

PROVIDENCE RIVER AND HARBOR
RHODE ISLAND
FEDERAL NAVIGATION PROJECT
MAINTENANCE DREDGING

DREDGED MATERIAL MANAGEMENT
PLAN

MAY 2025
REVISED MARCH 2026

**APPENDIX G – SUBSURFACE SITE
CHARACTERIZATION**

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1. STATEMENT OF PURPOSE

The purpose of this Subsurface Site Characterization Appendix is to provide an overview of regional geology and description of the local subsurface material types in the Federal Navigation Project (FNP). The subsurface conditions of Providence Harbor were evaluated using three site investigations between 2018 and 2021. Data from these investigations were used in the design of proposed Confined Aquatic Disposal (CAD) cell(s).

2. PROJECT SUMMARY

The Providence River & Harbor FNP was originally adopted in 1852 and modified by 17 subsequent authorizations. The 40-foot-deep channel feature of the existing project that is now being maintained was authorized by the River and Harbor Act of 1965. The FNP currently has an authorized depth of -40 feet mean lower low water (MLLW) and channel width of 600 feet, with wider bends and a 1,700-foot-wide harbor area at the upstream end. The total authorized channel length is approximately 16.8 miles long, extending from its upstream limit just downstream of the Providence (Fox Point) Hurricane Barrier to its downstream limit between Prudence Island and Aquidneck Island in the Eastern Passage of Narragansett Bay.

3. DREDGING AND DISPOSAL

Based on extrapolation of existing shoal rates within the Providence FNP, the project will need to be dredged twice within the 20-year planning period covered by this DMMP. The first cycle is planned to be performed in 2028, and the second cycle is predicted to be needed in 2048. For the first cycle of dredging, a total of approximately 2,072,933 cy of dredged material will be dredged from Providence River Channel FNP. A dredged material placement facility will be constructed in 2027 to contain the dredged material from the FNP as well as other dredged materials generated through the first 15 years of the 20-year DMMP planning period. A Confined Aquatic Disposal (CAD) cell is proposed to be constructed to contain the dredged material from the FNP and will also be designed and constructed to hold an additional estimated 65,240 cy of dredged material from the adjacent shallow-draft FNPs, if warranted, and an additional 300,000 CY generated over the first 15 years of the 20-year planning period by the non-federal sponsor of the project for a total dredged material quantity of approximately 2,437,173 CY. The entire capacity of the first CAD cell to be constructed is approximately 2,846,794 CY of dredged material, including a 15% bulking factor of the dredged material during placement. The CAD cell will also be constructed large enough to get capped with approximately 240,000 CY of clean material after about 15 years, when the CAD cell is expected to reach capacity.

After 20 years, a second dredge cycle of the Providence FNP would be initiated. A second CAD cell would be constructed to accommodate predicted quantities of dredged material from the various sources. The study predicts that based on a continuation of shoaling in the Providence River and Harbor, the Providence FNP will require approximately 1,990,800 CY of dredging, the adjacent associated shallow-draft FNPs will require approximately 44,320 CY of dredging, if warranted, and non-federal channels will need another 300,000 CY of dredging. The second CAD cell is possible at Edgewood Shoals South. The second CAD cell would need approximately 2,857,888 capacity, including a 15% bulking factor. This second CAD cell would then remain open until a third CAD cell is constructed since it will be used as a starter cell for the third CAD cell, for 15 to 20 years, and finally be capped with clean material, possibly from the clean material from the third CAD cell.

4. GEOLOGICAL INFORMATION

The Providence River FNP consists of a 16.8-mile-long north-south running navigation channel that separates Providence and East Providence. The channel is authorized to a depth of El. -40 feet MLLW and varies in width from 600 feet to 1,700 feet. The Federal channel extends from deep water in Narragansett Bay to the head of navigation near Fox Point in Providence. North of Field's Point the River is primarily a shipping channel and is narrow and deep, while south of Field's Point the River is substantially wider with a variable shallow and deep mudline. Providence River and Seekonk River are estuaries at the head of Narragansett Bay. The courses these rivers take was shaped by drainage of glacial meltwater during the retreat of the Laurentide ice sheet. The Providence outwash plane dominates most of the topography in this area creating a low-lying landscape apart from some hills to the west. Preglacial physiography included multiple cycles of uplift and erosion. The advance of the ice sheet during the Pleistocene preferentially eroded the softer sedimentary rocks in the Narragansett basin. Harder, more resistant crystalline rocks remain that surround the basin. Glacial deposits dominate the landscape as it appears today.

I. REGIONAL AND BEDROCK GEOLOGY

Providence Harbor and the surrounding land masses are part of the Avalon Terrane, which is made up of a Proterozoic basement that consists of metavolcanic and metasedimentary rocks. These basement rocks underwent emplacement of various plutons in the late Proterozoic through the Carboniferous. During the Carboniferous, clastic, nonmarine sedimentary rocks were deposited. Some of these rich in organics and are considered coal bearing. The Alleghanian orogeny resulted in compressive deformation of these rocks during the Permian, causing shearing along the Hope Valley Shear Zone within the Esmond-Dedham subterranean. This shear zone bounds Providence Harbor, and several border faults exist within Narragansett bay due to this shearing (Figure 1A).

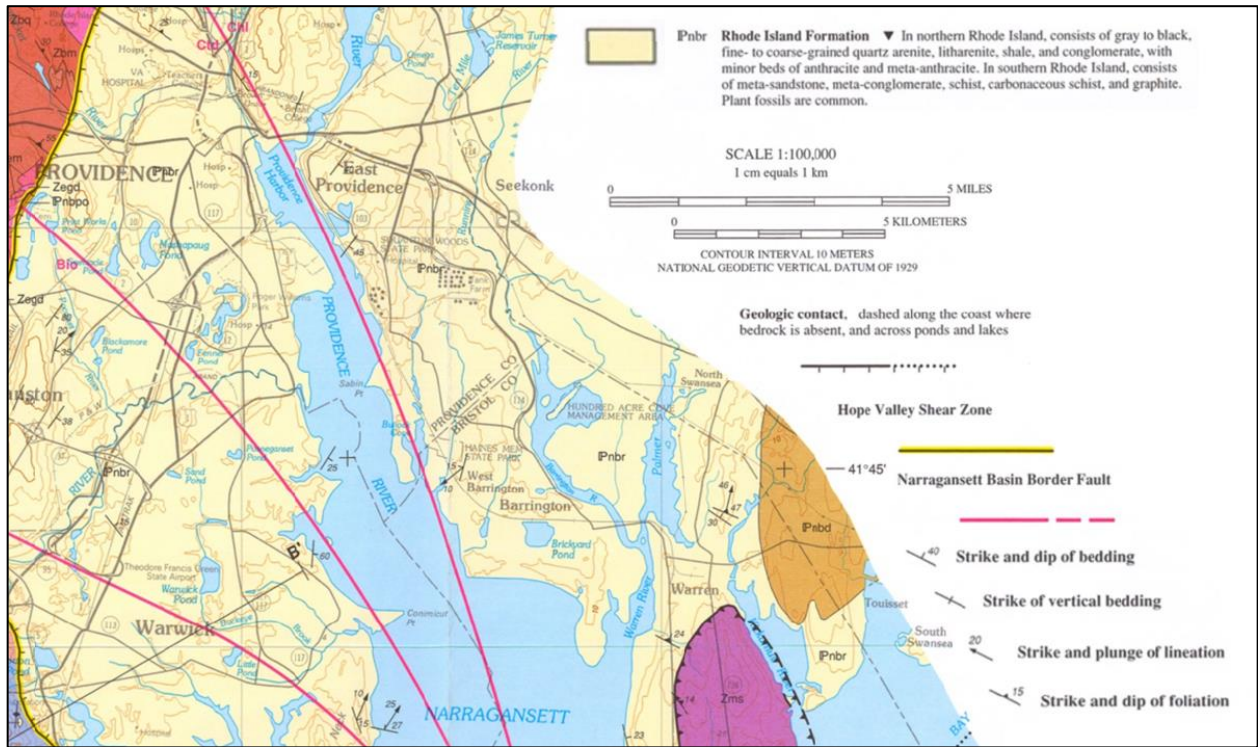


Figure 1A. Excerpt from Bedrock geologic map of Rhode Island: Rhode Island Geological Survey, showing High Valley Shear Zone (yellow) and Naragansett Basin Border Faults (pink) (Hermes, et al., 1994).

The primary rock type observed in Narragansett Bay is the Rhode Island Formation, which is part of the larger Narragansett Bay Group, a relatively younger (Pennsylvanian) sedimentary unit than the Esmond-Dedham subterranean it overlies. This unit consists of stratified rocks that were subsequently metamorphosed during Triassic to Jurassic regional uplift creating a synclinal basin with an axis that generally trends north-northeast (Figure 1B). In southern Rhode Island, these sedimentary rocks include meta-sandstone, meta-conglomerate, schist, carbonaceous schist, and graphite. Plant fossils are commonly found in these rock types (Hermes, et al., 1994).

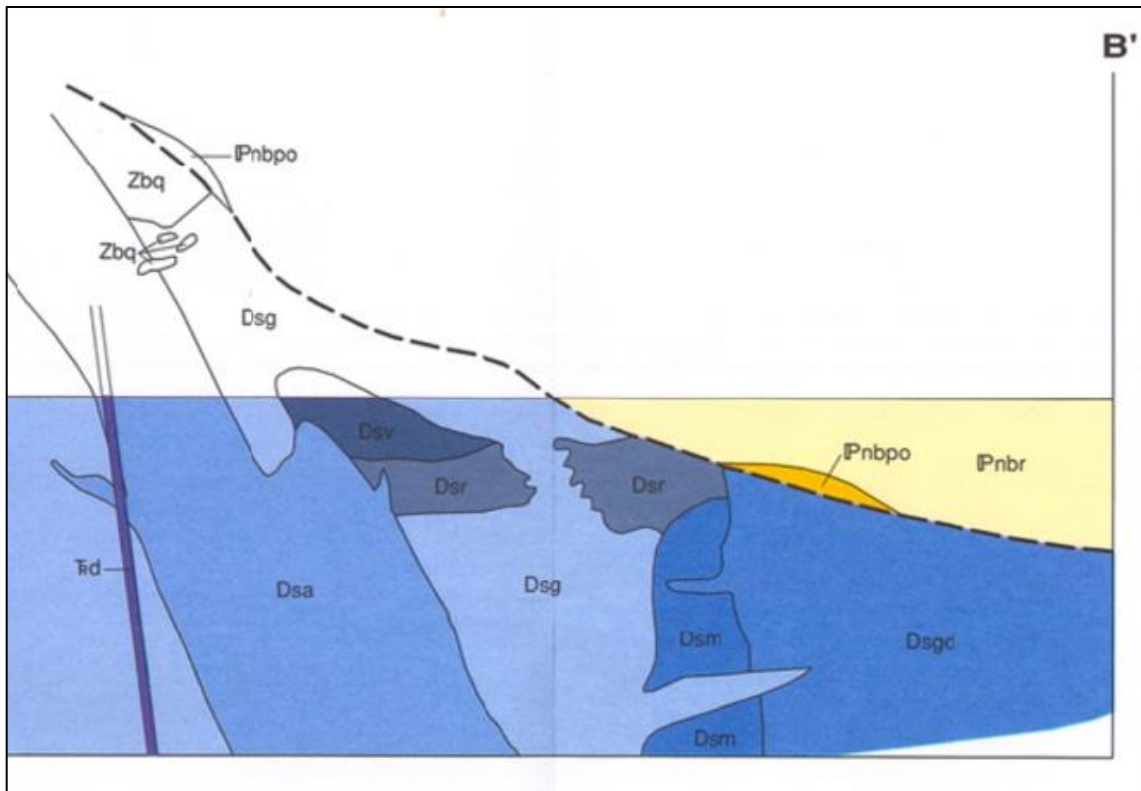


Figure 1B. Excerpt from cross section B-B' from the Bedrock geologic map of Rhode Island: Rhode Island Geological Survey, showing the Rhode Island Formation (light yellow) contact along a probable fault (dashed line) and older underlying rocks of the Esmond-Dedham Subterranean (blue units) (Hermes, et al., 1994).

II. SURFICIAL GEOLOGY

Surficial geology in the Providence region is predominantly of glacial origin. A relatively thin layer of till mantles most of the bedrock, which is overlain by various types of glacial outwash. In the lower lying areas of Narraganset basin, there are deposits of stratified drift, e.g. kames, kame terraces, and outwash plains, which tend to grade into each other rather than forming distinct boundaries between morphologies.

The glacial geology of the Bristol (Narraganset Bay) and Providence (Providence River) quadrangles was mapped in 1950 and 1952 by J. Hiram Smith (Figures 2 and 3). The predominant units are as follows:

Qop deposits – outwash plains: mostly moderately to well-sorted sand and local deposits of coarse gravel

Qkt deposits – kame terraces: sand and gravel deposited by glacial meltwater streams between ice in the valley and the valley wall

Qic deposits – ice channel deposits: smaller ridges of sand and gravel e.g. eskers

Qk deposits – kames: irregularly shaped mounds of sand and gravel

Qgm – ground moraine: relatively thin layer of till on bedrock

Qsu – undifferentiated sand and gravel

The soil to the west of Providence River consists predominantly of outwash plain deposits of moderately to well-sorted sand with local deposits of coarse gravel. Several kame terrace deposits are mapped in Fields Point (Edgewood Shoals area) where deposits of sand and gravel had visible ice-contact slopes on all sides. The Fox Point area and most of Bristol and the islands in Narraganset bay are ground moraine (thin till over with lenses of sorted material over bedrock), or basal till, deposits flanked by kame terraces (Smith, 1956). It's common to encounter cobbles and boulders along the shores of Narraganset Bay that were shaped by glaciers (Figure 2 and Figure 3).

Modern alluvial and marine deposits are continuously deposited as part of the sediment load of the Providence River. Alluvium tends to be well sorted, but the grain size varies from place to place in the harbor due to drift in the stream path and changes in water level over time. The best characterization of these recent sediments within the FNP is in Section 5, Previous Subsurface Investigations.

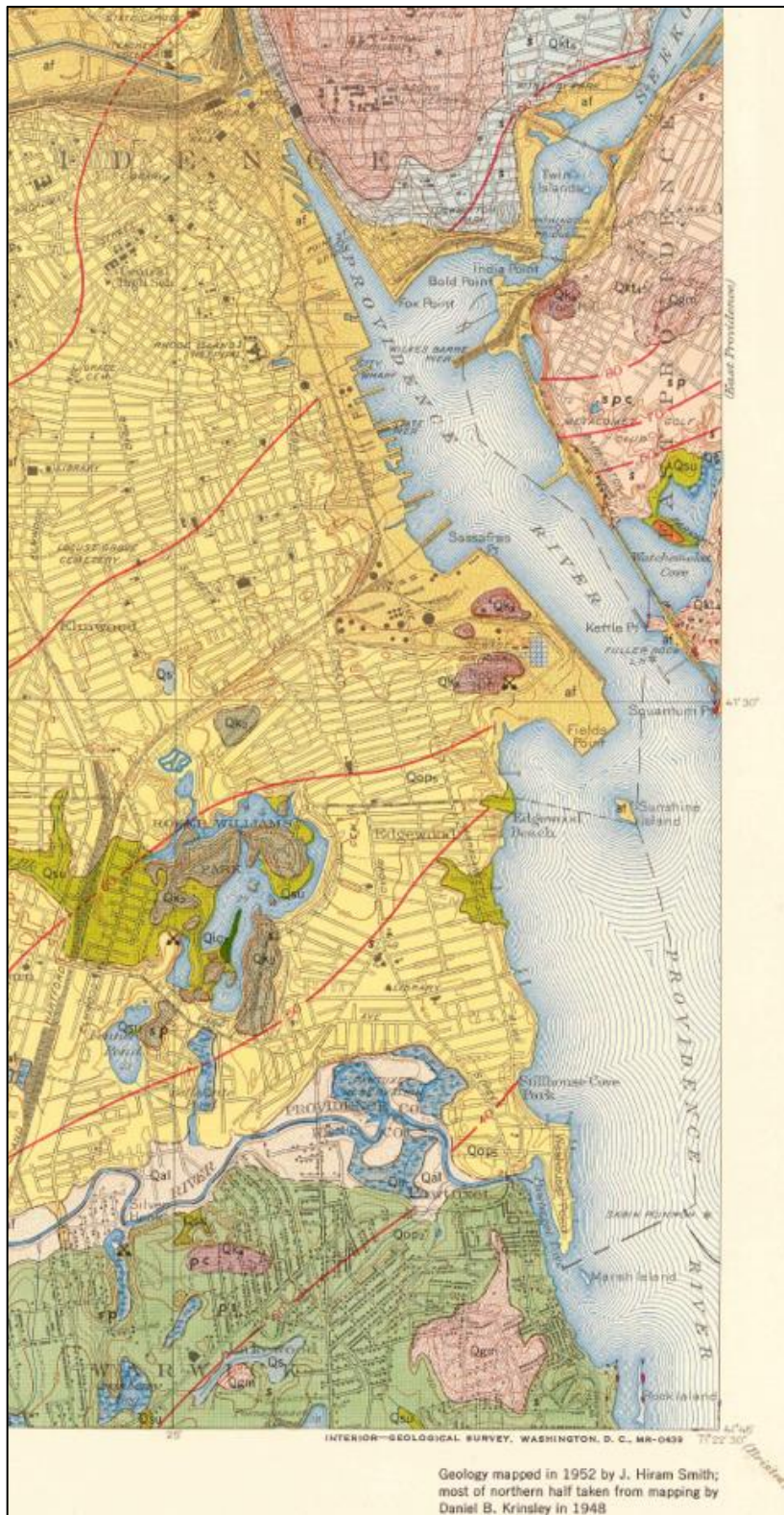


Figure 2. Excerpt from Surficial geology of the Providence quadrangle (Smith, 1956).

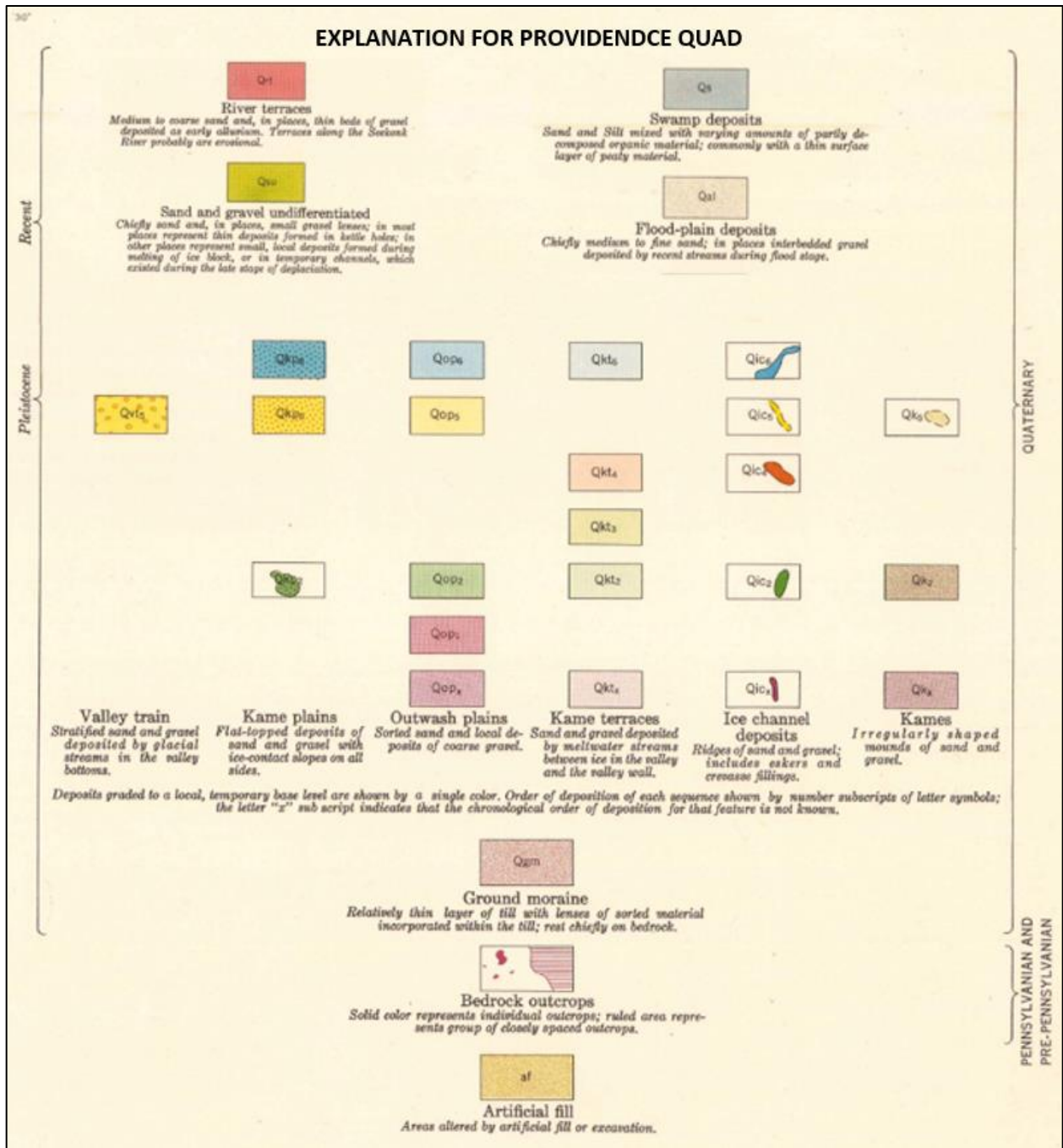


Figure 2. Legend for Surficial geology of the Providence quadrangle (Smith, 1956).

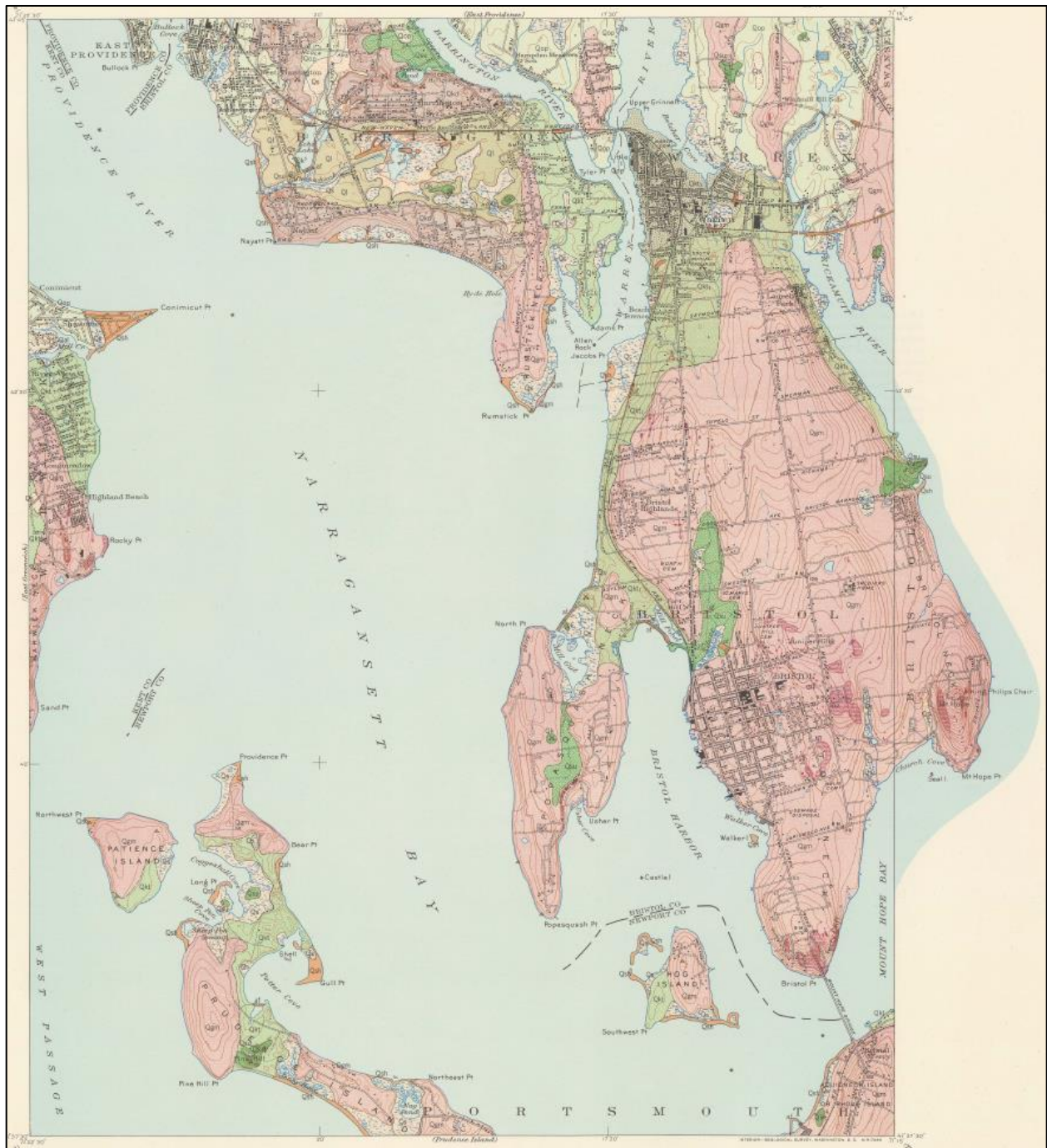


Figure 3. Excerpt from Surficial geology of the Bristol quadrangle and vicinity (Smith, 1955).

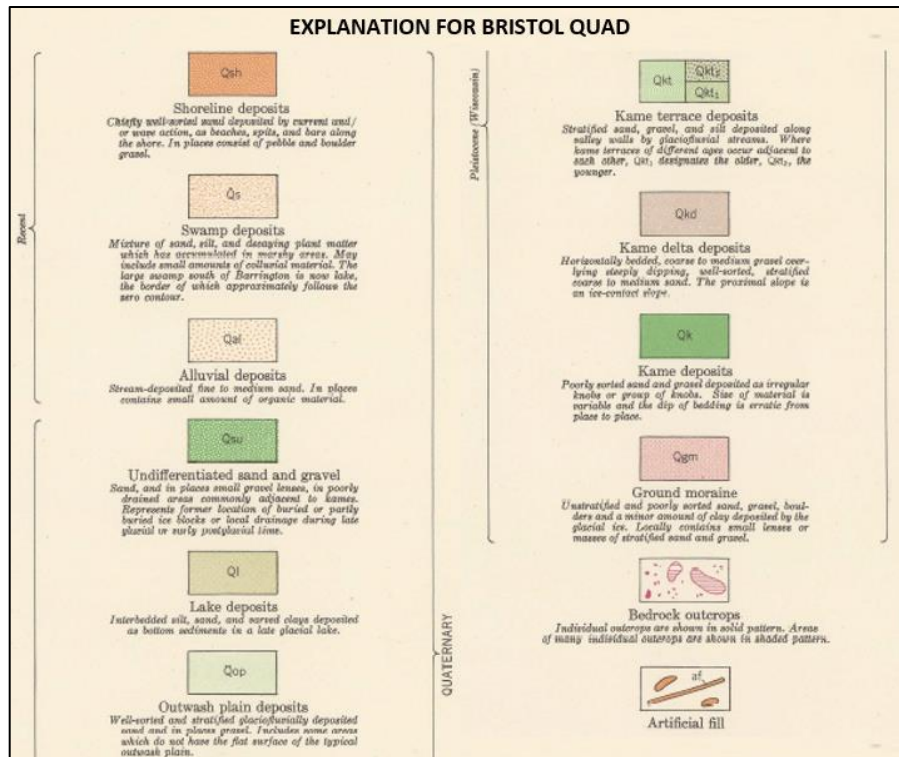


Figure 3. Legend for Surficial geology of the Bristol quadrangle and vicinity (Smith, 1955).

5. PREVIOUS SUBSURFACE INVESTIGATIONS

GZA SUBSURFACE INVESTIGATION 2018

GZA's services were provided in response to US Army Corps of Engineers (USACE) Request for Proposal (RFP), dated June 21, 2017, Delivery Order/Call No. W912WJ17F0126 under Contract Number W912WJ-16-D-0003, between GZA and the United States Army Corps of Engineers New England District (District), dated September 6, 2017. GZA performed a subsurface exploration, laboratory testing, and interpretation of results compiled in a report of explorations. The objective of the assignment was to conduct marine subsurface drilling investigations in specific areas of the Providence River within the Federal Navigation Project (FNP) north of Fields Point and outside the FNP south of Fields Point to assess bottom conditions for the construction of Confined Aquatic Disposal (CAD) cells. The project consisted of performing four (4) borings and six (6) probes, an evaluation of sediment and overburden soils, and execution of a geotechnical laboratory testing program to identify material properties. The investigation aimed to identify the presence, frequency, and consistency of dense soils and bedrock that could affect potential CAD cell locations and/or require alternative dredging approaches e.g. mechanical rock removal or underwater blasting.

Borings were drilled using drive and wash drilling techniques with 4-inch casing. Split-spoon sampling was conducted at 10-foot intervals using a 3-inch-outside-diameter, 24-inch-long split-spoon sampler. Refusal of the sampling spoon for the purposes of this project was defined as 100 blows per 1 inch of penetration, or bouncing refusal, and verified by advancing the roller bit 3-feet beyond observed refusal. Probes were drilled using drive and wash drilling techniques with 4-inch casing and a 3-inch or 4-inch rollerbit. Typical probe drilling consisted of driving casing from mudline to casing blow count refusal, then advancing the rollerbit to target elevation or rollerbit refusal criteria. Probe refusal was defined as rollerbit drilling 3-feet into the refusal material. Bedrock was not cored during this investigation; however, bedrock was inferred by observing rollerbit effort, penetration time, and boring wash-water.

Visual classification of the soil samples was performed in accordance with Visual-Manual Procedures (ASTM D2488) and the Unified Soil Classification System (USCS). Probe data was recorded on the same log as the boring logs and included location, depth, drilling effort, and wash-water description. Soil samples were chosen to represent the varying lithology encountered and classified in accordance with ASTM D-2487. Soil samples were analyzed for grain size and Atterberg limit analysis in accordance with ASTM D-6913 and D-4318, respectively.

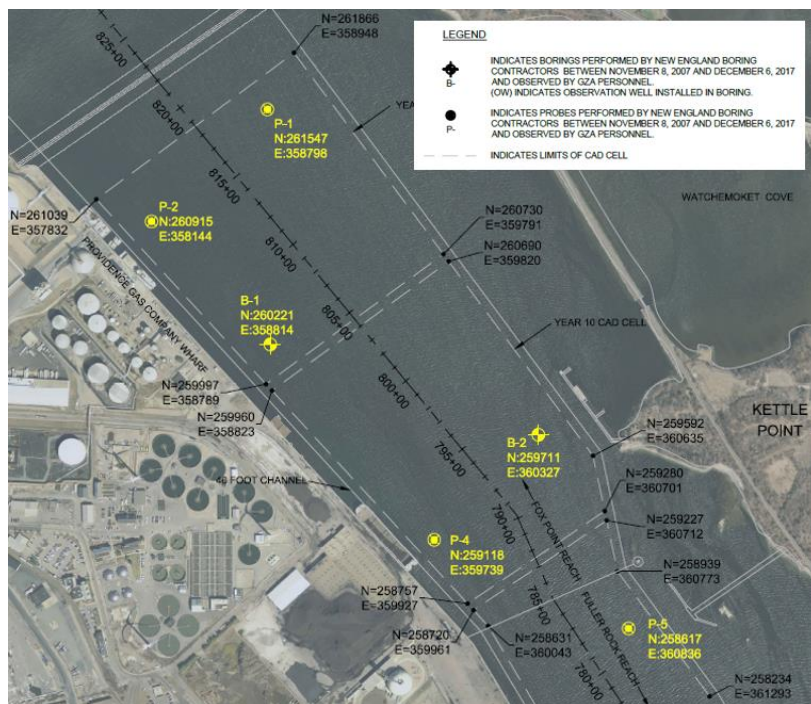


Figure 4. Excerpt from the exploration location plan (USACE, 2018).

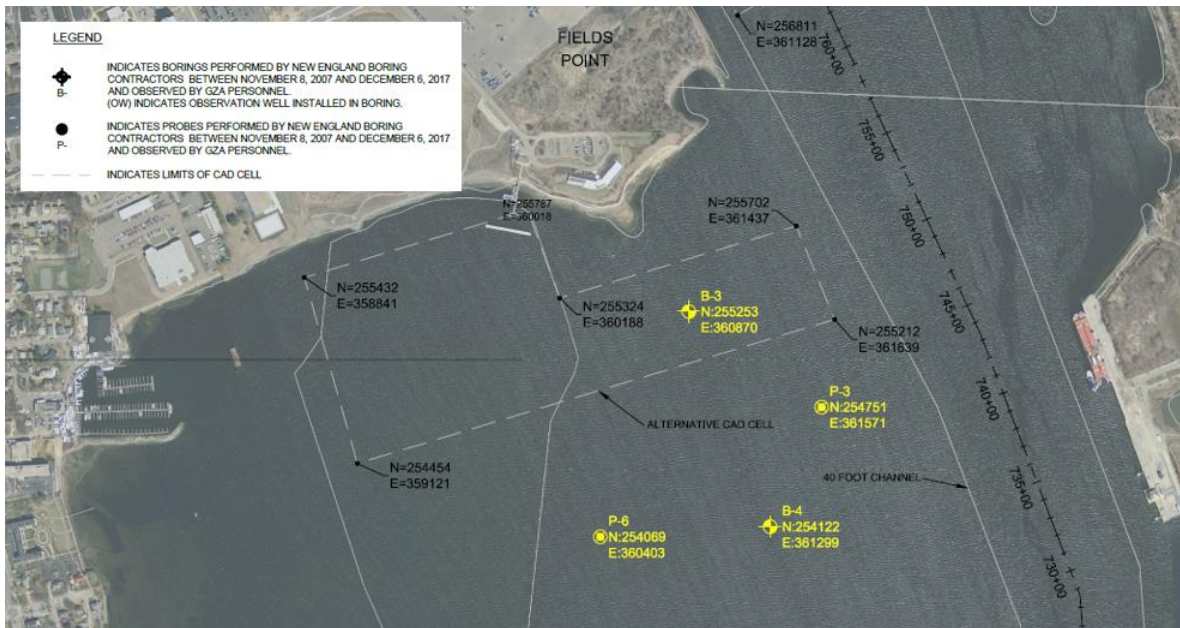


Figure 5. Excerpt from the exploration location plan (USACE, 2018).

The borings and probes were advanced to approximately El. -60 to -110 feet MLLW. The following material types were encountered during the subsurface investigation:

River Sediment: Approximately 7 to 36 feet of river sediment was encountered in all borings. The river sediment generally consisted of very loose, high plasticity black organic silt with shells and vegetative fibers at the surface changing to gray silt and shells at greater depths.

Glaciofluvial/Glaciomarine Outwash: All borings encountered a medium dense to very dense silt/sand/gravel deposit beneath the river sediment that ranged from approximately 2 to 42 feet thick. This stratum was interpreted as glaciofluvial/glaciomarine outwash and consisted of non-plastic stratified silt with clay and fine sand layers in some portions of the site and gravelly fine to coarse sand and sandy gravel in other portions of the site.

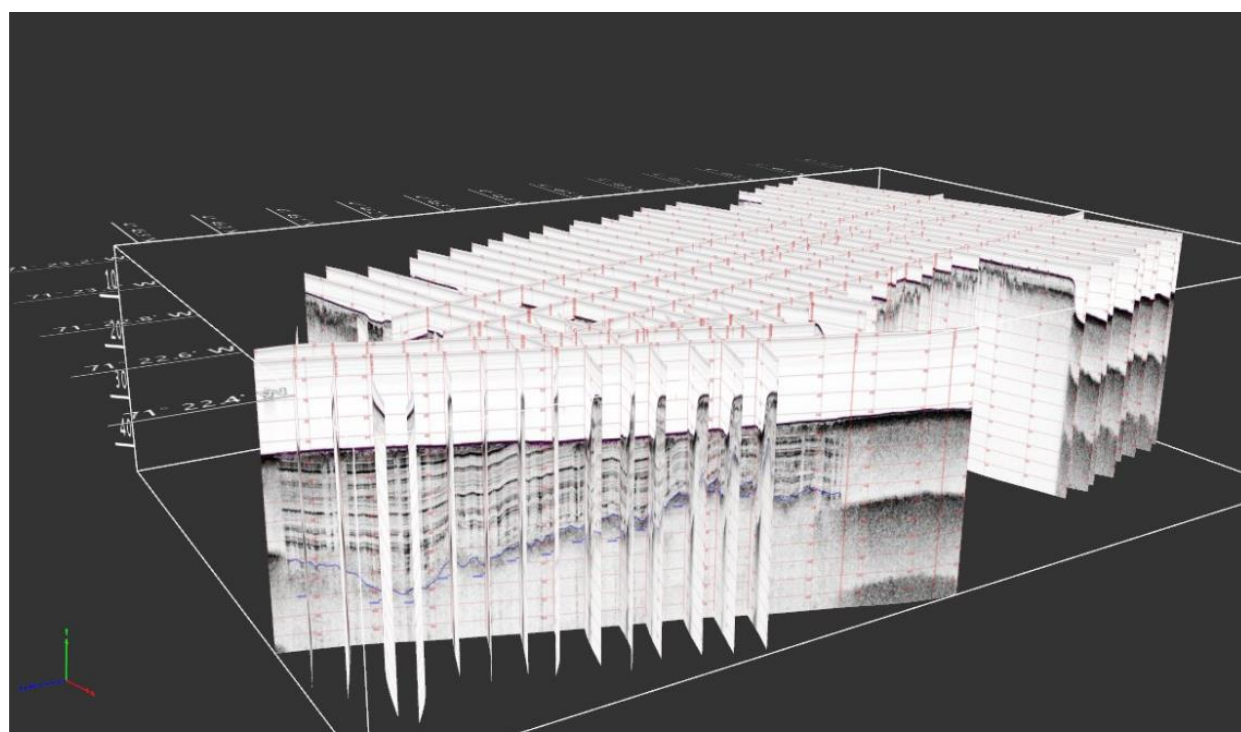
Glacial Till: Approximately 8 to 44 feet of dense to very dense silty gravel/sand stratum was encountered in three of the four borings, which was interpreted to be glacial till. This stratum was described as a poorly sorted mixture of silt, fine to coarse sand, clay, cobbles and boulders, typically not stratified.

Weathered Bedrock: Bedrock was not encountered everywhere but was inferred in one boring and three probes by advancing into the material with the rollerbit and observing effort, time, and wash-water. Weathered bedrock was inferred at approximately El. -106 feet MLLW in Fox Point Reach and between El. -53 and -95 feet MLLW in the area south of Fields Point.

2019 USACE SUB-BOTTOM PROFILER SURVEY

In 2019, USACE NAE’s Environmental Resources and Marine Programs Section performed a marine seismic reflection survey in order to identify potential CAD cell locations for further geophysical investigation. USACE NAE used a Compressed High Intensity Radar Pulse (CHIRP) sub-bottom profiler to survey the Edgewood Shoals area and a portion of the channel between stations 700+00 and 715+00. The output was a digital terrain model of the interpreted top of rock surface as well as a 3D model of the sub-bottom profiles in Fields Point Reach (Edgewood Shoals CAD cell area) and Sabin Point Reach.

The sub-bottom data were not calibrated for speed of sound through various sediment layers, but the survey provided the screening-level criteria needed to confirm these two sites as potential options for future CAD cell construction. An excerpt from the 3D model is shown in Figure 6.



Providence River - Fields Point and Sabin Point Reach		
Map Projection:	Company: USACE	Area: Providence River
Date: August 06, 2019	Chief Surveyor: R. Loyd	Vessel: R/V Nomad

Figure 6. Excerpt from a 3D model produced by NAE ERS indicating approximate top of rock surface in blue.

GEI SUBSURFACE INVESTIGATION 2021

USACE NAE authorized GEI to perform a marine subsurface exploration program on December 13, 2021, by a signed USACE Contract W912WJ-21-D-0001 and task order number W912WJ22F0002, dated December 8, 2021, between GEI and USACE-NAE. The intent of the exploration results was to support the design and construction of CAD cells as part of the Providence River DMMP. The marine subsurface exploration program included ten (10) borings in the Edgewood Shoals area and four (4) borings in the Fox Point Reach area of the FNP.

The borings were advanced through the moon well on the centerline of the barge using 4-inch minimum diameter driven flush joint steel casing and rotary wash drilling techniques (ASTM D5783). Standard Penetration Tests (SPTs) were performed in general accordance with ASTM Standard D1586. All soil samples were classified using the Unified Soil Classification System as defined in ASTM Standards D2487 and D2488. Soil samples for laboratory analysis were selected to represent the varying lithology encountered during the subsurface explorations. Laboratory analysis included grain size distribution (ASTM D6913), size distribution tests including hydrometer (ASTM D7928), Atterberg limits (ASTM D4318), and organic content (ASTM D2974).

Borings in the Edgewood Shoals area were advanced to El. -60' MLLW. The water column in the Edgewood Shoals area ranges from about 10 to 16-feet deep, therefore the borings extended approximately 50 feet into the sediment. Borings in the Fox Point Reach area were advanced to El. -100' MLLW. The water column in the Fox Point Reach area ranges from about 28 to 38 feet deep, therefore the borings extended approximately 60 feet into the sediment. The following material types were encountered:

River Bottom Sediment: An approximately 5- to 52-foot-thick layer of river bottom sediment was encountered below mudline in all borings. The upper portions of the river bottom sediment consisted of very soft, black, highly plastic organic silt and organic clay with shells and vegetative fibers. Strong marine-like, organic odor was observed in the soil samples collected in the upper 15 feet of this layer. At greater depths, the sediment transitioned to stiff to very soft, gray, low to medium plasticity silt to organic silt and organic clay with some peat fibers and shell fragments.

The consistency of the stratum ranged from very soft (Weight of Casing (WOC), Weight of Rod (WOR), and Weight of Hammer (WOH)) and less than two blows per foot material to stiff. In the Edgewood Shoals area, most of the soil at and above El. -60 feet MLLW was observed to be river bottom sediment.

Glaciomarine Outwash: A layer of glaciomarine outwash was encountered below the river bottom sediment in almost all the borings, and 12 borings were terminated in this layer. The thickness of the stratum ranged from 0.5 to 46 feet. This layer consisted generally of silty sand to widely graded sand with varying amounts of low-plasticity silt and gravel. Stratified, medium-

plastic clay and silt with fine sand layers was also observed.

Glacial Till: Glacial Till was encountered below the glaciomarine outwash in two of the borings in the Fox Point Reach area. The glacial till ranged from 0.3 to 22 feet thick. The SPT N-values in the Glacial Till ranged from 25 to 100 blows for less than 6 inches of penetration indicating a medium dense to very dense soil. The glacial till layer consisted of gray, unstratified narrowly graded gravel and silty sand with varying amounts of fine to coarse sand and non-plastic silt. The stratum was well-cemented. Boulders were encountered in at least one of the borings (FD22-06) in this unit as indicated by the drillers notes from 18 to 20 ft below the mudline, or El. -24.5 to -26.5 ft MLLW.

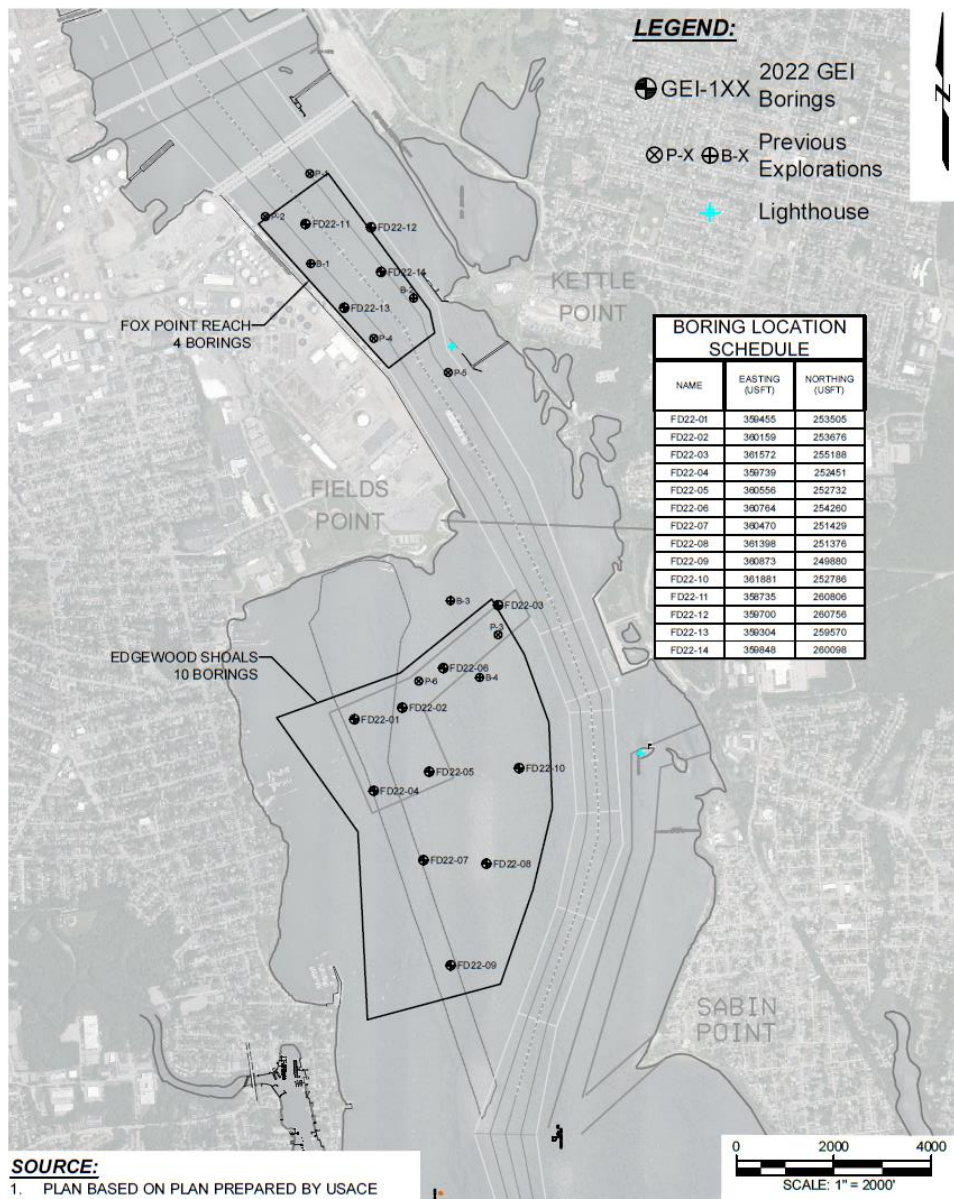


Figure 7. Excerpt from boring location plan (USACE, 2022).

6. SUBSURFACE CONDITIONS IN CAD CELL AREAS

This DMMP outlines three alternatives for CAD cell locations: Edgewood Shoals North (Alternative 1), Edgewood Shoals South (Alternative 2), and a main and starter CAD cells in Fox Point (Alternative 3). These CAD cell alternatives are detailed in the Engineering Appendix. The recommended plan is the Edgewood Shoals North CAD Cell and Beneficial Uses Alternative, which is Alternative 2A in the DMMP (See Section 8.2 in the main report). This plan recommends placement of dredged material from the Providence FNP for the first dredge cycle in one large CAD cell to be constructed within the northern central Edgewood Shoals embayment of the Providence River. Suitable materials excavated from the CAD cell construction would be beneficially used to cap Prudence Island Disposal Site with 3 feet of suitable material. Other sources of dredged material would also be placed in the CAD cell over 15 years until the CAD cell is full and then finally capped. The CAD cell would be a rectangular-shaped area covering 54.4 acres (~2,400,000 square feet), with lateral dimensions of 1,590 ft north-south and 1,490 ft east-west, dredged at a 1V:5H slope to an elevation of -60 ft MLLW. The vertical design grade of the slope is based on a slope stability analysis performed by NAE in 2022.

Previous subsurface investigations have described the following sediment types within the proposed CAD cell areas:

River Bottom Sediment: Recent (Holocene) river bottom sediment is pervasive throughout the FNP in varying thickness. The upper portions of this unit consist of very soft, black, organic silt and organic clay with shells and vegetative fibers with a strong marine-like, organic odor (OL to OH). At greater depths, this sediment transitions to a very soft to stiff, gray, low to medium plasticity silt to organic silt and organic clay with some peat fibers and shell fragments.

In the channel (Fox Point Reach area), this layer is relatively thinner due to previous dredging of the harbor to the authorized depth of El. -40 feet MLLW. Organic silt in the Fox Point Reach is about 5 to 16 feet thick, thickening towards the east. It is encountered from El -45 to -57 feet MLLW (Figure 8).



Figure 8. Organic river bottom sediment (typical) in Fox Point Reach. Sample S1 from depth 0 to 2 feet below ground surface (BGS) in boring FD22-11 (USACE 2022).

In the Edgewood Shoals area, most soil at or above El. -60 feet MLLW is river bottom sediment. Organic silt and clay (OL and OH) ranges in thickness. Inorganic silt and clay (ML and CL) are encountered below Organic silt and clay in most of the Edgewood Shoals area to the final depth of subsurface explorations at El. -60' MLLW. This unit is very loose; most standard penetration tests resulted in self-weight penetration (weight or rod or weight of hammer).



Figure 9. Organic river bottom sediment (typical) in Edgewood Shoals. Sample S1 from 0 to 2 feet BGS in FD22-02 (USACE 2022).



Figure 10. Inorganic river bottom sediment (typical) in Edgewood Shoals. Sample S8 from 16 to 18 feet BGS in boring FD22-02 (USACE 2022).

Glaciomarine Outwash: A layer of glaciomarine outwash is encountered below the river bottom sediment throughout the FNP. The thickness of this layer has not been fully characterized since many borings terminated in this unit. Historical surficial geology mapping efforts did not include characterization of marine sediments in Providence Harbor. The glaciomarine outwash unit consists generally of silty sand to widely graded sand with varying amounts of silt and gravel (SM, SW-SM, GW, SP-SM). Stratified clay and silt with fine sand layers was also observed (ML). The thickness of this stratum within the FNP ranges from 0.5 to deeper than the full authorized channel depth.



Figure 11. Glaciomarine outwash (typical) in Edgewood Shoals. Sample S14 from 38 to 40 feet BGS in boring FD22-05 (USACE 2022).



Figure 12. Glaciomarine outwash (typical) in Fox Point Reach. Sample S6 from 50 to 52 feet BGS in boring B-2 (USACE 2018). Note the stratification in the clay (red arrow).



Figure 13. Glaciomarine outwash (typical) in Fox Point Reach. Sample S6 from 19 to 21 feet BGS in boring FD22-12 (USACE 2022).

Glacial Till: Glacial Till was encountered below the glaciomarine outwash in only a few borings. The till consists of dense to very dense gray, unstratified narrowly graded gravel and silty sand with varying amounts of sand and silt. The stratum was well-cemented, and boulders and cobbles were encountered.

In the Fox Point Reach the top of glacial till was encountered in one boring at El. -99' MLLW on the western side of the channel and in one boring at El. -78 feet MLLW. In Edgewood Shoals glacial till was encountered in the northeastern portion of the shoals 18 to 38 feet below the mudline in B-3, B-4 and FD22-06, or between El. -18 and -45 feet MLLW.



Figure 14. Glacial till (typical) in Edgewood Shoals. Sample S13 from 36 to 38 feet BGS in boring FD22-06 (USACE 2022).

Bedrock: Bedrock was inferred in one boring (B-4) in Edgewood Shoals at El. -57 feet MLLW. Bedrock was also inferred in two probes in Edgewood Shoals, P-3 and P-6, at El. -100 to -72 feet MLLW, respectively. Weathered bedrock was inferred in one probe, P-4 in Fox Point Reach at approximate elevation of -106 feet MLLW.

7. REFERENCES

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ATTACHMENT A

SLOPE STABILITY ANALYSIS

PROVIDENCE RIVER AND HARBOR
RHODE ISLAND
FEDERAL NAVIGATION PROJECT
MAINTENANCE DREDGING

DREDGED MATERIAL MANAGEMENT
PLAN

SLOPE STABILITY ANALYSIS

1. SLOPE STABILITY

Several slope stability analyses were performed for the Fox Point Reach and Edgewood Shoals CAD Cells. Slope stability analyses were performed using Geostudio Slope/W module using the Morgenstern-Price method of slices. Analyses followed recommended methodology stated EM 1110-2-1902 Slope Stability.

Soil strata for the slope stability profiles were developed using the GEI “Providence River Harbor Subsurface Drilling Explorations” dated March 2022. The Fox Point Reach soil profile was developed using borings FD22-11, FD22-12, and FD22-14. The Edgewood Shoals soil profile was developed using borings FD22-01, FD22-02, FD22-06, B-4, B-3, and FD22-03. Boring locations are plotted on the drawings attached to the end of this attachment. These borings were of limited depth, so an “assumed gravel” strata was inserted into the models to represent additional granular material beneath the extent of exploration.

The strength parameters for the soil were developed using Standard Penetration Test blow counts with Terzaghi and Peck conversions. No Atterberg limits testing was performed for the organic and silt/clay materials encountered, nor vane shear. The strength parameters for the silt and clay were conservatively assumed based off the WOR to 6 blows/ft SPT results, as well as the descriptions in the boring logs. A cohesion of 250 psf was selected for the silt and organic layer. Organics had limited data and correlations beyond the blow counts, so a conservatively low cohesion of 150 psf was selected. Both drained and undrained analyses were performed, and the soil parameters are summarized below:

Table 1. Soil Strata.

Strata	Unit Weight	Cohesion	Friction Angle (Drained)	Effective Friction Angle (Undrained)
Assumed Granular	120 pcf	-	32°	32°
Dense Granular	120 pcf	-	32°	32°
Organic Silt	110 pcf	150 psf	0°	0°
Undrained Silt and Clay (ML, CL)	115 pcf	250 psf	25°	0°

Water level was assumed to be 0 ft MLLW. Each CAD cell is submerged at low tide and will not be subject to a partially saturated condition.

A factor of safety of 1.5 was required per EM 1110-2-1902. The CAD cell is planned to be open for several seasons before being capped and is considered to be a long-term slope condition.

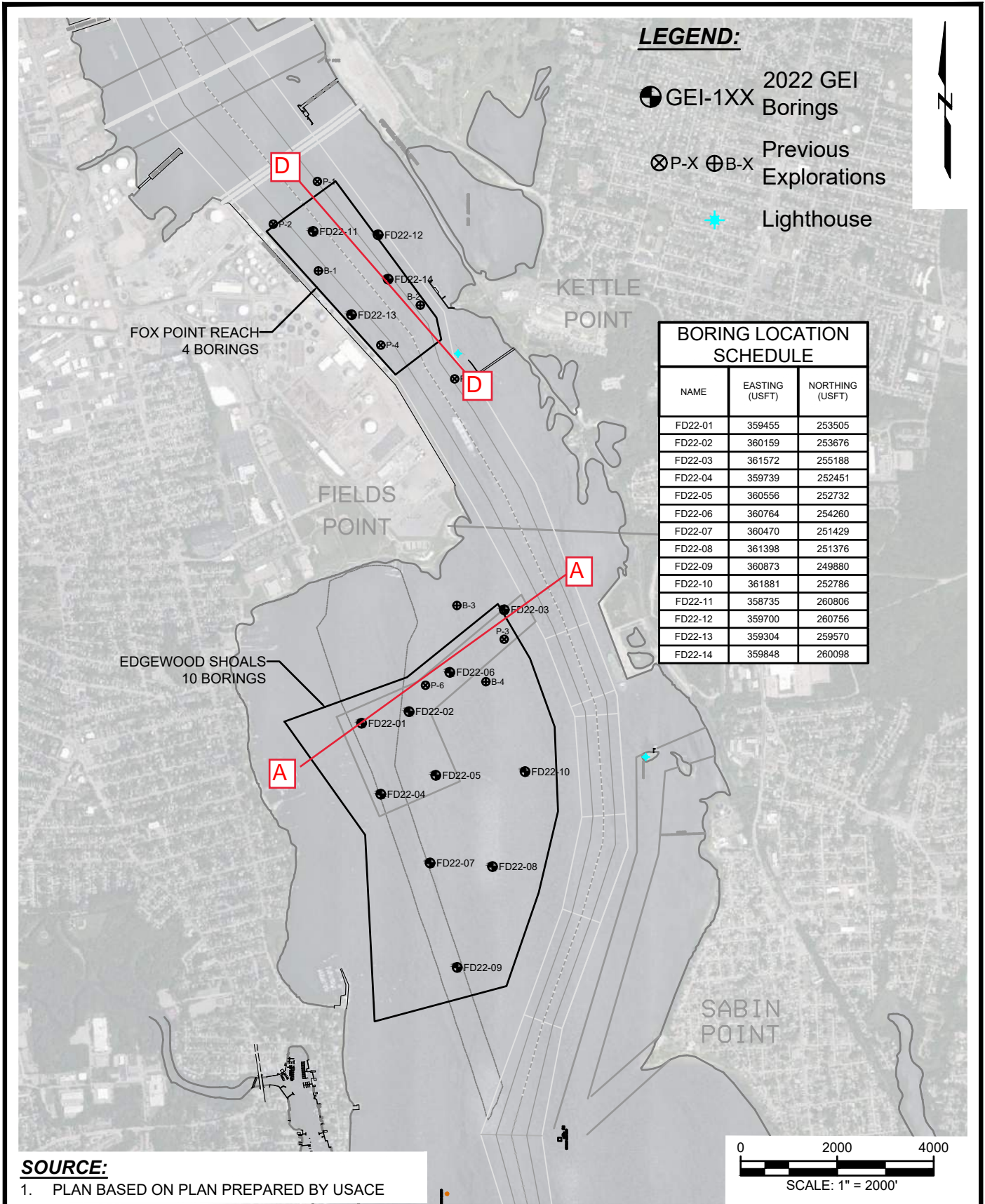
The results of the slope stability analysis are summarized below:

Table 2. Slope Stability Analysis.


Critical Slope Location for Each Grade	Load Condition	Slope	F.S.
Fox Point Reach (Upper) North Side	Drained	1V:3H	1.9
Fox Point Reach (Upper) North Side	Undrained	1V:3H	1.9
Fox Point Reach (Upper) North Side	Drained	1V:5H	3.1
Fox Point Reach (Upper) North Side	Undrained	1V:5H	3.1
Fox Point Reach (Upper) South Side	Drained	1V:3H	1.5
Fox Point Reach (Upper) South Side	Undrained	1V:3H	1.9
Fox Point Reach (Upper) South Side	Drained	1V:5H	2.4
Fox Point Reach (Upper) South Side	Undrained	1V:5H	2.9
Edgewood Shoals (Lower) East Side	Drained	1V:3H	1.4
Edgewood Shoals (Lower) East Side	Undrained	1V:3H	1.1
Edgewood Shoals (Lower) East Side	Drained	1V:5H	2.4
Edgewood Shoals (Lower) East Side	Undrained	1V:5H	1.6
Edgewood Shoals (Lower) West Side	Drained	1V:3H	1.5
Edgewood Shoals (Lower) West Side	Undrained	1V:3H	1.1
Edgewood Shoals (Lower) West Side	Drained	1V:5H	2.4
Edgewood Shoals (Lower) West Side	Undrained	1V:5H	1.6

The slope stability results indicate that the Fox Point Reach CAD Cell has an allowable slope stability of 1V:3H, while the Edgewood Shoals CAD Cell requires 1V:5H side slopes. The reason for the reduction in Edgewood Shoals side slopes is due to the presence of thick layers of low strength silt and clay strata indicated in the boring logs. The low strength silt and clay have less resistance to surface sliding and deep-seated slip circles, thus requiring the more stable 1V:5H slope.

The following pages include the Boring Location Plan from the March 2022 Providence River Harbor Subsurface Drilling Explorations and the slope stability profiles described in Table 2.

