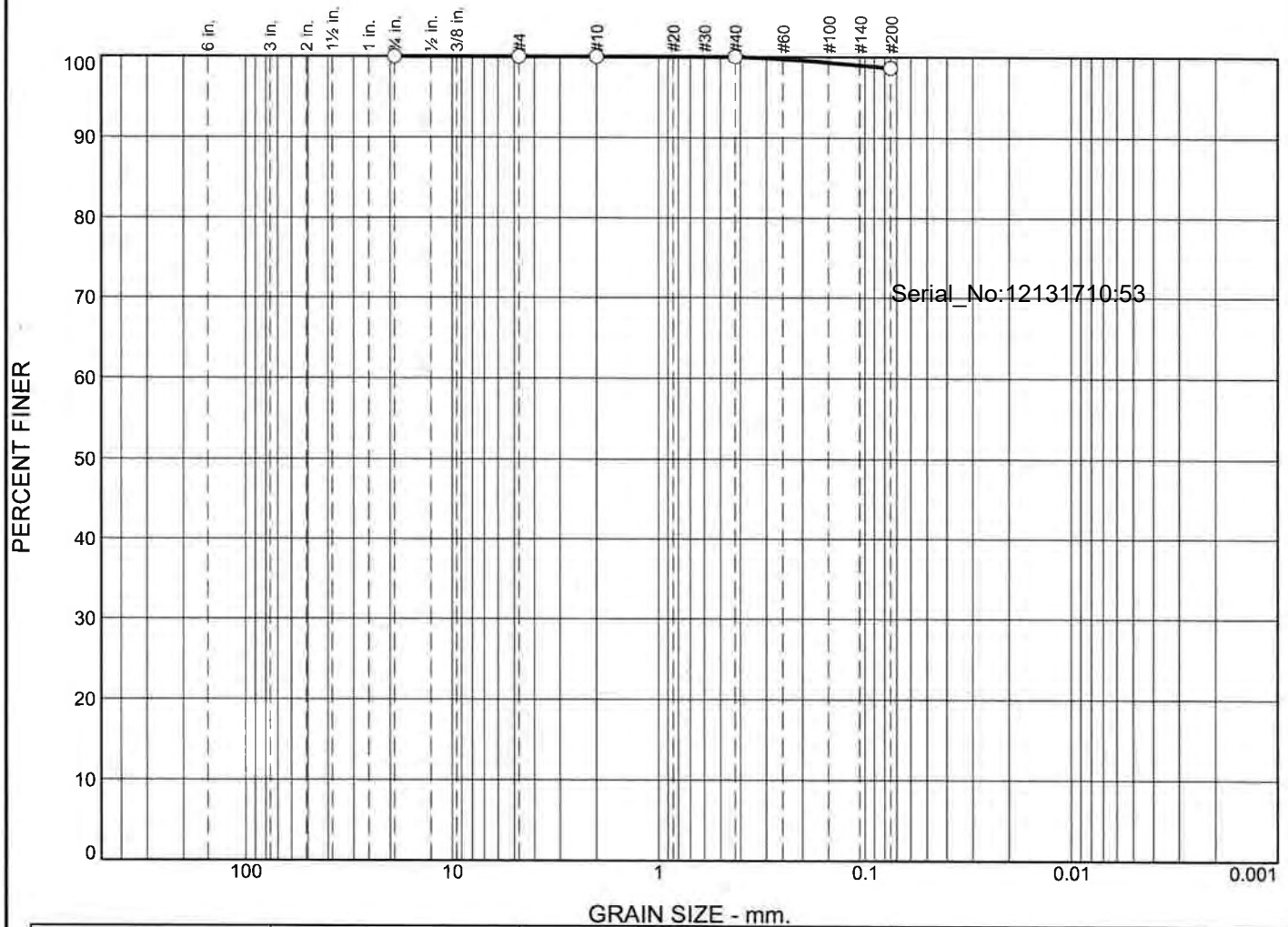
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.7	1.4	2.1	62.4	35.5	97.9

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0016	0.0030	0.0037	0.0045	0.0055	0.0322	0.0412	0.0563	0.0606	0.0655	0.0711

Fineness Modulus	C _u	C _c
0.03	25.26	0.30

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	0.0	0.0	1.4	98.6			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-T-TOP Sample Number: L1727561-13 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-T-TOP

Sample Number: L1727561-13

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 16.97

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
16.97	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.00	0.00	100.0
		#200	0.23	0.00	98.6

Serial_No:12131710:53

Fractional Components

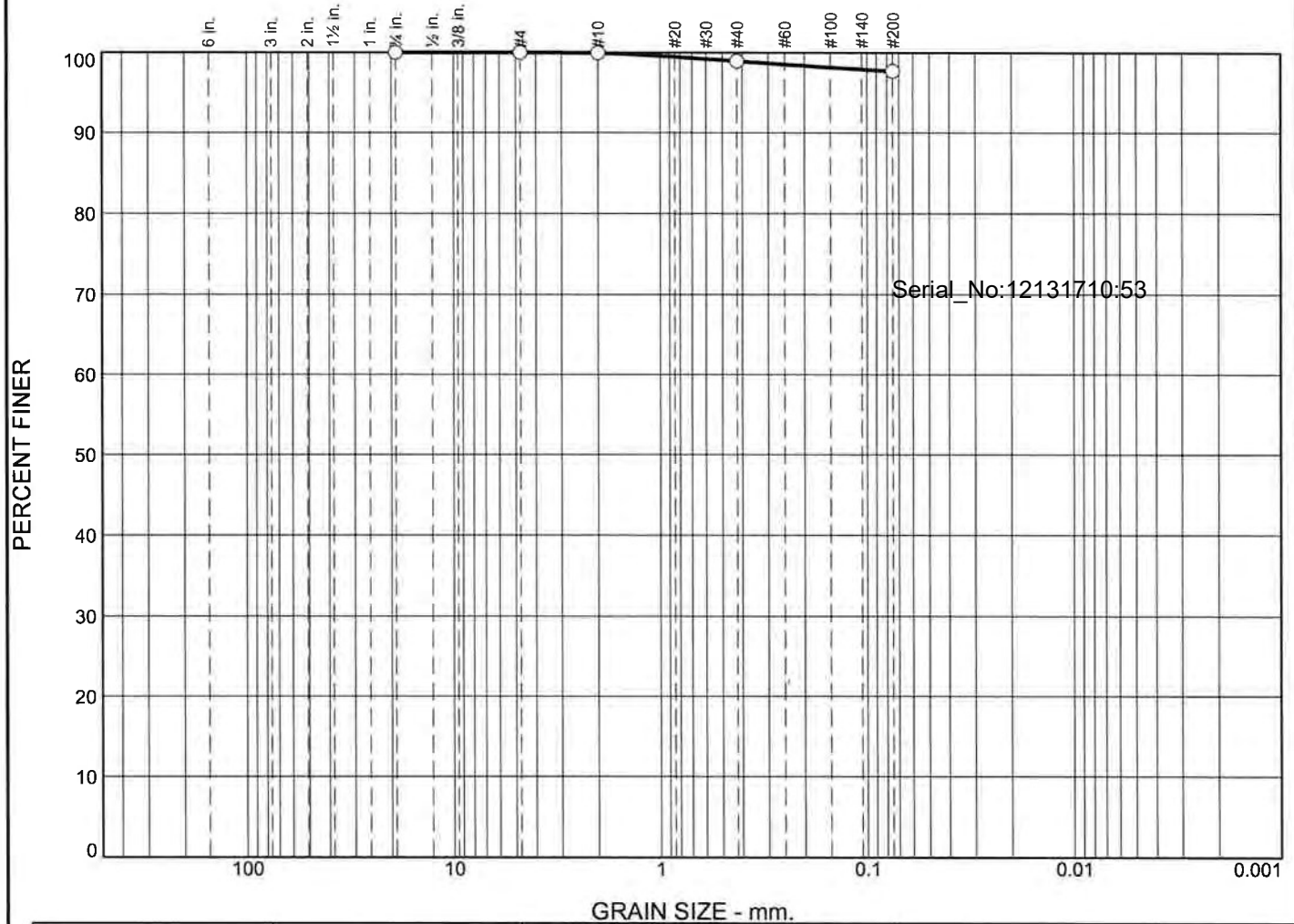
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4			98.6

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95

Fineness Modulus
0.01

Alpha Analytical

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	0.1	1.0	1.2	97.7			
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○											

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-T-BOTTOM Sample Number: L1727561-14 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-T-BOTTOM

Sample Number: L1727561-14

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 16.91
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
16.91	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	99.9
		#40	0.17	0.00	98.9
		#200	0.21	0.00	97.7

Serial_No:12131710:53

Fractional Components

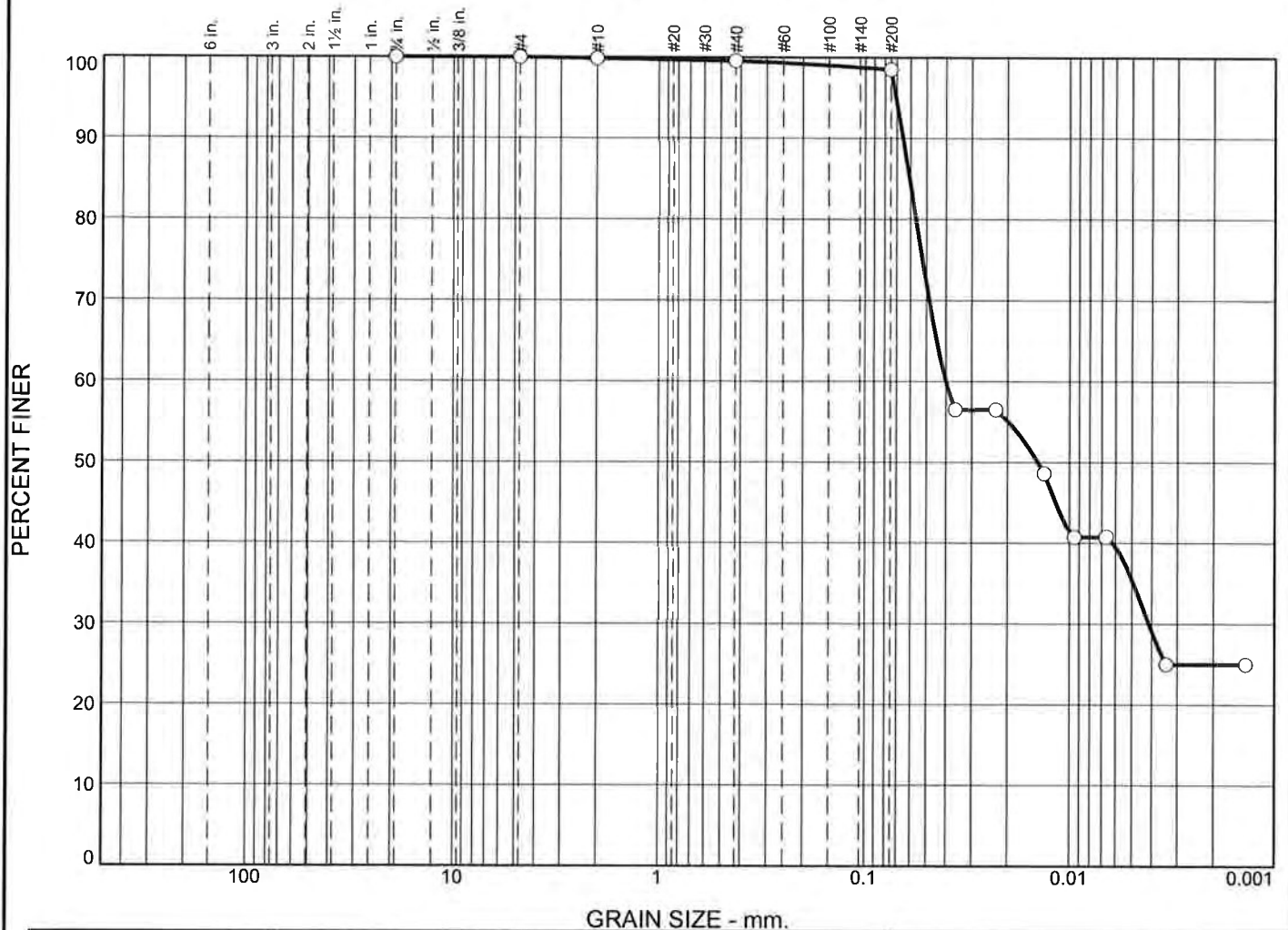
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.0	1.2	2.3			97.7

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅

Fineness Modulus
0.04

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	0.1	0.3	1.1	63.0		35.5	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0605	0.0401	0.0143	0.0041				

Material Description							USCS	AASHTO
☐								

Project No. Project: ☐ Source of Sample: NHH-U-TOP Sample Number: L1731354-15 Date: ☐ Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-U-TOP

Sample Number: L1731354-15

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 20.11
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.11	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.03	0.00	99.9
		#40	0.06	0.00	99.6
		#200	0.21	0.00	98.5

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 98.5

Weight of hydrometer sample = 20.11

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0070	1.0072	0.0134	7.0	14.4	0.0360	56.5
5.00	21.5	1.0070	1.0072	0.0134	7.0	14.4	0.0228	56.5
15.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0133	48.6
30.00	21.5	1.0050	1.0052	0.0134	5.0	15.0	0.0095	40.7
60.00	21.5	1.0050	1.0052	0.0134	5.0	15.0	0.0067	40.7
240.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0034	25.0
1440.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0014	25.0

