GEOTECHNICAL DESIGN REPORT
INTERSTATE 295 / U.S. ROUTE 1 EXIT 15
INTERCHANGE IMPROVEMENTS
MAINEDOT PIN 11086.00
YARMOUTH, MAINE

by

Haley & Aldrich, Inc.
Portland, Maine

for

Maine Department of Transportation
Augusta, Maine

File No. 37579-001
30 November 2012

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30 November 2012
File No. 37579-001

Maine Department of Transportation
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Attention: Ms. Karen Gross
Geotechnical Design Engineer

Subject: Geotechnical Design Report
Interstate 295 / U.S. Route 1 Exit 15 Interchange Improvements
MaineDOT PIN 11086.00
Yarmouth, Maine

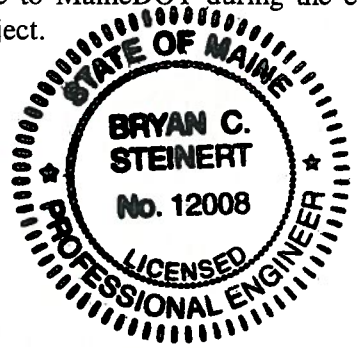
Ladies and Gentlemen:

We are pleased to submit herewith our report titled, "Geotechnical Design Report, Proposed Interstate 295 / U.S. Route 1 Exit 15 Interchange Improvements," prepared in accordance with our proposal, dated 21 February 2012 and with the provisions of our GCA Agreement with MaineDOT, No. 20110614000000006492.

This Geotechnical Design Report (GDR) is a compilation of the results of subsurface investigations and geotechnical laboratory testing programs, and provides geotechnical design recommendations for the subject project. This work has been coordinated with Fay, Spofford & Thorndike (FST) who is providing highway design services to the Maine Department of Transportation (MaineDOT).

Thank you for the opportunity to help support MaineDOT on this project. We look forward to providing continued assistance to MaineDOT during the contract document preparation, bidding, and construction phases of the project.

Sincerely yours,
HALEY & ALDRICH, INC.



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1. INTRODUCTION

This report presents the results of preliminary and design phase geotechnical investigations, laboratory testing, engineering evaluations, and geotechnical design recommendations conducted by Haley & Aldrich, Inc. (Haley & Aldrich) for the Maine Department of Transportation (MaineDOT) and Fay, Spofford & Thorndike (FST) for the proposed Interstate 295 / U.S. Route 1 Interchange Improvements in Yarmouth, Maine.

1.1 Existing Site Conditions and Proposed Construction

The project site is located at the Interstate 295 (I-295) interchange with U.S. Route 1 (Route 1) in Yarmouth, Maine (see Sheet 1, Project Locus). It is our understanding that the existing I-295 / Route 1 Interchange has been identified as a high accident location and as a result, requires reconfiguration to provide safer access to/from I-295.

During the preliminary stages of the project, we understand that MaineDOT investigated multiple options for improving safety at the interchange and based on their evaluations and studies, a partial diamond layout that maintains the existing Route 1 three-lane overpass bridge while providing new on-ramps to I-295 and geometric improvements to the existing off-ramps was selected as the preferred alternative. As a separate project, which will be constructed simultaneously with the interchange improvements, a new 300-space Park and Ride Facility adjacent to the existing southbound (SB) On-Ramp will be constructed. Additional details regarding the Park and Ride Facility are summarized in a separate report dated 15 June 2012.

Each of the interchange improvement components, based on information provided by FST and MaineDOT, is presented below.

1.1.1 I-295 Northbound Off-Ramp (Deceleration Lane and Off-Ramp Loop)

The proposed construction consists of creating a standard length parallel deceleration lane that passes between the Route 1 Overpass Bridge South Abutment and Pier No. 1 and a new northbound (NB) Off-Ramp Loop. The existing NB travel lane and shoulder will be widened to the east to accommodate the additional lane up to the Route 1 Overpass Bridge. The widening will require filling the existing ditches that run parallel to I-295 NB to match existing highway grades.

The existing Route 1 Overpass Bridge is generally oriented in a north-south direction across I-295. The bridge is approximately 240-ft long, and is supported by three piers and two stub abutments (North Abutment and South Abutment). The center pier (Pier No. 2) is located in the I-295 median between the NB and SB travel lanes; the two outside piers are located adjacent to the NB (Pier No. 1) and SB (Pier No. 3) breakdown lanes. Each pier consists of four individually-supported columns. Approximately 15-ft high, 2 horizontal to 1 vertical (2H:1V) slopes with block paver slope protection extend from the outside piers up to the stub abutments.

Based on our review of historic bridge plans, we understand that the piers and abutments are supported on two rows of HP10x42 steel H-piles. The existing piles have a “design capacity” equal to 35 tons and were driven to “firm end bearing”, likely to practicable refusal in/on glacial till or bedrock. Select pier and abutment piles are battered at 1H: 4V and 1H: 3V, respectively. The existing I-295 pavement elevation beneath the bridge is approximately El. 120. The existing grade along Route 1 (on top of the bridge) is approximately El. 140.

The portion of the NB Off-Ramp Deceleration Lane that is proposed within the limits of the Route 1 Overpass Bridge will also require filling the existing ditch as well as excavation (cut) into the existing fill approach embankment. As a result, a permanent earth retention system is required to provide room for the new ramp between Pier No. 1 and the South Abutment. The existing bridge piers and abutments will remain in place.

North and east of the existing Route 1 Overpass Bridge, the proposed construction consists of creating a new loop ramp, inside the footprint of the existing NB Off-Ramp up to the intersection with Route 1. The new loop ramp will be constructed, in part, to provide sufficient room for a new NB On-Ramp (discussed below). The area inside of the existing loop ramp is sparsely to densely wooded and slopes gently from north (approximately El. 150) to south (El. 125). Excavation (cut) up to approximately 25 ft will be required, primarily in bedrock, to transition from the current I-295 grade (approximately El. 120) to Route 1 (approximately El. 135).

1.1.2 I-295 Northbound On-Ramp

The proposed construction consists of creating a new outer connection cloverleaf-type ramp with a parallel acceleration lane. A portion of the on-ramp follows the new NB Off-Ramp Loop while other portions lie within the general footprint of the existing NB Off-Ramp Loop. The on-ramp alignment diverges from the existing NB off-ramp loop alignment in the vicinity of I-295 through a lightly wooded area. The existing ground surface elevation near the point of divergence is approximately El. 140, roughly 15 ft higher than the existing ramp-loop and I-295 grades. Excavation in bedrock will also be required along much of the proposed alignment.

1.1.3 I-295 Southbound Off-Ramp and Deceleration Lane

The proposed construction consists of creating a standard length parallel deceleration lane and to the extent practicable, lengthens the existing ramp to provide additional vehicle storage and sight distance. The existing SB travel lane and off-ramp shoulder will be widened to the north to accommodate the additional lane up to the Route 1 intersection. The widening will require filling the existing ditches that run parallel to the I-295 SB travel lane and off-ramp to match existing grades. We estimate that up to approximately 5 ft of fill may be required along this length of highway and off-ramp.

1.1.4 U.S. Route 1

The existing Route 1 alignment will be held, and the roadway will be widened in areas where turn lanes are being added. The Route 1 NB and SB lanes within the project limits will not be changed. Based on discussions with FST, we understand that the existing vertical grades will remain unchanged and the existing bituminous (asphalt) concrete pavement will be milled and overlaid.

1.1.5 I-295 Southbound On-Ramp

The proposed construction consists of replacing the existing SB On-Ramp with a new conventional diamond ramp and associated parallel acceleration lane. We understand that a new intersection will be created across Route 1 from the existing SB Off-Ramp to carry traffic from Route 1 onto I-295. The existing site condition along the current proposed alignment is lightly wooded and generally flat with ground surface elevations ranging between approximately El. 120 and El. 124. As a result, up to 15 ft of fill may be required near the on-ramp intersection with Route 1 (existing Route 1 grade is approximately El. 135).

1.2 Horizontal Coordinate System, Elevation Datum and Project Stationing

Plan locations of test borings were determined in the field by MaineDOT and were provided to Haley & Aldrich as northing and easting coordinates relative to the Maine State Plane Coordinate System, North American Datum of 1983 (NAD 83), Maine 2000 West Zone. Multiple baselines were developed by FST for the various on/off ramp alignments as summarized below.

- NB Off-Ramp: 1-series (STA 100+00)
- NB On-Ramp: 200-series (STA 200+00)
- SB Off-Ramp: 300-series (STA 300+00)
- U.S. Route 1: 400-series (STA 400+00)
- SB On-Ramp: 500-series (STA 500+00)

The project elevation datum and elevations referenced herein are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).

2. GEOLOGIC SETTING

Yarmouth is located in the Coastal Lowlands Region of southeastern Maine. During Late Wisconsinan time, approximately 16,000 years ago, the glacial ice margin had reached the present coast of Maine. The weight of the glacier caused downwarping of the earth's crust and the coastal region was submerged into the ocean. During glacial melting, large quantities of sediment were carried by glacial streams into the ocean at the glacier margin. The glaciomarine sediments settled to the sea floor and were subject to tidal movements and other marine processes between 11,000 and 12,000 years ago. The accumulated sediments consisted of sand, silt and clay and comprise the Presumpscot Formation. The marine deposits generally consist of massive to laminated silty clays, silt and sand and may contain shells or drop stones as well as localized sandy beds and lenses. This unit is typically mapped along gently sloping hills and in low-lying areas. The marine deposits (Presumpscot Formation) typically overly glacial till and/or bedrock.

Glacial Till sediment is composed of a heterogeneous mix of sand, silt, clay and gravel, and may include cobbles, boulders and rock debris. Glacial Till was deposited directly by the glacier without sorting and reworking by glacial meltwater and typically overlies bedrock.

Artificial Fill was encountered at the surface in areas of existing highway and bridge embankments along the project alignment. These soils typically consisted of well graded sand with minor percentages of gravel. In some instances the fill can consist of re-worked marine deposits (i.e., soil excavated from some areas and placed/compacted in other areas).

According to the Maine Geological Survey, bedrock mapped at the site and vicinity is Silurian to Late Ordovician in age and known as the Hutchins Corner and Richmond Corner Formations. These are metamorphic stratified rocks of the Central Maine Sequence consisting of SCHIST, GNEISS and GRANOFELS with pegmatite intrusions.

3. SUBSURFACE EXPLORATION PROGRAMS

Multiple subsurface exploration programs were undertaken in and around the subject site. Historic test borings were drilled by the Maine State Highway Commission for design and construction of the existing Route 1 Overpass Bridge. In addition, recent explorations, consisting of preliminary phase test borings drilled by MaineDOT and design phase test borings drilled by Haley & Aldrich, were completed. The plan locations of the explorations are shown on Sheet Nos. 23-40. Each exploration program is discussed separately, in the following sections of this report.

3.1 Historic Explorations

Explorations were conducted at the site in association with the original design and construction of the existing Route 1 overpass bridge. Five test borings, designated Y1-1 through Y1-5, were drilled in the vicinity of the existing bridge substructures (abutments and piers) by the Maine State Highway Commission in April 1957.

The test borings were drilled to depths ranging from approximately 22 to 47 ft below existing (pre-construction) site grades (BGS) using either 2.5-in. or 4-in. inside diameter (ID) steel casing. Each test boring was advanced approximately 5 to 6 ft into bedrock.

3.2 Recent Explorations

Test borings were drilled along multiple preliminary on/off ramp alignments by MaineDOT. Once the preferred on/off ramp alignments were identified by MaineDOT and FST, Haley & Aldrich completed a design phase subsurface exploration program.

3.2.1 Preliminary Phase Explorations by MaineDOT

MaineDOT completed a preliminary phase subsurface program in 2005 to determine the general subsurface soil/bedrock conditions and soil properties along multiple preliminary on/off ramp alignments. Several, but not all of the test borings were drilled in the vicinity of the proposed interchange improvements as discussed herein, and are summarized below.

- NB Off-Ramp: HB-YA-117
- NB On-Ramp: HB-YA-108 through HB-YA-111
- Route 1: HB-YA-112
- SB On-Ramp: HB-YA-101 through HB-YA-107

Please note that only those preliminary phase test borings that were judged by Haley & Aldrich to be in the immediate vicinity of the proposed on/off-ramp alignments are included and discussed herein.

In general, test borings in paved and non-paved areas were drilled with a CME 45C truck-mounted and Diedrich D-50 track-mounted drill rig, respectively. The test borings were drilled to depths ranging from approximately 1 to 20 ft BGS using either 2.5-in. inside diameter (ID) hollow stem augers (HSAs) or 5-in. outside diameter (OD) solid stem augers (SSAs).

Soil samples collected from test borings drilled with SSAs were collected from auger cuttings. Soil samples obtained from test borings drilled with HSAs at standard, 5-ft intervals by driving a 1-3/8-in. ID split-spoon sampler with a 140-lb hammer dropped from a height of 30 in. The number of hammer

blows required to advance the sampler through each 6 in. interval was recorded and is provided on the test boring logs. The uncorrected SPT N-value (N-uncorrected) is defined as the total number of blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval. The energy-corrected SPT N-value (N60) is equal to N-uncorrected multiplied by the hammer efficiency factor (0.6 for a standard rope and cathead pulley system and a safety hammer per MaineDOT requirements) divided by 0.6 (i.e., 60 percent theoretical hammer efficiency). All drilling, sampling and soil classification was performed in accordance with MaineDOT specifications.

3.2.2 Design Phase Explorations by Haley & Aldrich

A total of 74 design phase explorations, consisting of test borings, test probes and test pits, were completed during the period January through June 2011 for each of the proposed on/off-ramp alignments. A breakdown of the number and type of exploration completed for each proposed on/off-ramp alignment is provided below.

Project Component	Subsurface Explorations			
	Test Borings	Test Probes	Test Pits	Total
NB Off-Ramp	17	18	2	37
NB On-Ramp	8	11	0	19
SB On-Ramp	4	0	0	4
Route 1	5	0	0	5
SB Off-Ramp	8	1	0	9
Total	42	30	2	74

Explorations completed for each of the proposed on/off-ramp alignments were designated as follows:

- NB Off-Ramp: HB-YA-1 series explorations
- NB On-Ramp: HB-YA-200 series explorations
- SB Off-Ramp: HB-YA-300 series explorations
- U.S. Route 1: HB-YA-400 series explorations
- SB On-Ramp: HB-YA-500 series explorations

The following list of test probes and/or test borings were not drilled during the subsurface exploration program due to access limitations related to localized topography and winter conditions as well as traffic control restrictions on I-295: HB-YA-4, HB-YA-36, HB-YA-207, HB-YA-501 and HB-YA-502.

The test boring, test probe and test pit locations were laid out in the field by MaineDOT prior to the start of drilling. "As-drilled" exploration locations and ground surface elevations at test boring, test probe and test pit locations were determined in the field by MaineDOT upon the completion of drilling and were provided to Haley & Aldrich.

All drilling, sampling and soil classification was performed in accordance with MaineDOT specifications.

Additional details for each type of exploration conducted for the proposed on/off-ramp alignments are provided in the following sections of this report.

3.2.2.1 Test Probes and Test Borings

In general, test borings and test probes were drilled by Maine Test Borings of Hermon, Maine using either track-mounted Mobile Drill B53 or B47 Bombardiers or a CME 45 trailer-mounted drill rig. Each drill rig was equipped with a standard rope and cathead and safety hammer per MaineDOT requirements (Appendix A of MaineDOT Geotechnical Drilling Contract Specifications, revised June 2007).

Test probes were drilled using 4-in. OD SSAs where shallow bedrock was anticipated. The test probes were drilled to refusal in/on bedrock at depths ranging from approximately 1 to 20 ft BGS but were typically less than approximately 10 ft BGS. Soil samples were obtained from SSA cuttings.

The test borings were drilled to depths ranging from approximately 2 to 43 ft BGS using either 4-in. OD SSAs, 2.5-in. ID HSAs and/or 3-in. OD steel casing. Soil samples were obtained from test borings at standard 5-ft intervals by driving a split-spoon sampler as described in previous sections of this report.

In-situ vane shear tests were conducted within the marine clay stratum in test boring HB-YA-8. In-situ vane shear tests were conducted with a 65 mm by 130 mm Geonor rectangular vane (per MaineDOT requirements) attached to a 2-ft long, 12-mm diameter rod extension, attached to a string of 5/8-in. outside diameter (OD) hollow chrome-moly rods. At each in-situ vane shear test location, the vane was pushed (by hand) until the bottom of the vane was approximately 1 to 2 ft below the bottom of the borehole. The vane was then rotated at a rate of about 90 degrees per minute using a calibrated torque wrench. Results of the vane shear testing, including raw torque values and calculated shear strengths, are provided on the test boring logs in Appendix A.

One observation well was installed in completed test boring HB-YA-301 to provide information on the static groundwater level at that location. The observation well consisted of 2-in. ID, machine-slotted PVC pipe and solid PVC riser pipe extending approximately 3 ft above existing ground surface. The observation well was outfitted with a steel guardpipe and steel lock/cap assembly. Observation well installation and groundwater monitoring reports are provided in Appendix B.

Test borings HB-YA-10, HB-YA-22, HB-YA-204, HB-YA-208 and HB-YA-216 were advanced from approximately 15 to 35 ft into bedrock using a 2.0-in. (NQ-size) ID diamond-tipped core barrel. The bottom depth of the test borings after coring was generally consistent with the proposed ramp subgrade level.

All test probes and test borings were backfilled with drill cutting upon the completion of drilling. Explorations completed in paved areas were sealed at the ground surface with cold patch.

All soil samples were preserved in glass jars. The soil samples that were not submitted for laboratory testing are available for review upon request. The soil samples are being stored at the Haley & Aldrich laboratory facility in Portland, Maine.

3.2.2.2 Test Pits

Two test pits, designated TP-1 and TP-2, were excavated by Shaw Brothers Construction, Inc. of Gorham, Maine on 20 June 2011. The test pits were excavated on the south (TP-2) and north (TP-1) sides of the existing Route 1 overpass bridge and were allowed to stay open for an extended duration (approximately 10 days) to observe the behavior of the vertical excavation slopes. The data collected was used to evaluate different types of permanent earth retaining systems required to construct a portion of the NB Off-Ramp as discussed in subsequent sections of this report.

The test pits were excavated to depths ranging from approximately 5 to 6 ft BGS using a Takeuchi TB135 excavator. The test pits were subsequently backfilled on 30 June 2011.

A description of the conditions encountered in each test pit as well as photographs of the test pits taken during the period of time that the test pits were allowed to stay open are presented in Appendix B.

3.2.2.3 Bedrock Mapping

Haley & Aldrich collected rock mass data and photographed the exposed bedrock faces along the existing NB Off-Ramp on 7 July 2011. While onsite, data on structural geologic properties (e.g., discontinuity dip and dip direction, infilling, visible seepage, persistence, aperture) and general rock mass properties (e.g. weathering/alteration, intact rock compressive strength) was collected.

As an integral part of our field evaluations, Haley & Aldrich utilized industry-accepted technical guidance criteria produced by the International Society for Rock Mechanics (ISRM). The rock mass data that was collected was used to support and develop our preliminary technical evaluations and the subsequent conclusions and preliminary design recommendations included herein.

The rock mass data that was collected is summarized in subsequent sections of this report and is also provided for reference in Appendix C.

4. GENERALIZED SUBSURFACE CONDITIONS

The subsurface conditions (soil units and layer thicknesses) encountered within the project limits vary along and between each ramp alignment. A brief description of the soil units encountered, presented in order of increasing depth below ground surface, along each ramp alignment is summarized in the following sections. Detailed soil descriptions are provided on the test boring logs in Appendix A.

Please note that soil descriptions provided on the test boring logs and summarized below do not represent actual field conditions other than at the specific test boring, test probe and test pit locations. The actual conditions will vary from those described and shown herein and may not become apparent until construction begins.

4.1 Bituminous Concrete

A surficial layer of bituminous concrete was encountered in test borings drilled within the limits of the existing ramps. The thickness of the layer ranged from approximately 0.4 to 1.0 ft.

4.2 Man-Placed Fill

A layer of man-placed fill was encountered in several test borings and was generally limited to existing bituminous concrete-surface areas (Route 1, NB Off-Ramp, etc.) with few exceptions. The layer was typically encountered at the ground surface or directly beneath the surficial layer of bituminous concrete. The thickness of the fill ranged from approximately 1 to 18 ft with the greatest thicknesses encountered along Route 1, in the vicinity of the existing bridge abutments. Please note that some of the test borings were terminated in the man-placed fill and therefore, the full thickness of the layer was not determined. The material varied in composition and generally consisted of the following:

- silty CLAY with varying percentages of fine to coarse sand and gravel (CL),
- fine to coarse SAND with varying percentages of clay, silt and gravel (SP, SP-SM, SM, SW, SW-SP),
- sandy GRAVEL (GW), trace silt and coarse sand.

SPT N60-values typically ranged from 5 to in excess of 100 blows per foot (bpf).

4.3 Marine Deposit

Marine soils were encountered in several of the test borings either at the ground surface or beneath the man-placed fill layer. Where encountered, the layer was up to approximately 27-ft thick. In general, the greatest thicknesses were encountered in the following areas:

- Along the proposed NB Off-Ramp deceleration lane, south of the existing Route 1 Overpass Bridge,
- The easterly side of the intersection between the existing NB Off-Ramp and Route 1,
- The easterly side of the intersection between the proposed SB On-Ramp and Route 1.

Please note that some of the test borings were terminated in the marine deposit and therefore, the full thickness of the layer could not be determined. In addition, several test borings drilled for the proposed NB On/Off-Ramps were drilled to determine the depth of the bedrock surface BGS and soil samples

were not collected. It is likely that marine soils are present overlying bedrock at these locations. The material varied in composition and generally consisted of the following:

- fine to medium SAND with varying percentages of coarse sand, silt and gravel (SP, SM),
- SILT with varying percentages of clay and fine sand (ML),
- silty CLAY (CL) with occasional fine sand seams. The upper portions of this material typically had a blocky structure and were desiccated.

SPT N60-values ranged from 0 to 24 bpf. In addition, in-situ vane shear tests conducted in test boring HB-YA-8 suggested that the undrained shear strength ranged from approximately 700 to 800 pounds per square foot (psf).

4.4 Glacial Till

Glacial till, a heterogeneous mixture of sand, silt, clay and gravel, was encountered beneath the marine clay in some test borings. Where it was encountered, the deposit ranged in thickness from approximately 1 to 19 ft. SPT N60-values ranged from 11 to 81 bpf.