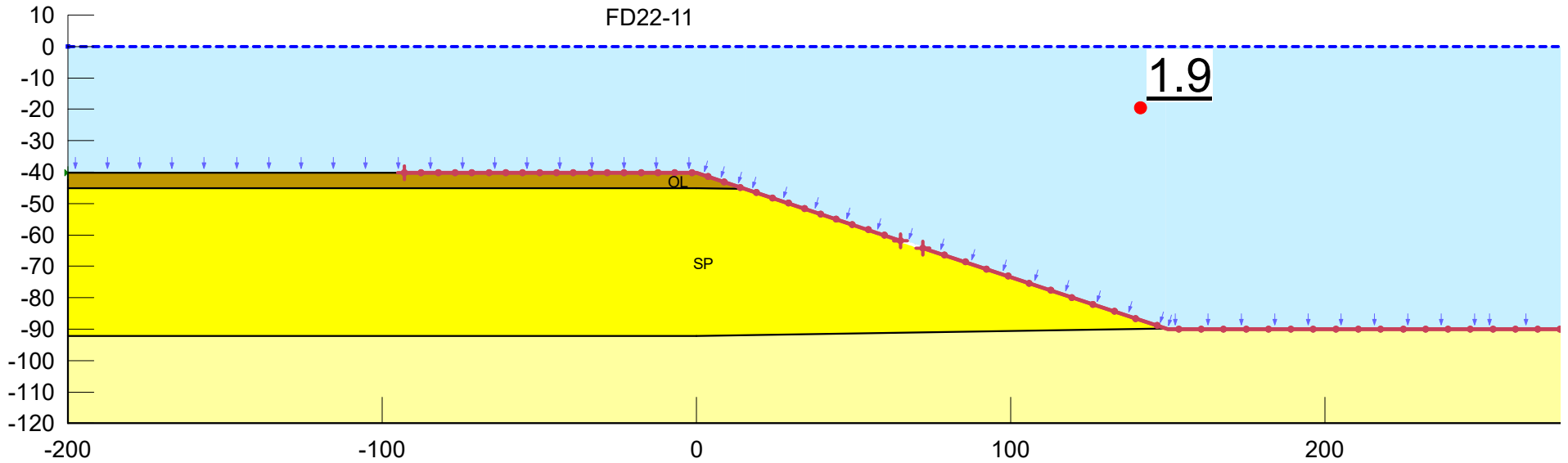


SOURCE:
 1. PLAN BASED ON PLAN PREPARED BY USACE





Providence River and Harbor Subsurface Explorations Report of Geotechnical Explorations Providence, Rhode Island		BORING LOCATION PLAN
U.S. Army Corps of Engineers, New England District Concord, Massachusetts	Project 2104664	March 2022 Fig. 2

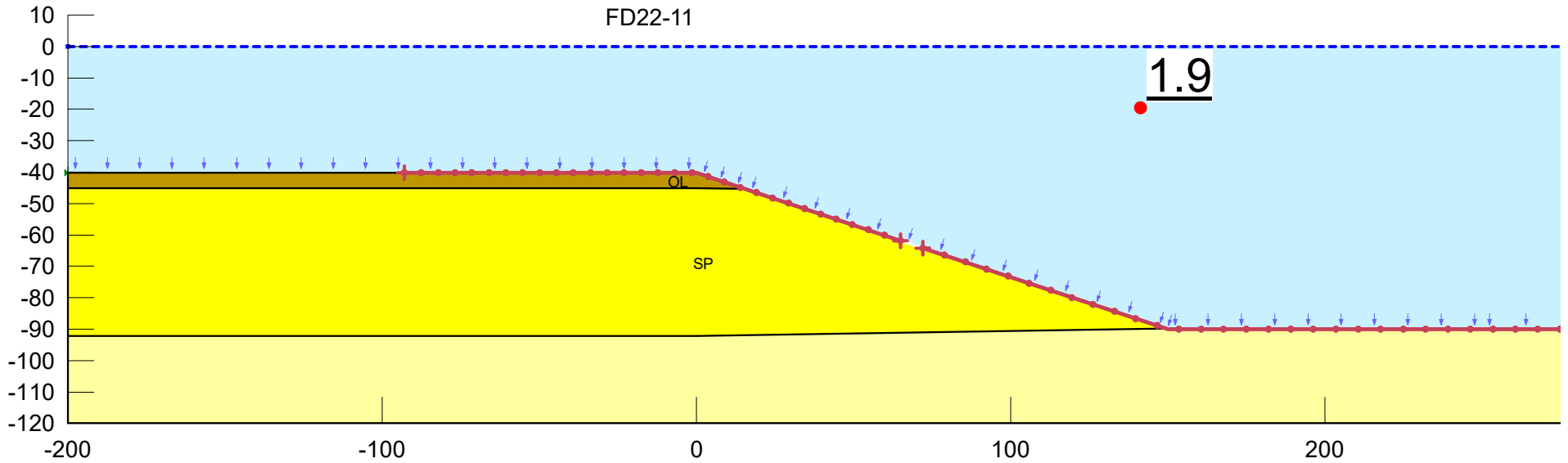
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence North 1:3 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Yellow	Assumed Granular	120	0	32
Yellow	Dense Granular	120	0	32
Cyan	Drained Silt and Clay (ML, CL)	115	0	25
Brown	Organic Silt	110	150	0



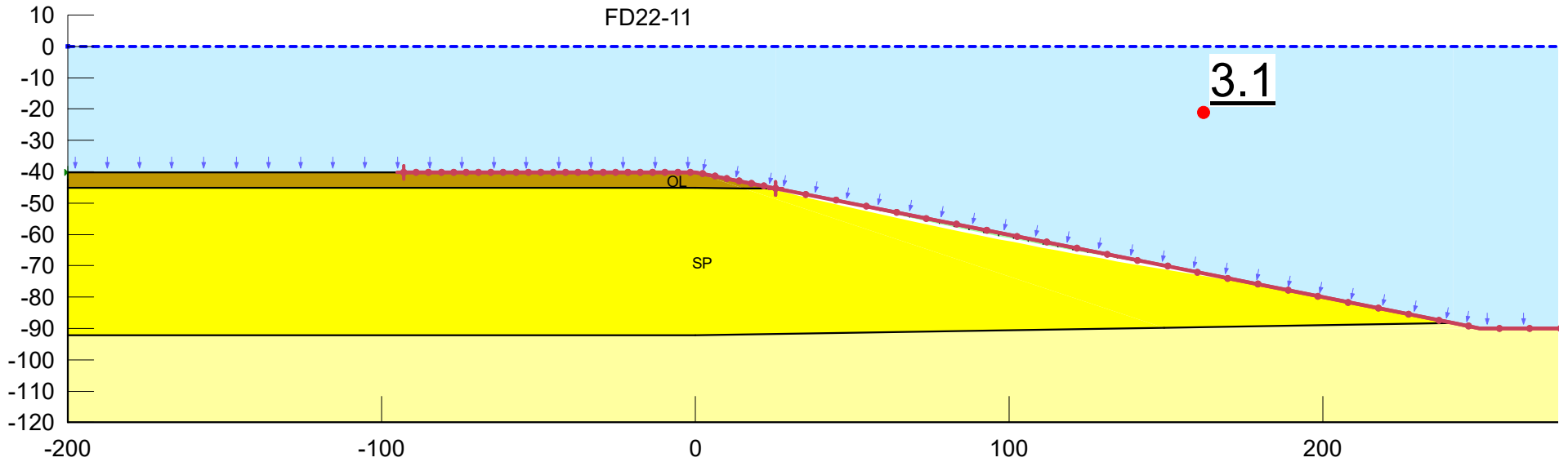
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence North 1:3 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0



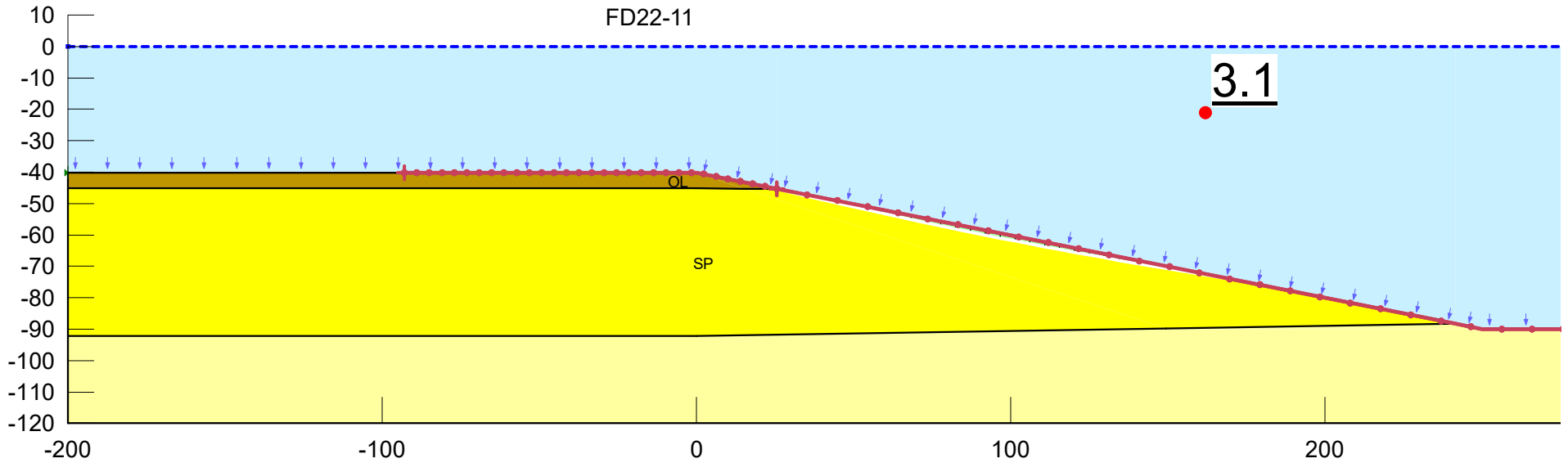
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence North 1:5 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Yellow	Assumed Granular	120	0	32
Yellow	Dense Granular	120	0	32
Cyan	Drained Silt and Clay (ML, CL)	115	0	25
Brown	Organic Silt	110	150	0







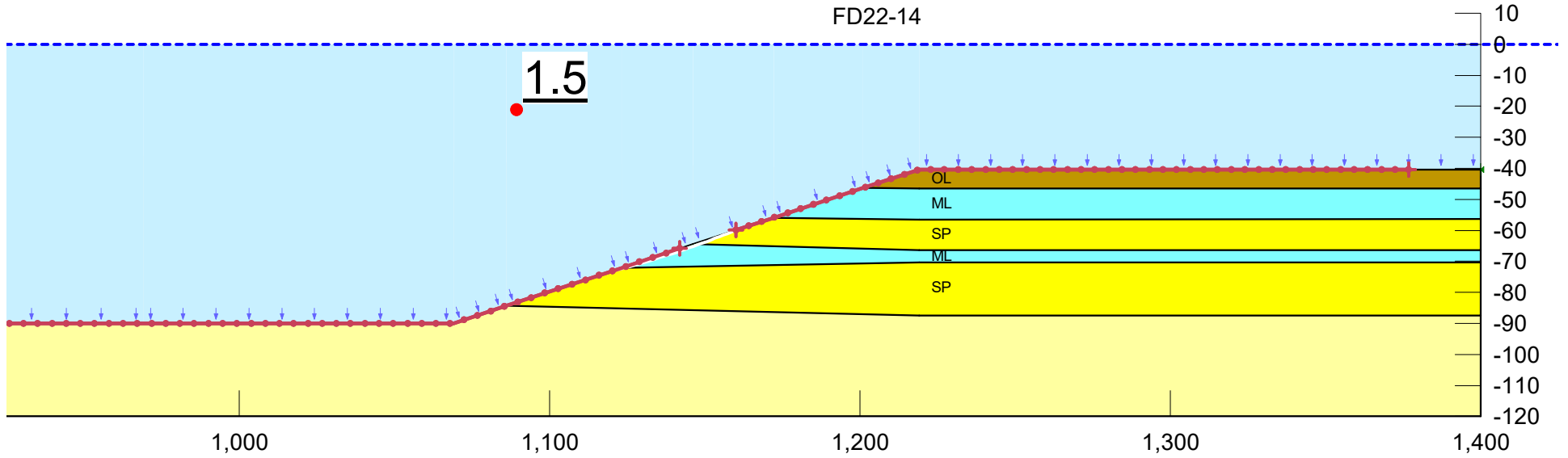
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence North 1:5 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Yellow	Assumed Granular	120	0	32
Yellow	Dense Granular	120	0	32
Brown	Organic Silt	110	150	0
Grey	Undrained Silt and Clay (ML, CL)	115	250	0







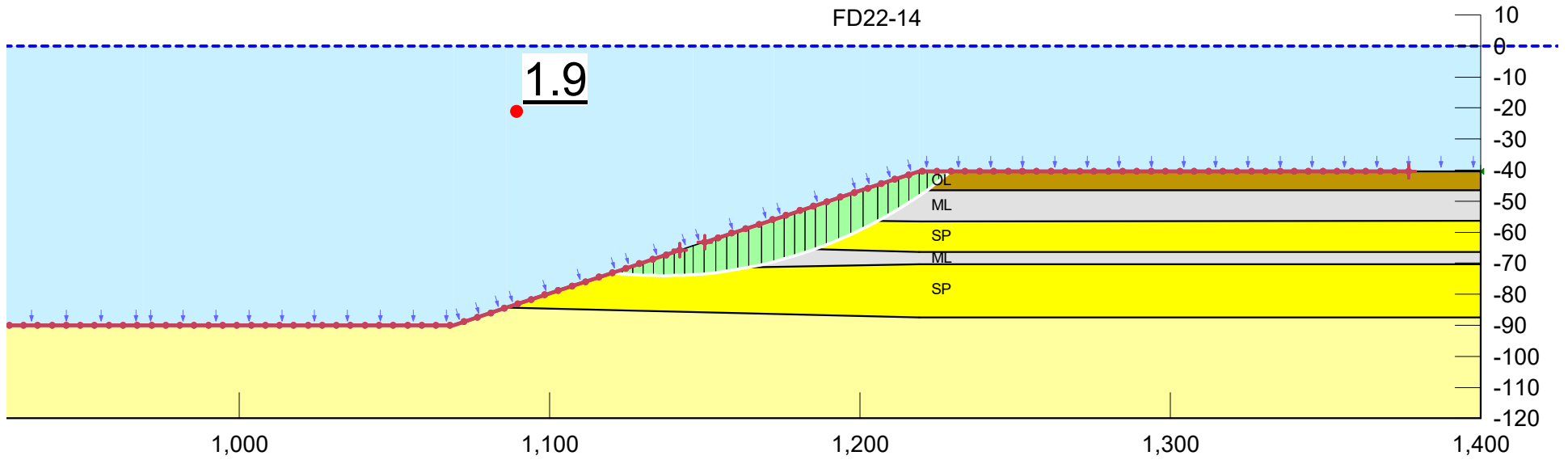
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 Fox Point Reach (Upper)
 Name: Upper Providence South 1:3 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
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	Dense Granular	120	0	32
	Drained Silt and Clay (ML, CL)	115	0	25
	Organic Silt	110	150	0



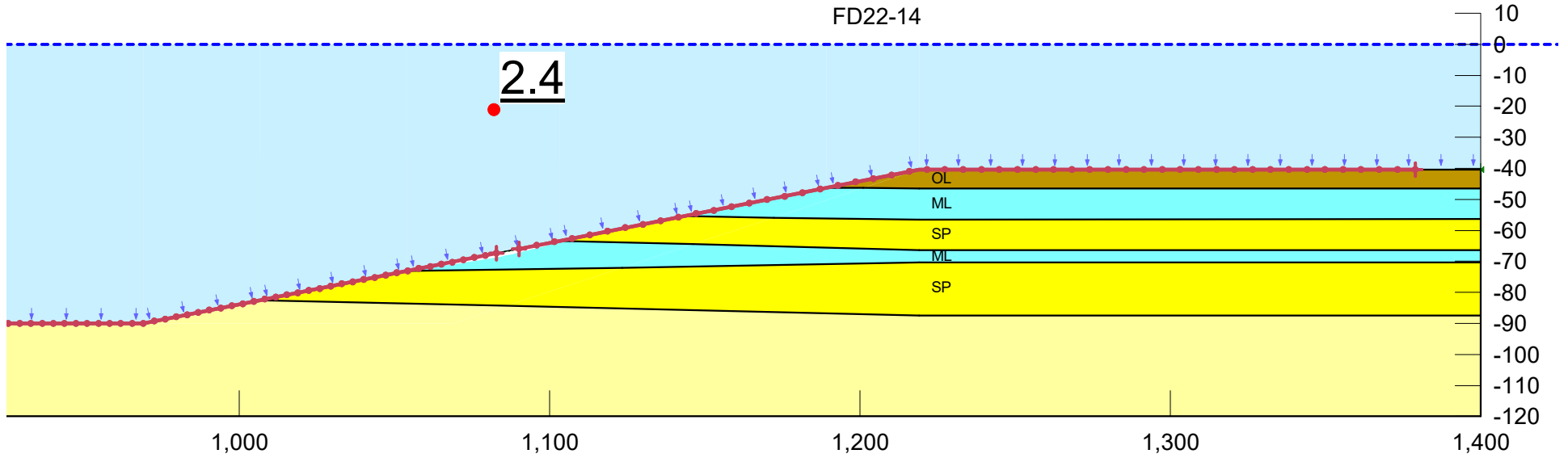
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence South 1:3 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
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	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0







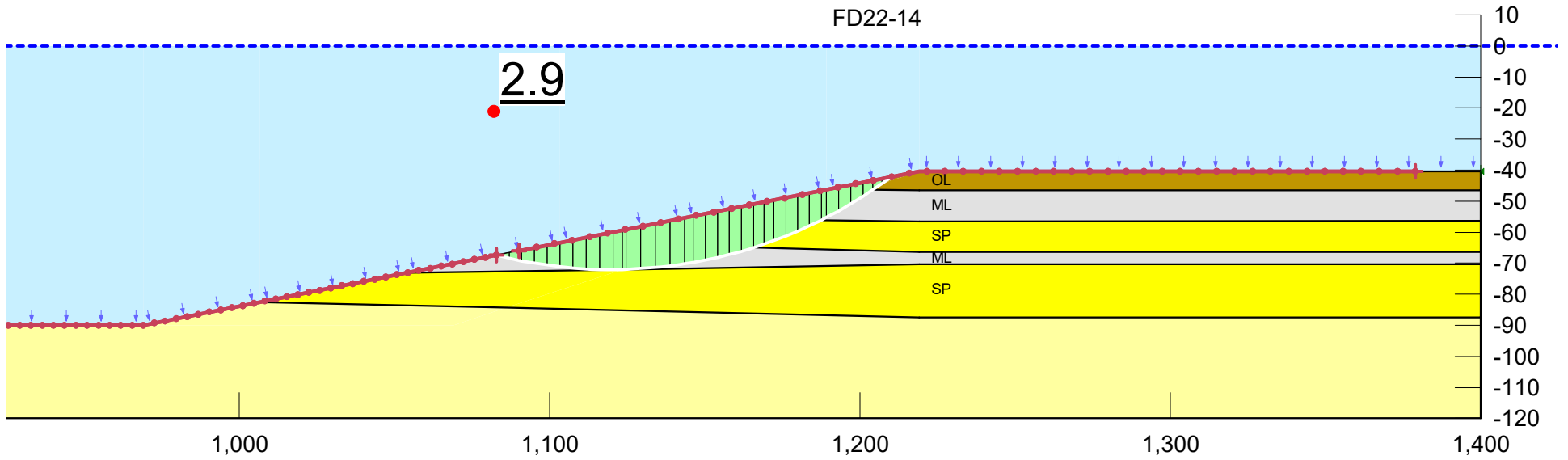
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence South 1:5 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Yellow	Assumed Granular	120	0	32
Bright Yellow	Dense Granular	120	0	32
Cyan	Drained Silt and Clay (ML, CL)	115	0	25
Brown	Organic Silt	110	150	0







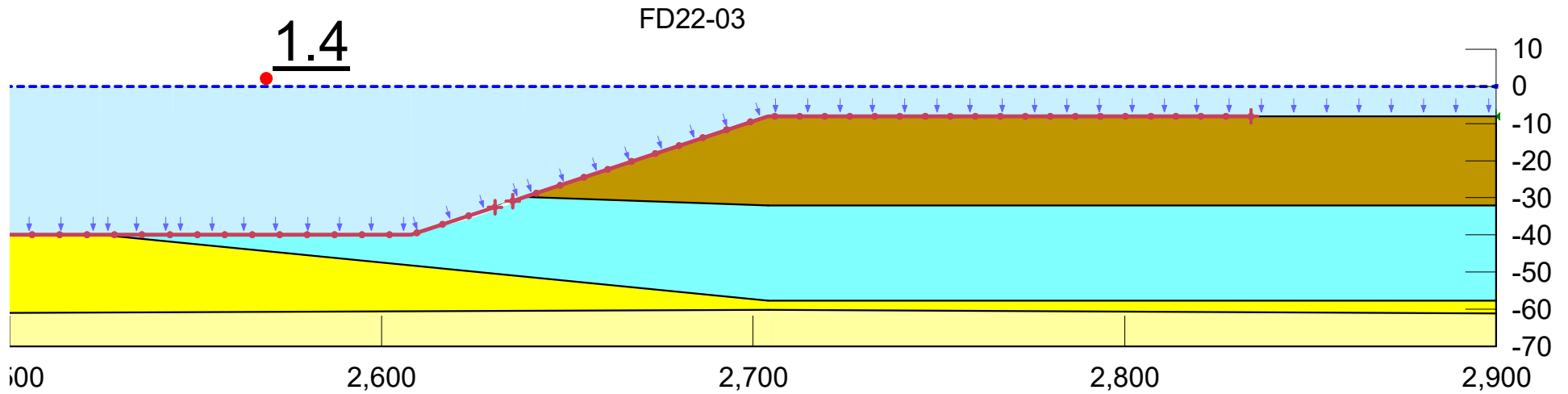
Providence DMMP
 Fox Point Reach (Upper)
 Name: Upper Providence South 1:5 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0







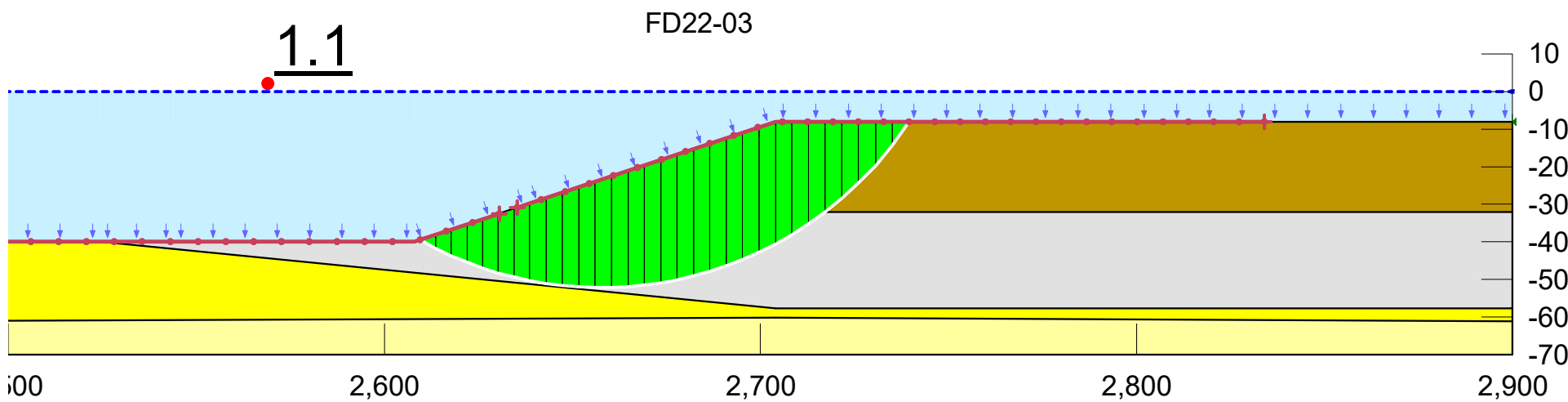
Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence East 1:3 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Drained Silt and Clay (ML, CL)	115	0	25
	Organic Silt	110	150	0







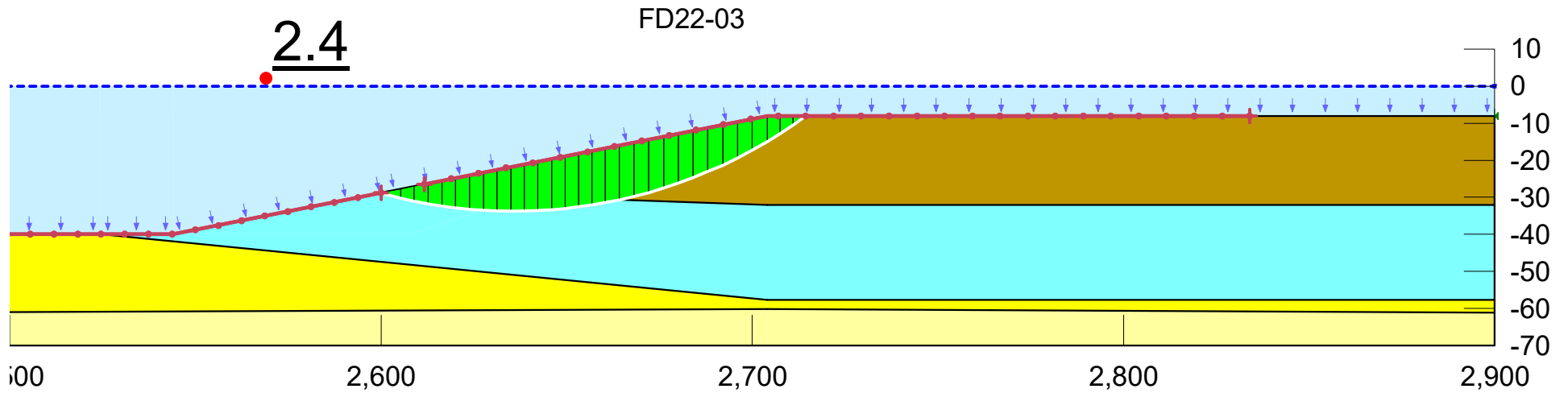
Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence East 1:3 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0







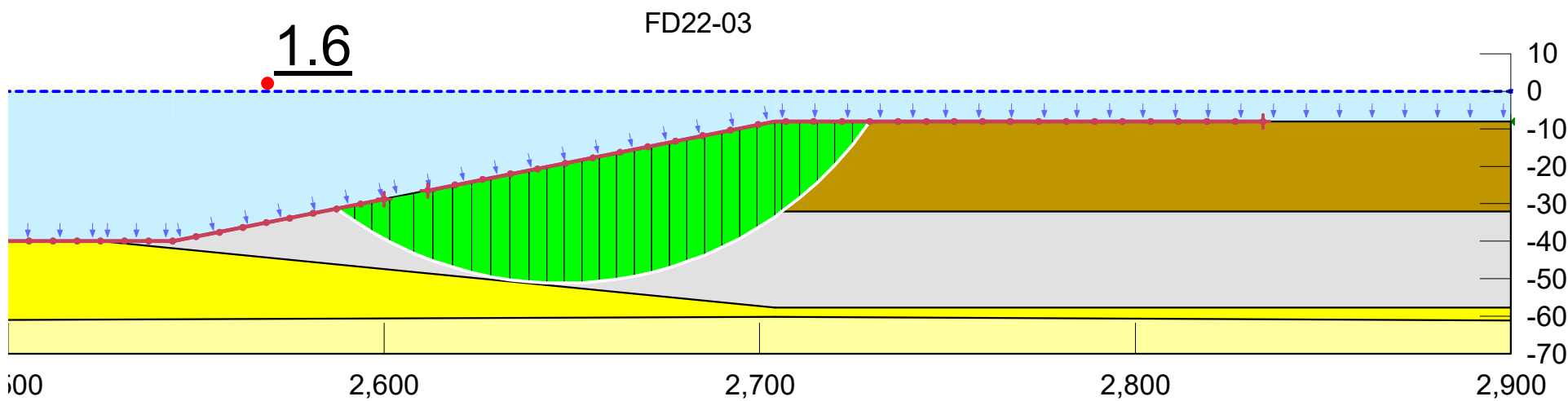
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 Edgewood Shoals (Lower Providence)
 Name: Lower Providence East 1:5 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Drained Silt and Clay (ML, CL)	115	0	25
	Organic Silt	110	150	0



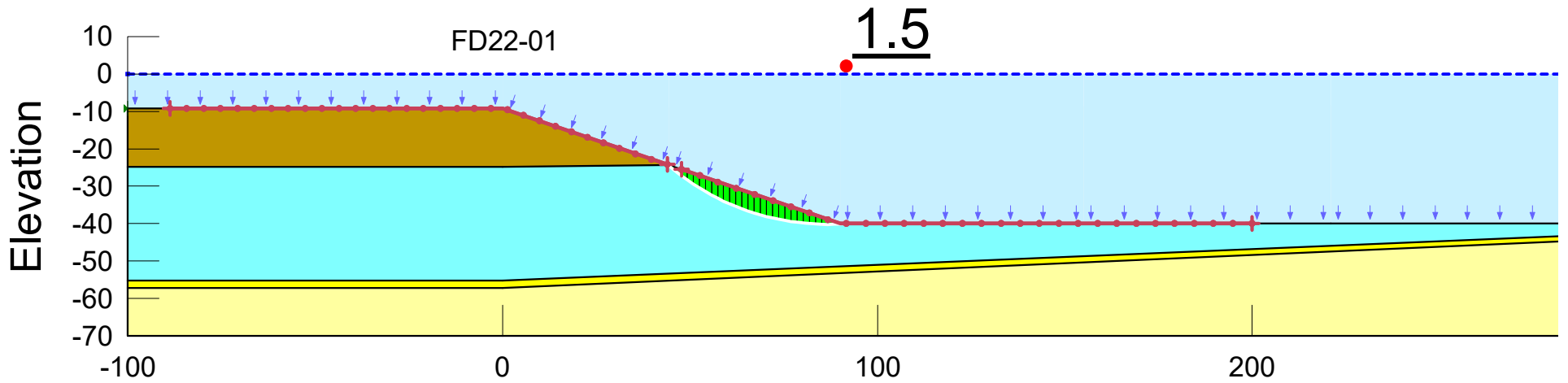
Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence East 1:5 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0







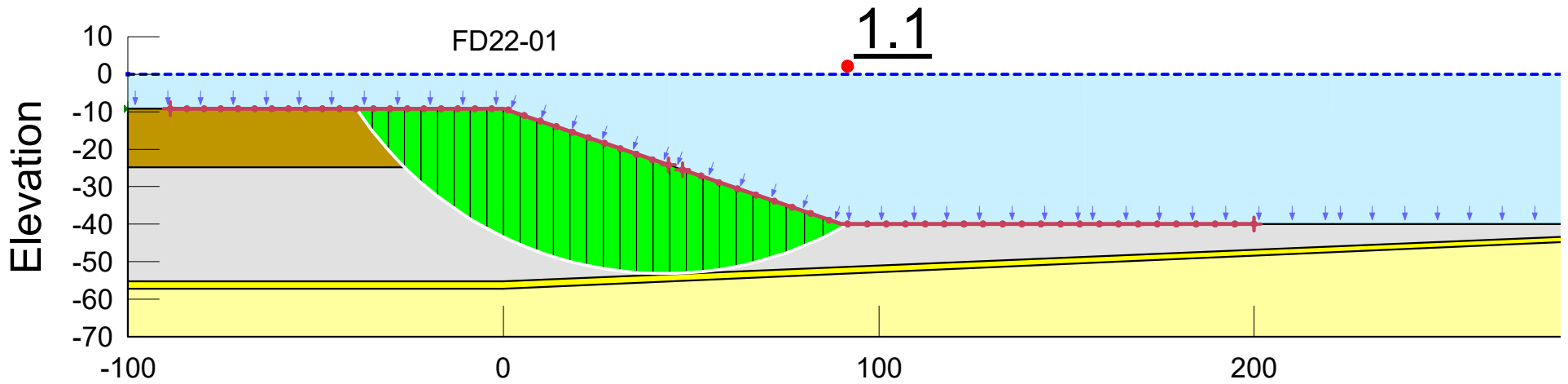
Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence West 1:3 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Yellow	Assumed Granular	120	0	32
Bright Yellow	Dense Granular	120	0	32
Cyan	Drained Silt and Clay (ML, CL)	115	0	25
Brown	Organic Silt	110	150	0



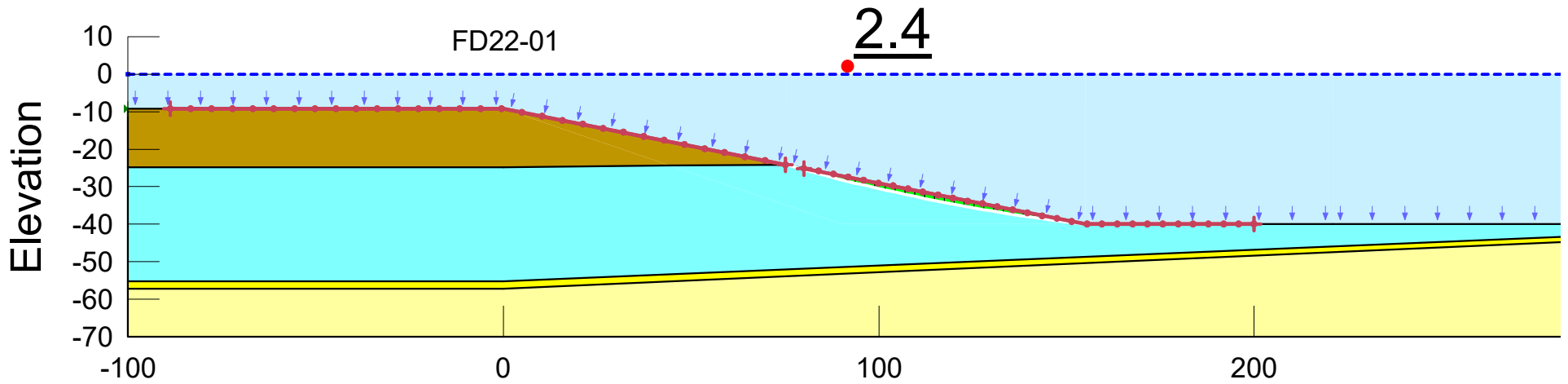
Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence West 1:3 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0







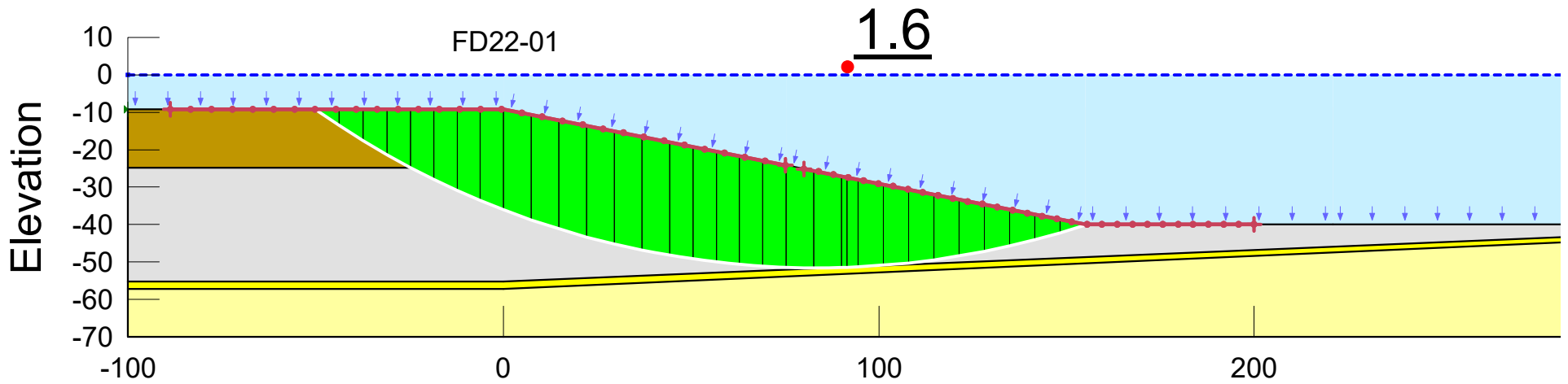
Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence West 1:5 Drained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Yellow	Assumed Granular	120	0	32
Yellow	Dense Granular	120	0	32
Cyan	Drained Silt and Clay (ML, CL)	115	0	25
Brown	Organic Silt	110	150	0



Providence DMMP
 Edgewood Shoals (Lower Providence)
 Name: Lower Providence West 1:5 Undrained

Color	Name	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	Assumed Granular	120	0	32
	Dense Granular	120	0	32
	Organic Silt	110	150	0
	Undrained Silt and Clay (ML, CL)	115	250	0



ATTACHMENT B

Final Report of Geotechnical Explorations Providence River and Harbor Subsurface Drilling Explorations (GEI Consultants, Inc, 2022)



Consulting
Engineers and
Scientists

Final Report of Geotechnical Explorations Providence River and Harbor Subsurface Drilling Explorations

Confined Aquatic Disposal Cells
Providence River DMMP
Providence, Rhode Island

U.S. Army Corps of Engineers
Contract No. W912WJ-21-D-0001

Submitted to:

U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Submitted by:

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801
781-721-4000

April 18, 2022
Project 2104664



Jeanne LeFebvre, P.E.
Senior Project Manager

Nancy Straub, P.E.
Senior Project Manager

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- B. Field Boring Logs
- C. Soil Sample Photographs
- D. Laboratory Data Test Results
- E. Daily Progress Reports
- F. Daily Safety Meeting Sheets

Final Report of Geotechnical Explorations
Providence River and Harbor Subsurface Drilling Explorations
Providence, Rhode Island
April 18, 2022

G. Daily Tidal Correction Logs

JAL

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1. Introduction

1.1 Purpose

This report presents the results of the marine subsurface exploration program at the Edgewood Shoals area and the Fox Point Reach (FPR) area for the Providence River Federal Navigation Project (FNP). The work was conducted by GEI Consultants, Inc. for the U.S. Army Corps of Engineers, New England District (USACE-NAE).

The explorations will support the design and construction of Confined Aquatic Disposal cells as part of the Providence River Dredged Material Management Plan in Providence, Rhode Island.

1.2 Authorization

Ms. Erin Bradley of the USACE-NAE authorized our work on December 13, 2021, by a signed USACE Contract W912WJ-21-D-0001 and task order number W912WJ22F0002, dated December 8, 2021, between GEI and USACE-NAE.

1.3 Scope of Work

We performed the following pre-field work for the explorations:

- Reviewed and evaluated available published geologic data and existing subsurface exploration data from previous explorations by others.
- Prepared a Work Plan, Accident Prevention Plan (APP) and Tidal Correction Plan for this project, including a plan showing proposed locations of our geotechnical borings.
- Driller notified DigSafe and a Local Notice to Mariners form was submitted to the U.S. Coast Guard.
- Held a kick-off meeting to review coordination requirements, project schedule, walkthrough of Work Plan and health and safety procedures outlined in the APP.

We performed the following exploration work:

- Engaged New England Boring Contractors (NEBC) to drill 14 borings over water from a spud barge.
- Coordinated the drilling and provided full-time observation of the borings.

We performed the following laboratory testing from samples within the borings:

- 15 grain size distribution tests. [ASTM D6913]

- 18 grain size distribution tests including hydrometer [ASTM D7928]
- 23 Atterberg limits test. [ASTM D4318]
- 9 organics content test. [ASTM D2974]

We completed this report of geotechnical explorations presenting the results of the geotechnical explorations, subsurface conditions and laboratory testing.

2. Site and Project Description

2.1 Site Description

The project site is separated into two distinct work areas: the Edgewood Shoals area (south of Fields Point) and the Fox Point Reach (FPR) area in the main channel of the Providence River. The Providence River FNP consists of a 16.8-mile-long navigation channel that is authorized to a depth of El. -40 feet mean lower low water (MLLW) and varies in width from 600 feet to 1,700 feet. The Federal channel extends from deep water in Narragansett Bay to the head of navigation near Fox Point in Providence, Rhode Island.

The FPR area is located within the main Federal channel and is narrow and dredged to approximately -40 feet MLLW, while the Edgewood Shoals area is wider with a mudline around -6 to -8 MLLW. A Site Location Map is included as Fig. 1.

2.2 Project Description

We understand the purpose of the project is to obtain geotechnical information to support the design of Confined Aquatic Disposal cells for disposal of maintenance dredging material of the Providence River, as part of the Providence River Dredged Material Management Plan.

The marine subsurface exploration program consisted of 14 exploratory borings with standard penetration tests (SPT); to evaluate the sediment and overburden soils and collect samples to perform geotechnical laboratory testing. Our borings were performed on the water using a marine plant consisting of a spud barge and a support boat.

The key elements of the field exploration program are as follows:

1. Edgewood Shoals Area – Advanced ten (10) borings to a maximum elevation of El. -60 feet MLLW. The typical water column in the Edgewood Shoals drilling area was 10-16 feet, therefore the borings were planned to extend approximately 50 feet into the river sediment.
2. Fox Point Reach Area – Advanced four (4) borings to a maximum elevation of El. -100 feet MLLW. The typical water column in the Fox Point Reach drilling area was 38 to 48 feet, therefore the borings were planned to extend approximately 60 feet into the river sediments.

2.3 Elevation and Horizontal Datums

All horizontal locations are reported on the logs referencing the Rhode Island State Plane and North American Datum of 1983 (NAD 83) in US survey feet. Elevations were surveyed in feet using the North American Vertical datum 1988 (NAVD 88) and converted to Mean Lower Low Water (MLLW) vertical datum. The conversion factor from NAVD 88 to MLLW for Providence, Rhode Island was obtained from the National Oceanic and Atmospheric Administration (NOAA) Tidal Elevation webpage for Station 8454000, Providence, Rhode Island, and is provided below:

$$\text{NAVD El. (feet)} + 2.47 \text{ feet} = \text{MLLW Elevation (feet)}$$

2.4 Site Geology

The project site is located in Providence River where subsurface information was not mapped in surficial geology maps or bedrock geology maps.

Based on the U.S. Geological Survey Surficial Geology of the Providence Quadrangle, Rhode Island, by J. Hiram Smith, dated 1956, the surficial soils in the area generally consist of Sand and Gravel and Artificial Fill. Sand and Gravel material described as Outwash Plains and Kame Terraces, including sorted sand and local deposits of coarse gravel as Outwash Plains; and sand and gravel deposited by meltwater streams between ice in the valley and the valley wall as Kame Terraces.

The U.S. Geological Survey Bedrock Geologic Map of Rhode Island (Hermes et al. 1994) identifies the bedrock at the project vicinity shoreline as Rhode Island Formation. Hermes et al. described the formation as gray to dark-gray, fine- to coarse-grained sandstone and lithic graywacke, and dark gray to black shale. The formation also includes conglomerate and meta-anthracite.

2.5 Previous Boring Data

Between November 8, 2017, and December 6, 2017, NEBC drilled four test borings and six probes in the Providence River for the USACE. The results of the explorations are documented in the “Report of Geotechnical Explorations, Providence River DMMP Subsurface Investigation”, by GZA GeoEnvironmental dated February 6, 2018. The test borings and probes were drilled to elevation of -59.9 to -110.5 feet MLLW. The locations of the previous borings and probes are shown in Fig. 2.

3. Subsurface Explorations and Testing

3.1 2022 Borings

GEI engaged NEBC to perform the 14 soil borings (FD22-01 through FD22-14) between January 20, 2022, and February 10, 2022. Boring locations are shown in Fig. 2. The Final boring logs are provided in Appendix A, and the Field boring logs are provided in Appendix B. A summary of the boring locations is presented in Table 1.

NEBC engaged Diligent Marine to provide a barge with spuds, with dimensions about 20 feet wide and about 56 feet in length and spuds 55 feet in length, for the borings. The borings were performed using a CME 45C skid drill rig mounted on a utility trailer and secured to the deck of the spud barge. The borings were advanced through the moon well on the centerline of the barge using 4-inch minimum diameter driven flush joint steel casing and rotary wash drilling techniques (ASTM D5783). Casing was used through the water column and into the subsurface materials. Samples S8 and S9 in boring FD22-11 were collected “open hole”, where the roller bit was advanced beyond the casing to the next sampling interval.

The borings in the Edgewood Shoals area were drilled to elevations -28 to -60 feet MLLW, and the borings in the FPR area were drilled to elevations -57 to -92 feet MLLW. The borings were terminated when the required elevation was achieved or as requested after coordinating with the USACE-NAE.

Mudline elevations at the boring locations were estimated from the measured depth to mudline below the water level and the tide elevations from the National Oceanic and Atmospheric Administration (NOAA) Tides and Currents for the Providence, RI Station No. 8454000. The locations of the borings were surveyed by GEI using a Leica Viva GNSS GS14 receiver (SmartPole) Real Time Kinematic (RTK) survey instrument. Upon completion, the borings were backfilled with soil cuttings.

The GEI field engineer was present on a full-time basis to document the position of the barge, document the as-drill the location of each boring, log the borings, classify and photograph soil samples, and observe the performance of the SPTs.

Daily field reports prepared by GEI providing a summary of the daily operations, communications and personnel are presented in Appendix E.

3.1.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) were performed in general accordance with ASTM Standard D1586. A safety hammer with rope and cathead lifting system was used to drive the 24-inch long, 2-inch-O.D. split-spoon sampler over a 30-inch drop. Split-spoon sampling intervals varied across the borings. As outlined in the PWS and our Work Plan, soil samples were to be collected continuously to El. -60 feet MLLW for the Edgewood Shoals area and to El. -100 feet MLLW for the FPR area. Due to the drilling rates, we coordinated with the USACE-NAE to adjust the sampling interval as needed.

Borings in the Edgewood Shoals area were generally sampled at 5-foot intervals below mudline to a depth of 20 feet and then continuous thereafter to the termination elevation to capture any stratigraphic transition. Borings in the FPR area were sampled to various depths and at various intervals to capture the full depth range across the four borings.

3.1.2 Soil Sampling

All soil samples were classified using the Unified Soil Classification System as defined in ASTM Standards D2487 and D2488. The SPT N Value, penetration, and recovery were recorded for each split spoon sample. All split spoon soil samples were photographed, as presented in Appendix C.

Split spoon samples were placed in plastic bags inside glass jars. The tops of the jars were sealed with electrical tape around the lid to preserve natural moisture content. Soil samples were transported to our lab in Woburn, Massachusetts. An engineer or geologist checked soil classifications at GEI's laboratory in general accordance with ASTM D2488.

3.2 Deviations from Work Plan

In general, the borings were completed in accordance with the approved Work Plan and the USACE-NAE was notified of all changes.

The USACE-NAE requested the boring naming convention be changed from "GEI-1XX" to "FD22-XX" to meet the typical USACE labeling system. Borings were renamed in accordance with the new labeling system with the end number remaining the same, with the exception of starting at -01 versus -101.

As noted above, the soil sampling interval was increased from fully continuous sampling to standard sampling at 5-foot intervals due to the production rates. As a result, FD22-02, FD22-06, FD22-11 through FD22-14 were not sampled to the planned termination elevation before being terminated, due to time limitations and production rates.

The USACE-NAE requested FD22-14 be relocated from the initial plan location closer to the middle of the main navigational channel, where the water column was closer to 40+ feet deep. The channel was not dredged to the authorized depth on the eastern side during the last deepening. GEI shifted the boring location towards the middle of the channel per the USACE-NAE request.

FD22-01 through -05, -07 through -09, and -11 through -14 were not performed within 25 feet of the planned coordinates in the Work Plan. The barge was set up on the required locations initially, but the barge drifted while the stabilizing spuds were being deployed. The drifting occurred due to strong currents and thick, very soft sediments in the Providence River and Edgewood Shoals area, therefore it was difficult to remain within tolerance. Several attempts were often made, as noted in the Daily Field Reports in Appendix E, to land and stabilize the spud barge at the plan location. We discussed this challenge with USACE, and the resulting offsets.

4. Subsurface Conditions

The soil layers encountered in the borings are described below, beginning at the mudline and proceeding downward. The subsurface conditions are known only at the boring locations. The subsurface conditions at other locations may vary significantly from those described below. These variations may not become evident until construction. A summary of subsurface conditions is presented in Table 2.

River Bottom Sediment: An approximately 5- to 52-foot-thick layer of river bottom sediment was encountered below mudline in all borings. The upper portions of the river bottom sediment consisted of very soft, black, organic silt and organic clay with shells and vegetative fibers. See Photo No. 1 and 19 for reference. Strong marine-like, organic odor was observed in the soil samples collected in the upper 15 feet of this layer.

At greater depths, the sediment transitioned to stiff to very soft, gray, low to medium plasticity silt to organic silt and organic clay with some peat fibers and shell fragments. See Appendix C, Photo No. 25 and 26 for reference.

The consistency of the stratum ranged from very soft (Weight of Casing (WOC), Weight of Rod (WOR) and Weight of Hammer (WOH) and less than two blows per foot material to stiff. In the Edgewood Shoals area, most of the soil at and above El. -60 feet MLLW was observed to be river bottom sediment.

Glaciomarine Outwash: A layer of glaciomarine outwash was encountered below the river bottom sediment in all borings except FD22-10. 12 borings were terminated in this layer. The thickness of the stratum ranged from 0.5 to 46 feet. This layer consisted generally of silty sand to widely graded sand with varying amounts of silt and gravel. See Photo No. 215 and 216 for reference. Stratified clay and silt with fine sand layers was also observed, as shown in Appendix C, Photo No. 92 and 190.

Glacial Till: Glacial Till was encountered below the glaciomarine outwash in FD22-06 and FD22-12, where both borings were terminated. The glacial till ranged from 0.3 to 22 feet thick. The SPT N-values in the Glacial Till ranged from 25 to 100 blows for less than 6 inches of penetration indicating a medium dense to very dense soil. The glacial till layer consisted of gray, unstratified narrowly graded gravel and silty sand with varying amounts of sand and silt. See Appendix C, Photo No. 102 and 209 for reference. The stratum was well-cemented, and boulders were encountered in FD22-06.

5. Laboratory Testing

5.1 Index Testing

Soil samples were selected to represent the varying lithology encountered during the subsurface explorations. We coordinated with the USACE-NAE by submitting a list of proposed samples for laboratory analysis, for review and approval. Index testing was performed at the GEI lab in Woburn, Massachusetts.

We performed 15 grain size distribution tests in general accordance with ASTM D6913. We performed 18 grain size distribution tests including hydrometer analyses in accordance with ASTM D7928.

We performed 23 Atterberg limits in general accordance with ASTM D4318. Samples were prepared using the wet method.

We performed 9 organic content tests in general accordance with ASTM D2974.

We did not perform grain size distribution tests including hydrometer analyses on samples FD22-02 S4, FD22-11 S1, FD22-09 S3, FD22-10 S2 & S6, because there was not enough sample left to perform the test, after completing organic content tests. FD22-13 S2 contained a high gravel percentage and was not index tested.

A summary of index testing results is included in Table 3. All index testing results are shown in Appendix D.

5.2 Other Geotech Testing

Miniature torvane and pocket penetrometer tests were not performed on selected samples in the lab. Tests were not feasible due to jar soil sample disturbance and remolding.

Miniature torvane and pocket penetrometer tests were performed in the field on select samples for FD22-12, but these tests were not carried through to other borings.

Tables

Table 1: Proposed and As-Drilled Boring Locations
Providence River and Harbor Subsurface Drilling Explorations
Confined Aquatic Disposal (CAD) Cells, Providence River DMMP
Providence, Rhode Island

Boring No.	Date Drilled	Proposed Coordinates		As-Drilled Coordinates		Distance from Proposed Coordinates (ft)	Proposed Termination Elevation (MLLW)	As-Drilled Mudline (MLLW)	Total Depth Drilled below Mudline (ft)	Boring Final El. (MLLW)
		Northing	Easting	Northing	Easting					
FD22-01	1/27/2022	253483	359345	253506	359455	112	-60	-9.2	48.0	-57.2
FD22-02	1/20/2022	253703	360139	253677	360159	33	-60	-6.3	22.0	-28.3
FD22-03	2/10/2022	255213	361931	255189	361573	359	-60	-8.1	52.0	-60.1
FD22-04	1/31/2022	252406	359758	252452	359739	49	-60	-7.5	52.0	-59.5
FD22-05	2/1/2022	252745	360655	252732	360556	99	-60	-6.7	54.0	-60.7
FD22-06	1/28/2022	254266	360750	254260	360764	15	-60	-6.4	41.4	-47.8
FD22-07	2/3/2022	251363	360521	251430	360471	83	-60	-8.1	52.0	-60.1
FD22-08	2/8/2022	251364	361436	251377	361398	40	-60	-7.9	52.0	-59.9
FD22-09	2/7/2022	250100	360706	249881	360873	276	-60	-8.0	52.0	-60.0
FD22-10	2/9/2022	252806	361881	252786	361881	20	-60	-7.2	52.0	-59.2
FD22-11	2/2/2022	261016	358751	260806	358735	210	-100	-40.2	52.0	-92.2
FD22-12	1/25/2022	260658	359541	260757	359700	188	-100	-33.7	45.0	-78.7
FD22-13	1/24/2022	259577	359366	259570	359305	61	-100	-40.8	16.0	-56.8
FD22-14	1/26/2022	260190	359848	260099	359849	91	-100	-40.4	47.0	-87.4

Notes: 1. Coordinates are listed in U.S. Feet and reference NAD83, Rhode Island State Plane. Elevations are listed in feet and reference Mean Lower Water (MLLW) datum.

Table 2: Subsurface Summary
Providence River and Harbor Subsurface Drilling Explorations
Confined Aquatic Disposal (CAD) Cells, Providence River DMMP
Providence, Rhode Island

Boring No.	As-Drilled Coordinates		Proposed Termination Elevation (MLLW)	As-Drilled Mudline (MLLW)	Total Depth Drilled below Mudline (ft)	Boring Final El. (MLLW)	Overburden Strata Thickness			Total Overburden Thickness (ft)
	Northing	Easting					River Sediment	Glaciomarine Outwash	Glacial Till	
FD22-01	253506	359455	-60	-9.2	48.0	-57.2	15.5	32.5	-	>48
FD22-02	253677	360159	-60	-6.3	22.0	-28.3	21.4	0.6	-	>22
FD22-03	255189	361573	-60	-8.1	52.0	-60.1	49.5	2.5	-	>52
FD22-04	252452	359739	-60	-7.5	52.0	-59.5	38	14	-	>52
FD22-05	252732	360556	-60	-6.7	54.0	-60.7	35	19	-	>54
FD22-06	254260	360764	-60	-6.4	41.4	-47.8	11	9	22	>41.4
FD22-07	251430	360471	-60	-8.1	52.0	-60.1	51	1	-	>52
FD22-08	251377	361398	-60	-7.9	52.0	-59.9	47.3	4.7	-	>52
FD22-09	249881	360873	-60	-8	52.0	-60	44	8	-	>52
FD22-10	252786	361881	-60	-7.2	52.0	-59.2	52	-	-	>52
FD22-11	260806	358735	-100	-40.2	52.0	-92.2	6	46	-	>52
FD22-12	260757	359700	-100	-33.69	45.0	-78.69	11.6	32.7	0.33	>45
FD22-13	259570	359305	-100	-40.83	16.0	-56.83	4.5	11.5	-	>16
FD22-14	260099	359849	-100	-40.4	47.0	-87.4	16.2	30.8	-	>47

- Notes: 1. Coordinates are listed in U.S. Feet and reference NAD83, Rhode Island State Plane. Elevations are listed in feet and reference Mean Lower Water (MLLW) datum.
2. Total overburden thickness is greater than measured thickness, since refusal was not encountered, and bedrock not defined.

Table 3: Geotechnical Laboratory Testing Results
Providence River and Harbor Subsurface Drilling Explorations
Confined Aquatic Disposal (CAD) Cells, Providence River DMMP
Providence, Rhode Island

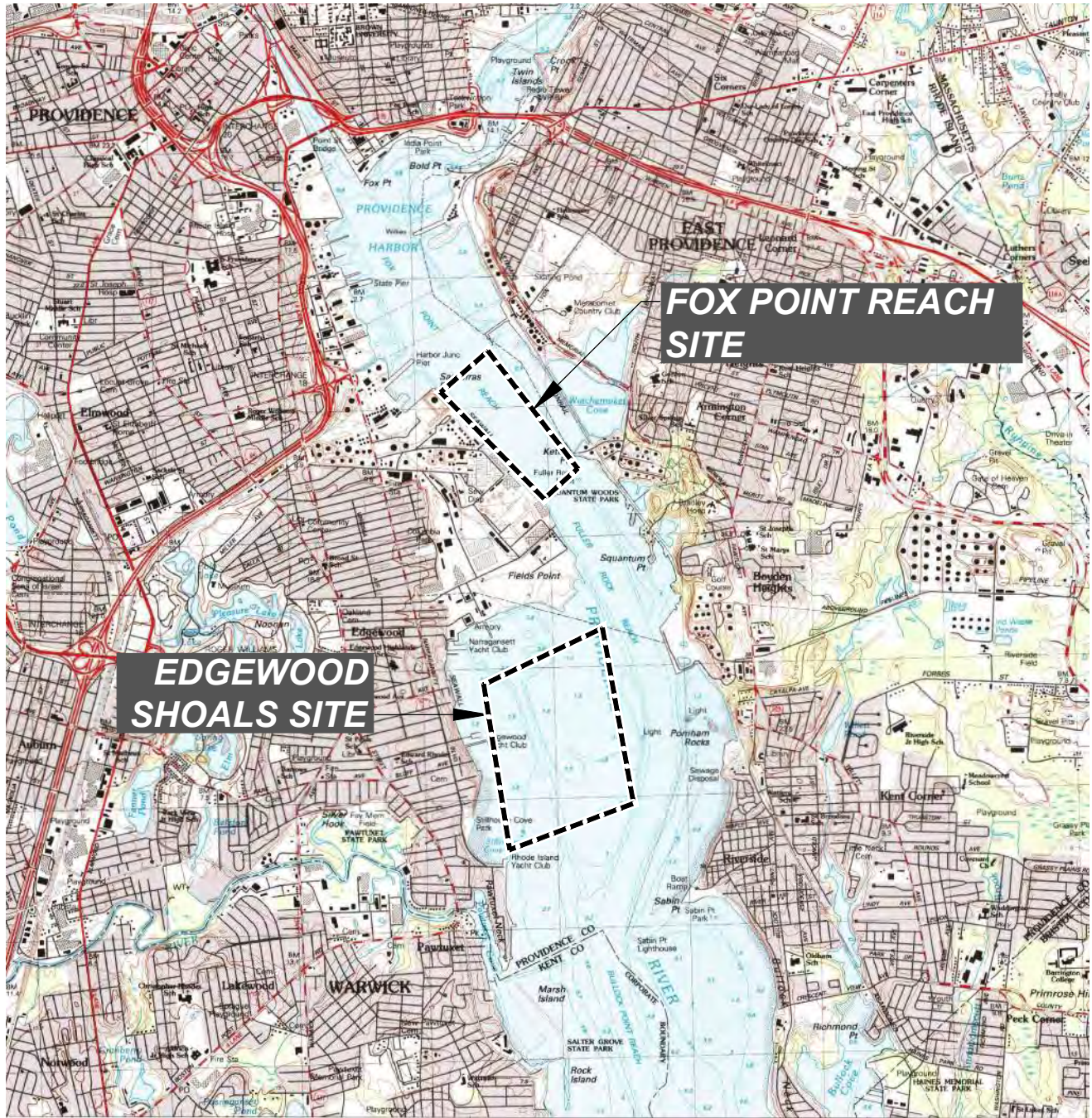
Boring No.	Sample No.	Depth (ft)	Water Content (%)	Organic Content (%)	LL (%)	PL (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Laboratory Log and Soil Description
FD22-01	S1	0-2	110.8	6.3	103	39	--	--	--	--	Organic Clay (OH)
	S1 (Oven-Dry) - see note 1	0-2	110.8	--	54	--	--	--	--	--	Organic Clay (OH)
	S2	5-7	--	--	--	--	0.0	2.3	66.9	30.8	Organic Clay (OH)
	S9	28-30	42.3	--	29	16	0.0	0.0	55.9	44.1	Lean Clay (CL)
	S10	30-32	--	--	--	--	0.0	1.5	92.6	5.9	Lean Clay (CL)
	S18	46-48	31.0	--	--	--	0.0	1.3	98.7		Lean Clay (CL)
FD22-02	S4	8-10	34.6	0.8	NV	NP	--	--	--	--	Silt (ML)
	S5	10-12	--	--	--	--	0.0	0.4	77.6	22.0	Silt (ML)
	S6	12-14	38.5	--	NV	NP	--	--	--	--	Silt (ML)
	S9	18-20	33.4	--	NV	NP	--	--	--	--	Silt (ML)
FD22-03	S5	20-22	72.4	3.6	66	31	--	--	--	--	Organic Clay (OH)
	S5 (Oven-Dry) - see note 1	20-23	72.4	--	43	--	--	--	--	--	Organic Clay (OH)
	S6	22-24	--	--	--	--	0.7	7.7	59.9	31.7	Organic Clay (OH)
	S16	42-44	--	--	--	--	0.0	17.2	53.7	29.1	Organic Clay with Sand (OH)
	S17	44-46	69.9	4.5	61	31	--	--	--	--	Organic Clay (OH)
	S17 (Oven-Dry) - see note 1	44-46	69.9	--	37	--	--	--	--	--	Organic Clay (OH)
S20	50-52	15.3	--	--	--	14.5	74.0	11.5		Poorly Graded Sand with Clay (SP-SC)	
FD22-04	S12(0-23")	34-36	79.6	7.0	90	43	--	--	--	--	Organic Silt (OH)
	S12(0-23") (Oven-Dry) - see note 1	34-36	79.6	--	50	--	--	--	--	--	Organic Silt (OH)
	S14	38-40	22.9	--	--	--	6.7	86.2	7.1		Poorly Graded Sand with Silt (SP-SM)
	S15	40-42	--	--	--	--	2.1	11.7	56.3	29.9	Organic Silt (OH)
	S19	48-50	17.5	--	--	--	5.7	89.1	5.2		Poorly Graded Sand with Silt (SP-SM)
FD22-05	S12(8-18")	34-36	26.3	--	32	23	--	--	--	--	Lean Clay (CL)
	S14	38-40	11.2	--	--	--	33.0	28.1	27.6	11.3	Silty Gravel with Sand (GM)
	S16	42-44	25.9	--	NV	NP	--	--	--	--	Silt (ML)
FD22-06	S6	22-24	9.2	--	--	--	20.5	55.1	19.1	5.3	Silty Sand with Gravel (SM)
	S10	32-34	10.4	--	--	--	27.7	58.1	14.2		Well Graded Sand with Clay and Gravel (SW-SC)
	S15	40-42	7.7	--	--	--	40.5	39.9	19.6		Silty Gravel with Sand (GM)
FD22-07	S3	10-12	71.9	--	69	32	--	--	--	--	Organic Clay (OH)
	S13	36-38	73.4	--	70	34	--	--	--	--	Organic Silt (OH)
	S20(14-24")	50-52	51.9	--	--	--	1.8	47.6	32.7	17.9	Sandy Silt (ML)
FD22-08	S11	32-34	81.4	--	78	36	--	--	--	--	Organic Silt (OH)
	S17	44-46	59.7	--	63	29	--	--	--	--	Organic Clay (OH)
	S19	48-50	27.2	--	--	--	0.0	67.6	22.3	10.1	Clayey Sand (SC)

Table 3: Geotechnical Laboratory Testing Results
Providence River and Harbor Subsurface Drilling Explorations
Confined Aquatic Disposal (CAD) Cells, Providence River DMMP
Providence, Rhode Island

Boring No.	Sample No.	Depth (ft)	Water Content (%)	Organic Content (%)	LL (%)	PL (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Laboratory Log and Soil Description
FD22-09	S3	10-12	84.0	4.3	77	32	--	--	--	--	Organic Clay (OH)
	S3 (Oven-Dry) - see note 1	10-12	84.0	--	47	--	--	--	--	--	Organic Clay (OH)
	S4	15-17	--	--	--	--	0.0	7.8	58.8	33.4	Organic Clay (OL)
	S5	20-22	80.7	--	66	29	--	--	--	--	Organic Clay (OH)
	S20	50-52	18.3	--	--	--	0.0	86.0	9.5	4.5	Silty Sand (SM)
FD22-10	S2	5-7	91.4	4.7	71	30	--	--	--	--	Organic Clay (OH)
	S2 (Oven-Dry) - see note 1	5-7	91.4	--	43	--	--	--	--	--	Organic Clay (OH)
	S3	10-12	--	--	--	--	0.0	5.8	62.9	31.3	Organic Clay (OH)
	S6	22-24	68.9	3.2	63	29	--	--	--	--	Organic Clay (OH)
	S6 (Oven-Dry) - see note 1	22-24	68.9	--	42	--	--	--	--	--	Organic Clay (OH)
	S7	24-26	--	--	--	--	0.2	7.4	60.8	31.6	Organic Clay (OH)
	S20	50-52	19.7	--	NV	NP	--	--	--	--	Silt (ML)
FD22-11	S1	0-2	170.7	8.9	132	55	--	--	--	--	Organic Silt (OH)
	S1 (Oven-Dry) - see note 1	0-2	170.7	--	65	--	--	--	--	--	Organic Silt (OH)
	S3	15-17	11.5	--	--	--	31.3	59.9	8.8		Poorly Graded Sand with Silt and Gravel (SP-SM)
	S5	25-27	21.7	--	--	--	0.0	33.7	66.3		Sandy Silt (ML)
	S8	40-42	15.0	--	--	--	11.6	82.8	5.6		Poorly Graded Sand with Silt (SP-SM)
FD22-12	S6	19-21	7.2	--	--	--	66.0	32.1	1.9		Well Graded Gravel with Sand (GW)
	S12	31-33	14.7	--	NV	NP	5.8	30.4	50.5	13.3	Sandy Silt (ML)
	S18 (0-16")	43-45	22.9	--	--	--	0.1	13.5	86.4		Silt (ML)
FD22-13	S1	0-2	--	--	--	--	0.9	9.6	55.2	34.3	Silt (ML)
	S4	6-8	10.0	--	--	--	36.6	53.1	10.3		Poorly Graded Sand with Silt and Gravel (SP-SM)
	S8	14-16	10.2	--	--	--	23.1	47.7	29.2		Silty Sand with Gravel (SM)
FD22-14	S2(12-24")	5-7	56.1	--	61	30	0.0	1.3	68.8	29.9	Organic Clay (OH)
	S7	30-32	24.5	--	--	--	0.0	47.0	53.0		Sandy Silt (ML)
	S13	45-47	13.1	--	--	--	10.4	58.9	30.7		Silty Sand (SM)

Notes: 1. Per ASTM D 2487, regarding organic silt and clay:
3.1.3 organic clay—a clay with sufficient organic content to influence the soil properties. For classification, an organic clay is a soil that would be classified as a clay except that its liquid limit value after oven drying is less than 75 % of its liquid limit value before oven drying.
3.1.4 organic silt—a silt with sufficient organic content to influence the soil properties. For classification, an organic silt is a soil that would be classified as a silt except that its liquid limit value after oven drying is less than 75 % of its liquid limit value before oven drying.

Figures



This Image is from U.S.G.S. Topographic 7.5 Minute Series Providence, RI Quadrangle, 1987.
 Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
 Contour Interval is 3 meters.
 Soundings in meters, datum is Mean Low Water (MLW).