Fractional Components

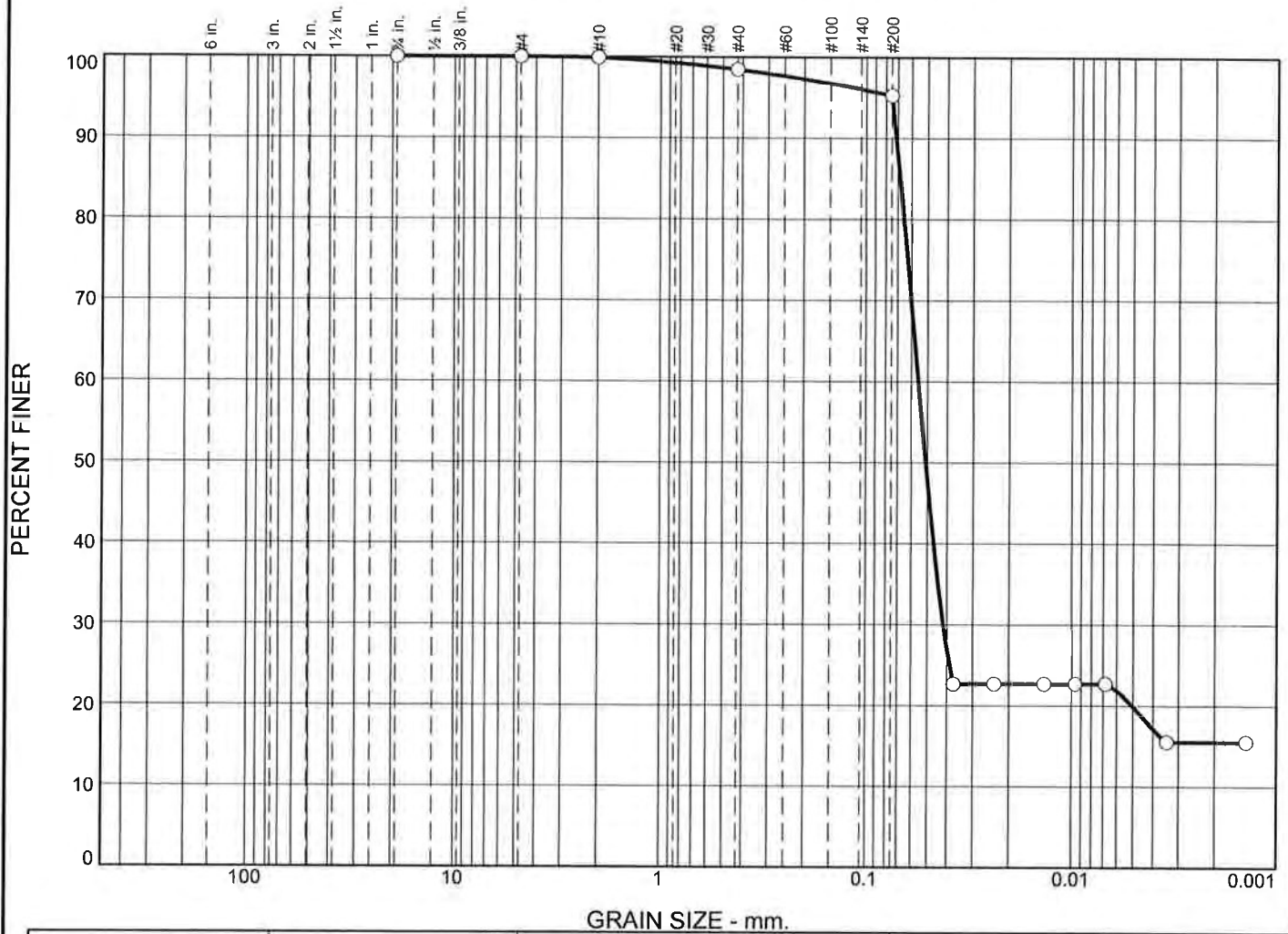
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.3	1.1	1.5	63.0	35.5	98.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.0041	0.0062	0.0143	0.0401	0.0562	0.0605	0.0652	0.0706

Fineness Modulus

0.02

Particle Size Distribution Report



GRAIN SIZE - mm.

GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	0.0	0.1	1.4	3.2	75.4		19.9	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0681	0.0554	0.0509	0.0418				

Material Description

USCS

AASHTO

☐

Project No.

Client:

Remarks:

Project:

☐ Source of Sample: NHH-U-BOTTOM

Sample Number: L1731354-16

Date: ☐

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-U-BOTTOM

Sample Number: L1731354-16

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.41

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.41	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.02	0.00	99.9
		#40	0.31	0.00	98.5
		#200	0.68	0.00	95.3

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 95.3

Weight of hydrometer sample = 21.41

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	22.7
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	22.7
15.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0136	22.7
30.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0096	22.7
60.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0068	22.7
240.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0034	15.6
1440.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0014	15.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.4	3.2	4.7	75.4	19.9	95.3

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0050	0.0418	0.0465	0.0509	0.0554	0.0652	0.0681	0.0713	0.0748

Fineness Modulus
0.07

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-U-TOP

Sample Number: WG1030761-1

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.06
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.06	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.68	0.00	96.0
		#40	0.85	0.00	91.0
		#200	0.45	0.00	88.4

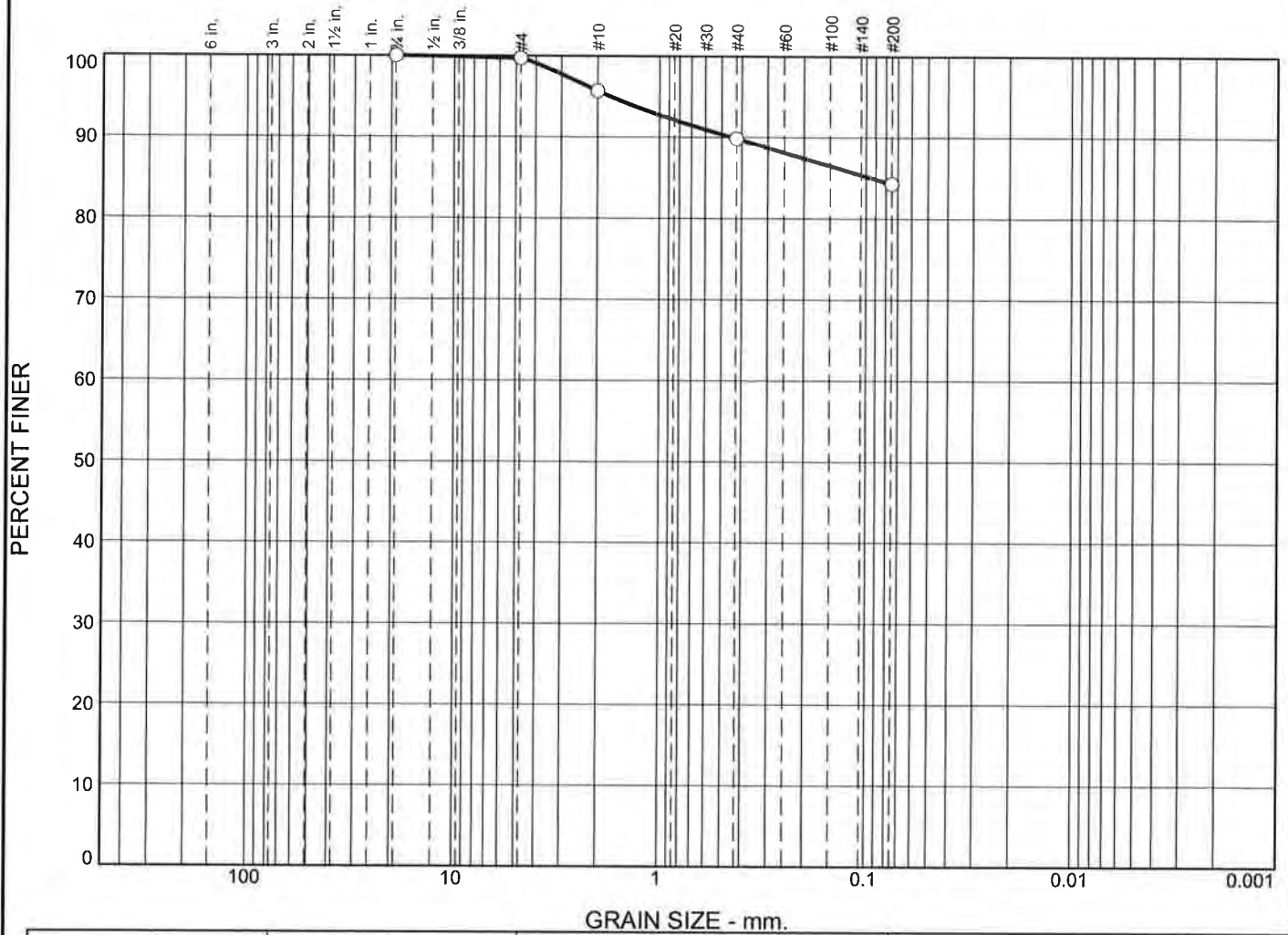
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	4.0	5.0	2.6	11.6			88.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.2415	1.5985

Fineness Modulus
0.38

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.3	4.0	5.9	5.5	84.3				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0947							
Material Description									USCS		AASHTO
☐											
Project No. Client:						Remarks:					
Project:											
☐ Source of Sample: NHH-U-BOTTOM Sample Number: L1727787-02											
Date: ☐						Figure					
Alpha Analytical											
Mansfield, MA											

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-U-BOTTOM

Sample Number: L1727787-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.94
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.94	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.80	0.00	95.7
		#40	1.17	0.00	89.8
		#200	1.11	0.00	84.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	4.0	5.9	5.5	15.4			84.3

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							0.0947	0.4495	1.7315

Fineness Modulus
0.44

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-U-TOP

Sample Number: L1727787-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.39
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.39	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.06	0.00	99.7
		#40	0.43	0.00	97.2
		#200	0.44	0.00	94.7

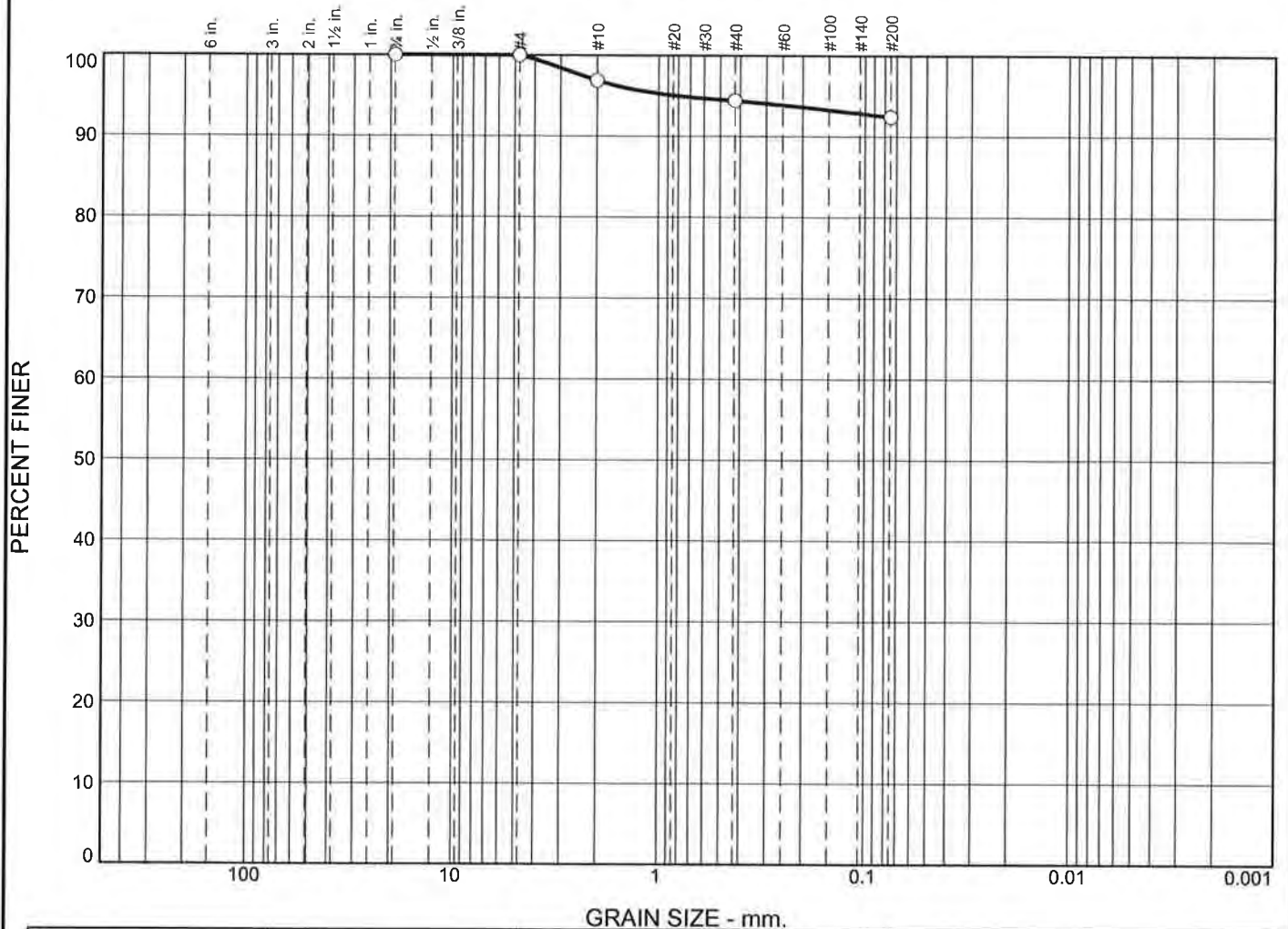
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.3	2.5	2.5	5.3			94.7

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
									0.0977

Fineness Modulus
0.11

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	3.1	2.5	2.0	92.4				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐											
☐											
Material Description									USCS		AASHTO
☐											
Project No. Client:						Remarks:					
Project:											
☐ Source of Sample: NHH-V-TOP Sample Number: L1727787-09											
Date: ☐											
Alpha Analytical						Figure					
Mansfield, MA											

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-V-TOP

Sample Number: L1727787-09

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.30
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.30	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.60	0.00	96.9
		#40	0.48	0.00	94.4
		#200	0.38	0.00	92.4