4.5 Bedrock

Bedrock was encountered in several test borings at depths ranging from approximately 0 to 43 ft BGS. Test borings drilled in the wooded area within the existing NB Off-Ramp loop typically encountered bedrock at depths less than approximately 9 ft BGS. Typically, the upper 1 to 2 ft of bedrock was weathered, and was augered through prior to reaching more competent material ("refusal" surface).

Approximately 15 to 35 ft of bedrock was sampled in select test borings drilled for the proposed NB On/Off-Ramps. The sampled bedrock generally consisted of the following:

- very hard, slightly weathered GRANITE. Joints were typically dipping at horizontal to low angles.
- Moderately hard to hard, fresh to slightly weathered GRANOFELS. Joints were typically dipping at horizontal to low angles.

Rock quality designation (RQD) is a common parameter that is used to help assess the competency of sampled bedrock. RQD is defined as the sum of pieces of recovered bedrock greater than 4 in. in length divided by the total length of recovered bedrock. RQD values for bedrock encountered at the site ranged from 23 to 100 percent (average = 79 percent).

During the 7 July 2011 site visit, it was observed that rock exposed in the existing cut slopes for the existing NB Off-Ramp consisted of the following:

- Moderately hard, slightly to moderately weathered, fine grained to aphanitic, gray GRANOFELS,
- Hard, fresh to moderately weathered, coarse grained, tan to white PEGMATITE.

Given the curved horizontal alignment of the existing NB Off-Ramp, the strike of the exposed rock face varies from N13°W to N83°W and from N7°E to N80°E left and right of the existing baseline.

In general, the data indicates that most joints dip predominantly to the southeast, away from the exposed face left of centerline and into the existing roadway for short segments right of centerline.

4.6 Groundwater Conditions

A groundwater monitoring well was installed in completed borehole HB-YA-301. A summary of the groundwater levels measured in the observation well is provided below.

Test Boring No.	Elevation of Measured Water Level (ft, NAVD 88)	Time Period
HB-YA-301	123.2 to 123.9	18 February to 28 March 2011

Groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography and precipitation. Water levels encountered during construction may differ from those observed in the test borings or observation wells. Observation well installation and groundwater monitoring reports are included in Appendix D.

5. LABORATORY TESTING PROGRAM

Preliminary and design phase laboratory testing programs were undertaken to assist in soil classification/identification and determination of engineering properties of representative soil samples collected during the subsurface exploration programs. In general, laboratory testing was performed on disturbed soil samples collected during SPT sampling.

Preliminary phase laboratory testing was performed by MaineDOT and design phase laboratory testing was performed by R.W. Gillespie & Associates, Inc. (Gillespie) of Saco, Maine. Geotechnical laboratory testing was performed in accordance with applicable American Society for Testing Materials (ASTM) testing procedures.

A summary of the number and type of laboratory tests completed for both the preliminary and design phases of the project are provided in the following sections. Individual laboratory test results are provided on applicable test boring logs. Laboratory test summary sheets are provided for reference in Appendix C.

5.1 Preliminary Phase Laboratory Testing by MaineDOT

The following soil tests (type and number of tests) were conducted:

- Grain Size Analysis (combined sieve and hydrometer (ASTM D422)) - 9
- Moisture Content (ASTM D2216) - 9
- Atterberg Limits (ASTM D4318) – 2

5.2 Design Phase Laboratory Testing by Haley & Aldrich

The following soil tests (type and number of tests) were conducted:

- Grain Size Analysis (combined sieve and hydrometer (ASTM D422)) - 35
- Moisture Content (ASTM D2216) - 35
- Atterberg Limits (ASTM D4318) – 15

6. GEOTECHNICAL DESIGN RECOMMENDATIONS

Geotechnical design recommendations for the subject project, as discussed and provided herein, were developed in accordance with the following documents:

- AASHTO, "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals," 5th Edition, 2009.
- Maine Department of Transportation, "Bridge Design Guide," August 2003 with Interim Revisions through August 2008.
- Maine Department of Transportation, "National Standards Highway Design Guide," Volume One, December 2004.
- Maine Department of Transportation, "State Standard Highway Design Guide," Volume Two, 28 July 2003.

6.1 Anticipated Subgrade Conditions

We anticipate that the proposed pavement section for the various on/off ramps will be approximately 30 in. Based on the assumed pavement section thickness, the subsurface soil conditions encountered in the preliminary and design phase explorations, and our review of proposed grading information provided by FST, we anticipate that subgrade conditions will be variable along and between the different on and off ramps and will consist of granular borrow, marine deposit soils (clay, silt, sand), glacial till and bedrock. A summary of the anticipated subgrade materials along each ramp alignment is provided in Table I.

It is our opinion that the soil types anticipated to be present at the design subgrade level are suitable for support of a properly designed and constructed pavement section. We recommend that all topsoil, organic matter, debris fill and other unsuitable material be excavated (removed) prior to subgrade preparation and placement of granular borrow or pavement section materials.

It is also recommended that the Contractor be made responsible for protecting the undisturbed subgrade soils due to construction vehicle traffic, and for the removal and replacement of any disturbed subgrade soils.

6.2 Subgrade Resilient Modulus Values

Current American Association of State Highway and Transportation Officials (AASHTO) design procedures for flexible pavement utilize material properties to define support characteristics of roadway subgrade soils. Specifically, subgrade resilient modulus is the most important material property input value and is defined as the ratio of the applied cyclic stress to the recoverable (elastic) strain after repeated loading. In areas of seasonal frost, thaw weakening can have a significant impact on the magnitude of resilient modulus.

As summarized above and on Table I, we anticipate that subgrade soil conditions along the ramp alignments will be variable. Estimates of resilient modulus were developed based on 1.) Correlations with soil classification, gradation, index properties and structural layer coefficients, 2.) Our internal database of resilient modulus values determined from in-situ California Bearing Ratio (CBR) and Falling Weight Deflectometer (FWD) tests, and 3.) Our experience on similar projects in similar geographic locations and soil/groundwater conditions.

It is our opinion that the pavement design should be based on a single value of resilient modulus since it is not practical to design different pavement sections for different portions of the same ramp alignment. As a result, we recommend that pavement design be based on a resilient modulus value equal to 3,600 pounds per square inch (psi), indicative of an undisturbed marine silt/clay subgrade.

6.3 Frost Susceptibility Classification and Maximum Depth of Frost Penetration

Three basic requirements must be met simultaneously in order for frost-induced movements (heave) to occur: 1) the soil must meet certain grain size requirements in order to be frost susceptible, 2) freezing temperatures must penetrate into the ground and 3) a source of water must be present (e.g., groundwater, surface water infiltration, capillary rise). A summary of the subsurface conditions at the site as they relate to these requirements is provided below.

- **Soil Type** – Laboratory grain size analyses were conducted on soil samples recovered during the subsurface exploration programs in part to assess the frost susceptibility of the soil. Based on the laboratory test results, a frost susceptibility classification was assigned to each of the soil types anticipated to be present at the design subgrade level. Frost susceptibility classifications were determined based on MaineDOT frost susceptibility criteria that were developed, in part, based on the Corps of Engineers method. Frost ratings range from 0 (non-frost susceptible) to IV (highly frost susceptible). A summary of the frost susceptibility classifications for each soil type is provided below.

Subgrade Material	Frost Susceptibility Classification
Granular Borrow	II
Marine Sand	III
Marine Silt/Clay	IV

- **Temperature** – Based on the State of Maine Design Freezing Index, the design freezing index for the Yarmouth, Maine area is approximately 1,300 freezing degree days (°F-days). Freezing temperatures must penetrate the pavement section and subgrade soil down to the capillary zone (zone where water is present) because the phase change from water to ice is largely responsible for drawing additional water from the surrounding soil toward the growing ice mass.

- **Water** – An uninterrupted source of water must be available to the zone of freezing. Typically, the source will be the underlying groundwater table, a perched water source, infiltration through overlying layers and/or by capillary rise. Water levels measured in observation wells and completed boreholes as well as natural water content laboratory tests were used to assess frost penetration. In addition, based on proposed grading provided by FST, some areas where raises in grade are planned, the supply of water to the freezing zone will be restricted by distance. In other areas where raises in grade are less, water may be drawn from the static groundwater level as well as from voids in the soil adjacent to the growing ice lens, resulting in potential heave.

Based on the information summarized above, we evaluated the maximum depth of seasonal frost penetration into the ground. Our evaluations were conducted using the computer program ModBerg version 99.2. The program calculates the maximum depth of frost penetration for a given geographic

location using input from its built-in long-term weather database and pavement/soil layer information provided by the user. ModBerg's primary algorithm is based on the Modified Berggren Equation. Multiple iterations were completed for various subgrade soil types and weather data from both Portland and Brunswick, Maine; the two closest weather recording stations to the site. The results of the evaluations are summarized below.

Subgrade Material[1]	Frost Susceptibility Classification[2]	Maximum Depth of Frost Penetration[3] (in.)		
		Brunswick	Portland	Average[4]
Granular Borrow	II	49.5	47.8	48.7
Marine Sand	III	49.7	47.8	48.8
Marine Silt/Clay	IV	40.0	38.9	39.5

[1] – Subgrade material partially based on assumed pavement section thickness equal to 30 in.
[2] – Classification based on MaineDOT criteria.
[3] - Maximum depth of frost penetration measured from finish grade.
[4] – Average value based on the assumption that the site is equidistant from Portland and Brunswick.

Based on the results summarized above, we recommend that a maximum depth of frost penetration equal to approximately 4 ft (1.5 ft into soil subgrade) be considered for pavement design.

6.4 Drainage

Excess moisture within pavement section materials, moisture-susceptible subgrade materials, and seasonal freeze/thaw effects can substantially reduce the service life of the on/off ramps. We recommend that adequate drainage be provided to remove water and limit its impact on service life and pavement performance. Specifically, we recommend that the following items be considered by FST during final design:

- Free-draining base and subbase gravels
- Ditches along the proposed on/off ramps. We recommend that the ditch invert elevation should be lower than the bottom of the pavement section and the subgrade should be sloped to promote drainage into the ditches.
- Underdrains within the curbed sections of the ramps/roadways and where bedrock is anticipated along the proposed ramp/roadway alignments.
- Drainage structures (catch basins, culverts, etc.) to remove water from the underdrains and ditches (if used).
- Shattering bedrock to a depth of 4 ft below the design subgrade level where bedrock is anticipated at subgrade level. We recommend that a geosynthetic separation fabric be placed over the shattered bedrock subgrade to prevent migration of fine-grained material from the pavement section into the subgrade.

6.5 Fill Areas

Based on our review of proposed grading information provided by FST, we anticipate a number of areas where fill will be required. The most notable areas requiring fill placement are along the acceleration and deceleration lanes (where filling of the existing ditches is required) as well as a significant length of the proposed SB On-Ramp.

6.5.1 Settlement and Stability

Fill placement is expected to result in minimal ground surface settlement from elastic compression and/or consolidation settlement of the underlying marine sand and/or marine silt/clay layers. Based on our review of preliminary and design phase test boring logs, we anticipate that the marine silt/clay layers present within the project limits are generally overconsolidated. In addition, existing ditches that will be filled to construct the proposed acceleration/deceleration lanes were constructed in cut areas and therefore, new fill placement will not result in stress increases in excess of the maximum previous stress. As a result, any settlement is anticipated to occur during and immediately after fill placement and prior to final paving. Post-construction settlement is expected to be negligible.

In addition, construction of the SB On-Ramp embankment using normal weight earthfill can cause excessive vertical and lateral strains eventually resulting in a shear failure of the foundation soil and subsequent failure of the embankments. A series of computer-assisted, two-dimensional global stability evaluations were performed using the computer program Slide 5.0 to evaluate the likelihood of global stability failures at the site.

Stability evaluations were conducted transverse to the project baseline, where, based on our review of proposed grading plans, maximum raises in grade are proposed. A typical soil profile was developed based on the subsurface conditions encountered in the preliminary and design phase test borings. Due to the limited thickness and relatively "stiff" nature of the marine clay present at the site, in-situ vane shear testing could not be conducted during advancement of the boreholes to assess the undrained shear strength characteristics. As a result, multiple global stability evaluations were conducted to assess the sensitivity of calculated safety factors to changes in undrained shear strength.

The results of global embankment stability analyses using normal-weight earthfill and assumed values of undrained shear strength for the marine clay (300 psf) indicated that the proposed SB On-Ramp embankment meets the minimum factor of safety requirements under static and seismic conditions (1.3 and 1.0) as specified by AASHTO LRFD and the MaineDOT BDG. We therefore conclude that proposed embankment construction using normal-weight earthfill will not cause a global stability failure.

6.5.2 Additional Considerations

We recommend that the fill areas be constructed in general accordance with the latest edition of the MaineDOT Standard Specifications, Section 203, with the variations outlined below.

- Unsuitable material including pavement, topsoil and organics should be removed prior to fill placement. This can be accomplished by requiring that grubbing be performed in accordance with subsection 203.01(a) regardless of fill height.
- In general, fill material should conform to MaineDOT Section 703.18 - Common Borrow. Fill placed within the estimated depth of freezing (approximately 4 ft below proposed pavement surface) should consist of MaineDOT Section 703.19 - Granular Borrow Material for Underwater Backfill. Rockfill, generated from the construction of the NB On/Off-Ramps is also acceptable for use in fill areas.
- Slope protection may be necessary to prevent erosion and surficial sloughing, especially if the timing of the project is such that the grass seed does not have sufficient time to take root into the embankment material. One method of minimizing surface erosion utilizes fiber reinforcement of topsoil and scarification of the embankment surface.

6.6 Cut Areas

Based on our review of proposed grading information provided by FST, we anticipate a number of areas where cut (excavation) will be required to reach the proposed finish roadway elevations. The most notable areas requiring cut (excavation) are beneath the existing Route 1 Overpass Bridge and along the NB On and Off Ramps. The heights of the cuts are expected to be up to approximately 25 ft.

6.6.1 Bedrock Cut

The test borings drilled within the bedrock cut areas and observation of the exposed rock face indicate the following:

- very hard, slightly weathered GRANITE. Joints were typically dipping at horizontal to low angles.
- Moderately hard to hard, fresh to slightly weathered fine grained to aphanitic, gray GRANOFELS. Joints were typically dipping at horizontal to low angles.
- Hard, fresh to moderately weathered, coarse grained, tan to white PEGMATITE.

As summarized previously, the strike of the exposed rock face varies from N13ºW to N83ºW and from N7°E to N80°E left and right of the existing baseline. In addition, most joints dip predominantly to the southeast, away from the exposed face left of centerline and into the existing roadway for short segments right of centerline.

Based on our review of the sampled bedrock and rock mass data collected along the exposed bedrock along the existing NB Off-Ramp, we anticipate that rock excavated at 1H:4V (MaineDOT standard) will be stable.

Rock slope stability analyses generally focus on two primary modes of failure: two-dimensional plane failure, and three-dimensional wedge failure. Plane failure can occur when rock discontinuities oriented parallel or sub-parallel (within 20 degrees of the cut face), and dip into the excavation at angles greater than the angle of friction along the discontinuities. Three-dimensional wedges are formed by intersection of two or more discontinuities and the cut face. Wedges where the line of intersection of the discontinuity planes dips toward the excavation may be potentially unstable depending on the friction angle and geometry of the discontinuity surfaces and other factors. As a result, it is possible that that areas may not be stable at 1H:4V. In these areas it may be necessary to flatten the slope or to provide rock face reinforcement in the form of grouted rock dowels. We recommend that the need for rock face stability assessments in these areas be made in the field once excavation begins.

It is possible that water will be present at the interface between the top of the bedrock and the bottom of the overlying soils, and that seepage from this zone could result in localized sloughing and near surface instability in the soils. We recommend that a near-level bench be provided at the interface between the soil and rock. A toe drain may also be needed to control seepage and retain the soil at the toe of the cut soil slope.

6.6.2 NB Off-Ramp Retaining Wall

The existing Route 1 Overpass Bridge is approximately 240-ft long, and is supported by three piers with stub abutments on the east and west sides. The center pier is located in the I-295 median between the NB and SB travel lanes; the two outside piers are located adjacent to the NB and SB breakdown

lanes. Approximately 15-ft high, 2 horizontal to 1 vertical (2H:1V) slopes with block paver slope protection extend from the outside piers up to the stub abutments.

Based on our review of historic bridge plans, we understand that the piers and abutments are supported on HP10x42 steel H-piles. Each abutment is supported on two rows of piles. The row of abutment piles nearest to I-295 were apparently installed on a 1H:3V batter (sloping downwards toward I-295). The existing I-295 pavement elevation beneath the bridge is approximately El. 120. The existing grade along Route 1 (on top of the bridge) is approximately El. 140.

As discussed previously, the proposed NB Off-Ramp will require excavation (cut) into the existing fill approach embankment and construction of a permanent earth retention system to provide room for new ramp between Pier 1 and the South Abutment. The existing bridge piers and abutments will remain in place.

6.6.2.1 General

Several different permanent cut wall earth retention systems were considered for the proposed NB Off-Ramp widening including soil nailing, installation of tieback soldier piles and lagging and steel sheeting. Consideration was given to the advantages and disadvantages of each alternative relative to site conditions, site restraints, constructability and overall cost. Based on our evaluation of each alternative, a permanent soil nail wall was judged to be the most technically-feasible and potentially cost-effective means to accommodate the NB Off-Ramp deceleration lane.

A soil nail wall consists of closely spaced soil nails (steel bars) installed into drillholes that are encased in grout. The nails improve global stability by providing passive reinforcement (i.e., they are not post-tensioned). Construction proceeds from the top of the cut to the bottom following the general sequencing outlined below.

- Step 1 – Excavation
- Step 2 - Drilling nail holes
- Step 3 - Nail installation and grouting
- Step 4 - Construction of temporary shotcrete facing
- Step 5 - Construction of subsequent levels
- Step 6 - Construction of final, permanent facing

6.6.2.2 Soil Nail Wall Design

We recommend that the permanent soil nail wall be designed and constructed by a prequalified specialty contractor. The permanent soil nail wall should be designed in accordance with FHWAO-IF-03-017, March 2003 “Geotechnical Engineering Circular No. 7, Soil Nail Walls” published by the Federal Highway Administration (FHWA).

In addition, we recommend that minimum requirements for the critical wall components as well as maximum design values for geotechnical parameters be provided to the specialty contractor, as summarized herein. It is our opinion that this allows the designer of record the flexibility to modify the design within the specified criteria to meet their means and methods in order to produce the most cost-effective design.

The specialty contractor will be responsible for producing a detailed design package including design drawings for review and acceptance prior to construction.

Additional design considerations are provided in the following sections.

6.6.2.3 Standup Time

The initial step in constructing a soil nail wall involves making vertical excavation in the soil. The cuts must remain stable for a short period of time during drilling and prior to construction of the temporary shotcrete facing.

Test pits TP-1 and TP-2 were excavated on the north and south sides of the existing Route 1 Overpass Bridge and were allowed to stay open for an extended duration (approximately 10 days between 20 and 30 June 2011) to observe the behavior of the vertical excavation slopes.

The test pits were excavated in front of and adjacent to the existing bridge abutment within the portion of the slope that will be removed as part of the soil nail wall construction. This was done so that the test pits would not disturb soils behind the front face of the soil nail wall. Test pits were excavated to depths ranging from approximately 5 to 6 ft BGS.

A description of the conditions encountered in each test pit as well as photographs of the test pits taken during the period of time that the test pits were allowed to stay open are presented in Appendix B.

As indicated on the photographs, there was virtually no movement of the near-vertical test pit slopes during the period that they were left open. This demonstrated that the man-placed fill and naturally deposited marine sand and clay are a potentially favorable soil material relative to "standup time." Since the man-placed fill is primarily granular, cohesionless soil, the good standup time performance observed in the test pits was attributed to apparent cohesion and/or a favorable combination of the gradation of the soil and the moisture content. However, this could have been impacted by the lack of precipitation during the time period that the test pits were allowed to remain open. It should be noted that precipitation can have a detrimental effect on the stability of the vertical cut face.

6.6.2.4 Man-Placed Fill

Soil nailing may not be technically feasible in loose granular soils with SPT N60-values less than about 10. It should be noted that SPT N60-values from test boring HB-YA-402 ranged from 14 to 40 bpf. In addition, it is our understanding that this feasibility criterion primarily relates to the standup time required for soil nailing. As noted above, test pits TP-1 and TP-2 demonstrated that the man-placed fill has favorable standup characteristics. However, prospective contractors should be aware that the loose man-placed fill soil could be present in localized areas and could have a relatively low strength. As a result, special design provisions such as closer nail spacing, longer nails, or other appropriate measures may be necessary. In addition, due to the cohesionless nature of the man-placed fill, it is possible that drill holes will cave. We recommend that prospective contractors utilize cased drill holes, as necessary, for nail installation.

6.6.2.5 Corrosion Protection

Since the soil nail wall will provide permanent lateral earth support, we recommend all hardware (nails, bearing plates, nuts, washers, etc.) consist of either a galvanized or epoxy-coated material to prevent premature degradation of soil nail wall elements. Since the nails will be encased in a grout-filled casing and the nail heads (plates, nuts, washers) will be encased in the cast-in-place concrete facing, both will provide an additional level of corrosion protection.

6.6.2.6 Drainage

We recommend that design provisions be included which promote drainage of surface runoff away from the soil nail wall, and that minimize infiltration of water into the man-placed fill behind the soil nail wall. In addition, we recommend that a drainage medium be placed on the exposed soil face before placing the temporary shotcrete face. We recommend that prefabricated vertical geocomposite strips be considered for behind-the-wall drainage, centered between the nails. These strips should be connected to weep hole outlet pipe, and to a footing drain located at the base of the wall. Selection of a prefabricated vertical composite drainage strip should consider filter compatibility with the man-placed fill and marine deposit soils, and the potential for fine particles within the man-placed fill to clog the filter fabric outside of the geocomposite drain.

6.6.2.7 Frost Considerations

Based on our review of subsurface information in the vicinity of the proposed permanent soil nail retaining wall, marine sand, silt and clay soils will be present behind a portion of the wall. Since these soils are considered moderately to highly frost-susceptible, we recommend rigid insulation board (4-in. thick) be provided between the temporary and permanent face to minimize the impacts of freezing on the permanent soil nail wall. In addition, we also recommend that the exposed soil faces, prior to the application of shotcrete facing, not be allowed to freeze. Shotcrete should not be applied to frozen soil. Provisions for drainage, as described above, will also aid in minimizing freezing/frost related impacts.