Providence River and Harbor Subsurface Explorations
 Report of Geotechnical Explorations
 Providence, Rhode Island

USACE New England District
 Concord, Massachusetts

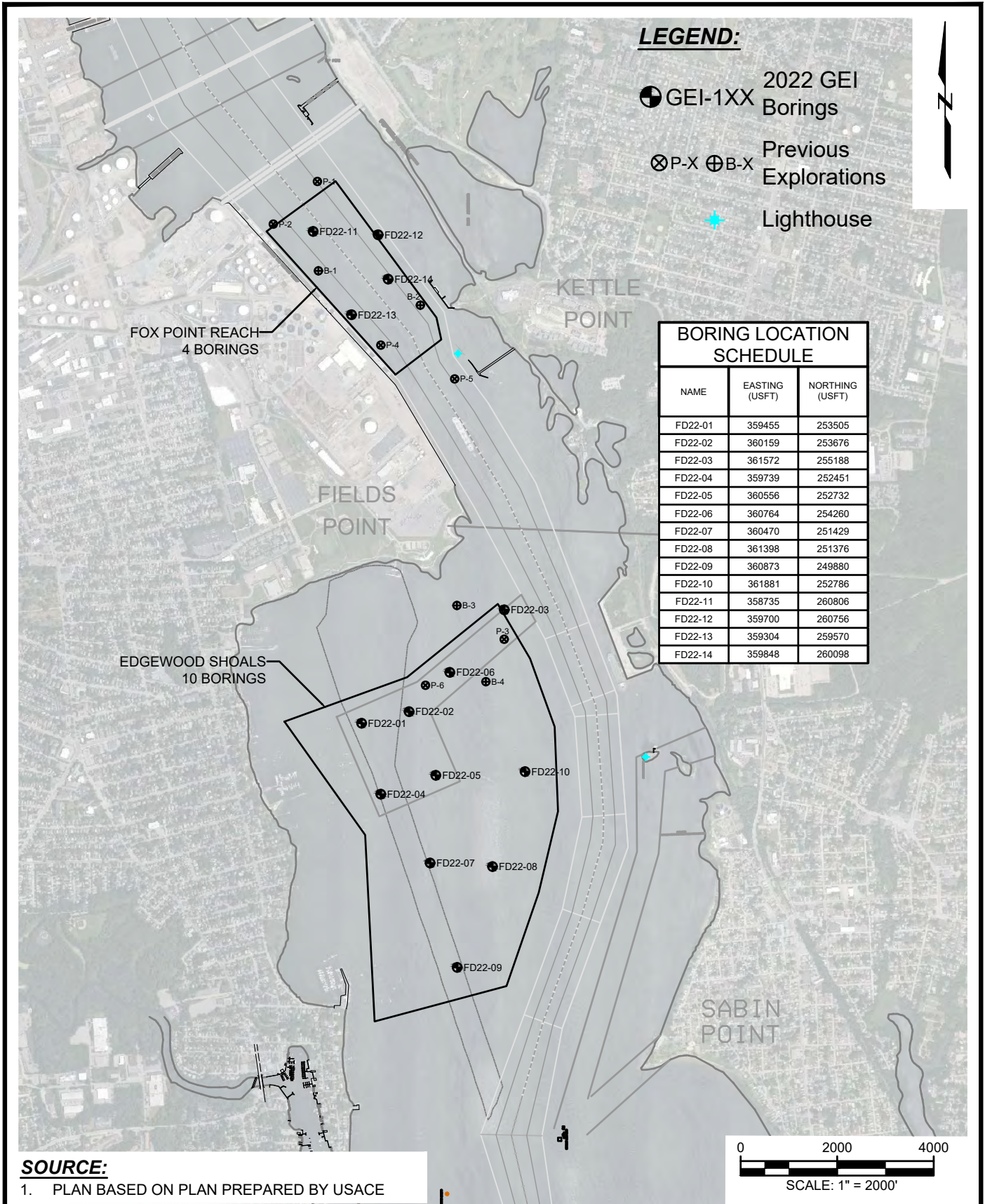


Project 2104664

SITE LOCATION MAP

April 2022

Fig. 1



Providence River and Harbor Subsurface Explorations
 Report of Geotechnical Explorations
 Providence, Rhode Island

U.S. Army Corps of Engineers, New England District
 Concord, Massachusetts

GEI Consultants

Project 2104664

BORING LOCATION PLAN





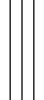
April 2022

Fig. 2

Appendix A



Final Boring Logs

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane		HORIZONTAL NAD83
2. HOLE NUMBER FD22-01		LOCATION COORDINATES N 253506 E 359455		VERTICAL MLLW
3. DRILLING AGENCY New England Boring Contractors		10. SIZE AND TYPE OF BIT 4" Rollerbit		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 18		DISTURBED 18
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING	UNDISTURBED 0
6. THICKNESS OF OVERBURDEN >48'		13. TOTAL NUMBER CORE BOXES 0		14. ELEVATION GROUND WATER See Remarks
7. DEPTH DRILLED INTO ROCK 0'		15. DATE BORING 1/27/22		STARTED 1/27/22
8. TOTAL DEPTH OF BORING 48'		16. ELEVATION TOP OF BORING -9.2'		COMPLETED 1/27/22
		17. TOTAL CORE RECOVERY FOR BORING N/A		18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
			S1: ORGANIC CLAY (OH) about 98% fines, high plasticity; about 2% sand, fine; black to dark gray, wet, very soft, organic odor, shell present throughout. w.c.=111%, LL=103, PL=39, PI=64, org.=6%	58	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
			S2: ORGANIC CLAY (OH) about 98% fines, high plasticity; about 2% sand, fine to coarse; black to dark gray, wet, very soft, organic odor, shell present throughout.	63	S2			0 0 0 0	WOR
			S3: Similar to S2	4	S3			0 0 0 0	WOH
-24.8	15.6		S4 (0-6)": ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; black, wet, very soft, fibers, wood, shells and vegetative material present throughout	79	S4			0 0 0 6	WOR
			S4 (6-9)": SILT (ML) about 90% fines, low plasticity; about 10% sand, fine; gray, wet, soft						

DRILLING LOG (Cont Sheet)		INSTALLATION New England District		SHEET 2 OF 3 SHEETS					
PROJECT Providence River DMMP		COORDINATE SYSTEM State Plane		HORIZONTAL VERTICAL NAD83 MLLW					
LOCATION COORDINATES N 253506 E 359455		ELEVATION TOP OF BORING -9.2'							
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S5: SILT WITH SAND (ML) about 80% fines, low plasticity; about 20% sand, fine; brown, wet, stiff, shells present throughout. Sand in lenses and stratified S6: Similar to S5, except no shells and very stiff	75	S5			8 6 7 8	13
			S7: SILT (ML) about 90% fines, low plasticity; about 10% sand, fine; gray, wet, soft S8: Similar to S7	100	S6			13 9 8 10	17
			S9: LEAN CLAY (CL) about 100% fines, medium plasticity; gray, wet, very soft, w.c.=42%, LL=29, PL=16, PI=13 S10: Similar to S9, except 1% fine sand, 99% fines.	67	S7			2 1 2 1	3
			S11: SANDY SILT (ML) about 60% fines, nonplastic to low plasticity; about 40% sand, fine; gray, wet, stiff S12: Similar to S11, except very stiff S13: Similar to S11, except very stiff S14: Similar to S11 S15: Similar to S11 S16: Similar to S11, except very stiff	100	S8			2 2 2 3	4
-37.2	28.0			88	S9			2 0 0 1	WOH
				83	S10			3 5 0 2	5
-41.2	32.0			100	S11			7 4 5 6	9
				100	S12			8 9 9 13	18
				88	S13			5 7 7 8	14
				100	S14		From the 6" to the 18" blow count intervals, the rods were sinking under their own weight between the hammer strikes.	4 3 5 4	8
				75	S15			4 4 4 6	8
				100	S16			11 10 14 22	24
								12	

DRILLING LOG (Cont Sheet)		INSTALLATION New England District		SHEET 3 OF 3 SHEETS	
PROJECT Providence River DMMP		COORDINATE SYSTEM State Plane		HORIZONTAL : VERTICAL NAD83 : MLLW	
LOCATION COORDINATES N 253506 E 359455		ELEVATION TOP OF BORING -9.2'			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
-55.2	46.0		S17: SANDY SILT (ML) about 60% fines, nonplastic to low plasticity; about 40% sand, fine; gray, wet, hard.	100	S17			16 18 26	34
-57.2	48.0		S18: LEAN CLAY (CL) about 99% fines, nonplastic; about 1% sand, fine to medium; gray, wet, dense, w.c.=31%,	50	S18			12 11 21 21	32

BOTTOM OF BOREHOLE AT 48.0 ft
Borehole was backfilled with cuttings

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 2 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-02		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 10	DISTURBED : UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >22'		15. DATE BORING 1/20/22	STARTED : COMPLETED : 1/20/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -6.3'	
8. TOTAL DEPTH OF BORING 22'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			






ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		(Wavy pattern)	S1: ORGANIC SILT (OH) about 80% fines, high plasticity; dark gray, wet, very soft, organic odor, about 10% shells, about 10% vegetative material	100	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		(Wavy pattern)	S2: Similar to S1, except about 15% shells, no vegetative material, about 85% silt	54	S2		No sample from 2 to 4 feet, weight of casing.		
		(Wavy pattern)	S3: Similar to S2	38	S3		Black washout water observed at 4 feet.	0 0 0 0	WOR
-14.3	8.0	(Vertical lines)	S4: SILT (ML) about 99% fines, nonplastic; about 1% sand, fine; gray and brown, wet, stiff, about 5% shells w.c.=35%, LL=NV, PL=NP, org.=0.8%	83	S4			2 8 5 9	13
		(Vertical lines)	S5: SIILT (ML) about 99% fines, nonplastic; about 1% sand, fine to medium; gray, wet, medium stiff	71	S5			3 3 4 4	7
		(Vertical lines)	S6: SILT (ML) about 90% fines, nonplastic; about 10% sand, fine; dark gray to gray, wet, very soft, no odor, w.c.=39%, LL=NV, PL=NP	100	S6			1 1 2 2	3
		(Vertical lines)	S7: SILT (ML) about 90% fines, nonplastic; about 10% sand, fine; dark gray, wet, very soft, no odor	79	S7			0 1 0 1	1
		(Vertical lines)	S8: Similar to S7, except stiff	100	S8			2 2 6 5	8
		(Vertical lines)	S9: Similar to S7, except stiff w.c.=33%, LL=NV, PL=NP	100	S9			3 5 7 6	12

DRILLING LOG (Cont Sheet)				INSTALLATION			SHEET 2		
				New England District			OF 2 SHEETS		
PROJECT				COORDINATE SYSTEM		HORIZONTAL	VERTICAL		
Providence River DMMP				State Plane		NAD83	MLLW		
LOCATION COORDINATES				ELEVATION TOP OF BORING					
N 253677 E 360159				-6.3'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
-27.7	21.4		S10 (0-5)": SILT (ML) about 90% fines, low plasticity; about 10% sand, fine; dark gray, wet, stiff, no odor	54	S10			8 12 15	20
-28.3	22.0		S10 (5-13)": SILTY SAND (SM) about 30% fines; about 60% sand, fine to coarse; about 10% gravel, fine; gray, wet, medium dense						
BOTTOM OF BOREHOLE AT 22.0 ft Borehole was backfilled with cuttings									

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL NAD83 VERTICAL MLLW
2. HOLE NUMBER FD22-03		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 20	DISTURBED 0 UNDISTURBED 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >52'		15. DATE BORING 2/10/22	STARTED 2/10/22 COMPLETED 2/10/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -8.1'	
8. TOTAL DEPTH OF BORING 52'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
			S1: ORGANIC SILT (OL) about 90% fines, low plasticity; about 10% sand, fine; dark gray, wet, very soft, organic odor, shell present throughout	46	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
			S2: Similar to S1	50	S2			0 0 0 0	WOH
			S3: Similar to S1	100	S3			2 0 1 1	1
			S4: Similar to S1, except soft, vegetative material and fibers present throughout	100	S4			2 2 2 2	4
-28.1	20.0								

DRILLING LOG (Cont Sheet)				INSTALLATION New England District		SHEET 2 OF 3 SHEETS			
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 255189 E 361573				ELEVATION TOP OF BORING -8.1'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S5: ORGANIC CLAY (OH) about 91% fines, high plasticity; about 8% sand, fine; about 1% gravel, fine; dark gray, wet, very soft, organic odor, plant fibers and shell present throughout w.c.=72%, LL=66, PL=31, PI=35, org.=4%	38	S5			0 0 0 0	WOR
			S6: ORGANIC CLAY (OH) about 91% fines, high plasticity; about 8% sand, fine to coarse; about 1% gravel, fine; dark gray, wet, very soft, organic odor, plant fibers and shell present throughout	100	S6			0 1 0 0	1
			S7: ORGANIC CLAY WITH SAND (OH) about 90% fines, low plasticity; about 10% sand, fine; dark gray, wet, very soft, shell, vegetative material and fibers present throughout	100	S7			0 0 0 0	WOR
			S8: Similar to S7	100	S8			0 0 0 0	WOR
			S9: Similar to S7	100	S9			0 0 0 1	WOR
			S10: Similar to S7, except no shells	100	S10			0 0 0 2	WOR
			S11: Similar to S7, except no shells	100	S11			0 0 0 0	WOR
			S12: Similar to S7, except no shells	100	S12			0 0 0 0	WOR
			S13: Similar to S7, except no shells	100	S13			0 0 0 0	WOR
			S14: Similar to S7, except no shells, and peat in tip of spoon	100	S14			0 0 0 3	WOR
			S15: Similar to S7, except no shells and peat present throughout	100	S15			0 0 0 4	WOR
			S16: ORGANIC CLAY WITH SAND (OH) about 83% fines, high plasticity; about 17% sand, fine to coarse, mostly fine; dark gray, wet, very soft	100	S16			0 0 3 3	3
								0	

DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 3 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 255189 E 361573				ELEVATION TOP OF BORING -8.1'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S17: ORGANIC CLAY (OH) about 90% fines, high plasticity; about 10% sand, fine; dark gray, wet, very soft, w.c.=70%, LL=61, PL=31, PI=30, org.=5%	88	S17			4 2 1	6
			S18: Similar to S17	100	S18			0 3 3 2	6
			S19 (0-18)": Similar to S17	100	S19			3 3 9 17	12
-57.6	49.5								
			S19 (18-24)": POORLY GRADED SAND WITH CLAY (SP-SC) about 20% fines, low plasticity; about 70% sand, fine to medium; about 10% gravel, fine to coarse; dark gray, wet, medium dense					12 26 30 27	
			S20: POORLY GRADED SAND WITH CLAY (SP-SC) about 12% fines, low plasticity; about 74% sand, fine to coarse; about 15% gravel, fine to coarse; dark gray, wet, very dense, possible glacial till in tip of spoon, cemented w.c.=15%	92	S20				56
-60.1	52.0								
			BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings						

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-04		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 20	DISTURBED : 20 UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL : ---	BEARING : ---
6. THICKNESS OF OVERBURDEN >52'		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
7. DEPTH DRILLED INTO ROCK 0'		15. DATE BORING 1/31/22	STARTED : 1/31/22 COMPLETED : 1/31/22
8. TOTAL DEPTH OF BORING 52'		16. ELEVATION TOP OF BORING -7.5'	17. TOTAL CORE RECOVERY FOR BORING N/A
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		-----	S1: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shells present throughout	71	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		-----	S2: Similar to S1	58	S2			0 0 0 0	WOR
-17.5	10.0	-----	S3: SILT (ML) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shells present throughout	100	S3			0 2 1 2	3
		-----	S4: Similar to S3	100	S4			1 1 1 1	2

DRILLING LOG (Cont Sheet)		INSTALLATION		SHEET					
PROJECT		New England District		2					
PROVIDENCE RIVER DMMP		COORDINATE SYSTEM		HORIZONTAL					
LOCATION COORDINATES		State Plane		VERTICAL					
N 252452 E 359739		ELEVATION TOP OF BORING		MLLW					
		-7.5'							
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/0.5 ft	N-Value
			S5: SILT (ML) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shells present throughout	100	S5			1 2 2 3	4
			S6: Similar to S5	100	S6			1 1 1 1	2
			S7: Similar to S5, still shells in soil	100	S7			0 0 0 0	WOR
			S8: Similar to S5, still shells in soil	46	S8			0 0 0 0	WOR
			S9: Similar to S5	100	S9			0 1 1 2	2
			S10 (0-20)": Similar to S5	100	S10		Weight of Rods for first 3" of sample at 30 feet.	1 0 0 1	WOR
-39.2	31.7		S10 (20-24)": PEAT (Pt) brown S11: PEAT (Pt) gray to brown	38	S11			2 3 2 2	5
-41.5	34.0		S12 (0-23)": ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; gray, wet, soft, organic fibers throughout w.c.=80%, LL=90, PL=43, PI=47, org.=7%	100	S12			0 0 3 4	3
-43.4	35.9		S12 (23-24)": PEAT (Pt) brown S13 (0-16)": Similar to S12 (0-23)"	100	S13			2 2 6 8	8
-43.5	36.0		S13 (16-24)": SILTY SAND (SM) about 30% fines, nonplastic; about 70% sand, fine to coarse; gray, wet, loose S14: POORLY GRADED SAND WITH SILT (SP-SM) about 7% fines, nonplastic; about 86% sand, fine to coarse; about 7% gravel, fine; gray, wet, loose, w.c.=23%	54	S14			2 4 5 6	9
-44.8	37.3		S15: ORGANIC SILT (OH) about 86% fines, high plasticity; about 12% sand, fine to coarse; about 2% gravel, fine; gray, wet, soft, organic fibers throughout S16: Similar to S15	46	S15			2 1 1 1	2
				54	S16			1 2 2 5	4
-47.5	40.0								
-51.5	44.0							0	


DRILLING LOG (Cont Sheet)			INSTALLATION New England District		SHEET 3 OF 3 SHEETS				
PROJECT Providence River DMMP			COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES N 252452 E 359739			ELEVATION TOP OF BORING -7.5'						
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RCD %	REMARKS	Blows/ 0.5 ft	N-Value
			S17: SILTY SAND (SM) about 20% fines, nonplastic; about 80% sand, fine to coarse; gray, wet, medium dense	25	S17			10 5 8	15
			S18: Similar to S17	42	S18			3 4 9 9	13
-55.5	48.0		S19: POORLY GRADED SAND WITH SILT (SP-SM) about 5% fines, nonplastic; about 89% sand, fine to coarse; about 6% gravel, fine; gray, wet, medium dense, w.c.=18%	75	S19			7 9 12 11	21
			S20 (0-20)": Similar to S19	100	S20			9 5 9 10	14
-59.2	51.7		S20 (20-24)": SILT WITH SAND (ML) about 75% fines, low plasticity; about 25% sand, fine; gray, wet, stiff						
-59.5	52.0		BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings						

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL NAD83
2. HOLE NUMBER FD22-05		LOCATION COORDINATES N 252732 E 360556	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rig	
4. NAME OF DRILLER Norman Stuttard		10. SIZE AND TYPE OF BIT 4" Rollerbit	VERTICAL MLLW
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		12. TOTAL SAMPLES 21	DISTURBED 21
6. THICKNESS OF OVERBURDEN >54'		13. TOTAL NUMBER CORE BOXES 0	
7. DEPTH DRILLED INTO ROCK 0'		14. ELEVATION GROUND WATER See Remarks	
8. TOTAL DEPTH OF BORING 54'		15. DATE BORING 2/1/22	UNDISTURBED 0
		16. ELEVATION TOP OF BORING -6.7'	STARTED 2/1/22
		COMPLETED 2/1/22	
		17. TOTAL CORE RECOVERY FOR BORING N/A	
		18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional	

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		[Pattern]	S1: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shells present throughout	21	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		[Pattern]	S2: Similar to S1	75	S2			0 0 0 0	WOR
		[Pattern]	S3: Similar to S1	92	S3			0 0 0 0	WOR
		[Pattern]	S4: Similar to S1	100	S4			2 1 1 1	2

DRILLING LOG (Cont Sheet)				INSTALLATION		SHEET 2			
				New England District		OF 3 SHEETS			
PROJECT		COORDINATE SYSTEM		HORIZONTAL		VERTICAL			
Providence River DMMP		State Plane		NAD83		MLLW			
LOCATION COORDINATES				ELEVATION TOP OF BORING					
N 252732 E 360556				-6.7'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S5: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shells present throughout	100	S5			0 0 0 0	WOR
			S6: Similar to S5	100	S6			0 0 0 0	WOR
			S7: Similar to S5	100	S7			0 0 0 0	WOR
			S8: Similar to S5	100	S8			0 0 0 0	WOR
			S9: Similar to S5	38	S9			0 0 0 0	WOR
			S10 (0-21)": Similar to S5	100	S10			0 0 0 0	WOR
-38.5	31.8								
-38.7	32.0		S10 (21-24)": PEAT (Pt) brown, fiber present throughout					0 0 0 0	WOR
			S11: SILT (ML) about 85% fines; about 15% sand, fine; dark gray, wet, very soft, fibers present throughout	100	S11			0 0 0 0	WOR
			S12 (0-8)": Similar to S11					0 4 7 9	11
-41.5	34.8		S12 (8-18)": LEAN CLAY (CL) about 90% fines, medium plasticity; about 10% sand, fine; light gray, wet, stiff, no shells present throughout. w.c.=26%, LL=32, PL=23, PI=9	75	S12			8 10 7 8	17
			S13: LEAN CLAY (CL) about 85% fines, medium plasticity; about 10% sand, fine; about 5% gravel, fine to coarse; light gray, wet, stiff, shell present throughout	17	S13			8 23 20 9	43
-44.7	38.0		S14: SILTY GRAVEL WITH SAND (GM) about 39% fines, nonplastic to low plasticity; about 33% gravel, fine to coarse, subangular to subrounded; about 28% sand, fine to coarse; gray, wet, dense, gravel up to 1.0" in size. w.c.=11%	71	S14			1 3 9 22	12
-46.7	40.0		S15: SILT WITH GRAVEL (ML) about 55% fines, low plasticity to nonplastic; about 25% sand, fine to coarse; about 20% gravel, fine to coarse, subangular to subrounded; gray, wet, stiff, gravel up to 1.5" in size.	100	S15			4 5 7 5	12
			S16: Similar to S15 w.c.=26%, LL=NV, PL=NP	75	S16			5	
-50.7	44.0								

DRILLING LOG (Cont Sheet)		INSTALLATION New England District		SHEET 3 OF 3 SHEETS	
PROJECT Providence River DMMP		COORDINATE SYSTEM State Plane		HORIZONTAL : VERTICAL NAD83 : MLLW	
LOCATION COORDINATES N 252732 E 360556		ELEVATION TOP OF BORING -6.7'			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RCD %	REMARKS	Blows/ 0.5 ft	N-Value
-60.7	54.0		S17: LEAN CLAY WITH GRAVEL (CL) about 55% fines, low plasticity; about 25% sand, fine to coarse; about 20% gravel, fine to coarse, subangular to subrounded; gray, wet, stiff, gravel up to 1.5" in size. (continued)	100	S17		Blow counts were not recorded for S18.	57	11
			S18: Similar to S17, except no gravel up to 1.5".	63	S18				
			S19: Similar to S17, except no gravel up to 1.5".	33	S19			11848	12
			S20: Similar to S17.	63	S20			2468	10
			S21: Similar to S17, except no gravel up to 1.5".	38	S21			993224	41

<p style="text-align: center;">BOTTOM OF BOREHOLE AT 54.0 ft Borehole was backfilled with cuttings</p>									
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DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 2 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-06		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rig	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 15	DISTURBED : 15 UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >41.4'		15. DATE BORING 1/28/22	STARTED : 1/28/22 COMPLETED : 1/28/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -6.4'	
8. TOTAL DEPTH OF BORING 41.4'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
-6.8	0.4		S1 (0-2)": ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; black, wet, very soft, organic odor, shells and vegetative material present throughout S1 (2-11)": SILT (ML) about 85% fines; about 15% sand, fine; gray, wet, very soft, organic odor	46	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
-11.4	5.0		S2: Similar to S1 (2-11)"	50	S2			0 0 0 0	WOR
-17.8	11.4		S3 (0-17)": Similar to S1 (2-11)", except stiff	100	S3			7 7 8 6	15
-18.2	11.8		S3 (17-22)": POORLY GRADED SAND WITH GRAVEL (SP-SM) about 15% fines, nonplastic; about 60% sand, fine to coarse; about 25% gravel, fine to coarse; gray, wet, medium dense, gravel up to 1" in size. S3 (22-24)": SILT WITH SAND (ML) about 55% fines, low plasticity; about 45% sand, fine; gray, wet, stiff						
-21.4	15.0		S4 (0-15)": SILT (ML) about 80% fines; about 20% sand, fine; gray, wet, very stiff, organic odor, shells present throughout	71	S4			5 11 10 20	21
-26.4	20.0		S4 (15-17)": WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) about 10% fines; about 70% sand, fine to coarse; about 20% gravel, fine to coarse, subangular to subrounded; brown, wet, medium dense				Driller indicated boulder presence from 18 to 20 feet; switched drill bit and advanced through.		

DRILLING LOG (Cont Sheet)		INSTALLATION		SHEET					
		New England District		2					
PROJECT		COORDINATE SYSTEM		HORIZONTAL					
Providence River DMMP		State Plane		VERTICAL					
LOCATION COORDINATES		ELEVATION TOP OF BORING							
N 254260 E 360764		-6.4'							
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Stamp No.	RQD %	REMARKS	Blows/0.5 ft	N-Value
			S5: SILTY SAND WITH GRAVEL (SM) about 24% fines, nonplastic; about 55% sand, fine to coarse; about 20% gravel, fine to coarse, subangular to subrounded; gray, wet, very dense, well cementation, gravel up to 1" in size.	63	S5			33 47 33 51	80
			S6: SILTY SAND WITH GRAVEL (SM) about 24% fines, nonplastic; about 55% sand, fine to coarse; about 20% gravel, fine to coarse, subangular to subrounded; gray, wet, very dense, weak cementation, gravel up to 1" in size. w.c.=9%	58	S6			30 34 32 37	66
			S7: NO RECOVERY	0	S7			18 28 22 23	50
			S8: Similar to S5, except dense and not cemented	42	S8			8 9 26 32	35
-34.4	28.0		S9: WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) about 14% fines, low plasticity; about 58% sand, fine to coarse; about 28% gravel, fine to coarse, subangular to rounded; gray, wet, dense, gravel up to 1" in size.	25	S9			13 18 10 8	28
			S10: Similar to S9 w.c.=10.4%	54	S10			13 8 17 27	25
			S11 (0-20)": Similar to S9	100	S11		Rig drill chattered from 32 to 34 feet; possible boulder.	16 25 56 100	81
			S11 (20-24)": Rock fragments, dark gray, diorite likely boulder				Gravel and rock fragments returned in wash.	12 40 100	140/0.8'
-42.4	36.0		S12: Similar to S9, except cemented, rock fragments up to 1" in size, marble and granite	25	S12				
			S13: POORLY GRADED GRAVEL (GP) about 5% fines, nonplastic; about 75% gravel, fine to coarse, angular to subrounded; about 20% sand, fine to coarse; gray, wet, very dense, gravel up to 1.5" in size, rock fragments in tip.	100	S13		Gravel and rock fragments returned in wash.	50 100	100/0.25'
			S14: SILTY GRAVEL WITH SAND (GM) about 20% fines, nonplastic; about 40% gravel, fine to coarse, angular to subrounded; about 40% sand, fine to coarse; gray, wet, very dense, gravel up to 1" in size, rock fragments throughout.	100	S14		gravel and rock fragments returned in wash, possible boulder from 38 to 40 feet.	100	100/0.4'
			S15: SILTY GRAVEL WITH SAND (GM) about 20% fines, nonplastic; about 40% gravel, fine to coarse, angular to subrounded; about 40% sand, fine to coarse; gray, wet, very dense, strong cementation, gravel up to 1" in size. w.c=8%	100	S15			26 55 100	155/0.9'
-47.8	41.4		BOTTOM OF BOREHOLE AT 41.4 ft Borehole was backfilled with cuttings						

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-07		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rig	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 20	DISTURBED : 20 UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >52'		15. DATE BORING 2/3/22	STARTED : 2/3/22 COMPLETED : 2/2/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -8.1'	
8. TOTAL DEPTH OF BORING 52'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		[Pattern]	S1: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; gray, wet, very soft, strong organic odor, shell present throughout	4	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		[Pattern]	S2: No recovery	0	S2			0 0 0 0	WOR
-18.1	10.0	[Pattern]	S3: ORGANIC CLAY (OH) about 90% fines, high plasticity; about 10% sand, fine; gray, wet, very soft, marine odor, w.c=72%, LL=69, PL=32, PI=37	100	S3			0 0 0 0	WOR
		[Pattern]	S4: Similar to S3	100	S4			0 0 0 0	WOR













DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 2 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 251430 E 360471				ELEVATION TOP OF BORING -8.1'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S5: ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; gray, wet, very soft, marine odor	100	S5			0 1 0 0	1
			S6: Similar to S5	100	S6			0 1 0 0	1
			S7: Similar to S5	92	S7			0 0 0 0	WOR
			S8: Similar to S5	100	S8			0 0 0 2	WOR
			S9: Similar to S5	100	S9			0 0 0 1	WOR
			S10: Similar to S5	100	S10			0 2 0 0	2
			S11: Similar to S5	100	S11			0 0 0 0	WOR
			S12: Similar to S5, except large amount of shell from 8" to 14"	100	S12			0 0 0 0	WOR
			S13: ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; gray, wet, very soft, marine odor, w.c.=73%, LL=70, PL=34, PI=36	100	S13			0 0 0 1	WOR
			S14: Similar to S13	100	S14			0 0 0 0	WOR
			S15: Similar to S13	100	S15			0 0 0 0	WOR
			S16: Similar to S13	100	S16			3 2 2 2	4
-52.1	44.0							0	



DRILLING LOG (Cont Sheet)				INSTALLATION			SHEET 3		
				New England District			OF 3 SHEETS		
PROJECT				COORDINATE SYSTEM		HORIZONTAL	VERTICAL		
Providence River DMMP				State Plane		NAD83	MLLW		
LOCATION COORDINATES				ELEVATION TOP OF BORING					
N 251430 E 360471				-8.1'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S17: SILT (ML) about 90% fines; about 10% sand, fine; gray, wet, very soft, marine odor (<i>continued</i>)	100	S17			0 0 0	WOR
			S18: Similar to S17	100	S18			0 0 0 0	WOR
			S19: Similar to S17, except fibers and shells present throughout	100	S19			0 0 0 0	WOR
			S20 (0-14)": Similar to S19					0 2 4 7	
-59.3	51.2			100	S20				6
-60.1	52.0		S20 (14-24)": SANDY SILT (ML) about 50% fines, nonplastic; about 48% sand, fine to coarse, mostly fine; about 2% gravel, fine; gray, wet, loose, fibers present throughout. w.c.=52%						
			BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings						

Boring Designation FD22-08

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-08		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 20	DISTURBED : 20 UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >52'		15. DATE BORING 2/8/22	STARTED : 2/8/22 COMPLETED : 2/8/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -7.9'	
8. TOTAL DEPTH OF BORING 52'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			














ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		[Symbol]	S1: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shell present throughout	46	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		[Symbol]	S2: Similar to S1	100	S2			0 0 0 0	WOR
		[Symbol]	S3: Similar to S1, except soft	100	S3			0 2 1 1	3
		[Symbol]	S4: Similar to S1	100	S4			0 0 0 0	WOR

DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 2 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 251377 E 361398				ELEVATION TOP OF BORING -7.9'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S5: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; dark gray, wet, very soft, organic odor, shell present throughout	100	S5			0 0 0 0	WOR
			S6: Similar to S5, except shell, fibers, and vegetative material present throughout	100	S6			0 0 0 0	WOR
			S7: Similar to S5	100	S7			0 0 0 0	WOR
			S8: Similar to S5	100	S8			0 0 0 0	WOR
			S9: Similar to S5	100	S9			0 2 1 0	3
-37.9	30.0								
			S10: ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; dark gray, wet, very soft, no odor, shell present throughout	100	S10			0 0 0 0	WOR
			S11: ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; dark gray, wet, very soft, no odor, shell present throughout w.c.=81%, LL=78, PL=36, PI=42	100	S11			0 3 3 1	6
			S12: Similar to S11, except fibers present throughout	100	S12			0 0 1 2	1
			S13: Similar to S11, except fibers present throughout	100	S13			0 0 0 0	WOR
			S14: Similar to S11	100	S14			0 1 1 2	2
			S15: Similar to S11, except medium stiff	100	S15			0 3 2 2	5
			S16: Similar to S11, except medium stiff	100	S16			3 2 2 2	4
								0	

DRILLING LOG (Cont Sheet)		INSTALLATION New England District		SHEET 3 OF 3 SHEETS					
PROJECT Providence River DMMP		COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW				
LOCATION COORDINATES N 251377 E 361398		ELEVATION TOP OF BORING -7.9'							
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RCD %	REMARKS	Blows/ 0.5 ft	N-Value
-55.2	47.3		S17: ORGANIC CLAY (OH) about 90% fines, high plasticity; about 10% sand, fine; dark gray, wet, soft, no odor, w.c.=60%, LL=63, PL=29, PI=34 S18 (0-16)": Similar to S17, except medium stiff	100	S17			2 2 1	4
-59.9	52.0		S18 (16-24)": CLAYEY SAND (SC) about 30% fines, low plasticity; about 70% sand, fine to coarse; gray, wet, loose S19: CLAYEY SAND (SC) about 32% fines, low plasticity; about 68% sand, fine to coarse, mostly fine; gray, wet, loose, fibers present throughout w.c.=27% S20: Similar to S18 (16-24)", except fibers present throughout	100	S18			3 2 6 6	8
				71	S19			5 3 4 7	7
				100	S20			11 9 12 24	21
<p>BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings</p>									

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL NAD83
		10. SIZE AND TYPE OF BIT 4" Rollerbit	VERTICAL MLLW
2. HOLE NUMBER FD22-09	LOCATION COORDINATES N 249881 E 360873	11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg	
3. DRILLING AGENCY New England Boring Contractors		12. TOTAL SAMPLES 20	DISTURBED 0
4. NAME OF DRILLER Norman Stuttard		13. TOTAL NUMBER CORE BOXES 0	UNDISTURBED 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		14. ELEVATION GROUND WATER See Remarks	
DEG FROM VERTICAL ---		15. DATE BORING 2/7/22	STARTED 2/7/22
6. THICKNESS OF OVERBURDEN >52'		16. ELEVATION TOP OF BORING -8'	COMPLETED 2/7/22
7. DEPTH DRILLED INTO ROCK 0'		17. TOTAL CORE RECOVERY FOR BORING N/A	
8. TOTAL DEPTH OF BORING 52'		18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional	

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		[Symbol]	S1: ORGANIC SILT (OL) about 10% sand, fine; dark gray to black, wet, very soft, organic odor, shell present throughout	21	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		[Symbol]	S2: Similar to S1, except dark gray	92	S2			0 0 0 0	WOR
-18.0	10.0	[Symbol]	S3: ORGANIC CLAY (OH) about 92% fines, high plasticity; about 8% sand, fine; dark gray, wet, very soft, slight organic odor, shell, fibers and vegetative material present throughout w.c.=84%, LL=77, PL=32, PI=45, org.=4%	100	S3			0 1 1 1	2
-21.0	13.0	[Symbol]							
		[Symbol]	S4: ORGANIC CLAY (OL) about 92% fines; about 8% sand, fine to medium; dark gray, wet, soft, slight organic odor, shell, fibers and vegetative material present throughout	100	S4			2 2 2 1	4
-26.0	18.0	[Symbol]							


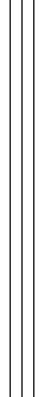
DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 2 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 249881 E 360873				ELEVATION TOP OF BORING -8'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
			S5: ORGANIC CLAY (OH) about 90% fines, high plasticity; about 10% sand, fine; dark gray, wet, very soft, shell present throughout w.c=81%, LL=66, PL=29, PI=37	17	S5			0 0 0 0	WOR
			S6: Similar to S5	92	S6			0 0 0 0	WOR
			S7: Similar to S5	100	S7			0 0 0 0	WOR
			S8: Similar to S5	100	S8			0 0 0 0	WOR
			S9: Similar to S5	100	S9			0 0 0 0	WOR
			S10: Similar to S5	100	S10			0 0 0 0	WOR
			S11: Similar to S5	100	S11			0 0 2 3	2
			S12: Similar to S5, except no shells and soft	100	S12			0 0 3 1	3
			S13: Similar to S5, except no shells and medium stiff	100	S13			2 2 3 2	5
			S14: Similar to S5, except medium stiff	100	S14			5 4 3 4	7
			S15: Similar to S5, except medium stiff	100	S15			2 3 3 2	6
-50.8	42.8		S16 (0-9)": Similar to S5, except medium stiff					6 9 10 8	
-52.0	44.0		S16 (9-24)": SILTY SAND (SM) about 20% fines, nonplastic; about 75% sand, fine to coarse; about 5% gravel, fine; wet	100	S16				19
								6	

DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 3 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 249881 E 360873				ELEVATION TOP OF BORING -8'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RCD %	REMARKS	Blows/ 0.5 ft	N-Value
-53.4	45.4		S17 (0-17)": SILT (ML) about 10% sand, fine; dark gray, wet, medium stiff, shell present throughout	100	S17			587	13
-54.0	46.0		S17 (17-24)": SILTY SAND (SM) about 20% fines, nonplastic; about 75% sand, fine to coarse; about 5% gravel, fine; wet						
-55.3	47.3		S18 (0-18)": Similar to S17 (0-17)"	100	S18			9977	16
			S18 (18-24)": Similar to S17 (17-24)"						
			S19: Similar to S17 (17-24)"	34	S19			2001	WOH
			S20: SILTY SAND (SM) about 14% fines; about 86% sand, fine to coarse, mostly fine; dark gray, wet, medium dense, w.c.=18%	75	S20			89811	17
-60.0	52.0		BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings						

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-10		LOCATION COORDINATES N 252786 E 361881	
3. DRILLING AGENCY New England Boring Contractors		10. SIZE AND TYPE OF BIT 4" Rollerbit	11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 20	DISTURBED : 20 UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >52'		15. DATE BORING 9/22/22	STARTED : 9/22/22 COMPLETED : 2/9/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -7.2'	17. TOTAL CORE RECOVERY FOR BORING N/A
8. TOTAL DEPTH OF BORING 52'		18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional	

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		(Wavy pattern)	S1: ORGANIC CLAY (OH) about 94% fines; about 6% sand, fine to coarse; dark gray, wet, very soft, organic odor, shell present throughout	13	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
		(Wavy pattern)	S2: ORGANIC CLAY (OH) about 94% fines; about 6% sand, fine to coarse; dark gray, wet, very soft, organic odor, shell present throughout w.c.=91%, LL=71, PL=30, PI=41, org.=5%	100	S2			0 0 0 0	WOR
		(Wavy pattern)	S3: ORGANIC CLAY (OH) about 94% fines; about 6% sand, fine to coarse; dark gray, wet, very soft, organic odor, shell present throughout	100	S3			0 0 0 0	WOR
		(Wavy pattern)	S4: Similar to S3	100	S4			1 1 1 2	2

DRILLING LOG (Cont Sheet)				INSTALLATION		SHEET 2			
				New England District		OF 3 SHEETS			
PROJECT		COORDINATE SYSTEM		HORIZONTAL		VERTICAL			
Providence River DMMP		State Plane		NAD83		MLLW			
LOCATION COORDINATES				ELEVATION TOP OF BORING					
N 252786 E 361881				-7.2'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
-29.2	22.0		S5: ORGANIC SILT (OL) about 10% sand, fine; dark gray, wet, very soft, organic odor, shell present throughout	38	S5			0 0 0 0	WOR
			S6: ORGANIC CLAY (OH) about 92% fines; about 7% sand, fine; about 1% gravel, fine; dark gray, wet, very soft, no odor, Shell present throughout w.c.=69%, LL=63, PL=29, PI=34, org.=3%	71	S6			0 0 0 0	WOR
			S7: ORGANIC CLAY (OH) about 92% fines; about 7% sand, fine to coarse; about 1% gravel, fine; dark gray, wet, very soft, no odor, large amount of shells	100	S7			0 0 0 0	WOR
			S8: Similar to S7	58	S8			3 1 1 1	2
			S9: Similar to S6	71	S9			0 1 1 0	2
			S10: Similar to S6.	88	S10			0 0 0 0	WOR
			S11: Similar to S6, except 2" of shells	21	S11			0 1 1 1	2
			S12: Similar to S6, except large amount of shells up to 30% by volume	67	S12			0 1 1 1	2
			S13: Similar to S6, except large amount of shells up to 30% by volume	83	S13			0 0 0 0	WOR
			S14: Similar to S12, except soft	50	S14			2 2 2 3	4
			S15: Similar to S12	75	S15			1 0 1 1	1
			S16: Similar to S12, except 2" of shell in tip of spoon	8	S16			0 0 0 0	WOR
								1	

DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 3 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 252786 E 361881				ELEVATION TOP OF BORING -7.2'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
-53.2	46.0		S17: 1" of shell	4	S17			0 200	WOH
			S18: SILT (ML) about 10% sand, fine; dark gray, wet, very soft, no odor, large amount of shells up to 30% by volume	63	S18			0 200	WOH
			S19: large amount of shells up to 30% by volume	100	S19			2 1 5	2
-59.2	52.0		S20: SILT (ML) about 5% sand, fine; gray, wet, stiff, shell present throughout w.c.=20%, LL=NV, PL=NP	50	S20			2 2 9 11	11
BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings									

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-11		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rig	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 9	DISTURBED : UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >52'		15. DATE BORING 2/2/22	STARTED : COMPLETED : 2/2/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -40.2'	
8. TOTAL DEPTH OF BORING 52'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			



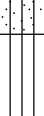
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
-45.2	5.0		S1: ORGANIC SILT (OH) about 90% fines, high plasticity; about 10% sand, fine; black, wet, very soft, w.c.=171%, LL=132, PL=55, PI=77, org. 9%	29	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler G. Romano of USACE directed to skip 5-7 feet sample to speed up drilling. Wash turned from back to gray at 6 feet; driller indicated possible strata change at 5 feet. Casing was out of alignment at 8 feet; corrected with barge.	0 0 0 0	WOR
-55.2	15.0		S2: SILTY SAND WITH GRAVEL (SM) about 15% fines, nonplastic; about 60% sand, fine to coarse; about 15% gravel, fine to coarse, subangular to subrounded; gray, wet, dense, gravel up to 0.5" in size.	54	S2			8 25 22 16	47
-60.2	20.0		S3: POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) about 9% fines, nonplastic; about 60% sand, fine to coarse; about 31% gravel, fine, subangular to subrounded; gray, wet, very dense, gravel up to 0.5" in size. w.c.=12%	63	S3		Casing was out of alignment at 15 feet; corrected with barge. Drill rig chattered from 17 to 18 feet.	14 20 38 42	58

DRILLING LOG (Cont Sheet)				INSTALLATION New England District			SHEET 2 OF 3 SHEETS		
PROJECT Providence River DMMP				COORDINATE SYSTEM State Plane		HORIZONTAL NAD83	VERTICAL MLLW		
LOCATION COORDINATES N 260806 E 358735				ELEVATION TOP OF BORING -40.2'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RCD %	REMARKS	Blows/ 0.5 ft	N-Value
-60.5	20.3		S4 (0-3)": SILTY SAND (SM) about 15% fines, nonplastic; about 80% sand, fine; about 5% gravel, fine; gray, wet, very dense S4 (3-18)": SANDY SILT (ML) about 55% fines, nonplastic to low plasticity; about 45% sand, fine; gray, wet, very dense	75	S4			19 22 25 27	47
-65.2	25.0		S5: SANDY SILT (ML) about 66% fines, nonplastic; about 34% sand, fine to medium; gray, wet, dense, w.c.=21.7%	79	S5		Spoon with 40 feet of rods fell into the hole before sampling at 25 feet.	13 19 19 21	38
			S6 (0-18)": Similar to S5, except very dense	96	S6			20 24 30 20	54
-71.8	31.6		S6 (18-23)": POORLY GRADED SAND WITH SILT (SP-SM) about 5% fines, nonplastic; about 70% sand, fine to coarse; about 25% gravel, fine to coarse, subangular to subrounded; gray, wet, very dense, gravel up to 0.25" in size.						
			S7 Similar to S6 (18-23)", except gravel up to 1" in size	100	S7			10 24 36 51	60
			S8: POORLY GRADED SAND WITH SILT (SP-SM) about 5% fines; about 83% sand, fine to coarse; about 12% gravel, fine, subangular to subrounded; gray, wet, very dense, gravel up to 0.5" in size. w.c.=15%	100	S8		Drill open hole from 40 feet.	8 17 39 56	56

DRILLING LOG (Cont Sheet)				INSTALLATION			SHEET 3		
				New England District			OF 3 SHEETS		
PROJECT				COORDINATE SYSTEM		HORIZONTAL	VERTICAL		
Providence River DMMP				State Plane		NAD83	MLLW		
LOCATION COORDINATES				ELEVATION TOP OF BORING					
N 260806 E 358735				-40.2'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
-92.2	52.0		S9: BLOW-IN SAND AND GRAVEL	100	S9		G. Romano of USACE directed to advance loft from S8 and skip 45 to 47 feet sample to get more depth. 5 feet of sand blow-in when trying to sample from 50 to 52 feet. 2" bottom bit advanced to 60 feet but unable to sample due to rods stuck in the hole.	8 20 42 79	62
			BOTTOM OF BOREHOLE AT 52.0 ft Borehole was backfilled with cuttings						

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL : NAD83 VERTICAL : MLLW
2. HOLE NUMBER FD22-12		10. SIZE AND TYPE OF BIT 4" Rollerbit	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rig	
4. NAME OF DRILLER Norman Stuttard		12. TOTAL SAMPLES 18	DISTURBED : 18 UNDISTURBED : 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
6. THICKNESS OF OVERBURDEN >45'		15. DATE BORING 1/25/22	STARTED : 1/25/22 COMPLETED : 1/25/22
7. DEPTH DRILLED INTO ROCK 0'		16. ELEVATION TOP OF BORING -33.7'	
8. TOTAL DEPTH OF BORING 45'		17. TOTAL CORE RECOVERY FOR BORING N/A	
18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional			

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
			S1: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; black, wet, very soft, diesel and organic odor	100	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
			S2: Similar to S1	100	S2			0 0 0 0	WOR
			S3 (0-19)": Similar to S1	100	S3			2 1 2 1	3
-45.3	11.6		S3 (19-24)": SILT (ML) about 90% fines; about 10% sand, fine; gray, wet, very soft, fibers present throughout.				Return wash turned from black to gray at 11 feet.		
			S4 (0-21)": Similar to S3 (19-24)"	100	S4			0 2 5 8	7
-50.5	16.8		S4 (21-24)": SILTY SAND WITH GRAVEL (SM) about 20% fines; about 60% sand, fine to coarse; about 20% gravel, fine to coarse, subangular to subrounded; gray, wet, loose, gravel up to 0.5" in size.	50	S5			1 2 2 10	4
-50.7	17.0		S5: WELL GRADED SAND WITH SILT (SW-SM) about 10% fines; about 80% sand, fine to coarse; about 10% gravel, fine; gray, wet, very loose					4 5 10 10	
-52.7	19.0								

DRILLING LOG (Cont Sheet)		INSTALLATION		SHEET					
		New England District		2					
PROJECT		COORDINATE SYSTEM		HORIZONTAL					
Providence River DMMP		State Plane		VERTICAL					
LOCATION COORDINATES		ELEVATION TOP OF BORING		MLLW					
N 260757 E 359700		-33.7'							
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	ROD %	REMARKS	Blows/0.5 ft	N-Value
-56.7	23.0		S6: WELL GRADED GRAVEL WITH SAND (GW) about 2% fines; about 66% gravel, fine to coarse, subangular to subrounded; about 32% sand, fine to coarse; gray, wet, medium dense, gravel up to 1" in size. w.c.=7%	50	S6		Return water was clear at 21 feet.		15
			S7: WELL GRADED GRAVEL WITH SAND (GW) about 5% fines; about 80% gravel, fine to coarse, subangular to subrounded; about 15% sand, fine to coarse; gray, wet, medium dense, gravel up to 1" in size.	50	S7			5 9 9 19	18
			S8: SILT (ML) about 95% fines, low plasticity; about 5% sand, fine; gray, wet, medium stiff	25	S8			3 2 5 4	7
			S9: Similar to S8. 1" recovery in tip of spoon	4	S9			0 0 3 8	3
			S10: SILT (ML) about 100% fines, low plasticity; light gray, wet, very stiff	38	S10			9 8 9 6	17
			S11: Similar to S10	79	S11			4 8 9 8	17
			S12: SANDY SILT (ML) about 64% fines, low plasticity; about 30% sand, fine to coarse; about 6% gravel, fine; gray, wet, very stiff, w.c.=15%, LL=NV, PL=NP	58	S12			18 12 16 14	28
			S13: Similar to S12	100	S13			9 9 9 25	18
			S14: Similar to S12	71	S14			16 22 26 30	48
			S15: SILT (ML) about 80% fines, low plasticity; about 20% gravel, fine; gray, wet, very soft	38	S15			0 0 2 3	2
-72.7	39.0		S16: SANDY SILT (ML) about 65% fines, low plasticity; about 3% sand, fine; gray, wet, very stiff	71	S16		Strong wind and gusts caused barge to move off casing.	18 21 37 46	58
			S17: SANDY SILT (ML) about 55% fines, low plasticity; about 35% sand, fine; about 10% gravel, coarse; gray, wet, very dense, gravel up to 1.5" in size.	46	S17			17 30 37 31	67
-76.7	43.0			83	S18			12 27 35 38	62

DRILLING LOG (Cont Sheet)		INSTALLATION New England District		SHEET 3
				OF 3 SHEETS
PROJECT Providence River DMMP		COORDINATE SYSTEM State Plane	HORIZONTAL NAD83	VERTICAL MLLW
LOCATION COORDINATES N 260757 E 359700		ELEVATION TOP OF BORING -33.7'		

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
-78.3	44.6		S18 (0-16)": SILT (ML) about 86% fines, low plasticity; about 14% sand, fine to coarse; gray, wet, very dense,						
-78.7	45.0		w.c.=23% (continued) S18 (16-20)": SILTY SAND WITH GRAVEL (SM) about 30% fines; about 50% sand, fine to coarse; about 20% gravel, fine to coarse; gray, wet, very dense, cemented						
			BOTTOM OF BOREHOLE AT 45.0 ft Borehole was backfilled with cuttings						

Boring Designation FD22-13

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL NAD83
2. HOLE NUMBER FD22-13		LOCATION COORDINATES N 259570 E 359305	
3. DRILLING AGENCY New England Boring Contractors		10. SIZE AND TYPE OF BIT 4" Rollerbit	VERTICAL MLLW
4. NAME OF DRILLER Norman Stuttard		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rlg	12. TOTAL SAMPLES DISTURBED 8 UNDISTURBED 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG FROM VERTICAL ---	BEARING
6. THICKNESS OF OVERBURDEN >16'		13. TOTAL NUMBER CORE BOXES 0	14. ELEVATION GROUND WATER See Remarks
7. DEPTH DRILLED INTO ROCK 0'		15. DATE BORING 1/24/22	STARTED 1/24/22
8. TOTAL DEPTH OF BORING 16'		16. ELEVATION TOP OF BORING -40.8'	COMPLETED 1/24/22
		17. TOTAL CORE RECOVERY FOR BORING N/A	18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
			S1: SILT (ML) about 89% fines; about 10% sand, fine to coarse; about 1% gravel, fine; black, wet, very soft, organic odor, vegetative material	38	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOH
			S2: SANDY ORGANIC SILT WITH GRAVEL (OL) about 55% fines; about 30% sand, fine to coarse; about 15% gravel, fine to coarse, subrounded; black, wet, hard, organic odor, gravel up to 1.5" in size.	75	S2			12 26 100	
-44.8	4.0								
-45.7	4.9		S3 (0-7)": SILTY SAND (SM) about 15% fines; about 75% sand, fine to coarse; about 10% gravel, fine to coarse; dark gray, wet, very dense, slight organic odor, gravel up to 1" in size.	63	S3			54 64 35 35	99
-46.8	6.0		S3 (7-15)": WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM) about 10% fines; about 60% sand, fine to coarse; about 30% gravel, fine to coarse, subrounded to rounded; brown, wet, very dense, gravel up to 1" in size.	46	S4			10 37 41 33	78
			S4: POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) about 10% fines, nonplastic; about 53% sand, fine to coarse; about 37% gravel, fine, subangular to subrounded; brown, wet, very dense, w.c.=10%	58	S5			14 22 33 33	55
			S5 (0-8)": Wash-like material, about 50% fine to coarse gravel; about 45% fine to coarse sand; about 5% fines; very dense, gray and wet	29	S6			21 25 17 18	42
			S5 (8-14)": Similar to S4						
-52.8	12.0		S6: Similar to S4, except gray, gravel up to 1" in size, gray						
			S7: WELL GRADED GRAVEL WITH SAND (GW) about 80% gravel, fine to coarse, subangular to subrounded; about 20% sand, fine to coarse; gray, wet, very dense, wash like material	58	S7		13 23 69 100	92	
-54.8	14.0								
			S8: SILTY SAND WITH GRAVEL (SM) about 29% fines; about 48% sand, fine to coarse; about 23% gravel, fine to coarse; gray, wet, very dense, gravel up to 1" in size. w.c.=10%	54	S8		15 6 68 38	74	
-56.8	16.0								

BOTTOM OF BOREHOLE AT 16.0 ft
Borehole was backfilled with cuttings

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEETS
1. PROJECT Providence River DMMP		9. COORDINATE SYSTEM State Plane	HORIZONTAL NAD83
2. HOLE NUMBER FD22-14		LOCATION COORDINATES N 260099 E 359849	
3. DRILLING AGENCY New England Boring Contractors		11. MANUFACTURER'S DESIGNATION OF DRILL CME-45 Skid Rig	
4. NAME OF DRILLER Norman Stuttard		10. SIZE AND TYPE OF BIT 4" Rollerbit	VERTICAL MLLW
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		12. TOTAL SAMPLES 0	DISTURBED 0
6. THICKNESS OF OVERBURDEN >47'		13. TOTAL NUMBER CORE BOXES 0	
7. DEPTH DRILLED INTO ROCK 0'		14. ELEVATION GROUND WATER See Remarks	
8. TOTAL DEPTH OF BORING 47'		15. DATE BORING 1/26/22	STARTED 1/26/22
		COMPLETED 1/26/22	
		16. ELEVATION TOP OF BORING -40.4'	
		17. TOTAL CORE RECOVERY FOR BORING N/A	
		18. SIGNATURE AND TITLE OF INSPECTOR Alex Juliano, Project Professional	

ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Samp No.	ROD %	REMARKS	Blows/ 0.5 ft	N-Value
		[Pattern]	S1: ORGANIC SILT (OL) about 90% fines; about 10% sand, fine; black, wet, very soft, organic odor	58	S1		SPT performed with 140-lb safety hammer with rope and cathead driving 2" O.D. split spoon sampler	0 0 0 0	WOR
-46.4	6.0	[Pattern]	S2 (0-12)": Similar to S1						
		[Pattern]	S2 (12-24)": ORGANIC CLAY (OH) about 99% fines, high plasticity; about 1% sand, fine to medium; gray, wet, very soft, organic odor, w.c.=56%, LL=61, PL=30, PI=31	100	S2			0 0 0 0	WOR
-50.4	10.0	[Pattern]							
		[Pattern]	S3 (0-14)": Similar to S1						
-51.6	11.2	[Pattern]	S3 (14-24)": Similar to S2 (12-24)", except shell and fibers present throughout	100	S3			0 0 0 0	WOR
		[Pattern]							
		[Pattern]	S4 (0-14)": Similar to S2 (12-24)"						
-56.6	16.2	[Pattern]						11 8 21 22	29
		[Pattern]	S4 (14-24)": SILTY SAND (SM) about 20% fines, nonplastic; about 75% sand, fine to medium; about 5% gravel, fine; gray, wet, medium dense	100	S4				
-60.4	20.0	[Pattern]							

DRILLING LOG (Cont Sheet)		INSTALLATION		SHEET					
		New England District		2					
PROJECT		COORDINATE SYSTEM		HORIZONTAL					
Providence River DMMP		State Plane		VERTICAL					
LOCATION COORDINATES		ELEVATION TOP OF BORING		MLLW					
N 260099 E 359849		-40.4'							
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Stamp No.	ROD %	REMARKS	Blows/0.5 ft	N-Value
-65.4	25.0		S5: BOULDER/COBBLE Rock fragments' gray, white and orange	33	S5			103 1001	100.0.25'
-66.3	25.9		S6 (0-3)": SILTY SAND WITH GRAVEL (SM) about 20% fines; about 50% sand, fine to coarse; about 30% gravel, fine to coarse; gray, wet, medium dense, gravel up to 0.5" in size. S6 (3-7)": SILT (ML) about 90% fines, low plasticity; about 10% sand, fine; gray, wet, stiff	29	S6			8 5 6 6	11
-75.4	35.0		S7: SANDY SILT (ML) about 53% fines; about 47% sand, fine to medium, mostly fine; gray, wet, medium dense, w.c.=25%	46	S7			4 11 10 10	21
-79.4	39.0		S8: POORLY GRADED SAND WITH SILT (SP-SM) about 10% fines; about 90% sand, fine to medium; gray, wet, medium dense S9: Similar to S8	42	S8			6 4 8 14	12
			S10: POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) about 10% fines, nonplastic; about 70% sand, fine to coarse; about 20% gravel, fine to coarse; gray, wet, dense S11: Similar to S10, except loose	54	S10			5 5 5 11	10
			S12: Similar to S10, except very dense and gravel up to 1" in size	42	S11			7 11 23 18	34
				71	S12			6 4 4 6	8
								18 21 36 37	57

DRILLING LOG (Cont Sheet)				INSTALLATION			SHEET 3		
				New England District			OF 3 SHEETS		
PROJECT				COORDINATE SYSTEM		HORIZONTAL	VERTICAL		
Providence River DMMP				State Plane		NAD83	MLLW		
LOCATION COORDINATES				ELEVATION TOP OF BORING					
N 260099 E 359849				-40.4'					
ELEV	DEPTH	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	% REC	Sampl No.	RQD %	REMARKS	Blows/ 0.5 ft	N-Value
-87.4	47.0		S13: SILTY SAND (SM) about 31% fines, nonplastic; about 59% sand, fine to coarse, mostly fine; about 10% gravel, fine; gray, wet, medium dense, w.c.=13%	71	S13			5 14	15
<p style="text-align: center;">BOTTOM OF BOREHOLE AT 47.0 ft</p> <p>1. Borehole was backfilled with cuttings 2. USACE directed to move this boring location toward center of channel to be in dredged area and not on slope area.</p>									

Appendix B

Field Boring Logs

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 253506 E 359455		11a VERTICAL DATUM MLLW	11b HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME 45 Skid Rig		
4. NAME OF DRILLER Norman Stoddard Stutard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 18		UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		▽
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal ▽		▽
7. THICKNESS OF OVERBURDEN 48 feet		16. DATE STARTED 01/27/2022 COMPLETED 1/27/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -11.5 feet, MLLW		
9. TOTAL DEPTH OF HOLE 48 feet		18. TOTAL ROCK CORE RECOVERY FOR -9.2 %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	2	S1 0-2		24/14	WOR x4			S1: ORGANIC SILT (OL): 90% organic silt, ~10% fine sand, Black, very soft, wet shells observed organic odor to d. gray
5	7	S2 5-7		24/15	WOR x4			S2: Similar to S1.
10	12	S3 10-12		24/11	WOR x4			S3 similar to S1
15	17	S4 15-17		24/19	WOR WOR WOR 6			S4: (0-6") ORGANIC SILT (OH) ~90% organic silt, ~10% fine sand fibers observed, wood, shells, vegetative matter. Black, very soft, wet (6-19") Silt (ML); ~10% fine sand, grey, wet, soft

RIVER BOTTOM SEDIMENT

1. Safety hammer w/ rope/chain lifting system used. 140lb hammer 2.0" OD sampler

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE -11.5 feet, MLLW	Hole No. GEI-101
PROJECT Providence River DMMP	-9.2	INSTALLATION New England District
		SHEET 2 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
20		X 55	20-22	24/18	8 6 7 8		<p>OUTWASH</p> <p>CLAY TO MARL</p> <p>55: SILT w/ SAND (ML); ~80% fines, ~20% fine sand lenses and stratified brown grey, wet, stiff, shells observed</p> <p>56: similar to 55 except no shells and very stiff.</p> <p>57: SILT (ML); ~90% low plasticity silt, ~10% fine sand, gray, wet soft</p> <p>58: similar to 57</p> <p>59: SANDY SILT (ML); ~40% fine sand, 50% low to nonplastic fines, gray very soft, wet.</p> <p>510: Similar to 59</p> <p>511: SANDY SILT (ML); ~60% nonplastic to low plasticity fines, ~40% fine sand, gray, stiff, wet</p> <p>512: similar to 511, except very stiff</p> <p>513: similar to 511, except stiff</p> <p>514: similar to 511</p> <p>515: similar to 511</p> <p>516: similar to 511, except very stiff</p> <p>517: similar to 511, except hard.</p>	
22		X 56	22-24	24/24	13 9 8 10			
24		X 57	24-26	24/16	2 1 2 1			
26		X 58	26-28	24/24	2 2 2 3			
28		X 59	28-30	24/21	2 WOH WOH 1			
30		X 510	30-32	24/20	3 5 WOH 2			
32		X 511	32-34	24/24	7 4 5 6			
34		X 512	34-36	24/24	8 9 9 13			
36		X 513	36-38	24/21	5 7 7 8			
38		X 514	38-40	24/24	4 3 5 4	<p>rods were falling under woh for 6-18" despite blow counts</p>		
40		X 515	40-42	24/18	4 4 4 6			
42		X 516	42-44	24/24	11 10 14 22			
44		X 517	44-46	24/24	12 10 18 26			
46								

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE -11.5 feet, MLLW -9.2	Hole No. GEI-101	SHEET 3 OF 3 SHEETS
PROJECT Providence River DMMP	INSTALLATION New England District		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
46	46 -48	S18	24	12	11 21 21			S18: SILTY SAND (SM); w/ 70% fine sand w/ 30% nonplastic fines, gray, dense, wet Terminate hole at 48' below mudline b/c at termination. E7 - 60 feet MLLW per contract backfill w/ cuttings
48				12				
51								
56								
61								
66								

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 2 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 253677 E 360159		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME - 45 Skid rig		
4. NAME OF DRILLER Norman Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 10 UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES		0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽ ▽ ▽
7. THICKNESS OF OVERBURDEN 22 feet		16. DATE STARTED 1/20/22 COMPLETED 1/20/22		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -6.17 -6.3 MLLW		▽
9. TOTAL DEPTH OF HOLE 22 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

1201
1215
1235
1250
1307
1321
1346
1428

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	1	S1	0-2	24/24	WOR x4	River bottom sediment WOR to 4' no sample	RIVER SEDIMENT	S1: Organic silt (OH); ~80% silt, ~10% shells ~10% vegetative material, very soft dark gray, wet, organic like odor, highly plastic
	2							
	3							
	4					Black wash water		S2: Similar to S1 except ~15% shells No vegetation material; ~85% silt
	5	S2	4-6	24/3	WOR x4			
	6							S3: Similar to S2.
		S3	6-8	24/9	WOR x4			
		S4	8-10	24/20	28 5 9			S4: Organic silt (OH); ~85% silt, ~10% fine sand, ~5% shells, gray to brown wet, organic like odor, stiff
	10							S5: Similar to S4, except gray and medium stiff
		S5	10-12	24/17	33 4 4			
	12							S6: Low plasticity silt (ML); ~90% silt, 10% fine sand, d. gray to gray, wet very soft, no odor
		S6	12-14	24/24	11 2 2			
	14							S7: silt (ML) ~90% silt, ~10% fine sand d. gray, wet, very soft, no odor
		S7	14-16	24/19	WOR 1 WOR 1			
	16							S8: Similar to S7. except stiff
		S8	16-18	24/24	2 26 5			
	18							S9: Similar to S8.
		S9	18-20	24/24	3 5 7 6			

1. USACE requests use naming convention "FD22-xx". New name is FD22-02 for GEI-102
2. Used safety hammer w/ rope and cathead lifting system

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE -6.17 feet, MLLW	Hole No. GEI-102
PROJECT Providence River DMMP	-6.3	INSTALLATION New England District
		SHEET 2 OF 2 SHEETS

1452

Elev. (ft)	Depth (ft)	Sample Information			Blows per 6 in. or RQD	Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)				
20								
	20-22	S10	24/13	8 8 12 15		21.4'	5/10: (0-5") similar to SB. (5-13") silty sand (SM) gray, med. dense, wet ~60% f.c (mostly medium to fine sands) ~30% silt ~10% fine gravel	
22					Silty sand	22'	Terminate hole @ 22' depth below mudline Backfill w/ cuttings	
25								
30								
35								
40								
45								

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 255189 E 361573		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME-45 SKID Rig		
4. NAME OF DRILLER Norman Studdard <i>studdard</i>		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 20
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES		UNDISTURBED 0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 52 feet		16. DATE STARTED COMPLETED 2/10/2022 2/10/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -8.1 feet, MLLW		▽
9. TOTAL DEPTH OF HOLE 52 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR <i>Alex Juliano</i>		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
2	0-2	S1	24/11	WOB x4		River Sediment	S1: ORGANIC SILT (ML); w/100's fine sandy wet, very soft, d. gray, shells observed organic odor	
5	5-7	S2	24/12	WOB x4			S2: Similar to S1.	
10	10-12	S3	24/24	2 WOB 1			S3: Similar to S1.	
15	15-17	S4	24/24	2 2 2 2			S4: Similar to S1. vegetative material and fibers observed, except soft	

Safety hammer w/ rope/cathedral lifting system used. 140lb hammer 2"OD sampler

DRILLING LOG (Cont. Sheet)

ELEVATION TOP OF HOLE
8.1 feet, MLLW

Hole No. GEI-1 03

PROJECT
Providence River DMMP

INSTALLATION
New England District

SHEET 2
OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	20	S5	20 22	24/9	WOR x4		S5: Similar to S1, fibers observed.	
	22	S6	22 24	24/ 24	WOR 1 WOH WOH		S6: Similar to S1	
	24	S7	24 26	24/ 24	WOR x4		S7: silt (ML), ~10% fine sand, wet, very soft, dark gray, shells observed and fibers observed. Vegetative material	
	26	S8	26 28	24/ 24	WOR WOR WOR WOH		S8: Similar to S7	
	28	S9	28 30	24/ 24	WOR WOR WOR 1		S9: Similar to S7	
	30	S10	30 32	24/ 24	WOR WOR WOR 2		S10: Similar to S7, except no shells	
	32	S11	32 34	24/ 24	WOR x4		S11: Similar to S7, except no shells	
	34	S12	34 36	24/ 24	WOR x4		S12: Similar to S7, except no shells	
	36	S13	36 38	24/ 24	WOR x4		S13: Similar to S7, except no shells	
	38	S14	38 40	24/ 24	WOR WOR WOR 3		S14: Similar to S7, except no shells present in tip	
	40	S15	40 42	24/ 24	WOR WOR WOR 4		S15: Similar to S7, except no shells and PEAT.	
	42	S16	42 44	24/ 24	WOR WOR 3 3		S16: Similar to S7, except no shells	
	44	S17	44 46	24/ 21	WOR 4 2		S17: Similar to S7, except no shells	

Sediment
Bottom
River

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE -8.1 feet, MLLW	Hole No. GEI-103
PROJECT Providence River DMMP	INSTALLATION New England District	SHEET 3 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	46	S18	46	24	WON	RBS	S18: similar to S7, no shells	
	48		48	24	3 3 2			
	48	S19	48	24	3	49.5	S19: (0-18"): similar to S7, no shells (18-24"): SILTY SAND (SM); ~70% f-m sand, ~30 nonplastic fines d. < .075, wet, medium dense.	
	50		50	24	3 9 12			
	50	S20	50	24	12	silty sand	S20: SILTY SAND (SM); ~70% fine sand ~20% nonplastic fines, ~10% fine gravel d. < .075, wet, very dense. Possible glacial till in tip. cemented	
	52		52	22	30 27			

terminate hole at 52 ft depth El. -60 ft MLLW the termination elevation

Backfill w/ cuttings

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 252452 E 359739		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME 45 Skid rig		
4. NAME OF DRILLER Norman Studdard Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 20		DISTURBED 0 UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		∇
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		∇
7. THICKNESS OF OVERBURDEN 52 feet		16. DATE STARTED 1/31/2022		COMPLETED 1/31/2022
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -7.5 feet, MLLW		
9. TOTAL DEPTH OF HOLE 52 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./Rec. (in)	Blows per 6 in. or RQD			
0	2	S1	0-2	24/17	WOR x4		SEDIMENT	S1: ORGANIC SILT (OL); ~90% silt, ~10% fine sand, shells observed, d. gray, wet, very soft, organic odor
	5	S2	5-7	24/14	WOR x4			S2: similar to S1.
10	12	S3	10-12	24/24	WOR 21 2			S3: silt (ML); ~90% silt, ~10% fine sand, shells, d. gray, wet, very soft organic-like odor.
15	17	S4	15-17	24/24	'1 '1 '1			S4: similar to S3

1. Safety hammer and rope/cable lifting system used. 140 lb hammer 2" OD sampler

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE		Hole No. GEI-104				
PROJECT Providence River DMMP		-7.5 feet, MLLW		INSTALLATION New England District				
				SHEET 2 OF 3 SHEETS				
Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
20	X	S5	20-22	24/24	1 2 2 3		Sediment River Bottom Silty Sand	S5: similar to S3.
22	X	S6	22-24	24/24	1 1 1 1			S6: similar to S3
24	X	S7	24-26	24/24	WOR x4			S7: similar to S3. Still shells in soil
26	X	S8	26-28	24/11	WOR x4			S8: similar to S3. Still shells in soil
28	X	S9	28-30	24/24	WOR 1 1 2			S9: similar to S3.
30	X	S10	30-32	24/24	1 WOR WOR 1	WOR for first 3"		S10: (0-20"): similar to S3 (20-24"): Peat (PT), brown
32	X	S11	32-34	24/9	2 3 2 2			S11: Peat (PT), gray to brown
34	X	S12	34-36	24/24	WOR WOR 2 4	Notice out of order here. S12 and S13		S12 (0-23"): SILTY SAND (SM); ~70% f-c sand (16-24"); ~30% nonplastic fines, gray loose, wet. S12 (0-23"): SILT (ML); ~10% fine sand, gray fibers throughout, gray, soft, wet (23-24): PEAT (PT); brown
36	X	S13	36-38	24/24	2 2 6 8			S13: (0-16"): similar to S12 (0-23")
38	X	S14	38-40	24/13	2 4 5 6			S14: SILTY SAND (SM); 80% f-c sand ~20% nonplastic fines, gray, loose wet
40	X	S15	40-42	24/11	2 1 1 1			S15: similar to S12 (0-23")
42	X	S16	42-44	24/13	1 2 2 5			S16: similar to S12 (0-23")
44	X	S17	44-46	24/6	WOR 10 5 8			S17: SILTY SAND (SA); 80% f-c sand, 20% nonplastic fines, gray, medium dense, wet.
46	X							

DRILLING LOG (Cont. Sheet) ELEVATION TOP OF HOLE 7.5 feet, MLLW **Hole No. GEI-104**

PROJECT Providence River DMMP INSTALLATION New England District SHEET 3 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
46	46	S18	46-48	24/10	34/9			S18: Similar to S17
48	48	S19	48-50	24/10	79/12			S19: WIDELY GRADED SAND w/ silt (SW-SM); ~90% f-c sand, ~10% nonplastic fines, med dense, wet, gray S20: (0-20"): Similar to S19 (20-24"): silt w/ sand (MC); ~25% fine sand, ~75% low plasticity fines, gray, stiff, wet clay??
50	50	S20	50-52	24/24	95/9			
52	52							
54								Terminate hole at 52 ft b/c reach est. -60 ft MLLW. Backfill w/ cuttings
56								

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 25 27 32 E 36 0556		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME-45 Skid Rig		
4. NAME OF DRILLER Norman Studdard Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 21		UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		∇
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		∇
7. THICKNESS OF OVERBURDEN 54 feet		16. DATE STARTED 3/1/2022 COMPLETED 2/1/2022		∇
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -6.7 feet, MLLW		
9. TOTAL DEPTH OF HOLE 54 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR <i>Alex Juliano</i>		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	2	S1	0-2	24/5	WOR x4			S1: ORGANIC SILT (sl); in 10% fine sand, d. gray, wet very soft, shells observed organic odor
5	7	S2	5-7	24/18	WOR x4			S2: Similar to S1
10	12	S3	10-12	24/22	WOR x4			S3 Similar to S1
15	17	S4	15-17	24/24	2, 1, 1			S4: Similar to S1

River bottom sediment

1. Safety hammer w/ rope/catched lifting system used. 140 lb hammer 2" OD samplers

DRILLING LOG (Cont. Sheet) ELEVATION TOP OF HOLE
 -6.7 feet, MLLW Hole No. **GEI-105**
 PROJECT: Providence River DMMP INSTALLATION: New England District SHEET 2 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
20	X	S5	20-22	24/24	WOR X4	River bottom sediment	S5: similar to S1	
22	X	S6	22-24	24/24	WOR X4		S6: similar to S1	
24	X	S7	24-26	24/24	WOR X4		S7: similar to S1	
26	X	S8	26-28	24/24	WOR X4		S8: similar to S1	
28	X	S9	28-30	24/9	WOR X4		S9: similar to S1. All samples still have shells.	
30	X	S10	30-32	24/24	WOR X4		S10: (0-21") similar to S1. (21-24"): Peat (PT); brown, fibers	
32	X	S11	32-34	24/24	WOR X4		S11: silt (ML); w/ 15% fine sand, fibers throughout, idigrey, wet, very soft + shells observed (8-18")	
34	X	S12	34-36	24/18	WOR 4 3 9		S12: lean clay (CL); w/ 10% fine sand fibers throughout, ^{light} grey, wet, stiff no shells, low plasticity (0-8"); similar to S11.	
36	X	S13	36-38	24/4	8 10 7 8		S13: similar to S12 (8-18") except w/ 5% fine to coarse rounded gravel, shells	
38	X	S14	38-40	24/17	8 23 20 9		S14: CLAYEY SAND; w/ 50% f-c sand w/ 20% f-c gravel up to 1", subrounded to subangular, 30% organic to low plastic fines, grey, dense, wet.	
40	X	S15	40-42	24/24	13 9 22	S15: LEAN CLAY (CL); w/ 25% f-c sand, w/ 20% f-c gravel up to 1/2", subrounded to subangular, grey, wet stiff ^{ul gravel} CLAY ??		
42	X	S16	42-44	24/18	4 5 7 5	S16: similar to S15		
44	X	S17	44-46	24/24	5 5 6 7	S17: similar to S15		

35

Glaciomarine soils

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE -6.7 feet, MLLW	Hole No. GEI-105
PROJECT Providence River DMMP	INSTALLATION New England District	SHEET 3 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
46	X	S18	46-48	24/15	Unknown	missed blows	S18: similar to S15	
48	X	S19	48-50	24/8	11 8 4 8		S19: similar to S15	
50	X	S20	50-52	24/15	24 6 8		S20: similar to S15, rock fragment up to 1.5"	
52	X	S21	52-54	24/9	9 9 32 24		S21: similar to S15	
54							<p>Terminate hole at 54 ft below mudline, after reaching terminative E1 of -60 ft MLLW.</p> <p>Backfill w/ cuttings</p>	

Glacial marine

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 2 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4" Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 254260 E 360764		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME-45 SK'd rig		
4. NAME OF DRILLER Norman Studdard Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 15		DISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		UNDISTURBED 0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 42 feet		16. DATE STARTED COMPLETED 1/28/22 1/28/22		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE - 6.4 feet, MLLW		▽
9. TOTAL DEPTH OF HOLE 42 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	0-2	S1	24/11	WOR X4		River Bottom Sediment	S1: (0-2") ORGANIC SILT (OL); ~90% fines, ~100% fine sand, black, very soft, wet shells, vegetative matter, organic odor (2-11") SILT (ML); ~85% fines, ~15% fine sand, organic odor, gray, wet, very soft.	
2							S2: Similar to S1 (2-11")	
5	5-7	S2	24/12	WOR X4		Glacio marine	S3: (0-17"); similar to S1 (2-11"), except stiff (17-22"): NARROWLY GRADED SAND w/ GRAVEL and silt (SP-SM); ~60% f-c sand, ~25% f-c gravel, ~15% nonplastic fines, gray, wet, med dense. gravel up to 1"	
7							(22-24") SILT w/ SAND; ~55% low plasticity silt, 45% fine sand, stiff, wet, gray	
10	10-12	S3	24/24	7 7 8 6			S4: (0-15"); SILT (ML); ~80 silt, ~20% fine sand, gray, wet, very stiff, shells, organic odor (15-17"); WIDELY GRADED SAND w/ SILT AND GRAVEL (SW-SM); ~70% f-c sand, ~20% f-c gravel subround to subangular brown, wet, med dense	
15	15-17	S4	24/17	5 10 20				
17								
20								

1. Safety Hammer w/ rope/cathod used. 140lb hammer 2"OD sampler

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE -6.4 feet, MLLW		Hole No. GEI-106				
PROJECT Providence River DMMP			INSTALLATION New England District		SHEET 2 OF 2 SHEETS			
Elev. (ft)	Depth (ft)	Sample Information			Drilling Remarks	Graphic Log	Soil and Rock Description	
		Sample No.	Depth (ft)	Pen./ Rec. (in)				Blows per 6 in. or RQD
20	X	S5	20-22	24/15	33 47 33	LACIAL TILL	S5: SILTY SAND (SM); 50% fine to coarse sand, ~30% nonplastic fines, 20% f-c gravel subrounded to subangular up to 1". Gray, very dense, wet. Cemented TILL	
22	X	S6	22-24	24/14	30 34 32 37		S6: Similar to S5, except not as well cemented, as S5.	
24	X	S7	24-26	24/0	18 28 22 23		S7: NO RECOVERY	
26	X	S8	26-28	24/10	8 9 26 32		S8: Similar to S5, except denser and not cemented	
28	X	S9	28-30	24/6	13 18 10 8		S9: Similar to S5, except not cemented	
30	X	S10	30-32	24/13	13 8 17 27		S9: WIDELY GRADED SAND W/ SFT AND GRAVEL (SW-SM); ~60% f-c sand, ~10% nonplastic fines, ~30% f-c gravel rounded to subangular up to 1". Gray dense, wet	
32	X	S11	32-34	22/24	16 25 56 100/4"		S10: Similar to S9, except very dense	
34	X	S12	34-36	16/4	12 40 100/4"		S11: (0-20"); similar to S9 (20-24"); Rock fragments, d. gray, diorite likely boulder	
36	X	S13	36-38	9/9	50 100/3"		S12: Similar to S9, cemented, rock fragments up to 1" marble and granite	
38	X	S14	38-40	1"/6"	100/1"		S13: Narrowly graded gravel (GP); ~75% f-c gravel angular to subrounded ~20% f-c sand, ~5% nonplastic fines gray, wet, very dense, gravel up to 1.5" rock fragments in tip	
40	X	S15	40-42	17/19	26 55 100/5"		S14: Narrowly graded gravel (GP) - 65% f-c gravel angular to subrounded ~30% f-c sand, ~5% nonplastic fines, gray, wet very dense, gravel up to 1". Rock fragments throughout	
42	X						S15: Similar to S14, cemented.	
44							41/41	terminate hole at 42' below mudline Backfill w/ cuttings
45								

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 251430 E 360471		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME 45 skid rig		
4. NAME OF DRILLER Norman Studdard <i>Studdard</i>		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 20	UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES	0	
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal	16. DATE STARTED 02/03/2022 COMPLETED 02/03/2022	
7. THICKNESS OF OVERBURDEN 52 feet		17. ELEVATION TOP OF HOLE -0.1 feet, MLLW		
8. DEPTH DRILLED INTO ROCK 0 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
9. TOTAL DEPTH OF HOLE 52 feet		19. SIGNATURE OF INSPECTOR <i>Alex Juliano</i>		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	0-2	S1	0-2	24/1	WOR XY		S1: ORBENT Silt (OL); w 10% fine sand gray, very soft, shells observed, strong organic odor. In tip.	
2								
5	5-7	S2	5-7	24/0	WOR XY		S2: No recovery	
7								
10	10-12	S3	10-12	24/24	WOR XY		S3: Silt (ML) ~ 10% fine sand shells observed, gray, very soft wet, marine-odor	
12								
15	15-17	S4	15-17	24/24	WOR XY		S4: Similar to S3.	
17								

River bottom sediment

1. Safety hammer and rope/catchall lifting system used 14lb hammer 2" OD scraper

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE		Hole No. GEI-107				
PROJECT Providence River DMMP		-8.1 feet, MLLW		INSTALLATION New England District				
				SHEET 2 OF 3 SHEETS				
Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	20	S5	20-22	24/24	WOR 1 WOH		RIVER BOTTOM Sediment	S5: Similar to S3
	22			24	WOH			S6: Similar to S3
	21	S6	22-24	24/24	WOR WOH			S7: Similar to S3
	25	S7	24-26	24/22	WOR x4			S8: Similar to S3
	26	S8	26-28	24/24	WOR WOR WOR 2			S9: Similar to S3
		S9	28-30	24/24	WOR WOR WOR 1			S10: Similar to S3
	30	S10	30-32	24/24	WOH 2 WOH WOH			S11: Similar to S3
	32	S11	32-34	24/24	WOR x4			S12: Similar to S3, large amount of shells from 8-14"
	34							S13: Similar to S3
	35	S12	34-36	24/24	WOR x4			S14: Similar to S3
	36	S13	36-38	24/24	WOR x3 1			S15: Similar to S3
	38	S14	38-40	24/24	WOR x4			S16: Similar to S3
	40	S15	40-42	24/24	WOR x4			S17: Similar to S3
		S16	42-44	24/24	32 R2			
	45	S17	44-46	24/24	WOR x4			

DRILLING LOG (Cont. Sheet) ELEVATION TOP OF HOLE -8.1 feet, MLLW Hole No. GEI-107
 PROJECT Providence River DMMP INSTALLATION New England District SHEET 3 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
46	46	S18	46	24	WOR		S18 Similar to S3	
48	48		48	24	X4			
50	50	S19	48-50	24	WOR X4		S19: Similar to S3, except fibers observed throughout, still shells inside.	
52	50-52	S20	50-52	24	WOR 24 7		S20: (0-14") similar to S19 (14-24"): silty sand (SM); ~70% fine to medium sand, ~30% nonplastic fines, gray, wet, loose. fibers observed.	