Fractional Components

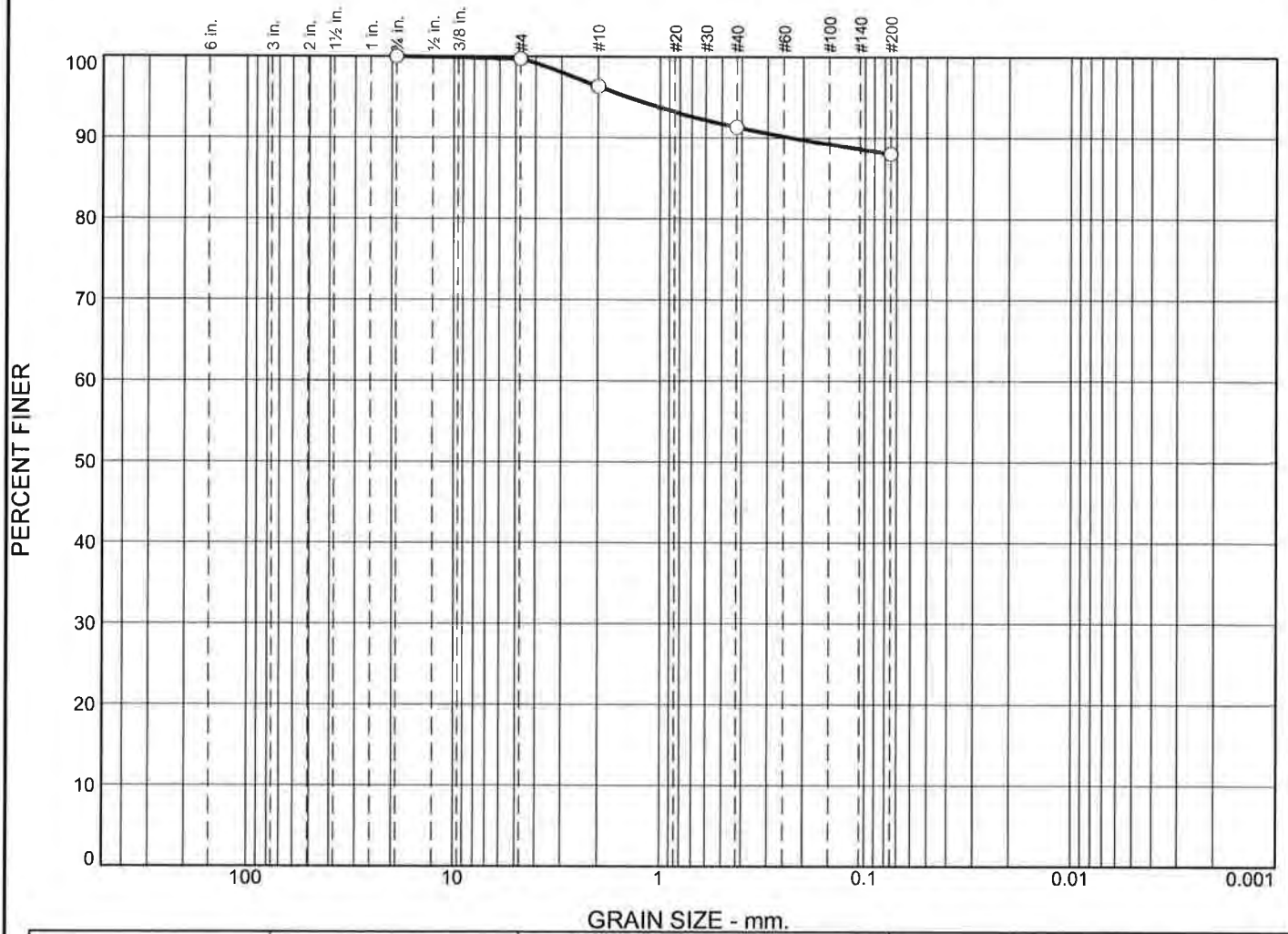
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.1	2.5	2.0	7.6			92.4

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
									0.8028

**Fineness
Modulus**

0.25

Particle Size Distribution Report



GRAIN SIZE - mm.												
% +3"	% Gravel		% Sand			% Fines						
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay					
0.0	0.0	0.3	3.4	5.0	3.3	88.0						
☒	Colloids	LL	PL	D85	D60	D50	D30	D15	D10	C _c	C _u	
☐												
Material Description									USCS		AASHTO	
Project No. Client: Project: ☐ Source of Sample: NHH-V-BOTTOM Sample Number: L1727787-10 Date: ☐											Remarks: 	
Alpha Analytical Mansfield, MA												
											Figure	

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-V-BOTTOM

Sample Number: L1727787-10

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.91
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.91	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.68	0.00	96.3
		#40	0.99	0.00	91.3
		#200	0.65	0.00	88.0

Fractional Components

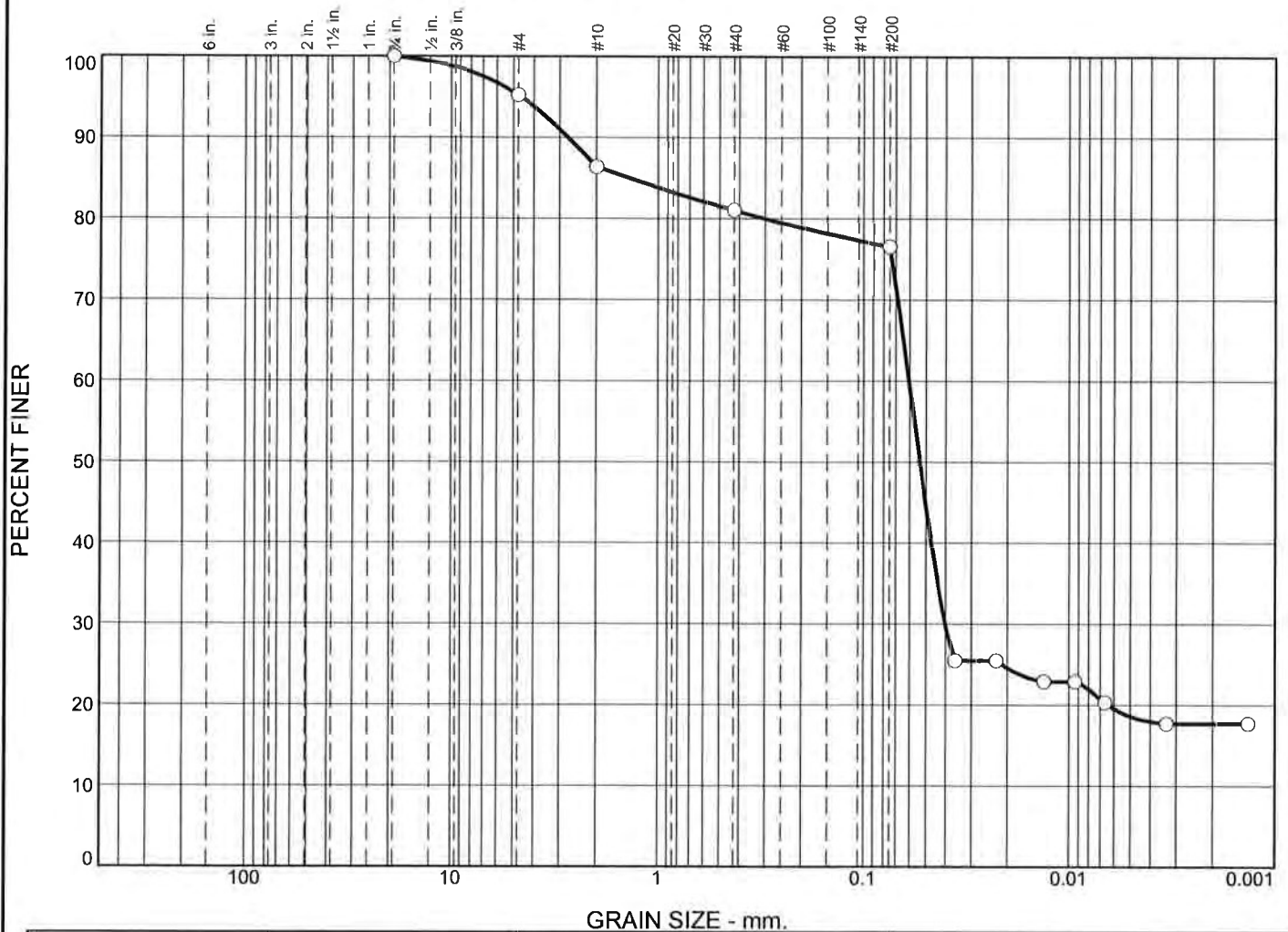
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	3.4	5.0	3.3	11.7			88.0

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.2303	1.4514

**Fineness
Modulus**

0.37

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0		0.0	4.8	8.8	5.4	4.4	58.0		18.6	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				1.3923	0.0604	0.0536	0.0403				

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-V-TOP Sample Number: L1731354-23 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-V-TOP

Sample Number: L1731354-23

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.85
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.85	0.00	0.75	0.00	0.00	100.0
		#4	1.14	0.00	95.2
		#10	2.11	0.00	86.4
		#40	1.28	0.00	81.0
		#200	1.06	0.00	76.6

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 76.6
 Weight of hydrometer sample = 23.76
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0361	25.5
5.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0228	25.5
15.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0132	22.9
30.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0094	22.9
60.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0066	20.3
240.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0033	17.7
1440.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0014	17.7

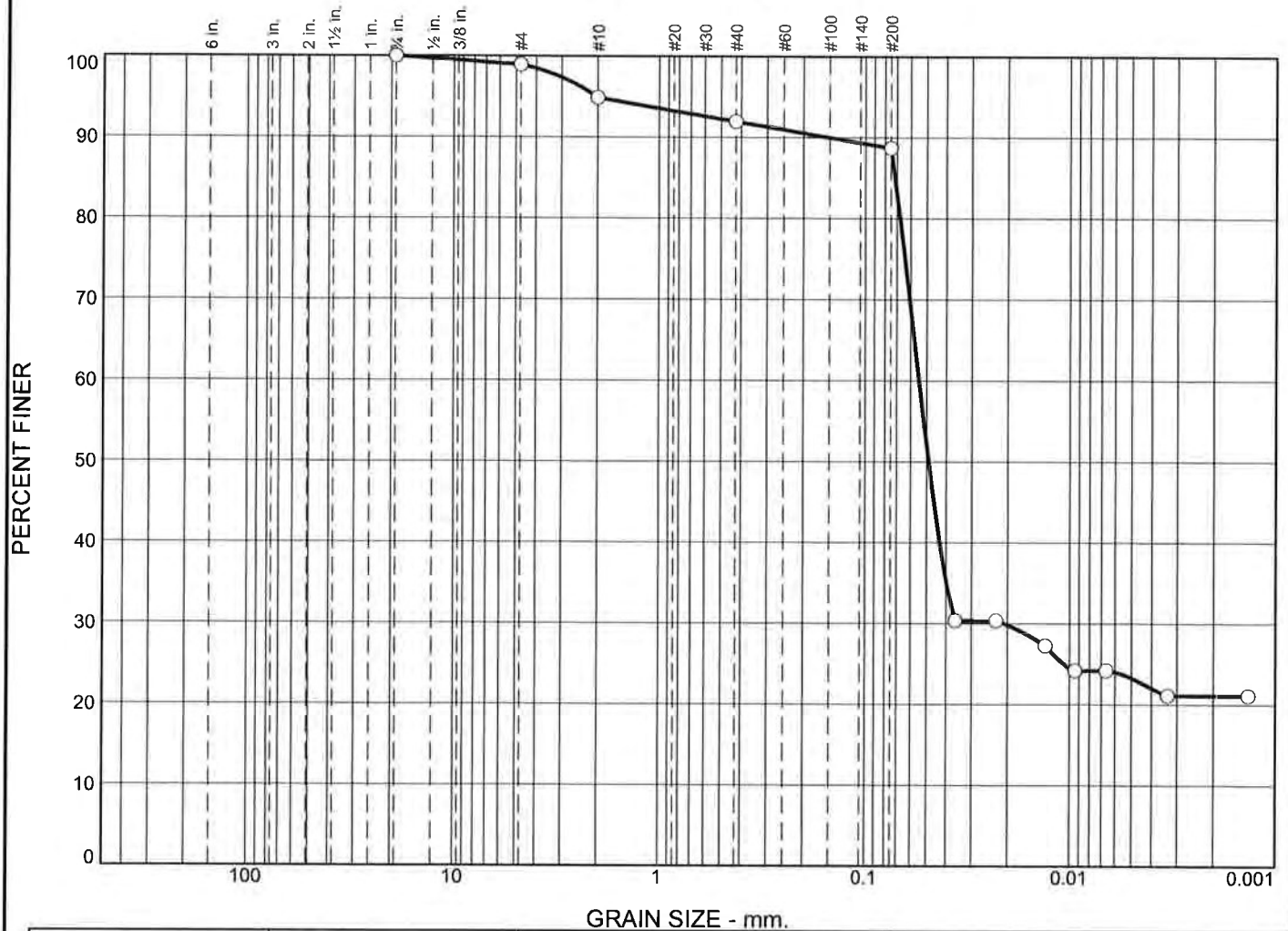
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.8	4.8	8.8	5.4	4.4	18.6	58.0	18.6	76.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
			0.0064	0.0403	0.0472	0.0536	0.0604	0.3020	1.3923	2.7403	4.6150

Fineness Modulus
0.93

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel			% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	1.1	4.0	3.0	3.2	65.4		23.3	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0716	0.0545	0.0488	0.0208				

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-V-BOTTOM Sample Number: L1731354-24 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-V-BOTTOM

Sample Number: L1731354-24

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 22.48
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.48	0.00	0.75	0.00	0.00	100.0
		#4	0.24	0.00	98.9
		#10	0.91	0.00	94.9
		#40	0.66	0.00	91.9
		#200	0.73	0.00	88.7

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 88.7
 Weight of hydrometer sample = 23.11
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0361	30.4
5.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0228	30.4
15.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0132	27.3
30.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0094	24.2
60.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0066	24.2
240.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0033	21.1
1440.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0014	21.1