6.6.2.8 Design Soil Properties

Soil nail walls are typically specified as a specialty contractor designed and installed system. The information provided herein is judged to be suitable for use by an experienced soil nail specialty contractor to design an appropriate system. It is recommended that the contract documents require the contractor to submit the qualifications and experience of the individual or subcontractor who will be responsible for the wall design and construction.

The following engineering properties for the man-placed fill, marine sand and marine clay are recommended for design of the permanent soil nail wall:

Soil Type	Friction Angle (degrees)	Cohesion (psf)	Total Unit Weight (pcf)
Man-Placed Fill	28	NA	120
Marine Sand	30	NA	115
Marine Clay	NA	500	115

7. CONSTRUCTION CONSIDERATIONS

7.1 Excavation

7.1.1 Soil

Excavation will be required for general site grading and for general construction of various interchange improvements. We anticipate that excavation of the in-situ soils (primarily marine sand and/or marine silt/clay) can be accomplished using normal earth-excavating equipment. Naturally deposited soils present within the project limits are considered susceptible to disturbance from construction activities especially when the soils are wet or saturated. We anticipate that excavations may be made using sloped-open cut techniques. We recommended that the contractor be responsible for the design, stability and safety of all excavations in accordance with local, state and federal regulations.

7.1.2 Bedrock

As discussed in previous sections of this report, shallow bedrock was encountered along portions of the proposed NB On/Off-Ramp alignments. As noted on the test boring logs, several feet of soil overburden exists overlying a typical 1 to 2-ft thickness of weathered and/or fractured rock prior to reaching more competent rock.

As discussed above, rock excavation of up to approximately 25 ft or more will be required. Based on observations of the character of the bedrock as observed on the exposed rock faces and rock core samples, it is anticipated that excavation within more competent rock will require systematic drilling and blasting. The rock may tend to overbreak unless presplitting, line drilling or other controlled blasting procedures are used.

We recommend that systematic drilling and blasting of rock be managed to prevent damage to adjacent structures (Route 1 Overpass Bridge), nearby buildings and existing utilities. We also recommend that the Contractor take necessary measures to prevent flyrock from impacting traffic operations on I-295 and Route 1. The contract documents should include provisions for pre-blast condition survey's, blast vibration monitoring and traffic control during blasting.

Please note that the top of bedrock elevations provided on the test boring logs and summarized herein do not represent actual field conditions other than at the specific test boring locations. The actual bedrock surface will vary from those described and shown herein and may not become apparent until construction begins. We recommend that prospective Contractors consider this variability in their bids.

7.2 Dewatering

We anticipate that excavation dewatering may be accomplished by using ditches and open pumping from sumps. We recommend that the Contractor be made responsible for controlling all infiltration from groundwater and surface runoff to permit subgrade preparation, fill placement and construction in-the-dry.

Excavation and control of water should be done by methods that prevent disturbance to subgrade soils. Sumps and pumps should be designed with proper filters to control the loss of fine grained soil.

Dewatering and discharge of dewatering effluent should be performed in accordance with all applicable local, state and federal regulations. Dewatering discharge should be recharged on site if possible. If on-site recharge is not feasible, dewatering discharge will likely need to be directed to the local storm drain system. Sedimentation tanks and other treatment methods may be required for legal disposal of the effluent into the storm drain system.

7.3 Subgrade Preparation

As discussed in previous sections of this report, we anticipate that subgrade conditions within portions of the project limits will consist of marine sand and/or marine silt/clay. These materials are easily disturbed by construction activities and we anticipate over excavation and replacement of several feet of disturbed material could be necessary if typical rubber-tired earth-moving equipment such as articulated trucks, graders, and scrapers are used within a few feet of design subgrade elevations.

Based on these considerations, we recommend that roadway/parking subgrades be covered with a minimum of 18 in. of subbase sand and gravel to protect them from rutting and disturbance from construction traffic. If disturbance and rutting occur, the disturbed materials should be removed and replaced with compacted sand and gravel. In addition, we also recommend the use of lightweight tracked grading equipment, such as low ground-pressure bulldozers, within 2 ft of subgrade elevation in areas underlain by marine sand/silt/clay to the extent possible. It may also be appropriate (or necessary) to over excavate several feet of excess silt/clay below subgrade elevation in these areas and place a woven geotextile, meeting the requirements of MaineDOT Standard Specification 722.01 (stabilization/reinforcement geotextile), overlain by granular fill material to provide suitable haul roads for heavy equipment. We recommend that the Contractor be made responsible for protecting roadway/parking subgrades. Any damage to the subgrade surface resulting from Contractor means and methods should be repaired at no additional expense to MaineDOT.

The following guidelines are recommended to protect subgrade soils beneath roadway and parking areas:

- Make final excavations into natural bearing soils using smooth-bladed equipment to limit disturbance (particularly important in the marine silt/clay soils).
- Prevent water from accumulating on soil surfaces to reduce the possibility of soil disturbance. All filling should be performed in-the-dry. Subgrades that become disturbed due to water infiltration should be re-excavated and stabilized. Subgrade stabilization methods could include placement of crushed stone and/or woven geotextile with approval of a geotechnical engineer.
- Exposed subgrades should be examined in the field by a geotechnical engineer to verify strength and bearing capacity. Excavation may be necessary to remove weak, disturbed or otherwise unacceptable soils.
- Disturbance due to water and adverse weather could be reduced by maintaining excavations at least 12 in. above the final bearing level until immediately before placing fill material. Alternatively, it may be desirable to protect the exposed soil subgrade areas, as soon as possible after acceptance by a geotechnical engineer, by placing and fill material (granular borrow, rock fill, base/subbase materials, etc.).
- Limit equipment traffic across the exposed soil bearing surfaces.

7.4 Reuse of Excavated On-Site Soils

As discussed previously, we anticipate that the vast majority of the interchange improvements will require filling to meet proposed grading. As a result, the quantity of excavated soils that could

potentially be reused on the site will be minimal. Excavated material is anticipated to consist of topsoil, marine sand, and/or marine silt/clay soils. We anticipate that these materials could be reused in landscaped areas as common borrow. However, Contractors should be made aware that the excavated material is highly susceptible to strength loss when wet and that moisture conditioning will likely be required for reuse in order to adequately place and compact the material.

Bedrock excavated as part of the reconfiguration of the proposed NB On/Off Ramps will generate a significant volume of material that is considered suitable for use as riprap or processed for crushed stone or gravel for use as slope protection, rock borrow or drainage layers. If used as fill, the bedrock should be processed to meet appropriate MaineDOT material specifications and should be covered with a minimum of 6 in. of granular soil graded to fill surface voids in the rock fragment subgrade.

7.5 NB Off-Ramp Deceleration Lane Retaining Wall

7.5.1 Drilling Obstructions

Potential specialty Contractor's should be aware that the existing piles which support the stub abutments could obstruct soil nail installation. The nail layout should be designed such that existing piles are avoided. The contractor should be responsible for avoiding the existing piles and for any damage to the existing bridge or the nearby utilities resulting from his construction activities.

7.5.2 Soil Nail Testing

We recommend that verification tests, consisting of proof and performance (creep) tests be conducted during installation of soil nails as specified in the specialty Contractor's design submittal and accepted by MaineDOT. We recommend that proof and performance testing be conducted in accordance with the recommendations included in the publication "Geotechnical Engineering Circular No. 7, Soil Nail Walls", dated March 2003, published by the Federal Highway Administration (FHWA).

8. LIMITATIONS OF RECOMMENDATIONS

This report is prepared for the exclusive use of MaineDOT and FST relative to the proposed I-295 / U.S. Route 1 Exit 15 Interchange Improvements in Yarmouth, Maine. There are no intended beneficiaries other than MaineDOT and FST. Haley & Aldrich shall owe no duty whatsoever to any other person or entity on account of the Agreement or the report. Use of this report by any person or entity other than MaineDOT and FST for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from MaineDOT and from Haley & Aldrich indicating that the Report is adequate for such other use. Use of this report by such other person or entity without the written authorization of MaineDOT and Haley & Aldrich shall be at such other person's or entities sole risk, and shall be without legal exposure or liability to Haley & Aldrich.

The analyses and recommendations are based, in part, upon the data obtained from the referenced subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations of this report.

REFERENCES

1. American Association of State Highway and Transportation Officials, "AASHTO Guide for Design of Pavement Structures."

2. American Society of Civil Engineers, "Frost Action and Its Control," Technical Council on Cold Regions Engineering Monograph, 1984, pp. 145.

3. Federal Highway Administration, "Geotechnical Aspects of Pavements, Reference Manual / Participant Workbook," NHI Course No. 132040, Publication No. FHWA NHI-05-037, May 2006.

4. Federal Highway Administration, "Geotechnical Engineering Circular No. 7, Soil Nail Walls," Report No. FHWAO-IF-03-017, March 2003.

5. Maine Department of Transportation, "National Standards Highway Design Guide," Volume One, December 2004.

6. Maine Department of Transportation, "State Standard Highway Design Guide," Volume Two, 28 July 2003.

7. Maine Department of Transportation, "Bridge Design Guide," August 2003 with Interim Revisions through August 2008.

8. Maine Department of Transportation, "Standard Specifications," Revision of December 2002.

TABLE I - SUMMARY OF CUT/FILL DEPTHS AND ANTICIPATED SUBGRADE CONDITION
INTERSTATE 295 / U.S. ROUTE 1 INTERCHANGE IMPROVEMENTS
MAINEDOT PIN 11086.00
EXIT 15 - YARMOUTH, MAINE

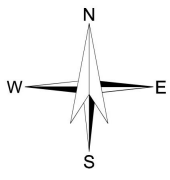
HALEY & ALDRICH, INC. FILE NO.: 37579-001

Alignment	Approximate Begin Station	Approximate End Station	Approximate Length (ft)	Cut/Fill	Approximate Cut/Fill Amount	Anticipated Subgrade Material	Reference Test Borings
NB Off-Ramp	100+00	108+00	800	Cut	0 to 3 ft	Silt/Clay	HB-YA-1 through HB-YA-3
	108+00	111+00	300	Fill	3 to 5 ft	Silt/Clay	-
	111+00	115+00	400	Cut	0 to 9 ft	Silt/Clay	HB-YA-5 through HB-YA-8
	115+00	121+00	600	Cut	to 25 ft	Bedrock	HB-YA-9 through HB-YA-27
	121+00	121+50	50	Fill	3 to 7 ft	Bedrock	HB-YA-27 through HB-YA-28
	121+50	123+50	200	Cut	0 to 3 ft	Bedrock	HB-YA-29 through HB-YA-32
	123+50	128+00	450	Cut	0 to 3 ft	Silt/Clay	HB-YA-32 through HB-YA-39
NB On-Ramp	200+00	202+00	200	Cut	0 to 4 ft	Silt/Clay	-
	202+00	205+00	300	Fill	3 to 7 ft	Silt/Clay	HB-YA-201 through HB-YA-203
	205+00	206+50	150	Cut	0 to 12 ft	Glacial Till	HB-YA-203 through HB-YA-206
	206+50	207+75	125	Cut	12 to 22 ft	Bedrock	HB-YA-206, HB-YA-208
	207+75	209+75	200	Fill	3 to 8 ft	Bedrock	-
	209+75	212+75	300	Cut	0 to 22 ft	Bedrock	HB-YA-209 through HB-YA-215
	212+75	213+75	100	Fill	3 to 8 ft	Bedrock	-
	213+75	215+75	200	Cut	0 to 3 ft	Bedrock	HB-YA-216 through HB-YA-218, HB-YA-110
	215+75	218+00	225	Fill	3 to 7 ft	Glacial Till	HB-YA-219 through HB-YA-220, HB-YA-108 through HB-YA-109
	218+00	229+00	1,100	Cut	0 to 3 ft	Silt/Clay	-
SB Off-Ramp	300+00	304+75	475	Cut	0 to 3 ft	Silt/Clay	HB-YA-301
	304+75	307+00	225	Fill	3 to 4 ft	Silt/Clay	-
	307+00	316+25	925	Cut	0 to 3 ft	Silt/Clay	HB-YA-302 through HB-YA-304
SB On-Ramp	500+00	521+25	2,125	Cut	0 to 3 ft	Glacial Till	HB-YA-503 through HB-YA-506, HB-YA-509, HB-YA-101 through HB-YA-105
	521+25	523+25	200	Fill	3 to 12 ft	Granular Borrow	HB-YA-507 through HB-YA-508, HB-YA-510 through BH-YA-511, HB-YA-106 through HB-YA-107

Notes:
[1] - Station limits defining cut/fill areas as well as the magnitude of cut/fill were estimated based on centerline profiles provided by FST on 17 April 2012 and an assumed pavement section thickness.
[2] - Station limits defining cut/fill areas rounded to the nearest 25-ft station increment.

	Individual	Date
Developed By:	BCS	4/17/2012
Checked By:	BCS	4/20/2012
Reviewed By:	JWW	11/28/2012

SITE COORDINATES:43°47'6"N 70°11'25"W



U.S.G.S. QUADRANGLE: YARMOUTH, ME

HALEY & ALDRICH

INTERSTATE 295 / U.S. ROUTE 1
EXIT 15 INTERCHANGE IMPROVEMENTS
MAINEDOT PIN 11086.00
YARMOUTH, MAINE

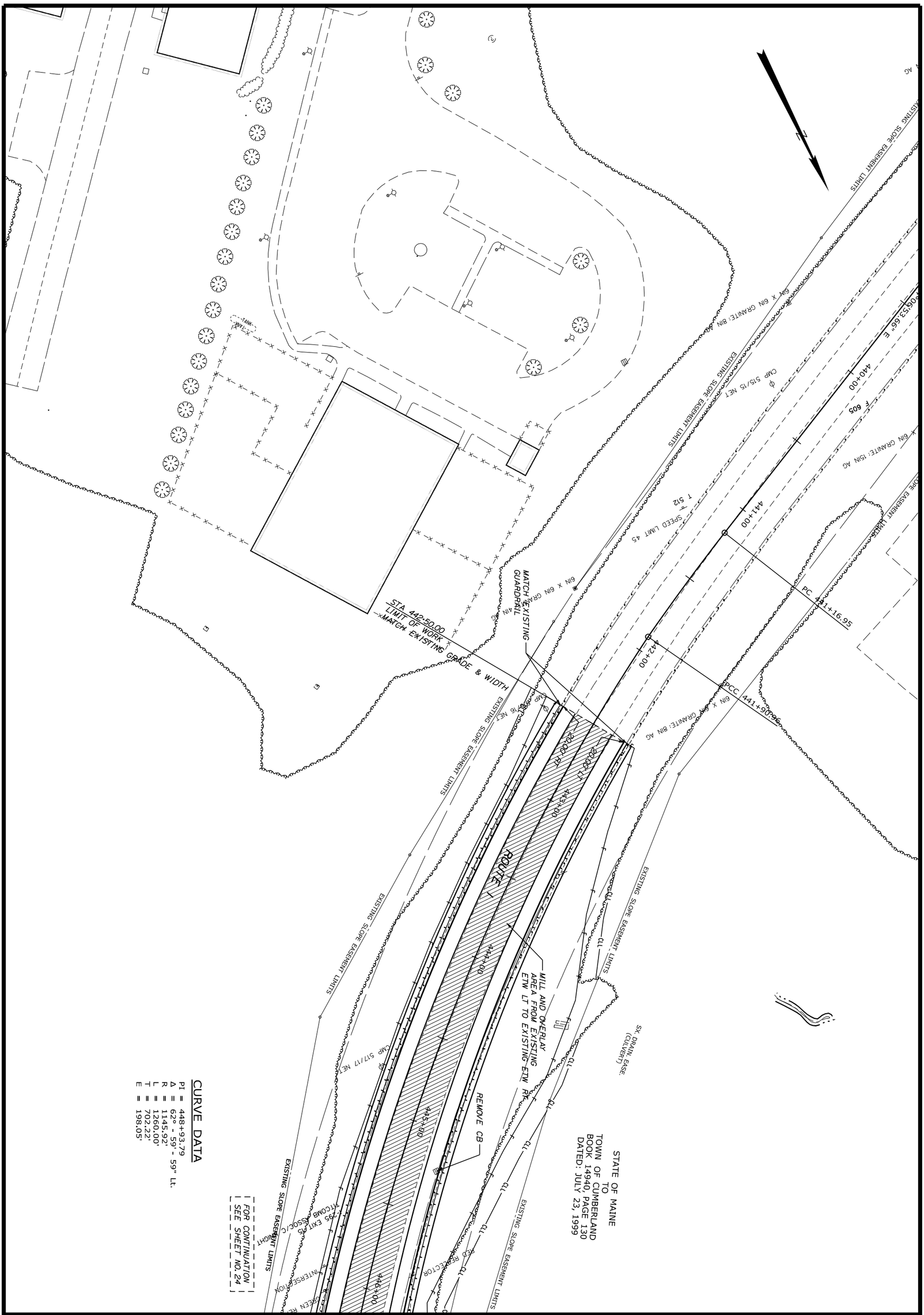
PROJECT LOCUS

SCALE: 1:24,000
NOVEMBER 2012

FIGURE 1

37579-001 1.PDF

Filename: Division: HIGHWAY Username: COMMON Date:2/21/2011



SHEET NUMBER 23 OF 226	YARMOUTH I-295 EXIT 15 PLANS	PROJ. MANAGER / DESIGN-DETAILED / CHECKED-REVIEWED / DESIGN2-DETAILED2 / DESIGN3-DETAILED3 / REVISIONS 1 / REVISIONS 2 / REVISIONS 3 / REVISIONS 4 / FIELD CHANGES (BY, DATE) SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION IM-295-1108(600)E EXIT 15 CM-1794(000)X PARK & RIDE LOT PIN 11086.00 EXIT 15 PIN 17490.00 PARK & RIDE LOT HIGHWAY PLANS

Filename: Division: HIGHWAY Username: COMMON Date:2/21/2011

STATE OF MAINE
TO
TOWN OF CUMBERLAND
BOOK 14940, PAGE 130
DATED: JULY 23, 1999

WIDGERY THOMAS
TO
STATE OF MAINE
DATED: 5/14/69
BOOK 3086, PAGE 173

FOR CONTINUATION SEE SHEET NO. 26

FOR CONTINUATION SEE SHEET NO. 23

FOR CONTINUATION SEE SHEET NO. 25

TOWN LINE

CUMBERLAND

YARMOUTH

EXISTING SLOPE EASEMENT LIMITS

REMOVE CB

RELOCATE (BY OTHERS)

6IN X 6IN GRANITE

12IN RCP

445+00

446+00

447+00

448+00

449+00

450+00

451+00

200+00

MILL AND OVERLAY AREA FROM EXISTING ETW LT TO EXISTING ETW RT

LIMIT OF MILL AND OVERLAY AT PROPOSED ETW RT. STA. 447+25 RT TO STA. 448+25 RT

LIMIT OF MILL AND OVERLAY AT STA. 448+25

·01.05, 20.00 RT

·32.33, 29.00 RT

·00.92, 29.00 RT

·63.19, 33.88' LT

·200+00.00, 2.00 RT

R=40.00'

U TURN

NO PARKING

KEEP RIGHT

KEEP RIGHT W/DIAMOND REFLECTOR

GREEN REFLECTOR

INTERSECTION

I-295 EXIT 15
YARMOUTH/CUMBERLAND

I-295 EXIT 15
PORTLAND

ROUTE 1

TBM 183

TBM 184

TBM 185

TBM 187

F 542

T 540

F 544

HB-YA-112

HB-YA-113

HB-YA-401

SEE S.H.C. 3-193
(FEE - RESTRICTED TO SCENIC USE)

SEE SEWER & WATER EASE PLAN PLAN BOOK 193, PAGE 345

REMOVE PIPE

REMOVE HMA AND PLACE 2" LOAM AND SEED (TYP)

EXISTING SLOPE EASEMENT LIMITS

CMP 518/17-1 NET W/ UG

KEBAR W/CAP ·1252· 6IN AG

18IN CMP

24IN CMP

12IN RCP

CB5

CB6

DMH1

PI 200+79.70

P.I.

CURVE DATA

PI = 448+93.79
Δ = 62° - 59' - 59" Lt.
R = 1145.92'
L = 1260.00'
T = 702.22'
E = 198.05'

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 PARK & RIDE LOT
PIN 17490.00 PARK & RIDE LOT

HIGHWAY PLANS

SIGNATURE

P.E. NUMBER

DATE

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER

24

OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE
P.E. NUMBER
DATE

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
25
OF 226

CURVE DATA
PI = 448+93.79
Δ = 62° - 59' - 59" Lt.
R = 1145.92'
L = 1260.00'
T = 702.22'
E = 198.05'

CURVE DATA
PI = 127+15.40
Δ = 83° - 50' - 21" Rt.
R = 237.00'
L = 346.80'
T = 12.79'
E = 81.51'

CURVE DATA
PI = 201+74.43
Δ = 13°32'10.3" Rt.
R = 182.00'
L = 43.00'
T = 21.60'
E = 1.28'

CURVE DATA
PI = 202+39.48
Δ = 50°46'05.0" Rt.
R = 92.00'
L = 81.52'
T = 43.65'
E = 9.83'

CURVE DATA
PI = 202+94.03
Δ = 10°28'31.1" Rt.
R = 182.00'
L = 33.27'
T = 16.68'
E = 0.76'

FOR CONTINUATION SEE SHEET NO. 24

FOR CONTINUATION SEE SHEET NO. 26

FOR CONTINUATION SEE SHEET NO. 35

FOR CONTINUATION SEE SHEET NO. 36

WIDGERY THOMAS TO STATE OF MAINE DATED: 5/14/69 BOOK 3086, PAGE 173

SEE S.H.C. 3-193 (EE - RESTRICTED TO SCENIC USE)

TBM 185

TBM 184

TBM 183

T 542

T 541

T 540

F 606

F 607

ROUTE 1

NB OFF AUX. RAMP

NB ON RAMP

NB OFF BASELINE

NB OFF AUXILIARY BASELINE

456+92.28, 20.00 LT

457+51.99, 14.51 LT

454+23.51, 16.00 RT

455+82.01, 16.00 RT

452+15.44, 38.32 RT

457+75.41, 26.00 RT

125+94.35, 19.26 RT

203+10.62, 2.00 RT

2.00 RT

LIMIT OF MILL AND OVERLAY, STA. 453+70

MILL AND OVERLAY AREA FROM EXISTING ETW LT TO EXISTING ETW OF INSIDE LANE RT

128+47.50, 4.00 RT

124+83.67, 8.00 RT

GRADE GRASS AREA DOWNWARD FROM EOP TO CB. 4:1 MAX
RESET SIGNS.
6" LOAM AND SEED

350 FLARED TERMINAL

REMOVE CB

REMOVE HMA AND PLACE 2" LOAM AND SEED (TYP)

REMOVE HMA AND PLACE 2" LOAM AND SEED (TYP)

PAVEMENT GRADING BREAK LINE:
RADIUS=252'
PAVEMENT CROSS SLOPE NORTH OF LINE CONTROLLED BY NB OFF BASELINE:
PAVEMENT CROSS SLOPE SOUTH OF LINE CONTROLLED BY NB OFF AUXILIARY BASELINE

TYLER TECHNOLOGIES, INC.
COLE HAAN - LESSEE
TA = 61.7± AC.(SURVEY)
PP 4

LOT PLANS THIS AREA
"SURVEY FOR COLE-HAAN"
BY LAND USE CONSULTANTS
PLAN BOOK 193, PAGE 245
"COLE HAAN SITE PLAN WITH LOT
DIVISION AND ACCESS R.O.W."
PLAN BOOK 208, PAGE 314

SEE SEWER & WATER EASE. PLAN PLAN BOOK 193, PAGE 245

EXISTING SLOPE EASEMENT LIMITS

6IN X 6IN GRANITE CUMBERLAND AND CHEBEAQUE TECHNOLOGIES PARK

HB-YA-401

HB-YA-39

HB-YA-38

HB-YA-37

HB-YA-36

HB-YA-35

HB-YA-34

HB-YA-33

HB-YA-32

HB-YA-202

HB-YA-203

HB-YA-201

CB6 12" RCP

CB7 12" RCP

CB8

CB9

DMH1

DMH2

12" RCP

24IN CMP

12IN RCP

6IN SCH 40 PVC

POB 200+00.00

POB 150+00.00

PC 201+52.83

PC 201+95.83

PCC 202+77.35

PT 203+10.62

PT 200+79.70

PC 124+83.67

PT 124+25.07

PT 128+47.50

PC 113+81.25

TYPE B UD

TYPE C UD

EXISTING C.O.A.