River silt sediment

51'

52'

glacio-marine

Terminate hole at 52' below mudline (EI-60 ft MLLW)

Backfill w/cuttings

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 251377 E 361390		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME 45 Skid rig		
4. NAME OF DRILLER Norman Studdard Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 20	UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		▽
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 52 feet		16. DATE STARTED 2/8/2021 COMPLETED 2/8/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -7.9 feet, MLLW		
9. TOTAL DEPTH OF HOLE 52 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	0-2	S1	0-2	24/11	WOR X4			S1: ORGANIC Silt (OL) ~10% fine sand d. gray, very soft, wet, shells Observed, organic odor
5	5-7	S2	5-7	24/24	WOR X4			S2: similar to S1.
10	10-12	S3	10-12	24/24	WOR 2, 1			S3: similar to S1, except soft
15	15-17	S4	15-17	24/24	WOR X4			S4: similar to S1

River bottom sediment

1. Safety hammer w/ rope/catch lifting system used. 140lb hammer, 2" OD sampler

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE -7.9 feet, MLLW	Hole No. GEI-108
PROJECT Providence River DMMP	INSTALLATION New England District	SHEET 2 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
20		S5	20-22	24/24	WOR x4		S5: similar to S1	
22		S6	22-24	24/24	WOR x4		S6: similar to S1. Fibers and vegetative material observed. In addition to shells.	
24		S7	24-26	24/24	WOR x4		S7: similar to S1.	
26		S8	26-28	24/24	WOR x4		S8: similar to S1	
28		S9	28-30	24/24	WOR 2 1 WH		S9: similar to S1, except soft	
30		S10	30-32	24/24	WOR x4		S10: SICT (M); 10 ⁴ fine sand, d. gray, very soft, wet, shells observed no organ odor	
32		S11	32-34	24/24	WOR 3 3, 1		S11 similar to S10	
34		S12	34-36	24/24	WOR WOR 1 2		S12 similar to S10, fibers observed	
36		S13	36-38	24/24	WOR x4		S13 similar to S12	
38		S14	38-40	24/24	WOR 1 2		S14 similar to S10	
40		S15	40-42	24/24	WOR 3 2 2		S15 similar to S10, except medium stiff	
42		S16	42-44	24/24	3 2 2		S16 similar to S10, except med stiff	
44		S17	44-46	24/24	WOR 2 2 1		S17 similar to S10, except soft	

River bottom sediment

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE			Hole No. GEI-108		
PROJECT Providence River DMMP				-7.9 feet, MLLW		INSTALLATION New England District	
					SHEET 3 OF 3 SHEETS		
Elev. (ft)	Depth (ft)	Sample Information			Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)			
46	X 46	S18	46	24	32	47.3' S14 sand 52'	S18: (0-16") : similar to S10, med stiff, silty (16-24") : SILTY SAND (SM); ~70% f-c sand, ~30% nonplastic fines gray, wet, loose
48	X 48	S19	48	24	66		S19 : similar to S18 (16-24") ; fibers observed
50	X 50	S20	50	17	53		S20 :
52	X 52	S20	52	24	119		S20 : 129
Terminate Logging at 52 ft Et. - 60 MLLW the actual elevation Backfill w/ cuttings							

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT <i>4</i> Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 249881 E 360873		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG <i>CMB-45 skid rig</i>		
4. NAME OF DRILLER Norman Studdard <i>Studdard</i>		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED: 20 UNDISTURBED: 0		
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		▽
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 0 52 feet		16. DATE STARTED: 2/2/2022 COMPLETED: 2/2/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -8.0 feet, MLLW		
9. TOTAL DEPTH OF HOLE 52 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR <i>Alex Juliano</i>		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0		X S1	0-2	24/5	WOR x4			S1: ORGANIC SILT (04); n10% fine sand, shells observed, wet, very soft, dark gray to black, organic odor
5		X S2	5-7	24/22	WOR x4			S2: similar to S1, except all dark gray
10		X S3	10-12	24/24	WOH 1, 1			S3: silt (M); n 10% fine sand, d. gray, wet, very soft, slight organic odor, shells observed, vegetative material, fibers
15		X S4	15-17	24/24	22 21			S4: similar to S3, except soft

River Bottom Sediment

1. Safety hammer w/ rope/cable lifting system used. 190lb hammer 2"OD sampler

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE -80 feet, MLLW	Hole No. GEI-109	
PROJECT Providence River DMMP		INSTALLATION New England District		SHEET 2 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information			Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)			
20	20	S5	20-22	24/4	WOR x4		S5 SILT (ML) ~ 100% fine sand, dk. gray, wet, very soft, shells observed
22	22	S6	22-24	24/22	WOR x4		S6 Similar to S5
24	24	S7	24-26	24/24	WOR x4		S7 Similar to S5
26	26	S8	26-28	24/24	WOR x4		S8 Similar to S5
28	28	S9	28-30	24/24	WOR x4		S9 Similar to S5
30	30	S10	30-32	24/24	WOR x4		S10 Similar to S5
32	32	S11	32-34	24/24	WOR WOH 2 3		S11 Similar to S5
34	34	S12	34-36	24/24	WOR WOH 3		S12 Similar to S5, except no shells and soft
36	36	S13	36-38	24/24	2 2 3 2		S13: Similar to S12, except medium stiff
38	38	S14	38-40	24/24	5 4 3 4		S14 Similar to S5, except medium stiff
40	40	S15	40-42	24/24	2 3 3 2		S15 Similar to S5 except medium stiff
42	42	S16	42-44	24/24	6 9 10 0		S16: (0-9) Similar to S15
44	44	S17	44-46	24/24	6 5 8 7		S17: (9-24") Silty Sand (SM); ~75% f-c sand, ~20% nonplastic fines, ~5% fine gravel

Sediment
River

Silty Sand

17-24 similar to S16(9-24")

DRILLING LOG (Cont. Sheet) ELEVATION TOP OF HOLE 8.0 feet, MLLW **Hole No. GEI-109**

PROJECT Providence River DMMP INSTALLATION New England District SHEET 3 OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
46			46	24	99			S18: (0-18"): similar to S15
49		S18	-49	24	7			(18-24") similar to S16 (9-24")
50		S19	49-50	24	2 wolt w/ H 1			S19 similar to S16 (9-24")
52		S20	50-52	24	89 188 11			S20 similar to S16 (9-24")
								Terminate hole at 52ft depth at El -60 ft MLLW
								Basket of cuttings

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 252806 E 361881		11a VERTICAL DATUM MLLW	11b HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CNC-45 skid rig		
4. NAME OF DRILLER Norman Studdard Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		DISTURBED 20
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES		UNDISTURBED 0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 52 feet		16. DATE STARTED 2/9/2022 COMPLETED 2/9/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -7.2 feet, MLLW		▽
9. TOTAL DEPTH OF HOLE 52 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	0	S1	0/2	24/3	WOR x 4			S1: ORGANIC SILT (OC). ~ 100% fine sand, wet, very soft, dk. gray. Shells observed organic odor
2								
5	5	S2	5/7	24/24	WOR x 4			S2: Similar to S1
7								
10	10	S3	10/12	24/24	WOR x 4			S3: Similar to S1
12								
15	15	S4	15/17	24/24	1 1/2			S4: Similar to S1
17								

River Bottom Sediment

Safety hammer w/ rope/catch head lifting system used 140lb hammer 2" OD sampler

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE		Hole No. GEI-110			
PROJECT Providence River DMMP			INSTALLATION New England District				
			SHEET 2 OF 3 SHEETS				
Elev. (ft)	Depth (ft)	Sample Information			Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)			
	20	S5	20-22	24/9	WOR x4		S5: similar to S1
	22	S6	22-24	24/17	WOR x4		S6: SILT (ML); ~10% fine sand, wet, dk. gray. Very soft, shells observed. No organic odor.
	24	S7	24-26	24/24	WOR x4		S7: similar to S6, large amount of shells
	26	S8	26-28	24/14	3 1 1		S8: similar to S6, large amount of shells
	28	S9	28-30	24/17	WOR 1 WOR		S9: similar to S6
	30	S10	30-32	24/21	WOR x4		S10: similar to S6
	32	S11	32-34	24/5	WOR 1 1		S11: similar to S6, 2" of shells
	34	S12	34-36	24/16	WOR 1 1		S12: similar to S6, large amount of shells ~30% by volume
	36	S13	36-38	24/20	WOR x4		S13: similar to S6, large amount of shells ~30% by volume
	38	S14	38-40	24/12	2 2 2 3		S14: similar to S12, except soft
	40	S15	40-42	24/18	1 WOR 1 1		S15: similar to S12
	42	S16	42-44	24/2	WOR x4		S16: similar to S12. 2" in tip of spoon
	44	S17	44-46	24/1	1 WOR WOR 2		S17: 1" of shells

River bottom sediment

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE -7.2 feet, MLLW		Hole No. GEI-110	
		PROJECT Providence River DMMP			INSTALLATION New England District
				SHEET 3 OF 3 SHEETS	

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
46	X 518	46	24/15	W02 W0H W0H 2		(VI) River Sediment	S18: Similar to S12	
48	X 519	48	24/24	2, 1 5			S19: Similar to S12	
50	X 520	50	24/12	2, 9 11			S20: SILT (ml); 5% fine sand, gray, wet, stiff, low plasticity shells observed	
52							<p>Terminate at depth of 52 ft at El - 60 ft MLLW the termination Elevation.</p> <p>Backfill w/ cuttings</p>	

DRILLING LOG	DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
	1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit
2. BORING LOCATION (Coordinates or Station) N 260806 E 358735		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME-45 skid rig	
4. NAME OF DRILLER Norman Studdard Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 9	DISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0	UNDISTURBED 0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal	16. DATE STARTED 2/02/2022
7. THICKNESS OF OVERBURDEN 52 feet		16. DATE COMPLETED 2/02/2022	17. ELEVATION TOP OF HOLE -40.2 feet, MLLW
8. DEPTH DRILLED INTO ROCK 0 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 52 feet		19. SIGNATURE OF INSPECTOR <i>Alex Juliano</i>	

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
0	0-2	S1	24/7	WOR	x4	482 ft water column at 0935 set sands, two anchors and concrete block	S1: ORGANIC SILT (OL); ~100% fine sand Black, wet, very soft	
2						Gaina Romeo directed to SK p 5-7. Sample b/c don't need more Sample of silt and to speed up drilling		
5						0935 @ 8' depth casing out of alignment, correct w/ barge		
10						driller indicated change in strike @ ~5 ft		
12	10-12	S2	24/13	8	25	Wash turns from black to grey at 6'	S2: SILTY SAND w/ GRAVEL (SM); ~60% f-c sand, ~15% nonplastic fines, ~15% fine to coarse gravel up to 0.5" Subangular to subrounded, grey, wet, dense.	
15						Wash turns from black to grey at 6'		
17	15-17	S3	24/15	14	20	casing out of alignment @ 15ft mention barge	S3: WIDELY GRADED SAND w/ GRAVEL (SW-SM); ~60% f-c sand, ~10% nonplastic fines, ~30% f-c gravel Subangular to subrounded up to 0.5", grey, wet, very dense.	
						Drill rig chatter at 17-18 ft.		

1. Safety hammer w/ rope/catched lifting system 140 lbs hammer 2" OD Surpacer

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE		Hole No. GEI-111				
PROJECT Providence River DMMP		-40.2 feet, MLLW		INSTALLATION New England District				
				SHEET 2 OF 3 SHEETS				
Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
20	22	S4	20-22	24/18	19 22 25 27		Glaciomarine	S4: (0-3") Silty sand (SM); ~80% fine sand, ~15% nonplastic fines, ~5% fine gravel, gray, wet, very dense (3-18") SANDY SILT (ML); ~55% nonplastic to low plasticity fines, ~45% fine sand, gray, wet, very dense
25	27	S5	25-27	24/19	13 19 21	Spun w/ 40' of rods fell into hole before sampling.		S5: Silty sand (SM); ~15% nonplastic fines ~85% fine sand gray, wet, dense
30	32	S6	30-32	24/23	20 24 30 20			S6: (0-18") similar to S5 except very dense. (18-23") WIDELY GRADED SAND w/ Gravel (SW); ~90% f-c sand ~25% f-c gravel up to 0.25" sub angular to sub rounded, ~50% nonplastic fines, gray very dense, wet.
35	37	S7	35-37	24/24	10 24 30 51			S7: similar to S6 (18-23"); gravel up to 1"
40	42	S8	40-42	24/24	8 17 39 56			S8: similar to S6 (18-23")
45								

DRILLING LOG (Cont. Sheet)

ELEVATION TOP OF HOLE
-40.2 feet, MLLW

Hole No. GEI-11

PROJECT
Providence River DMMP

INSTALLATION
New England District

SHEET 3
OF 3 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
45						Core direct to advance left from 58 and skip 45 to 47 ft sample to get more depth Drill open hole from 40 ft	Glaciomarine	59' Blow-in sand and gravel
47								
50						5 ft of sand blow-in When to sample @ 51 ft 2" button bit advanced to 60 ft but unable due to rods stuck in hole terminate hole.	52	Terminate hole @ 52 ft Backfill w/ Cuttings
52		S9	50-52	24/24	20 42 79			
55								
60								
65								
70								

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 2 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 260757 E 359700		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME-45 Skid Rig		
4. NAME OF DRILLER Norman Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN		13. TOTAL NO. OF DISTURBED 18 UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES		0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 45 feet		16. DATE STARTED 01/25/2022 COMPLETED 1/25/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -33.7 feet, MLLW		▽
9. TOTAL DEPTH OF HOLE 45 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR Alex Juliano		

0870

0856

0909

0943

0950

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	2	S1 0-2	24/24	24/24	WOR x4	River bottom sediment 0-116ft	River bottom sediment	S1: ORGANIC SILT (OL); ~90% organic silt, ~10% fine sand, very soft, black, wet organic-like odor, deisel-like odor
	5-7	S2 5-7	24/24	24/24	WOR x4			S2: Similar to S1.
	10-12	S3 10-12	24/24	24/24	2 1/2	return west turns from black to gray @ 11 ft	SILT	S3: (0-19"); Similar to S1 (19-24"); silt (ML); ~90% silt, ~10% fine sand, very soft, gray, wet, fibers observed.
	15-17	S4 15-17	24/24	24/24	WOR 2 5/8			S4 (0-21"); similar to S3 (19-24") (21-24"); SILTY SAND w/ GRAVEL (SM), ~60% f-c sand, ~20% silt, ~20% f-c gravel up to 0.5" subrounded to subangular, gray, wet, loose
	17-19	S5 17-19	24/12	24/12	1 2/10		Sand + Gravel	S5: WIDELY GRADED SAND w/ SILT (SW-SM); ~80% f-c sand, ~10% fines, ~10% fine gravel, gray, very loose, wet.

1. Safety hammer w/ rope/ cathead lifting system. 14x15 hammer 2.0" OD sampler

DRILLING LOG (Cont. Sheet)

ELEVATION TOP OF HOLE
-33.7 feet, MLLW

Hole No. **GEI-112**
FD22-12

PROJECT
Providence River DMMP

INSTALLATION
New England District

SHEET **2**
OF 2 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
1035	19	S6	19-21	24/12	4 5 10	clear return water	S6: WIDELY GRADED GRAVEL w/ SAND (6%) ~ 80% f-c gravel, subangular to sub rounded up to 1", ~ 15% f-c sand, ~ 5% fines gray, med dense, wet.	
1042	21	S7	21-23	24/12	5 9 9			S7: Similar to S6.
1122	24	S8	23-25	24/16	3 2 5 4	23'	S8: Low plasticity silt (ML); 95% low plasticity fines, ~ 5% fine sand, gray med. stiff, wet	
1128	25	S9	25-27	24/11	WOR WOR 3 8		S9: Similar to S8. 1" in tip of spoon of recovery	
1202	27	S10	27-29	24/9	9 8 9 6	Qp = 0.5 tsf Sv = 0.25 tsf	S10: Low plasticity SILT (ML); light gray, very stiff, wet	
1208	29	S11	29-31	24/19	4 8 9 8	Qp = 0.5 tsf Sv = 0.25 tsf	S11: Similar to S10.	
1323	31	S12	31-33	24/14	13 12 16 14	Qp = 1.25 tsf	S12: Low plasticity SILT (ML); ~ 20% fine sand, ~ 5% fine gravel, gray, very stiff, wet	
1372	34	S13	33-35	24/24	9 9 25		S13: Similar to S12.	
1400	35	S14	35-37	24/17	16 22 26 30		S14: Similar to S12.	
1410	37	S15	37-39	24/9	WOR WOR 2 3	Strong winds and gusts causing barge to move off casing	S15: Low plasticity SILT (ML); ~ 20% fine sand, gray, very soft wet	
1432	39	S16	39-41	24/17	18 21 37 46	Qp = 2.0 tsf	S16: SANDY SILT (ML); ~ 65% low plasticity fines, ~ 35% fine sand gray, very stiff, wet.	
	41	S17	41-43	24/11	17 30 37 31		S17: SANDY SILT (ML) ~ 55% low plasticity fines, ~ 35% fine sand ~ 10% coarse gravel up to 1.5", gray, wet, very dense.	
1500	43	S18	43-45	24/20	12 27 35 38		S18 (0-16"); SILTY SAND (SM) ~ 60% fine sand ~ 40% low plasticity silt. gray very dense, wet (16-20"); SILTY SAND w/ GRAVEL (SM); ~ 50% f-c sand, ~ 30% fines, ~ 20% f-c gravel gray, very dense, wet, cemented.	
GLACIAL TILL								
Terminate hole at 45' below mudline Backfill w/ cuttings								

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 1 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 259570 E 359304		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME 45 Skid Rig		
4. NAME OF DRILLER Norman Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES		DISTURBED 8 UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES		0
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER		Tidal
7. THICKNESS OF OVERBURDEN 16 feet		16. DATE STARTED		1/24/2022
8. DEPTH DRILLED INTO ROCK 0 feet		16. DATE COMPLETED		
9. TOTAL DEPTH OF HOLE 16 feet		17. ELEVATION TOP OF HOLE		-40.8 feet, MLLW
		18. TOTAL ROCK CORE RECOVERY FOR BORING		%
		19. SIGNATURE OF INSPECTOR Alex Juliano		

0910
0945
1045
1155
1205
220
335

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	0					River bottom sediment, span penetrator 0 to 2' due to soft surface sediment and WOR		S1: ORGANIC SILT (OL); 90% organic silt, 5% fine sand, 5% vegetative material. Black, very soft, wet. Organic odor
	1	S1	0-2	24/9	WOR x4		River sediment	S2: SANDY ORGANIC SOIL w/ GRAVEL (OL) ~ 55% silt, 30% f-c sand, ~15% subrounded f-c gravel up to 1.5" black, hard, wet, organic odor
	2	S2	2-4	16/12	12 26 100/14"		4.5	S3: (0-7); SILTY SAND (SM); ~75% f-c sand, ~15% silt, ~10% f-c gravel up to 1", d. grey very dense, wet, slight odor organic
	5	S3	4-6	24/15	54 64 35 35			(7-15) WIDELY GRADED SAND w/ silt and gravel (SW-SM); ~60% f-c sand, ~30% f-c gravel subrounded to rounded up to 1", ~10% fines brown, very dense, wet.
	6	S4	6-8	24/11	10 37 41 33			S4: WIDELY GRADED SAND w/ SILT AND GRAVEL (SW-SM) - 75% f-c sand, ~15% f-c gravel subangular to subrounded, minor nonplastic fines, brown, very dense, wet.
	8	S5	8-10	24/14	14 22 33 33			S5: (0-8") Wash-like material ~45% f-c sand, ~50% f-c gravel, 5% fines grey, very dense, wet
	10	S6	10-12	24/7	21 25 17 18			(8-14"); similar to S4.
	12	S7	12-14	19/11	13 23 69 100/11"	large waves from fast moving crest guard boats move barge off of alignment w/ casing.		S6: similar to S4 except grey, dense, wet gravel up to 1"
	14	S8	14-16	24/13	15 6 68 38			S7: WIDELY GRADED GRAVEL w/ sand ~80% f-c gravel subangular to subrounded ~20% f-c sand, grey, very dense, wet. Wash-like material.
	15							S8: Silty sand w/ gravel; ~60% f-m sand, ~20% fines, ~20% f-c gravel up to 1" grey, very dense, wet.
	16							Terminate hole at 16' below mudline Backfill w/ cuttings

River sediment
4.5
Glaciomarine outwash
16

1. Safety hammer w/ rope/cuthead lifting system, 140lb hammer, 20" OD sampler

DRILLING LOG		DIVISION North Atlantic Division	INSTALLATION New England District	SHEET 1 OF 3 SHEET
1. PROJECT Providence River DMMP, Providence, Rhode Island		10. SIZE AND TYPE OF BIT 4 Inch Rollerbit		
2. BORING LOCATION (Coordinates or Station) N 22069 E 359849		11a. VERTICAL DATUM MLLW	11b. HORIZONTAL DATUM State Plane, NAD 83	
3. DRILLING AGENCY New England Boring Contractors		12. MANUFACTURER'S DESIGNATION OF DRILL RIG CME 45 SKD RIG		
4. NAME OF DRILLER Norman Studdard		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN 13		UNDISTURBED 0
5. NAME OF INSPECTOR Alex Juliano		14. TOTAL # OF ROCK SAMPLES 0		▽
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.		15. ELEVATION GROUND WATER Tidal		▽
7. THICKNESS OF OVERBURDEN 47 feet		16. DATE STARTED 1/26/2022 COMPLETED 1/26/2022		▽
8. DEPTH DRILLED INTO ROCK 0 feet		17. ELEVATION TOP OF HOLE -42.7 -40.4 ft, MLLW		
9. TOTAL DEPTH OF HOLE 47 feet		18. TOTAL ROCK CORE RECOVERY FOR BORING %		
		19. SIGNATURE OF INSPECTOR <i>Alex Juliano</i>		

0812

0915

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
	2	S1	0-2	24/14	WOR x4	River bottom Sediment 0-15ft WOR material	S1: ORGANIC SILT (OL); ~90% organic silt, ~10% fine sand, very soft, black, wet. Organic odor.	
	7	S2	5-7	24/24	WOR x4		S2: (0-12") Similar to S1. (12-24") SILT (ML); ~90% silt, ~10% fine sand, very soft, gray, wet.	
	12	S3	10-12	24/24	WOR x4		S3 (0-14"): similar to S1. (14-24"): similar to S2 (12-24") fibers observed and shells	
	17	S4	15-17	24/24	118 21 22	16.2'	S4: (0-14") Similar to S2 (12-24") (14-24") SILTY SAND (SM); ~75% f-m sand, ~20% nonplastic fines ~5% fine gravel, gray, med dense wet.	

1. Safety hammer w/ rope/cable lifting system used. 14 to 15 hammer 2" OD sampler
2. USACE direct to move this location toward center of channel to be in dredged area not on slope of area.

DRILLING LOG (Cont. Sheet)	ELEVATION TOP OF HOLE 42.7 feet, MLLW -40.4	Hole No. GEI-114
PROJECT Providence River DMMP	INSTALLATION New England District	SHEET 2 OF 2 SHEETS

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
20	20	S5	20-22	9/3	103 100/3"	likely boulder or cubic at 20'	S5: Rock fragments; grey, white and orange quartz	
22	22							
25	25	S6	25-27	24/7	85 6 6		S6: (0-3") SILTY SAND w/ GRAVEL (SM); ~50% f-c sand, ~20% fines, ~30% f-c gravel up to 0.5", gray wet, med dense S7: SILT (ML); ~90% low plasticity fines, ~10% fine sand, gray, wet, stiff	
27	27							
30	30	S7	30-32	24/11	4 11 10 10		S7: SILTY SAND (SM); ~80% fine sand, ~20% nonplastic fines, gray wet, med. dense	
32	32							
35	35	S8	35-37	24/10	6 4 8 14		S8: NARROWLY GRADED SAND w/ SILT (SP-SM) fine sand, ~90% nonplastic fines, gray, wet, med dense. S9: similar to S8.	
37	37	S9	37-39	24/11	5 5 5 11			
39	39	S10	39-41	24/13	7 11 23 18		S10: NARROWLY GRADED SAND w/ SILT AND GRAVEL (SP-SM) ~70% f-c sand, ~10% nonplastic fines, ~20% f-c gravel gray, dense, wet S11: similar to S10, except loose S12: similar to S10, except very dense gravel up to 1"	
40	40							
41	41	S11	41-43	24/10	6 4 4 6			
43	43	S12	43-45	24/17	18 21 36 37			
45	45	S13	45-47	see next page				

SANDY SILTY

DRILLING LOG (Cont. Sheet)		ELEVATION TOP OF HOLE -42.7 feet, MLLW		Hole No. GEI-114	
		PROJECT Providence River DMMP		INSTALLATION New England District	

Elev. (ft)	Depth (ft)	Sample Information				Drilling Remarks	Graphic Log	Soil and Rock Description
		Sample No.	Depth (ft)	Pen./ Rec. (in)	Blows per 6 in. or RQD			
45	45-47	S13	45	24/17	5 6	Silty sand	S13: Similar to S8	
47			9	14				
50							Terminate hole at 47' below mudline. Backfill w/ cuttings	
55								
60								
65								

Appendix C

Soil Sample Photographs

Boring Split Spoon Sample Photos - Providence River and Harbor Subsurface Explorations



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Boring Split Spoon Sample Photos - Providence River and Harbor Subsurface
Explorations



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Photo No. 1 – FD22-01 S1



Photo No. 2 – FD22-01 S2



Photo No. 3 – FD22-01 S3



Photo No. 4 – FD22-01 S4



Photo No. 5 – FD22-01 S5



Photo No. 6 – FD22-01 S6



Photo No. 7 – FD22-01 S7



Photo No. 8 – FD22-01 S8

Jan 27, 2022 11:43:26 AM



Photo No. 9 – FD22-01 S9

Jan 27, 2022 11:49:15 AM



Photo No. 10 – FD22-01 S10



Photo No. 11 – FD22-01 S11



Photo No. 12 – FD22-01 S12



Photo No. 13 – FD22-01 S13



Photo No. 14 – FD22-01 S14



Photo No. 15 – FD22-01 S15



Photo No. 16 – FD22-01 S16



Photo No. 17 – FD22-01 S17

NOT PHOTOGRAPHED

Photo No. 18 – FD22-01 S18



Photo No. 19 – FD22-02 S1



Photo No. 20 – FD22-02 S2



Photo No. 21 – FD22-02 S3



Photo No. 22 – FD22-2 S4



Photo No. 23 – FD22-02 S5



Photo No. 24 – FD22-02 S6



Photo No. 25 – FD22-02 S7



Photo No. 26 – FD22-02 S8



Photo No. 27 – FD22-02 S9



Photo No. 28 – FD22-02 S10



Photo No. 29 – FD22-03 S1



Photo No. 30 – FD22-03 S2



Photo No. 31 – FD22-03 S3



Photo No. 32 – FD22-03 S4



Photo No. 33 – FD22-03 S5



Photo No. 34 – FD22-03 S6



Photo No. 35 – FD22-03 S7



Photo No. 36 – FD22-03 S8



Photo No. 37 – FD22-03 S9



Photo No. 38 – FD22-03 S10



Photo No. 39 – FD22-03 S11



Photo No. 40 – FD22-03 S12



Photo No. 41 – FD22-03 S13



Photo No. 42 – FD22-03 S14



Photo No. 43 – FD22-03 S15



Photo No. 44 – FD22-03 S16



Photo No. 45 – FD22-03 S17



Photo No. 46 – FD22-03 S18



Photo No. 47 – FD22-03 S19



Photo No. 48 – FD22-03 S20



Photo No. 49 – FD22-04 S1



Photo No. 50 – FD22-04 S2



Photo No. 51 – FD22-04 S3



Photo No. 52 – FD22-04 S4



Photo No. 53 – FD22-04 S5



Photo No. 54 – FD22-04 S6



Photo No. 55 – FD22-04 S7



Photo No. 56 – FD22-04 S8



Photo No. 57 – FD22-04 S9

NOT PHOTOGRAPHED

Photo No. 58 – FD22-04 S10



Photo No. 59 – FD22-04 S11



Photo No. 60 – FD22-04 S12



Photo No. 61 – FD22-04 S13



Photo No. 62 – FD22-04 S14



Photo No. 63 – FD22-04 S15



Photo No. 64 – FD22-04 S16



Photo No. 65 – FD22-04 S17



Photo No. 66 – FD22-04 S18



Photo No. 67 – FD22-04 S19



Photo No. 68 – FD22-04 S20



Photo No. 69 – FD22-05 S1



Photo No. 70 – FD22-05 S2



Photo No. 71 – FD22-05 S3



Photo No. 72 – FD22-05 S4



Photo No. 73 – FD22-05 S5



Photo No. 74 – FD22-05 S6



Photo No. 75 – FD22-05 S7



Photo No. 76 – FD22-05 S8

NOT PHOTOGRAPHED

Photo No. 77 – FD22-05 S9



Photo No. 78 – FD22-05 S10



Photo No. 79 – FD22-05 S11



Photo No. 80 – FD22-05 S12



Photo No. 81 – FD22-05 S13



Photo No. 82 – FD22-05 S14



Photo No. 83 – FD22-05 S15



Photo No. 84 – FD22-05 S16



Photo No. 85 – FD22-05 S17



Photo No. 86 – FD22-05 S18



Photo No. 87 – FD22-05 S19



Photo No. 88 – FD22-05 S20



Photo No. 89 – FD22-05 S21



Photo No. 90 – FD22-06 S1



Photo No. 91 – FD22-06 S2



Photo No. 92 – FD22-06 S3



Photo No. 93 – FD22-06 S4



Photo No. 94 – FD22-06 S5



Photo No. 95 – FD22-06 S6



Photo No. 96 – FD22-06 S7



Photo No. 97 – FD22-06 S8



Photo No. 98 – FD22-06 S9



Photo No. 99 – FD22-06 S10



Photo No. 100 – FD22-06 S11



Photo No. 101 – FD22-06 S12



Photo No. 102 – FD22-06 S13

NOT PHOTOGRAPHED

Photo No. 103 – FD22-06 S14



Photo No. 104 – FD22-06 S15

NOT PHOTOGRAPHED

Photo No. 105 – FD22-07 S1

NO RECOVERY

Photo No. 106 – FD22-07 S2



Photo No. 107 – FD22-07 S3



Photo No. 108 – FD22-07 S4



Photo No. 109 – FD22-07 S5



Photo No. 110 – FD22-07 S6



Photo No. 111 – FD22-07 S7



Photo No. 112 – FD22-07 S8



Photo No. 113 – FD22-07 S9



Photo No. 114 – FD22-07 S10



Photo No. 115 – FD22-07 S11



Photo No. 116 – FD22-07 S12



Photo No. 117 – FD22-07 S13



Photo No. 118 – FD22-07 S14



Photo No. 119 – FD22-07 S15



Photo No. 120 – FD22-07 S16



Photo No. 121 – FD22-07 S17



Photo No. 122 – FD22-07 S18



Photo No. 123 – FD22-07 S19



Photo No. 124 – FD22-07 S20



Photo No. 125 – FD22-08 S1



Photo No. 126 – FD22-08 S2



Photo No. 127 – FD22-08 S3



Photo No. 128 – FD22-08 S4



Photo No. 129 – FD22-08 S5



Photo No. 130 – FD22-08 S6



Photo No. 131 – FD22-08 S7



Photo No. 132 – FD22-08 S8



Photo No. 133 – FD22-08 S9



Photo No. 134 – FD22-08 S10



Photo No. 135 – FD22-08 S11



Photo No. 136 – FD22-08 S12



Photo No. 137 – FD22-08 S13



Photo No. 138 – FD22-08 S14



Photo No. 139 – FD22-08 S15



Photo No. 140 – FD22-08 S16



Photo No. 141 – FD22-08 S17



Photo No. 142 – FD22-08 S18

NOT PHOTOGRAPHED

Photo No. 143 – FD22-08 S19



Photo No. 144 – FD22-08 S20



Photo No. 145 – FD22-09 S1



Photo No. 146 – FD22-09 S2



Photo No. 147 – FD22-09 S3



Photo No. 148 – FD22-09 S4



Photo No. 149 – FD22-09 S5



Photo No. 150 – FD22-09 S6



Photo No. 151 – FD22-09 S7



Photo No. 152 – FD22-09 S8



Photo No. 153 – FD22-09 S9



Photo No. 154 – FD22-09 S10



Photo No. 155 – FD22-09 S11



Photo No. 156 – FD22-09 S12



Photo No. 157 – FD22-09 S13



Photo No. 158 – FD22-09 S14



Photo No. 159 – FD22-09 S15



Photo No. 160 – FD22-09 S16



Photo No. 161 – FD22-09 S17



Photo No. 162 – FD22-09 S18



Photo No. 163 – FD22-09 S19



Photo No. 164 – FD22-09 S20



Photo No. 165 – FD22-10 S1



Photo No. 166 – FD22-10 S2



Photo No. 167 – FD22-10 S3



Photo No. 168 – FD22-10 S4



Photo No. 169 – FD22-10 S5



Photo No. 170 – FD22-10 S6



Photo No. 171 – FD22-10 S7



Photo No. 172 – FD22-10 S8



Photo No. 173 – FD22-10 S9



Photo No. 174 – FD22-10 S10



Photo No. 175 – FD22-10 S11



Photo No. 176 – FD22-10 S12



Photo No. 177 – FD22-10 S13



Photo No. 178 – FD22-10 S14



Photo No. 179 – FD22-10 S15



Photo No. 180 – FD22-10 S16



Photo No. 181 – FD22-10 S17



Photo No. 182 – FD22-10 S18



Photo No. 183 – FD22-10 S19



Photo No. 184 – FD22-10 S20



Photo No. 185 – FD22-11 S1



Photo No. 186 – FD22-11 S2



Photo No. 187 – FD22-11 S3



Photo No. 188 – FD22-11 S4



Photo No. 189 – FD22-11 S5



Photo No. 190 – FD22-11 S6



Photo No. 191 – FD22-11 S7

NOT PHOTOGRAPHED

Photo No. 192 – FD22-11 S8

NOT PHOTOGRAPHED

Photo No. 193 – FD22-11 S9



Photo No. 194 – FD22-12 S1



Photo No. 195 – FD22-12 S2



Photo No. 196 – FD22-12 S3



Photo No. 197 – FD22-12 S4



Photo No. 198 – FD22-12 S5



Photo No. 199 – FD22-12 S6

NOT PHOTOGRAPHED

Photo No. 200 – FD22-12 S7



Photo No. 201 – FD22-12 S8



Photo No. 202 – FD22-12 S9



Photo No. 203 – FD22-12 S10



Photo No. 204 – FD22-12 S11



Photo No. 205 – FD22-12 S12



Photo No. 206 – FD22-12 S13



Photo No. 207 – FD22-12 S14



Photo No. 208 – FD22-12 S15



Photo No. 209 – FD22-12 S16



Photo No. 210 – FD22-12 S17



Photo No. 211 – FD22-12 S18



Photo No. 212 – FD22-13 S1



Photo No. 213 – FD22-13 S2



Photo No. 214 – FD22-13 S3



Photo No. 215 – FD22-13 S4



Photo No. 216 – FD22-13 S5



Photo No. 217 – FD22-13 S6



Photo No. 218 – FD22-13 S7



Photo No. 219 – FD22-13 S8



Photo No. 220 – FD22-14 S1



Photo No. 221 – FD22-14 S2



Photo No. 222 – FD22-14 S3



Photo No. 223 – FD22-14 S4



Photo No. 224 – FD22-14 S5



Photo No. 225 – FD22-14 S6



Photo No. 226 – FD22-14 S7



Photo No. 227 – FD22-14 S8

NOT PHOTOGRAPHED

Photo No. 228 – FD22-14 S9



Photo No. 229 – FD22-14 S10



Photo No. 230 – FD22-14 S11



Photo No. 231 – FD22-14 S12 (wrong lid in photo)

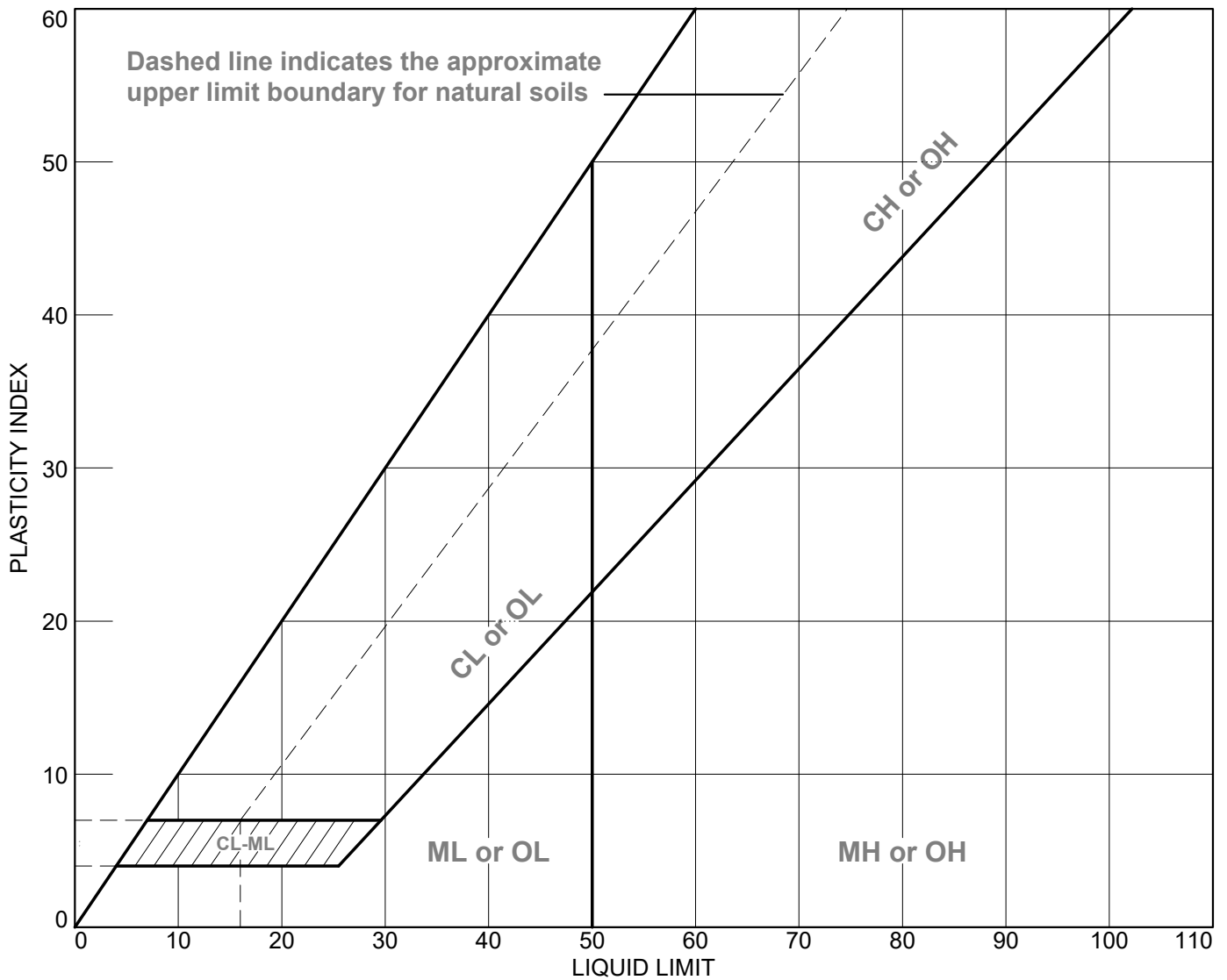


Photo No. 232 – FD22-14 S13

Appendix D

Laboratory Data Test Results

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-01	S1 (Oven Dry)	0-2 ft	110.8		54		OH

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-01

Depth: 0-2 ft

Sample Number: S1 (Oven Dry)

Material Description: ORGANIC CLAY

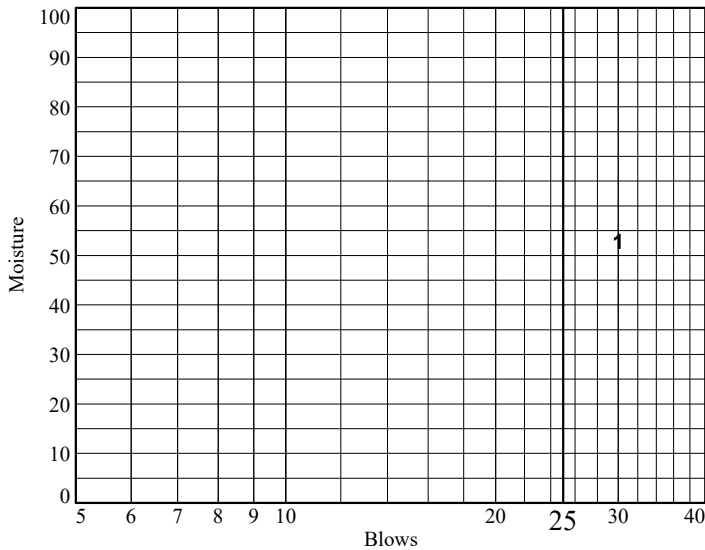
USCS: OH

Tested by: MA

Checked by: EF

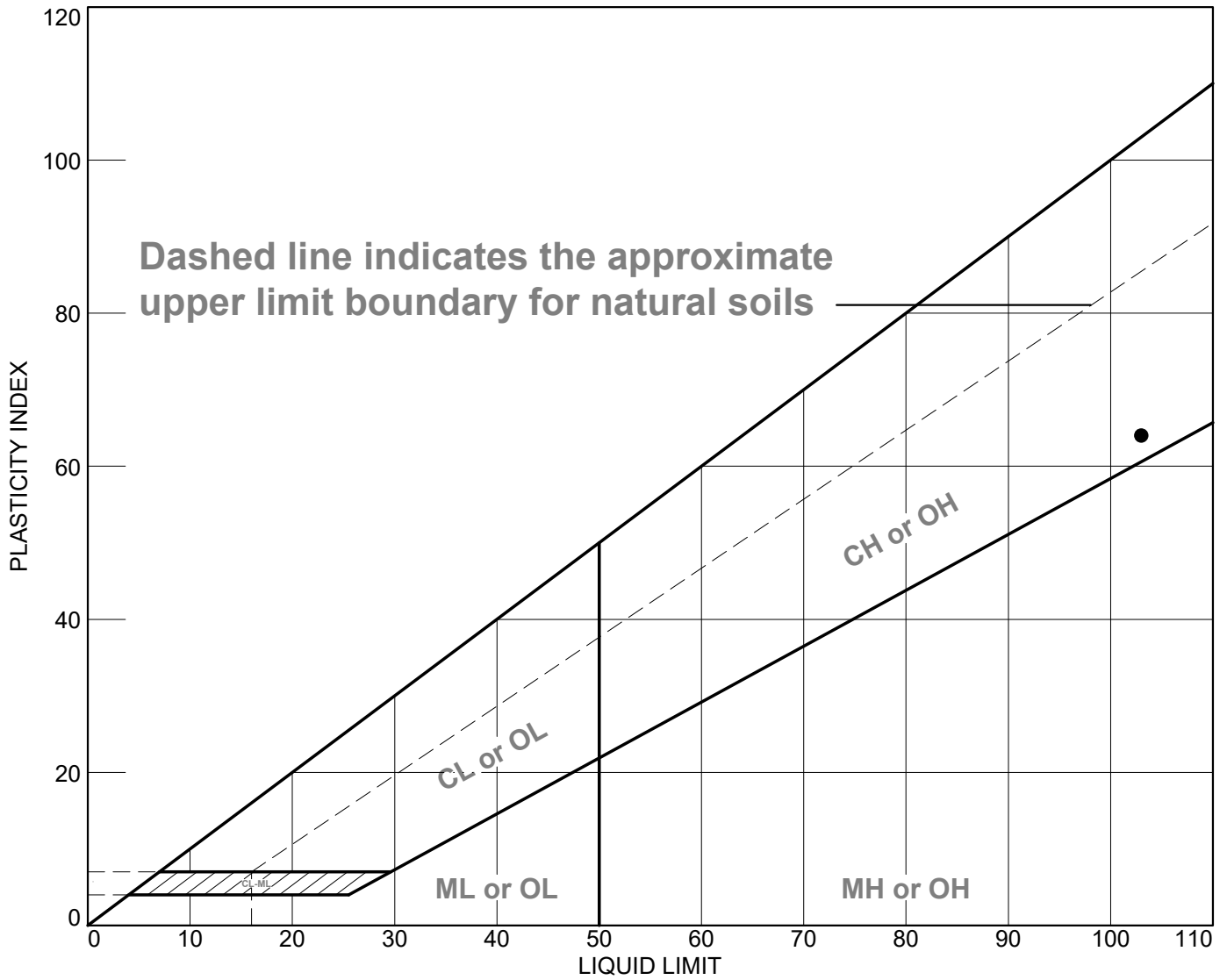
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	27.75					
Dry+Tare	22.12					
Tare	11.49					
# Blows	30					
Moisture	53.0					



Liquid Limit= 54
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 110.8

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-01	S1	0-2 ft	110.8	39	103	64	OH

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-01

Depth: 0-2 ft

Sample Number: S1

Material Description: ORGANIC CLAY

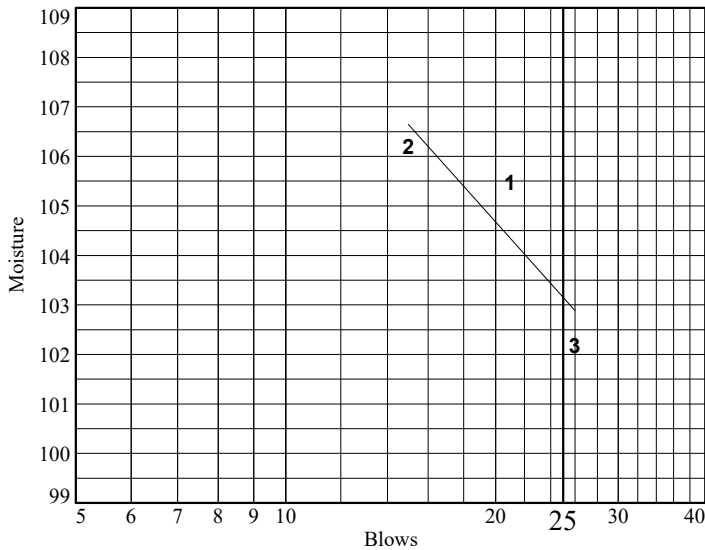
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	32.93	32.33	34.44			
Dry+Tare	26.19	26	27.91			
Tare	19.80	20.04	21.52			
# Blows	21	15	26			
Moisture	105.5	106.2	102.2			

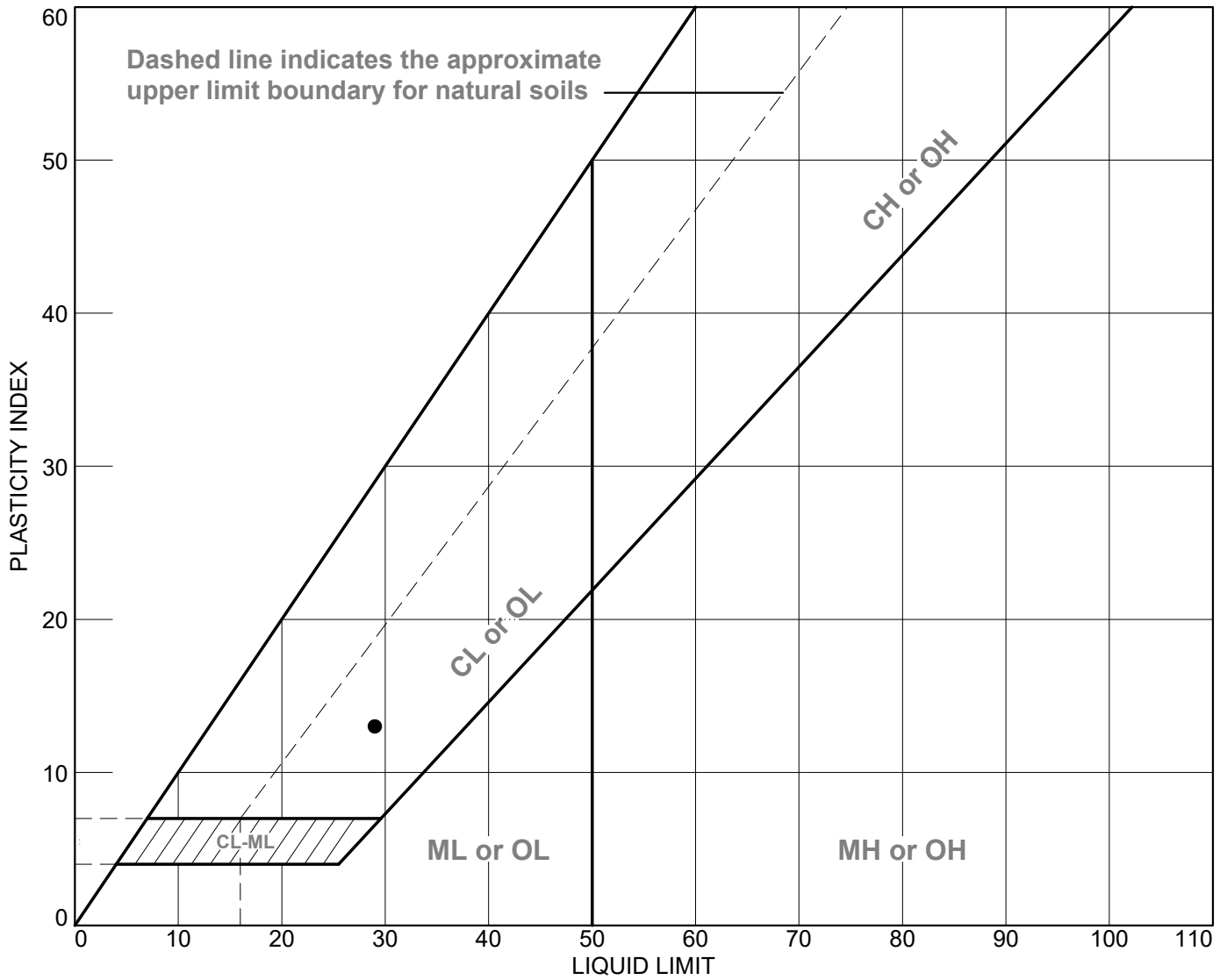


Liquid Limit= 103
Plastic Limit= 39
Plasticity Index= 64
Natural Moisture= 110.8
Liquidity Index= 1.1

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	18.13	13.03		
Dry+Tare	16.36	11.36		
Tare	11.88	7.01		
Moisture	39.5	38.4		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-01	S9	28-30 ft	42.3	16	29	13	CL

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-01

Depth: 28-30 ft

Sample Number: S9

Material Description: LEAN CLAY

USCS: CL

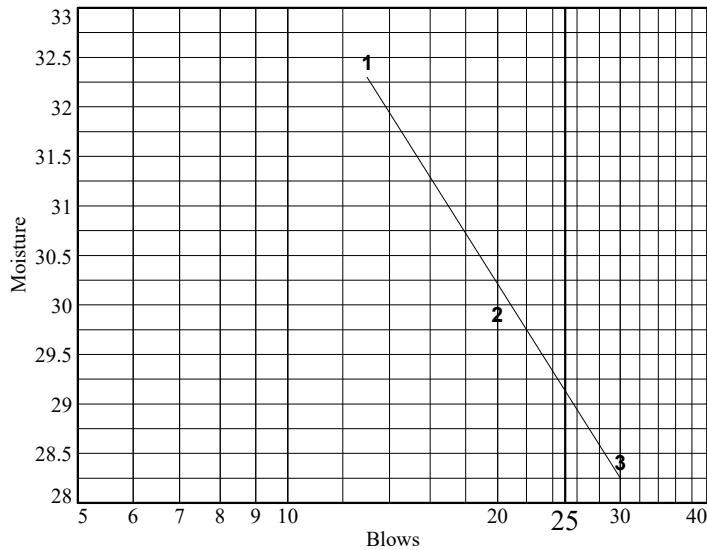
AASHTO: A-6(12)

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	37.41	36.26	36.04			
Dry+Tare	33.13	32.48	32.46			
Tare	19.94	19.84	19.86			
# Blows	13	20	30			
Moisture	32.4	29.9	28.4			



Liquid Limit= 29
Plastic Limit= 16
Plasticity Index= 13
Natural Moisture= 42.3
Liquidity Index= 2.0

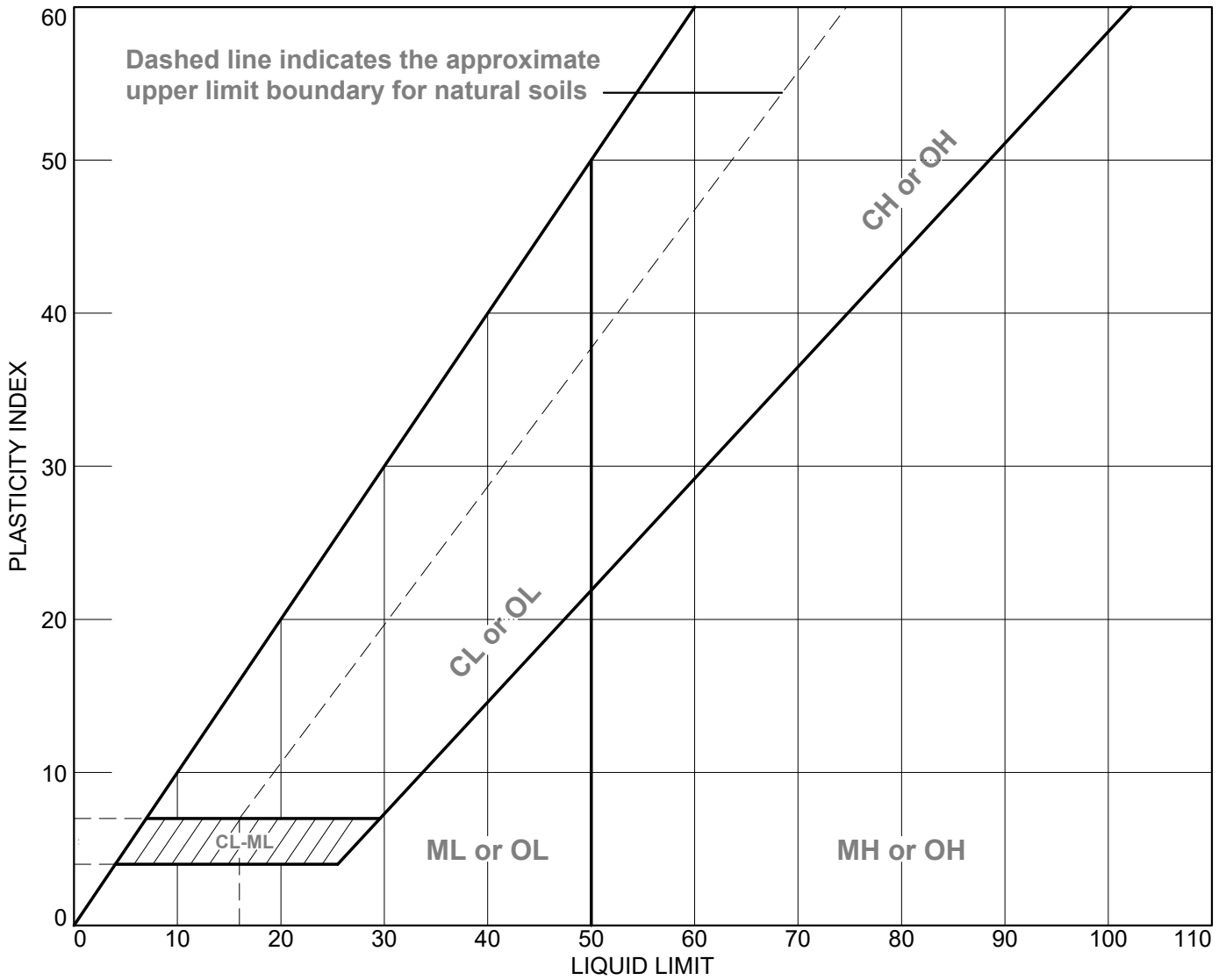
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.50	17.02		
Dry+Tare	16.65	16.20		
Tare	11.38	11.00		
Moisture	16.1	15.8		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
43.89	37.25	21.54	42.3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-02	S4	8-10 ft	34.6	NP	NV	NP	ML

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-02

Depth: 8-10 ft

Sample Number: S4

Material Description: SILT

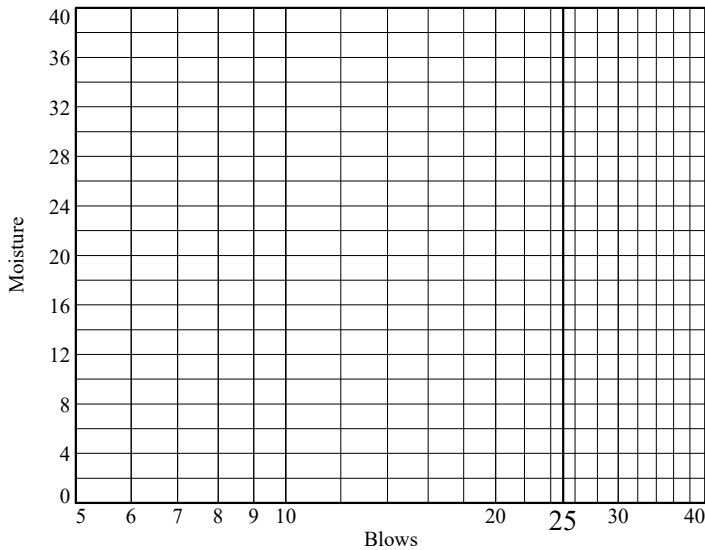
USCS: ML

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						

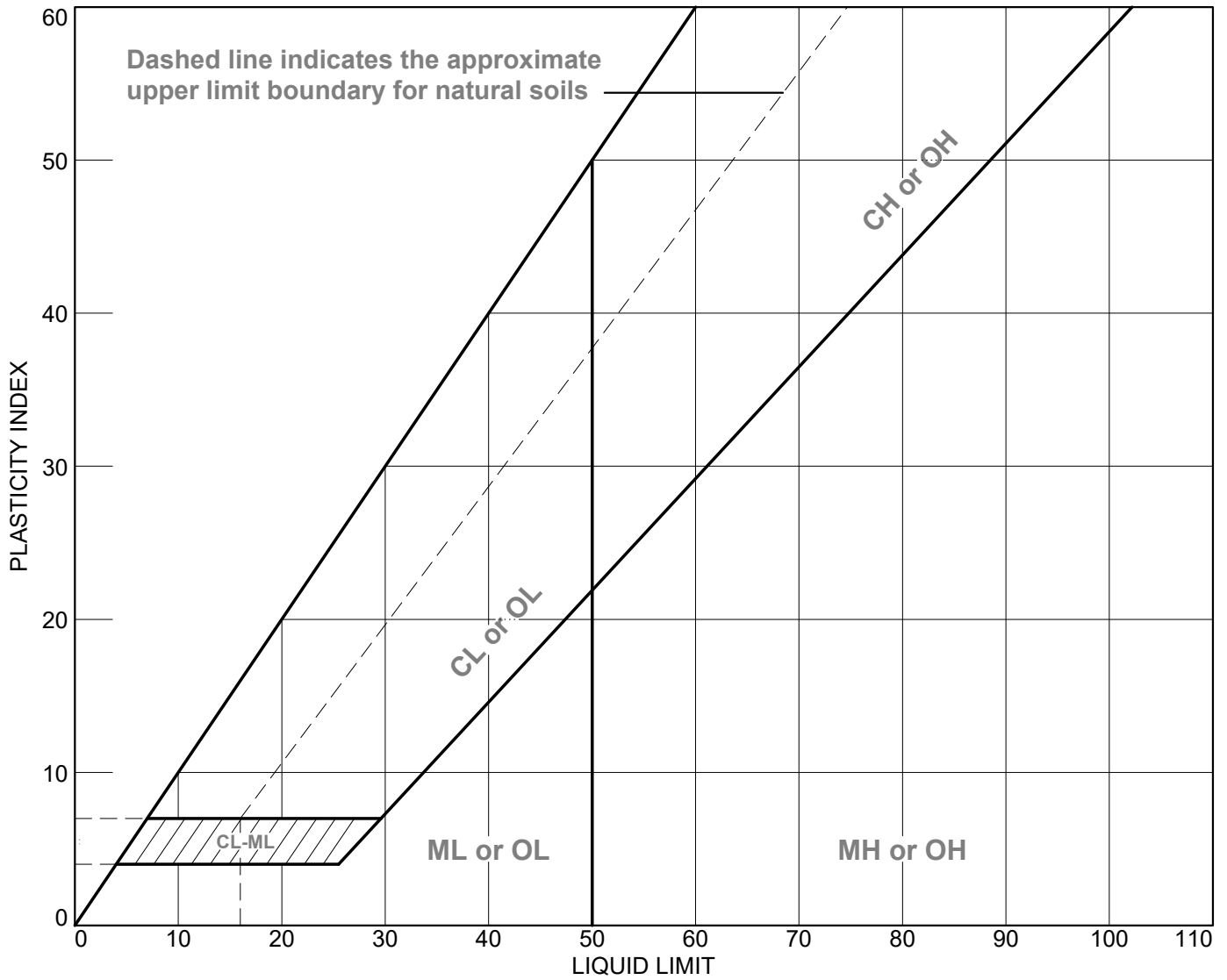


Liquid Limit= NV
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 34.6

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare				
Dry+Tare				
Tare				
Moisture				