Fractional Components

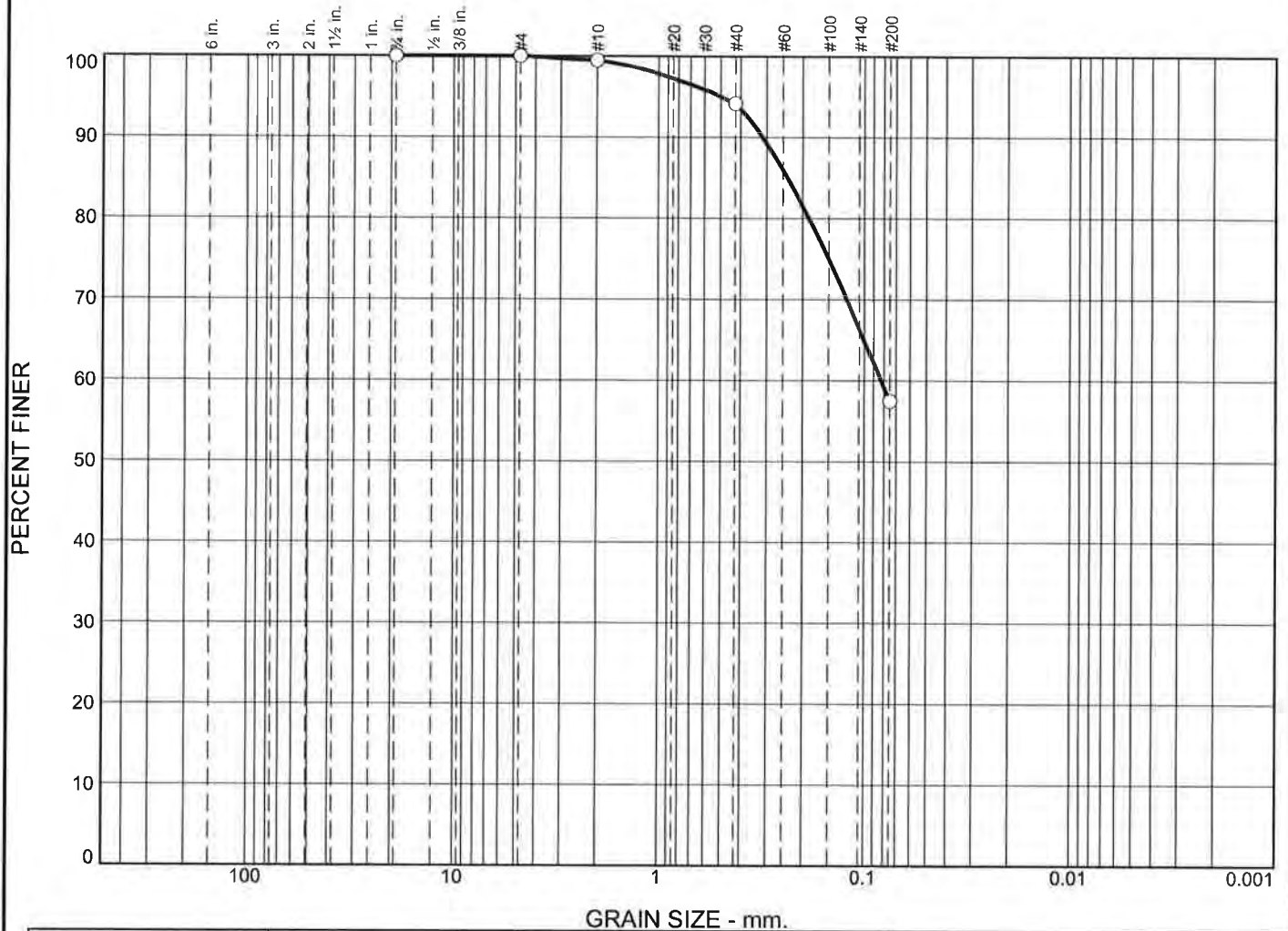
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.1	1.1	4.0	3.0	3.2	10.2	65.4	23.3	88.7

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.0208	0.0431	0.0488	0.0545	0.0675	0.0716	0.1505	2.0301

Fineness Modulus

0.38

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	0.5	5.3	36.7	57.5			
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.2378	0.0827						

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-W-TOP Sample Number: L1727787-07 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-W-TOP

Sample Number: L1727787-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.74
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.74	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.12	0.00	99.5
		#40	1.26	0.00	94.2
		#200	8.72	0.00	57.5

Fractional Components

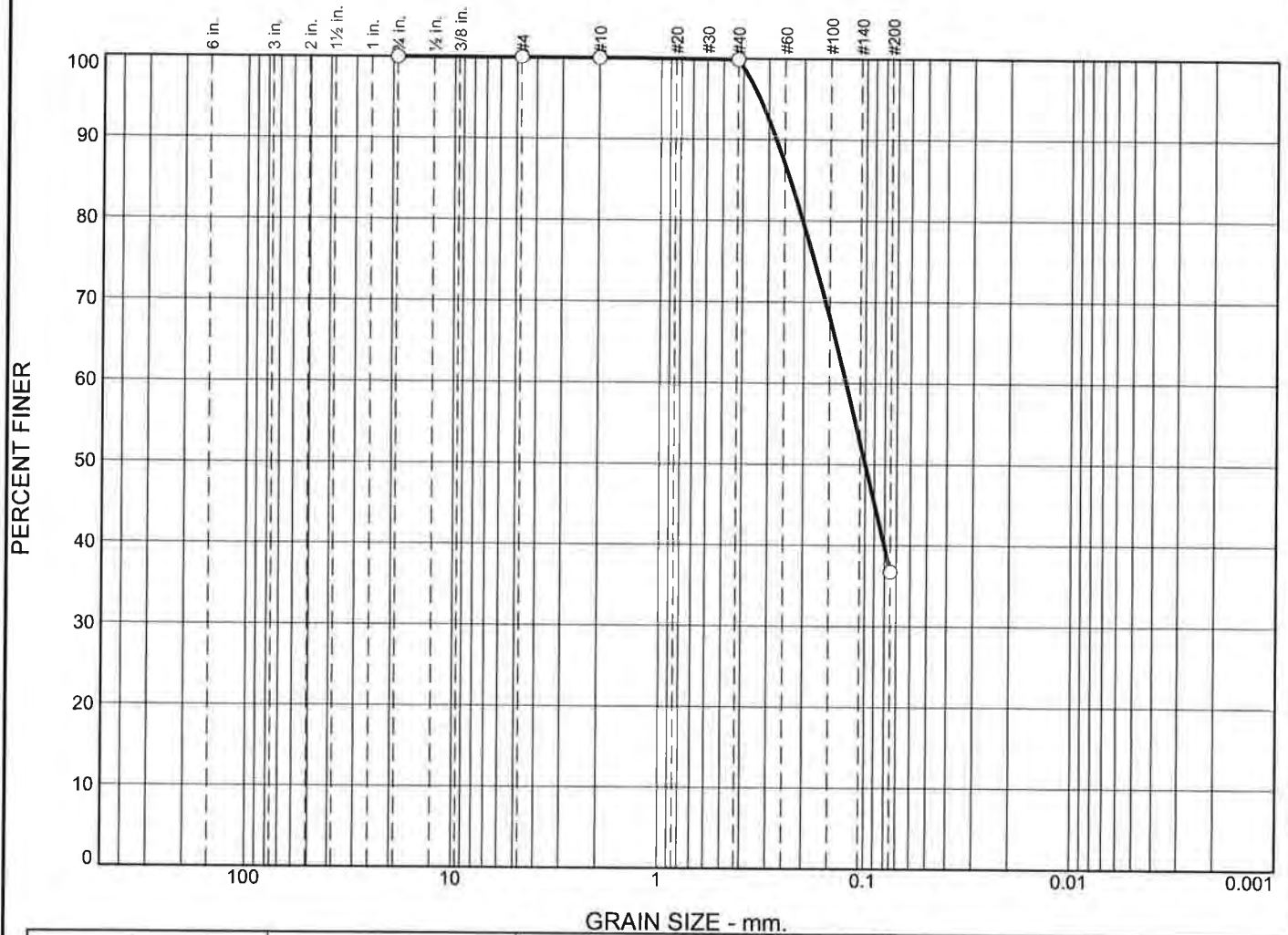
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.5	5.3	36.7	42.5			57.5

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
					0.0827	0.1871	0.2378	0.3144	0.4991

**Fineness
Modulus**

0.42

Particle Size Distribution Report



GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-W-BOTTOM

Sample Number: L1727787-08

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 38.45
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
38.45	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.05	0.00	99.9
		#200	24.28	0.00	36.7

Fractional Components

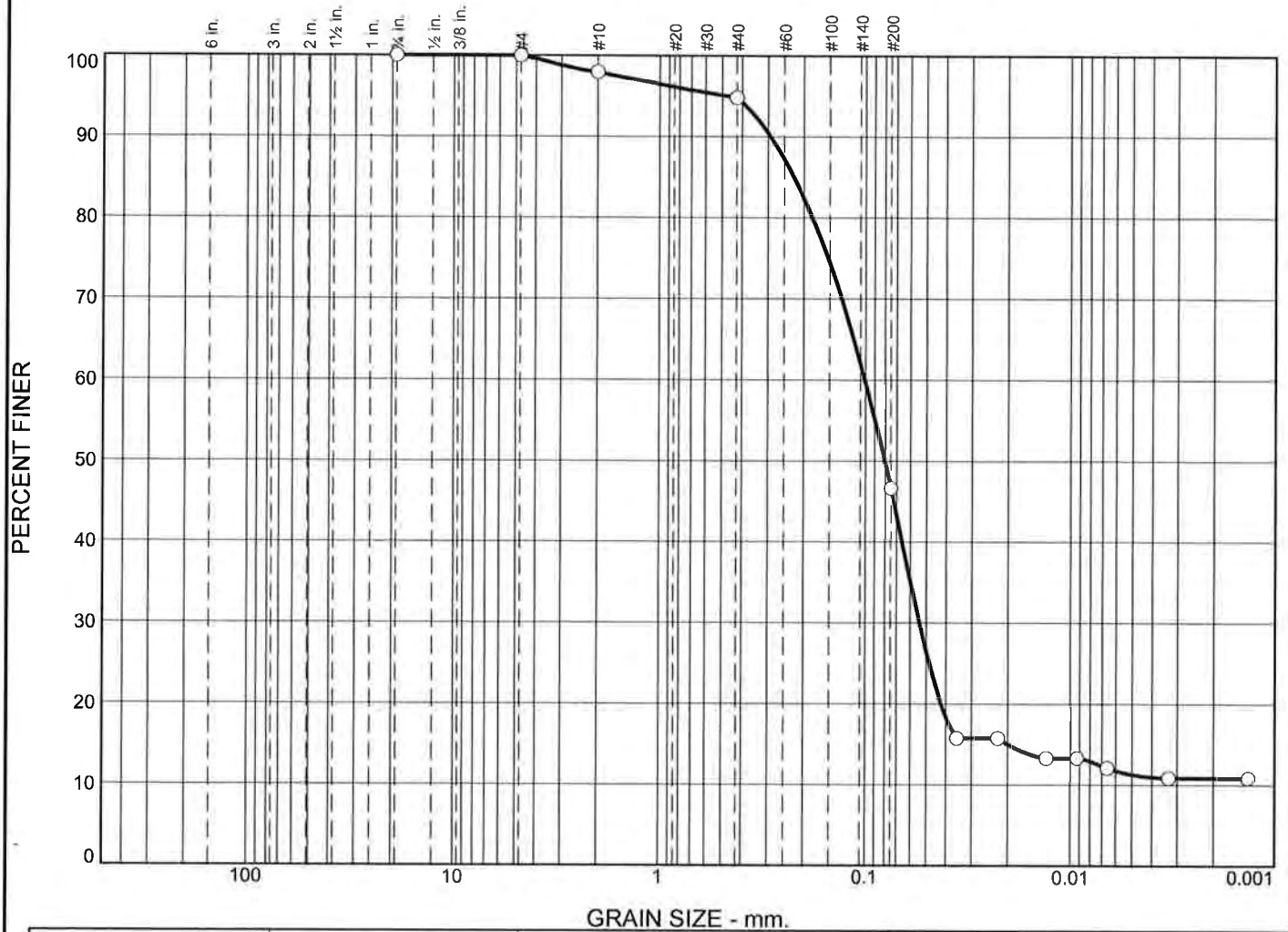
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	63.2	63.3			36.7

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.0998	0.1245	0.2035	0.2348	0.2754	0.3324

**Fineness
Modulus**

0.40

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	2.1	3.1	48.2	35.3		11.3		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.2243	0.1007	0.0804	0.0540	0.0200			

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-W-TOP Sample Number: L1731354-21 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-W-TOP

Sample Number: L1731354-21

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 29.74
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
29.74	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.61	0.00	97.9
		#40	0.93	0.00	94.8
		#200	14.33	0.00	46.6

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 46.6
 Weight of hydrometer sample = 30.46
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0060	1.0064	0.0131	6.0	14.7	0.0356	15.8
5.00	23.1	1.0060	1.0064	0.0131	6.0	14.7	0.0225	15.8
15.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0131	13.3
30.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0093	13.3
60.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0066	12.1
240.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0033	10.9
1440.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0014	10.9