EXISTING SLOPE EASEMENT LIMITS

EXISTING R.O.W.

EXISTING CL

CLL

PFO

ETW

EOP

KEEP RIGHT - NO U TURN

STOP

DO NOT ENTER

YIELD / DO NOT ENTER

ONE WAY

WRONG WAY

YELLOW REFLECTOR

RED REFLECTOR

DIAMOND REFLECTOR

U TURN W/REFLECTOR

NO LEFT TURN

CUMBERLAND

YARMOUTH

SERVICES

18" OPT. III

15" OPT. III

4IN WIDE

4IN WHITE

4IN YELLOW

6" LOAM AND SEED

NORTH TO 115

W/ COVER

NET 1.5%

NET 1.6%

0.9%

1.2%

2%

6%

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15
PIN 17490.00 PARK & RIDE LOT

HIGHWAY PLANS

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER

26

OF 226

FOR CONTINUATION SEE SHEET NO. 31

FOR CONTINUATION SEE SHEET NO. 40

FOR CONTINUATION SEE SHEET NO. 27

FOR CONTINUATION SEE SHEET NO. 25

SB ON RAMP

I-295 SB

I-295 NB

NB OFF RAMP

ROUTE 1

HB-YA-103

HB-YA-104

HB-YA-105

HB-YA-106

HB-YA-402

HB-YA-403

HB-YA-504

WIDGERY THOMAS
TO
STATE OF MAINE
DATED: 5/14/69
BOOK 3086, PAGE 173

SEE S.H.C. 3-198
(FEE - RESTRICTED TO SCENIC USE)

100' BUFFER

LEVEL SPREADER
SEE DRAINAGE
DETAILS SHEET

PT 517+08.05

PT 522+37.48

EXISTING C.O.A.

EXISTING SLOPE EASEMENT LIMITS

6IN X 6IN GRANITE: 9IN AG

6IN X 6IN GRANITE: 16IN AG

6IN X 6IN GRANITE: 20IN AG

6IN X 6IN GRANITE: 12IN AG & LEANING

6IN X 6IN GRANITE: 6IN AG & LEANING

RETAINING WALL NO LEFT TURN

REMOVE 250' OF EXIST GUARDRAIL

RED REFLECTOR

SAWCUT

N53°57'30"E

GUARDRAIL BRIDGE TRANSITION TYPE 2 TYPICAL ALL 4 CORNERS
459+95.88,
14.51 LT

TIE PROPOSED GUARDRAIL INTO EXISTING GUARDRAIL

QUADGUARD IMPACT ATTENUATOR

112+55.30,
30.30 LT

112+55.30,
18.00 LT

460+19.34,
26.00 RT

MILL AND OVERLAY ENTIRE WIDTH OF BRIDGE PAVEMENT

LOW VOLUME TERMINAL END

GREEN REFLECTOR

TYPE B UD

CB

24IN RCP

12IN CONCRETE

24IN WIDE

6IN CMP UD

6IN CMP: UNDER DRAIN

24IN X 24IN CONCRETE ELL

TBM 172

TBM 173

TBM 152

TBM 154

T 532

T 531

11+4 (HISTORIC)

11+5 (HISTORIC)

11+2 (HISTORIC)

11+1 (HISTORIC)

5001
5002
5003
5004

5C01
5C02
5C03
5C04
5C05
5C06
5C07
5C08
5C09
5C10
5C11

514+00
515+00
516+00
517+00
452+00
453+00
454+00
455+00
456+00
457+00
458+00
459+00
109+00
110+00
111+00
112+00
113+00
114+00
115+00
461+00
608
506
523
PI 111+33.73
PI 111+53.72

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

FOR CONTINUATION SEE SHEET NO. 31

FOR CONTINUATION SEE SHEET NO. 28

FOR CONTINUATION SEE SHEET NO. 26

FOR CONTINUATION SEE SHEET NO. 36

HB-YA-511

HB-YA-508

HB-YA-404

HB-YA-106

HB-YA-107

HB-YA-502

HB-YA-503

HB-YA-301

HB-YA-304

522+00

523+00

524+00

525+00

526+00

527+00

528+00

529+00

530+00

531+00

532+00

533+00

534+00

535+00

536+00

537+00

538+00

539+00

540+00

541+00

542+00

543+00

544+00

545+00

546+00

547+00

548+00

549+00

550+00

551+00

552+00

553+00

554+00

555+00

556+00

557+00

558+00

559+00

560+00

561+00

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

ST. LAWRENCE AND ATLANTIC RAILROAD CO

CURVE DATA
PI = 621+98.58
Δ = 74° - 37' - 43" Lt.
R = 164.00'
L = 213.61'
T = 125.00'
E = 42.21'

CURVE DATA
PI = 623+75.59
Δ = 53° - 20' - 09" Rt.
R = 176.00'
L = 163.84'
T = 88.40'
E = 20.95'

CURVE DATA
PI = 601+31.64
Δ = 64° - 32' - 02" Lt.
R = 100.00'
L = 112.63'
T = 63.14'
E = 18.26'

FOR CONTINUATION SEE SHEET NO. 31

FOR CONTINUATION SEE SHEET NO. 29

ENTRANCE/EXIT TO PARK & RIDE

PROHIBITED ON RAMPS

REMOVE HMA AND PLACE 2" LOAM & SEED (TYP)

2 WAY TRAFFIC WITH ALL TRAFFIC RIGHT

DIAMOND REFLECTORS

605+00 604+00 624+43 603+00 602+00 624+00 601+00 623+00 622+00

18.02 16.00' LT

R=480.00'

622+78.95

45°

REBAR W/CAP "CATHEDRAL" 18" AG

CB3

6" BIN GRANITE BIN AG

44.43 3.99' LT

PK NAIL FOUND

ALL TRAFFIC RIGHT

HB-YA-601

R=96.00'

36.97 31.38' RT

PT 601+81.09

GRANITE MONUMENT: LAYMAN ON LOCK

STOP

DO NOT ENTER

18" BIN CMP

UNKNOWN OUTLET

18" DPT. III

REMOVE EXIST. CB

HIGH VOLTAGE POWER LINES

CENTRAL MAINE POWER COMPANY

REMOVE LP

NORTH BIORETENTION CELL SEE DRAINAGE DETAILS SHEET

R=71.15'

350 FLARED TERMINAL

86.53 16.77' LT

MILL AND OVERLAY AREA FROM EXISTING ETW LT TO EXISTING ETW RT

EXISTING SLOPE EASEMENT LIMITS

8" UNDERDRAIN

HB-YA-607

EXIT EDUCATION

NORTH WATER QUALITY DITCH. SEE DRAINAGE DETAILS SHEET

LOW VOLUME GUARDRAIL TERMINAL

STA. 465+30.85, 29.00' LT

CONC HEADWALL

41.77 29.00' LT

R=180.00'

HB-YA-508

18" RCP

EX. SLOPE

HB-YA-107

HB-YA-510

R=90.00'

NO LEFT TURN

SOUTH / NORTH

ROUTE 1

HB-YA-404

465+00 466+00 467+00 468+00 469+00 470+00

POB 300+00.00

HB-YA-405

02.18 16.00' RT

R=190.00'

03.31 31.01' LT

R=190.00'

R=93.00'

CB4

UNKNOWN 24" RCP OUTLET

WEIGHT RESTRICTION

STA. 469+62.00, 23.00 RT

REMOVE LP

I-295 NB

CLL

EXISTING SLOPE

STA. 469+62.00, 27.00 RT

RELOCATION BY OTHERS

18" OPT. III

I-295 SOUTHPORTLAND

EXISTING SLOPE EASEMENT LIMITS

350 FLARED TERMINAL

S.H.C. FILE NO. 13-124

CMP

11/HYNES D

PCC 467+30.92

6IN X 6IN GRANITE MONUMENT LEANING

24IN ELECTRICAL BOX

RELOCATE ELECTRICAL CONTROL BOX (SEE LIGHTING PLANS)

CURVE DATA
PI = 469+75.41
Δ = 24° - 05' -31" Rt.
R = 1145.92'
L = 481.84'
T = 244.53'
E = 25.80'

FOR CONTINUATION SEE SHEET NO. 27

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE
P.E. NUMBER
DATE

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
28
OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

ST. LAWRENCE AND ATLANTIC RAILROAD CO

I-295 EXIT 15 ISOTROPIC HIGH-TILT COMB CMP09 w/ TRANSFORMER

REMOVE HMA AND PLACE 2" LOAM & SEED (TYP)

RELOCATE BY OTHERS

DIAMOND REFLECTOR

SPEED LMT 45

I-295 SOUTH

·12.61, 31.00 LT

·36.90, 20.66 LT

PT 473+36.90

END CONST ROUTE 1 SB MATCH EXISTING GRADE AND WIDTH

·36.90, 12.00 LT

CMP 08

PORTLAND / CUMBERLAND

FDM RS-0141[1]

295 SOUTH

FOR CONTINUATION SEE SHEET NO. 30

ROUTE 1

N 25°24'42.26" E

N 25°39'05.54" E

N 25°39'44.21" E

470+00

471+00

472+00

473+00

474+00

475+00

476+00

·12.78, 20.50 RT

·87.00, 26.80 RT

NORTH

SPEED LMT 40

18IN CMP

TOWN OF YARMOUTH

PCC 472+13.76

GRANITE SIN AG

·12.78, 27.00 RT

TRAFFIC SIGNAL

NODE 225

W/ CONTROL BOX

I-295 NB

CMP

EXISTING SLOPE EASEMENT LIMITS

MILL AND OVERLAY FROM EXISTING ETW LT TO EXISTING ETW RT

REMOVE LIGHT POLE

EXISTING SLOPE EASEMENT LIMITS

1 1/2 W UGE&T

·12.00, 26.30 RT

PAVED DRIVE

SIN SHRUB COVER

PT 474+32.76

YARMOUTH WOODS

PT 474+59.90

PAVED DRIVE

SIN

502

NAIL FOUND

·62.40, 26.00 RT

CLE VALVE

HYDRANT

GATE

PARKING

·37.39, 22.50 RT

MILL AND OVERLAY FROM CL TO EXISTING ETW RT

FOR CONTINUATION SEE SHEET NO. 28

CURVE DATA

PI = 469+75.41
Δ = 24° - 05'-31" Rt.
R = 1145.92'
L = 481.84'
T = 244.53'
E = 25.80'

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE

P.E. NUMBER

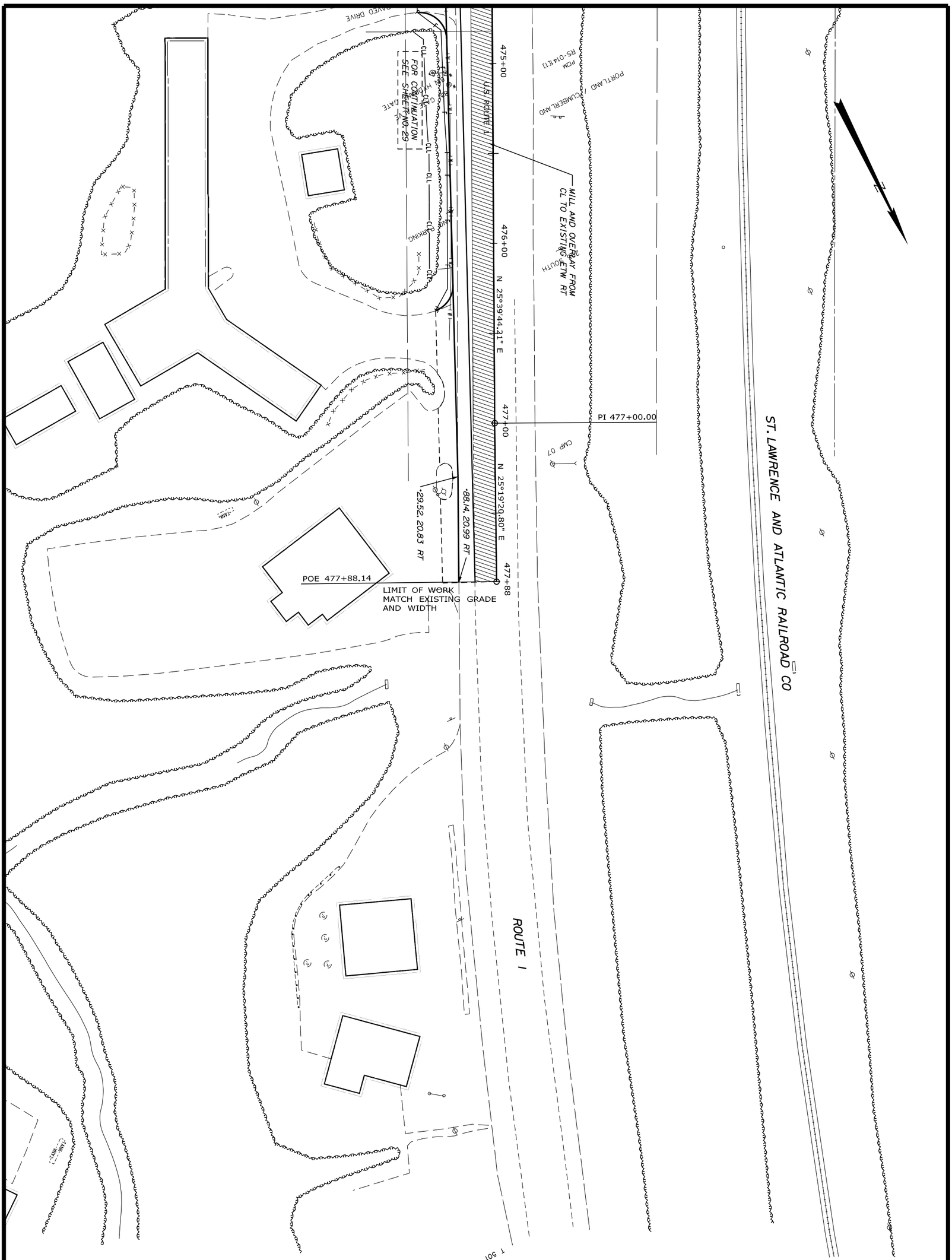
DATE

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED		
DESIGN3-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
29
OF 226



SHEET NUMBER 30 OF 226	YARMOUTH I-295 EXIT 15 PLANS	PROJ. MANAGER / DESIGN-DETAILED / CHECKED-REVIEWED / DESIGN2-DETAILED2 / DESIGN3-DETAILED3 / REVISIONS 1 / REVISIONS 2 / REVISIONS 3 / REVISIONS 4 / FIELD CHANGES (BY / DATE)	SIGNATURE P.E. NUMBER DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT
PIN 11086.00 EXIT 15
PIN 17490.00 PARK & RIDE LOT
HIGHWAY PLANS

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

ST. LAWRENCE AND ATLANTIC RAILROAD CO

MAINTENANCE FACILITY

RAILROAD CROSSING

REVERSE DIRECTION AHEAD

STOP AHEAD

MOOT MAINTENANCE LOT

HIGH VOLTAGE POWER LINES

FOR CONTINUATION SEE SHEET NO. 28

FOR CONTINUATION SEE SHEET NO. 32

FOR CONTINUATION SEE SHEET NO. 27

FOR CONTINUATION SEE SHEET NO. 22

SEE S.H.C. 3-193

SEE S.H.C. 3-193
(FEE - RESTRICTED TO SCENIC USE)

SB ON RAMP

RIGHT TURN

NORTH BIO-RETENTION CELL, SEE DRAINAGE DETAILS SHEET

WATER QUALITY DITCH SOUTH
SEE DRAINAGE DETAILS SHEET

WATER QUALITY DITCH NORTH
SEE DRAINAGE DETAILS SHEET

SCREENING FENCE

EASEMENT

LIMITS

100' BUFFER

LEVEL SPREADER
SEE DRAINAGE DETAILS SHEET

WIDGERY THOMAS
TO
STATE OF MAINE
DATED: 5/14/69
BOOK 3086, PAGE 173

TE OF EMILY S. RAND
RT S. O'DONNELL
JANE O'DONNELL HACKER
ERSONAL REPRESENTATIVES

L.1

CURVE DATA
PI = 617+41.39
Δ = 26° - 15' - 23" Lt.
R = 164.00'
L = 75.15'
T = 38.25'
E = 4.40'

CURVE DATA
PI = 619+61.83
Δ = 47° - 32' - 57" Rt.
R = 287.00'
L = 238.18'
T = 126.43'
E = 26.61'

CURVE DATA
PI = 621+98.58
Δ = 74° - 37' - 43" Lt.
R = 164.00'
L = 213.61'
T = 125.00'
E = 42.21'

CURVE DATA
PI = 515+63.91
Δ = 41° - 38' - 31" Lt.
R = 416.00'
L = 302.34'
T = 158.20'
E = 29.06'

CURVE DATA
PI = 521+00.29
Δ = 82° - 09' -57" Rt.
R = 244.00'
L = 349.91'
T = 212.73'
E = 79.71'

PC 618+27.14
PT 617+70.00
PC 616+94.84
PT 517+08.05
PC 518+87.56
PRC 620+65.33
PT 522+37.48

HB-YA-602
HB-YA-603
HB-YA-604
HB-YA-605
HB-YA-606
HB-YA-607
HB-YA-504
HB-YA-505
HB-YA-506
HB-YA-506B
HB-YA-507
HB-YA-508
HB-YA-511
HB-YA-105
HB-YA-106
HB-YA-107

CB3

8" UNDERDRAIN

REBAR W/ ALUMINUM CAP IN AG

4IN X 4IN GRANITE IN AG

SAAT-0.46

SAAB 0.46 SAA17

P.L. SAAB EASEMENT

SOUTH / NORTH

EX. SAAB

-49

-00

-49.58 44.62' RT
R=15.00'
-64.57 30.00' RT
R=50.00'
-75.01 16.00' RT
-24.99 67.27' RT
R=10.00'
-33.27 16.00' LT
-43.25 25.34' LT
-80.19 9.35' LT
R=4.00'
-84.17 4.00' LT
-25.35 8.00' LT
R=180.00'
-97.48 18.00' RT
R=90.00'

611+00 610+00 609+00 608+00 607+00 606+00 605+00
616+00 617+00 618+00 619+00 620+00 621+00 622+00
516+00 517+00 518+00 519+00 520+00 521+00 522+00 523+00

12' 14' 4' 10' 8'

T 536

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE
P.E. NUMBER
DATE

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
31
OF 226

ST. LAWRENCE AND ATLANTIC RAILROAD CO

S.H.C. FILE NO. 3-49

I-295 SOUTH

RED REFLECTOR

REVERSE DIRECTION

POST AND RAIL FENCE

•72.61
20.00' LT

•31.08
32.94' RT

•71.09
4.00' LT

612+00

R=4.00'

•67.54
10.42' LT

HB-YA-604

PC 612+11.50

PT 614+91.10

ESTATE OF EMILY S. RAND
ROBERT S. O'DONNELL
MARY JANE O'DONNELL HACKER
CO-PERSONAL REPRESENTATIVES
PP 6
TM. 7 L.1

FOR CONTINUATION
SEE SHEET NO. 31

REMOVE HMA AND PLACE
2" LOAM & SEED (TYP)

I-535

STOP

YELLOW REFLECTOR

YELLOW REFLECTOR

HB-YA-509

PT 508+84.81

350 FLARED
TERMINAL

TOWN
LINE

YARMOUTH
CUMBERLAND

6IN CMP UD

HB-YA-605

SOUTH BIO-RETENTION CELL
SEE DRAINAGE DETAILS SHEET

EXISTING C.O.A.

CURVE DATA
PI = N/A
Δ = 180° - 00' - 00" Lt.
R = 89.00'
L = 279.60'
T = N/A
E = N/A

614+00

CBI

•35.05
10.42' LT

•31.50
4.00' LT

R=4.00'

615+00

HB-YA-60

BEAUTIFICATION

18" OPT. III

24" OPT. III

CB2

EXISTING

EXISTING C.O.A.