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-02	S6	12-14 ft	38.5	NP	NV	NP	ML

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-02

Depth: 12-14 ft

Sample Number: S6

Material Description: SILT

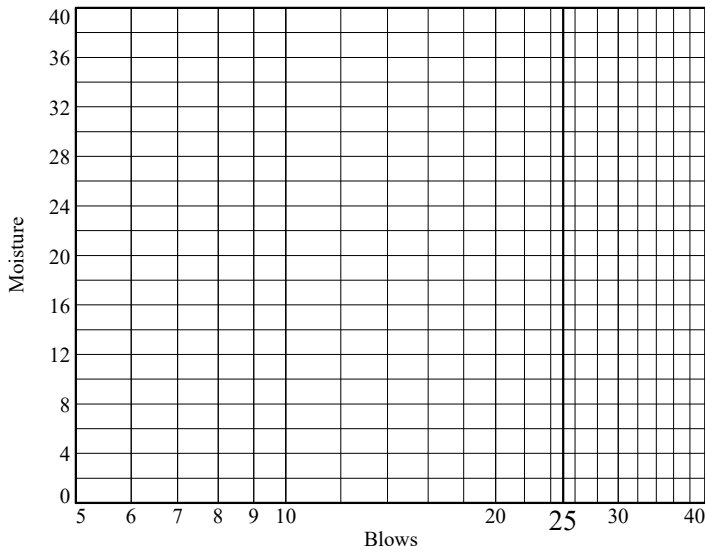
USCS: ML

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NV
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 38.5

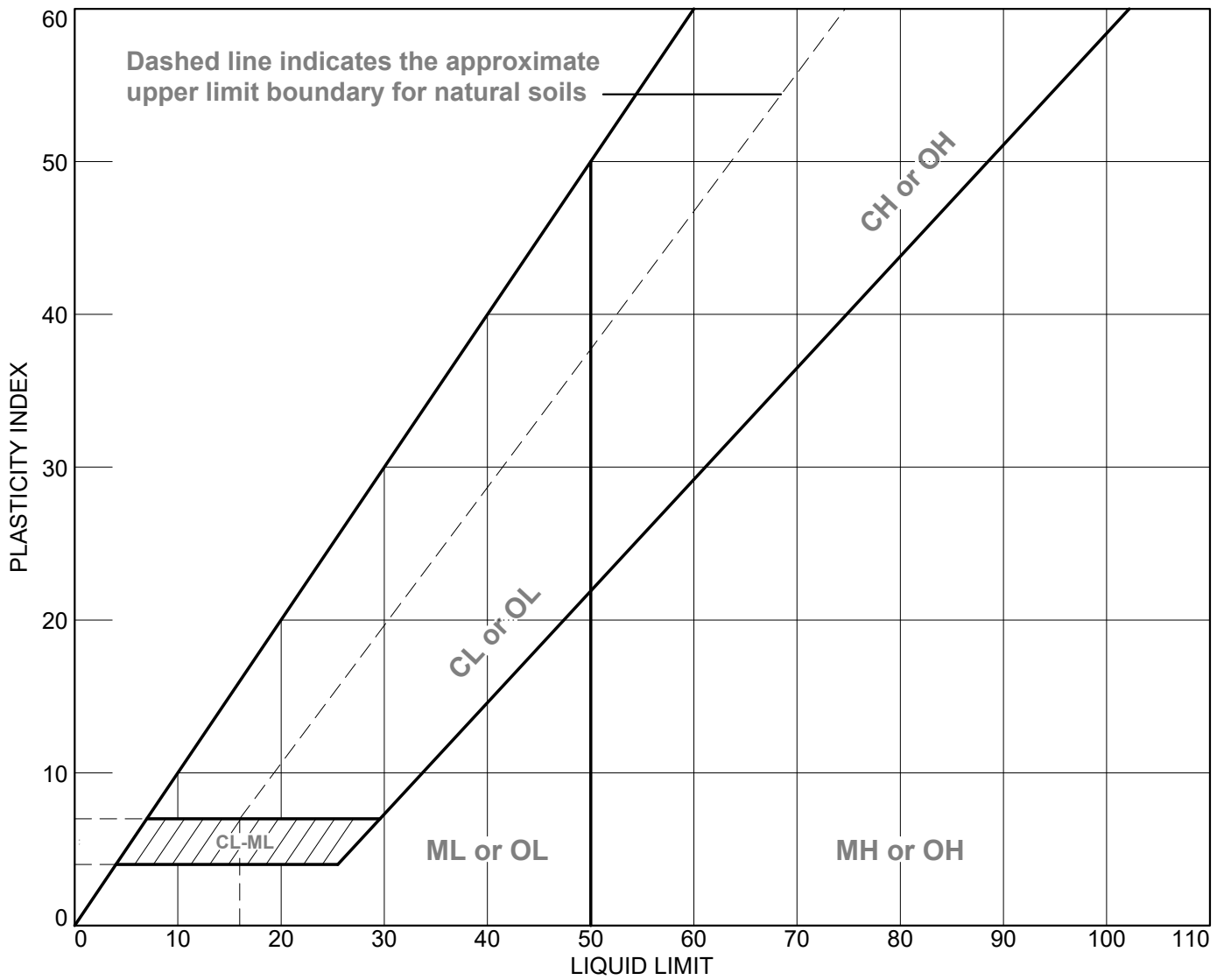
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare				
Dry+Tare				
Tare				
Moisture				

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
42.41	36.17	19.96	38.5

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-02	S9	18-20 ft	33.4	NP	NV	NP	ML

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-02

Depth: 18-20 ft

Sample Number: S9

Material Description: SILT

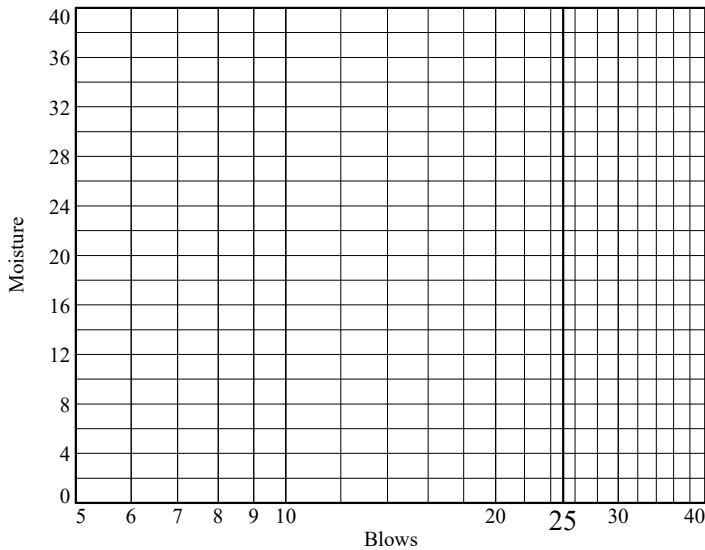
USCS: ML

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NV
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 33.4

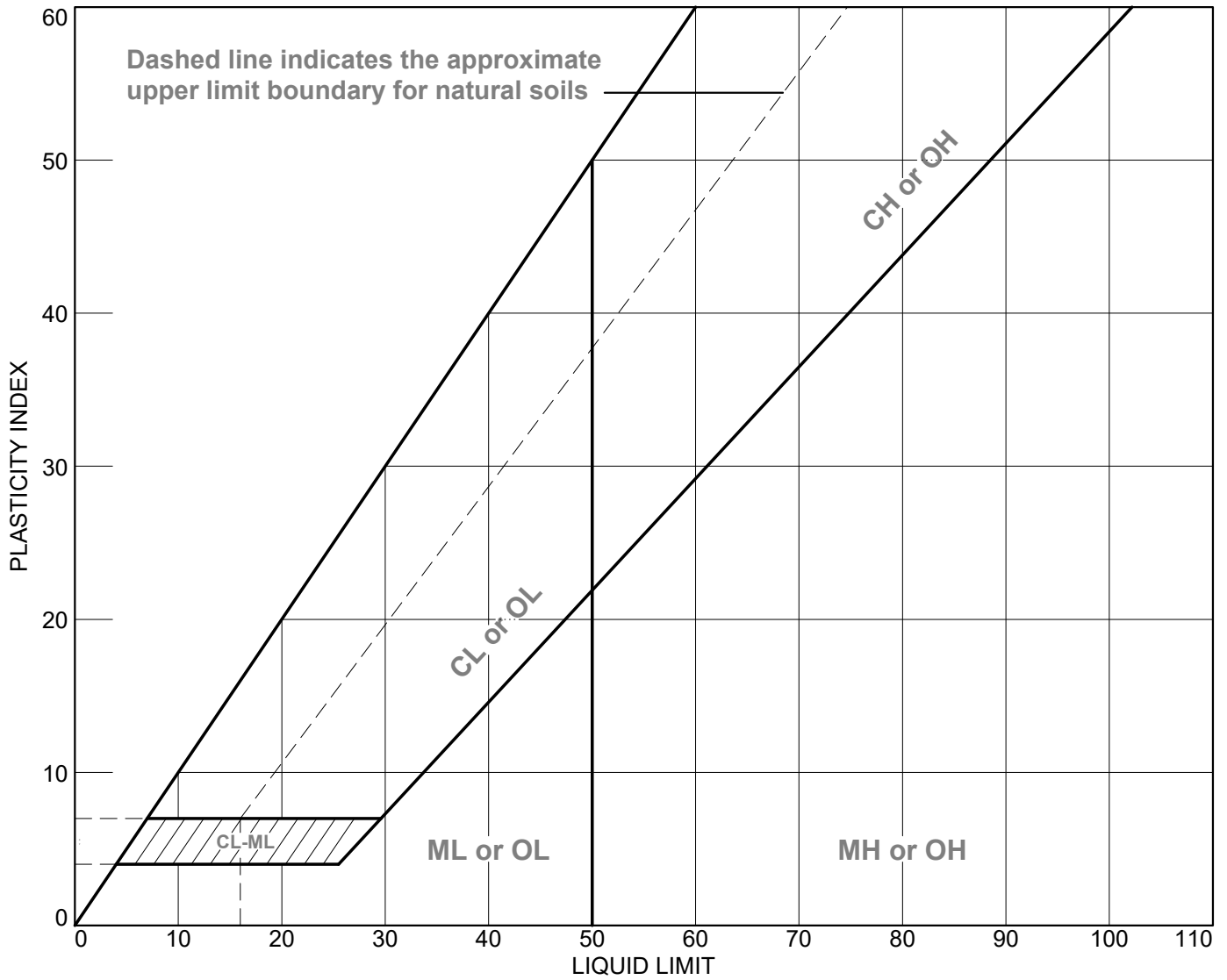
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare				
Dry+Tare				
Tare				
Moisture				

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
43.49	37.57	19.84	33.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-03	S5 (Oven Dry)	20-22 ft	72.4		43		OH

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-03

Depth: 20-22 ft

Sample Number: S5 (Oven Dry)

Material Description: ORGANIC CLAY

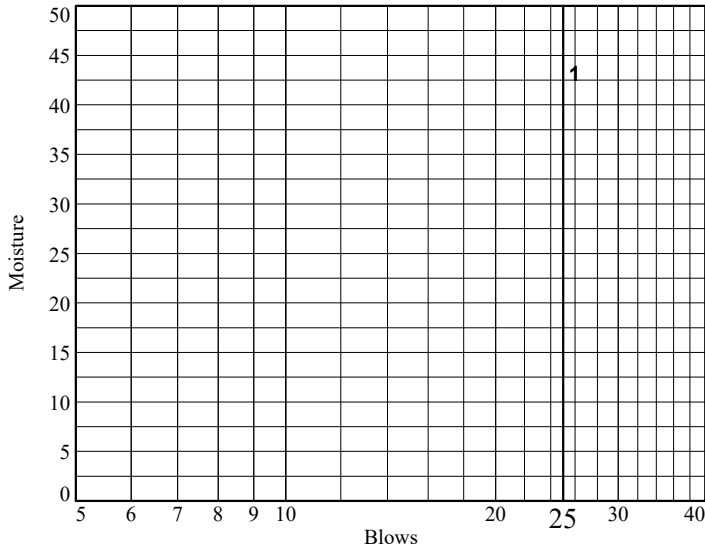
USCS: OH

Tested by: MA

Checked by: EF

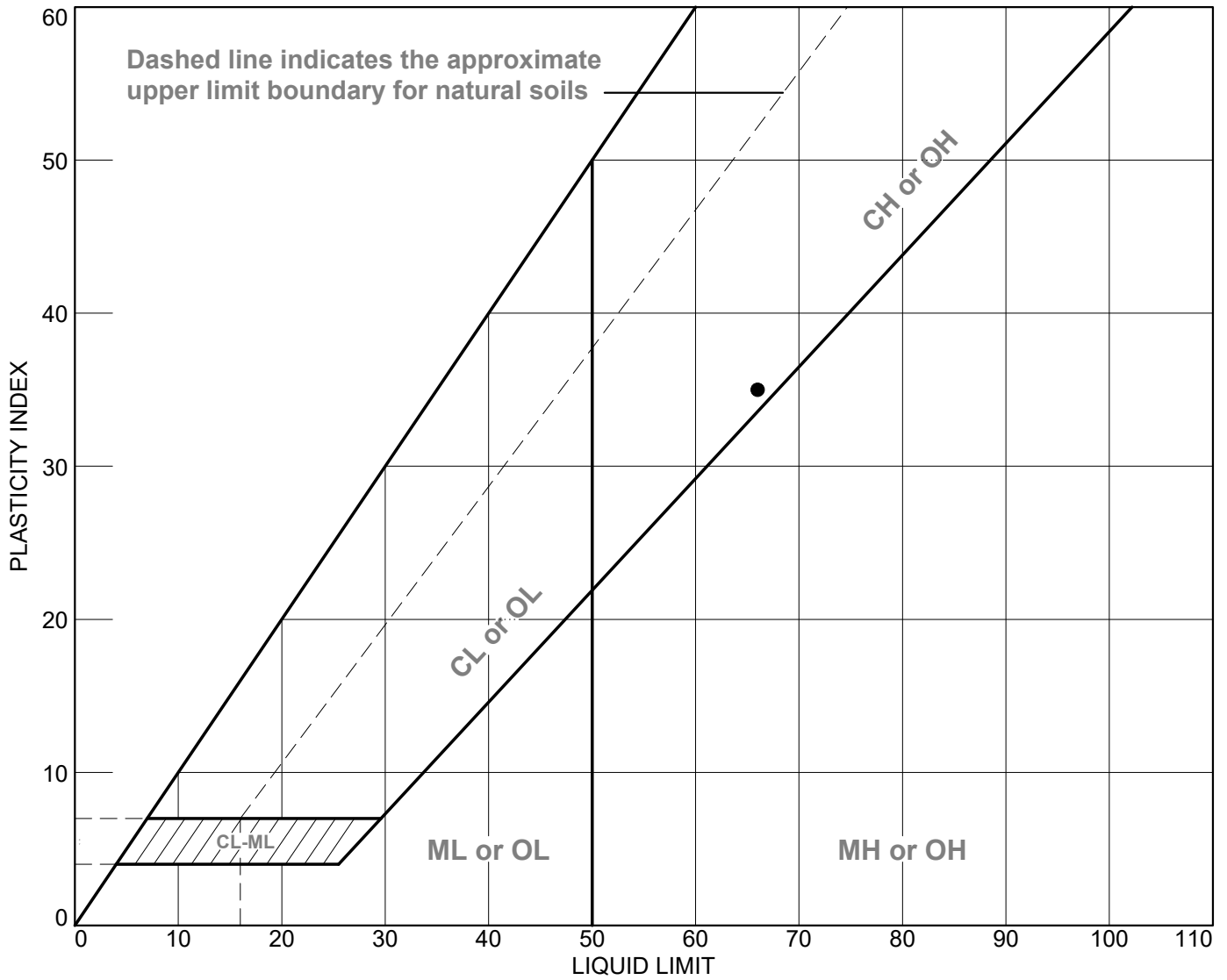
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	34.55					
Dry+Tare	30.13					
Tare	19.89					
# Blows	26					
Moisture	43.2					



Liquid Limit= 43
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 72.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-03	S5	20-22 ft	72.4	31	66	35	OH

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-03

Depth: 20-22 ft

Sample Number: S5

Material Description: ORGANIC CLAY

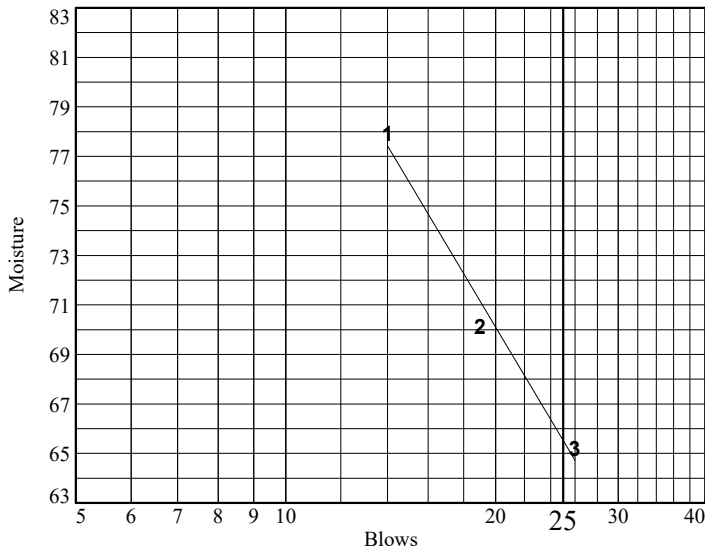
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	32.57	33.84	33.19			
Dry+Tare	27.06	28.13	27.96			
Tare	19.99	19.99	19.94			
# Blows	14	19	26			
Moisture	77.9	70.1	65.2			

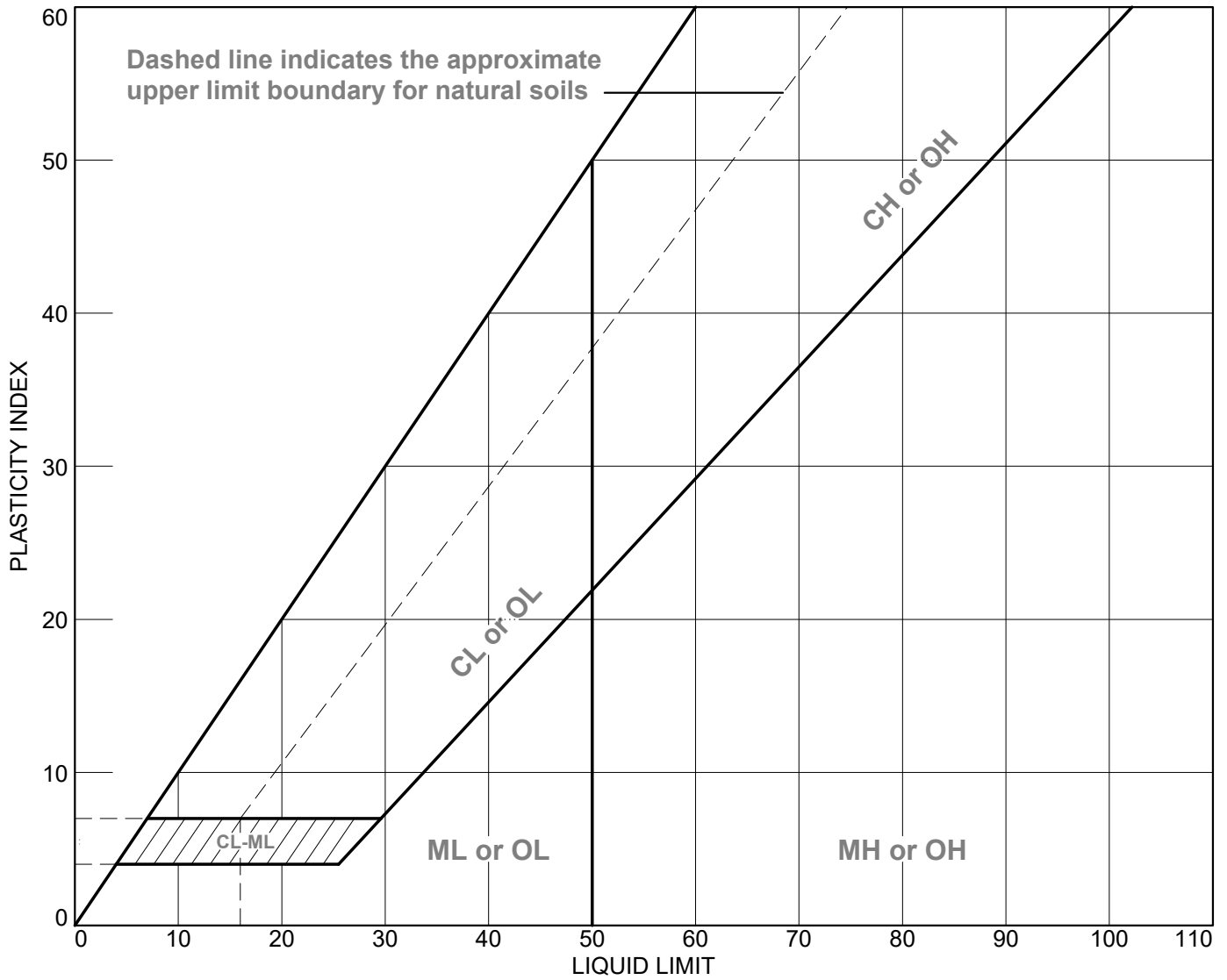


Liquid Limit= 66
Plastic Limit= 31
Plasticity Index= 35
Natural Moisture= 72.4
Liquidity Index= 1.2

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	27.07	26.91		
Dry+Tare	25.35	25.29		
Tare	19.92	20.11		
Moisture	31.7	31.3		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-03	S17 (Oven Dry)	44-46 ft	69.9		37		OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-03

Depth: 44-46 ft

Sample Number: S17 (Oven Dry)

Material Description: ORGANIC CLAY

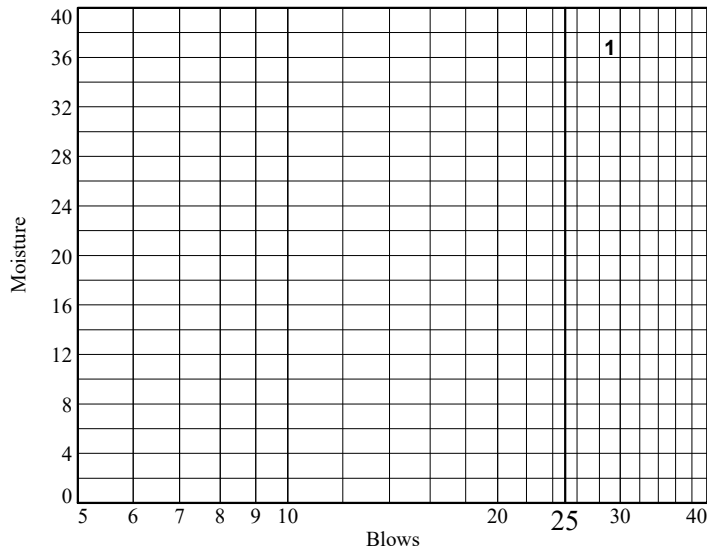
USCS: OH

Tested by: MA

Checked by: EF

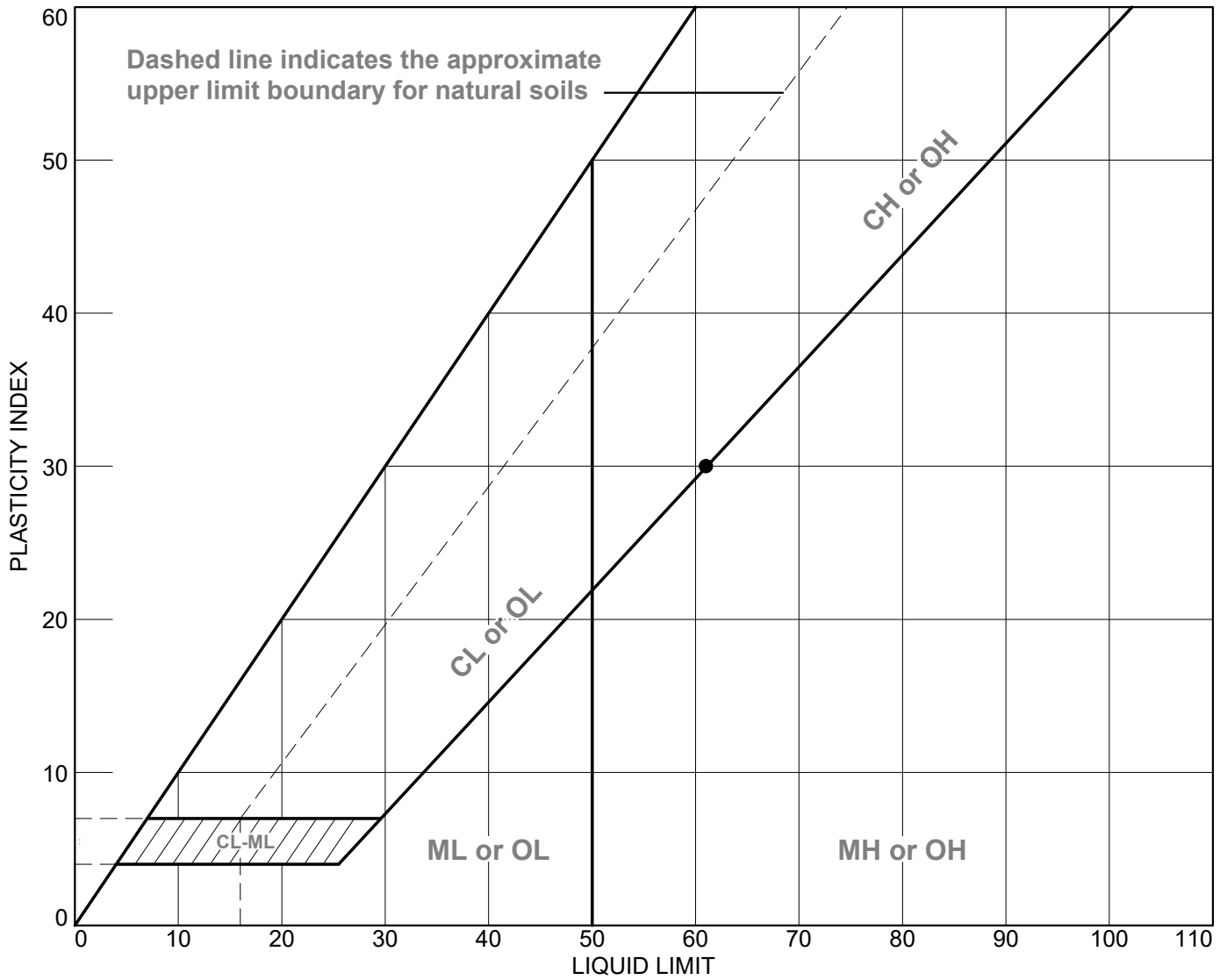
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	35.93					
Dry+Tare	31.61					
Tare	19.88					
# Blows	29					
Moisture	36.8					



Liquid Limit= 37
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 69.9

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-03	S17	44-46 ft	69.9	31	61	30	OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-03

Depth: 44-46 ft

Sample Number: S17

Material Description: ORGANIC CLAY

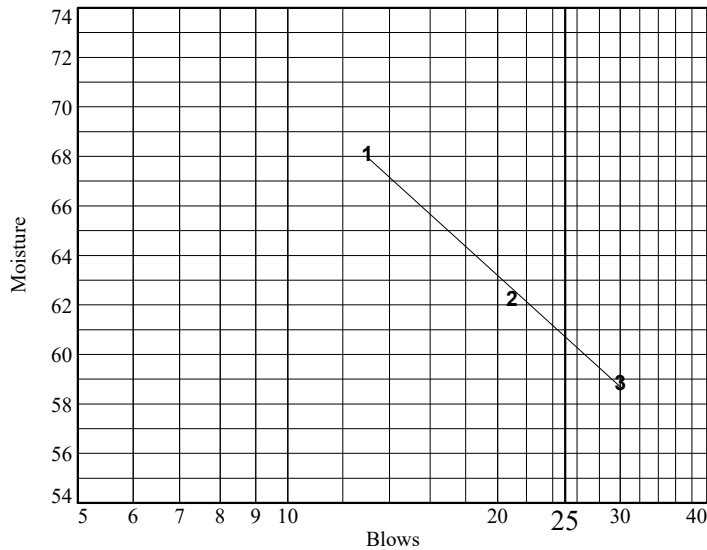
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.03	35.82	33.73			
Dry+Tare	27.75	29.71	28.60			
Tare	20.00	19.90	19.89			
# Blows	13	21	30			
Moisture	68.1	62.3	58.9			

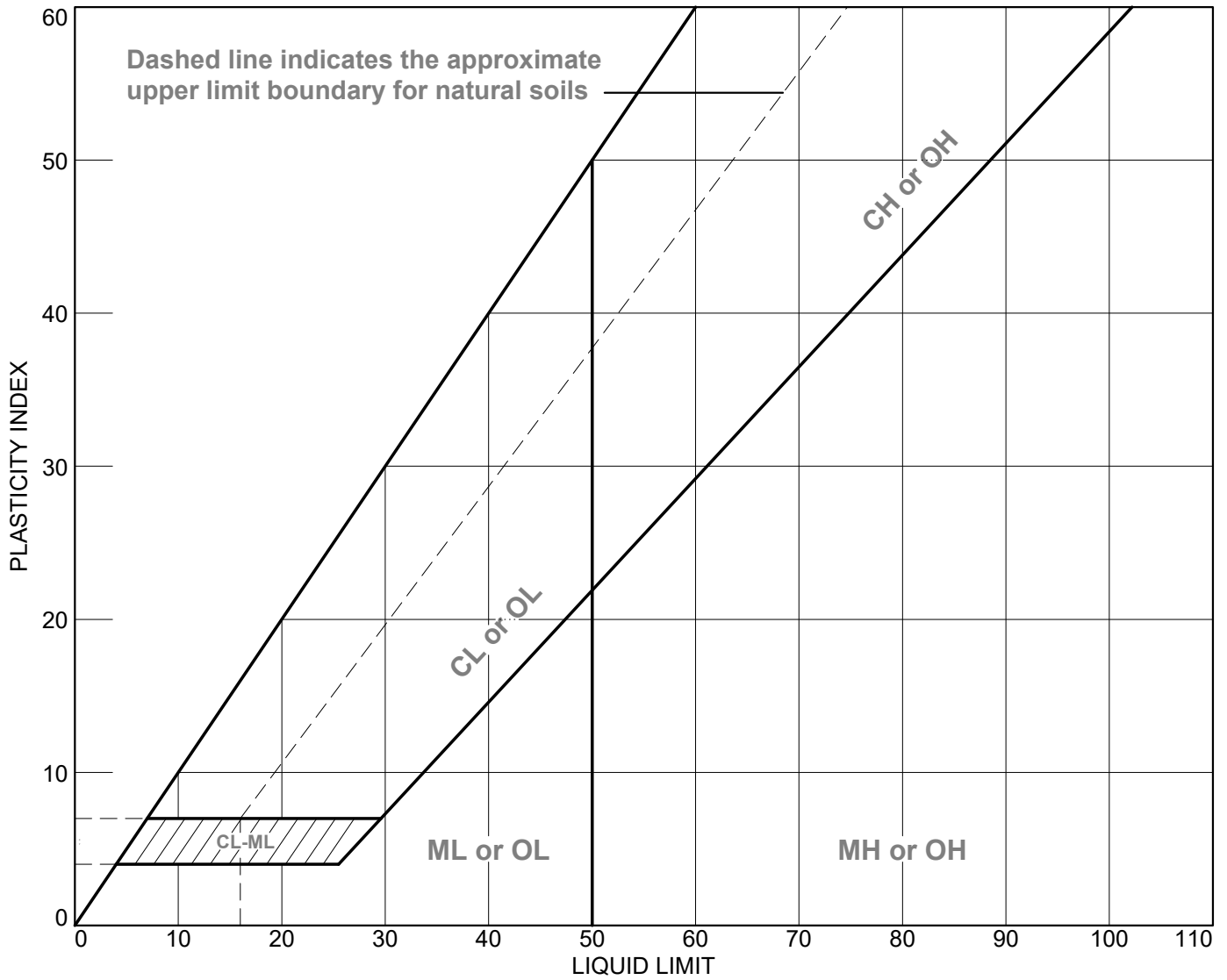


Liquid Limit= 61
Plastic Limit= 31
Plasticity Index= 30
Natural Moisture= 69.9
Liquidity Index= 1.3

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	28.14	27.04		
Dry+Tare	26.54	25.36		
Tare	21.38	20.02		
Moisture	31.0	31.5		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-04	S12(0-23") (Oven Dry)	34-36 ft	79.6		50		OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-04

Depth: 34-36 ft

Sample Number: S12(0-23")(Oven Dry)

Material Description: ORGANIC SILT

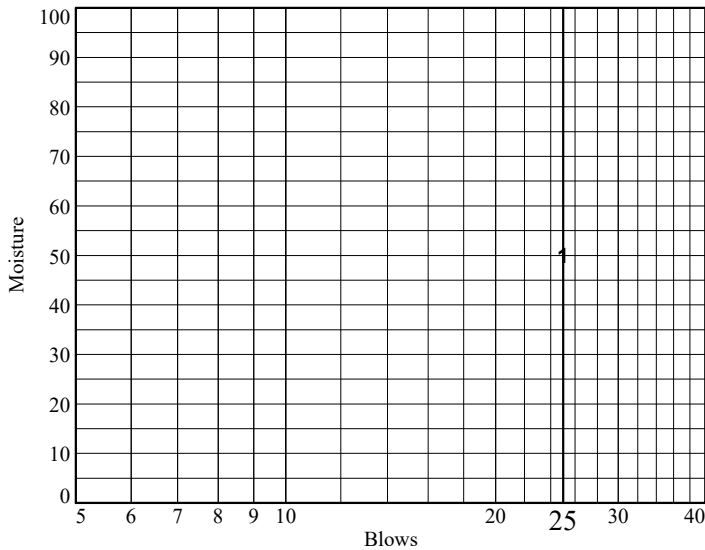
USCS: OH

Tested by: MA

Checked by: EF

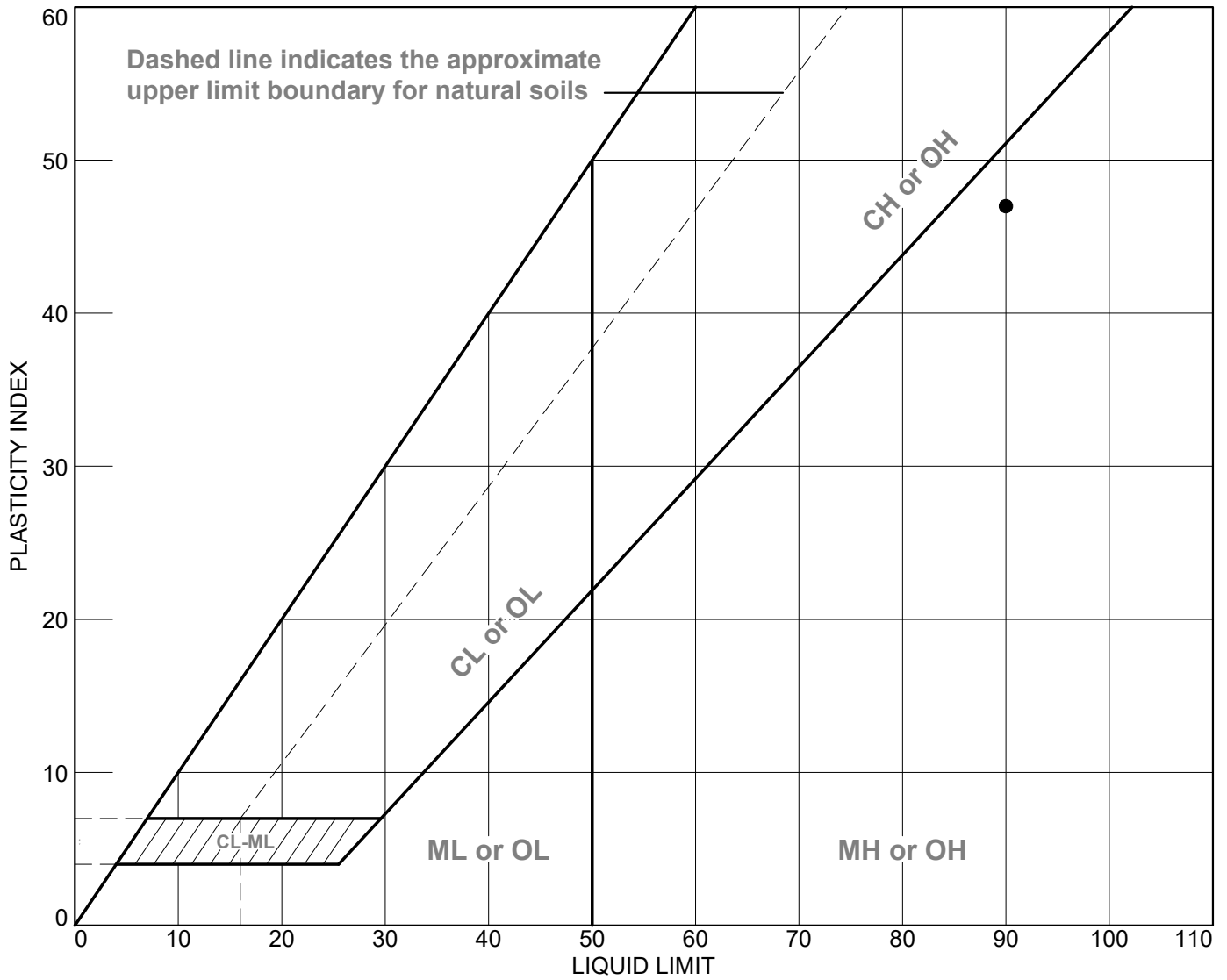
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.54					
Dry+Tare	28.98					
Tare	19.87					
# Blows	25					
Moisture	50.1					



Liquid Limit= 50
 Plastic Limit= _____
 Plasticity Index= _____
 Natural Moisture= 79.6

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-04	S12 (0-23")	34-36 ft	79.6	43	90	47	OH

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-04

Depth: 34-36 ft

Sample Number: S12 (0-23")

Material Description: ORGANIC SILT

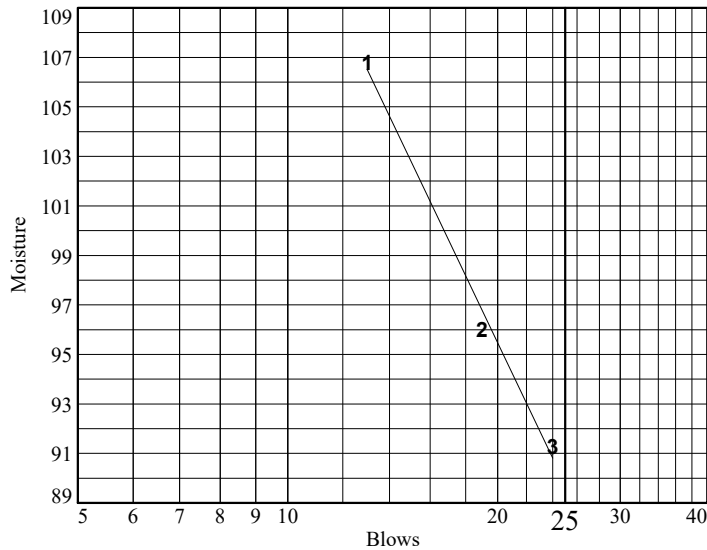
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	20.48	23.93	33.33			
Dry+Tare	13.42	17.66	27.67			
Tare	6.81	11.13	21.47			
# Blows	13	19	24			
Moisture	106.8	96.0	91.3			

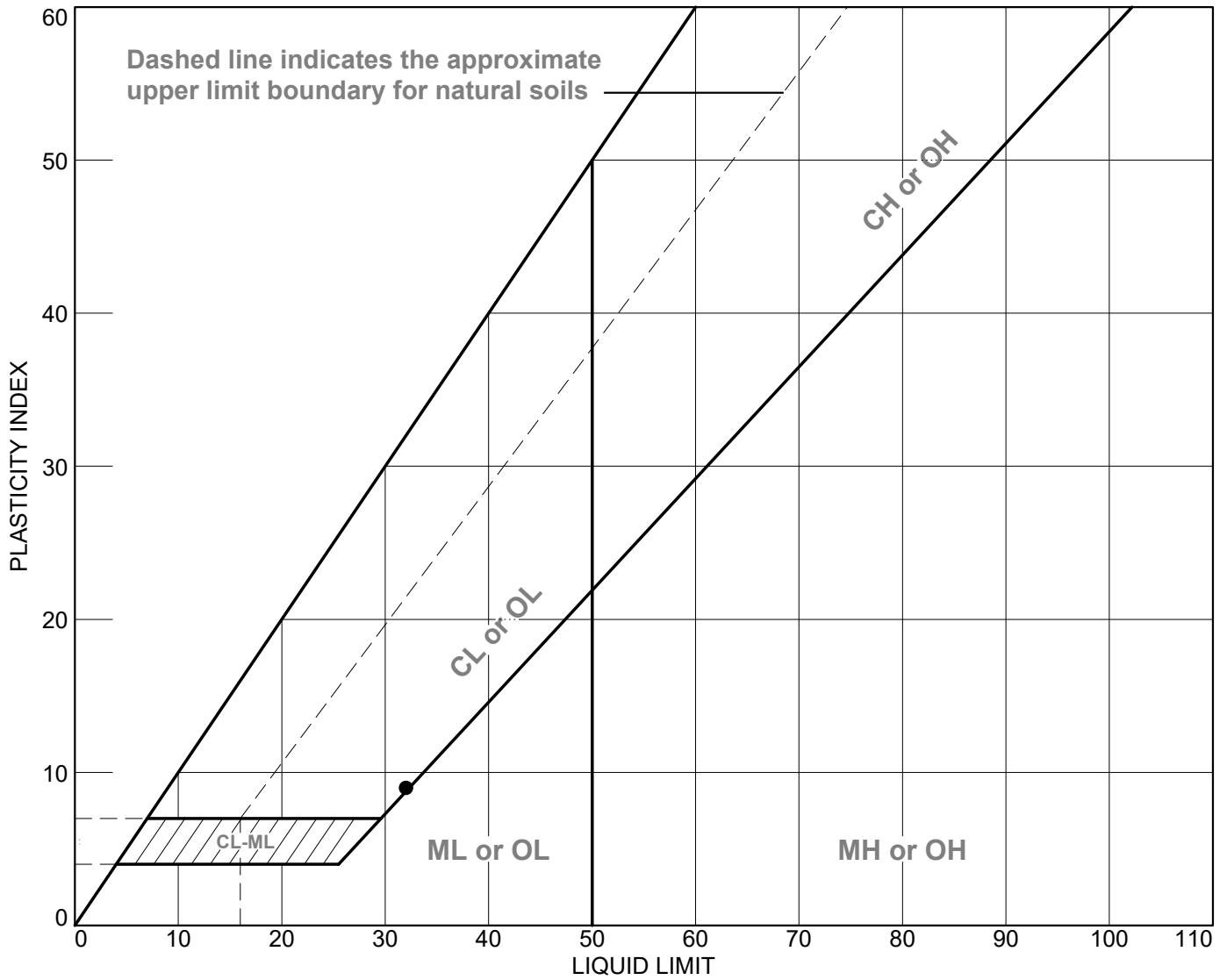


Liquid Limit= 90
Plastic Limit= 43
Plasticity Index= 47
Natural Moisture= 79.6
Liquidity Index= 0.8

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.69	17.64		
Dry+Tare	15.82	15.79		
Tare	11.41	11.48		
Moisture	42.4	42.9		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-05	S12(8"-18")	34-36 ft	26.3	23	32	9	CL

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-05

Depth: 34-36 ft

Sample Number: S12(8"-18")

Material Description: LEAN CLAY

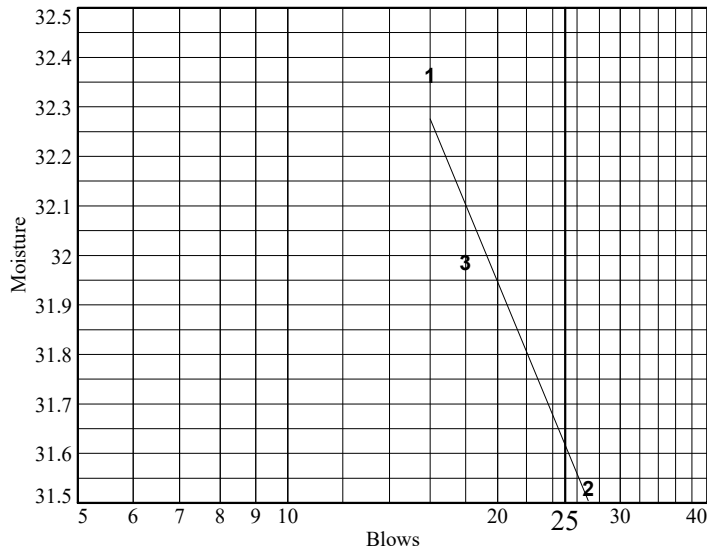
USCS: CL

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	35.89	35.80	33.50			
Dry+Tare	31.99	32.01	30.57			
Tare	19.94	19.99	21.41			
# Blows	16	27	18			
Moisture	32.4	31.5	32.0			



Liquid Limit= 32
Plastic Limit= 23
Plasticity Index= 9
Natural Moisture= 26.3
Liquidity Index= 0.4

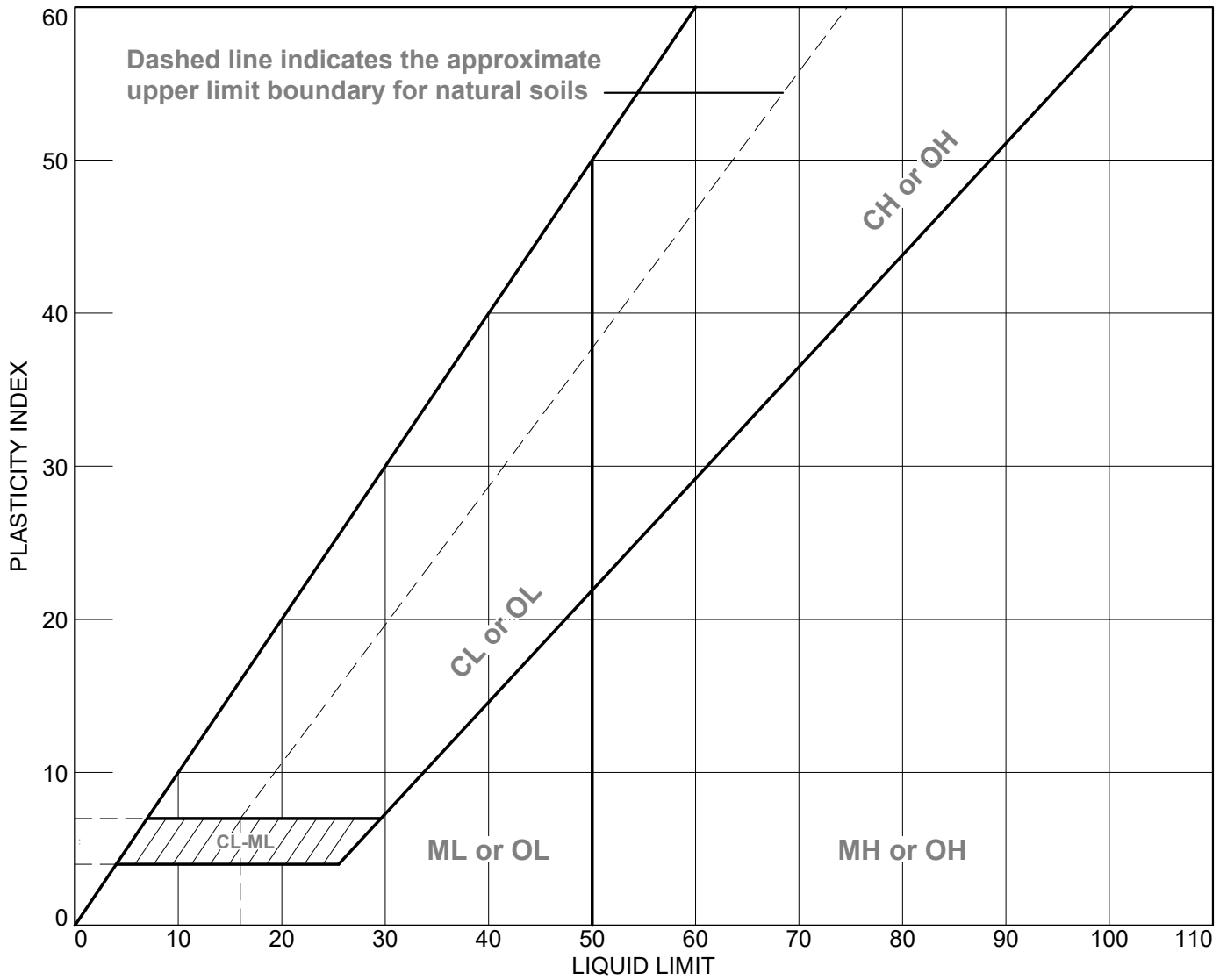
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	26.34	26.10		
Dry+Tare	25.16	24.97		
Tare	20.00	19.99		
Moisture	22.9	22.7		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
44.16	39.44	21.48	26.3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-05	S16	42-44 ft	25.9	NP	NV	NP	ML

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: AH

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-05

Depth: 42-44 ft

Sample Number: S16

Material Description: SILT

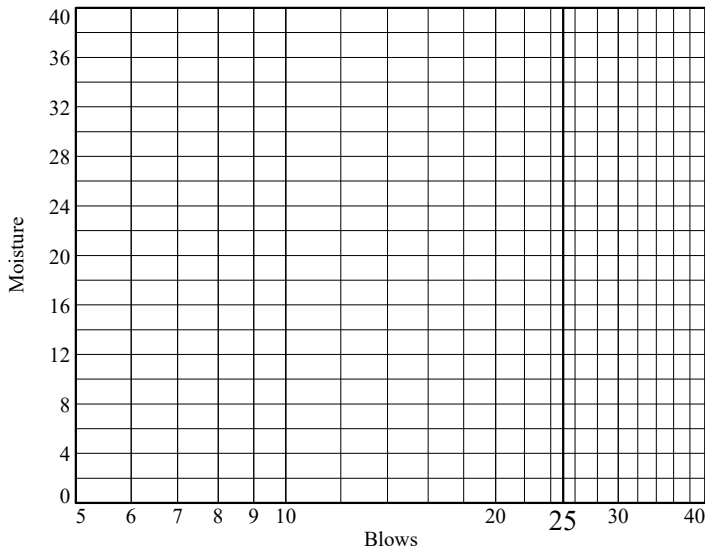
USCS: ML

Tested by: AH

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NV
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 25.9

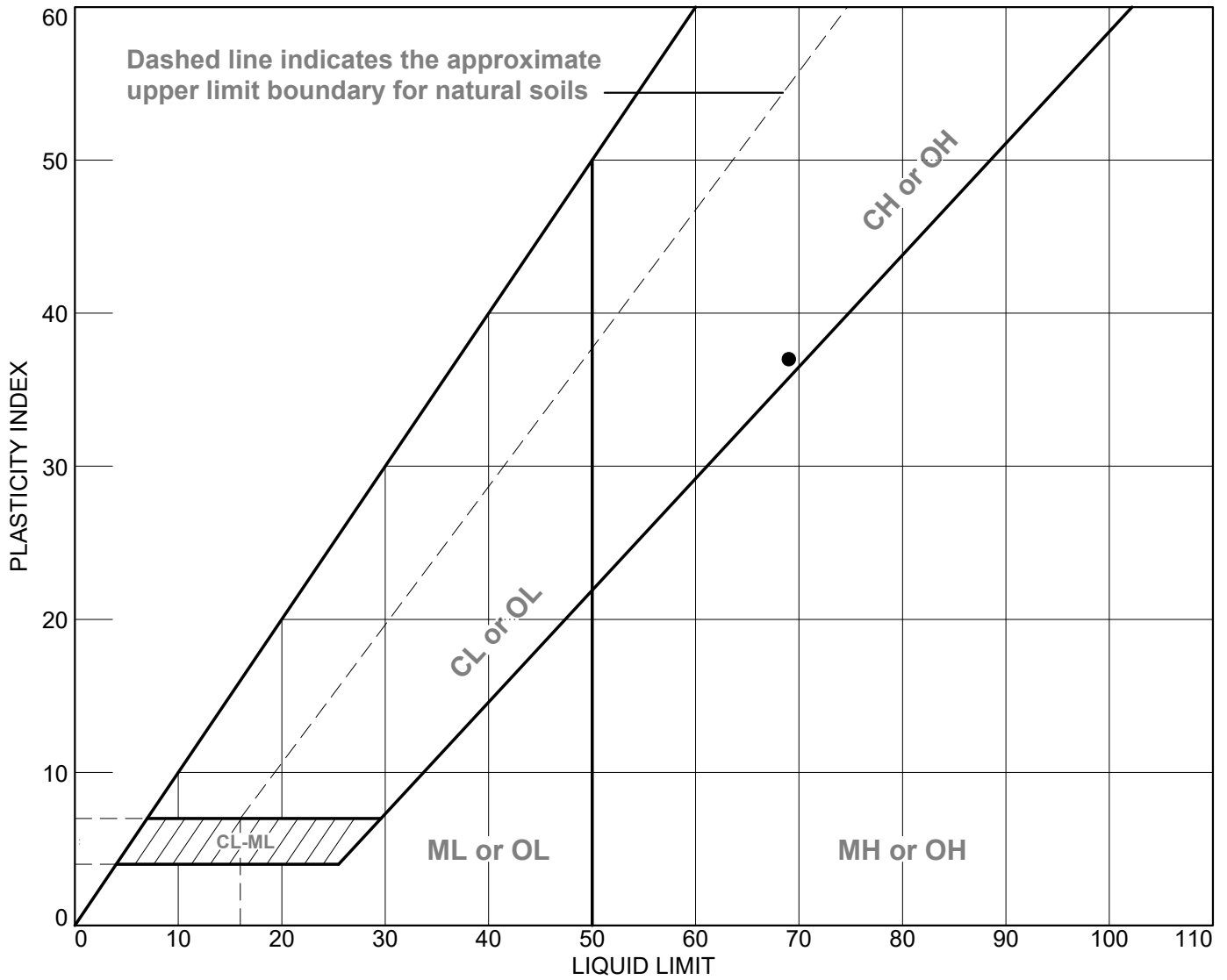
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare				
Dry+Tare				
Tare				
Moisture				

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
43.11	38.34	19.91	25.9

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-07	S3	10-12 ft	71.9	32	69	37	OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-07

Depth: 10-12 ft

Sample Number: S3

Material Description: ORGANIC CLAY

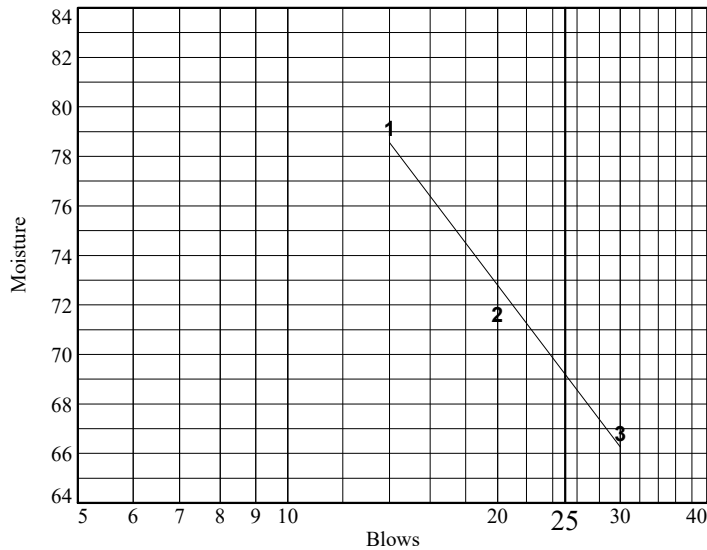
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.02	25.17	23.73			
Dry+Tare	18.70	19.41	18.78			
Tare	11.98	11.37	11.37			
# Blows	14	20	30			
Moisture	79.2	71.6	66.8			



Liquid Limit= 69
Plastic Limit= 32
Plasticity Index= 37
Natural Moisture= 71.9
Liquidity Index= 1.1

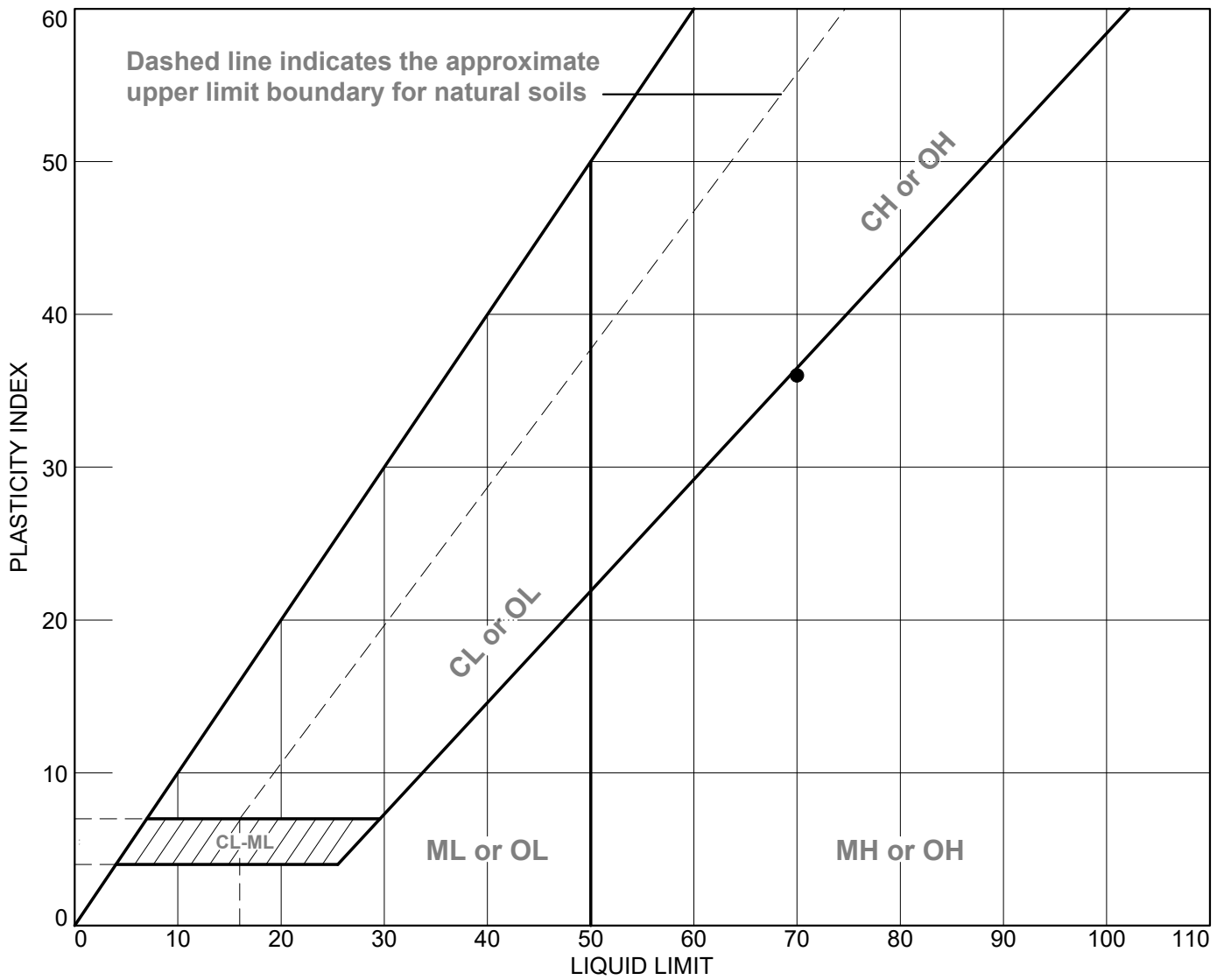
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.84	18.25		
Dry+Tare	16.30	16.53		
Tare	11.36	11.17		
Moisture	31.2	32.1		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
42.48	33.07	19.99	71.9

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-07	S13	36-38 ft	73.4	34	70	36	OH

GEI Consultants, Inc.
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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-07

Depth: 36-38 ft

Sample Number: S13

Material Description: ORGANIC SILT

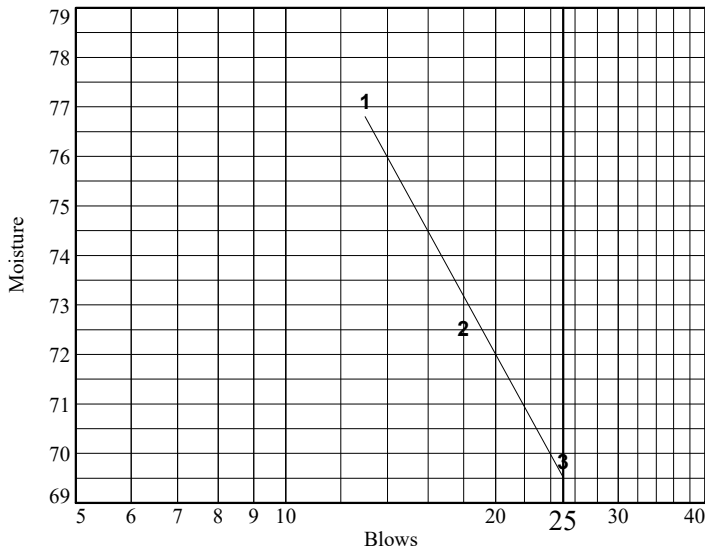
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.49	24.31	26.26			
Dry+Tare	18.23	18.87	20.10			
Tare	11.41	11.37	11.28			
# Blows	13	18	25			
Moisture	77.1	72.5	69.8			



Liquid Limit= 70
Plastic Limit= 34
Plasticity Index= 36
Natural Moisture= 73.4
Liquidity Index= 1.1

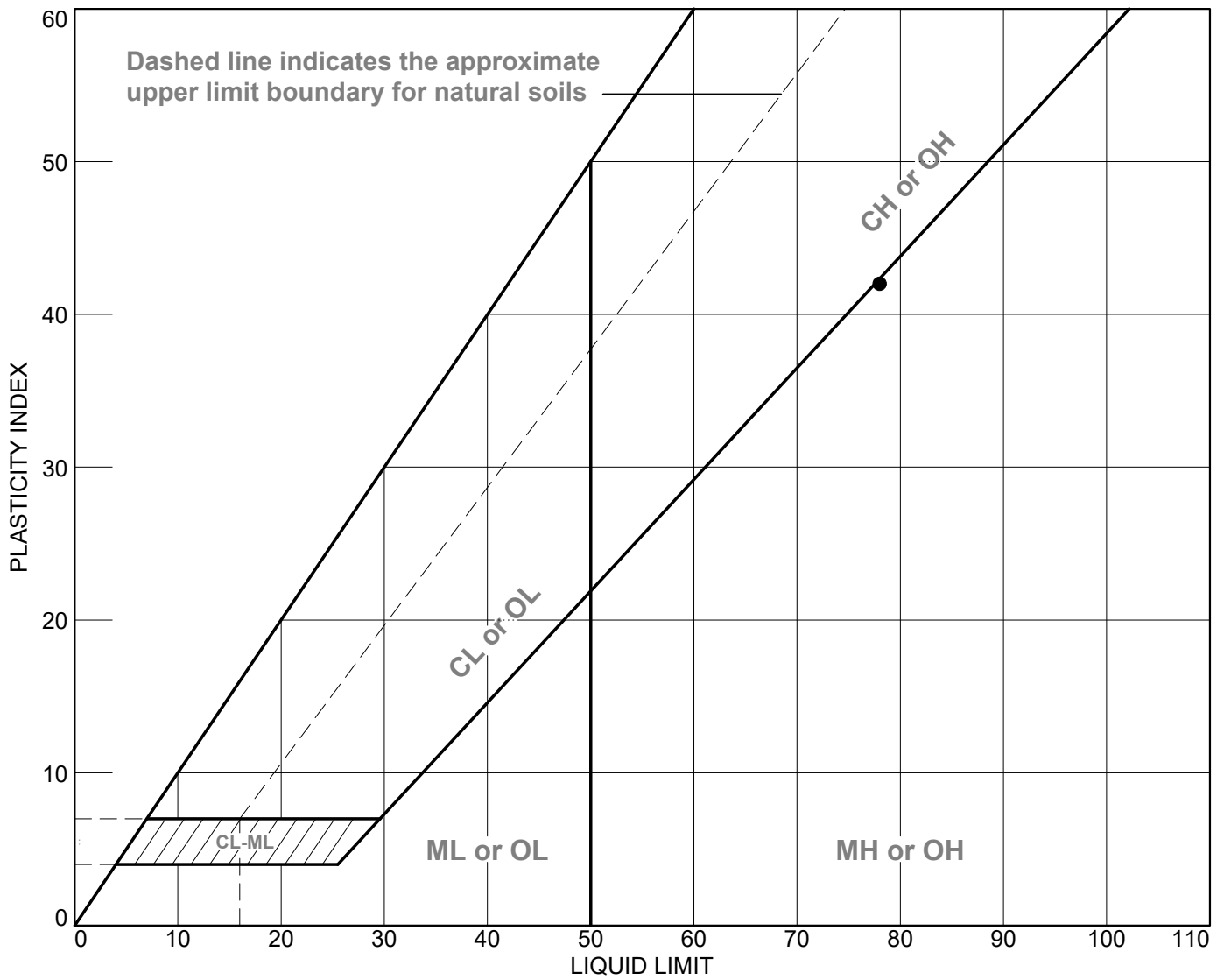
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.51	18.20		
Dry+Tare	15.94	16.55		
Tare	11.40	11.72		
Moisture	34.6	34.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
45.92	34.89	19.87	73.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-08	S11	32-34 ft	81.4	36	78	42	OH

GEI Consultants, Inc.
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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-08

Depth: 32-34 ft

Sample Number: S11

Material Description: ORGANIC SILT

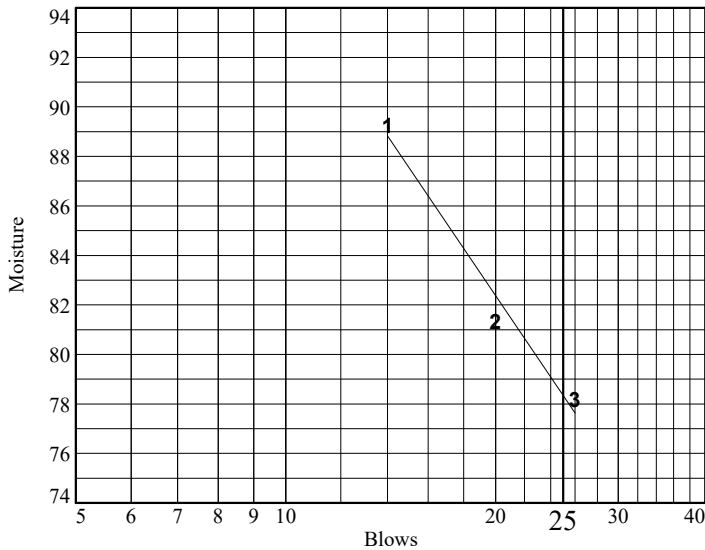
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	24.08	24.62	25.09			
Dry+Tare	18.10	18.68	19.31			
Tare	11.40	11.38	11.92			
# Blows	14	20	26			
Moisture	89.3	81.4	78.2			