Fractional Components

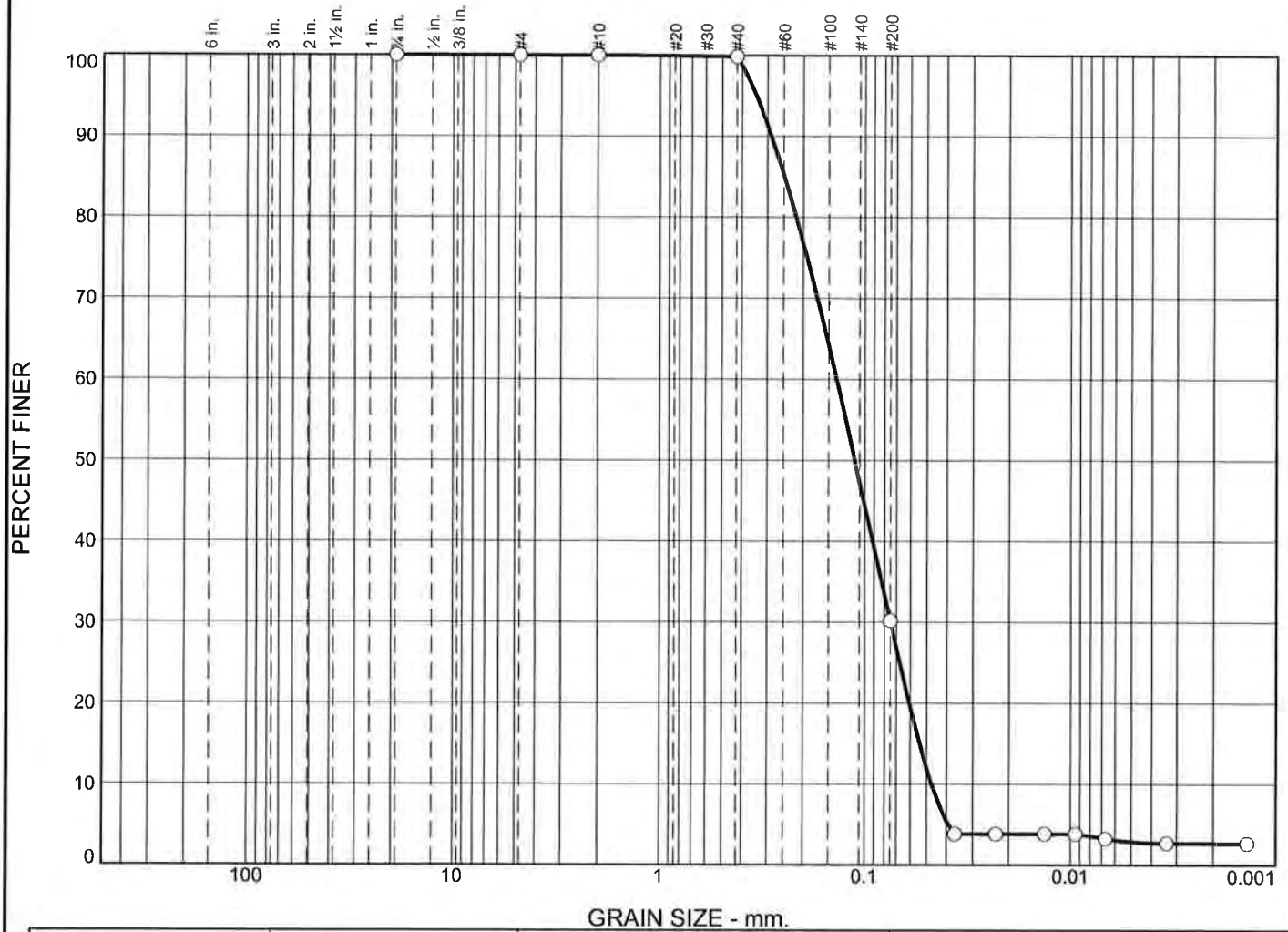
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.1	3.1	48.2	53.4	35.3	11.3	46.6

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0200	0.0424	0.0540	0.0658	0.0804	0.1007	0.1824	0.2243	0.2915	0.4690

Fineness Modulus

0.45

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	0.0	0.1	69.7	27.3		2.9		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.2478	0.1375	0.1118	0.0747	0.0540	0.0473	0.86	2.91

Material Description							USCS	AASHTO
☐								

Project No. Project: ☐ Source of Sample: NHH-W-BOTTOM Sample Number: L1731354-22 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-W-BOTTOM

Sample Number: L1731354-22

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 40.62
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
40.62	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.06	0.00	99.9
		#200	28.29	0.00	30.2

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 30.2
 Weight of hydrometer sample = 43.32
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0366	3.8
5.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0231	3.8
15.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0134	3.8
30.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0094	3.8
60.00	23.1	1.0025	1.0029	0.0131	2.5	15.6	0.0067	3.3
240.00	23.1	1.0020	1.0024	0.0131	2.0	15.8	0.0034	2.7
1440.00	23.1	1.0020	1.0024	0.0131	2.0	15.8	0.0014	2.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	69.7	69.8	27.3	2.9	30.2

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0393	0.0473	0.0540	0.0606	0.0747	0.0913	0.1118	0.1375	0.2171	0.2478	0.2871	0.3411

Fineness Modulus	C _u	C _c
0.45	2.91	0.86

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0	0.0	0.0	0.0	0.8	6.9	83.4		8.9		
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.0694	0.0551	0.0503	0.0408	0.0128	0.0104	2.89	5.28

Material Description							USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-X-TOP Sample Number: L1731354-01 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-X-TOP

Sample Number: L1731354-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.67
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.67	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.15	0.00	99.2
		#200	1.37	0.00	92.3

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 92.3

Weight of hydrometer sample = 19.67

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	23.9
5.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0238	16.4
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	16.4
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	8.9
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	8.9
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.9
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.9

Fractional Components

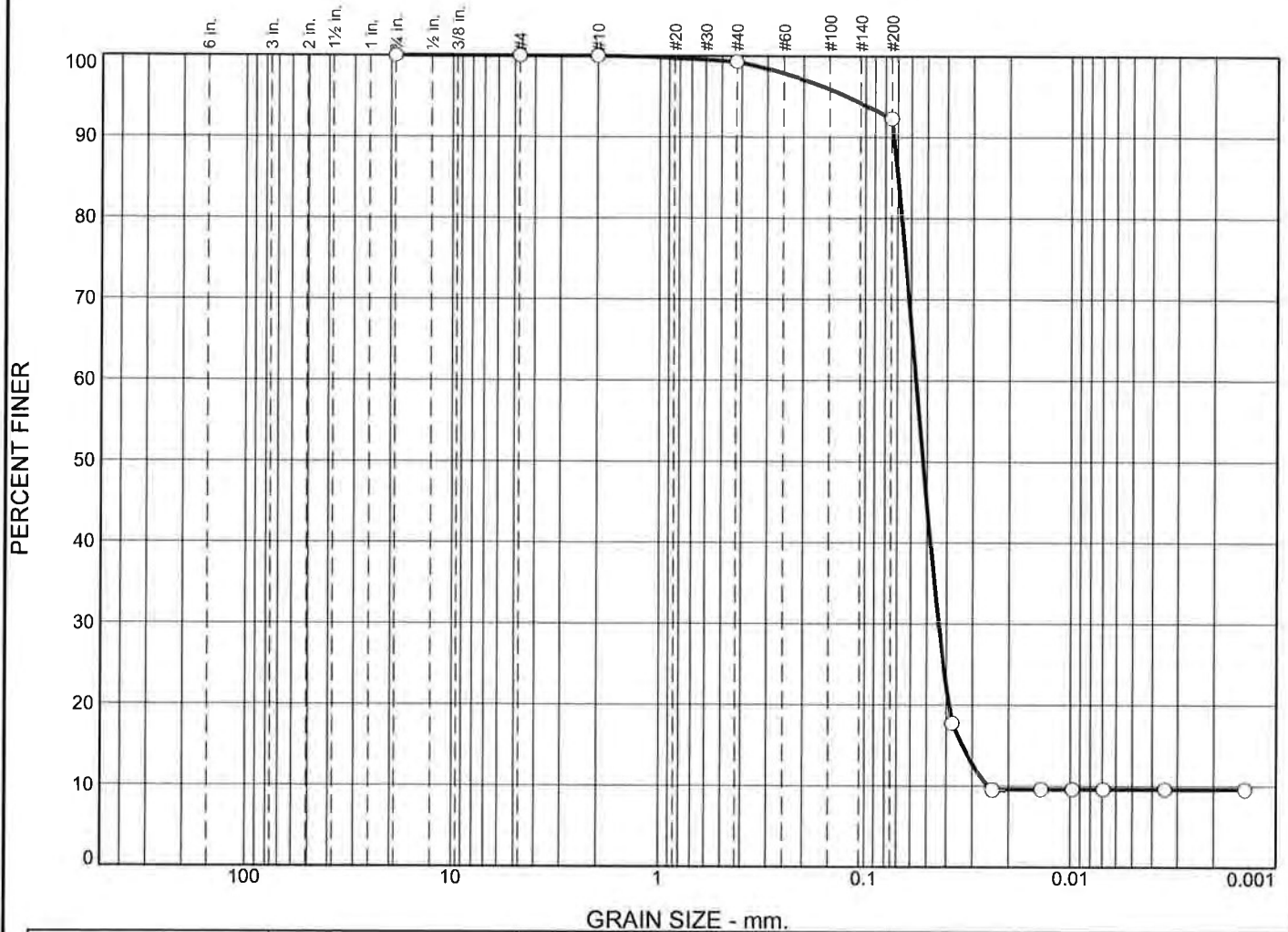
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.8	6.9	7.7	83.4	8.9	92.3

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0104	0.0128	0.0309	0.0408	0.0457	0.0503	0.0551	0.0661	0.0694	0.0731	0.1251

Fineness Modulus	C _u	C _c
0.06	5.28	2.89

Alpha Analytical

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	0.0	0.7	7.1	82.6		9.6		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.0700	0.0568	0.0523	0.0437	0.0336	0.0249	1.35	2.28

Material Description								USCS	AASHTO
☐									

Project No. Client: Project: ☐ Source of Sample: NHH-X-REP-TOP Sample Number: L1731354-02 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-X-REP-TOP

Sample Number: L1731354-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 18.19
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
18.19	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.13	0.00	99.3
		#200	1.28	0.00	92.2

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 92.2
 Weight of hydrometer sample = 18.19
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0376	17.7
5.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0240	9.6
15.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0138	9.6
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	9.6
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	9.6
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	9.6
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	9.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.7	7.1	7.8	82.6	9.6	92.2

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
	0.0249	0.0336	0.0389	0.0437	0.0481	0.0523	0.0568	0.0669	0.0700	0.0733	0.1249

Fineness Modulus	C _u	C _c
0.06	2.28	1.35

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-X-BOTTOM**Sample Number:** L1731354-03**Sieve Test Data****Post #200 Wash Test Weights (grams):** Dry Sample and Tare = 40.43

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
40.43	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.08	0.00	99.8
		#40	5.44	0.00	86.3
		#200	20.55	0.00	35.5

Hydrometer Test Data**Hydrometer test uses material passing #200****Percent passing #200 based upon complete sample = 35.5****Weight of hydrometer sample = 40.43****Automatic temperature correction****Composite correction (fluid density and meniscus height) at 20 deg. C = 0****Meniscus correction only = 0.0****Specific gravity of solids = 2.65****Hydrometer type = 151H****Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0130	1.0132	0.0134	13.0	12.9	0.0340	18.6
5.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0221	14.4
15.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0128	14.4
30.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0090	14.4
60.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0064	14.4
240.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0032	14.4
1440.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0013	14.4

Fractional Components

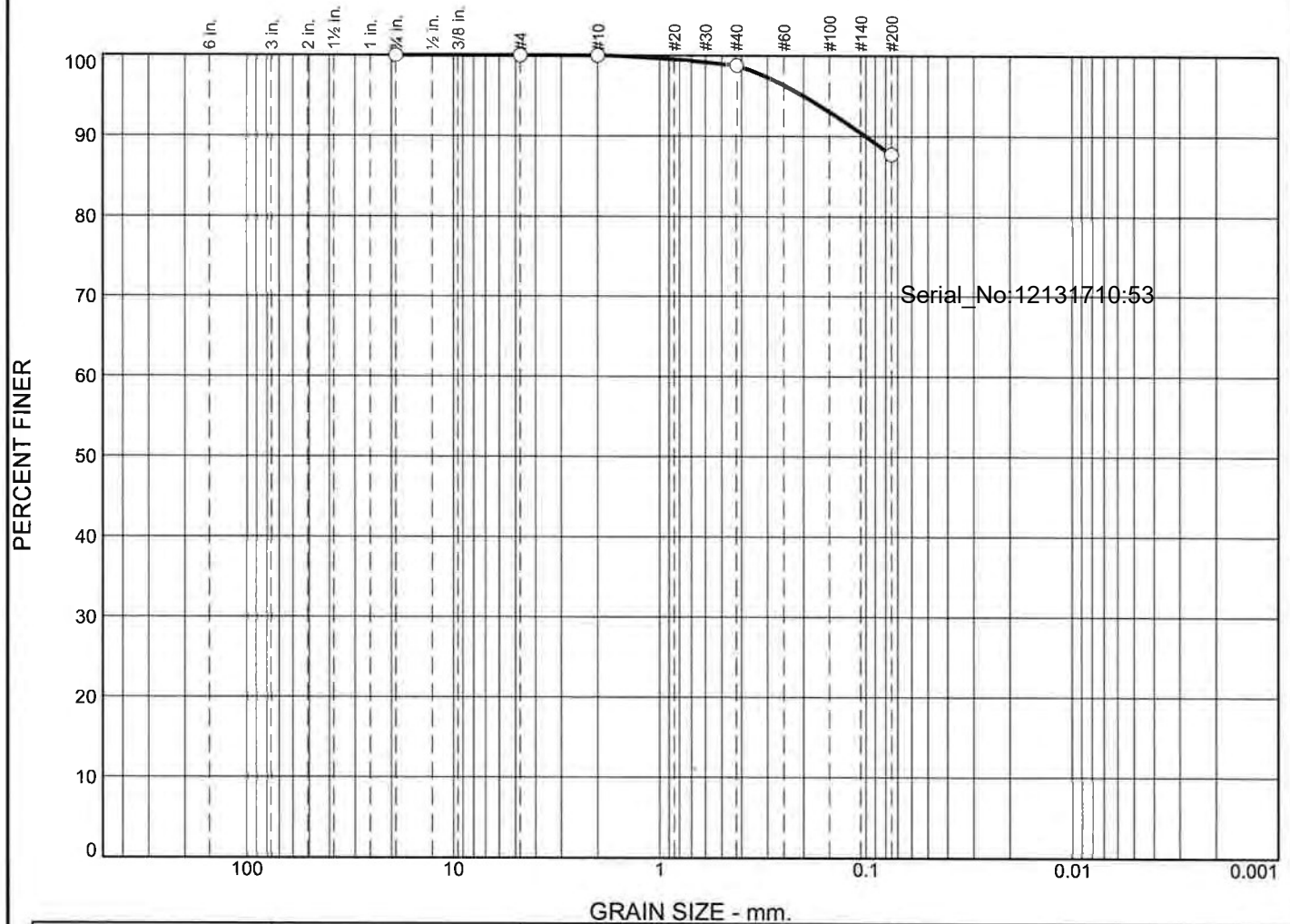
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	13.5	50.8	64.5	21.1	14.4	35.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
		0.0246	0.0372	0.0606	0.0878	0.1214	0.1657	0.3244	0.3992	0.5163	0.7480

Fineness Modulus

0.75

Particle Size Distribution Report



	% +3"		% Gravel		% Sand				% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	0.0	0.0	1.2	11.0	87.8				
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
○												

Material Description									USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-X-TOP Sample Number: L1727561-01 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-X-TOP

Sample Number: L1727561-01

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 17.88

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.88	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.22	0.00	98.8
		#200	1.97	0.00	87.8