509+00

510+00

CURVE DATA
PI = 451+83.60
Δ = 22° - 55' - 41" Rt.
R = 3819.72'
L = 1528.54'
T = 774.64'
E = 77.76'

FT APPROXIMATE OUTLET: END BURIED

HB-YA-503

514+00

TOWNLINE MONUMENT-RM X 6IN X 24IN

TOWN LINE BOUNDARY

446+00

447+00

CURVE DATA
PI = 103+48.03
Δ = 05° - 04' - 23" Rt.
R = 3765.72'
L = 333.42'
T = 166.82'
E = 3.69'

FOR CONTINUATION
SEE SHEET NO. 33

SAWCUT

CURVE DATA
PI = 515+63.91
Δ = 41° - 38' - 31" Lt.
R = 416.00'
L = 302.34'
T = 158.20'
E = 29.06'

PC 514+05.71

WATER QUALITY
DITCH SOUTH
SEE DRAINAGE
DETAILS SHEET

512+00

513+00

STA. 512+87.00,
18.00 RT

553

SB ON RAMP

514+00

103+00

104+00

448+00

6IN CMP UD

STA. 105+14.51,
12.00 LT

I-295 SB

STA. 512+87.00,
23.00 RT

HB-YA-102

STA. 512+87.00,
33.00 RT

449+00

515+00

516+00

HB-YA-504

105+00

NB OFF RAMP

I-295 NB

15IN RCP

15IN CMP

450+00

106+00

S.H.C. FILE NO. 3-124

FOR CONTINUATION
SEE SHEET NO. 35

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE

P.E. NUMBER

DATE

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
32
OF 226

Filename:
Division: HIGHWAY
Usernome: COMMON
Date:2/21/2011

Usercname: COMMON Date:2/21/2011

Division: HIGHWAY

Filename:

CUMBERLAND
YARMOUTH

ST. LAWRENCE AND ATLANTIC RAILROAD CO

EXISTING C.O.A.

FOR CONTINUATION
SEE SHEET NO. 34

REMOVE LP

CURVE DATA
PI = 505+17.07
Δ = 10° - 54' - 42" Rt.
R = 3873.72'
L = 737.73'
T = 369.98'
E = 17.63'

24IN CMP

24IN CMP

I-295 SOUTH

RED REFLECTOR

REMOVE HMA AND PLACE
2" LOAM & SEED (TYP)

503+00
504+00
505+00
506+00
507+00
508+00
509+00

SB ON RAMP

I-295 SB

I-295 NB

440+00
441+00
442+00
443+00
444+00
445+00
446+00

SAWCUT

HB-YA-101

MERCURY

MILE 15

APPROXIMATE OUTLET

15IN RCP

HB-YA-509

PT 508+84.81

FOR CONTINUATION
SEE SHEET NO. 32

350 FLARED
TERMINAL

TOWN
LINE

ASSESSMENT DESC. C KNIGHT

STA. 508+84.81,
12.00 RT

STA. 100+00.00,
10.00 RT

HB-YA-1

GREEN REFLECTOR

546

CURVE DATA
PI = 451+83.60
Δ = 22° - 55' - 41" Rt.
R = 3819.72'
L = 1528.54'
T = 774.64'
E = 77.76'

28IN WHITE PINE

POB 100+00.00
STA 442+92.35
41.80' RT
MAINLINE MEDIAN BASELINE
LIMIT OF WORK
MATCH EXISTING GRADE
AND WIDTH

CURVE DATA
PI = 103+48.03
Δ = 05° - 04' - 23" Rt.
R = 3765.72'
L = 333.42'
T = 166.82'
E = 3.69'

EXISTING C.O.A.

STA. 101+81.08,
12.00 LT

SAWCUT

101+00
102+00
103+00
104+00

NB OFF RAMP

MILE 15

STA. 101+81.08,
8.00 RT

PC 101+81.08

HB-YA-2

HB-YA-117

FOR CONTINUATION
SEE SHEET NO. 35

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE

P.E. NUMBER

DATE

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
33
OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

ST. LAWRENCE AND ATLANTIC RAILROAD CO

EXISTING C.O.A.

6IN X 6IN GRANITE MONUMENT - 10IN AG

GREEN REFLECTOR

I-295 SOUTH

PC 498+45.47
STA 435+56.50, 42.00' LT
MAINLINE & MEDIAN BASELINE
BEGIN PROJECT
MATCH EXISTING GRADE
AND WIDTH

MEET EXIST GUARDRAIL

STA. 498+45.47,
8.00 LT

I-295 SB

CURVE DATA

PI = 499+96.37
Δ = 04° - 52' - 33" Rt.
R = 3544.36'
L = 301.62'
T = 150.90'
E = 3.21'

CURVE DATA

PI = 505+17.07
Δ = 10° - 54' - 42" Rt.
R = 3873.72'
L = 737.73'
T = 3769.98'
E = 17.63'

PCC 501+47.09

REMOVE HMA AND PLACE
2" LOAM & SEED TYP

REMOVE LP

FOR CONTINUATION
SEE SHEET NO. 33

REMOVE LP

YIELD

499+00
500+00
501+00
502+00
503+00

SAWCUT

STA. 501+47.09,
12.00 RT

SB ON RAMP

433+00
434+00
435+00
436+00
437+00
438+00
439+00
440+00

N25°38'02"E

I-295 NB

518

RED REFLECTOR

17IN RED PINE

6IN X 6IN GRANITE MONUMENT

6IN X 6IN HIGHWAY CONTROL MONUMENT

CURVE DATA

PI = 451+83.60
Δ = 22° - 55' - 41" Rt.
R = 3819.72'
L = 1528.54'
T = 774.64'
E = 77.76'

533

DOUBLE MAPLE: 9IN & 6IN

EXISTING C.O.A.

EXISTING C.O.A.

EXISTING C.O.A.

EXISTING C.O.A.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE
P.E. NUMBER
DATE

BY	DATE

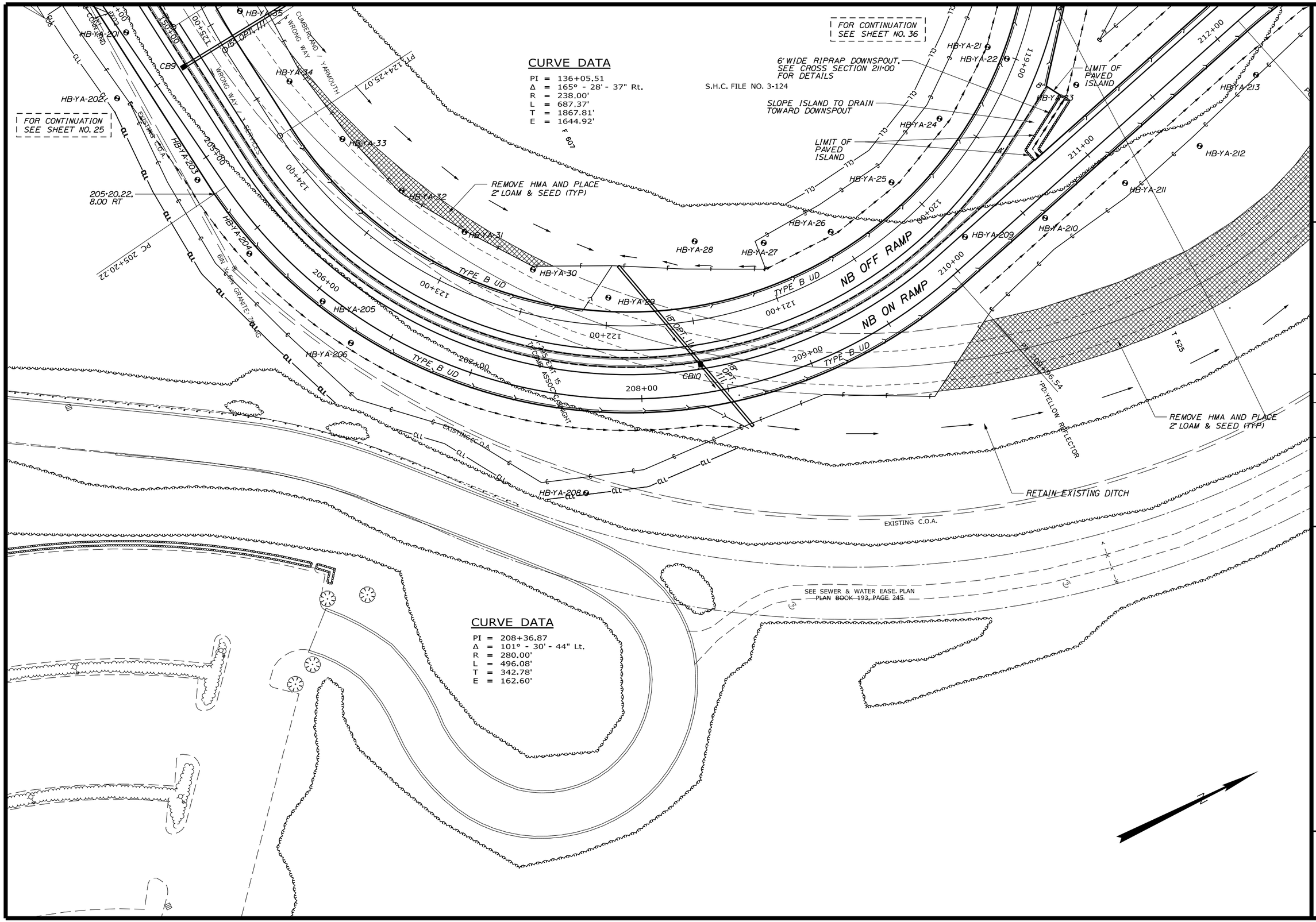
PROJ. MANAGER
DESIGN-DETAILED
CHECKED-REVIEWED
DESIGN2-DETAILED2
DESIGN3-DETAILED3
REVISIONS 1
REVISIONS 2
REVISIONS 3
REVISIONS 4
FIELD CHANGES

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
34
OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER

35

OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

FOR CONTINUATION SEE SHEET NO. 27

FOR CONTINUATION SEE SHEET NO. 26

FOR CONTINUATION SEE SHEET NO. 37

FOR CONTINUATION SEE SHEET NO. 35

CURVE DATA
PI = 468+04.08
Δ = 17° - 00' - 00" Lt.
R = 3819.72'
L = 1133.33'
T = 570.86'
E = 42.42'

CURVE DATA
PI = 114+83.55
Δ = 18° - 28' - 57" Rt.
R = 628.00'
L = 202.58'
T = 102.18'
E = 8.26'

CURVE DATA
PI = 116+62.43
Δ = 27° - 43' - 26" Rt.
R = 318.00'
L = 153.87'
T = 78.47'
E = 9.54'

CURVE DATA
PI = 136+05.51
Δ = 165° - 28' - 37" Rt.
R = 238.00'
L = 687.37'
T = 1867.81'
E = 1644.92'

CURVE DATA HB-YA-110
PI = 213+80.53
Δ = 55° - 29' - 26" Rt.
R = 325.00'
L = 314.76'
T = 170.96'
E = 42.22

I-295 SB
I-295 NB
SB OFF RAMP
NB OFF RAMP
NB ON RAMP
EXISTING EDGE OF SHOULDER
EXISTING EDGE OF TRAVEL LANE
SAWCUT
REMOVE HMA AND PLACE 2" LOAM & SEED (TYP)
REMOVE DMH
RETAIN EXISTING 24" CMP
REMOVE 2 X 18" CMP
350 FLARED TERMINAL
ROCK CUT, 1:4 SLOPE
DITCH WITH STONE PROTECTION
6' WIDE RIPRAP DOWNSPOUT. SEEE CROSS SECTION 211+00 FOR DETAILS
REMOVE HMA AND PLACE 2" LOAM AND SEED (TYP)
RETAIN EXIST. DITCH
TYPE B UD
24" OPT. III
S.H.C. FILE NO. 3-124

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
36
OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

FOR CONTINUATION SEE SHEET NO. 27

FOR CONTINUATION SEE SHEET NO. 36

EXISTING C.O.A.

EXISTING BEAUTIFICATION ESEMENT LIMITS

HIGH VOLTAGE POWER LINES

304+00

305+00

306+00

307+00

308+00

309+00

310+00

311+00

312+00

464+00

465+00

466+00

467+00

468+00

469+00

470+00

219+00

220+00

221+00

222+00

215+00

216+00

217+00

218+00

18IN CMP

24IN CMP

36IN CMP

6IN

6IN GRANITE 9IN AG

CLL

SB OFF RAMP

NB ON RAMP

I-295 SB

I-295 NB

TYPE B UD

REMOVE HMA AND PLACE 2" LOAM & SEED (TYP)

REMOVE HMA AND PLACE 2" LOAM AND SEED (TYP)

350 FLARED TERMINAL

RED REFLECTOR

TBM 170

T 529

EXIT 15 FORMERLY 16

DIAMOND REFLECTOR

305+67.63, 18.00 LT

305+80.38, 58.98 LT

216+30.44, 33.00 LT

216+30.44, 23.00 LT

216+30.44, 18.00 LT

HB-YA-218

HB-YA-217

HB-YA-219

HB-YA-220

HB-YA-109

HB-YA-108

HB-YA-110

HB-YA-302

PT 221+30.55

PCC 308+25.93

PCC 311+30.12

TBM 169

TBM 165

EXIT 15 CUMBERLAND - YARMOUTH

EXIT 25 MPH

YARMOUTH FREEPORT

SAWCUT

SAWCUT

SPIKE FOUND

SBM

IRON RED PIPE

IRON WHITE PIPE

5/8IN PIPE 8IN AG

WIDGERY THOMAS TO STATE OF MAINE DATED: 5/14/69 BOOK 3086, PAGE 173

T 537

T 539

SEE S.H.C. 3-193 (FEE - RESTRICTED TO SCENIC USE)

SEE S.H.C. 3-193

220+35.87, 12.00 LT

FOR CONTINUATION SEE SHEET NO. 38

CURVE DATA

PI = 305+55.97
Δ = 33° - 43' - 58" Lt.
R = 945.00'
L = 556.37'
T = 286.51'
E = 42.48'

CURVE DATA

PI = 468+04.08
Δ = 17° - 00' - 00" Lt.
R = 3819.72'
L = 1133.33'
T = 570.86'
E = 42.42'

CURVE DATA

PI = 309+78.30
Δ = 09° - 14' - 56" Lt.
R = 1885.00'
L = 304.29'
T = 152.47'
E = 6.16'

CURVE DATA

PI = 223+02.49
Δ = 07° - 57' - 54" Lt.
R = 3919.00'
L = 544.80'
T = 272.94'
E = 9.49'

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

BY	DATE	SIGNATURE
		P.E. NUMBER
		DATE

PROJ. MANAGER	
DESIGN-DETAILED	
CHECKED-REVIEWED	
DESIGN2-DETAILED2	
DESIGN3-DETAILED3	
REVISIONS 1	
REVISIONS 2	
REVISIONS 3	
REVISIONS 4	
FIELD CHANGES	

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER

37

OF 226

Filename:
Division: HIGHWAY
Username: COMMON
Date:2/21/2011

EXISTING BEAUTIFICATION ESEMENT LIMITS

H.C. 3-193

CURVE DATA
PI = 309+78.30
Δ = 09° - 14' - 56" Lt.
R = 1885.00'
L = 304.26'
T = 152.47'
E = 6.16'

CURVE DATA
PI = 468+04.08
Δ = 17° - 00' - 00" Lt.
R = 3819.72'
L = 1133.33'
T = 570.86'
E = 42.42'

CURVE DATA
PI = 312+80.20
Δ = 04° - 33' - 52" Lt.
R = 3765.72'
L = 300.00'
T = 150.08'
E = 2.99'

EXISTING BEAUTIFICATION ESEMENT LIMITS

EXISTING C.O.A.

5/8IN PIPE 8IN AG

EXIT 15 CUMBERLAND - YARMOUTH

PCC 311+30.12

TBM 169

310+00

HB-YA-302

311+00

312+00

313+00

314+00

315+00

316+00

FOR CONTINUATION SEE SHEET NO. 37

311+30.12 12.00 RT

15" CMP

SB OFF RAMP

I-295 SB

460+00

470+00

471+00

472+00

473+00

474+00

475+00

476+00

15IN CMP

SAWCUT

6IN CMP UP

AUTHORIZED VEHICLES ONLY

I-295 NB

220+00

221+00

222+00

223+00

224+00

225+00

226+00

227+00

NB ON RAMP

527

PC 220+35.87

SAWCUT

314+30.12 12.00 RT

24IN WHITE PINE

PT 314+30.12

6IN X 6IN HIGHWAY CONTROL MONUMENT

6IN X 6IN GRANITE MONUMENT; 9IN AG

EXISTING C.O.A.

POE 316+20.98 LIMIT OF WORK MATCH EXIST GRADE & WIDTH

6IN X 6IN GRANITE MONUMENT; 10IN AG

HB-YA-303

N36°17'23"E

316+20.98 10.00 LT

350 FLARED TERMINAL

FOR CONTINUATION SEE SHEET NO. 39

N31°44'47"E

HIGH VOLTAGE POWER LINES

EXISTING C.O.A.

6IN X 6IN GRANITE MONUMENT; 6IN AG

6IN X 6IN GRANITE MONUMENT; 4IN AG

EXISTING C.O.A.

PD SIGN POST

CURVE DATA
PI = 223+02.49
Δ = 07° - 57' - 54" Lt.
R = 3919.00'
L = 544.80'
T = 272.94'
E = 9.49'

SEE S.H.C. 3-193

CENTRAL MAINE POWER COMPANY
PP 7 & 8

LIMITS

EXISTING C.O.A.

6IN X 6IN GRANITE MONUMENT

EXISTING C.O.A.

PT 225+80.67

5/8IN X 5/8IN CONCRETE MONUMENT

FREEPORT NEXT 4 EXITS

602

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE
P.E. NUMBER
DATE

BY	DATE

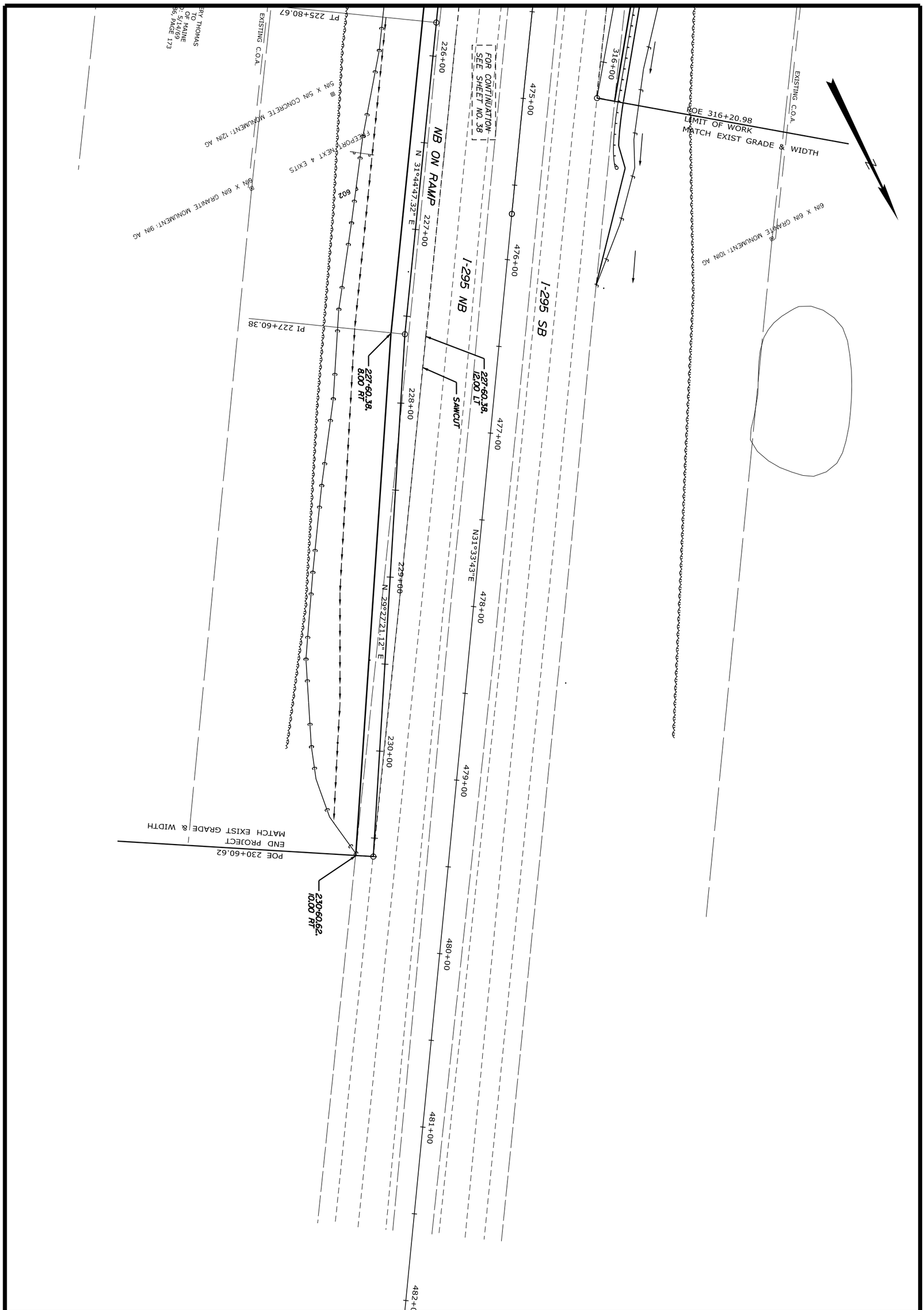
PROJ. MANAGER
DESIGN-DETAILED
CHECKED-REVIEWED
DESIGN2-DETAILED2
DESIGN3-DETAILED3
REVISIONS 1
REVISIONS 2
REVISIONS 3
REVISIONS 4
FIELD CHANGES

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER
38
OF 226

Filename: Division: HIGHWAY Username: COMMON Date:2/21/2011



SHEET NUMBER 39 OF 226

YARMOUTH
I-295 EXIT 15

PLANS

PROJ. MANAGER		BY	DATE
DESIGN-DETAILED			
CHECKED-REVIEWED			
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15
PIN 17490.00 PARK & RIDE LOT

HIGHWAY PLANS

Usermame: COMMON Date:2/21/2011

Division: HIGHWAY

Filename:

FOR CONTINUATION SEE SHEET NO. 32

FOR CONTINUATION SEE SHEET NO. 26

FOR CONTINUATION SEE SHEET NO. 24

FOR CONTINUATION SEE SHEET NO. 25

SEE S.H.C. 3-193
(FEE - RESTRICTED TO SCENIC USE)

SAWCUT

SAWCUT

S.H.C. FILE NO. 3-124

I-295 SB

I-295 NB

SB ON RAMP

NB OFF RAMP

EXISTING C.O.A.

EXISTING C.O.A.

EXISTING C.O.A.

EXISTING C.O.A.