Liquid Limit= 78
Plastic Limit= 36
Plasticity Index= 42
Natural Moisture= 81.4
Liquidity Index= 1.1

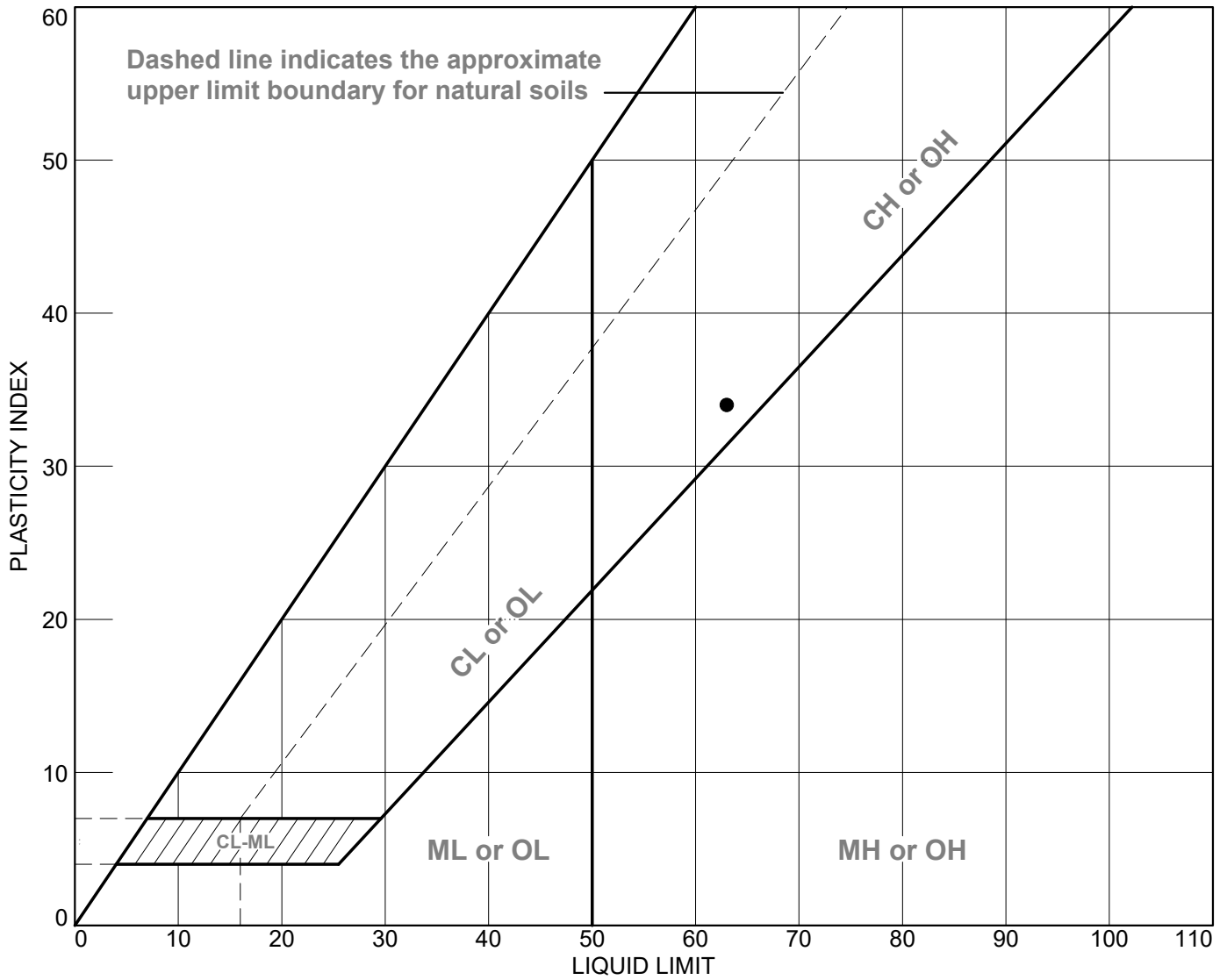
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	26.39	26.57		
Dry+Tare	24.70	24.89		
Tare	20.02	20.12		
Moisture	36.1	35.2		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
40.16	31.07	19.90	81.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-08	S17	44-46 ft	59.7	29	63	34	OH

GEI Consultants, Inc.
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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-08

Depth: 44-46 ft

Sample Number: S17

Material Description: ORGANIC CLAY

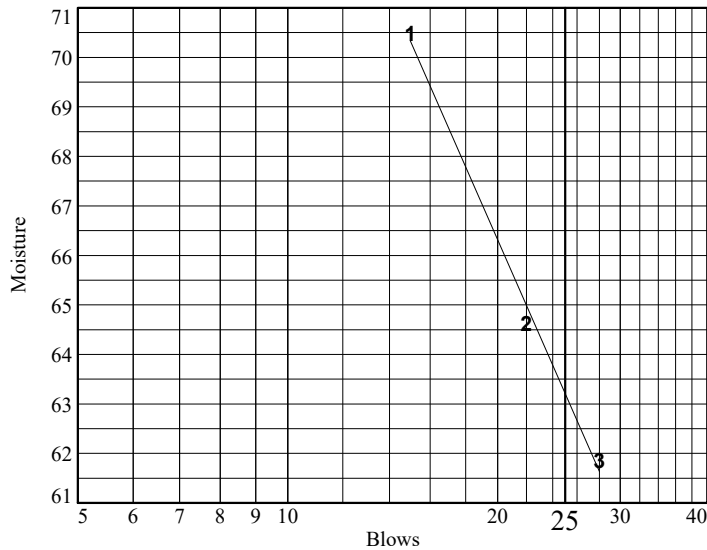
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.48	25.55	26.93			
Dry+Tare	18.49	19.96	21.09			
Tare	11.41	11.31	11.65			
# Blows	15	22	28			
Moisture	70.5	64.6	61.9			



Liquid Limit= 63
Plastic Limit= 29
Plasticity Index= 34
Natural Moisture= 59.7
Liquidity Index= 0.9

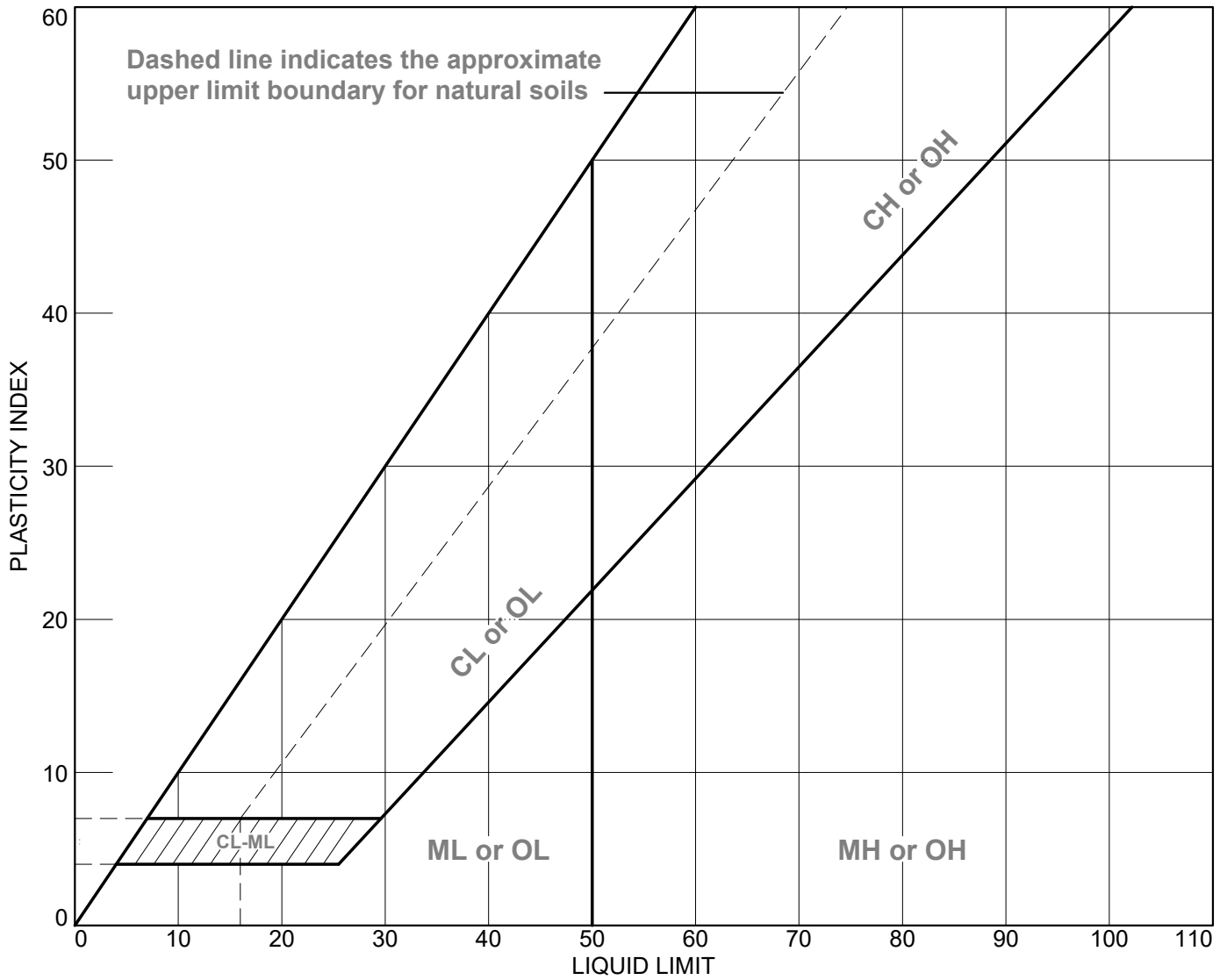
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	27.61	27.67		
Dry+Tare	26.21	26.23		
Tare	21.34	21.35		
Moisture	28.7	29.5		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
41.06	33.14	19.87	59.7

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-09	S3 (Oven Dry)	10-12 ft	84.0		47		OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-09

Depth: 10-12 ft

Sample Number: S3 (Oven Dry)

Material Description: ORGANIC CLAY

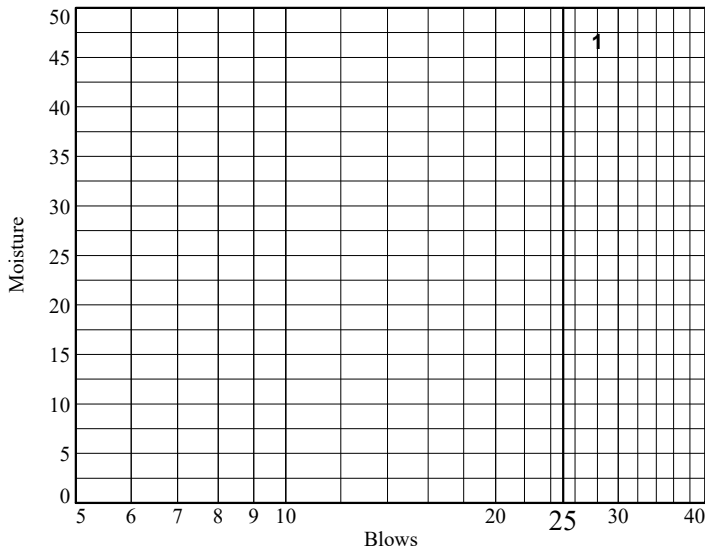
USCS: OH

Tested by: MA

Checked by: EF

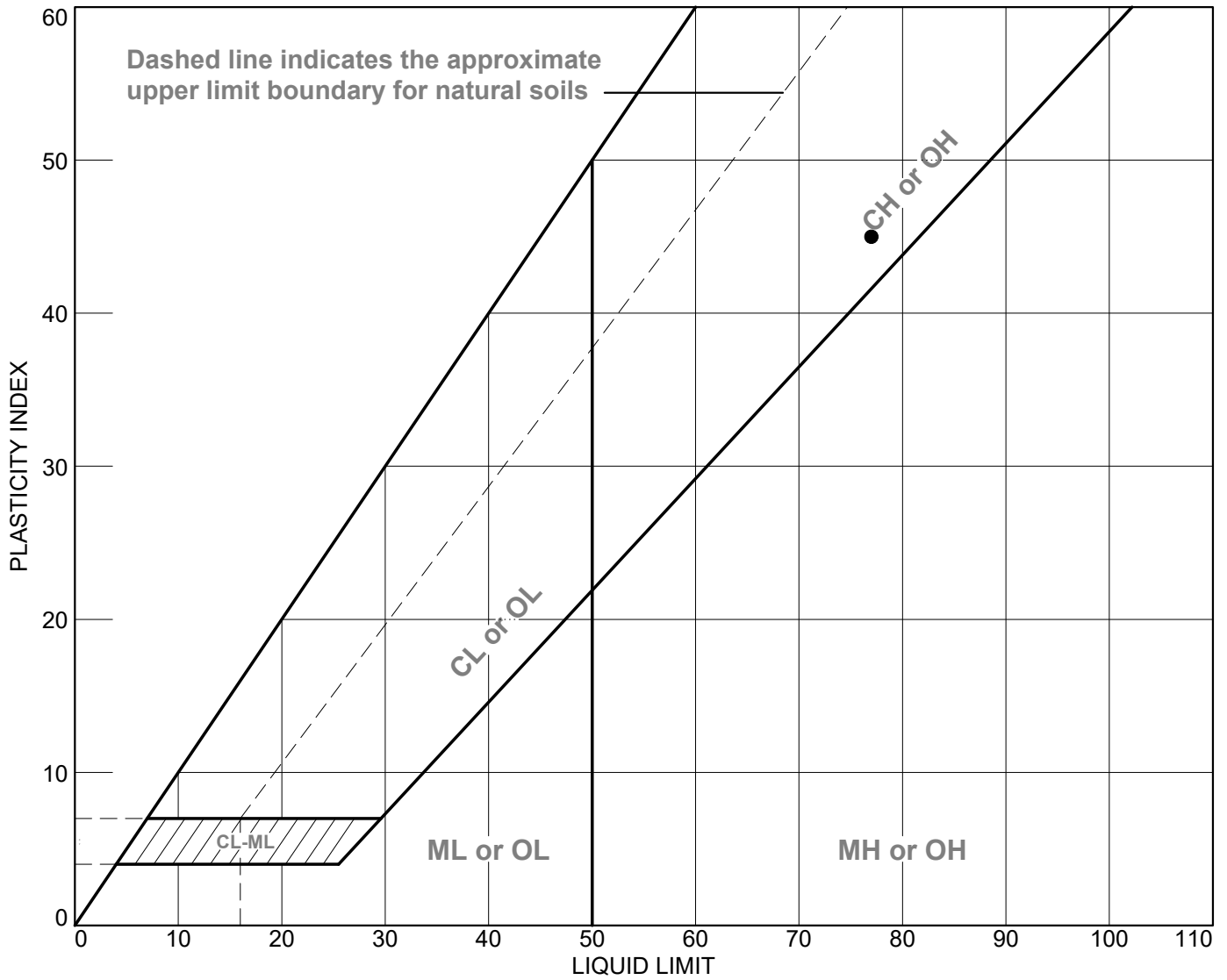
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	34.26					
Dry+Tare	29.69					
Tare	19.89					
# Blows	28					
Moisture	46.6					



Liquid Limit= 47
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 84.0

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-09	S3	10-12 ft	84.0	32	77	45	OH

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400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-09

Depth: 10-12 ft

Sample Number: S3

Material Description: ORGANIC CLAY

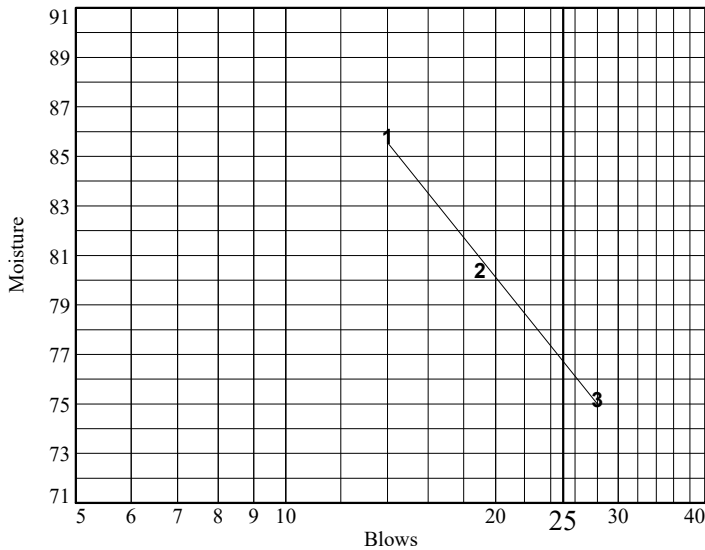
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	34.91	35.37	36.35			
Dry+Tare	28.67	29.17	30.01			
Tare	21.40	21.46	21.58			
# Blows	14	19	28			
Moisture	85.8	80.4	75.2			

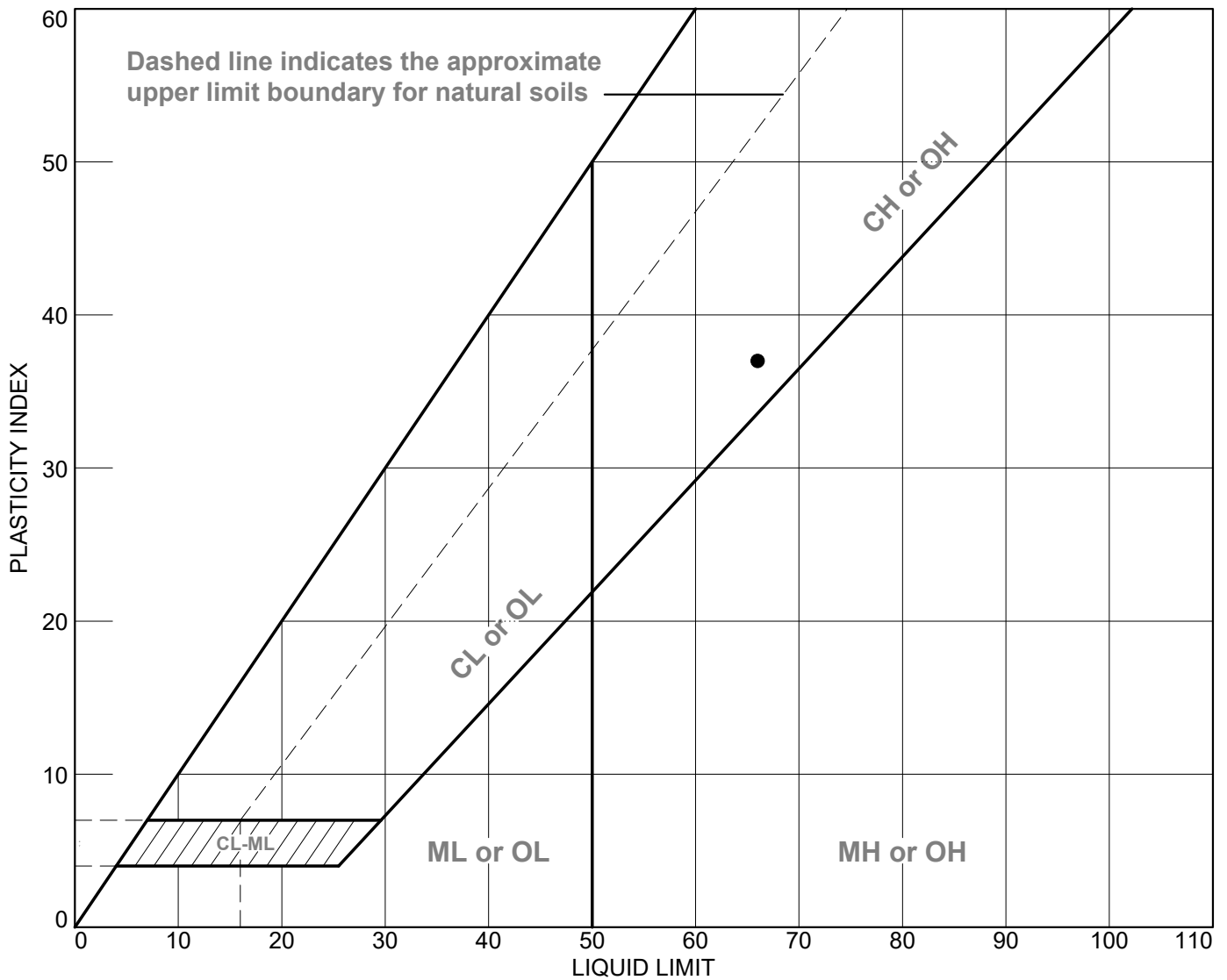


Liquid Limit= 77
Plastic Limit= 32
Plasticity Index= 45
Natural Moisture= 84.0
Liquidity Index= 1.2

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	18	13.54		
Dry+Tare	16.49	11.96		
Tare	11.71	7		
Moisture	31.6	31.9		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-09	S5	20-22 ft	80.7	29	66	37	OH

GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-09

Depth: 20-22 ft

Sample Number: S5

Material Description: ORGANIC CLAY

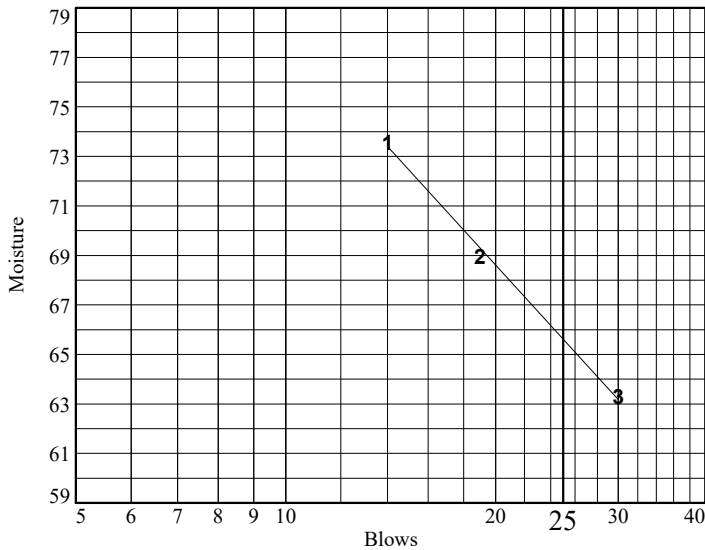
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.21	32.33	32.46			
Dry+Tare	27.61	27.26	27.63			
Tare	20.00	19.91	20.00			
# Blows	14	19	30			
Moisture	73.6	69.0	63.3			



Liquid Limit= 66
Plastic Limit= 29
Plasticity Index= 37
Natural Moisture= 80.7
Liquidity Index= 1.4

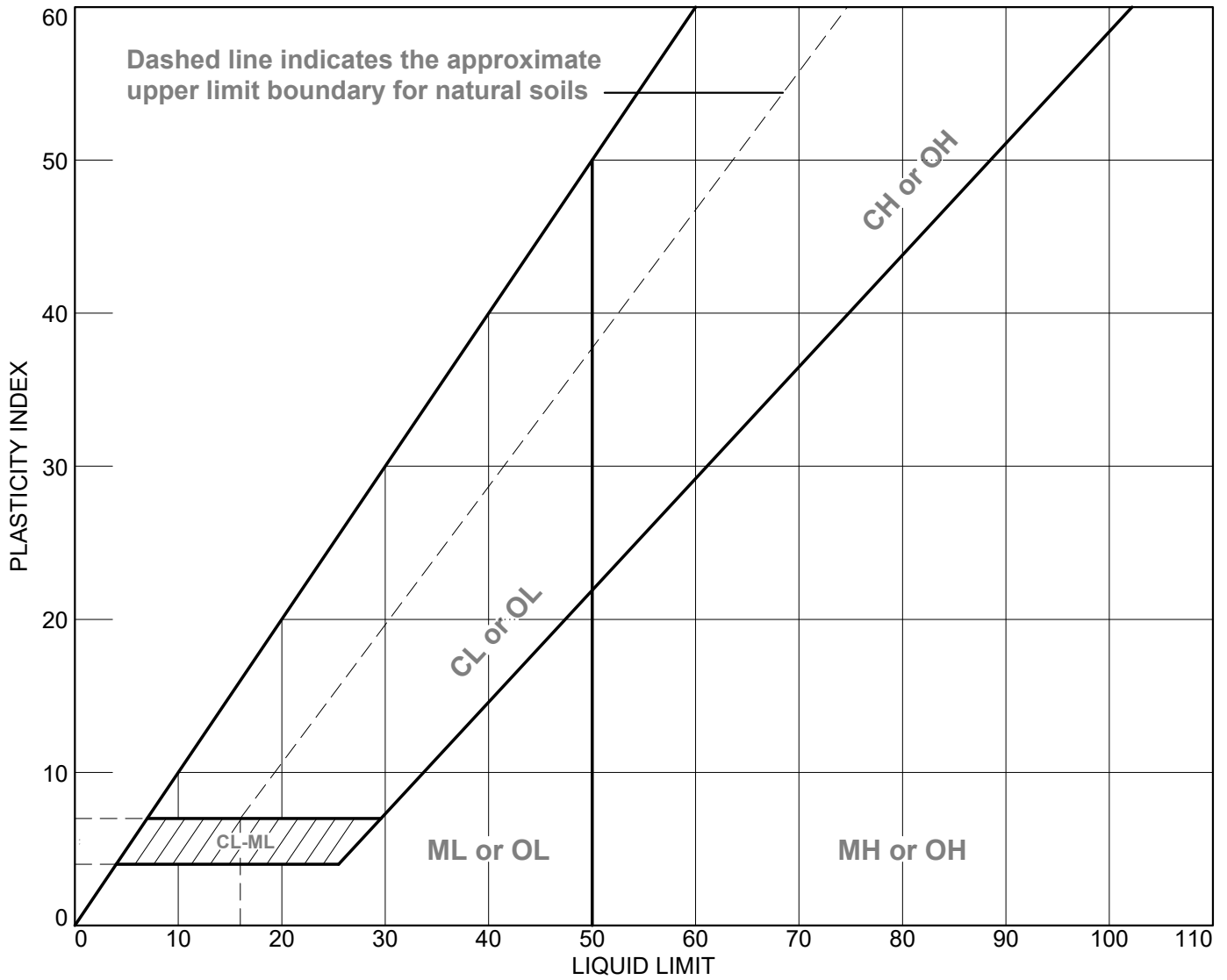
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	13.09	13.66		
Dry+Tare	11.73	12.16		
Tare	7.00	7.00		
Moisture	28.8	29.1		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
37.38	29.60	19.96	80.7

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-10	S2 (Oven Dry)	5-7 ft	91.4		43		OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-10

Depth: 5-7 ft

Sample Number: S2 (Oven Dry)

Material Description: ORGANIC CLAY

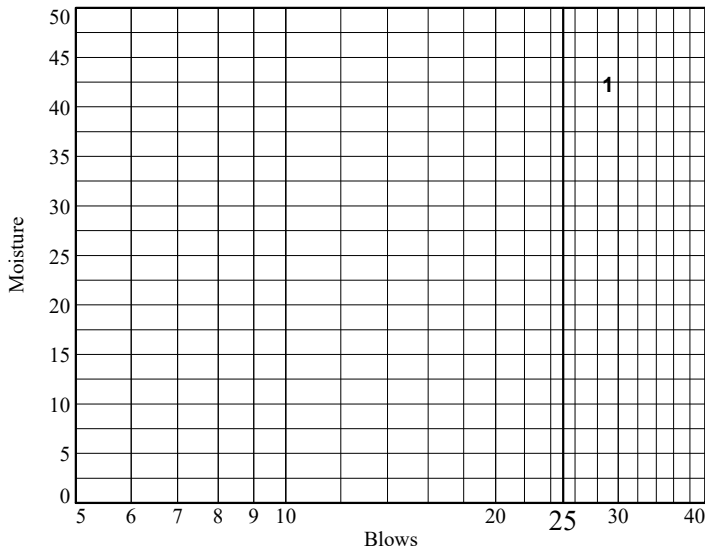
USCS: OH

Tested by: MA

Checked by: EF

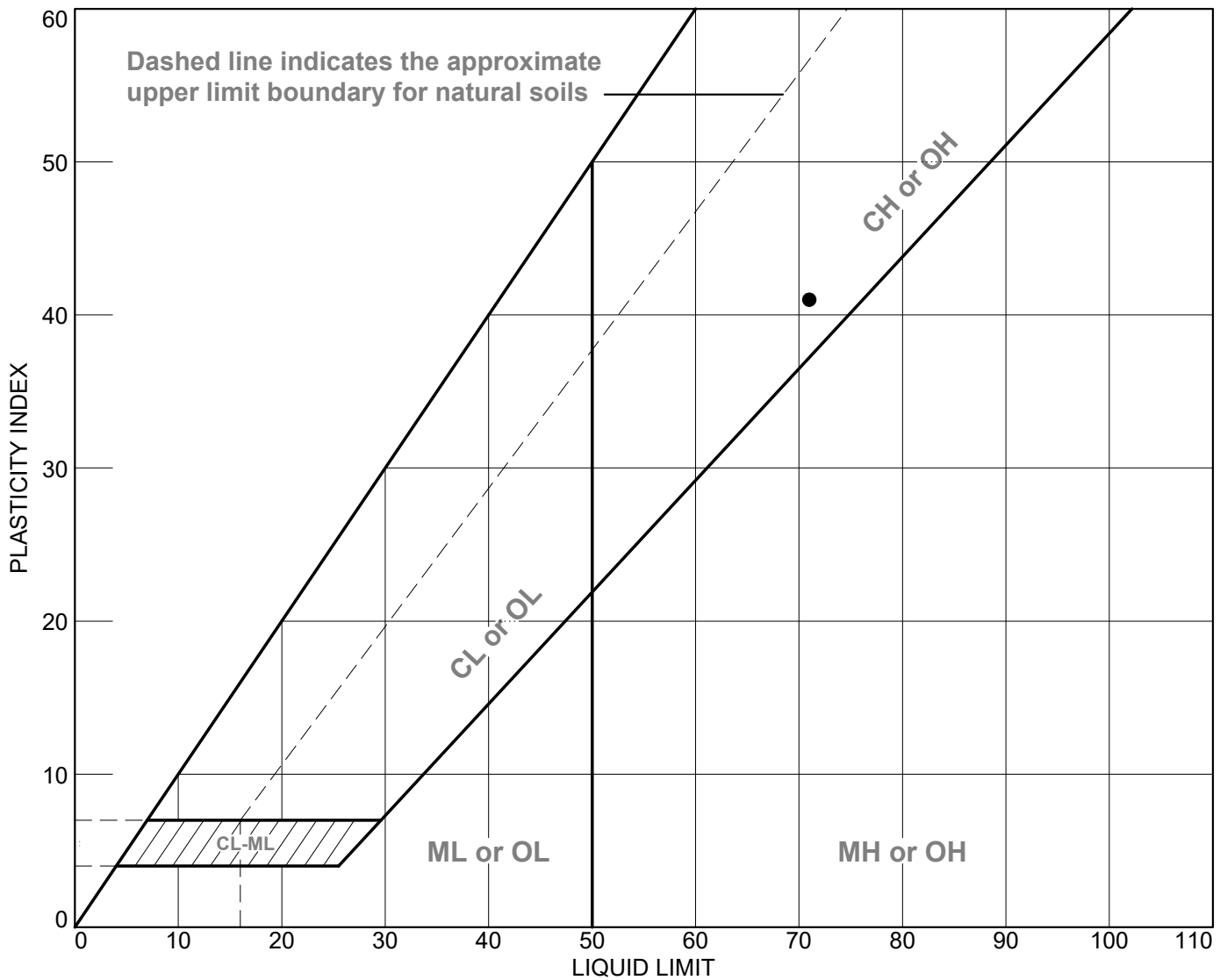
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.88					
Dry+Tare	29.73					
Tare	19.91					
# Blows	29					
Moisture	42.3					



Liquid Limit= 43
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 91.4

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-10	S2	5-7 ft	91.4	30	71	41	OH

GEI Consultants, Inc.
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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-10

Depth: 5-7 ft

Sample Number: S2

Material Description: ORGANIC CLAY

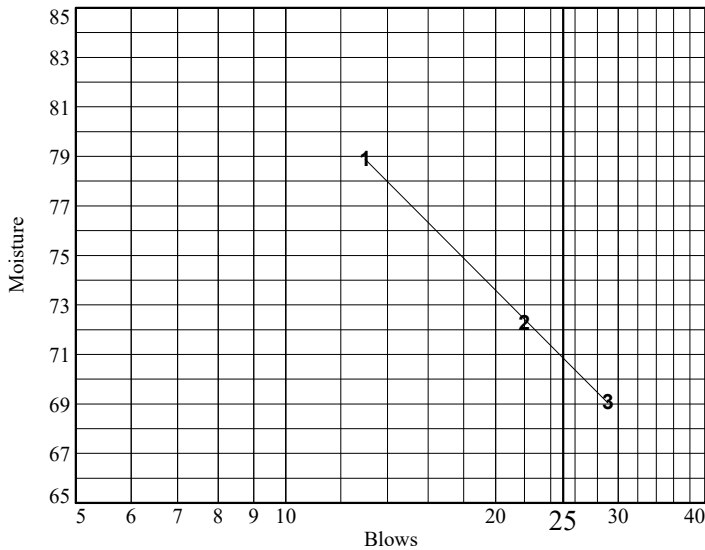
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	32.58	32.73	33.51			
Dry+Tare	26.96	27.38	27.98			
Tare	19.84	19.98	19.98			
# Blows	13	22	29			
Moisture	78.9	72.3	69.1			

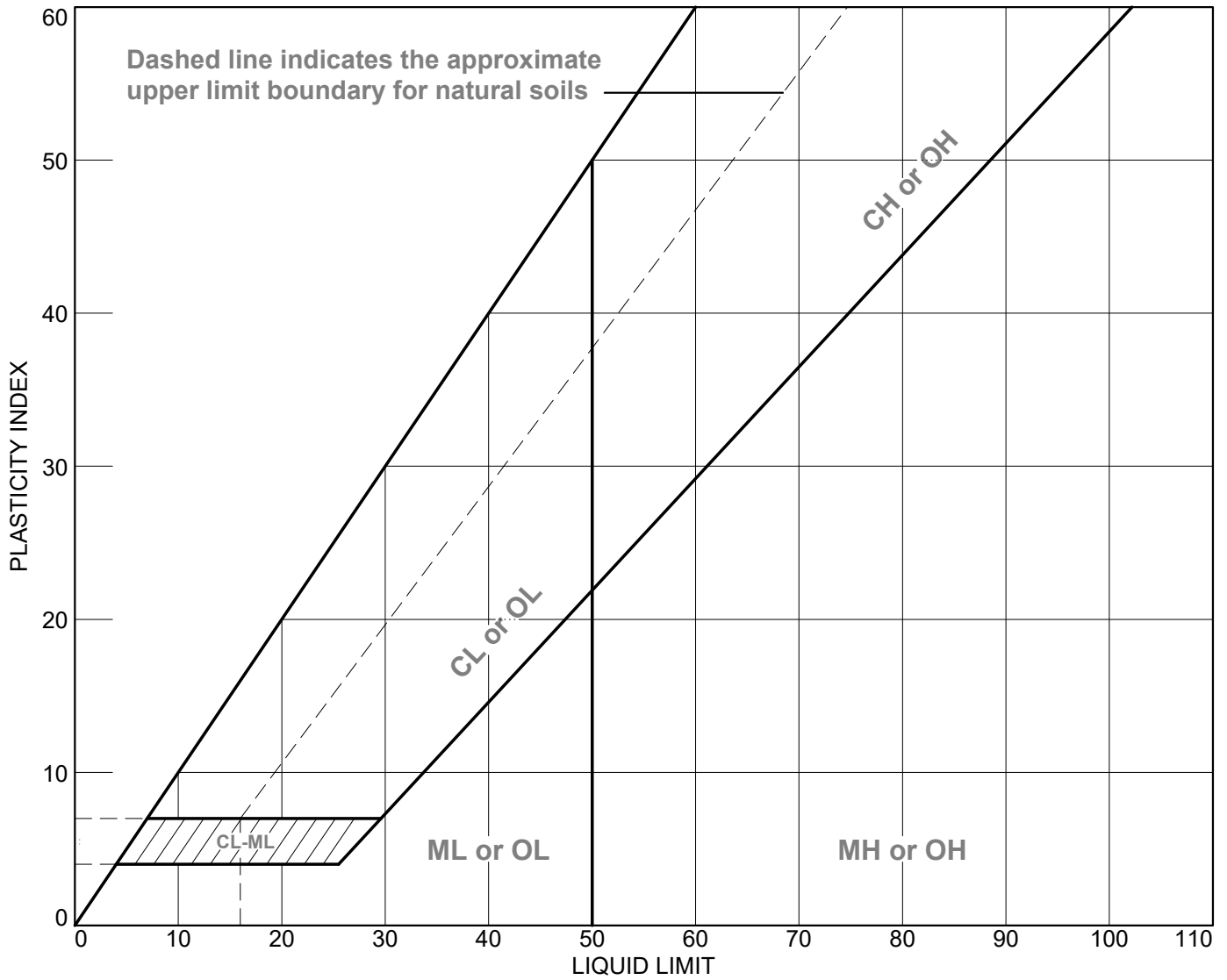


Liquid Limit= 71
Plastic Limit= 30
Plasticity Index= 41
Natural Moisture= 91.4
Liquidity Index= 1.5

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	18.21	17.90		
Dry+Tare	16.74	16.39		
Tare	11.85	11.41		
Moisture	30.1	30.3		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-10	S6 (Oven Dry)	22-24 ft	68.9		42		OH

GEI Consultants, Inc.
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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-10

Depth: 22-24 ft

Sample Number: S6 (Oven Dry)

Material Description: ORGANIC CLAY

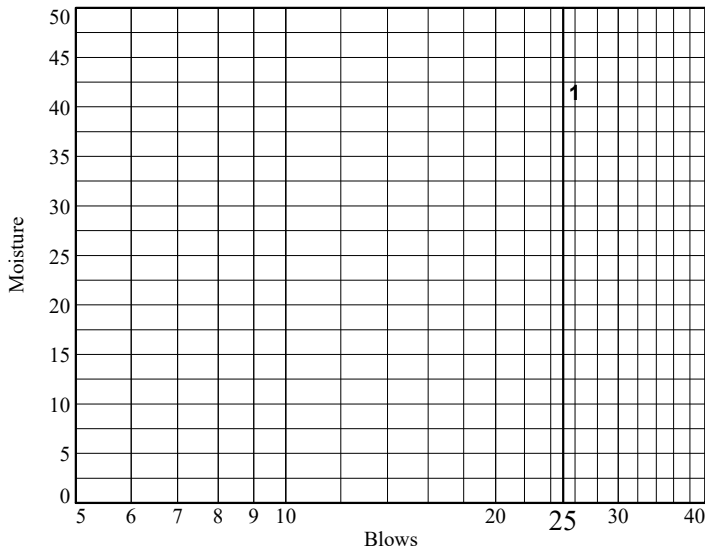
USCS: OH

Tested by: MA

Checked by: EF

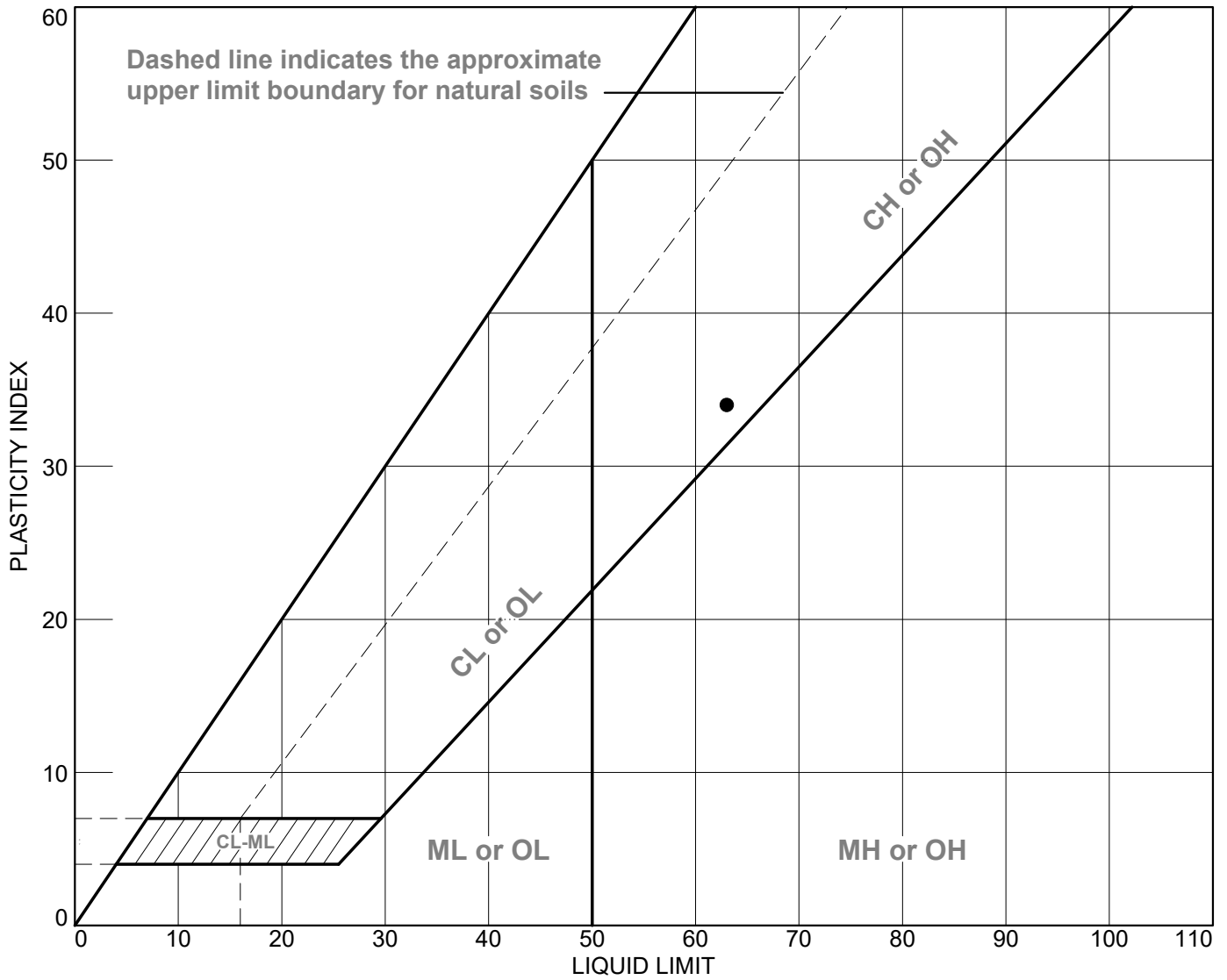
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.86					
Dry+Tare	30.23					
Tare	21.48					
# Blows	26					
Moisture	41.5					



Liquid Limit= 42
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 68.9

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-10	S6	22-24 ft	68.9	29	63	34	OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-10

Depth: 22-24 ft

Sample Number: S6

Material Description: ORGANIC CLAY

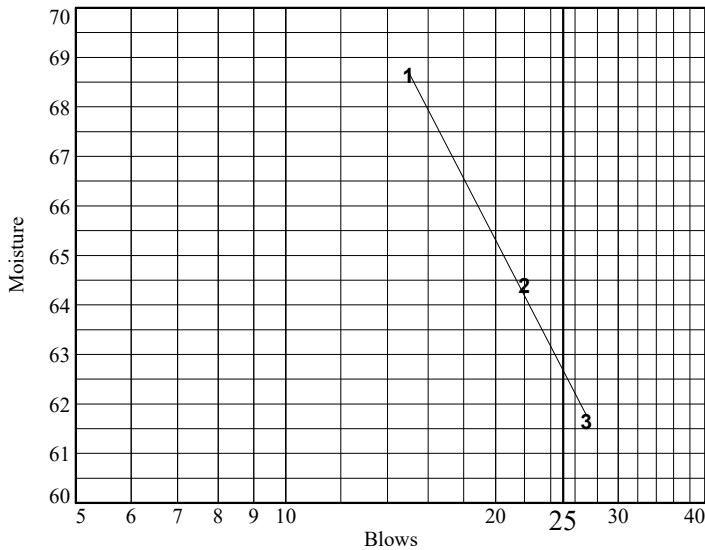
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.33	23.21	22.55			
Dry+Tare	18.47	18.58	17.92			
Tare	11.39	11.39	10.41			
# Blows	15	22	27			
Moisture	68.6	64.4	61.7			

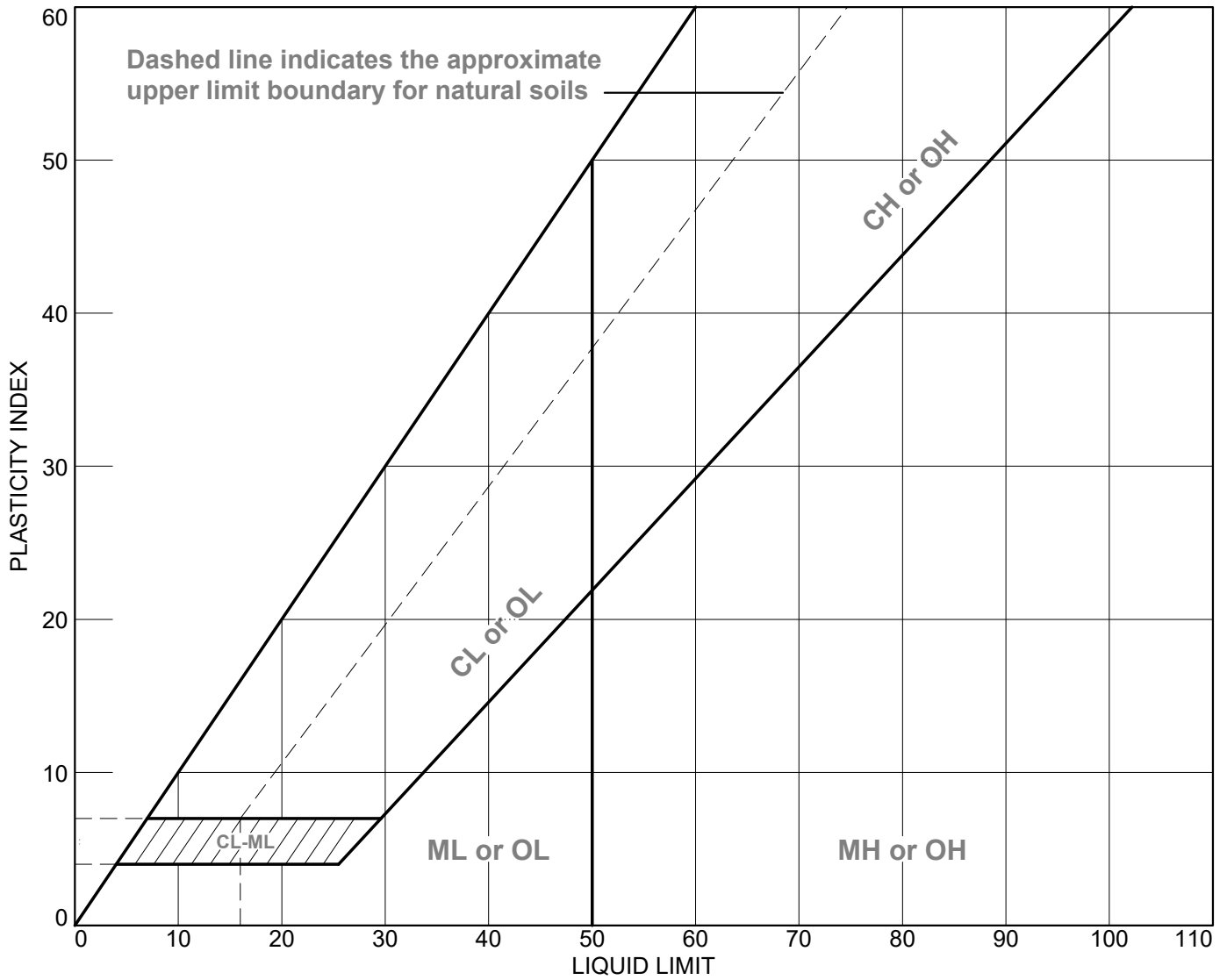


Liquid Limit= 63
Plastic Limit= 29
Plasticity Index= 34
Natural Moisture= 68.9
Liquidity Index= 1.2

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	17.61	17.76		
Dry+Tare	16.21	16.32		
Tare	11.46	11.38		
Moisture	29.5	29.1		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-10	S20	50-52 ft	19.7	NP	NV	NP	ML

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-10

Depth: 50-52 ft

Sample Number: S20

Material Description: SILT

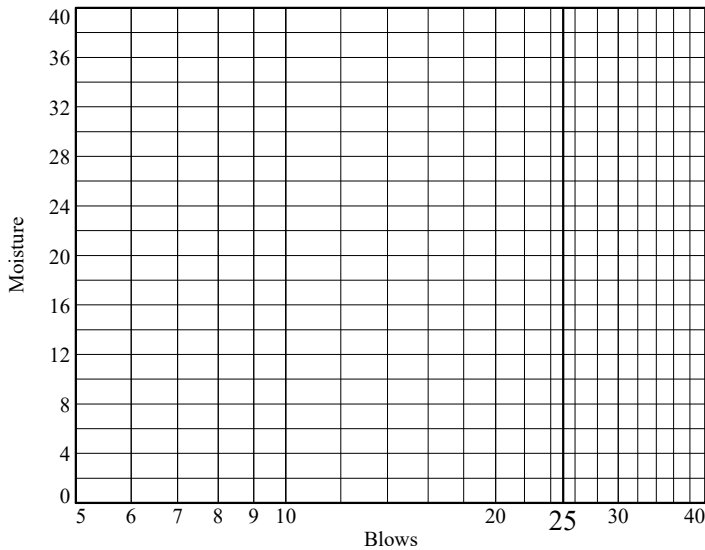
USCS: ML

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						



Liquid Limit= NV
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 19.7

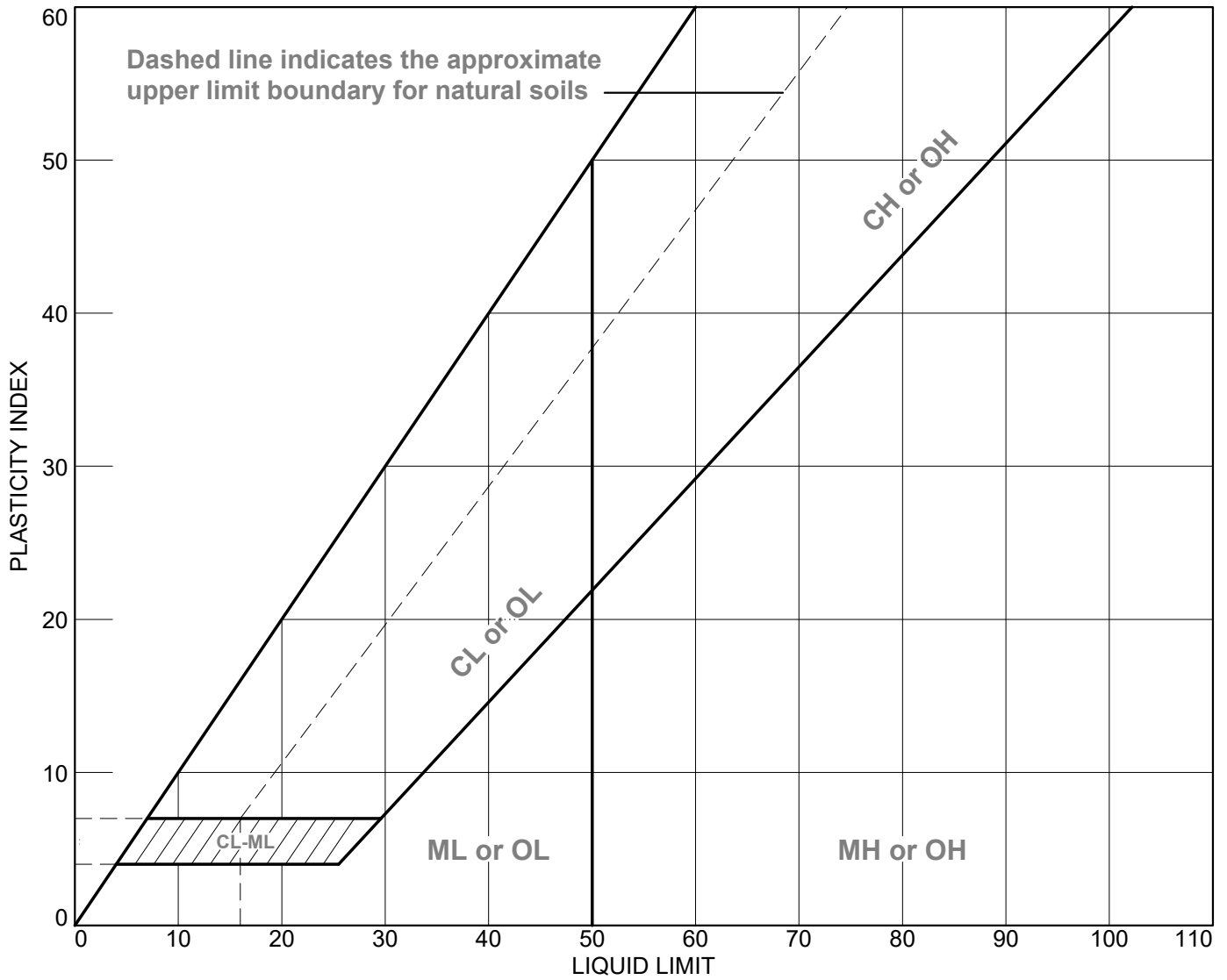
Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare				
Dry+Tare				
Tare				
Moisture				

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
40.50	37.12	19.94	19.7

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-11	S1 (Oven Dry)	0-2 ft	170.7		65		OH

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Woburn, MA 01801



Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-11

Depth: 0-2 ft

Sample Number: S1 (Oven Dry)

Material Description: ORGANIC SILT

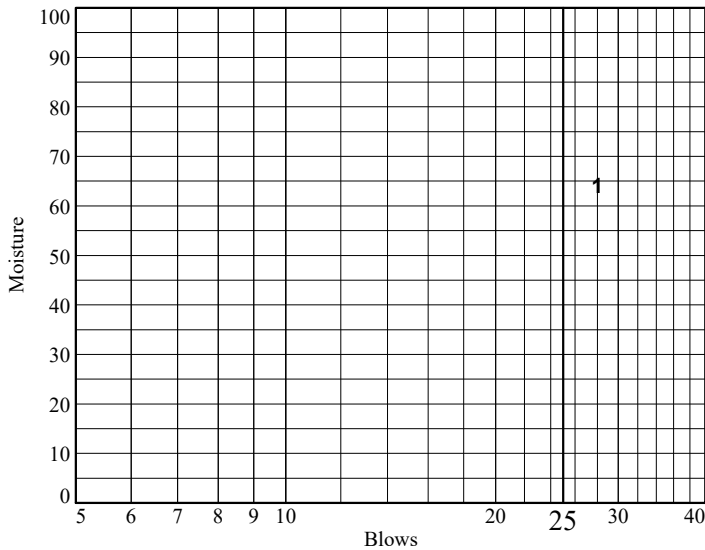
USCS: OH

Tested by: MA

Checked by: EF

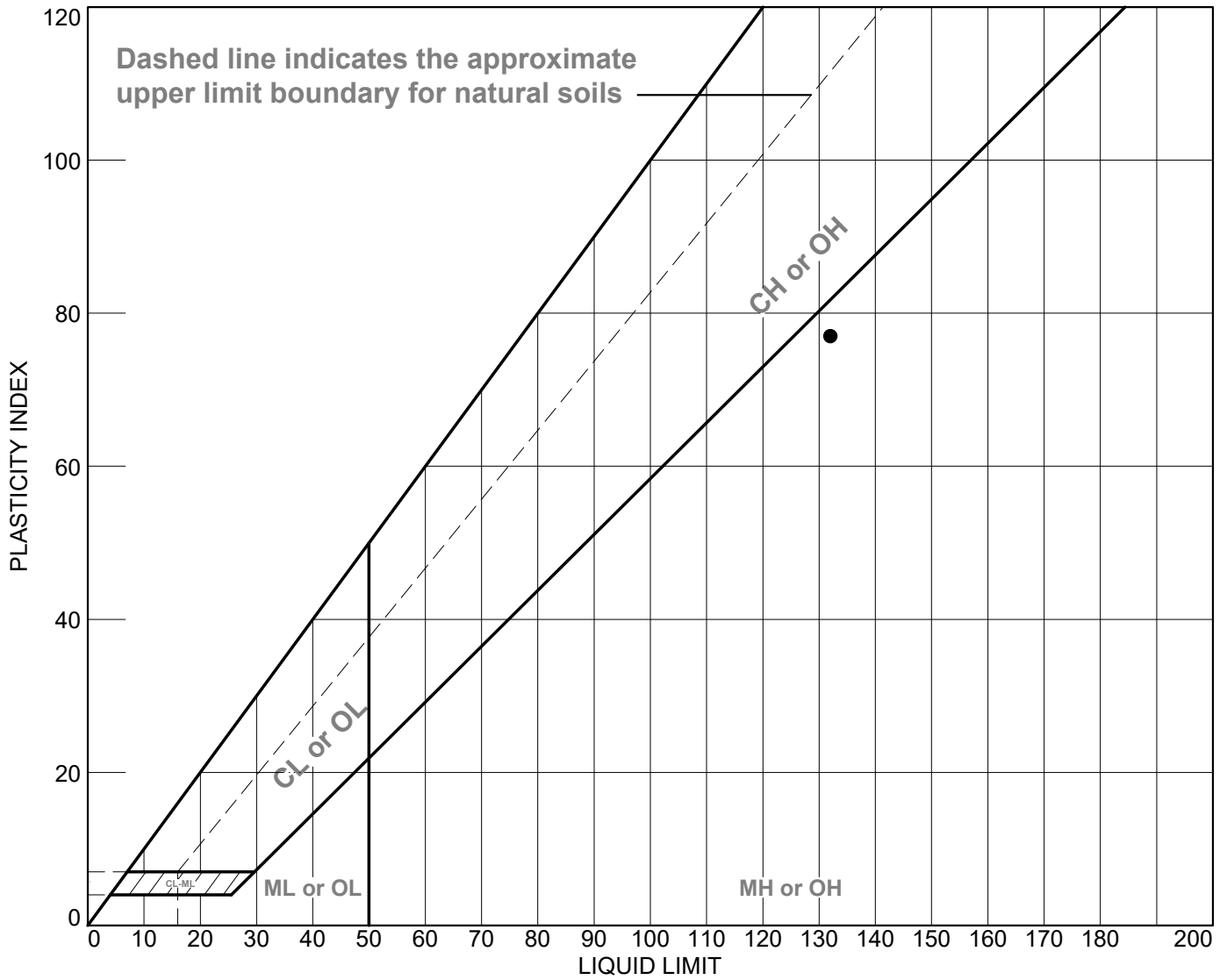
Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.22					
Dry+Tare	28.05					
Tare	19.99					
# Blows	28					
Moisture	64.1					



Liquid Limit= 65
Plastic Limit= _____
Plasticity Index= _____
Natural Moisture= 170.7

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-11	S1	0-2 ft	170.7	55	132	77	OH

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-11

Depth: 0-2 ft

Sample Number: S1

Material Description: ORGANIC SILT

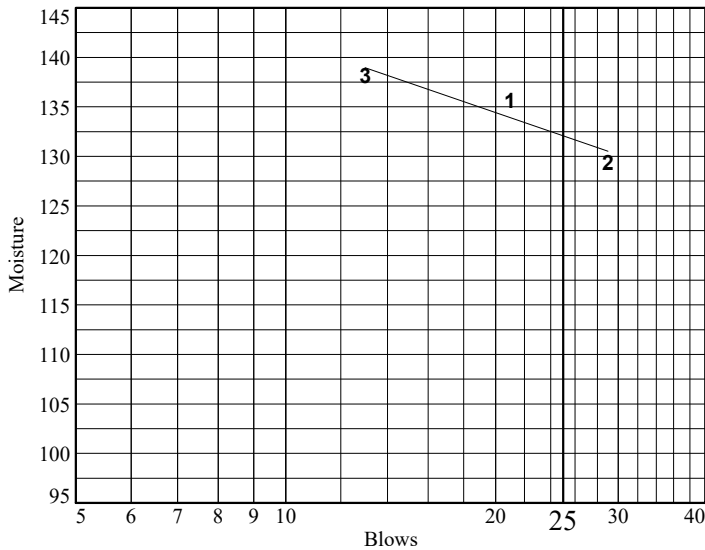
USCS: OH

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.46	18.89	23.20			
Dry+Tare	16.54	12.08	16.37			
Tare	11.44	6.82	11.43			
# Blows	21	29	13			
Moisture	135.7	129.5	138.3			

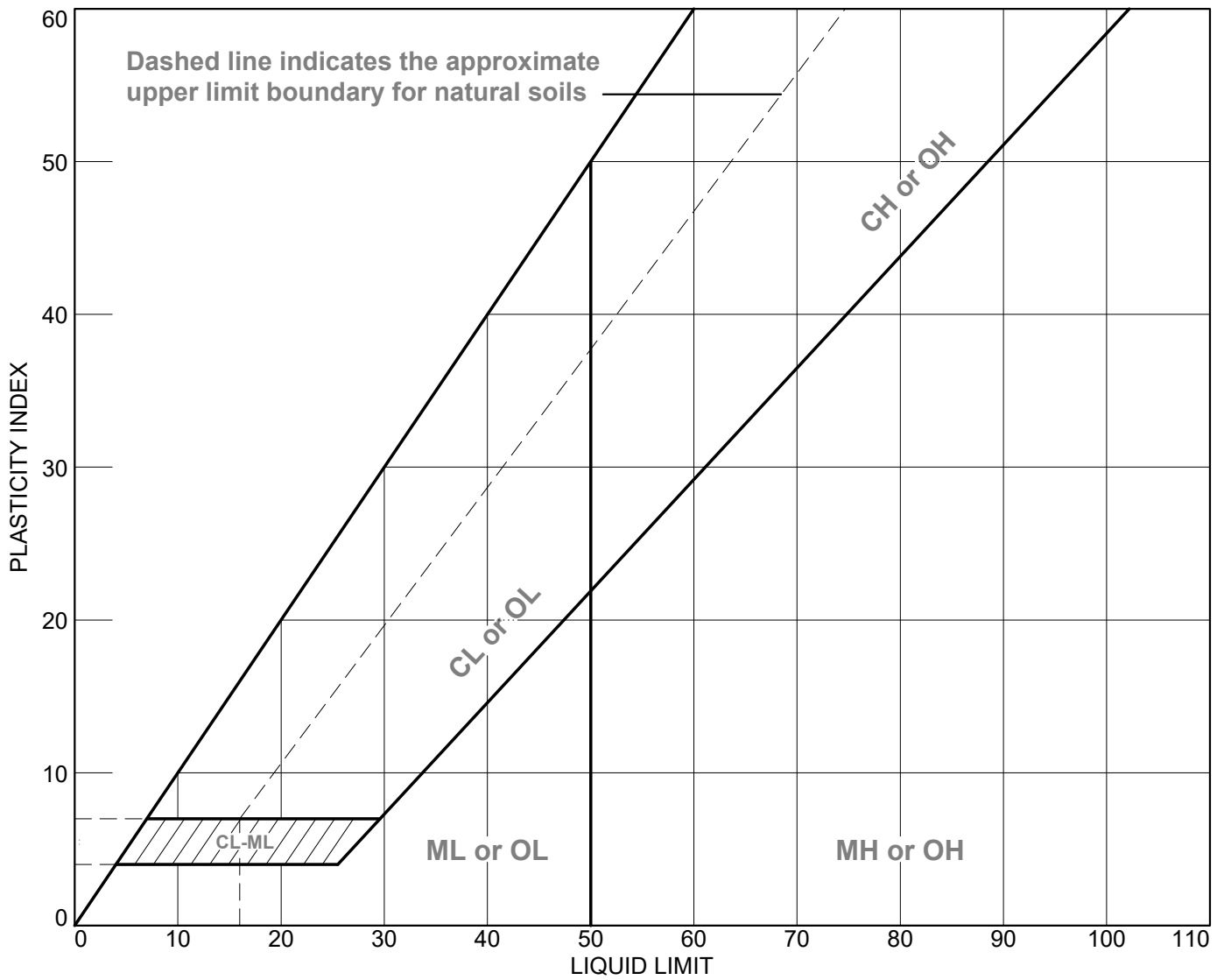


Liquid Limit= 132
Plastic Limit= 55
Plasticity Index= 77
Natural Moisture= 170.7
Liquidity Index= 1.5

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	18.09	17.58		
Dry+Tare	15.89	15.37		
Tare	11.86	11.41		
Moisture	54.6	55.8		

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-12	S12	31-33 ft	14.7	NP	NV	NP	ML

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-12

Depth: 31-33 ft

Sample Number: S12

Material Description: SILT

USCS: ML

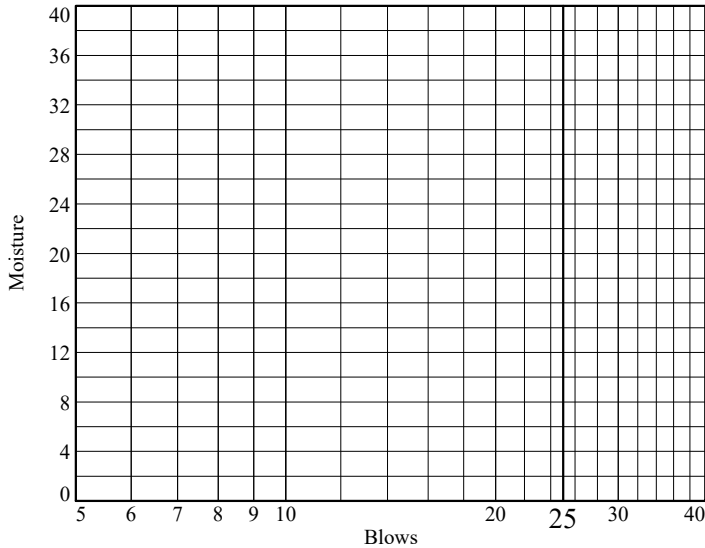
AASHTO: A-4(0)

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare						
Dry+Tare						
Tare						
# Blows						
Moisture						