Serial_No:12131710:53

Fractional Components

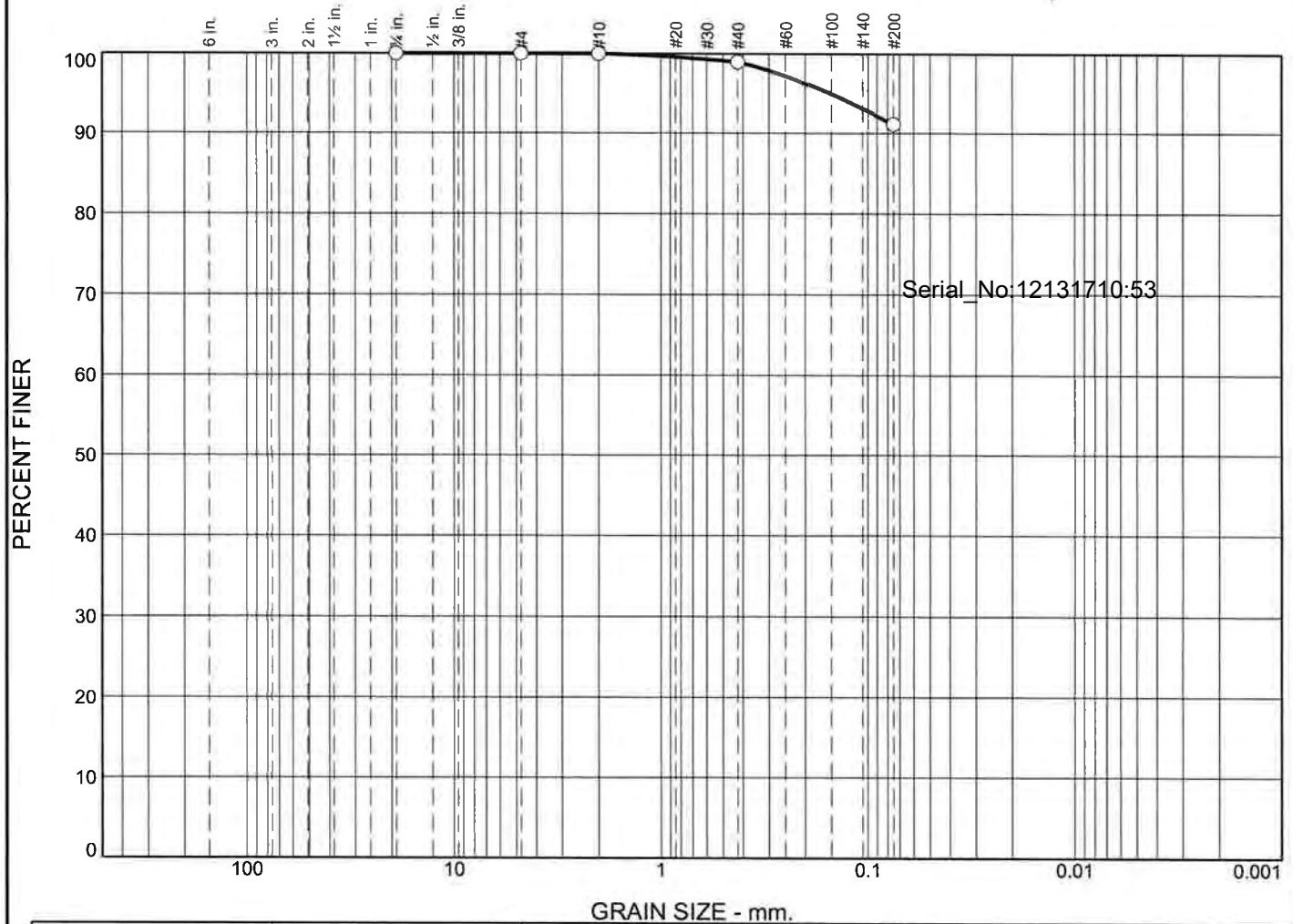
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.2	11.0	12.2			87.8

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.1000	0.2002

Fineness Modulus
0.11

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0	0.0	0.0	0.0	1.0	7.9	91.1			
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c C _u
☐										
☐										

Material Description	USCS	AASHTO
☐		

Project No. Project: ☐ Source of Sample: NHH-X-REP-TOP Sample Number: L1727561-02 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-X-REP-TOP

Sample Number: L1727561-02

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 15.41
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
15.41	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.16	0.00	99.0
		#200	1.21	0.00	91.1

Serial_No:12131710:53

Fractional Components

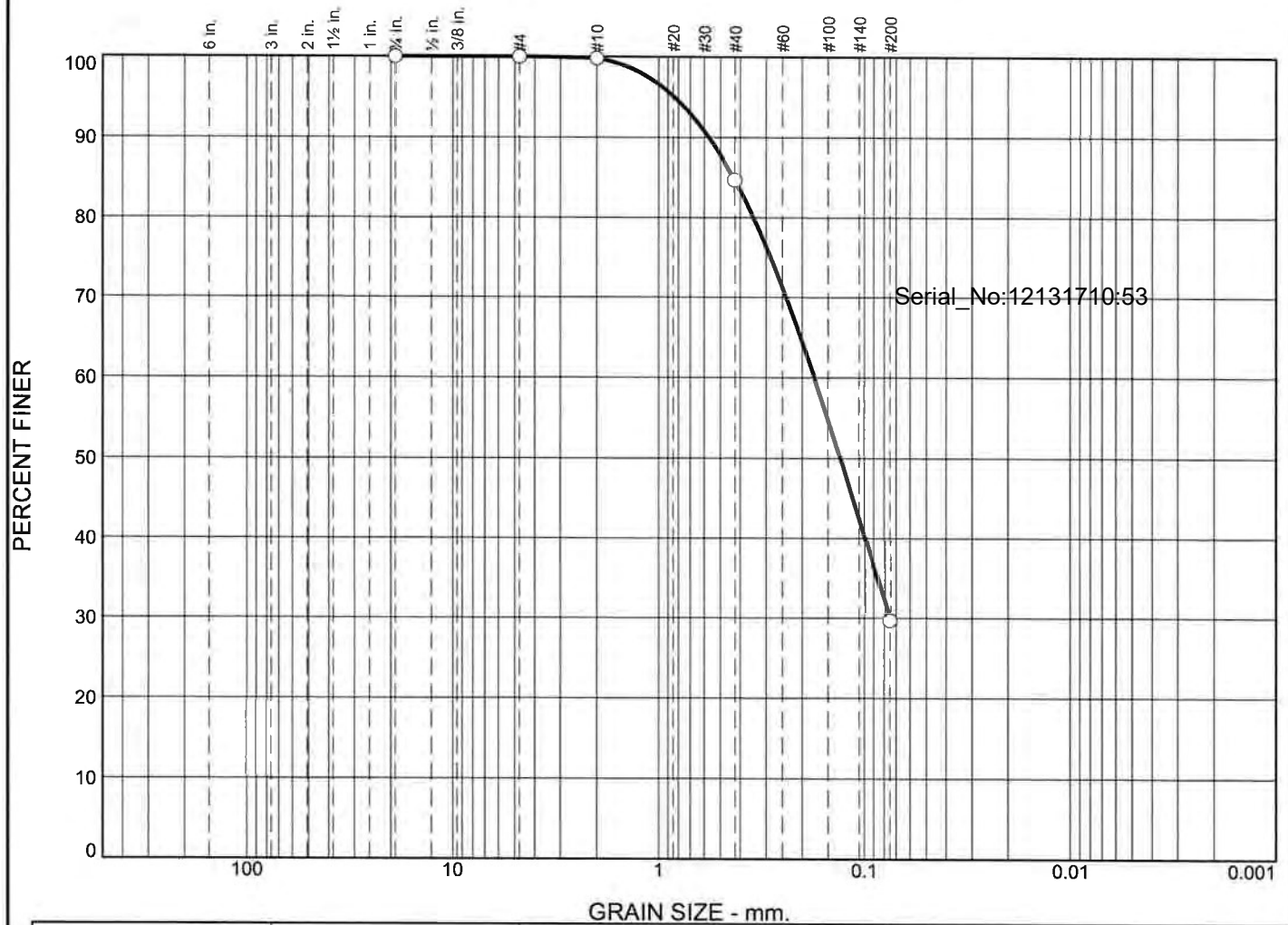
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.0	7.9	8.9			91.1

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
									0.1544

Fineness Modulus
0.08

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
☐	0.0	0.0	0.0	0.2	15.1	55.0	29.7				
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				0.4316	0.1749	0.1307	0.0756				
Material Description									USCS		AASHTO
☐											

Project No.

Client:

Remarks:

Project:

☐ Source of Sample: NHH-X-BOTTOM

Sample Number: L1727561-03

Date: ☐

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-X-BOTTOM

Sample Number: L1727561-03

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 34.46

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
34.46	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.06	0.00	99.8
		#40	5.22	0.00	84.7
		#200	18.94	0.00	29.7

Serial_No:12131710:53

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	15.1	55.0	70.3			29.7

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
			0.0756	0.1307	0.1749	0.3461	0.4316	0.5678	0.8349

Fineness Modulus
0.80

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
☐	0.0	0.0	0.0	0.0	0.9	3.7	93.9	1.5		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
☐				0.0697	0.0596	0.0561	0.0494	0.0442	0.0423	0.97
☐										1.41

Material Description							USCS	AASHTO
☐								

Project No. Client: Project: ☐ Source of Sample: NHH-Y-TOP Sample Number: L1731354-04 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Y-TOP

Sample Number: L1731354-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 18.61
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
18.61	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.16	0.00	99.1
		#200	0.69	0.00	95.4

Hydrometer Test Data

Hydrometer test uses material passing #200
 Percent passing #200 based upon complete sample = 95.4
 Weight of hydrometer sample = 18.61
 Automatic temperature correction
 Composite correction (fluid density and meniscus height) at 20 deg. C = 0
 Meniscus correction only = 0.0
 Specific gravity of solids = 2.65
 Hydrometer type = 151H
 Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	1.5
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	1.5
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	1.5
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.5
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.5
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.5
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.5

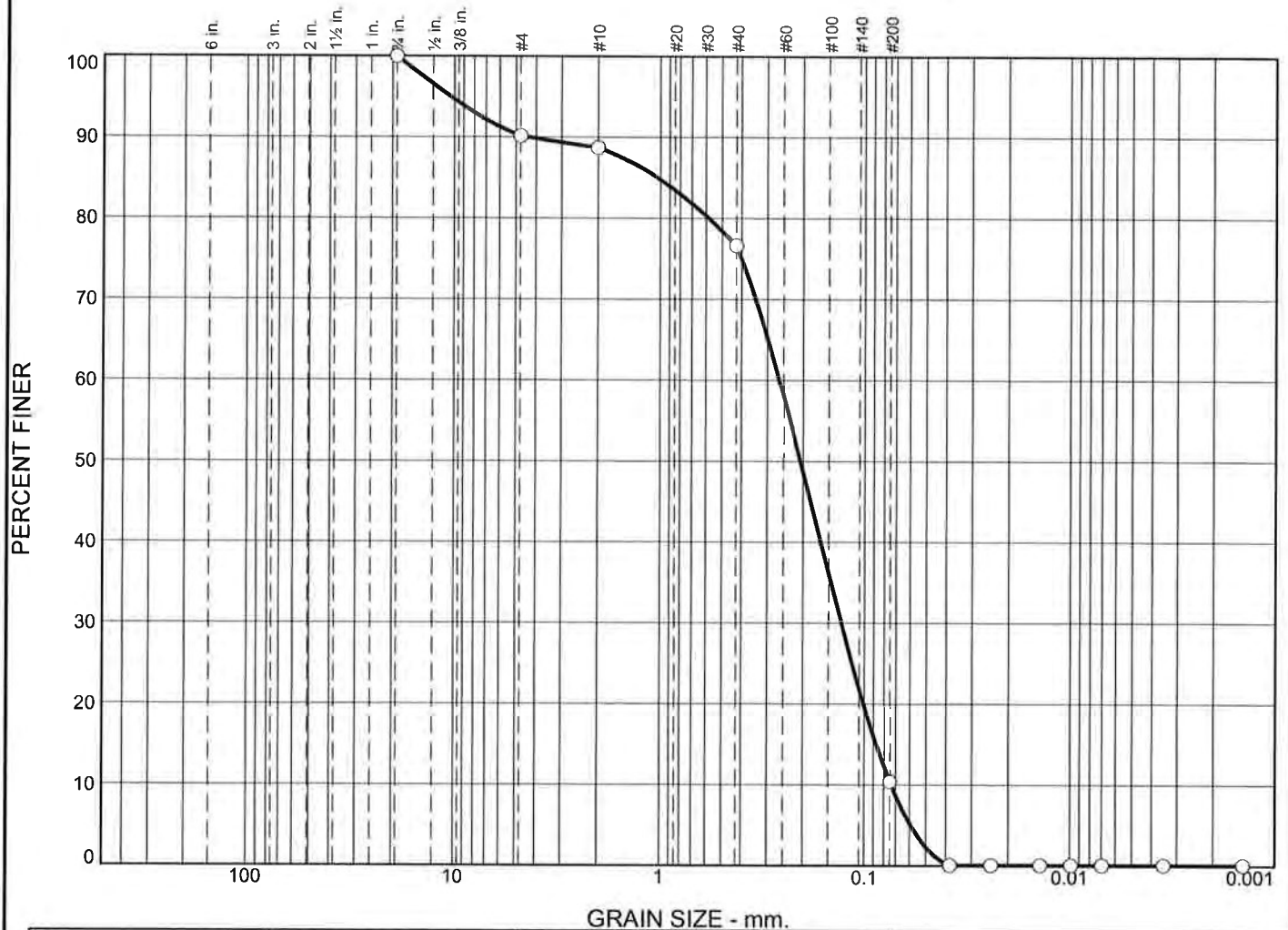
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	3.7	4.6	93.9	1.5	95.4

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0401	0.0423	0.0442	0.0460	0.0494	0.0527	0.0561	0.0596	0.0674	0.0697	0.0721	0.0748

Fineness Modulus	C _u	C _c
0.05	1.41	0.97

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
☐	0.0		0.0	9.8	1.5	12.1	66.1	10.4		0.1	
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
☐				1.0338	0.2623	0.2066	0.1299	0.0872	0.0738	0.87	3.56

Material Description								USCS	AASHTO
☐									

Project No. Project: ☐ Source of Sample: NHH-Y-BOTTOM Sample Number: L1731354-05 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Y-BOTTOM