TOWN LINE YARMOUTH

PCC 105+14.51

PT 108+27.79

105+14.51, 12.00 LT

15" CMP

6IN CMP UD

15IN CMP

15IN RCP

6IN X 6IN GRANITE

6IN X 6IN GRANITE

9IN X 9IN LOCK

6IN X 6IN GRANITE: 16IN AG

PED TWN OAK 9"&10"

6" OAK

HB-YA-2

HB-YA-117

HB-YA-116

HB-YA-115

HB-YA-114

HB-YA-113

HB-YA-102

HB-YA-3

103+00 104+00 105+00 106+00 107+00 108+00 109+00

448+00 449+00 450+00 451+00 452+00

513+00 514+00 515+00

CURVE DATA

PI = 451+83.60
Δ = 22° - 55' - 41" Rt.
R = 3819.72'
L = 1528.54'
T = 774.64'
E = 77.76'

CURVE DATA

PI = 103+48.03
Δ = 05° - 04' - 23" Rt.
R = 3765.72'
L = 333.42'
T = 166.82'
E = 3.69'

CURVE DATA

PI = 106+71.63
Δ = 09° - 26' - 51" Rt.
R = 1900.00'
L = 313.29'
T = 157.00'
E = 6.48'

WIDGERY THOMAS TO STATE OF MAINE DATED: 5/14/69 BOOK 3086, PAGE 173

F 542

F 543

F 541

TBM 185

TBM 184

IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 IN9 IN10 IN11 IN12 IN13 IN14 IN15 IN16 IN17 IN18 IN19 IN20 IN21 IN22 IN23 IN24 IN25 IN26 IN27 IN28 IN29

IP01 IP02 IP03 IP04 IP05 IP06 IP07 IP08 IP09 IP10 IP11 IP12 END

PFO

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

IM-295-1108(600)E EXIT 15
CM-1794(000)X PARK & RIDE LOT

PIN 11086.00 EXIT 15 HIGHWAY PLANS
PIN 17490.00 PARK & RIDE LOT

SIGNATURE

P.E. NUMBER

DATE

	DATE	BY
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

YARMOUTH
I-295 EXIT 15

PLANS

SHEET NUMBER

40

OF 226

APPENDIX A

Test Boring Logs

Preliminary Phase
Test Boring Logs by
MaineDOT
(-100 Series)

Note: Station and offset information provided on the test boring logs reference preliminary alignments no longer being considered, see Sheet Nos. 23-40 for plan location.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-101
PIN: 11086.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/29/08; 12:30-14:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	149+75, 4.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S1		0.70 - 5.00				SSA	-0.70		PAVEMENT. 0.70	G#207212 A-2-4, SM WC=8.4%
										Brown, moist, fine to coarse SAND, some gravel.	
5								-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-102
PIN: 11086.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/29/08; 12:30-14:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	153+65, 6.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S2		0.70 - 3.40				SSA	-0.70		PAVEMENT.	
										0.70 Brown, moist, fine to coarse SAND, some gravel.	
	S3		3.40 - 5.00					-3.40		3.40 Dark brown, moist, fine to medium SAND, little silt.	G#207213 A-2-4, SM WC=12.8%
5								-5.00		5.00 **Bottom of Exploration at 5.00 feet below ground surface.** NO REFUSAL	
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-103
PIN: 11086.00

Driller:	MaineDOT	**Elevation (ft.)**		**Auger ID/OD:**	5" Dia.
Operator:	E. Giguere	**Datum:**	NAVD 88	**Sampler:**	Off Flights
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	N/A
Date Start/Finish:	12/29/08; 12:30-14:00	**Drilling Method:**	Solid Stem Auger	**Core Barrel:**	N/A
Boring Location:	156+55, 57.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None observed
Hammer Efficiency Factor:		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	S4		0.70 - 5.00				SSA	-0.70		PAVEMENT. 0.70	
										Brown, moist, fine to coarse SAND, some gravel.	
5								-5.00		5.00	
										Bottom of Exploration at 5.00 feet below ground surface. NO REFUSAL	
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-104
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/19/08; 08:00-08:30	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	157+00, 5.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/16	0.00 - 2.00	1/2/4/6	6	8	HSA	-0.20		TOP SOIL, (Sod). 0.20 Brown, moist, loose, fine SAND, trace silt.	G#207214 A-3, SP-SM WC=29.8%
5	2D	24/20	5.00 - 7.00	6/12/17/19	29	37		-5.50		5.50 Olive, moist, very stiff, SILT, little fine sand.	G#207215 A-4, CL-ML WC=23.6%
10	3D	24/15	10.00 - 12.00	6/5/4/4	9	12		-10.50		10.50 Grey, wet, loose, fine SAND, some silt.	G#207216 A-4, ML WC=24.8%
15	MD	1.2/0	15.00 - 15.10					-15.10		Failed sample attempt. 15.10 **Bottom of Exploration at 15.10 feet below ground surface.** REFUSAL	
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-105
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/19/08; 08:30-09:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	159+07, CL	**Casing ID/OD:**	N/A	**Water Level*:**	None observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/20	0.00 - 2.00	1/1/4/5	5	6	HSA	-0.20		TOP SOIL, (Sod). 0.20	G#207217 A-4, CL-ML WC=23.2%
										Brown, moist, loose, fine SAND, little silt.	
5								-4.90		4.90 **Bottom of Exploration at 4.90 feet below ground surface.** REFUSAL	
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-106
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/19/08; 09:30-10:30	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	161+00, 5.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/16	0.00 - 2.00	1/1/4/7	5	6	HSA	-0.20		TOP SOIL, (Sod).	
								0.20		Brown, moist, loose, fine SAND, trace silt.	
								-4.50			
5	2D	24/20	5.00 - 7.00	8/9/12/15	21	27		4.50		Olive, moist, very stiff, Clayey SILT, little fine sand.	G#207218 A-4, CL WC=20.1% LL=28 PL=19 PI=9
								-9.50			
10	3D	24/20	10.00 - 12.00	9/33/46/30	79	101		9.50		Brown, moist, very dense, fine to coarse SAND, trace gravel.	
								-13.00			
15	4D	24/22	15.00 - 17.00	15/16/17/17	33	42		13.00		Grey, moist, dense, fine to medium SAND, trace silt.	
								-19.50			
20								19.50		**Bottom of Exploration at 19.50 feet below ground surface.** REFUSAL	
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-107
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/19/08; 10:30-11:30	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	163+00, 5.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	+0.9-0.0' ags.
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/15	0.00 - 2.00	1/1/3/6	4	5	HSA			0.9' of Water/Ice above groud level. Olive-brown, wet, soft, Clayey SILT, little fine sand, roots.	#207219 A-4, CL-ML WC=22.8% LL=22 PL=17 PI=5
	2D	24/18	4.10 - 6.10	6/9/13/16	22	28		-4.60		4.60	
5										Brown, moist, medium dense, fine SAND, some silt.	
								-8.10		8.10	
	3D	8.4/8.4	9.10 - 9.80	5/30(2.4")	---			-9.80		Brown, wet, dense, fine to coarse SAND, some gravel, trace silt. 9.80 **Bottom of Exploration at 9.80 feet below ground surface.** REFUSAL	
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-108
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/22/08; 11:00-12:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	200+00, 6.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/20	0.00 - 2.00	4/5/6/6	11	14	HSA			Brown, moist, medium dense, fine to medium SAND, trace silt.	G#207220 A-4, ML WC=21.8%
								-4.50		4.50	
5	2D	9.6/9.6	5.00 - 5.80	5/30(3.6")	---					Brown, saturated, medium dense, fine to coarse SAND, some gravel.	
								-5.80		5.80	
										Bottom of Exploration at 5.80 feet below ground surface. REFUSAL	
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-109
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/22/08; 12:00-13:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	201+00, 5.0 Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	14.4/8	0.00 - 1.20	3/10/40(2.4")	---		HSA			Brown, saturated, very dense, fine to coarse SAND, some gravel, trace silt.	
								-1.20		1.20	
										Bottom of Exploration at 1.20 feet below ground surface. REFUSAL	
5											
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-110
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/22/08; 14:00-15:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	202+00, 5.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	21.6/14	0.00 - 1.80	1/2/3/50(3.6")	5	6	HSA			Brown, moist, loose, fine to medium SAND, little gravel, little silt.	
								-1.80		1.80	
										Bottom of Exploration at 1.80 feet below ground surface. REFUSAL	
5											
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-111
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/23/08; 15:00-16:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	203+00, 5.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	14.4/6	0.00 - 1.20	2/23/50(2.4")	---		HSA			Brown, moist, very dense, fine to coarse SAND, some gravel, trace silt.	
								-1.20		1.20	
										Bottom of Exploration at 1.20 feet below ground surface. REFUSAL	
5											
10											
15											
20											
25											

Remarks:

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-112
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/24/08; 07:30-08:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	14+00, 5.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0					---		HSA	-0.30		TOPSOIL. 0.30	
	A1		2.00 - 3.90							Brown, moist, fine to coarse SAND, little gravel, trace silt.	
								-3.90		3.90	
5										**Bottom of Exploration at 3.90 feet below ground surface.** REFUSAL	
10											
15											
20											
25											

Remarks:

A=Auger Sample

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: I-295 North On/Off-Ramp
I-295 South On-Ramp
Location: Yarmouth, Maine

Boring No.: HB-YA-117
PIN: 11086.00

Driller:	Northern Test Boring	**Elevation (ft.)**		**Auger ID/OD:**	2-1/2" 6-3/4"
Operator:	Mike/Nick	**Datum:**	NAVD 88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50 (Track)	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	12/24/08; 11:30-12:00	**Drilling Method:**	Hollow Stem Auger	**Core Barrel:**	N/A
Boring Location:	21+00, 14.0 Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.77	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR/C = weight of rods or casing
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.00 - 2.00	1/1/2/4	3	4	HSA			Brown, damp, loose, fine to medium SAND, trace silt.	
								-3.10		3.10	
										Bottom of Exploration at 3.10 feet below ground surface. REFUSAL	
5											
10											
15											
20											
25											

Remarks:

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Design Phase
Test Boring Logs by
Haley & Aldrich, Inc.

Northbound Off-Ramp
Test Boring & Test Probe Logs
(HB-YA-1 series)

Note: Station and offset information provided on the test boring logs reference the NB Off-Ramp baseline stationing, see Sheet Nos. 23-40 for plan locations.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-1
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	124.7	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/09/11-2/09/11	**Drilling Method:**	HSA to 10 ft	**Core Barrel:**	--
Boring Location:	STA. 99+98, 12' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/20	0.5 - 2.5	32/52/55/18	107	107	HSA			Brown, damp (frozen), very dense, gravelly fine to coarse SAND, little silt -FILL-(SP-SM)	G#11716a A-1-a, SP-SM WC=8.5%
								121.2		3.5	
5	2D	24/22	5.0 - 7.0	4/9/15/14	24	24				Grayish-brown, moist, very stiff, silty CLAY, trace fine to medium sand, desiccated with mottling -MARINE DEPOSIT-(CL)	G#11716b A-7-6(28), CL WC=24.5% LL=49, PL=24 PI=25
10	3D	24/24	10.0 - 12.0	9/8/8/9	16	16				Brown-gray, moist to wet, very stiff, silty CLAY, with occasional gray-brown, fine sandy silt seams, mottling -MARINE DEPOSIT-(CL)	
								112.7		12.0	
										Bottom of Exploration at 12.0 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-2
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.2	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/07/11-2/07/11	**Drilling Method:**	HSA to 5.5 ft	**Core Barrel:**	--
Boring Location:	STA. 102+98, 15' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MD = Unsuccessful Split Spoon Sample attempt
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/7	0.0 - 2.0	4/5/7/3	12	12	HSA	119.2		Grey-brown, wet, medium dense, fine to medium SAND, little coarse sand and organic silt, abundant rootlets, slight organic odor -FILL-(SW-SP) 1.0	
	2D	24/17	2.0 - 4.0	7/30/34/52	64	64				Brown, wet, medium dense, GRAVEL, little fine to coarse sand, gravel in tip (GP) Gray, wet, very dense, gravelly fine to coarse SAND, trace silt, rusty decomposed rock -WEATHERED BEDROCK-(SP-SM)	G#11716c A-1-a, SP-SM WC=11.2%
5	2D	24/22	5.5 - 7.5	4/9/15/14	24	24		115.2 114.7		5.0 -WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 5.5 ft. 5.5 **Bottom of Exploration at 5.5 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-3
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.2	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/09/11-2/09/11	**Drilling Method:**	HSA to 30 ft	**Core Barrel:**	--
Boring Location:	STA. 107+97, 8' LT.	**Casing ID/OD:**	--	**Water Level*:**	14.7 ft
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/20	0.5 - 2.5	24/24/25/16	49	49	HSA			Dark brown-brown, dense (frozen), fine to coarse SAND, some gravel, trace silt -FILL-(SP-SM)	G#11716d A-1-b, SP-SM WC=5.2%
								116.2		4.0	
5	2D	24/19	5.0 - 7.0	4/5/5/8	10	10				Gray, moist to wet, stiff, silty CLAY, slightly blocky texture -MARINE DEPOSIT-(CL)	G#11716e A-7-6(22), CL WC=27.6% LL=42, PL=22 PI=20
10	3D	24/24	10.0 - 12.0	1/1/1/WOH	2	2				Gray, wet, very soft, silty CLAY to clayey SILT -MARINE DEPOSIT-(CL/ML)	
15	4D	24/24	15.0 - 17.0	WOH/WOH/WOH/1						Gray, wet, very soft, silty CLAY to clayey SILT, with occasional gray, fine sandy silt seams -MARINE DEPOSIT-(CL/ML)	
20	5D	24/24	20.0 - 22.0	WOH/WOH/WOH/1						Gray, wet, very soft, silty CLAY to clayey SILT, with occasional gray, fine sandy silt seams -MARINE DEPOSIT-(CL/ML)	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-3
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.2	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/09/11-2/09/11	**Drilling Method:**	HSA to 30 ft	**Core Barrel:**	--
Boring Location:	STA. 107+97, 8' LT.	**Casing ID/OD:**	--	**Water Level*:**	14.7 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	24/24	25.0 - 27.0	1/5/3/1	8	8	HSA			Gray, wet, medium stiff, silty CLAY to clayey SILT, with occasional pockets of fine sandy silt -MARINE DEPOSIT-(CL/ML)	
30	7D	24/8	30.0 - 32.0	WOH/4/6/9	10	10		89.2		Gray, wet, soft, silty CLAY to clayey SILT, with occasional pockets of fine sandy silt -MARINE DEPOSIT-(ML) 31.0	
								88.2		Gray, wet, medium dense, fine to medium SAND, little silt, trace gravel and coarse sand -GLACIAL TILL-(SM) 32.0	
35										**Bottom of Exploration at 32.0 feet below ground surface.**	
40											
45											
50											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-7
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	116.7	**Auger ID/OD:**	HW 4 in. I.D.
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	C. Helstrom	**Rig Type:**	Mobile Drill B47 Bombardier	**Hammer Wt./Fall:**	300/24 HW; 140/30 SS
Date Start/Finish:	6/28/11-6/28/11	**Drilling Method:**	HW to 10 ft	**Core Barrel:**	--
Boring Location:	STA. 114+01, 11' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.0 - 2.0	WOH/WOH/1/1	1	1	HW Drive	116.3		Gray and dark brown, wet, very loose, SILT with sand, contains seams of clean fine sand, slight organic odor, contains grass, roots and trace organic soil -TOPSOIL-(ML)	
										0.4	
	2D	24/24	2.0 - 4.0	1/3/1/2	4	4				Gray-brown, wet, very loose, silty SAND, no structure, no odor -MARINE DEPOSIT-(SM)	
										Gray, moist to wet, soft, SILT with sand, occasional fine sand layers, no odor -MARINE DEPOSIT-(ML)	
5	3D	24/24	5.0 - 7.0	3/2/1/1	3	3				Gray, moist to wet, soft, SILT with sand, occasional fine sand layers, no odor, coarse gravel embedded in silt near top of sample, fine sand layers much more frequent than above -MARINE DEPOSIT-(ML)	
								109.2		7.5	
										Note: Coarse sand and fine gravel observed in wash at 7.5 ft. Casing blows increased from 7 to 8 ft. Change of drilling action at 7.5 ft. -GLACIAL TILL-(SP)	
10	4D	24/6	10.0 - 12.0	11/25(5.0")						Gray and brown, wet, dense, poorly-graded SAND with gravel, somewhat bonded, contains weathered rock fragments, evidence of weathered rock in sampler tip	
								105.7		11.0	
										Probable top of bedrock at 11.0 ft. Advanced rollerbit into probable bedrock to 14.0 ft.	
								102.7		14.0	
										Bottom of Exploration at 14.0 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-8
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	116.4	**Auger ID/OD:**	HW 4 in. I.D.
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	C. Helstrom	**Rig Type:**	Mobile Drill B47 Bombardier	**Hammer Wt./Fall:**	300/24 HW; 140/30 SS
Date Start/Finish:	6/28/11-6/28/11	**Drilling Method:**	HW to 35 ft	**Core Barrel:**	--
Boring Location:	STA. 112+83, 16' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/18	0.0 - 2.0	WOH/1/1/2	2	2	HW Drive	116.0		Gray and dark brown, wet, very loose, silty SAND, no structure, slight organic odor, contains trace fine gravel, roots, grass and organic soil. Thin layer of red-brown coarse to fine sand with fine gravel (0.2 ft thick) before transitioning to very soft gray-brown marine clay -TOPSOIL-(SM)	
										0.4	
	2D	24/24	2.0 - 4.0	3/3/5/5	8	8				Light gray and light brown, damp, medium stiff, silty CLAY, contains layers of sandy silt, fine sand and orange-brown mottled clay, no odor -MARINE DEPOSIT-(CL)	
5	3D	24/24	5.0 - 7.0	3/2/1/1	3	3				Light gray, wet, very soft, silty CLAY, contains trace isolated fine gravel fragments, no odor -MARINE DEPOSIT-(CL) Note: Drop stones observed in wash from 5 to 7 ft	
	V1A		7.0 - 8.0	Su=740/140 psf						65x110 mm vane raw torque readings: V1A: 310/60 in-lbs	
	V1B		8.0 - 9.0	Su=710/140 psf						65x110 mm vane raw torque readings: V1B: 300/60 in-lbs	
10	4D	24/24	10.0 - 12.0	WOH/WOH/WHO/2						Light gray, wet, very soft, silty CLAY, contains trace isolated fine gravel fragments, no odor -MARINE DEPOSIT-(CL)	
15	V2A		15.0 - 16.0	Su=795/225 psf						65x110 mm vane raw torque readings: V2A: 340/90 in-lbs	
	V2B		16.0 - 17.0	Su=795/255 psf						65x110 mm vane raw torque readings: V2B: 340/110 in-lbs	
20	5D	24/17	20.0 - 22.0	3/1/1/1	2	2				Gray, wet, very loose, poorly-graded SAND, interbedded with layers of gray silt and gray sandy silt, no odor -MARINE DEPOSIT-(SP)	
								93.4		23.0	
25										Note: Casing driving resistance increased from 23 to 25 ft. Gravel observed in wash water.	

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-8
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	116.4	**Auger ID/OD:**	HW 4 in. I.D.
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	C. Helstrom	**Rig Type:**	Mobile Drill B47 Bombardier	**Hammer Wt./Fall:**	300/24 HW; 140/30 SS
Date Start/Finish:	6/28/11-6/28/11	**Drilling Method:**	HW to 35 ft	**Core Barrel:**	--
Boring Location:	STA. 112+83, 16' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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SSA = Solid Stem Auger
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T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	24/8	25.0 - 27.0	11/11/13/11	24	24	HW Drive			Gray, wet, medium dense, poorly-graded SAND with gravel, somewhat bonded, no odor -GLACIAL TILL-(SP)	
30	7D	24/24	30.0 - 32.0	18/26/43/55	69	69				Gray, wet, very dense, poorly-graded SAND with gravel, somewhat bonded, no odor, contains layers approximately 0.3 to 0.4 ft thick of clean medium to coarse sand and fine gravel -GLACIAL TILL-	
35							OPEN			Note: Advanced casing to 35 ft. Washed ahead without further sampling to bottom of exploration.	
40										Note: Rollerbit through cobbles from approximately 40.0 to 40.8 ft.	
								74.9		41.5 Top of probable bedrdock at 41.5 ft. Advanced rollerbit 1 ft into probable bedrock.	
								73.9		42.5 **Bottom of Exploration at 42.5 feet below ground surface.**	
45											
50											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-9
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**		**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:		**Drilling Method:**	SSA to ___ft	**Core Barrel:**	--
Boring Location:		**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0											
5								-5.2		5.2 -WEATHERED BEDROCK-	
								-6.2		Note: Auger refusal on probable top of bedrock at 6.2 ft. 6.2	
										Bottom of Exploration at 6.2 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Boring No.: HB-YA-9