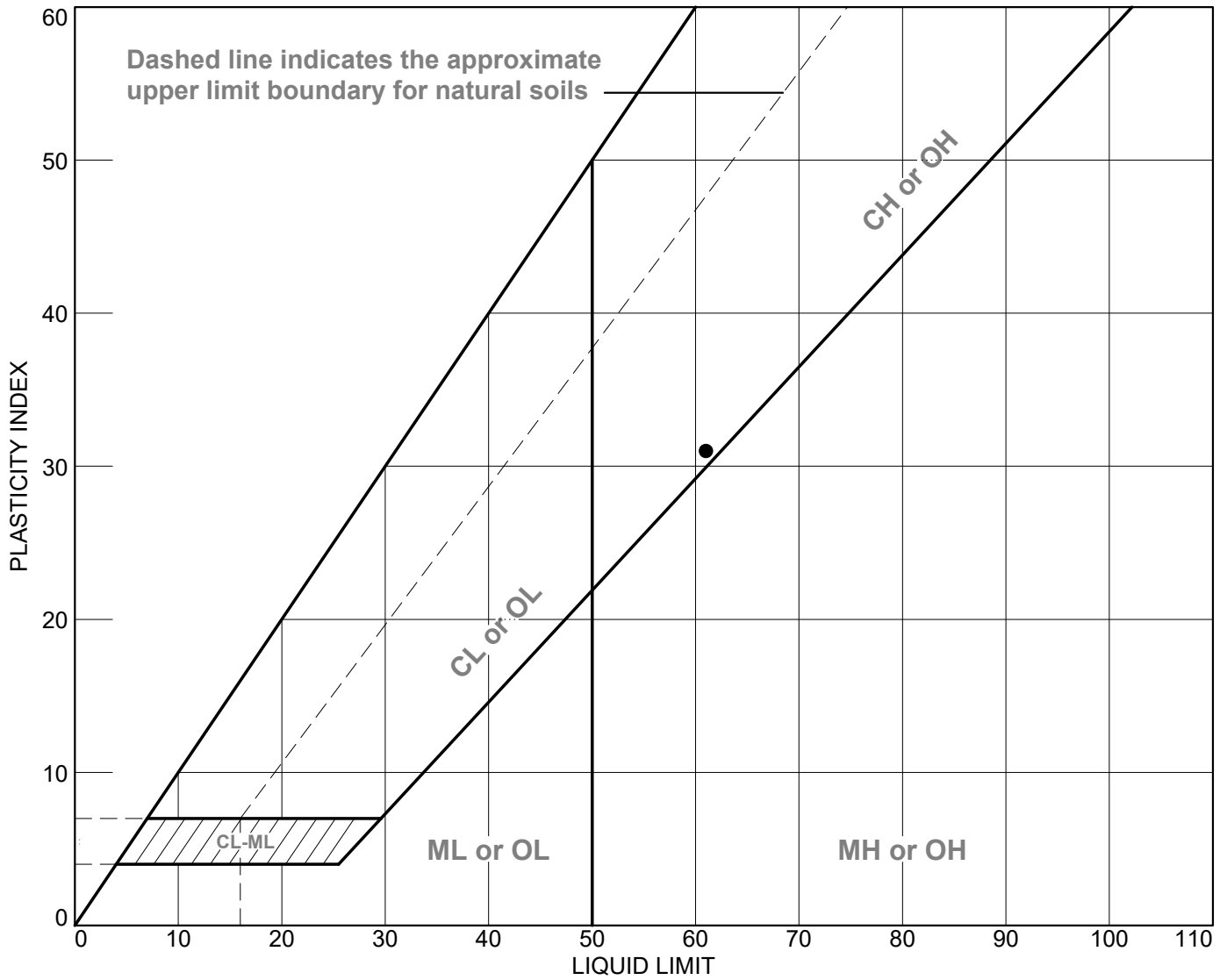


Liquid Limit= NV
Plastic Limit= NP
Plasticity Index= NP
Natural Moisture= 14.7

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare				
Dry+Tare				
Tare				
Moisture				

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	FD22-14	S2 (12"-24")	5-7 ft	56.1	30	61	31	OH

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Client: USACE - New England
Project: Providence River Drilling

Project No.: 2104664

Figure

Tested By: MA

Checked By: EF

LIQUID AND PLASTIC LIMIT TEST DATA

3/18/2022

Client: USACE - New England

Project: Providence River Drilling

Project Number: 2104664

Location: FD22-14

Depth: 5-7 ft

Sample Number: S2 (12"-24")

Material Description: ORGANIC CLAY

USCS: OH

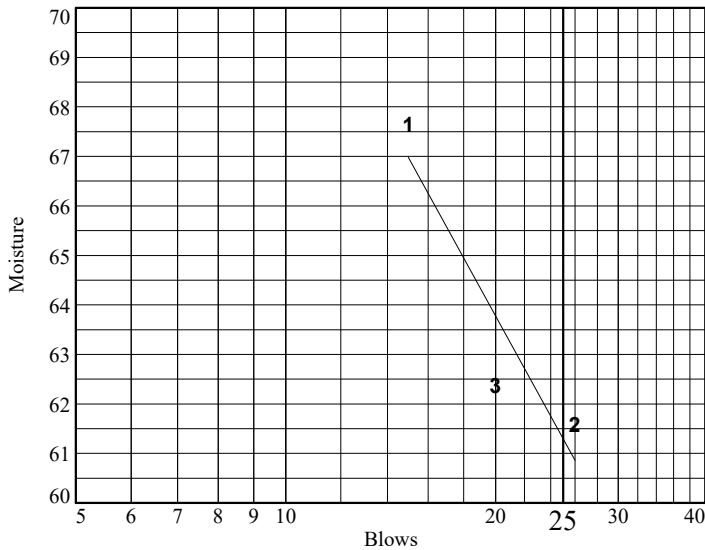
AASHTO: A-7-5(37)

Tested by: MA

Checked by: EF

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	33.04	37.42	33.32			
Dry+Tare	27.77	31.31	28.81			
Tare	19.98	21.39	21.58			
# Blows	15	26	20			
Moisture	67.7	61.6	62.4			



Liquid Limit= 61
Plastic Limit= 30
Plasticity Index= 31
Natural Moisture= 56.1
Liquidity Index= 0.8

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	13.48	18.69		
Dry+Tare	11.93	17.12		
Tare	6.83	11.88		
Moisture	30.4	30.0		

Natural Moisture Data

Wet+Tare	Dry+Tare	Tare	Moisture
37.98	31.49	19.93	56.1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	0.0	0.0	0.1	0.3	1.9	66.9	30.8		
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.0345	0.0113	0.0094	0.0048				

Material Description	USCS	AASHTO
ORGANIC CLAY	OH	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

Source of Sample: FD22-01 **Depth:** 5-7 ft **Sample Number:** S2

Remarks:

Figure



Tested By: MA

Checked By: EF

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	0.0	55.9	44.1		
X	LL	PL	D85	D60	D50	D30	D15	D10	C _c	C _u
○	29	16	0.0248	0.0100	0.0066	0.0022				
Material Description							USCS	AASHTO		
○ LEAN CLAY							CL	A-6(12)		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

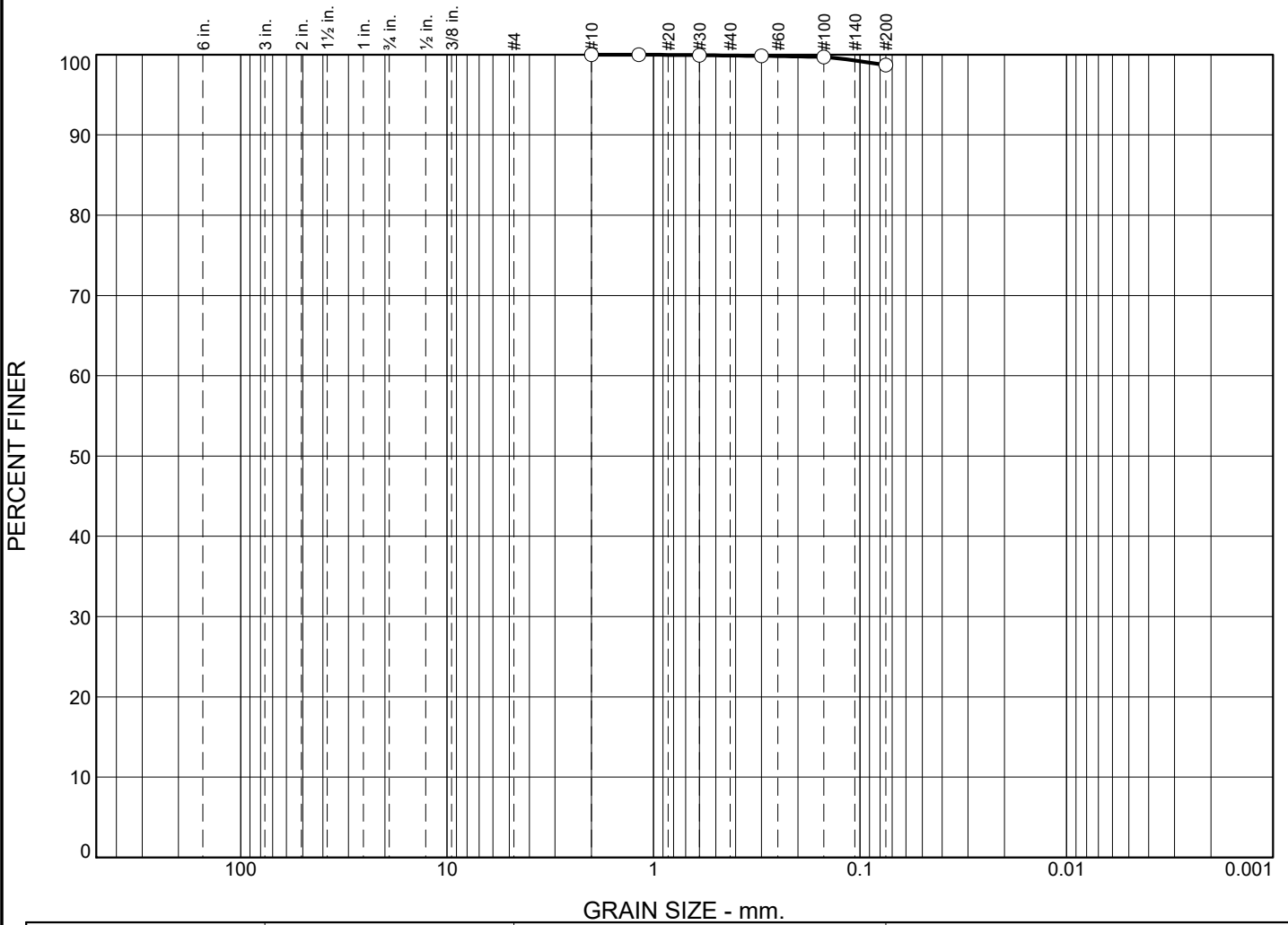
○ **Source of Sample:** FD22-01 **Depth:** 28-30 ft **Sample Number:** S9

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Remarks:

Figure

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	1.2	98.7			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○										
Material Description								USCS	AASHTO	
○ LEAN CLAY								CL		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

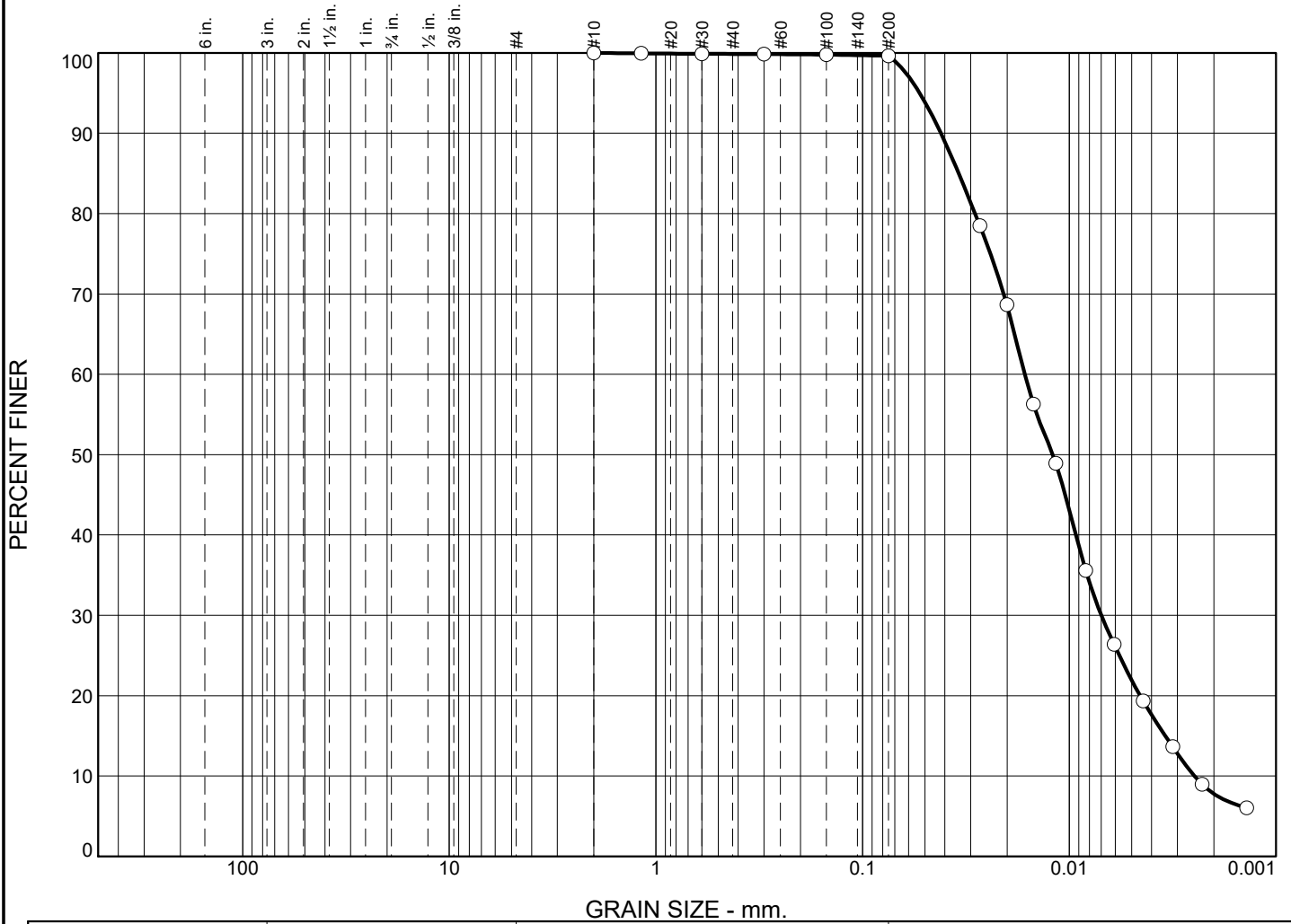
○ **Source of Sample:** FD22-01 **Depth:** 46-48 ft **Sample Number:** S18

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Remarks:
 ○ As received WC=31.0%.
 Fines visually classified.

Figure

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	0.3	77.6	22.0		
X	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.0343	0.0164	0.0120	0.0070	0.0034	0.0025	1.20	6.61
Material Description								USCS	AASHTO	
○ SILT								ML		

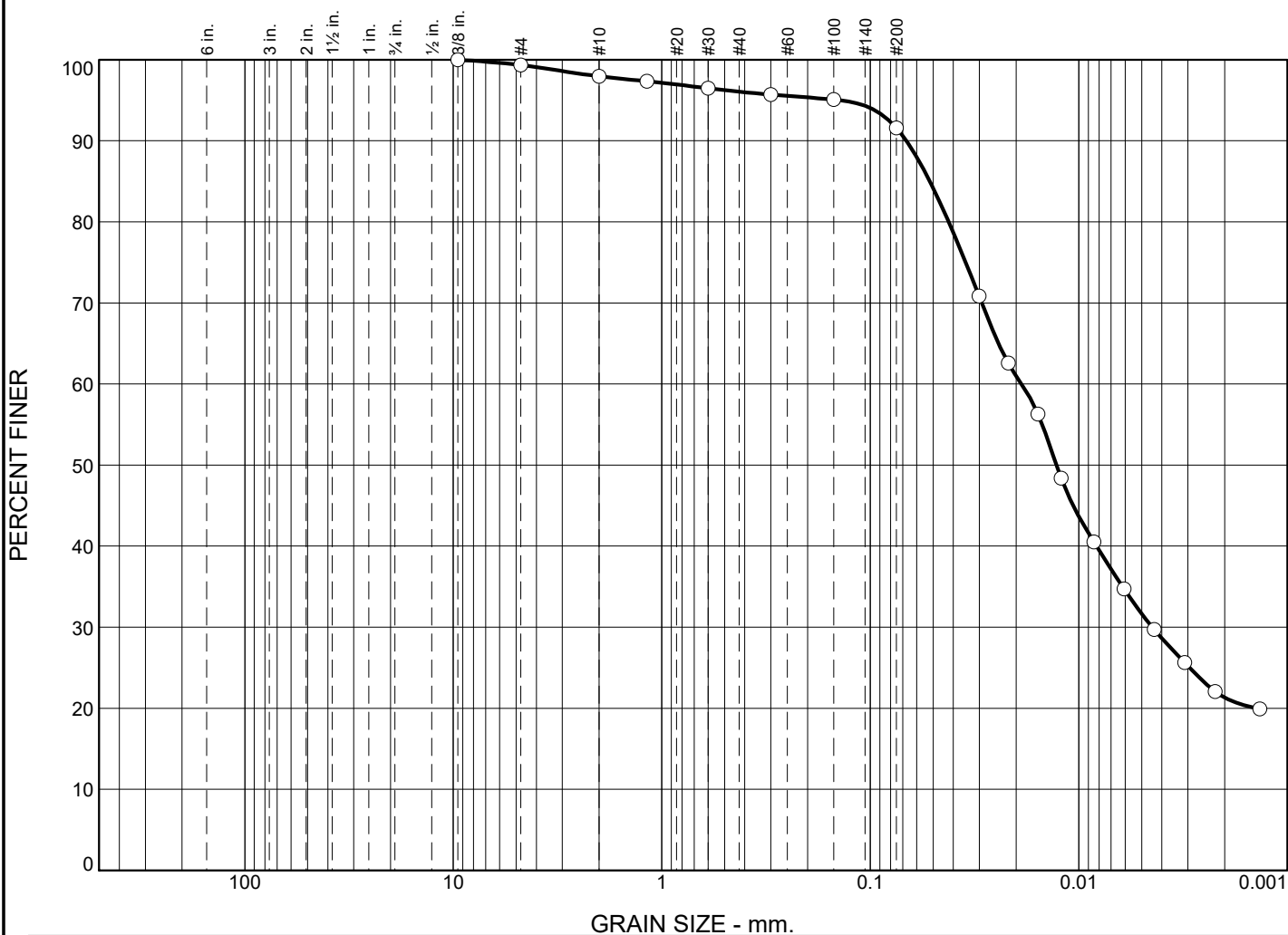
Project No. 2104664 Client: USACE - New England Project: Providence River Drilling ○ Source of Sample: FD22-02 Depth: 10-12 ft Sample Number: S5	Remarks:

Figure

Tested By: MA

Checked By: EF


Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	1.3	1.9	4.5	59.9	31.7

LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		0.0518	0.0189	0.0128	0.0045				

Material Description	USCS	AASHTO
○ ORGANIC CLAY	OH	

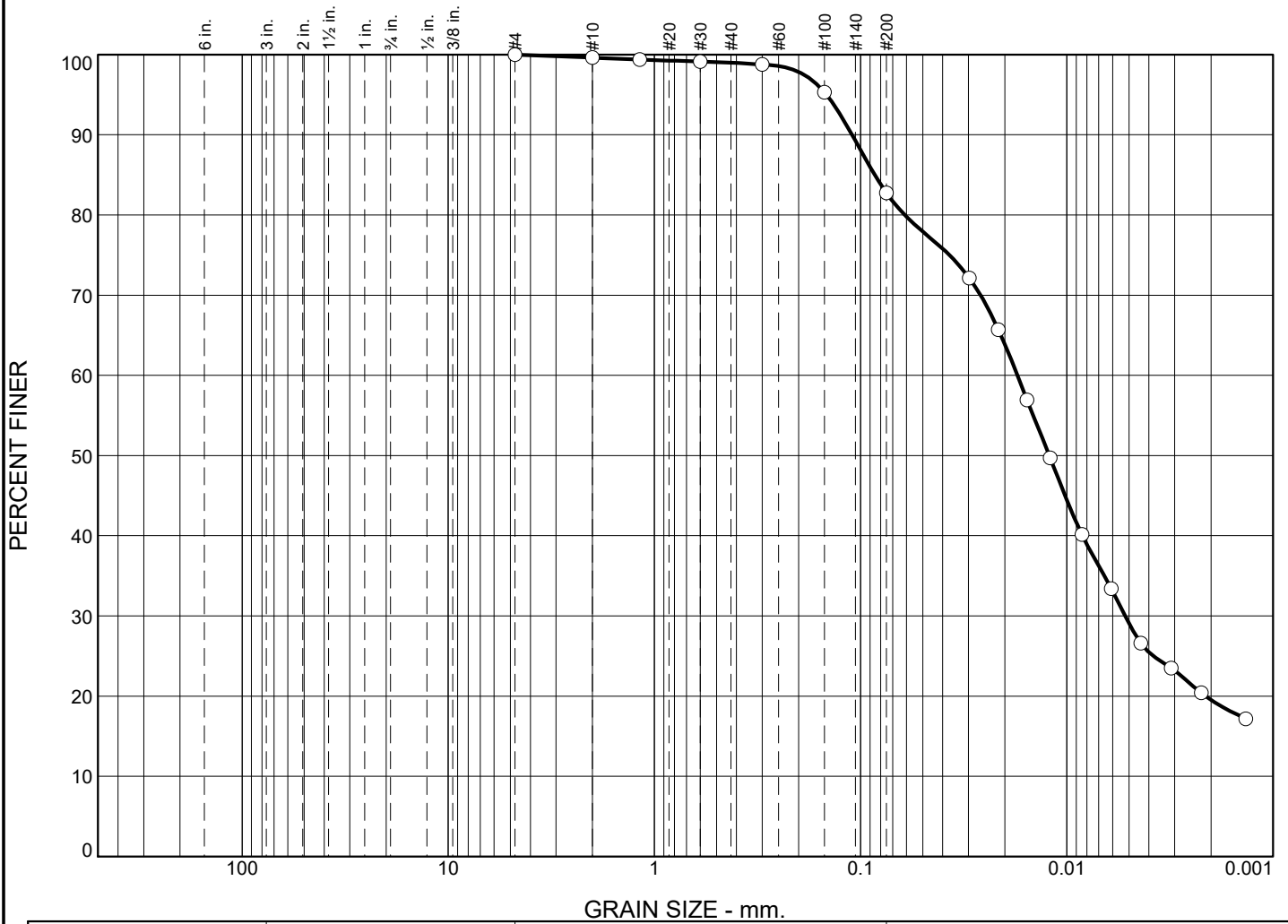
<p>Project No. 2104664 Client: USACE - New England</p> <p>Project: Providence River Drilling</p> <p>○ Source of Sample: FD22-03 Depth: 22-24 ft Sample Number: S6</p>	<p>Remarks:</p>
	

Figure

Tested By: MA

Checked By: EF

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.0	0.4	0.6	16.2	53.7	29.1		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.0853	0.0174	0.0122	0.0052				
Material Description							USCS	AASHTO		
○ ORGANIC CLAY with Sand							OH			

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-03 **Depth:** 42-44 ft **Sample Number:** S16

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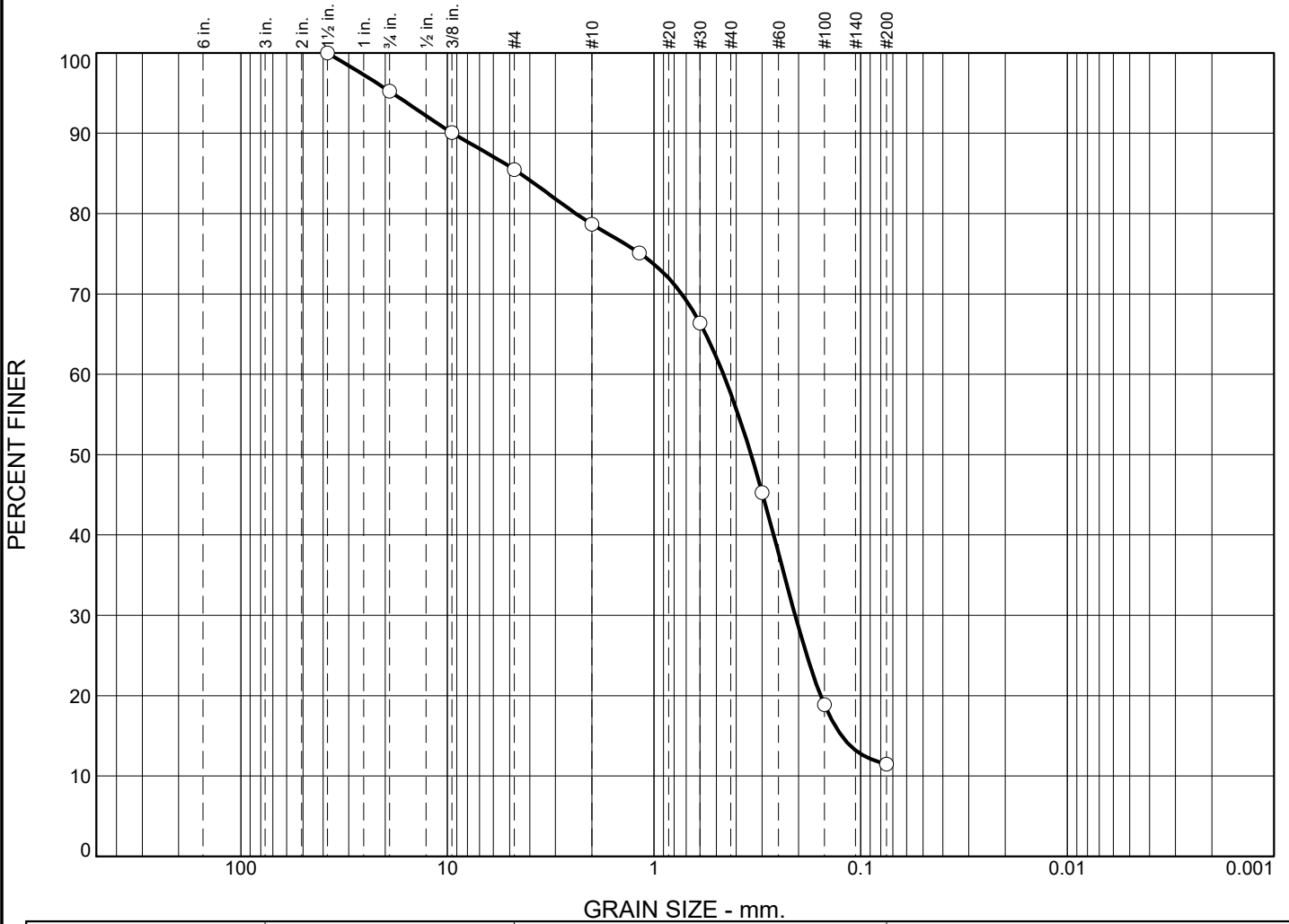
Remarks:

Figure

Tested By: MA

Checked By: EF

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	4.8	9.7	6.8	21.2	46.0	11.5			
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		4.4556	0.4621	0.3395	0.2076	0.1236			

Material Description	USCS	AASHTO
○ NARROWLY GRADED SAND with Clay	SP-SC	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

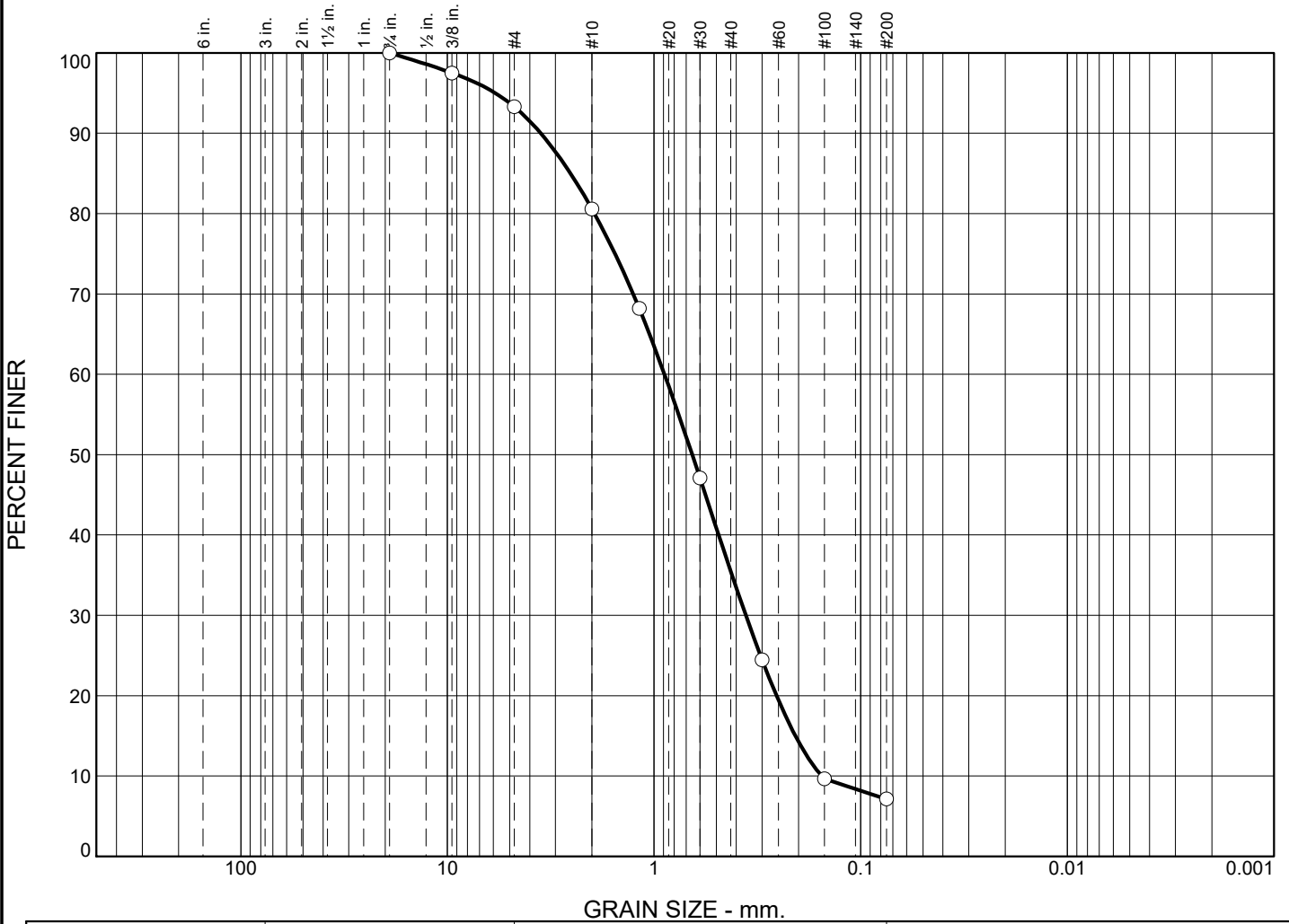
 ○ **Source of Sample:** FD22-03 **Depth:** 50-52 ft **Sample Number:** S20

GEI Consultants, Inc.
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 Woburn, MA 01801

Remarks:
 ○ As received WC=15.3%.
 Fines visually classified.

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	6.7	12.7	45.2	28.3	7.1			
⊗	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			2.5393	0.8918	0.6545	0.3598	0.2071	0.1545	0.94	5.77
Material Description								USCS	AASHTO	
○ NARROWLY GRADED SAND with Silt								SP-SM		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-04 **Depth:** 38-40 ft **Sample Number:** S14

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 400 Unicorn Park Drive
 Woburn, MA 01801

Remarks:
 ○ As received WC=22.9%.
 Fines visually classified.

Figure

Tested By: AH

Checked By: W. Lukas

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	2.1	1.7	3.3	6.7	56.3	29.9		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.0682	0.0119	0.0089	0.0050				

Material Description	USCS	AASHTO
○ ORGANIC SILT	OH	

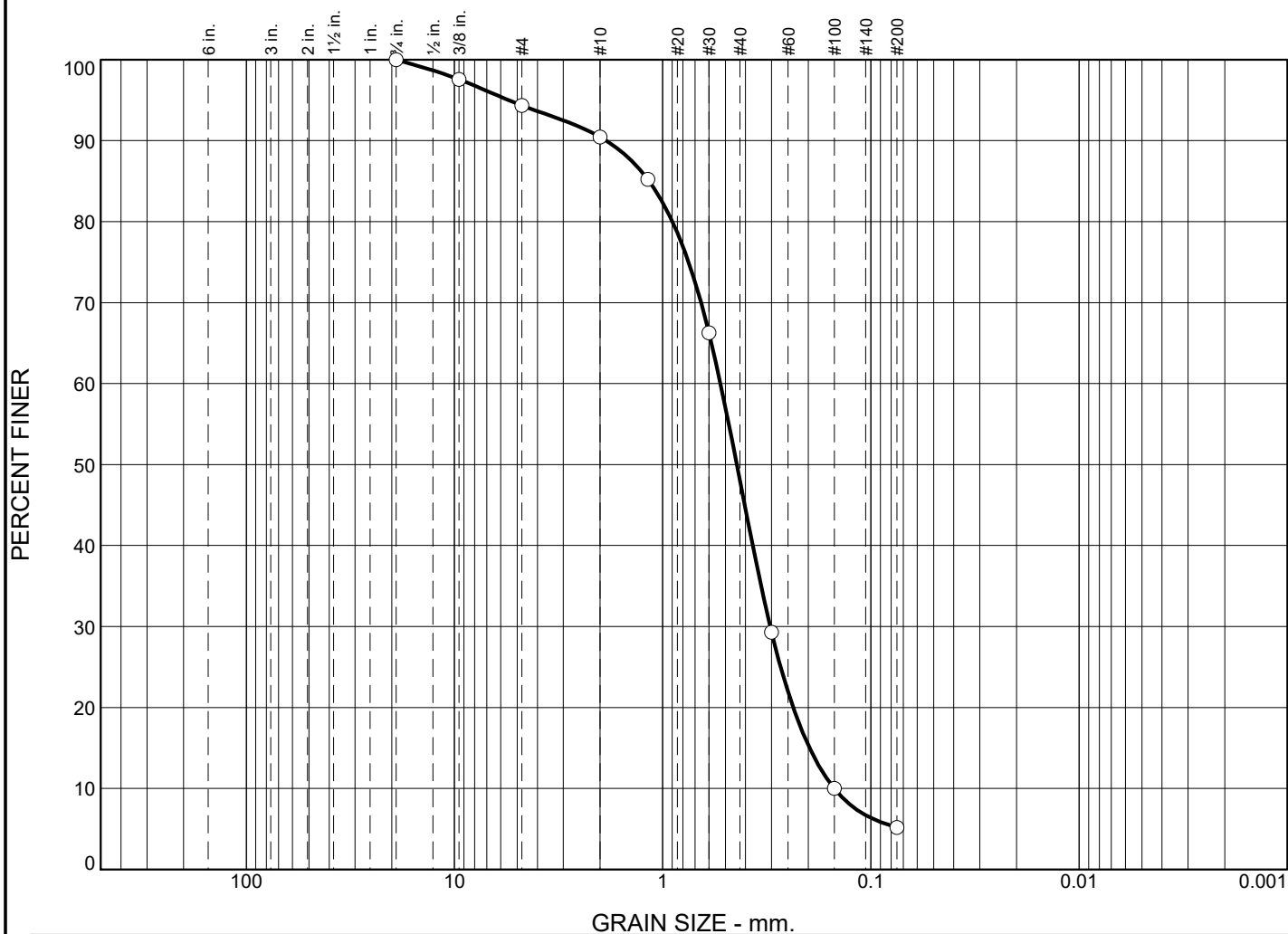
Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling
 ○ **Source of Sample:** FD22-04 **Depth:** 40-42 ft **Sample Number:** S15

Remarks:

Figure



Particle Size Distribution Report



GRAIN SIZE - mm.

%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
<input type="radio"/>	0.0	0.0	5.7	3.9	42.5	42.7	5.2			
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			1.1640	0.5283	0.4408	0.3046	0.1972	0.1500	1.17	3.52
Material Description								USCS	AASHTO	
<input type="radio"/> NARROWLY GRADED SAND with Silt								SP-SM		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

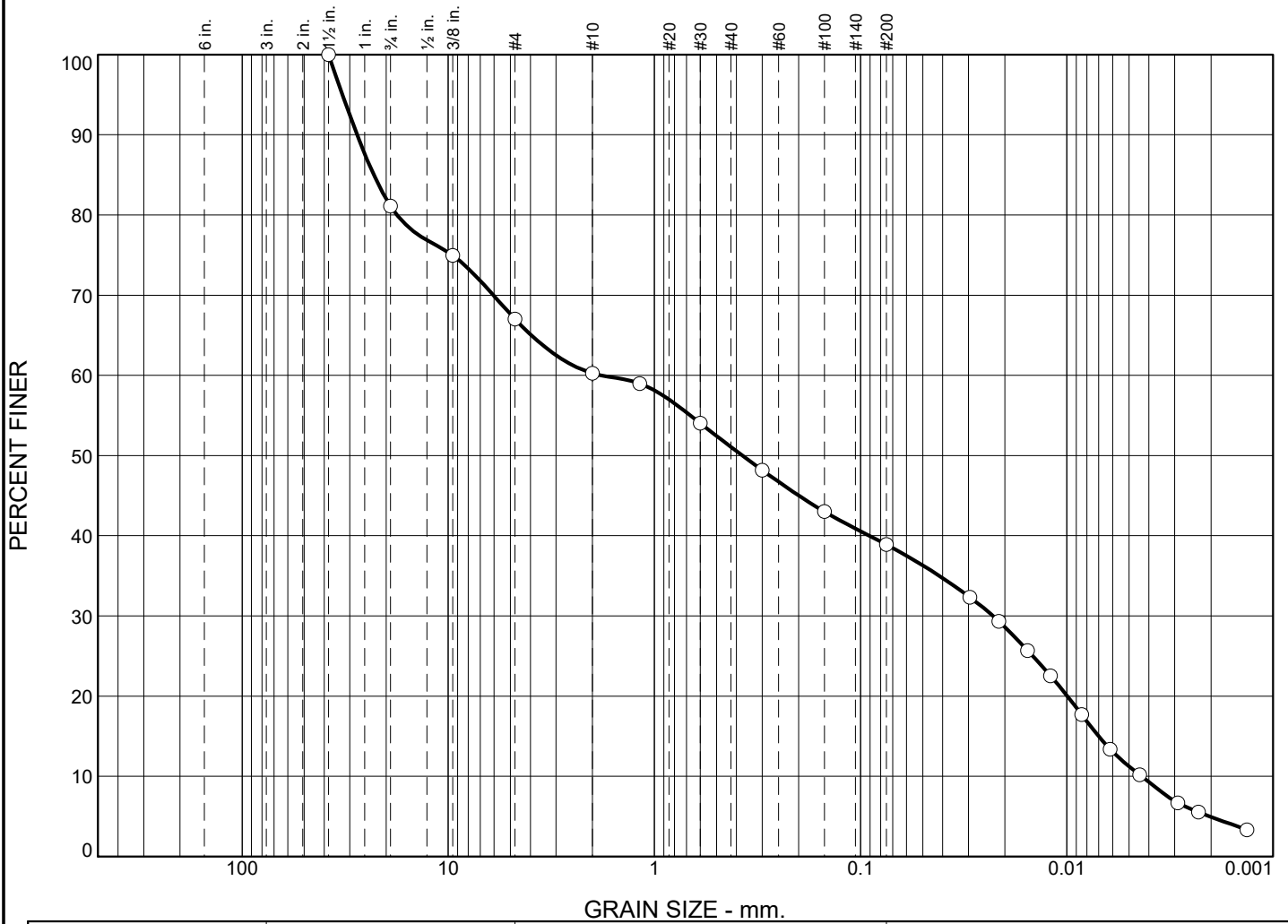
Source of Sample: FD22-04 **Depth:** 48-50 ft **Sample Number:** S19

GEI Consultants, Inc.
 400 Unicorn Park Drive
 Woburn, MA 01801

Remarks:
 As received WC=17.5%.
 Fines visually classified.

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	18.9	14.1	6.7	9.2	12.2	27.6	11.3		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			22.9680	1.8097	0.3746	0.0228	0.0070	0.0043	0.07	416.87
Material Description								USCS	AASHTO	
○ Silty GRAVEL with Sand								GM		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-05 **Depth:** 38-40 ft **Sample Number:** S14

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Remarks:

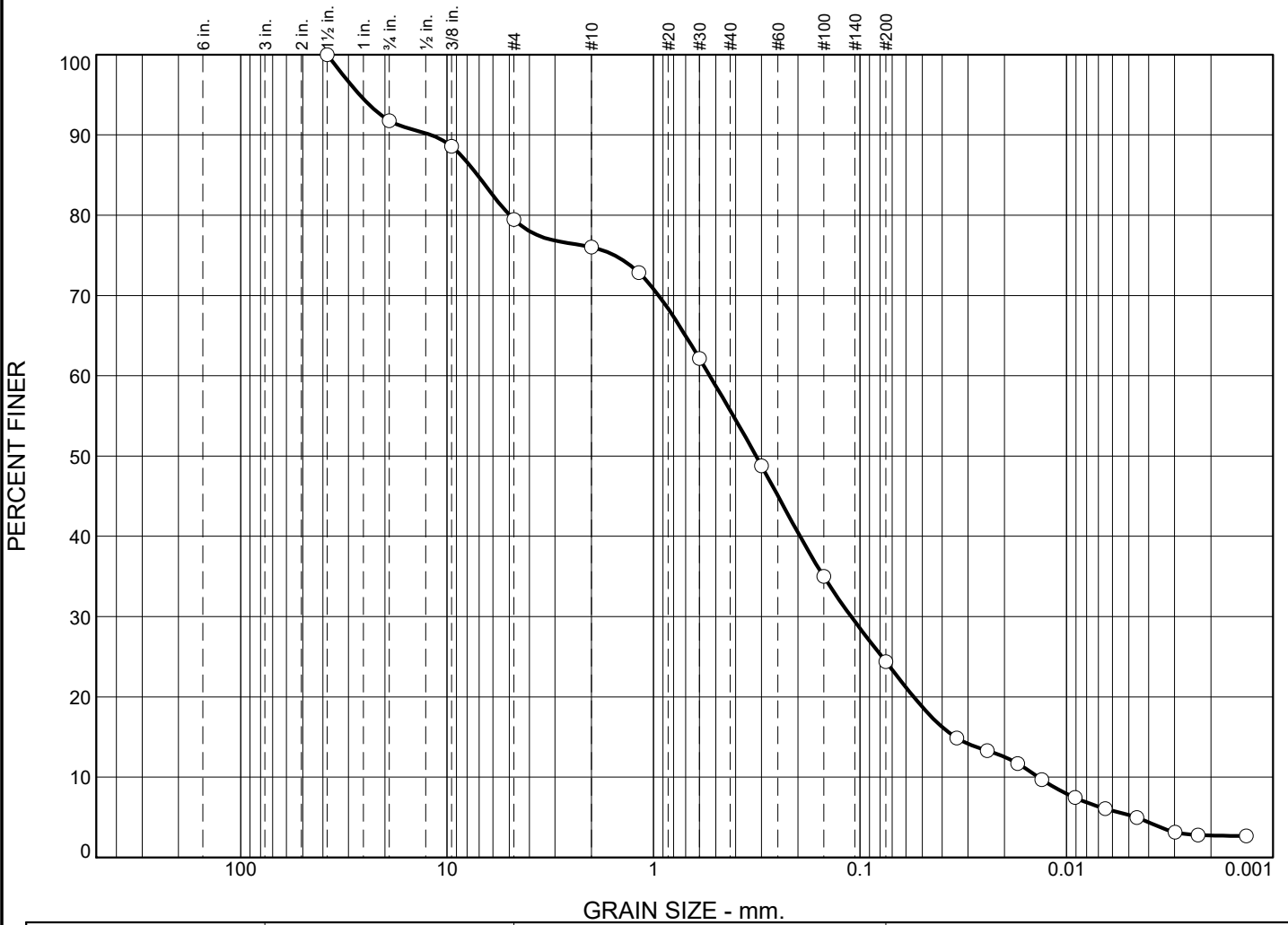
○ As received WC=11.2%
 Fines classified visually

Figure

Tested By: AH

Checked By: EF

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	8.2	12.3	3.5	20.4	31.2	19.1	5.3		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			7.1275	0.5349	0.3187	0.1104	0.0347	0.0137	1.66	38.94

Material Description	USCS	AASHTO
○ Silty SAND with Gravel	SM	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-06 **Depth:** 22-24 ft **Sample Number:** S6

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Remarks:
 ○ As received WC=9.2%
 Fines classified visually

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	4.0	23.7	11.4	20.7	26.0	14.2			
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			10.1770	1.8367	0.7650	0.2510	0.0816			
Material Description								USCS	AASHTO	
○ WIDELY GRADED SAND with Clay and Gravel								SW-SC		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-06 **Depth:** 32-34 ft **Sample Number:** S10

GEI Consultants, Inc.
 400 Unicorn Park Drive
 Woburn, MA 01801

Remarks:
 ○ As received WC=10.4%.
 Fines visually classified.

Figure

Tested By: AH

Checked By: W. Lukas

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	26.5	14.0	6.5	13.0	20.4	19.6			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			26.8218	5.1606	1.3129	0.2001				
Material Description								USCS	AASHTO	
○ Silty GRAVEL with Sand								GM		

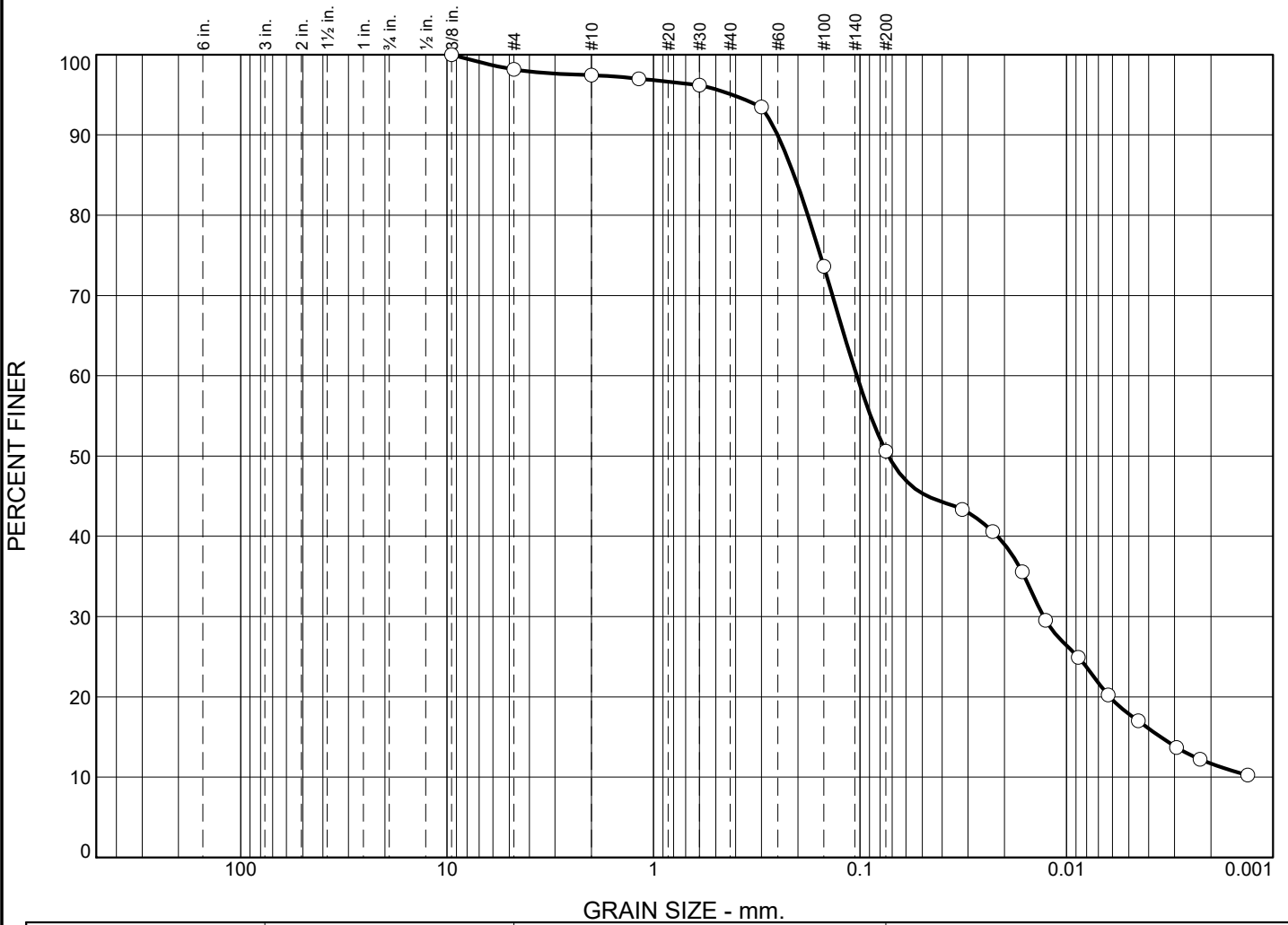
<p>Project No. 2104664 Client: USACE - New England</p> <p>Project: Providence River Drilling</p> <p>○ Source of Sample: FD22-06 Depth: 40-42 ft Sample Number: S15</p>	<p>Remarks:</p> <p>○ As received WC=7.7%. Fines visually classified.</p>

Figure

Tested By: AH

Checked By: W. Lukas

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	0.0	1.8	0.8	2.3	44.5	32.7	17.9		
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		0.2089	0.1037	0.0729	0.0129	0.0035			

Material Description	USCS	AASHTO
○ Sandy SILT	ML	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source:** FD22-07 **Depth:** 50-52 ft **Sample No.:** S20 (14"-24")

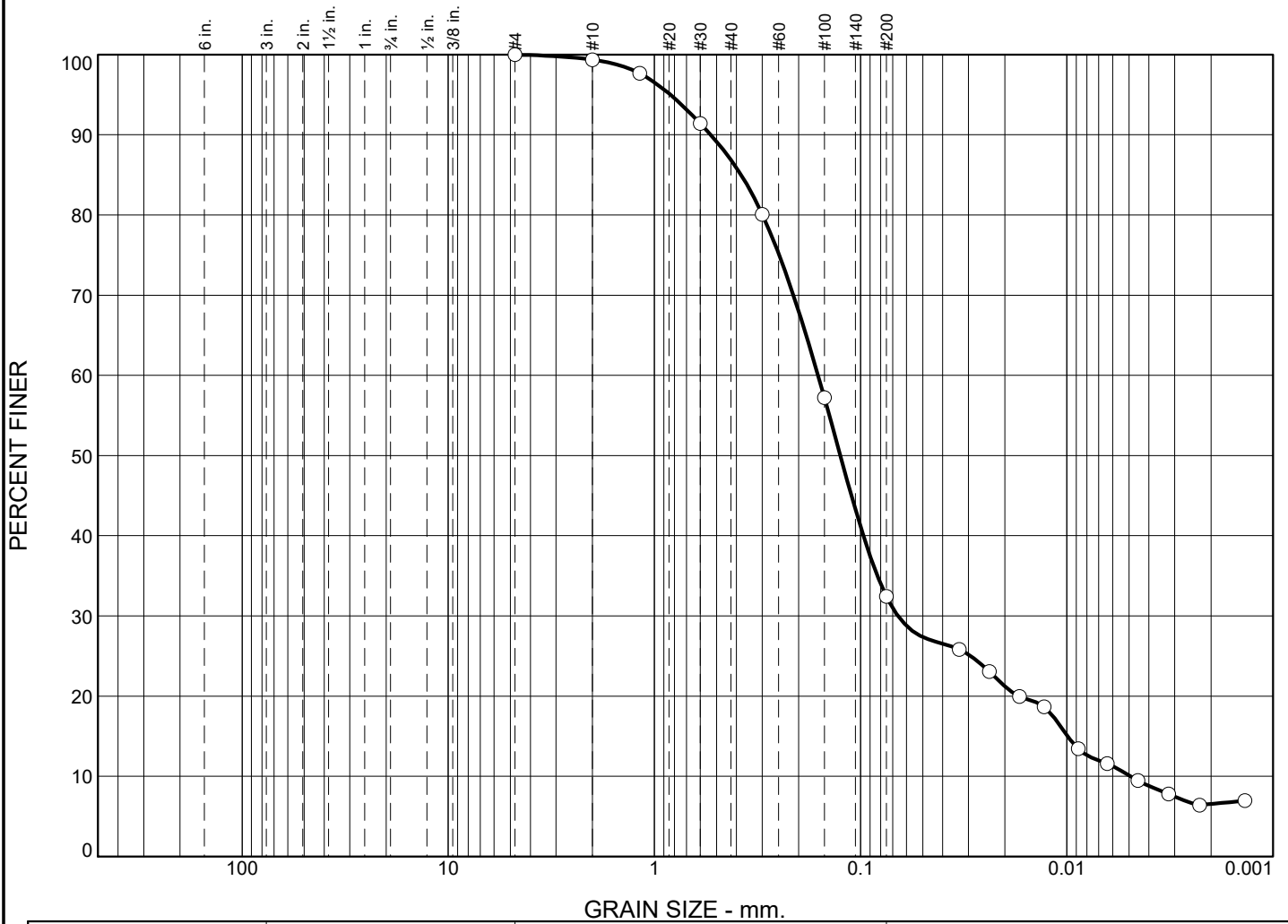
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 400 Unicorn Park Drive
 Woburn, MA 01801

Remarks:

○ Fines classified visually

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.0	0.6	12.6	54.4	22.3	10.1		
X	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.3804	0.1609	0.1255	0.0659	0.0099	0.0049	5.49	32.73
Material Description								USCS	AASHTO	
○ Clayey SAND								SC		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-08 **Depth:** 48-50 ft **Sample Number:** S19

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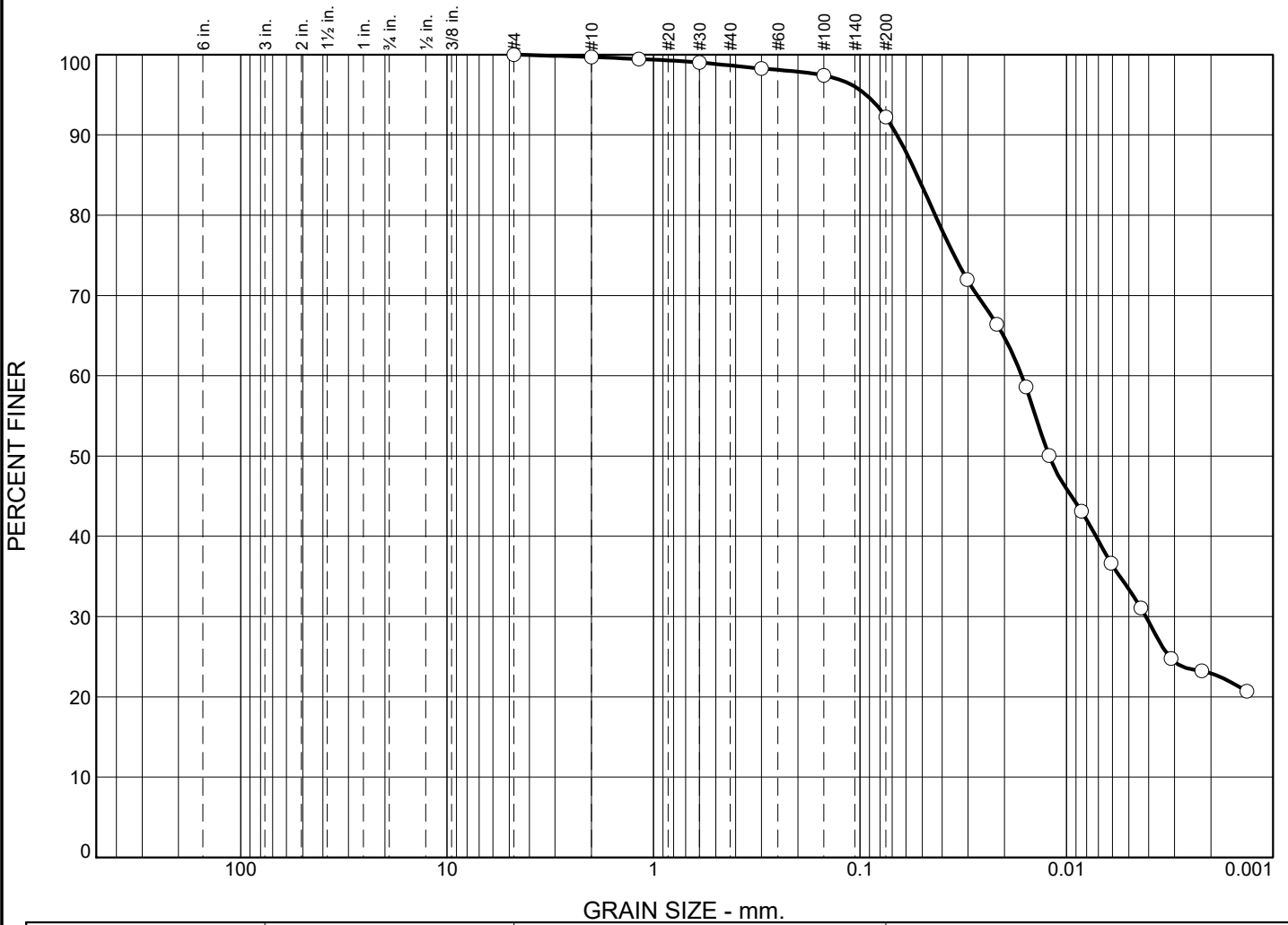
Remarks:
 ○ Fines visually classified

Figure

Tested By: MA

Checked By: EF

Particle Size Distribution Report



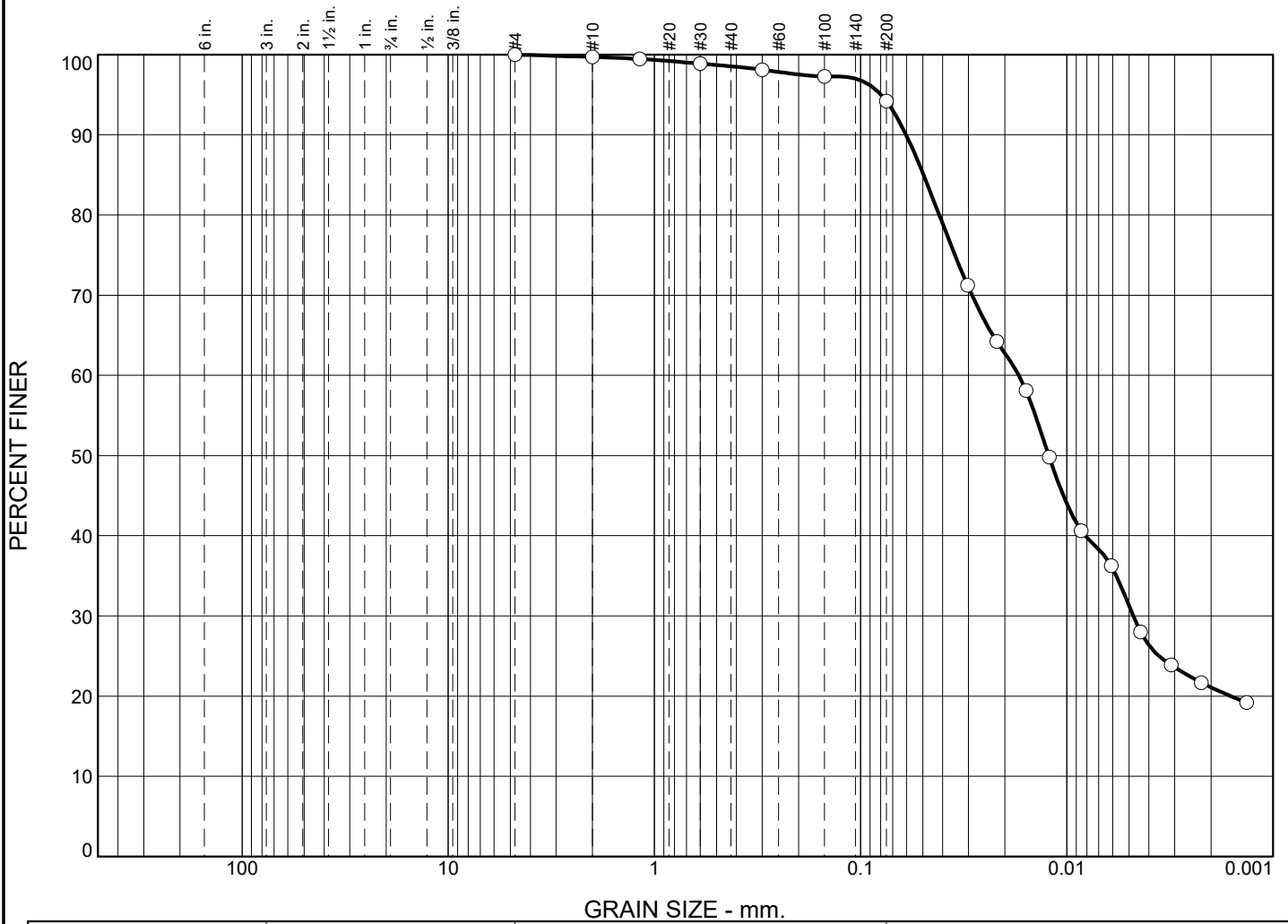
% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	0.0	0.0	0.3	1.0	6.5	58.8	33.4		
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		0.0530	0.0164	0.0121	0.0041				

Material Description	USCS	AASHTO
○ ORGANIC CLAY	OL	

<p>Project No. 2104664 Client: USACE - New England</p> <p>Project: Providence River Drilling</p> <p>○ Source of Sample: FD22-09 Depth: 15-17 ft Sample Number: S4</p>	<p>Remarks:</p>
<p>GEI Consultants, Inc. 400 Unicorn Park Drive Woburn, MA 01801</p>	

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.0	0.3	1.2	4.3	62.9	31.3		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.0495	0.0171	0.0122	0.0048				
Material Description							USCS	AASHTO		
○ ORGANIC CLAY							OH			

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

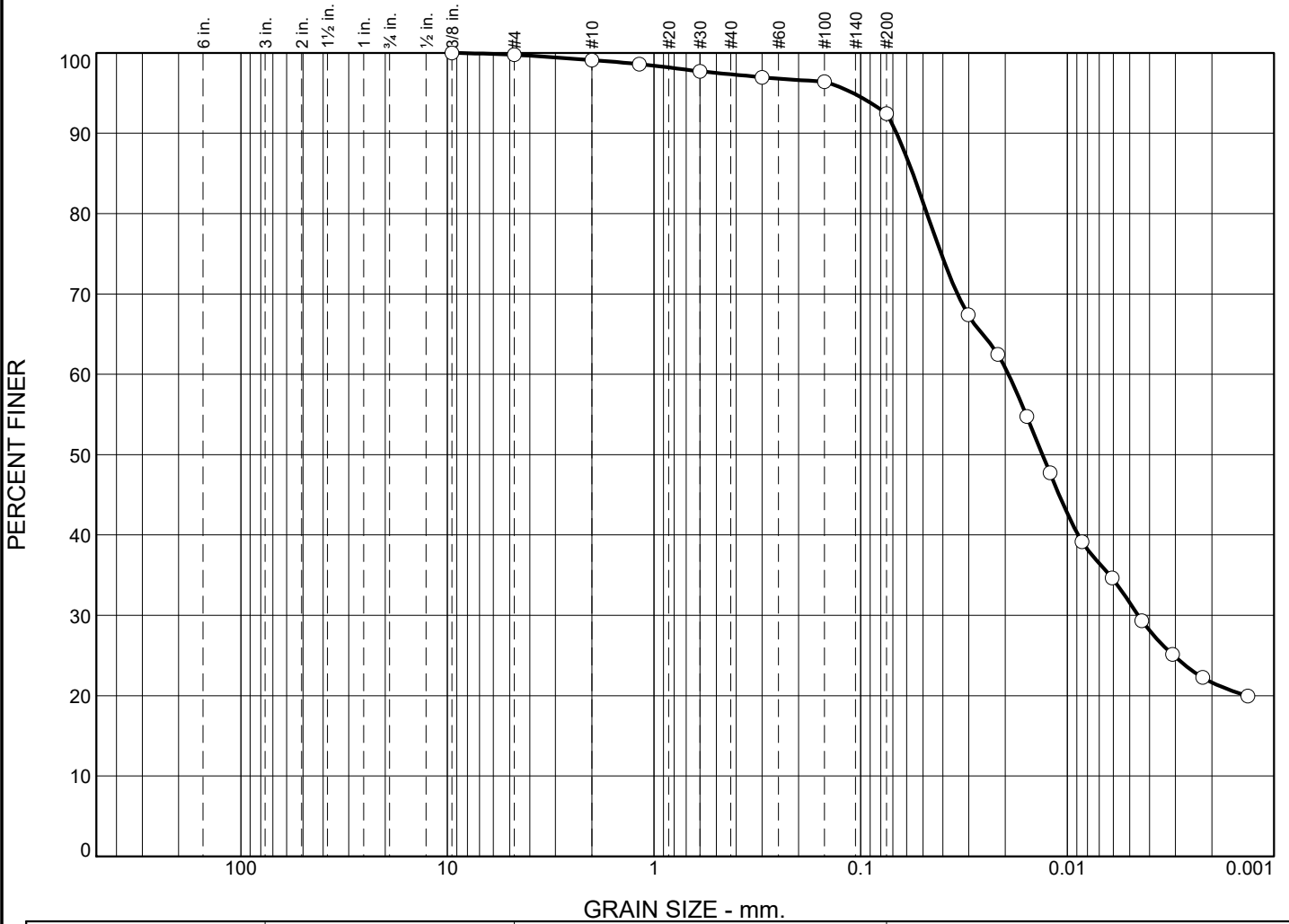
 ○ **Source of Sample:** FD22-10 **Depth:** 10-12 ft **Sample Number:** S3

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 Woburn, MA 01801

Remarks:

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.2	0.7	1.8	4.9	60.8	31.6		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.0560	0.0193	0.0132	0.0045				

Material Description	USCS	AASHTO
○ ORGANIC CLAY	OH	

<p>Project No. 2104664 Client: USACE - New England</p> <p>Project: Providence River Drilling</p> <p>○ Source of Sample: FD22-10 Depth: 24-26 ft Sample Number: S7</p>	<p>Remarks:</p>
<p>GEI Consultants, Inc. 400 Unicorn Park Drive Woburn, MA 01801</p>	<p>Figure</p>

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	31.3	8.2	17.9	33.8	8.8			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			12.1187	1.8973	0.6971	0.2400	0.1213	0.0829	0.37	22.88
Material Description								USCS	AASHTO	
○ Narrowly Graded SAND with Silt and Gravel								SP-SM		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-11 **Depth:** 15-17 ft **Sample Number:** S3

Remarks:
 ○ As received WC=11.5%.
 Fines visually classified.