Sample Number: L1731354-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 43.25

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
43.25	0.00	0.75	0.00	0.00	100.0
		#4	4.26	0.00	90.2
		#10	0.64	0.00	88.7
		#40	5.23	0.00	76.6
		#200	28.60	0.00	10.5

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 10.5

Weight of hydrometer sample = 43.25

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	0.1
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

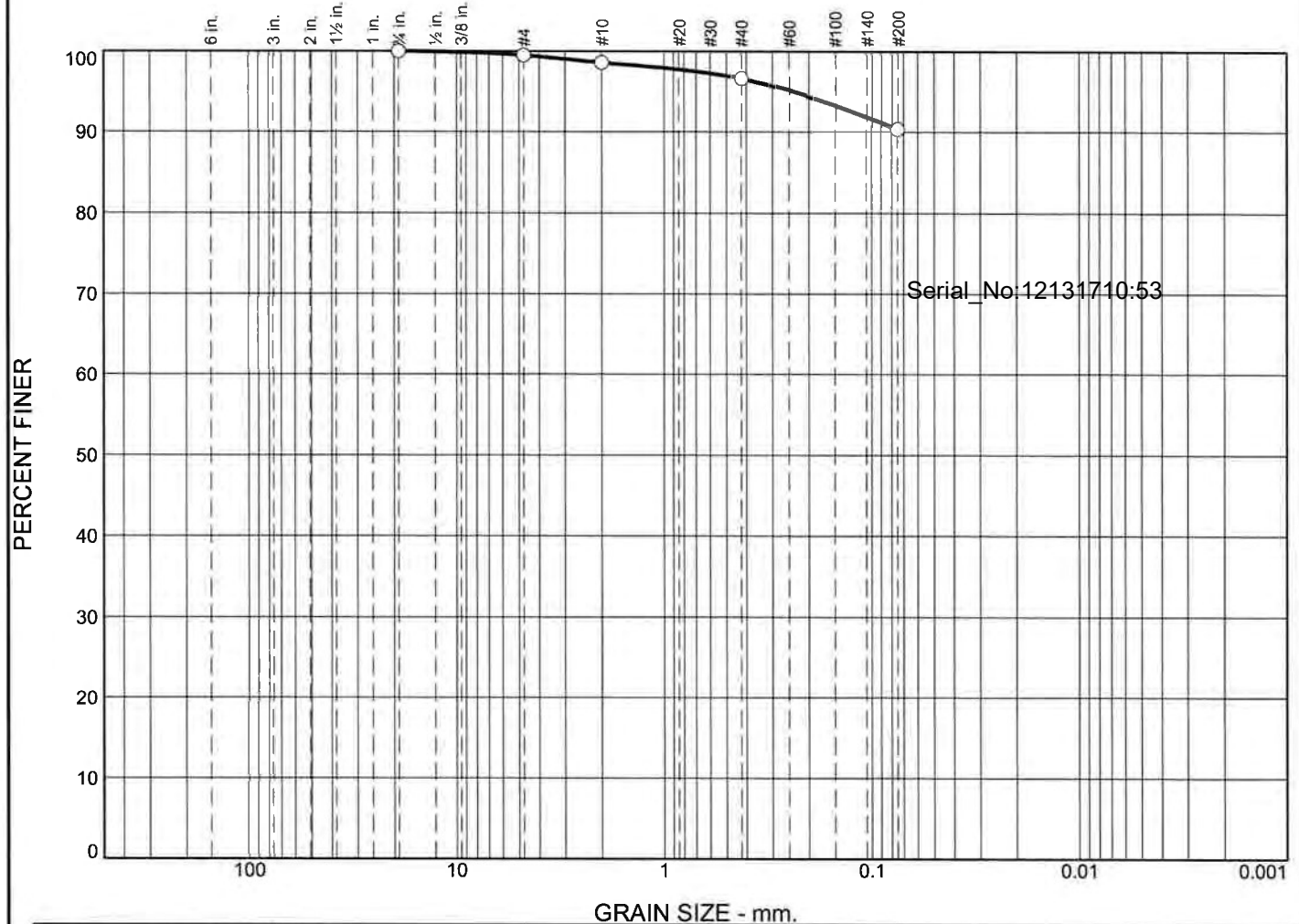
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	9.8	9.8	1.5	12.1	66.1	79.7	10.4	0.1	10.5

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0592	0.0738	0.0872	0.1008	0.1299	0.1642	0.2066	0.2623	0.5813	1.0338	4.3505	10.4352

Fineness Modulus	C _u	C _c
1.59	3.56	0.87

Particle Size Distribution Report



	GRAIN SIZE - mm.										
	% +3"		% Gravel		% Sand				% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0		0.0	0.5	0.9	2.0	6.3	90.3			
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○											

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-Y-TOP Sample Number: L1727561-04 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-Y-TOP

Sample Number: L1727561-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 15.59
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
15.59	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.5
		#10	0.14	0.00	98.6
		#40	0.31	0.00	96.6
		#200	0.98	0.00	90.3

Serial_No:12131710:53

Fractional Components

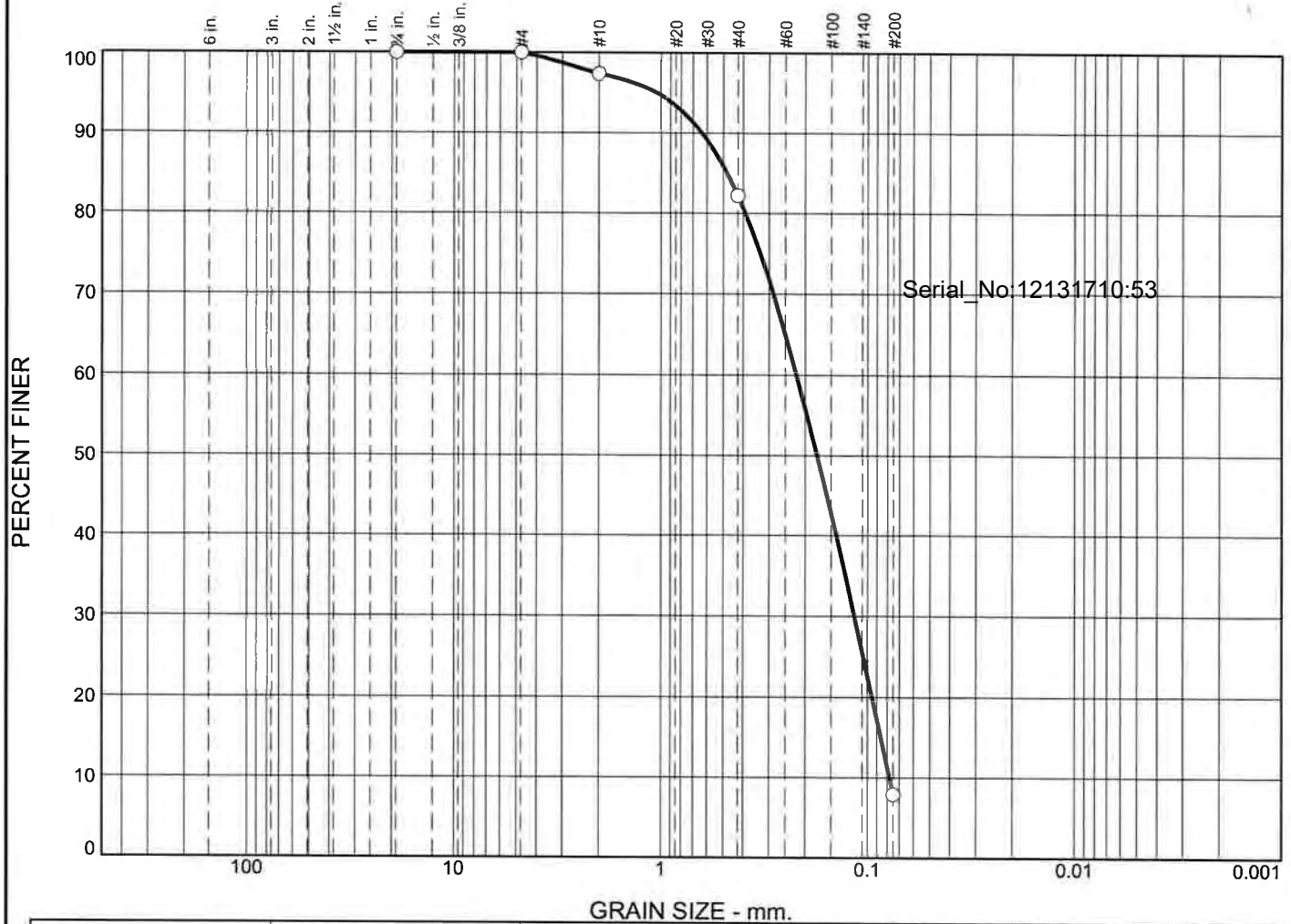
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	0.9	2.0	6.3	9.2			90.3

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
									0.2435

Fineness Modulus
0.18

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand			% Fines			
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	2.6	15.2	74.3	7.9			
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.4791	0.2206	0.1753	0.1155	0.0860	0.0781	0.77	2.83

Material Description									USCS	AASHTO

Project No. Client: Project: ☐ Source of Sample: NHH-Y-BOTTOM Sample Number: L1727561-05 Date: ☐	Remarks:
Alpha Analytical Mansfield, MA	

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-Y-BOTTOM

Sample Number: L1727561-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 36.48
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.48	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.95	0.00	97.4
		#40	5.54	0.00	82.2
		#200	27.10	0.00	7.9

Serial_No:12131710:53

Fractional Components

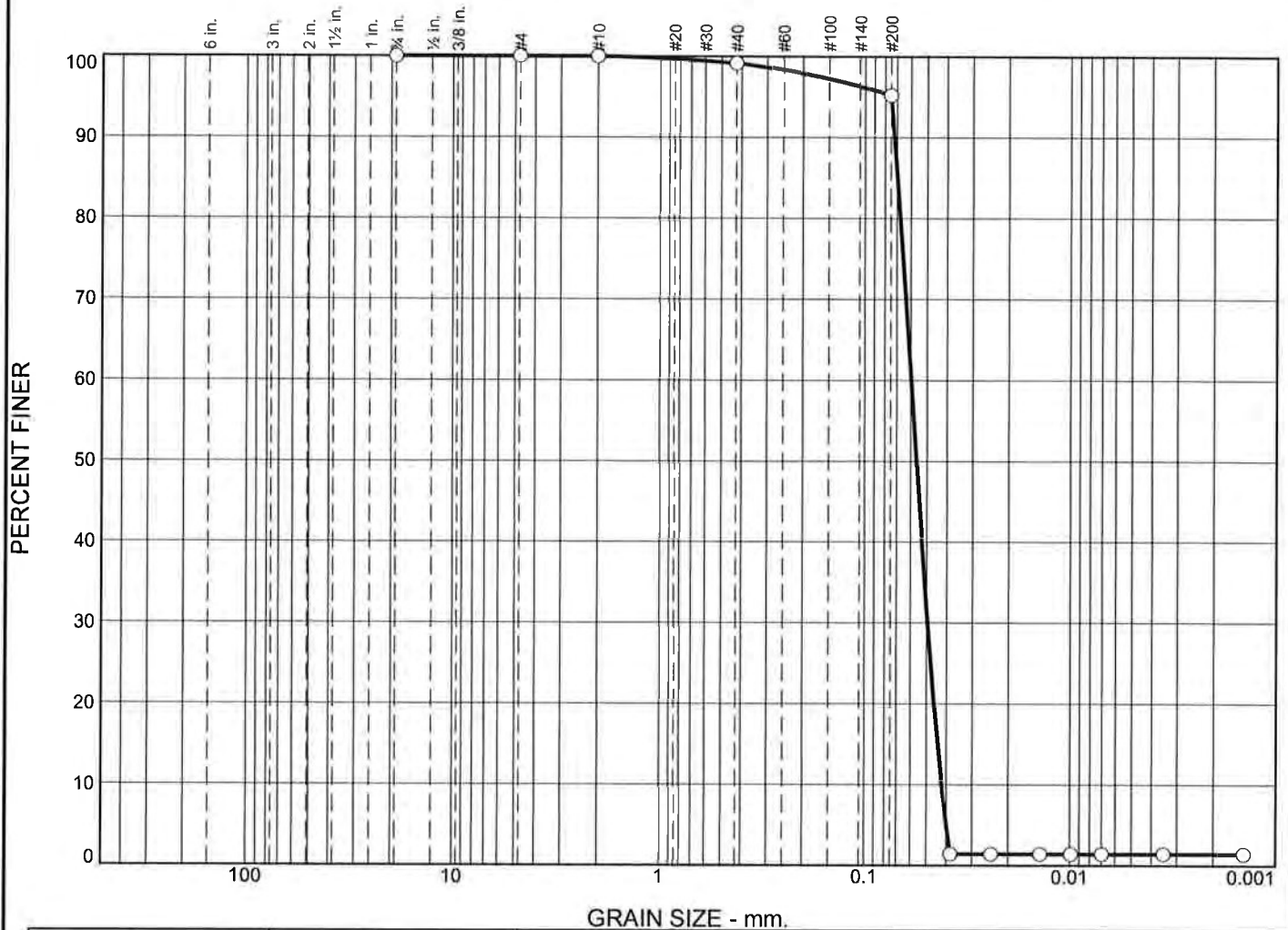
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.6	15.2	74.3	92.1			7.9

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0781	0.0860	0.0948	0.1155	0.1753	0.2206	0.3908	0.4791	0.6334	1.0568

Fineness Modulus	C _u	C _c
1.03	2.83	0.77

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel			% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0		0.0	0.0	0.0	0.8	4.0	93.8		1.4	
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○				0.0698	0.0596	0.0561	0.0494	0.0442	0.0423	0.97	1.41

Material Description								USCS	AASHTO

Project No.