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-10
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	124.7	**Auger ID/OD:**	NW 3.0 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/15/11-02/16/11	**Drilling Method:**	NW Spun to 7.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 116+00, 1' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							NW			Note: Brown, dry to damp, fine to medium SAND, little silt, trace coarse sand observed from approximately 2 to 4 ft.	
5								118.5		6.2 -WEATHERED BEDROCK-	
	R1	60/57	7.0 - 12.0	RQD = 87%				117.7		7.0 Top of Bedrock at El. 117.7 R1: Gray, medium to fine grained, hard, fresh to slightly weathered GRANOFELS. Joints dipping at horizontal to low angles, very close to close, tight. One high angle secondary joint, occasional quartz veins. Rock Mass Quality-Good -HUTCHINS CORNER FORMATION- R1 Core Times (min:sec): 7.0-8.0' (4:00), 8.0-9.0' (2:00), 9.0-10.0' (1:00), 10.0-11.0' (2:00), 11.0-12.0' (1:00)	
10	R2	60/59	12.0 - 17.0	RQD = 98%						R2: Gray, medium to fine grained, hard, fresh to slightly weathered GRANOFELS. Joints dipping at horizontal to low angles, close to moderately close, tight. Occasional quartz veins. Rock Mass Quality-Excellent -HUTCHINS CORNER FORMATION- R2 Core Times (min:sec): 12.0-13.0' (2:00), 13.0-14.0' (1:00), 14.0-15.0' (1:00), 15.0-16.0' (1:00), 16.0-17.0' (1:00)	
15	R3	60/60	17.0 - 22.0	RQD = 100%						R3: Gray, fine grained, hard, fresh to slightly weathered GRANOFELS. Joints dipping at horizontal to low angles, moderately close, tight to open, occasional quartz veins. Pegmatite intrusion at approximately 18.8 ft. Rock Mass Quality=Excellent -HUTCHINS CORNER FORMATION- R3 Core Times (min:sec): 17.0-18.0' (2:00), 18.0-19.0' (1:00), 19.0-20.0' (2:00), 20.0-21.0' (2:00), 21.0-22.0' (1:00)	
20								102.7		22.0 **Bottom of Exploration at 22.0 feet below ground surface.**	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-11
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	129.6	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 3.1 ft	**Core Barrel:**	--
Boring Location:	STA. 116+52, 15' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								128.0		1.6	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.1 ft.	
								126.5		3.1	
										Bottom of Exploration at 3.1 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-12
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	124.5	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 3.1 ft	**Core Barrel:**	--
Boring Location:	STA. 116+55, 28' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								121.9		2.6	
								121.4		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.1 ft.	
										3.1	
										Bottom of Exploration at 3.1 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-13
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	136.3	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 2.5 ft	**Core Barrel:**	--
Boring Location:	STA. 117+01, 22' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								134.8		1.5	
										-WEATHERED BEDROCK-	
								133.8		Note: Auger refusal on probable top of bedrock at 2.5 ft.	
										2.5	
										Bottom of Exploration at 2.5 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-14
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**		**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA	**Core Barrel:**	--
Boring Location:		**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0										**Bottom of Exploration at 0.0 feet below ground surface.** Note: Bedrock exposed at ground surface, confirmed with hand tools did not drill.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-15
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	137.8	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/17/11-2/17/11	**Drilling Method:**	SSA to 3.0 ft	**Core Barrel:**	--
Boring Location:	STA 117+43, 20' RT	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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MD = Unsuccessful Split Spoon Sample attempt
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								135.9		1.9	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.0 ft.	
								134.8		3.0	
										Bottom of Exploration at 3.0 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-16
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	142.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 1.8 ft	**Core Barrel:**	--
Boring Location:	STA. 117+55, 36' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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U = Thin Wall Tube Sample
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								141.7		1.2	
								141.1		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 1.8 ft.	
										1.8 **Bottom of Exploration at 1.8 feet below ground surface.**	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-17
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	144.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 3.2 ft	**Core Barrel:**	--
Boring Location:	STA. 117+98, 14' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								143.1		1.6	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.2 ft.	
								141.5		3.2	
										Bottom of Exploration at 3.2 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-18
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	147.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 1.6 ft	**Core Barrel:**	--
Boring Location:	STA. 118+00, 37' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	146.8		0.9	
								146.1		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 1.6 ft.	
										1.6	
										Bottom of Exploration at 1.6 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-19
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	146.1	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 2.2 ft	**Core Barrel:**	--
Boring Location:	STA. 118+52, 21' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								144.3		1.8	
								143.9		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.2 ft.	
										2.2	
										Bottom of Exploration at 2.2 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-20
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	150.3	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 4.3 ft	**Core Barrel:**	--
Boring Location:	STA. 118+53, 30' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								149.1		1.2	
										Cobbles/boulders encountered at 1.2 ft -COBBLES/BOULDERS-	
								147.3		3.0	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 4.3 ft.	
								146.0		4.3	
										Bottom of Exploration at 4.3 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-21
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	146.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 6.3 ft	**Core Barrel:**	--
Boring Location:	STA. 118+99, 18' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
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U = Thin Wall Tube Sample
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0											
							SSA			Grayish-brown, moist, silty fine SAND, trace medium sand and gravel (SM)	
5								142.2		4.7	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 6.3 ft.	
								140.6		6.3	
										Bottom of Exploration at 6.3 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-22
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	147.9	**Auger ID/OD:**	--
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/16/11-02/16/11	**Drilling Method:**	NW Spun to 8.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 119+02, 5' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							NW				
								144.9		3.0	
										Note: Encountered apparent weathered bedrock from approximately 3.0 to 7.8 ft. -WEATHERED BEDROCK-	
5											
								140.1		7.8	
	R1	58/58	8.0 - 12.8	RQD = 63%						Top of Bedrock at El. 140.1 R1: Gray, coarse to fine grained, hard, fresh to slightly weathered GRANOFELS with occasional moderately weathered joints. Joints dipping at horizontal to moderate angles, very close to close, open, frequent quartz veins and intrusions. Rock Mass Quality=Fair -HUTCHINS CORNER FORMATION- R1 Core Times (min:sec): 8.0-9.0' (2:00), 9.0-10.0' (2:00), 10.0-11.0' (1:00), 11.0-12.0' (1:00), 12.0-12.8' (2:00)	
10											
	R2	60/52	12.8 - 17.8	RQD = 77%						R2: Gray, coarse to fine grained, hard, fresh to slightly weathered GRANOFELS with occasional moderately weathered joints. Joints dipping at horizontal to low angles, very close to close, open, frequent quartz veins and intrustions. Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R2 Core Times (min:sec): 12.8-13.8' (2:00), 13.8-14.8' (1:00), 14.8-15.8' (2:00), 15.8-16.8' (1:00), 16.8-17.8' (2:00)	
15											
	R3	60/58.5	17.8 - 22.8	RQD = 65%						R3: Gray, medium to fine grained, hard, fresh to slightly weathered GRANOFELS with occasional moderately weathered joints. Joints dipping at horizontal to low angles, very close to close, tight to open, frequent quartz veins and intrusions. Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R3 Core Times (min:sec): 17.8-18.8' (2:00), 18.8-19.8' (1:00), 19.8-20.8' (1:00), 20.8-21.8' (2:00), 21.8-22.8' (1:00)	
20											
	R4	60/56	22.8 - 27.8	RQD = 85%						R4: Gray, coarse to fine grained, hard, fresh to slightly weathered GRANOFELS. Joints dipping at low angles, very close to moderately close, tight to open, frequent quartz veins. Pegmatite intrusion from approximately 25.3 to 26.0 ft.	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-22
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	147.9	**Auger ID/OD:**	--
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/16/11-02/16/11	**Drilling Method:**	NW Spun to 8.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 119+02, 5' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25										Rock Mass Quality-Good -HUTCHINS CORNER FORMATION- R4 Core Times (min:sec): 22.8-23.8' (2:00), 23.8-24.8' (2:00), 24.8-25.8' (1:00), 25.8-26.8' (1:00), 26.8-27.8' (2:00)	
	R5	60/60	27.8 - 32.8	RQD = 89%						R5: Gray, coarse to fine grained, hard, fresh to slightly weathered GRANOFELS. Joints dipping at low angles, very close to moderately close, tight to open, frequent quartz veins. One secondary high angle joint. Pegmatite intrusion from approximately 29.9 to 31.1 ft. Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R5 Core Times (min:sec): 27.8-28.8' (1:00), 28.8-29.8' (2:00), 29.8-30.8' (1:00), 30.8-31.8' (3:00), 31.8-32.8' (1:00)	
30											
35								115.1		32.8 **Bottom of Exploration at 32.8 feet below ground surface.**	
40											
45											
50											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-23
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	150.0	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 1.1 ft	**Core Barrel:**	--
Boring Location:	STA. 119+01, 38' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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SSA = Solid Stem Auger
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RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
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$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	148.9		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 1.1 ft.	
										1.1 **Bottom of Exploration at 1.1 feet below ground surface.**	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-24
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	146.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 3.5 ft	**Core Barrel:**	--
Boring Location:	STA. 119+53, 23' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
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N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								144.0		2.7	
								143.2		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.5 ft.	
										3.5 **Bottom of Exploration at 3.5 feet below ground surface.**	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-25
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	145.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 3.7 ft	**Core Barrel:**	--
Boring Location:	STA. 120+04, 21' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								143.7		2.2	
										-WEATHERED BEDROCK-	
										Note: Auger refusal on probable top of bedrock at 3.7 ft.	
								142.2		3.7	
										Bottom of Exploration at 3.7 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-26
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	149.6	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 6.4 ft	**Core Barrel:**	--
Boring Location:	STA. 120+53, 20' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
										Brown, moist, medium to fine SAND, trace gravel, trace silt (SP-SM)	
5								143.6		6.0	
								143.2		-WEATHERED BEDROCK-	
										Note: Auger refusal on probable top of bedrock at 6.4 ft.	
										6.4	
10										**Bottom of Exploration at 6.4 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-27
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	148.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 2.2 ft	**Core Barrel:**	--
Boring Location:	STA. 120+95, 32' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								147.2		1.5	
								146.5		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.2 ft.	
										2.2 **Bottom of Exploration at 2.2 feet below ground surface.**	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-28
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	146.8	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 2.8 ft	**Core Barrel:**	--
Boring Location:	STA. 121+40, 45' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
								144.8		2.0	
								144.0		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.8 ft.	
										2.8	
										Bottom of Exploration at 2.8 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-29
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	129.4	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/09/11-2/09/11	**Drilling Method:**	SSA to 5.2 ft	**Core Barrel:**	--
Boring Location:	STA. 122+00, 16' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	129.0		-BITUMINOUS CONCRETE- 0.4	
	1D	12/3	1.0 - 2.0	50(4")						Light brown, dry to damp, dense, fine to medium SAND, little coarse sand, trace gravel -FILL-(SP)	
	2D	24/14	2.0 - 4.0	19/12/10/42	22	22					
										Brown to grayish-brown, damp, medium dense, fine to medium SAND, little silt	
								125.4		-FILL-(SM) 4.0	
5								124.2		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 5.2 ft. 5.2	
										Bottom of Exploration at 5.2 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-30
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	130.3	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 5.8 ft	**Core Barrel:**	--
Boring Location:	STA. 122+49, 25' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA 4.5	129.9		-BITUMINOUS CONCRETE- 0.4	
	1D	5/3	1.0 - 1.4	50(5")						Light brown, dry, fine to medium SAND, little gravel and coarse sand, trace silt -FILL-(SP)	
	2D	24/19	2.0 - 4.0	17/17/14/20	31	31				Light brown, damp, dense, fine to coarse SAND, trace gravel, trace silt -FILL-(SW)	
	3D	16/8	4.5 - 5.8	5/15/50(4")				125.8		Brownish-gray, damp, medium dense, silty medium to fine SAND, trace gravel -FILL-(SM) 4.5	
5								124.5		Grayish-brown, dry to damp, very dense, sandy GRAVEL, trace silt -WEATHERED/BLASTED BEDROCK-(GW) Note: Auger refusal on probable top of bedrock at 5.8 ft. 5.8	
										Bottom of Exploration at 5.8 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-31
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	131.0	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 6.8 ft	**Core Barrel:**	--
Boring Location:	STA. 123+00, 31' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
	1D	24/17	1.0 - 3.0	34/30/24/25	54	54				Light brown, dry to damp, very dense, fine to coarse SAND, little gravel, trace silt -FILL-(SW)	
	2D	24/13	3.0 - 5.0	26/42/17/16	59	59				Brown, dry to damp, very dense to dense, fine to medium, sandy GRAVEL, trace coarse sand, trace silt -FILL-(GW)	
5	3D	24/19	5.0 - 7.0	20/20/50/50(4")	70	70		125.5		Brown, dry to damp, very dense to dense, fine to medium, sandy GRAVEL, trace coarse sand, trace silt -FILL-(GW)	
										5.5	
								124.2		Grayish-brown, dry to moist, very dense, sandy GRAVEL, trace silt -WEATHERED/BLASTED ROCK-(GW) Note: Split-spoon refusal on probable top of bedrock at 6.8 ft.	
										6.8	
10										**Bottom of Exploration at 6.8 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-32
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	131.6	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 4.8 ft	**Core Barrel:**	--
Boring Location:	STA. 123+50, 32' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	131.2		-BITUMINOUS CONCRETE- 0.4	
	1D	4/2	1.0 - 1.3	50(4")						Frozen sub-base - FILL- Dark brown, damp, gravelly fine to medium SAND	
	2D	14/9	2.0 - 3.2	20/27/50(2")						-FILL-(SW) Cobbles/frozen material to 2.0 ft	
										Light brown, dry to damp, fine to coarse SAND, little gravel, trace silt -FILL-(SW) Note: Cobbles encountered from approximately 3.2 to 3.8 ft	
	3D	2/2	4.0 - 4.2	50(2")				127.4		Brown, damp to moist gravelly SAND 4.2	
5								126.8		-WEATHERED/BLASTED BEDROCK- Note: Split-spoon refusal at 4.8 ft. 4.8	
										Bottom of Exploration at 4.8 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-33
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	132.3	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	HSA to 8.0 ft	**Core Barrel:**	--
Boring Location:	STA. 124+01, 28' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA	131.7		-BITUMINOUS CONCRETE- 0.6	
	1D	2/0	1.0 - 1.2	50(2")						Brown-gray, fine to medium SAND, little coarse sand, little gravel, trace silt observed in auger cuttings from 0.6 to 1.0 ft	
	2D	24/14	2.0 - 4.0	16/16/11/15	27	27				-FILL-(SP) Light brown, dry to damp, medium dense, fine to medium SAND, little gravel, trace silt	
										-FILL-(SP) Grayish-brown, damp, medium dense, fine to medium SAND, little silt, trace gravel	
	3D	24/13	4.0 - 6.0	13/22/30/30	52	52				-FILL-(SP-SM) Light brown to brown, damp to moist, very dense, fine to coarse SAND, some gravel, trace silt	
5										-FILL-(SW) Grayish-brown, damp to moist, dense, fine to medium SAND, some gravel, little silt, trace coarse sand	
	4D	24/18	6.0 - 8.0	24/23/27/20	50	50				-FILL-(SM)	
								124.3		8.0	
										Bottom of Exploration at 8.0 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-34
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	132.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 7.0 ft	**Core Barrel:**	--
Boring Location:	STA. 124+50, 20' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			-BITUMINOUS CONCRETE-	
								131.9		1.0	
	1D	24/16	1.0 - 3.0	27/18/12/10	30	30				Brown, dry to damp, medium dense, fine to medium SAND, trace gravel, trace coarse sand -FILL-(SP)	
								129.9		3.0	
	2D	24/17	3.0 - 5.0	2/3/5/7	8	8				Gray and brown, damp to moist, loose, alternating layers of brown silty fine SAND and gray fine sandy SILT, little medium sand -MARINE DEPOSIT-(SM)	
5	3D	24/15	5.0 - 7.0	5/12/18/25	30	30					
								126.9		6.0	
								126.0		Grayish-brown, moist, medium dense, fine to medium SAND, some gravel, little silt, trace coarse sand -GLACIAL TILL-(SP)	
								125.9		6.9	
										-WEATHERED BEDROCK-	
										7.0	
10										**Bottom of Exploration at 7.0 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-35
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	133.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 8.0 ft	**Core Barrel:**	--
Boring Location:	STA. 124+99, 14' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			-BITUMINOUS CONCRETE-	
								132.7		1.0	
										Brown, fine to medium SAND, little gravel and coarse sand (auger cuttings)	
	1D	24/16	2.0 - 4.0	40/22/9/6	31	31				-FILL-(SP)	
										Light brown, damp to moist, dense, fine to coarse SAND, trace gravel and silt	
								130.2			
								129.7		-FILL-(SW)	
	2D	24/19	4.0 - 6.0	3/3/4/8	7	7				3.5	
5										Gray, moist, dense, fine SAND, some silt, little medium sand (SP)	
										4.0	
										Brownish-gray, moist, medium stiff, clayey SILT, trace fine sand, with rust-colored mottling (ML)	
	3D	24/20	6.0 - 8.0	3/5/7/10	12	12		127.2		Brownish-gray, moist, stiff, clayey SILT, trace fine sand, with rust-colored mottling (ML)	
										6.5	
								125.7		Grading to a brownish-gray, moist to wet, silty CLAY with blocky texture and mottling	
										-MARINE DEPOSIT-(CL)	
										8.0	
10										**Bottom of Exploration at 8.0 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-37
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	134.5	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 7.0 ft	**Core Barrel:**	--
Boring Location:	STA. 125+48, 10' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	133.7		-BITUMINOUS CONCRETE- 0.8	
										Note: Augered to 2.5 ft due to apparent cobbles. Gravelly SAND with cobbles -FILL-(SW)	
	1D	24/11	2.5 - 4.5	16/5/15/16	20	20		132.0		2.5	
								131.0		Light brown, dry to damp, medium dense, medium to fine SAND, little coarse sand, trace gravel (SP) 3.5	
5										Gray, moist, silty, fine to medium SAND with gravel, fragments in tip of spoon -FILL-(SW)	
	2D	24/19	5.0 - 7.0	5/5/6/6	11	11				Brownish-gray, moist, medium dense, fine to medium SAND, some silt, trace gravel and coarse sand with small fragments -FILL-(SM)	
								127.5		7.0	
										Bottom of Exploration at 7.0 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-38
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	135.2	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 6.0 ft	**Core Barrel:**	--
Boring Location:	STA. 125+99, 7' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	134.4		-BITUMINOUS CONCRETE- 0.8	
										Augered through sub-base from 1.0 to 2.0 ft with cobbles	
	1D	24/14	2.0 - 4.0	35/37/26/30	63	63				-FILL- Brown, dry to damp, very dense, fine to medium SAND, some gravel, little coarse sand, contains stick 1 in. in diameter -FILL-(SW)	
	2D	24/13	4.0 - 6.0	3/2/4/5	6	6				Grayish-brown, damp, loose, fine to medium SAND, little gravel, little silt, trace coarse sand -FILL-(SP-SM)	
5								129.2		6.0	
										Bottom of Exploration at 6.0 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-39
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	135.8	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/10/11-2/10/11	**Drilling Method:**	SSA to 6.0 ft	**Core Barrel:**	--
Boring Location:	STA. 126+48, 6' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			-BITUMINOUS CONCRETE-	
								134.8		1.0	
										Note: Collected soil from auger flights from 1 to 2 ft	
	1D	24/12	2.0 - 4.0	12/11/6/6	17	17				-FILL- Light brown, damp, medium dense, gravelly fine to coarse SAND	
										-FILL-(SW) Brown, damp, medium dense, fine to medium SAND, little gravel, trace coarse sand, trace silt	
	2D	24/14	4.0 - 6.0	8/10/8/8	18	18				-FILL-(SP) Grayish-brown, damp, medium dense, gravelly fine to medium SAND, trace coarse sand and silt	
5										-FILL-(SP)	
								129.8		6.0	
										Bottom of Exploration at 6.0 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Northbound On-Ramp
Test Boring & Test Probe Logs
(HB-YA-200 series)

Note: Station and offset information provided on the test boring logs reference the NB On-Ramp baseline stationing, see Sheet Nos. 23-40 for plan locations.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-201
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	130.5	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/03/11-2/03/11	**Drilling Method:**	HSA to 18.1 ft	**Core Barrel:**	NQ
Boring Location:	STA. 204+09, 4' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
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S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
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LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/17	0.0 - 2.0	1/1/3/5	4	4	HSA	130.3		-TOPSOIL- 0.2 Gray-brown, moist, soft, silty CLAY, trace fine to coarse sand, mottled, contains rootlets -MARINE DEPOSIT-(CL)	G#11717a A-6(16), CL WC=23.5% LL=38, PL=20 PI=18
	2D	24/24	2.0 - 4.0	6/7/9/13	16	16				Gray-brown, moist, very stiff, silty CLAY, trace fine to coarse sand, mottled, blocky texture -MARINE DEPOSIT-(CL)	G#11717b A-6(19), CL WC=25.1% LL=40, PL=22 PI=18
	3D	24/24	4.0 - 6.0	6/8/11/12	19	19				Olive, moist, very stiff, silty CLAY, trace fine to medium sand, contains some decomposed gravel, slightly mottled -MARINE DEPOSIT-(CL)	
5	4D	24/21	6.0 - 8.0	3/8/7/10	15	15				Gray, moist, stiff, silty CLAY, some fine sand, slightly mottled -MARINE DEPOSIT-(CL)	G#11717c A=6(19), CL WC=23.2% LL=39, PL=20 PI=19
	5D	24/24	8.0 - 10.0	2/2/3/4	5	5				Brown, moist, medium stiff, sandy CLAY (CL) Gray, moist, medium stiff, silty CLAY with fine sand seams (CL)	
10	6D	24/24	10.0 - 12.0	3/5/5/4	10	10				Olive, wet, stiff, sandy CLAY, frequent fine sand seams, trace mottling -MARINE DEPOSIT-(CL)	
	7D	24/24	12.0 - 14.0	5/5/5/5	10	10		118.5		12.0 Olive, saturated, loose, silty fine SAND, layers of iron-stained fine sand, (2 to 4 in.) layers of fine sand/silt (SM)	
	8D	24/20	14.0 - 16.0	1/6/14/16	20	20				Light brown, saturated, medium dense, fine SAND, little silt -MARINE DEPOSIT-(SM)	
15								115.0		15.5	
	9D	24/24	16.0 - 18.0	3/6/5/17	11	11		114.5		Dark gray, wet, medium dense, GRAVEL, some sand (GP) 16.0 Brown, saturated, medium dense, fine to medium SAND, little coarse sand, gravel, little silt -GLACIAL TILL-(SP)	
	10D	1.2/3	18.0 - 18.1	50(1.2")				112.4		Brown, saturated, very dense, fine SAND, little medium to coarse sand, little gravel (SP) Note: Split spoon refusal on probable top of bedrock at 18.1 ft. 18.1 **Bottom of Exploration at 18.1 feet below ground surface.**	
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-202
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	133.2	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/03/11-2/03/11	**Drilling Method:**	SSA to 19.8 ft	**Core Barrel:**	--
Boring Location:	STA. 204+39, 28' RT.	**Casing ID/OD:**	--	**Water Level*:**	4.7 ft
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			Brown, wet, sandy CLAY, slightly mottled -MARINE DEPOSIT-(CL)	
								129.2		4.0	
5										Brown, saturated, SILT, some sand -MARINE DEPOSIT-(ML)	
10										Brown, saturated, sandy SILT, trace medium to coarse sand -MARINE DEPOSIT-(ML)	
								121.2		12.0	
										Note: Encountered gravel at 12.0 ft based on drill action.	
15										Gray-brown, wet to saturated, silty SAND, some gravel (SM)	
										Note: Auger refusal on probable top of bedrock at 19.8 ft.	
20								113.4		19.8 **Bottom of Exploration at 19.8 feet below ground surface.**	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-203
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	140.8	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/03/11-2/03/11	**Drilling Method:**	SSA to 3.7 ft	**Core Barrel:**	--
Boring Location:	STA. 205+02, 12' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			Brown, dry to damp, fine to medium SAND, little coarse, trace gravel	
								138.0		2.8	
								137.1		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.7 ft.	
										3.7	
										Bottom of Exploration at 3.7 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-204
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	145.3	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS, 300/16 NW
Date Start/Finish:	2/04/11-2/04/11	**Drilling Method:**	SSA to 5.0 ft, NW to 7.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 205+52, 13' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/9	0.0 - 2.0	2/2/2/3	4	4	SSA	145.0		-TOPSOIL- 0.3	
										Orange-brown, dry to moist, loose, fine to medium SAND, little silt, trace coarse sand and gravel, abundant rootlets -MARINE DEPOSIT-(SM)	G#11717d A-2-4, SM WC=10.1%
	2D	24/15	2.0 - 4.0	1/2/10/10	12	12				Orange-brown, dry to moist, medium dense, fine to medium SAND, little silt, trace coarse sand and gravel -MARINE DEPOSIT-(SM)	
	3D	24/17	4.0 - 6.0	7/9/20/25(4")				141.3		Brown, dry to moist, medium dense, silty fine SAND, little medium sand and gravel, trace coarse sand -GLACIAL TILL-(SM) 4.0	G#11718a A-4, SM WC=12.8%
5							NW	139.5		Brown, dry to moist, medium dense, fine SAND, little medium to coarse sand, trace silt (SP)	
								138.3		Brown, dry to moist, medium dense, fine SAND, some gravel, little medium to coarse sand, well bonded -GLACIAL TILL-(SP) 5.8	
	R1	60/60	8.0 - 13.0	RQD = 83%						-WEATHERED BEDROCK- 7.0	
10										Top of Bedrock at El. 138.3 ft R1: Pinkish-white, aphanitic to coarse-grained igneous GRANITE, very hard, slightly weathered, horizontal to low angle, close, open joints. Contains 2 to 3 in. thick pegmatite veins. Secondary vertical, close, open, joint set, moderately dipping biotite foliation. Rock Mass Qaulity=Good -HUTCHINS CORNER FORMATION- R1 Core Times (min:sec): 8.0-9.0' (3:00), 9.0-10.0' (2:00), 10.0-11.0' (2:00), 11.0-12.0' (2:00), 12.0-13.0' (2:00)	
	R2	60/60	13.0 - 18.0	RQD = 67%				132.1		3 in. thick layer of granofels with baked boundaries -GRANITE- 13.2	
15										R2: Dark gray, aphanitic to fine-grained GRANOFELS, hard, slightly weathered, horizontal to low angles, close, open joints. Pegmatite veins and intrusions (1 to 11 in. thickness), parallel to foliation. Rock Mass Quality=Fair -HUTCHINS CORNER FORMATION- R2 Core Times (min:sec): 13.0-14.0' (2:00), 14.0-15.0' (2:00), 15.0-16.0' (2:00), 16.0-17.0' (2:00), 17.0-18.0' (2:00)	
	R3	60/60	18.0 - 23.0	RQD = 85%						R3: Dark gray, aphanitic to fine-grained GRANOFELS, moderately hard to hard, slightly weathered to fresh, horizontal to low angle, close, open joints with weathering along joint surfaces. Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R3 Core Times (min:sec): 18.0-19.0' (1:00), 19.0-20.0' (1:00), 20.0-21.0' (1:00), 21.0-22.0' (1:00), 22.0-23.0' (2:00)	
20											
	R4	60/52	23.0 - 28.0	RQD = 87%						R4: Dark gray, aphanitic to fine-grained GRANOFELS, moderately hard to hard, slightly weathered to fresh, horizontal to low angle, close, open joints with weathering along joint surfaces. Rock Mass Quality=Good	
25											

Remarks:

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2. Hammer consisted of rope and cathead and safety hammer.