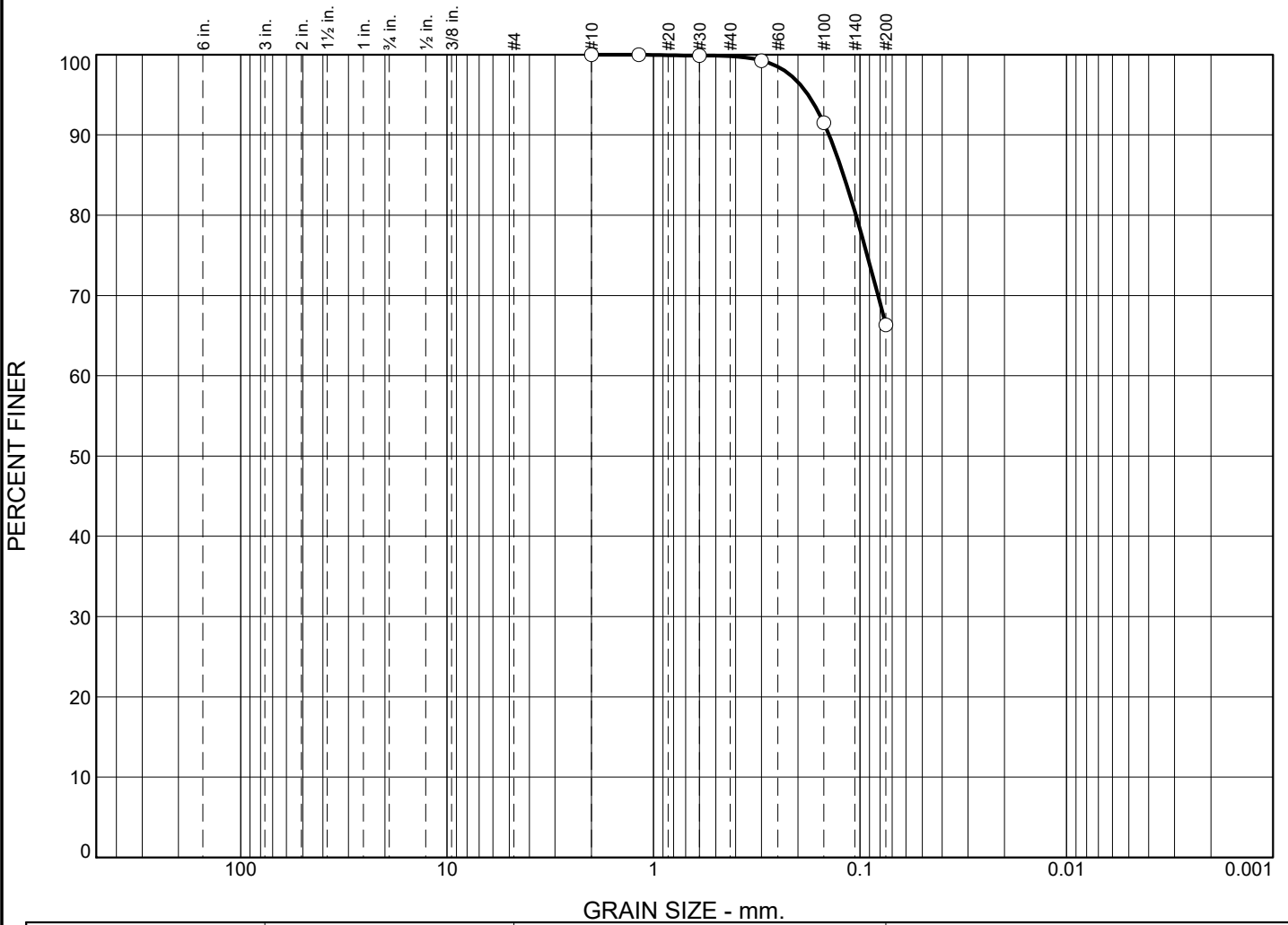


Figure

Tested By: AH

Checked By: EF

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.0	0.0	0.2	33.5	66.3			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.1202							

Material Description	USCS	AASHTO
○ Sandy SILT	ML	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

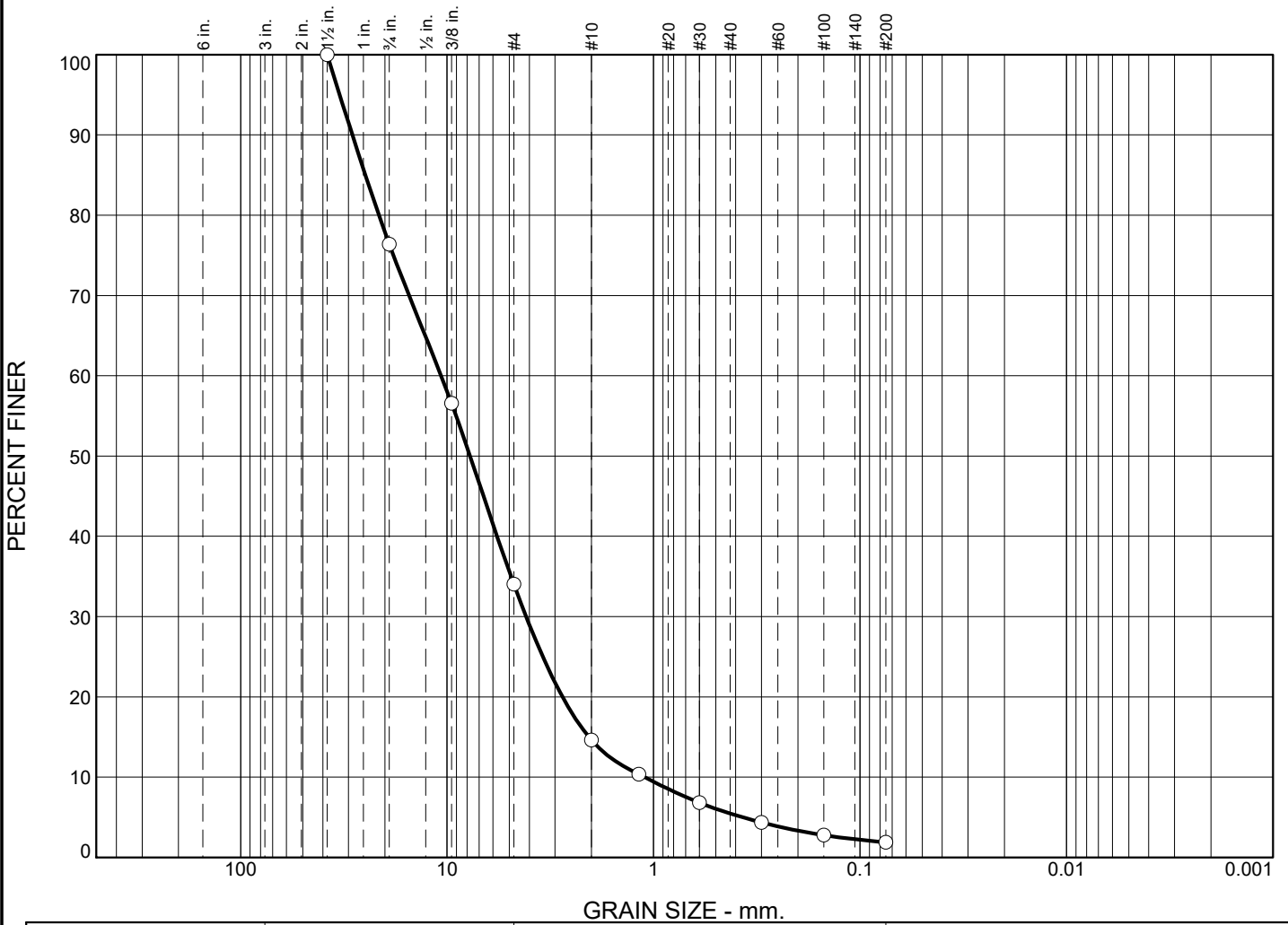
 ○ **Source of Sample:** FD22-11 **Depth:** 25-27 ft **Sample Number:** S5

Remarks:
 ○ As received WC=21.7%.
 Fines visually classified.



Figure

Particle Size Distribution Report

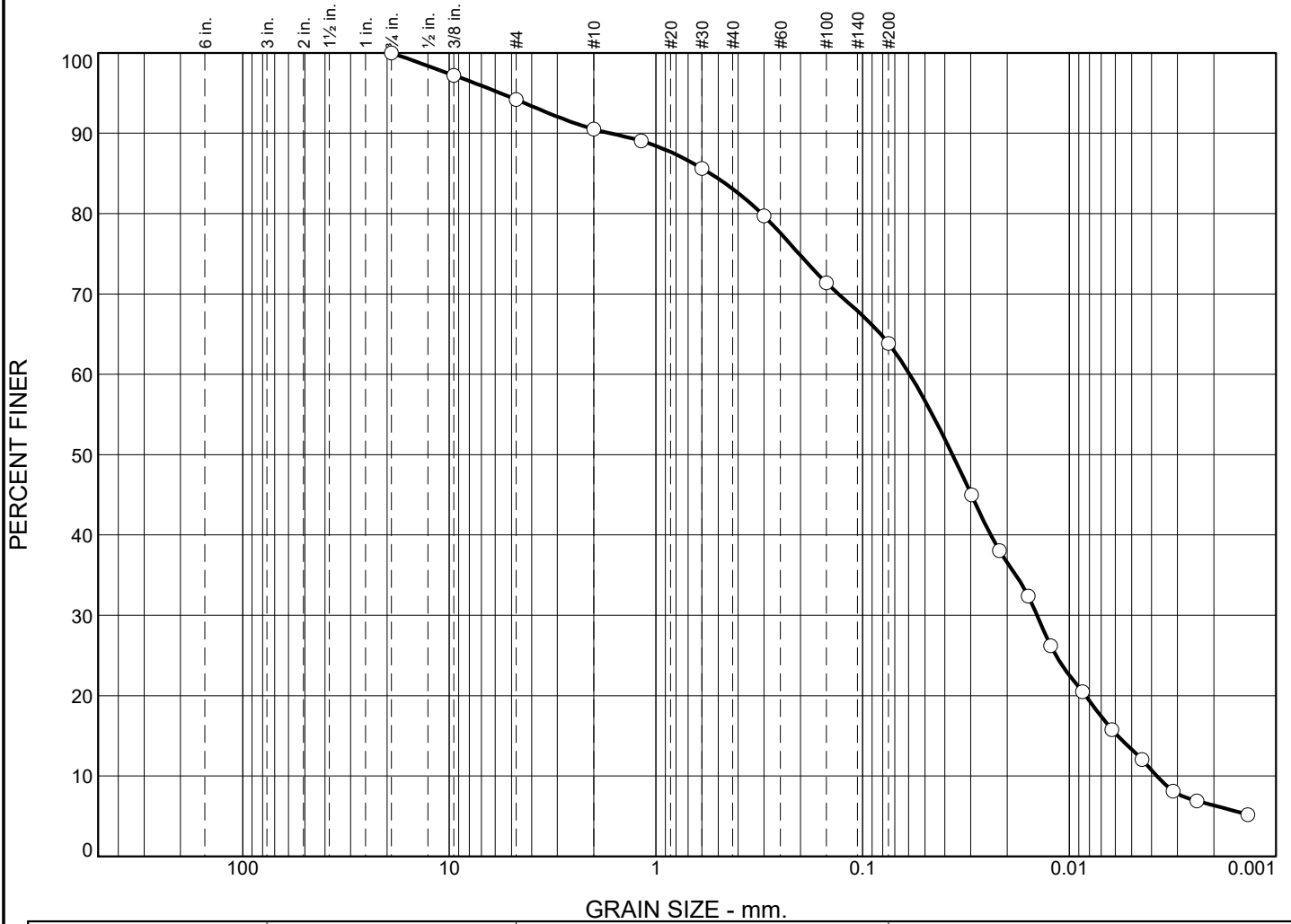


% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	23.6	42.4	19.4	9.1	3.6	1.9			
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		24.8765	10.6950	7.7480	4.1442	2.0605	1.1081	1.45	9.65

Material Description	USCS	AASHTO
○ Widely Graded GRAVEL with Sand	GW	

<p>Project No. 2104664 Client: USACE - New England</p> <p>Project: Providence River Drilling</p> <p>○ Source of Sample: FD22-12 Depth: 19-21 ft Sample Number: S6</p>	<p>Remarks:</p> <p>○ As received WC=7.2%. Fines visually classified.</p>

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	5.8	3.7	7.4	19.3	50.5	13.3		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○	NV	NP	0.5470	0.0592	0.0368	0.0143	0.0058	0.0038	0.92	15.73
Material Description								USCS	AASHTO	
○ Sandy SILT								ML	A-4(0)	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-12 **Depth:** 31-33 ft **Sample Number:** S12

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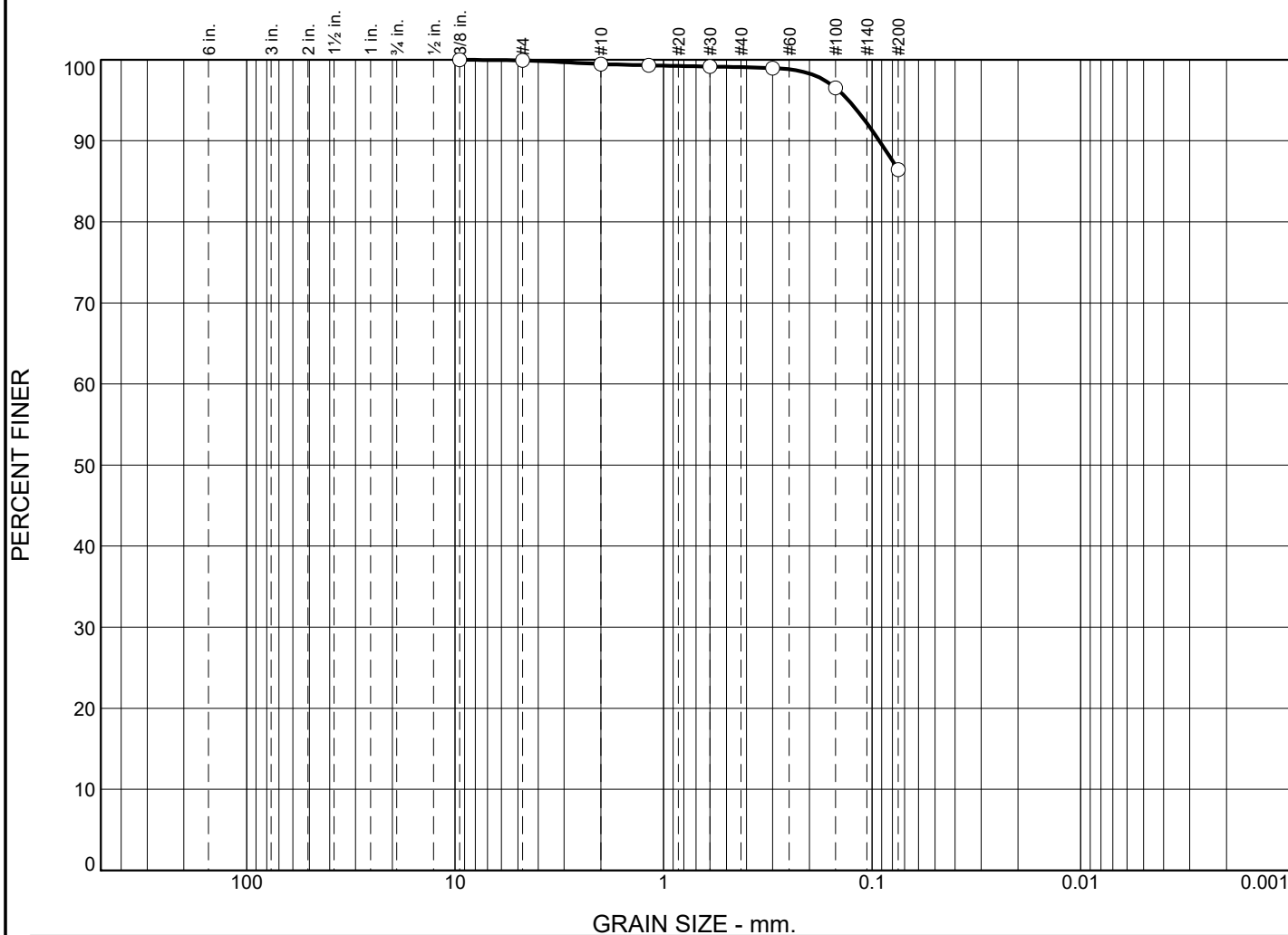
Remarks:
 ○ As received WC=13.7%.

Figure

Tested By: AH

Checked By: EF

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0		0.0	0.1	0.4	0.4	12.7	86.4		
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○										
Material Description								USCS	AASHTO	
○ SILT								ML		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source:** FD22-12 **Depth:** 43-45 ft **Sample No.:** S18 (0-16")

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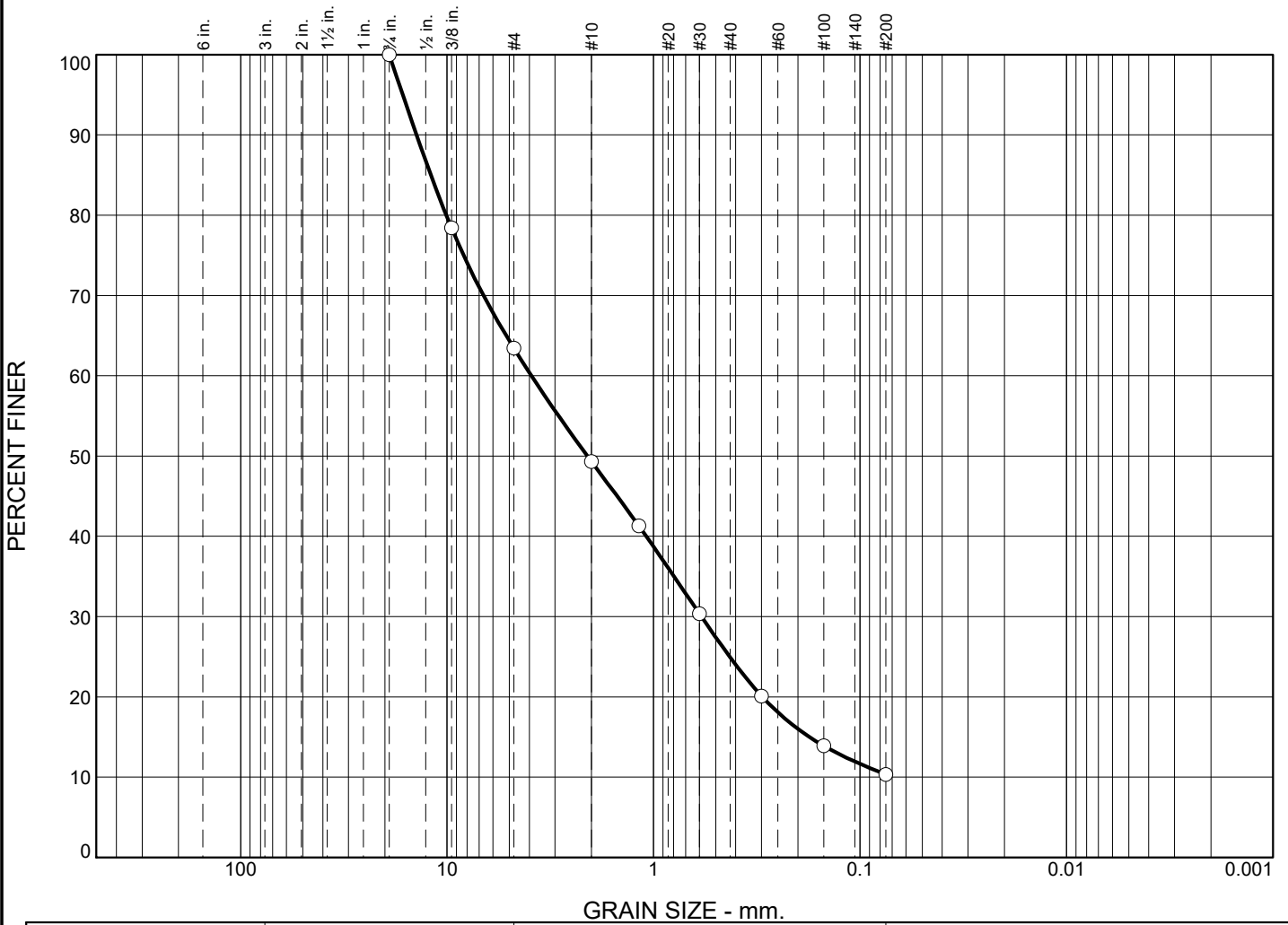
Remarks:

○ As received WC=22.9%
 Fines visually classified

Figure

Tested By: AH **Checked By:** EF

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	36.6	14.1	24.4	14.6	10.3			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			11.9806	3.9051	2.0927	0.5869	0.1761			
Material Description									USCS	AASHTO
○ Narrowly Graded SAND with Silt and Gravel									SP-SM	

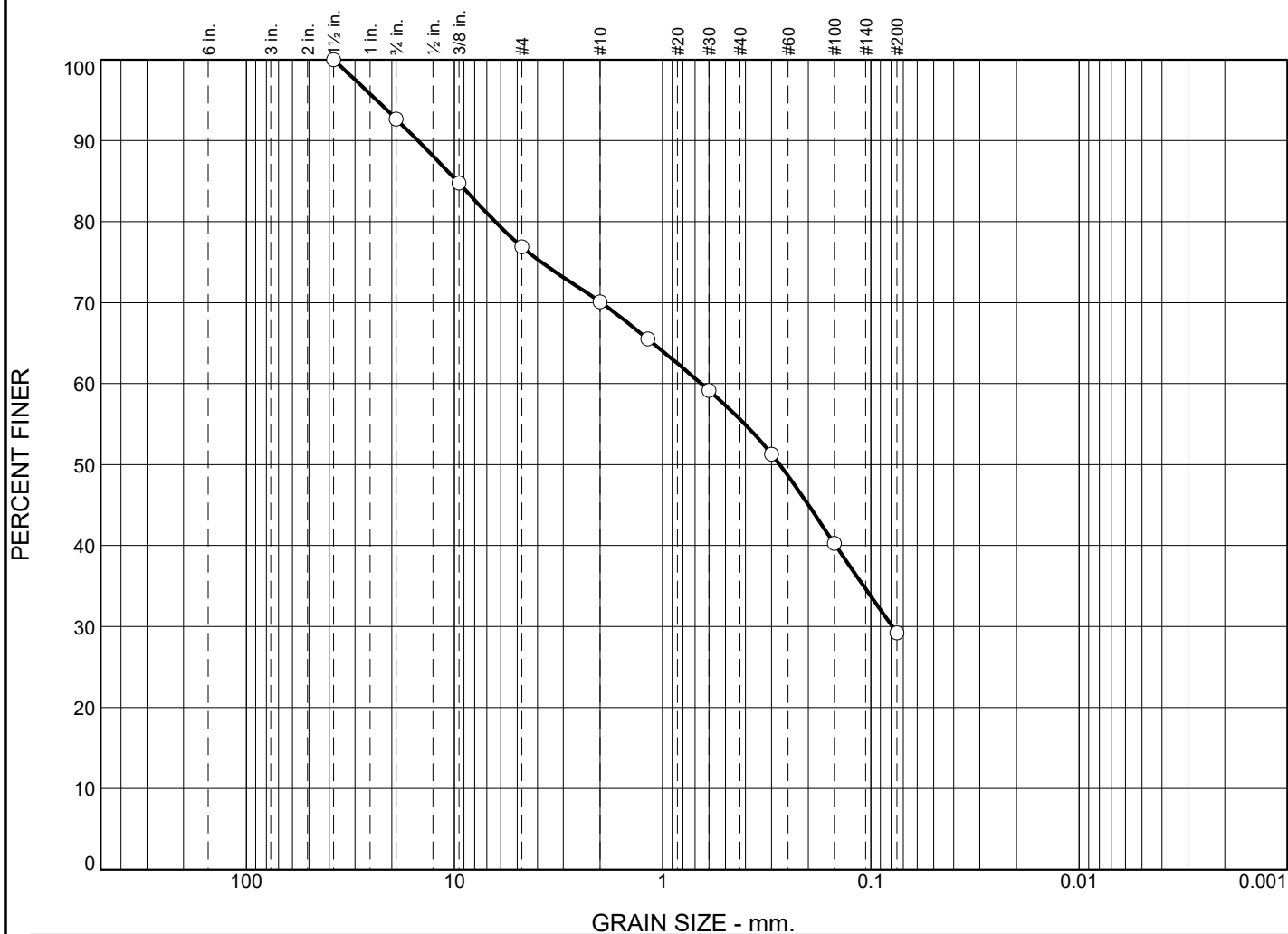
Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling
 ○ **Source of Sample:** FD22-13 **Depth:** 6-8 ft **Sample Number:** S4

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400 Unicorn Park Drive
Woburn, MA 01801

Remarks:
 ○ As received WC=10.0%
 Fines visually classified

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	7.3	15.8	6.8	14.5	26.4	29.2			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			9.7353	0.6546	0.2745	0.0789				
Material Description								USCS	AASHTO	
○ Silty SAND with Gravel								SM		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

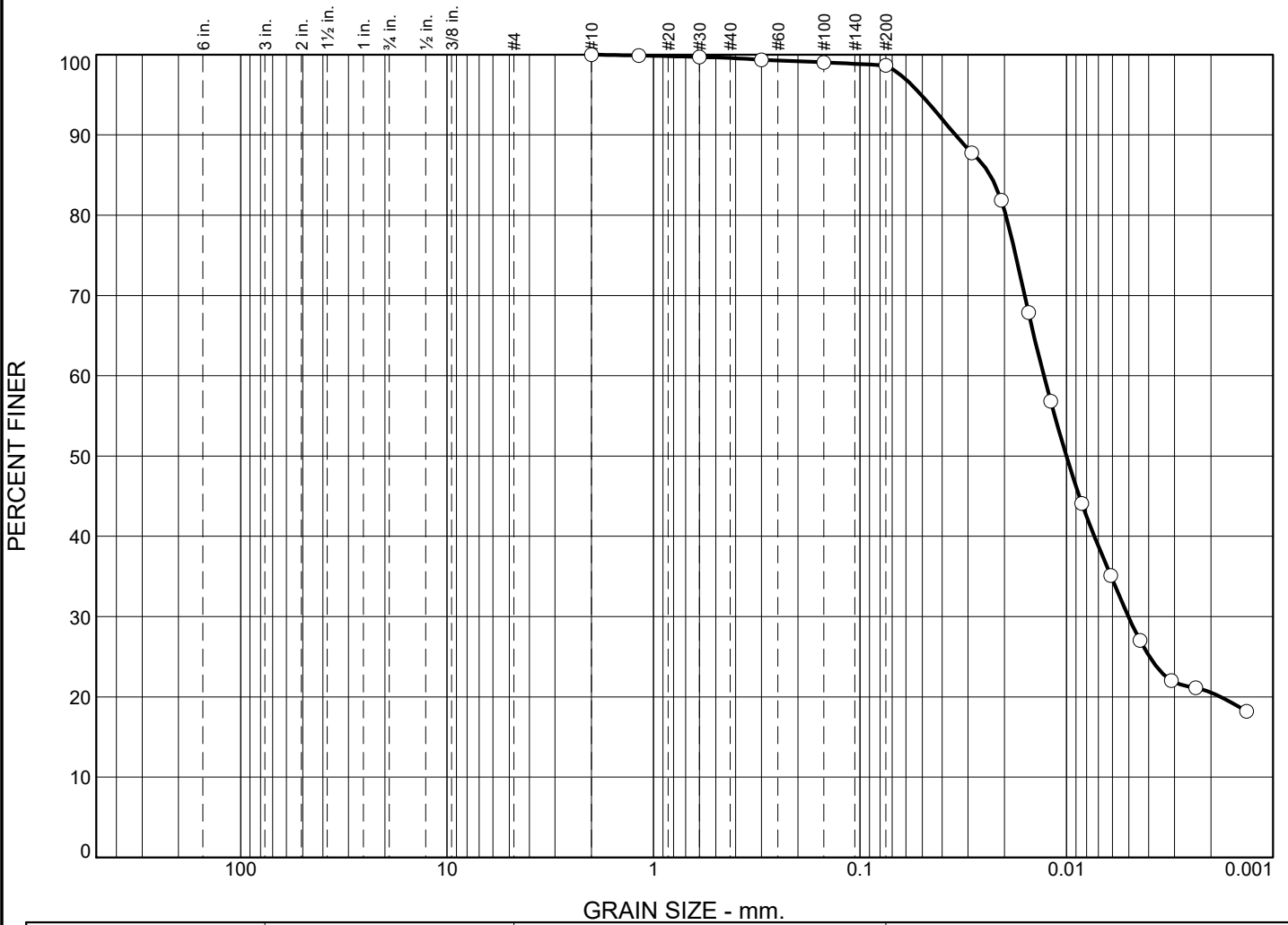
 ○ **Source of Sample:** FD22-13 **Depth:** 14-16 ft **Sample Number:** S8

Remarks:
 ○ As received WC=10.2%
 Fines visually classified



Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.0	0.0	0.4	0.9	68.8	29.9		
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○	61	30	0.0234	0.0129	0.0100	0.0050				
Material Description								USCS	AASHTO	
○ ORGANIC CLAY								OH	A-7-5(37)	

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

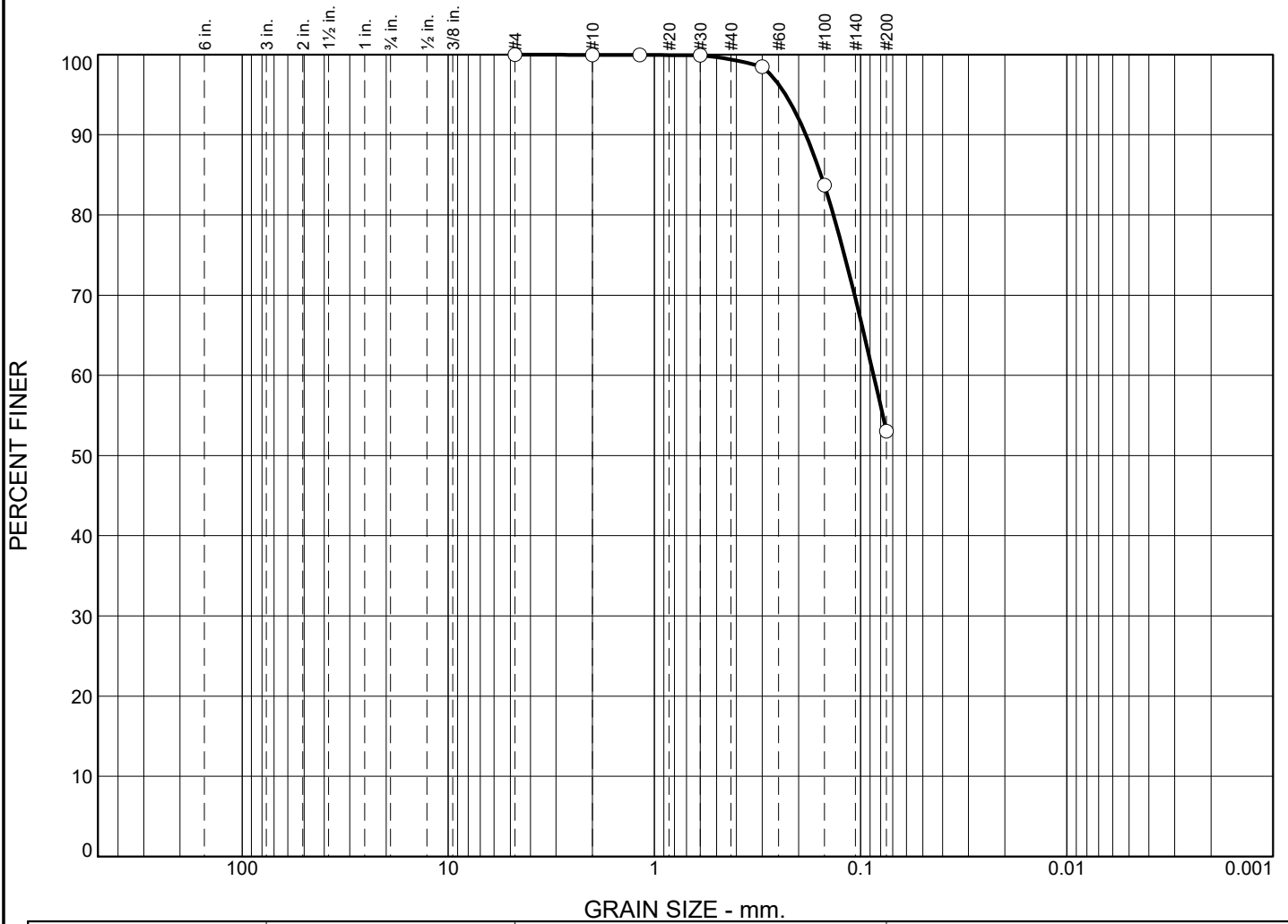
 ○ **Source:** FD22-14 **Depth:** 5-7 ft **Sample No.:** S2 (12"-24")

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 Woburn, MA 01801

Remarks:

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	0.0	0.0	0.6	46.4	53.0			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			0.1558	0.0865						
Material Description								USCS	AASHTO	
○ Sandy SILT								ML		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-14 **Depth:** 30-32 ft **Sample Number:** S7

Remarks:
 ○ As received WC=24.5%.
 Fines visually classified.



Figure

Tested By: AH

Checked By: EF

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	10.4	8.7	16.6	33.6	30.7			
×	LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
○			2.8595	0.2782	0.1396					
Material Description								USCS	AASHTO	
○ Silty SAND								SM		

Project No. 2104664 **Client:** USACE - New England
Project: Providence River Drilling

 ○ **Source of Sample:** FD22-14 **Depth:** 45-47 ft **Sample Number:** S13

Remarks:
 ○ As received WC=13.1%.
 Fines visually classified.



Figure

Tested By: AH

Checked By: EF

Appendix E

Daily Progress Reports

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Thurs. Jan 20, 2022
Report No. 1
Page: Page 1 of 2
GEI Proj. No. 2104664

Time of Arrival: 06:47

Departure: 16:50

Weather: 30's F, Rain, Snow, Cloudy

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

Gina Romano, USACE-NAE
Dr. Stephen Potts, USACE-NAE

GEI Representatives

Alex Juliano
Parker Aubin (0700-0900)
Jeanne LeFebvre (0700-0900)

Summary of Work Performed and Observations

1. GEI conducted the initial kickoff meeting, which included a walk through of Work Plan, Accident Prevention Plan, and health and safety procedures with the project team.
2. Gina Romano requested the boring naming convention be changed from “GEI-1XX” to “FD22-XX” to meet their typical USACE labeling system. Borings will be referred to in accordance with the new labeling system with the end number remaining the same, with the exception of starting at -01 versus -101.
3. Mudline for FD-22-02 was observed to be a EI. -6.01 feet MLLW, indicating the boring will be drilled to at least 54 feet below mudline. Continuous samples were taken from below mudline and soil was recovered in each split- spoon.
4. Sampled Boring FD22-02 to 22 feet below mudline; boring was terminated, casing pulled, and barge moved off of location, due to time constraints and the need to move the barge back to dock location. Barge returned to East Providence Yacht Club. May return at later date if an additional day is to be exercised and days remain in schedule.
5. Boring FD22-02 was surveyed to be within 35 feet of planned coordinates.
6. Per communication with J. Lefebvre and Deborah Acone (USACE-NAE), NEBC will have a portable toilet facility loaded on the barge on Friday 01/21/2022. A. Juliano will be onsite to confirm.
7. A weather day is expected to be exercised on Friday 01/21/2022 due to wind and low temperatures, and to allow loading of portable toilet facility on the barge.

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Thurs. Jan 20, 2022
Report No. 1
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GEI Proj. No. 2104664

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-02	12:01/0.0	15:18/22.0	22	Yes, but may return

By: Alex Juliano	Reviewed By: P. Aubin
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FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Fri. Jan 21, 2022
Report No. 2
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 07:55 **Departure:** 9:55 **Weather:** 14 F, P. Sunny, Windy

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Josh Belanger, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. On Thursday January 20, 2022 at the kickoff meeting, Diligent Marine recommended a weather day be taken due to winds, wind direction, and dropping temperatures presented in NOAA weather forecasts. GEI and USACE agreed with assessment.
2. NEBC and Diligent Marine loaded a portable toilet facility on the barge to be in compliance with contract. The toilet facility was secured on the centerline of the barge on the stern side of the 8-ton crane. The toilet was secured using new 2" wide nylon ratcheting load straps, running from the barge deck through the lift eye on the roof of the toilet back down to the deck. The straps can hold 2000 lbs of load. The undersigned confirmed the conditions.
3. Diligent Marine switched out the two shorter spuds with the longer 50-foot spuds, for anticipation of beginning drilling in the Fox Point Reach Area next week.

By: Alex Juliano	Reviewed By: P. Aubin
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FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Mon. Jan 24, 2022
Report No. 3
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 06:38 **Departure:** 17:00 **Weather:** 30's °F, Partly Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-13 was observed to be El. -40.8 feet MLLW, indicating the boring will be drilled to at least 59 feet below mudline. Continuous samples were taken from below mudline and soil was recovered in each split-spoon.
3. Sampled Boring FD22-13 to 16 feet below mudline (El. -56.8 feet MLLW); boring was terminated, casing pulled, and barge moved off of location, due to restrictions leaving the barge over the drilling location overnight. Barge returned to East Providence Yacht Club.
4. The undersigned contacted the USACE-NAE at midday regarding continuous sampling and the time constraints with sampling continuously to the maximum elevation of El. -100 feet MLLW. The district advised to perform continuous sampling until time allows, since historic borings were discontinuous. Upon taking the final sample for day, the undersigned contacted the district to confirm final depth.
5. Boring FD22-13 was surveyed to be within 61 feet of planned coordinates. Barge drifted while stabilizing barge with spuds due to soft sediments and strong current in navigational channel. Several attempts made to land barge at the plan location.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-13	09:10/0.0	15:40/16.0	16	Yes

By: Alex Juliano **Reviewed By:** P. Aubin

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Tues. Jan 25, 2022
Report No. 4
Page: Page 1 of 2
GEI Proj. No. 2104664

Time of Arrival: 06:55

Departure: 16:50

Weather: 30's °F, Snow, Partly Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Five attempts were made to land the barge at FD22-11, but sufficient spud embedment could not be achieved. The barge was moved to FD22-12 and ten attempts were made to land barge at the plan location, before setting up to drill.
3. Mudline for FD22-12 was observed to be El. -33.7 feet MLLW, indicating the boring will be drilled to at least 66 feet below mudline.
4. Gina Romano (USACE-NAE) contacted the undersigned and directed field personnel to perform soil sampling at 5-foot intervals from the mudline, to a depth of 15 feet below mudline, followed by continuous sampling thereafter.
5. Sampled Boring FD22-12 to 45 feet below mudline (El. -78.7 feet MLLW); boring was terminated, casing pulled, and barge moved off of location, due to restrictions leaving the barge over the drilling location overnight. Barge returned to East Providence Yacht Club. Upon taking the final sample for day, the undersigned contacted the district to confirm final depth.
6. Boring FD22-12 was surveyed to be within 188 feet of planned coordinates. Barge drifted while stabilizing barge with spuds due to soft sediments and strong current in navigational channel.
7. Gina Romano contacted the undersigned and requested FD22-14 be relocated closer to the middle of the navigational channel. She mentioned the channel was not dredged to the authorized depth on the eastern side during the last deepening and FD22-12 may have hit the side slope where it wasn't fully dredged to the full depth.

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Tues. Jan 25, 2022
Report No. 4
Page: Page 2 of 2
GEI Proj. No. 2104664

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-12	08:30/0.0	15:00/45.0	45	Yes

By: Alex Juliano

Reviewed By: P. Aubin

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Field Observation Report FOR4.doc

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Weds. Jan 26, 2022
Report No. 5
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 06:51

Departure: 16:50

Weather: 20's °F, Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Gina Romano contacted the undersigned and requested FD22-14 be relocated closer to the middle of the navigational channel, where the water column is closer to 40+ feet deep. She mentioned the channel was not dredged to the authorized depth on the eastern side during the last deepening.
3. Mudline for FD22-14 was observed to be El. -42.7 feet MLLW, indicating the boring will be drilled to at least 57 feet below mudline.
4. Gina Romano (USACE-NAE) contacted the undersigned and directed field personnel to perform soil sampling at 5-foot intervals from the mudline, to a depth of 35 feet below mudline, followed by continuous sampling thereafter.
5. Sampled Boring FD22-14 to 47 feet below mudline (El. -89.7 feet MLLW); boring was terminated, casing pulled, and barge moved off of location, due to restrictions leaving the barge over the drilling location overnight. Barge returned to East Providence Yacht Club. Upon taking the final sample for day, the undersigned contacted the district to confirm final depth.
6. Boring FD22-14 was surveyed to be within 91 feet of original planned coordinates.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-14	08:18/0.0	14:52/47.0	47	Yes

By: Alex Juliano

Reviewed By: P. Aubin

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Thurs. Jan 27, 2022
Report No. 6
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 06:56

Departure: 15:55

Weather: 10's °F, Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-01 was observed to be El. -11.5 feet MLLW, indicating the boring will be drilled to at least 48 feet below mudline.
3. Gina Romano (USACE-NAE) contacted the undersigned and directed field personnel to perform soil sampling at 5-foot intervals from the mudline, to a depth (20 feet below mudline) where the previous boring in the Edgewood Sholas area (FD22-02) was terminated, followed by continuous sampling thereafter.
4. Sampled Boring FD22-01 to 48 feet below mudline (El. -59.5 feet MLLW). Upon reaching the maximum termination elevation, the undersigned contacted Gina to confirm final depth and termination of the hole. The boring was terminated at 48 feet. The barge was left anchored with spuds overnight in the Edgewood Shoals area.
5. Boring FD22-01 was surveyed to be within 112 feet of original planned coordinates.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-02	08:55/0.0	14:20/48.0	48	Yes

By:

Alex Juliano

Reviewed By: Parker Aubin

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Field Observation Report FOR6.doc



FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Fri. Jan 28, 2022
Report No. 7
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 06:40

Departure: 15:55

Weather: 30's °F, Cloudy

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-06 was observed to be El. -6.4 feet MLLW, indicating the boring will be drilled to at least 54 feet below mudline.
3. Sampled Boring FD22-06 to 41.4 feet below mudline (El. -47.8 feet MLLW). Soil sampling was performed at 5-foot intervals from the mudline to a depth 20 feet below mudline, followed by continuous sampling thereafter until termination. The boring was terminated at 41.4 feet below mudline, casing pulled, and barge moved off of location, due to approaching weather, time constraints and the need to move the barge back to dock location. Barge returned to East Providence Yacht Club for weekend. Upon termination, the undersigned contacted Gina to confirm final depth.
4. NEBC and Diligent Marine prepared the drill rig, barge and support vessel for impending blizzard by tarping the watercraft and drill rig and storing all loose materials in the storage shed, and anchoring barge in protected cove near yacht club.
5. Boring FD22-06 was surveyed to be within 15 feet of original planned coordinates.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-06	08:08/0.0	14:00/41.4.0	41.4	Yes

By: Alex Juliano **Reviewed By:** Parker Aubin

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Mon. Jan 31, 2022
Report No. 8
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 07:22

Departure: 16:25

Weather: 10's °F, Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-04 was observed to be El. -7.5 feet MLLW, indicating the boring will be drilled to at least 52 feet below mudline.
3. Sampled Boring FD22-04 to 52 feet below mudline (El. -59.5 feet MLLW). Upon reaching the maximum termination elevation, the undersigned contacted Gina to confirm final depth and termination of the hole. The boring was terminated at 52 feet. The barge was left anchored with spuds overnight in the Edgewood Shoals area.
4. Boring FD22-04 was surveyed to be within 49 feet of original planned coordinates.
5. Diligent attempted to transport USACE-NAE personnel from the Save the Bay Dock, near the Edgewood Shoals drilling area, but the dock was closed for the winter, and access via a snow-covered rip-rap slope down to the beach was unsafe. USACE was unable to make a field/safety visit today without a safe pickup location. Josh will research other dock options. For safety reasons, Diligent Marine will not be able to shuttle personnel back to East Providence Yacht Club from Edgewood Shoals since it is a 45-minute boat ride, one way, on the support vessel. Diligent indicated they could pick up USACE-NAE staff at East Providence Yacht Club, but would need to stop drilling operations due to safety concerns. USACE did not elect to stop production in order to make a site visit today.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-04	10:35/0.0	15:20/52.0	52	Yes

By: Alex Juliano

Reviewed By: Parker Aubin

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FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Tues. Feb 01, 2022
Report No. 9
Page: Page 1 of 2
GEI Proj. No. 2104664

Time of Arrival: 06:54

Departure: 16:00

Weather: 20's °F, Cloudy

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-05 was observed to be El. -6.7 feet MLLW, indicating the boring will be drilled to at least 54 feet below mudline.
3. Sampled Boring FD22-05 to 54 feet below mudline (El. -60.7 feet MLLW). Upon reaching the maximum termination elevation, the undersigned contacted Gina to confirm final depth and termination of the hole. The boring was terminated at 54 feet.
4. Boring FD22-05 was surveyed to be within 99 feet of original planned coordinates.
5. The last deep boring (FD22-11) in the Fox Point Reach Area will be drilled tomorrow 2/2/2022 due to favorable tides and weather conditions. Barge returned to East Providence Yacht Club for night, in preparation. For safety reasons, Diligent Marine will not be able to shuttle personnel back to East Providence Yacht Club from Fox Point Reach Area without halting drilling operations, since it is a 40-minute boat ride, one way, on the support vessel. Gina Romano (USACE-NAE) informed she will make a site visit for full day tomorrow. Gina Romano contacted the undersigned and directed field personnel to perform soil sampling at 5-foot intervals, from the mudline to El. -90 feet MLLW (skipping the 5 to 7 ft sample), followed by continuous sampling thereafter to the termination elevation of El. -100 feet MLLW for FD22-05, since it is important to get to termination grade.
6. Diligent Marine loaded concrete blocks on the barge in preparation for drilling las boring in Fox Point Reach Area. Concrete blocks are needed, in addition to spuds and anchors, to stabilize and anchor the barge due to strong current and water column depth.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-05	08:25/0.0	13:55/54.0	54	Yes

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Tues. Feb 01, 2022
Report No. 9

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GEI Proj. No. 2104664

By: Alex Juliano

Reviewed By: Parker Aubin

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Field Observation Report FOR9.doc

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Wed. Feb 02, 2022
Report No. 10
Page: Page 1 of 2
GEI Proj. No. 2104664

Time of Arrival: 06:49

Departure: 17:10

Weather: 30's °F, Cloudy

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Theodore Labelle, Diligent Marine – Barge Operator

Gina Romano, USACE-NAE

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-11 was observed to be El. -40.2 feet MLLW, indicating the boring will be drilled to at least 60 feet below mudline.
3. Gina Romano (USACE-NAE) directed field personnel to perform soil sampling at 5-foot intervals, from the mudline to El. -90 feet MLLW (skipping the 5 to 7 ft sample), followed by continuous sampling thereafter to the termination elevation of El. -100 feet MLLW, since it is important to get to termination grade.
4. Sampled Boring FD22-11 to 52 feet below mudline (El. -92.2 feet MLLW). Gina Romano directed field personnel to extend sampling interval to a 10-foot interval at a depth of 40 feet, followed by advancing the button bit after a depth of 50 feet, to termination elevation of El. -100 feet MLLW. However, blow-in sand was encountered while drilling open hole past 40 feet and workday time limit was reached. The hole was terminated at a depth of 52 feet below mudline.
5. Boring FD22-11 was surveyed to be within 210 feet of original planned coordinates. Diligent Marine used two 55-foot spuds, a concrete block and two anchors to stabilize the barge, however the barge shifted while marking out location due to water column depth and lack of resistance in soft sediment.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-11	08:55/0.0	15:45/52.0	52	Yes

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Wed. Feb 02, 2022
Report No. 10
Page: Page 2 of 2
GEI Proj. No. 2104664

By: Alex Juliano

Reviewed By: Parker Aubin

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Field Observation Report FOR10.doc

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Thurs. Feb 03, 2022
Report No. 11
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 06:56 **Departure:** 16:20 **Weather:** 40's °F, Cloudy, Fog, Rain

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-07 was observed to be El. -8.1 feet MLLW, indicating the boring will be drilled to at least 52 feet below mudline.
3. Sampled Boring FD22-07 to 52 feet below mudline (El. -60.1 feet MLLW). Upon reaching the maximum termination elevation, the undersigned contacted Gina Romano (USACE-NAE) to confirm final depth and termination of the hole. The boring was terminated at 52 feet.
4. Boring FD22-07 was surveyed to be within 83 feet of original planned coordinates.
5. Barge returned to East Providence Yacht Club. A weather day is expected to be exercised on Friday 02/04/2022 due to freezing rain, wind and low temperatures. NEBC and Diligent Marine prepared the drill rig, barge and support vessel for impending storm by tarping the watercraft and drill rig and storing all loose materials in the storage shed.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-07	09:40/0.0	14:20/52.0	52	Yes

By: Alex Juliano **Reviewed By:** Parker Aubin

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FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Fri. Feb 4, 2022
Report No. 12
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: NA

Departure: NA

Weather: Storm

Persons Contacted, Company

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. On Thursday 2/3/2022, Diligent Marine and NEBC recommended a weather day be taken on Friday, 2/4/2022 due to rain, freezing rain, snow, sleet, wind, and low temperatures presented in NOAA weather forecasts. GEI and USACE agreed with assessment.

By: Alex Juliano

Reviewed By: P. Aubin

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Mon. Feb 7, 2022
Report No. 13
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 0646 **Departure:** 1340 **Weather:** 30's °F, Cloudy, Rain/Sleet

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Josh Belanger, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-09 was observed to be El. -8.0 feet MLLW, indicating the boring will be drilled to at least 52 feet below mudline.
3. Sampled Boring FD22-09 to 52 feet below mudline (El. -60.0 feet MLLW). Upon reaching the maximum termination elevation, the undersigned contacted Gina Romano (USACE-NAE) to confirm final depth and termination of the hole. The boring was terminated at 52 feet. The barge was left anchored with spuds overnight in the Edgewood Shoals area.
4. Boring FD22-09 was surveyed to be within 276 feet of original planned coordinates.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-09	08:20/0.0	13:28/52.0	52	Yes

By: Alex Juliano **Reviewed By:** P. Aubin

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Field Observation Report FOR13.doc



FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Tues. Feb 8, 2022
Report No. 14
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 0700 **Departure:** 1355 **Weather:** 30's °F, Cloudy, Rain

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-08 was observed to be El. -7.9 feet MLLW, indicating the boring will be drilled to at least 52 feet below mudline.
3. Sampled Boring FD22-08 to 52 feet below mudline (El. -60.0 feet MLLW). Upon reaching the maximum termination elevation, the undersigned contacted Gina Romano (USACE-NAE) to confirm final depth and termination of the hole. The boring was terminated at 52 feet.
4. Boring FD22-08 was surveyed to be within 40 feet of original planned coordinates.
5. Marked out boring location FD22-10 for drilling on Wednesday February 9th. The barge was left anchored with spuds overnight at the location in the Edgewood Shoals area.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-08	08:02/0.0	12:50/52.0	52	Yes

By: Alex Juliano **Reviewed By:** P. Aubin

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Wed. Feb 9, 2022
Report No. 15
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 0651

Departure: 1422

Weather: 30's °F, P. Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Theodore Labelle, Diligent Marine – Barge Operator

Gina Romano, USACE-NAE

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-10 was observed to be El. -7.2 feet MLLW, indicating the boring will be drilled to at least 52 feet below mudline.
3. Sampled Boring FD22-10 to 52 feet below mudline (El. -59.2 feet MLLW). Upon reaching the maximum termination elevation, Gina Romano (USACE-NAE) confirmed final depth and termination of the hole. The boring was terminated at 52 feet.
4. Boring FD22-10 was surveyed to be within 20 feet of original planned coordinates.
5. Marked out boring location FD22-03 for drilling on Thursday February 10th. The barge was left anchored with spuds overnight at the location in the Edgewood Shoals area. This will be the final boring of the drilling program.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-10	07:55/0.0	12:40/52.0	52	Yes

By: Alex Juliano

Reviewed By: P. Aubin

FIELD OBSERVATION REPORT

Project : Providence River and Harbor
Subsurface Drilling Explorations,
Providence River DMMP,
Providence Rhode Island
Contract: W912WJ-21-D-0001
Client : U.S. Army Corps of Engineers New
England District
Contractor: New England Boring Contractors

Date: Thurs. Feb 10, 2022
Report No. 16
Page: Page 1 of 1
GEI Proj. No. 2104664

Time of Arrival: 0650

Departure: 1420

Weather: 40's °F, P. Sunny

Persons Contacted, Company

Norman Stuttard, NEBC – Driller
Parker Johnson, NEBC – Driller Assistant
Theodore Labelle, Diligent Marine – Barge Operator

GEI Representatives

Alex Juliano

Summary of Work Performed and Observations

1. GEI conducted the daily safety meeting with the project team prior to beginning work.
2. Mudline for FD22-03 was observed to be El. -8.1 feet MLLW, indicating the boring will be drilled to at least 52 feet below mudline.
3. Sampled Boring FD22-03 to 52 feet below mudline (El. -60.1 feet MLLW). Upon reaching the maximum termination elevation, Gina Romano (USACE-NAE) confirmed final depth and termination of the hole. The boring was terminated at 52 feet.
4. Boring FD22-03 was surveyed to be within 359 feet of original planned coordinates.
5. Gina Romano informed the undersigned and project team, the USACE-NAE does not plan to exercise the option for additional drilling. The boring program field work was completed. NEBC and Diligent Marine will demobilize on Friday 2/11/2022.

Boring No.	Start Time/Depth (Ft)	Finish Time/Depth (Ft)	Overburden Sampled (Ft)	Complete ?
FD22-03	08:22/0.0	11:55/52.0	52	Yes

By: Alex Juliano

Reviewed By: P. Aubin

Appendix F

Daily Safety Meeting Sheets

DRILL RIG EQUIPMENT SAFETY CHECKLIST

1. **Drilling Controls**
 - All controls, linkages, warning & operation lights & lenses are free of oil, grease and/or ice
 - All controls, feed levers & gearboxes are in neutral prior to starting
2. **Emergency Shut-Off**
 - Check that trip wires, shut-offs & guards are in place & working correctly
3. **Cathead & Ropes**
 - Free from rust, oil & grease
 - No unusual wear or damage
 - No excessive rust
 - Rope is in good condition
 - Rope is proper length
4. **Hoists, Cables & Rope**
 - Check sheaves, bearings & guides, hooks, shackles & rings for wear
 - Check rope for ice
 - Check all connections & fittings
 - Cable fasteners checked & U-bolts tightened
5. **Hammers & Ropes**
 - Check wire ropes for broken wires, abrasion, heat damage, reduction in diameter, corrosion, kinking, bird caging, improper reeving, jamming, core protrusion, wire protrusion, fatigue or damage
 - Check that buckeyes & chains are secure
 - Lubricate swivel bearings as needed
6. **Hydraulic Lines & Connections**
 - Check for leaks
 - Check that connections are secure
 - Check for excessive wear
7. **Chains and Belt Guards**
 - Check for excessive wear
 - Check that guards are in place & working correctly
8. **Personal Protective Equipment**
 - Hard Hat
 - Safety Glasses
 - Ear Plugs
 - Steel Toed Shoes
 - Gloves
 - Life Jacket
 - Safety belt/lifeline, when working on elevated platforms
9. **General**
 - Suitable storage locations for all tools, materials or supplies within or on the mast (derrick) of the drill rig
 - Pipes, drill rods, casing, augers, etc. are stacked in an orderly fashion on racks or sills to prevent spreading, rolling or sliding
 - Driving hammers are placed securely to prevent movement when not in use.
 - Work areas, platforms, walkways, scaffolding & other access ways are kept free of debris, obstruction & substances such as ice, oil or grease that could cause a surface to become slick or otherwise hazardous.
 - All hand tools are clean & in good repair
10. **Water Work**
 - Ring buoys & line are in place
 - At least one lifesaving skiff is immediately available
11. **Other**
 - Check fluid levels in radiator, gearbox, hydraulics & engine

Signed: _____

Driller

Date: _____

1/24/2021



Daily Safety Briefing and Site Visitor Sign-In

Project Number: 2104664 Project Name: USACE Providence River & Harbor Drilling

Date: 02/07/2022 Time: 0700

Briefing Conducted by: Alex Juliano Signature: [Signature]

This sign-in log documents the tailgate briefing conducted in accordance with the site specific HASP. Personnel who perform work operations on site are required to attend each briefing and to acknowledge receipt of each briefing, daily.

TOPICS COVERED (check all those covered):

- Accident Reporting Procedures, Changes to the HASP, Cold Stress, Confined Space, Decon Procedures, Exposure Guidelines, General PPE Usage, Heat Stress, Hearing Conservation, Lockout/Tagout, Personal Hygiene, Respiratory Protection, Review of Hazards, Site Control, Site Emergency Procedures, Slips, Trips, Falls, Traffic Safety, Other: (multiple)

Daily Safety Topic Description:

Ice on deck, be careful, watch step, salt deck

Personnel Sign-in List

Table with 5 columns: Printed Name, Signature, Company Name, Time-In, Time-Out. Includes entries for Alex Juliano (GEI), Parker Nelson (NEBC), James Starnes (NEBC), and John [unclear] (Diligent).

Appendix G

Daily Tidal Correction Logs



TIDAL CORRECTION LOG

Boring No. FD22-04

PROJECT Providence River and Harbor Subsurface Drilling Explorations
 Confined Aquatic Disposal (CAD) Cells
 Providence River DMMP

LOCATION Providence, Rhode Island

CLIENT USACE New England District

CONTRACTOR New England Boring Contractors

PAGE 1 OF 1
PROJECT # 2104664
DATE 1/31/2022
WEATHER 9°F, Sunny
DATUM MLLW
GEI REP. A. Juliano

Time (hours)	Sample No.	Tide El. MLLW (ft)	Freeboard (ft)	Depth to Mudline (ft)	Deck El. MLLW (ft)	Mudline El. MLLW (ft)	Rod Length (ft)	Rod Stickup (ft)	Rod Tip El. MLLW (ft)	Rod Tip Depth (ft)
10:34		1.54	2.3	11.3	3.8	-7.5				
12:23	S7	-0.2	2.3	-	2.1	-7.5	42	5.8	-34.1	26.6
13:00	S10	-0.19	2.3	-	2.1	-7.5	45	3.3	-39.6	32.1
14:23	S16	0.09	2.3	-	2.4	-7.5	59	4.9	-51.7	44.3
15:35		0.23	2.3	-	2.53					

NOTES:
 1. Tide Elevation referenced from NOAA Tidal Elevation Station 8454000, Providence, Rhode Island
 2. NAVD 88 El. (feet) + 2.47 feet = MLLW Elevation (feet)
 3. @15:35 GPS Deck El. = El. -0.336 ft NAVD 88 = 2.134 ft MLLW ≈ 2.53 ft MLLW (Based on Tide)



TIDAL CORRECTION LOG

Boring No.

FD22-05

PROJECT Providence River and Harbor Subsurface Drilling Explorations
Confined Aquatic Disposal (CAD) Cells
Providence River DMMP

LOCATION Providence, Rhode Island

CLIENT USACE New England District

CONTRACTOR New England Boring Contractors

PAGE 1 OF 1
PROJECT # 2104664
DATE 2/1/2022
WEATHER 20°F, P. Sunny
DATUM MLLW
GEI REP. A. Juliano

Time (hours)	Sample No.	Tide El. MLLW (ft)	Freeboard (ft)	Depth to Mudline (ft)	Deck El. MLLW (ft)	Mudline El. MLLW (ft)	Rod Length (ft)	Rod Stickup (ft)	Rod Tip El. MLLW (ft)	Rod Tip Depth (ft)
8:45		5.44	2.3	14.4	7.7	-6.7				
10:09	S5	3.95	2.3	-	6.3	-6.7	38	3	-28.8	22.1
10:30	S8	3.42	2.3	-	5.7	-6.7	43	3	-34.3	27.6
11:22	S13	1.86	2.3	-	4.2	-6.7	53	4.3	-44.5	37.9
12:08	S16	0.69	2.3	-	3.0	-6.7	58	3.8	-51.2	44.6
12:38	S20	0.08	2.3	-	2.4	-6.7	65	3.8	-58.8	52.2
13:30		-0.3	2.3	-	2.00					

- NOTES:
- 1. Tide Elevation referenced from NOAA Tidal Elevation Station 8454000, Providence, Rhode Island
 - 2. NAVD 88 El. (feet) + 2.47 feet = MLLW Elevation (feet)
 - 3. @13:30 GPS Deck El. = El. -0.628 ft NAVD 88 = 1.842 ft MLLW ≈ 2.00 ft MLLW (Based on Tide)



TIDAL CORRECTION LOG

Boring No.

FD22-10

PROJECT Providence River and Harbor Subsurface Drilling Explorations
 Confined Aquatic Disposal (CAD) Cells
 Providence River DMMP

LOCATION Providence, Rhode Island

CLIENT USACE New England District

CONTRACTOR New England Boring Contractors

PAGE 1 OF 1

PROJECT # 2104664

DATE 2/9/2022

WEATHER 30°F, P. Sunny

DATUM MLLW

GEI REP. A. Juliano

Time (hours)	Sample No.	Tide El. MLLW (ft)	Freeboard (ft)	Depth to Mudline (ft)	Deck El. MLLW (ft)	Mudline El. MLLW (ft)	Rod Length (ft)	Rod Stickup (ft)	Rod Tip El. MLLW (ft)	Rod Tip Depth (ft)
7:49		0.79	2.3	10.3	3.1	-7.2				
8:40	S4	1.13	2.3	-	3.4	-7.2	35	7.2	-24.4	17.2
9:25	S8	1.31	2.3	-	3.6	-7.2	45	5.8	-35.6	28.4
10:00	S13	1.43	2.3	-	3.7	-7.2	53	4	-45.3	38.1
11:08	S14	1.82	2.3	-	4.1	-7.2	56	5	-46.9	39.7
12:02	S20	2.13	2.3	-	4.4	-7.2	69	5.5	-59.1	51.9
12:45		2.31	2.3	-	4.61					

- NOTES:
- Tide Elevation referenced from NOAA Tidal Elevation Station 8454000, Providence, Rhode Island
 - NAVD 88 El. (feet) + 2.47 feet = MLLW Elevation (feet)
 - @12:45 GPS Deck El. = El. 2.123 ft NAVD 88 = 4.593 ft MLLW ≈ 4.61 ft MLLW (Based on Tide)



TIDAL CORRECTION LOG

Boring No. FD22-11

PROJECT Providence River and Harbor Subsurface Drilling Explorations
 Confined Aquatic Disposal (CAD) Cells
 Providence River DMMP

LOCATION Providence, Rhode Island

CLIENT USACE New England District

CONTRACTOR New England Boring Contractors

PAGE 1 OF 1
PROJECT # 2104664
DATE 2/2/2022
WEATHER 30°F, Cloudy
DATUM MLLW
GEI REP. A. Juliano

Time (hours)	Sample No.	Tide El. MLLW (ft)	Freeboard (ft)	Depth to Mudline (ft)	Deck El. MLLW (ft)	Mudline El. MLLW (ft)	Rod Length (ft)	Rod Stickup (ft)	Rod Tip El. MLLW (ft)	Rod Tip Depth (ft)
8:35		5.64	2.3	48.1	7.9	-40.2				
10:01	S2	4.9	2.3	-	7.2	-40.2	67	7.5	-52.3	12.1
10:37	S3	4.09	2.3	-	6.4	-40.2	69	4.5	-58.1	18.0
11:28	S4	2.78	2.3	-	5.1	-40.2	73	5	-62.9	22.8
12:15	S5	1.4	2.3	-	3.7	-40.2	77	6	-67.3	27.1
12:43	S6	0.72	2.3	-	3.0	-40.2	78	3.5	-71.5	31.3
13:07	S7	0.23	2.3	-	2.5	-40.2	85	6	-76.47	36.3
13:51	S8	-0.3	2.3	-	2.0	-40.2	88	4	-82	41.8
15:36		0.19	2.3	-	2.49					

- NOTES:**
1. Tide Elevation referenced from NOAA Tidal Elevation Station 8454000, Providence, Rhode Island
 2. NAVD 88 El. (feet) + 2.47 feet = MLLW Elevation (feet)
 3. @12:20 GPS Deck El. = El. -0.032 ft NAVD 88 = 2.438 ft MLLW ≈ 2.49 ft MLLW (Based on Tide)



TIDAL CORRECTION LOG

Boring No. FD22-12

PROJECT Providence River and Harbor Subsurface Drilling Explorations
 Confined Aquatic Disposal (CAD) Cells
 Providence River DMMP

LOCATION Providence, Rhode Island

CLIENT USACE New England District

CONTRACTOR New England Boring Contractors

PAGE 1 OF 1
PROJECT # 2104664
DATE 1/25/2022
WEATHER 30°F, Cloudy
DATUM MLLW
GEI REP. A. Juliano

Time (hours)	Sample No.	Tide El. MLLW (ft)	Freeboard (ft)	Depth to Mudline (ft)	Deck El. MLLW (ft)	Mudline El. MLLW (ft)	Rod Length (ft)	Rod Stickup (ft)	Rod Tip El. MLLW (ft)	Rod Tip Depth (ft)
8:30		2.31	2.3	38.3	4.6	-33.7				
9:09	S3	2.32	2.3	-	4.6	-33.7	60	9.4	-46.0	12.3
9:43	S4	2.36	2.3	-	4.7	-33.7	63	7.5	-50.8	17.2
9:47	S5	2.36	2.3	-	4.7	-33.7	63	5.6	-52.7	19.1
10:35	S6	2.47	2.3	-	4.8	-33.7	65	5.5	-54.7	21.0
10:42	S7	2.47	2.3	-	4.8	-33.7	65	3.5	-56.7	23.0
11:22	S8	3.01	2.3	-	5.3	-33.7	68	4	-58.69	25.0
11:28	S9	3.1	2.3	-	5.4	-33.7	68	2	-60.61	26.9
12:02	S10	3.65	2.3	-	6.0	-33.7	72	3.1	-62.95	29.3
12:09	S11	3.76	2.3	-	6.1	-33.7	72	1.2	-64.74	31.1
13:23	S12	4.27	2.3	-	6.6	-33.7	75	1.6	-66.83	33.1
13:32	S13	4.29	2.3	-	6.6	-33.7	80	4.7	-68.71	35.0
14:00	S14	4.06	2.3	-	6.4	-33.7	83	6	-70.64	37.0
15:33		2.89	2.3	-	5.19					

NOTES:

1. Tide Elevation referenced from NOAA Tidal Elevation Station 8454000, Providence, Rhode Island
2. NAVD 88 El. (feet) + 2.47 feet = MLLW Elevation (feet)
3. @15:33 GPS Deck El. = El. 2.52 ft NAVD 88 = 4.99 ft MLLW ≈ 5.19 ft MLLW (Based on Tide)



TIDAL CORRECTION LOG

Boring No. FD22-14

PROJECT Providence River and Harbor Subsurface Drilling Explorations
 Confined Aquatic Disposal (CAD) Cells
 Providence River DMMP

LOCATION Providence, Rhode Island

CLIENT USACE New England District

CONTRACTOR New England Boring Contractors

PAGE 1 OF 1

PROJECT # 2104664

DATE 1/26/2022

WEATHER 20°F, P. Sunny

DATUM MLLW

GEI REP. A. Juliano

Time (hours)	Sample No.	Tide El. MLLW (ft)	Freeboard (ft)	Depth to Mudline (ft)	Deck El. MLLW (ft)	Mudline El. MLLW (ft)	Rod Length (ft)	Rod Stickup (ft)	Rod Tip El. MLLW (ft)	Rod Tip Depth (ft)
8:08		0.94	2.3	43.6	3.2	-40.4				
9:58	S4	1.6	2.3	-	3.9	-40.4	65	3.8	-57.3	16.9
10:45	S5	1.63	2.3	-	3.9	-40.4	73	6.2	-62.9	22.5
11:40	S6	1.96	2.3	-	4.3	-40.4	76	4	-67.7	27.4
12:33	S7	2.35	2.3	-	4.7	-40.4	83	5.8	-72.6	32.2
13:17	S8	3.13	2.3	-	5.4	-40.4	89	6	-77.6	37.2
14:00	S10	3.58	2.3	-	5.9	-40.4	91	4	-81.12	40.8
14:40	S12	3.67	2.3	-	6.0	-40.4	95	3.5	-85.53	45.2
15:15		3.41	2.3	-	5.71					

- NOTES:
- Tide Elevation referenced from NOAA Tidal Elevation Station 8454000, Providence, Rhode Island
 - NAVD 88 El. (feet) + 2.47 feet = MLLW Elevation (feet)
 - @15:15 GPS Deck El. = El. 2.96 ft NAVD 88 = 5.43 ft MLLW ≈ 5.71 ft MLLW (Based on Tide)