Client:

Remarks:

Project:

Source of Sample: NHH-Z-TOP

Sample Number: L1731354-06

Date: ○

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Z-TOP

Sample Number: L1731354-06

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 19.28
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.28	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.16	0.00	99.2
		#200	0.76	0.00	95.2

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 95.2

Weight of hydrometer sample = 19.28

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	1.4
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	1.4
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	1.4
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.4
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.4
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.4
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.4

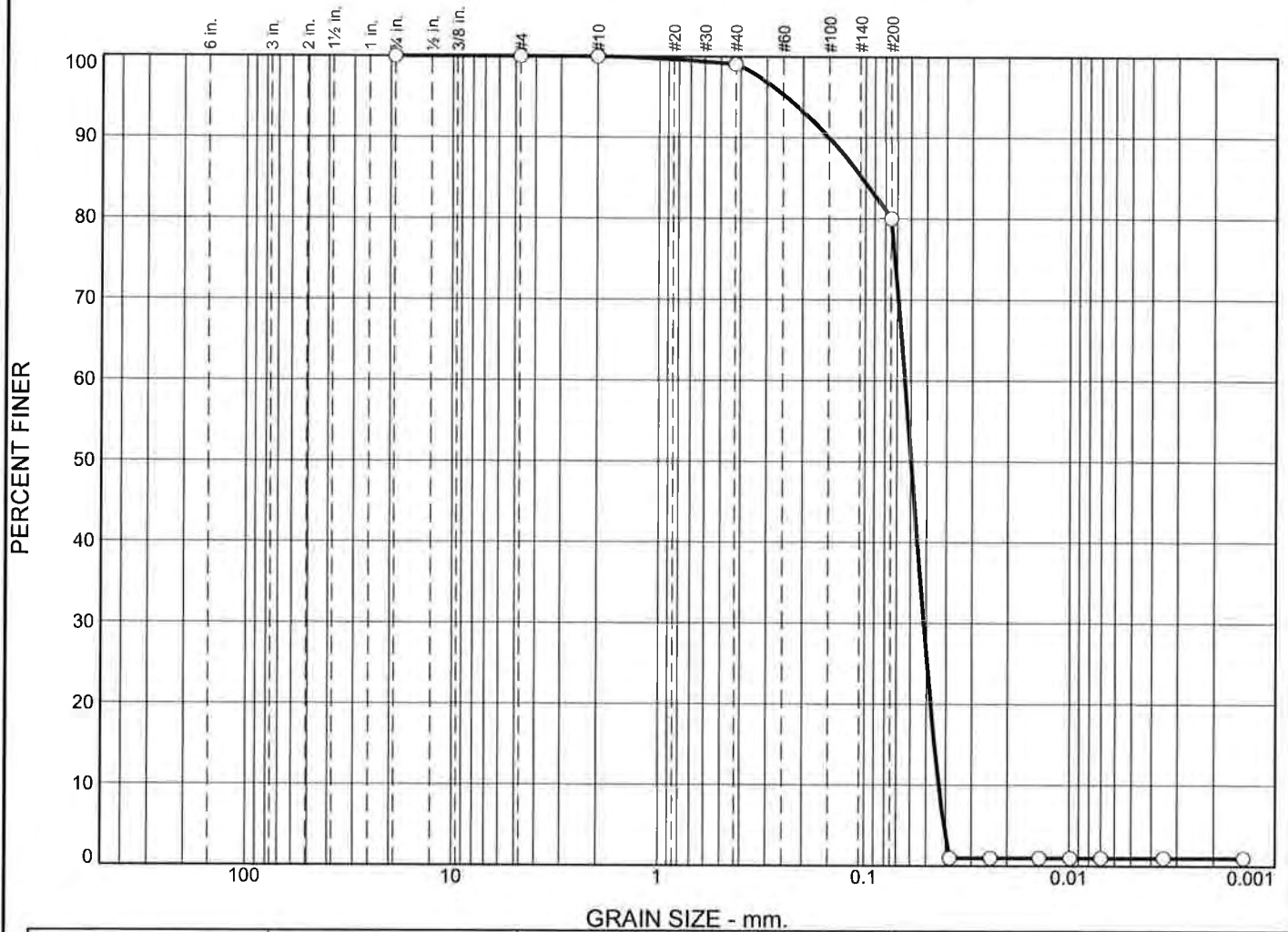
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.8	4.0	4.8	93.8	1.4	95.2

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0401	0.0423	0.0442	0.0460	0.0494	0.0527	0.0561	0.0596	0.0675	0.0698	0.0722	0.0749

Fineness Modulus	C _u	C _c
0.05	1.41	0.97

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
☐	0.0	0.0	0.0	0.0	0.9	19.1	79.0	1.0		
☒	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
☐				0.1037	0.0641	0.0597	0.0515	0.0454	0.0432	0.96
☐										1.48

Material Description							USCS	AASHTO
☐								

Project No.

Client:

Remarks:

Project:

Source of Sample: NHH-Z-BOTTOM

Sample Number: L1731354-07

Date: ☐

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Z-BOTTOM

Sample Number: L1731354-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.58
 Tare Wt. = 0.00
 Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.58	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.22	0.00	99.1
		#200	4.50	0.00	80.0

Hydrometer Test Data

Hydrometer test uses material passing #200

Percent passing #200 based upon complete sample = 80.0

Weight of hydrometer sample = 23.58

Automatic temperature correction

Composite correction (fluid density and meniscus height) at 20 deg. C = 0

Meniscus correction only = 0.0

Specific gravity of solids = 2.65

Hydrometer type = 151H

Hydrometer effective depth equation: $L = 16.294964 - 0.2645 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	1.0
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	1.0
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	1.0
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.0
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.0
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.0
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.0

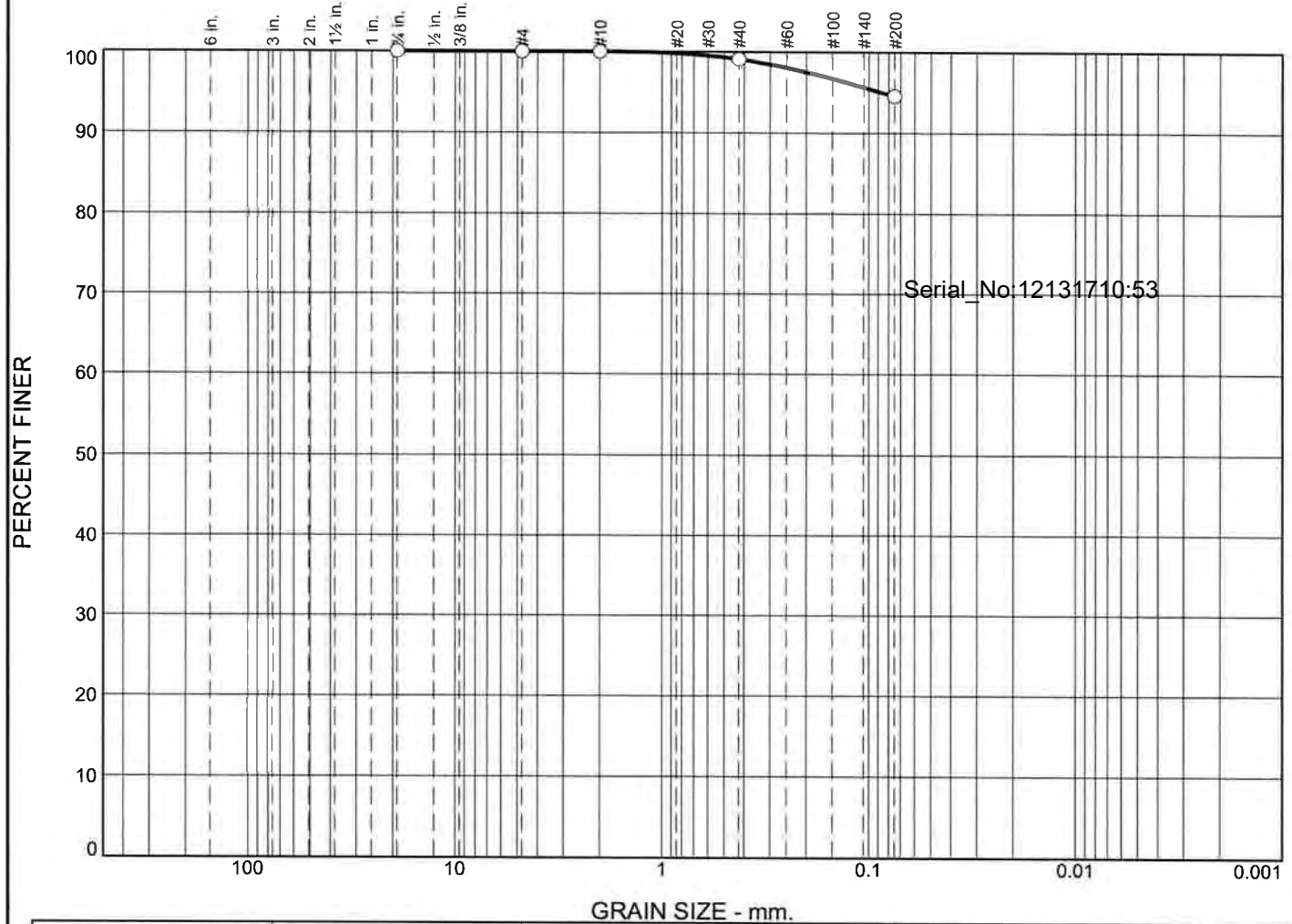
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	19.1	20.0	79.0	1.0	80.0

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
0.0407	0.0432	0.0454	0.0475	0.0515	0.0555	0.0597	0.0641	0.0751	0.1037	0.1513	0.2431

Fineness Modulus	C _u	C _c
0.14	1.48	0.96

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"			% Gravel		% Sand				% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0		0.0	0.0	0.0	0.9	4.5	94.6			
✕	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○											

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-Z-TOP Sample Number: L1727561-06 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-Z-TOP

Sample Number: L1727561-06

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 15.43
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
15.43	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.14	0.00	99.1
		#200	0.70	0.00	94.6

Serial_No:12131710:53

Fractional Components

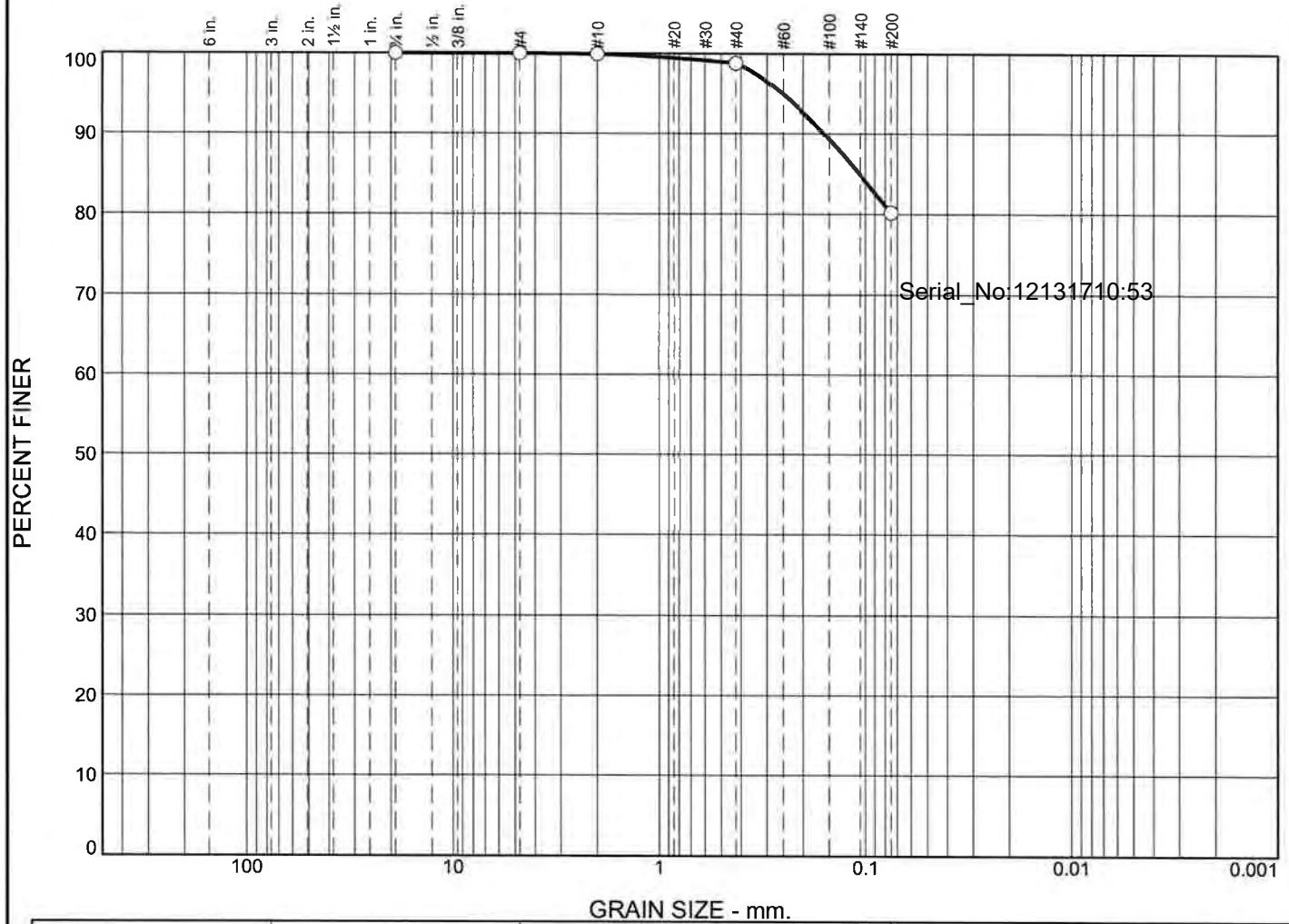
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	4.5	5.4			94.6

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
									0.0864

Fineness Modulus
0.05

Alpha Analytical

Particle Size Distribution Report



GRAIN SIZE - mm.												
% +3"			% Gravel		% Sand			% Fines				
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	0.0	0.1	1.1	18.6	80.2				
⊗	Colloids	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
○				0.1074								

Material Description								USCS	AASHTO

Project No. Project: ☐ Source of Sample: NHH-Z-BOTTOM Sample Number: L1727561-07 Date: ☐	Client: Alpha Analytical Mansfield, MA	Remarks: Figure
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GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Sample Number: L1727561-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 21.03

Tare Wt. = 0.00

Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.03	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.02	0.00	99.9
		#40	0.23	0.00	98.8
		#200	3.92	0.00	80.2

Serial_No:12131710:53

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.1	18.6	19.8			80.2

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
							0.1074	0.1594	0.2535

Fineness Modulus
0.16

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