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Boring No.: HB-YA-204

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-204
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	145.3	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS, 300/16 NW
Date Start/Finish:	2/04/11-2/04/11	**Drilling Method:**	SSA to 5.0 ft, NW to 7.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 205+52, 13' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25										-HUTCHINS CORNER FORMATION- R4 Core Times (min:sec): 23.0-24.0' (1:00), 24.0-25.0' (2:00), 25.0-26.0' (2:00), 26.0-27.0' (2:00), 27.0-28.0' (2:00)	
	R5	62/61	27.8 - 33.0	RQD = 98%						Note: 2 in. of R4 recovered in R5. R5: Dark gray, aphanitic to fine-grained GRANOFELS, hard, fresh, horizontal to low angle, close to moderately close, open joints, 10 in. pegmatite vein at 2.7 ft. Rock Mass Quality=Excellent -HUTCHINS CORNER FORMATION- R5 Core Times (min:sec): 28.0-29.0' (2:00), 29.0-30.0' (2:00), 30.0-31.0' (2:00), 31.0-32.0' (2:00), 32.0-33.0' 2:00)	
30											
	R6	61/60	33.0 - 38.1	RQD = 98%						R6: Dark gray, aphanitic to fine-grained GRANOFELS, hard, fresh, low angle, moderately close, open joints, 0.5 to 5 in. pegmatite veins parallel to foliation (low angle foliation). Rocm Mass Quality=Excellent -HUTCHINS CORNER FORMATION- R6 Core Times (min:sec): 33.0-34.0' (2:00), 34.0-35.0' (2:00), 35.0-36.0' (2:00), 36.0-37.0' (2:00), 37.0-38.0' (3:00)	
35											
								107.3		38.0 **Bottom of Exploration at 38.0 feet below ground surface.**	
40											
45											
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-205
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	147.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/03/11-2/03/11	**Drilling Method:**	SSA to 8.8 ft	**Core Barrel:**	--
Boring Location:	STA. 206+00, 4' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			Light brown, dry to moist, fine SAND, some silt, little medium sand, trace coarse sand and gravel (SM)	G#11718b A-2-4, SM WC=9.1%
										Note: Cobbles encountered from 4.0 to 5.0 ft.	
5										Brown, moist, fine to medium SAND, some gravel (SP)	
								140.5		7.4	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 8.8 ft.	
								139.1		8.8	
10										**Bottom of Exploration at 8.8 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-206
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	150.5	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/04/11-2/04/11	**Drilling Method:**	SSA to 3.3 ft	**Core Barrel:**	--
Boring Location:	STA. 206+26, 15' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA			Brown, dry to damp, fine to medium SAND (SP)	
								149.5		1.0	
										-WEATHERED BEDROCK-	
										Note: Auger refusal on probable top of bedrock at 3.3 ft.	
								147.2		3.3	
										Bottom of Exploration at 3.3 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Boring No.: HB-YA-206

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-208
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	170.9	**Auger ID/OD:**	--
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/31/11-1/31/11	**Drilling Method:**	NW Spun to 5.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 207+66, 55' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	19/14	0.0 - 1.6	1/1/4/50(1")	5	5	NW	170.7		-TOPSOIL- 0.2	
								169.3		Light brown to orange-brown, dry to moist, loose, fine SAND, little medium sand and silt, trace coarse sand, trace gravel, poorly graded, weathered rock in spoon tip (SP) 1.6	
										-WEATHERED BEDROCK-	
								166.4		4.5	
5	R1	60/60	5.0 - 10.0	RQD = 23%						Top of Bedrock at El. 166.4 R1: Dark gray, fine to coarse-grained GRANOFELS, moderately hard, slightly to moderately severe weathering, horizontal to low angle, very close to close, open joints. Rust staining on most joint surfaces. Rock Mass Quality=Poor -HUTCHINS CORNER FORMATION- R1 Core Times (min:sec) 5.0-6.0' (2:00), 6.0-7.0' (2:00), 7.0-8.0' (2:00), 8.0-9.0' (1:00), 9.0-10.0' (1.00)	
10	R2	60/60	10.0 - 15.0	RQD = 68%						R2: Dark gray, fine to coarse-grained GRANOFELS, moderately hard, slightly to moderately weathered, horizontal to low angle, very close to moderate, open joints. Increased weathering and rust along joint surfaces. Occasional pegmatite veins. Pegmatite intrusion from approximately 19.0 to 19.8 ft. Rock Mass Quality=Fair -HUTCHINS CORNER FORMATION- R2 Core Times (min:sec): 10.0-11.0' (2:00), 11.0-12.0' (2:00), 12.0-13.0' (2:00), 13.0-14.0' (1:00), 14.0-15.0' (2:00)	
15	R3	60/60	15.0 - 20.0	RQD = 47%						R3: Dark gray, fine to coarse-grained GRANOFELS, moderately hard, fresh to slightly weathered with occasional moderately weathered joints. Horizontal to moderately dipping, very close to close, open joints. Increased weathering and rust staining on joint surfaces. Occasional pegmatite veins. Pegmatite intrusions from approximately 18.6 to 19.0 ft and 19.3 to 21. 0 ft. Rock Mass Quality=Poor -HUTCHINS CORNER FORMATION- R3 Core Times (min:sec): 15.0-16.0' (1:00), 16.0-17.0' (1:00), 17.0-18.0' (1:00), 18.0-19.0' (1:00), 19.0-20.0' (2:00)	
20	R4	60/60	20.0 - 25.0	RQD = 67%						R4: Dark gray, fine to coarse-grained GRANOFELS, moderately hard, fresh to slightly weathered with occasional moderately weathered joints. Horizontal to moderately dipping, very close to close, open joints. Increased weathering and rust staining on joint surfaces. Occasional pegmatite veins. Rock Mass Quality=Fair -HUTCHINS CORNER FORMATION- R4 Core Times (min:sec): 20.0-21.0' (2:00), 21.0-22.0' (2:00), 22.0-23.0' (2:00), 23.0-24.0' (2:00), 24.0-25.0' (2:00)	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-208
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	170.9	**Auger ID/OD:**	--
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/31/11-1/31/11	**Drilling Method:**	NW Spun to 5.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 207+66, 55' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	R5	60/60	25.0 - 30.0	RQD = 73%						R5: Dark gray, fine to coarse-grained GRANOFELS, moderately hard, fresh to slightly weathered, horizontal to low angle, very close to close, tight to open joints. Rock Mass Quality=Fair -HUTCHINS CORNER FORMATION- R5 Core Times (min:sec): 25.0-26.0' (2:00), 26.0-27.0' (2:00), 27.0-28.0' (2:00), 28.0-29.0' (2:00), 29.0-30.0' (2:00)	
30	R6	60/60	30.0 - 35.0	RQD = 92%						R6: Gray to dark gray, fine to medium-grained GRANOFELS, moderately hard, slightly weathered, horizontal to low angle, close, open joints, occasional pegmatite veins. Rock Mass Quality=Excellent -HUTCHINS CORNER FORMATION- R6 Core Times (min:sec): 30.0-31.0' (2:00), 31.0-32.0' (2:00), 32.0-33.0' (2:00), 33.0-34.0' (2:00), 34.0-35.0' (2:00)	
35	R7	48/48	35.0 - 39.0	RQD = 69%						R7: Gray to dark gray, fine to medium-grained GRANOFELS, moderately hard, slightly weathered, horizontal to low angle, close, open joints, occasional pegmatite veins. Rock Mass Quality=Fair -HUTCHINS CORNER FORMATION- R7 Core Times (min:sec): 35.0-36.0' (1:00), 36.0-37.0' (1:00), 37.0-38.0' (2:00), 38.0-39.0' (1:00)	
								131.9		39.0 **Bottom of Exploration at 39.0 feet below ground surface.**	
40											
45											
50											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-209
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	147.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 8.0 ft	**Core Barrel:**	--
Boring Location:	STA. 210+10, 12' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0											
										Grayish-brown, moist, fine sandy SILT (ML)	
5											
								140.6		7.3	
								139.9		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 8.0 ft.	
										8.0 **Bottom of Exploration at 8.0 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-210
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	148.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 7.0 ft	**Core Barrel:**	--
Boring Location:	STA. 210+51, 11' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0										Grayish-brown, moist, silty fine SAND, little medium sand, trace coarse sand and gravel (SM)	G#11718c A-2-4, SM WC=17.8%
5								142.6		6.1 -WEATHERED BEDROCK-	
								141.7		Note: Auger refusal on probable top of bedrock at 7.0 ft. 7.0 **Bottom of Exploration at 7.0 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-211
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	149.1	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 3.5 ft	**Core Barrel:**	--
Boring Location:	STA. 210+99, 26' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0								146.2		2.9	
								145.6		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 3.5 ft.	
										3.5	
										Bottom of Exploration at 3.5 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-212
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	145.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 2.6 ft	**Core Barrel:**	--
Boring Location:	STA. 211+45, 39' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0								143.9		2.0	
								143.3		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.6 ft.	
										2.6	
										Bottom of Exploration at 2.6 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-213
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	140.9	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 4.1 ft	**Core Barrel:**	--
Boring Location:	STA. 211+97, 30' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0										Brown, moist, medium to fine SAND, little silt, trace gravel (SM)	
								137.4		3.5	
								136.8		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 4.1 ft.	
5										4.1 **Bottom of Exploration at 4.1 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Boring No.: HB-YA-213

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-214
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	147.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/15/11-2/15/11	**Drilling Method:**	SSA to 2.1 ft	**Core Barrel:**	--
Boring Location:	STA. 212+05, 32' LT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0								146.1		1.6	
								145.6		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.1 ft.	
										2.1 **Bottom of Exploration at 2.1 feet below ground surface.**	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-215
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	133.4	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	02/14/11-02/14/11	**Drilling Method:**	SSA to 4.5 ft	**Core Barrel:**	--
Boring Location:	STA. 212+57, 18' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0										Brown, moist, fine SAND, little silt, trace gravel and medium sand (SM)	
								129.5		3.9	
								128.9		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 4.5 ft.	
5										4.5 **Bottom of Exploration at 4.5 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-215

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-216
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	125.4	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/01/11-2/01/11	**Drilling Method:**	SSA to 5.8 ft, NW to 8.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 214+12, 23' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/17	0.0 - 2.0	2/3/4/7	7	7	SSA	124.9		-TOPSOIL- 0.5 Brown, moist, loose, fine SAND, some medium sand, little coarse sand and gravel, trace silt, seams of medium sand, with wood fragments (SP)	
										Note: Augered through cobbles from 2.0 to 3. 0 ft.	
	2D	24/8	3.0 - 5.0	8/38/43/41	81	81				Brown, moist, very dense, fine SAND, some gravel, trace medium to coarse sand, gravel in spoon tip -GLACIAL TILL-(SP)	
5	3D	5/5	5.5 - 5.9	50/(5")				119.6		Note: Augered through cobble from 5.0 to 5.5 ft. Brown, moist, very dense, fine SAND, little medium to coarse sand, trace gravel, weathered rock in tip (SP) 5.8	
							NW			-WEATHERED BEDROCK-	
								117.9		7.5 Top of Bedrock at El. 117.9	
	R1	60/60	8.0 - 13.0	RQD = 82%						R1: Blueish-dark gray, aphanitic to medium-grained GRANOFELS, moderately hard to hard, slightly weathered, low angle, close, open joints, occasional 2.0 to 6.0 in. pegmatite veins. Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R1 Core Times (min:sec): 8.0-9.0' (3:00), 9.0-10.0' (3:00), 10.0-11.0' (2:00), 11.0-12.0' (2:00), 12.0-13.0' (2:00)	
10											
	R2	60/60	13.0 - 18.0	RQD = 87%						R2: Blueish to dark gray, aphanitic to medium-grained GRANOFELS, moderately hard to hard, slightly weathered to fresh, horizontal to low angle, close, open joints. Some healed, vertical joints. 1 to 5 in. thick pegmatite veins. Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R2 Core Times (min:sec): 13.0-14.0' (2:00), 14.0-15.0' (2:00), 15.0-16.0' (2:00), 16.0-17.0' (2:00), 17.0-18.0' (2:00)	
15											
	R3	60/60	18.0 - 23.0	RQD = 93%						R3: Blueish to dark gray, aphanitic to medium-grained GRANOFELS, moderately hard to hard, slightly weathered to fresh, low angle, close, open joints. 0.5 to 4 in. pegmatite veins. Rock Mass Quality=Excellent -HUTCHINS CORNER FORMATION- R3 Core Times (min:sec): 18.0-19.0' (2:00), 19.0-20.0' (2:00), 20.0-21.0' (2:00), 21.0-22.0' (2:00), 22.0-23.0' (2:00)	
20											
	R4	60/59	23.0 - 28.0	RQD = 83%						R4: Blueish to dark gray, aphanitic to medium-grained GRANOFELS, moderately hard to hard, slightly weathered to fresh, horizontal to low angle, close, open joints. One vertical weathered calc-silicate seam at the bottom of the core. 0.5 to 2 in. pegmatite veins.	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-216
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	125.4	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/01/11-2/01/11	**Drilling Method:**	SSA to 5.8 ft, NW to 8.0 ft	**Core Barrel:**	NQ
Boring Location:	STA. 214+12, 23' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25										Rock Mass Quality=Good -HUTCHINS CORNER FORMATION- R4 Core Times (min:sec): 23.0-24.0' (2:00), 24.0-25.0' (2:00), 25.0-26.0' (2:00), 26.0-27.0' (2:00), 27.0-28.0' (2:00)	
								97.4		28.0 **Bottom of Exploration at 28.0 feet below ground surface.**	
30											
35											
40											
45											
50											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-217
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	128.8	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/01/11-2/01/11	**Drilling Method:**	SSA to 3.4 ft	**Core Barrel:**	--
Boring Location:	STA. 214+68, 37' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.0 - 2.0	1/1/1/3	2	2	SSA			-TOPSOIL-	
								127.8		1.0	
										Orange-brown, dry to moist, very loose, fine SAND, some gravel, some silt, trace medium to coarse sand (SM)	
	2D	17/11	2.0 - 3.4	24/40/50(1")				126.8		2.0	
										Brown, dry to moist, very dense, gravelly fine to coarse SAND, trace silt	
								125.4		-WEATHERED BEDROCK-(GW)	
										Note: Auger refusal on probable top of bedrock at 3.4 ft.	
										3.4	
										Bottom of Exploration at 3.4 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-218
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	122.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/01/11-2/01/11	**Drilling Method:**	SSA to 3.5 ft	**Core Barrel:**	--
Boring Location:	STA. 214+61, 10' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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U = Thin Wall Tube Sample
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/9	0.0 - 2.0	1/1/1/2	2	2	SSA			-TOPSOIL-	
								121.2		1.5	
	2D	14/14	2.0 - 3.2	6/5/50(2")						Brown, moist to wet, medium dense, fine SAND, some medium sand, little gravel, little silt, trace coarse sand	
								119.5		-GLACIAL TILL-(SW)	
								119.2		3.2	
										-WEATHERED BEDROCK-	
										Note: Auger refusal on probable top of bedrock at 3.5 ft.	
5										3.5	
										Bottom of Exploration at 3.5 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-219
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	121.1	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/01/11-2/01/11	**Drilling Method:**	SSA to 2.0 ft	**Core Barrel:**	--
Boring Location:	STA. 216+16, 13' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/14	0.0 - 2.0	1/1/4/25(2")	5	5	SSA	120.6		-TOPSOIL- 0.5	
								119.4		Brown, moist to wet, loose, fine SAND, little medium sand and silt, trace coarse sand, trace gravel (SP-SM)	
								119.1		1.7 -WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.0 ft. 2.0	
										Bottom of Exploration at 2.0 feet below ground surface.	
5											
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-220
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	122.8	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/01/11-2/01/11	**Drilling Method:**	SSA to 5.7 ft	**Core Barrel:**	--
Boring Location:	STA. 217+17, 22' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/16	0.0 - 2.0	2/2/5/7	7	7	SSA	122.5		-TOPSOIL- 0.3 Brown, dry to moist, loose, fine to medium SAND, little coarse sand and silt, little gravel, grading to medium sand (SP-SM)	
	2D	24/14	2.0 - 4.0	16/19/20/22	39	39		120.8		2.0 Brown, moist, dense, fine SAND, some silt, little medium sand and gravel, trace coarse sand -GLACIAL TILL-(SM)	G#11718d A-2-4, SM WC=10.1%
	3D	16/14	4.0 - 5.3	9/10/50(4")						Brown, moist, medium dense, fine SAND, some silt, little medium sand and gravel, trace coarse sand, weathered rock in tip -GLACIAL TILL-(SM)	
5								117.5 117.1		5.3 -WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 5.7 ft. 5.7 **Bottom of Exploration at 5.7 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Southbound Off-Ramp
Test Boring & Test Probe Logs
(HB-YA-300 series)

Note: Station and offset information provided on the test boring logs reference the SB Off-Ramp baseline stationing, see Sheet Nos. 23-40 for plan locations.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-301
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	117.7	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/17/11-2/17/11	**Drilling Method:**	HSA to 15.0 ft	**Core Barrel:**	--
Boring Location:	STA. 302+17, 100' RT.	**Casing ID/OD:**	--	**Water Level*:**	
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA				
	1D	24/19	1.0 - 3.0	1/2/5/7	7	7				Brown, damp, very loose, fine SAND, some silt, trace medium to coarse sand -MARINE DEPOSIT-(SM)	G#11719a A-2-4, SM WC=20.3% LL=29, PL=NP PI=NP
5								112.7		5.0	
	2D	24/24	5.0 - 7.0	5/5/7/9	12	12				Brownish-gray, damp to moist, stiff, silty CLAY, with blocky texture and mottling -MARINE DEPOSIT-(CL)	
10	3D	24/24	10.0 - 12.0	1/1/WOH/1	1	1				Gray, wet, very soft, silty CLAY, trace fine sand -MARINE DEPOSIT-(CL)	G#11719b A-6(16), CL WC=31.8% LL=34, PL=18 PI=16
15								102.7		15.0 **Bottom of Exploration at 15.0 feet below ground surface.** Note: Installed Observation Well in completed borehole. See Observation Well Installation and Groundwater Monitoring Reports for details.	
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. NP = non plastic.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-302
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	122.1	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/17/11-2/17/11	**Drilling Method:**	SSA to 10.0 ft	**Core Barrel:**	--
Boring Location:	STA. 309+98, 0.6' RT.	**Casing ID/OD:**	--	**Water Level*:**	7.6 ft
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA				
	1D	24/18	1.0 - 3.0	8/7/4/4	11	11				Brown, damp, medium dense, fine to medium SAND, little gravel and silt, trace coarse sand -FILL-(SP-SM)	
										Light brown, damp, medium dense, fine to medium SAND, trace silt, coarse sand and gravel -FILL-(SP)	G#11720a A-1-b, SP WC=6.7%
	2D	24/15	3.0 - 5.0	4/7/7/13	14	14				Grayish-brown to brown, damp to moist, medium dense, fine to medium SAND, some silt, little gravel, trace coarse sand -FILL-(SM)	G#11720b A-2-4, SM WC=13.8%
5	3D	24/15	5.0 - 7.0	9/60/17/8	77	77				Grayish-brown to brown, moist, very dense, gravelly medium to fine SAND, little silt, trace coarse sand -FILL-(SM)	G#11720c A-1-b, SM WC=6.8%
										Note: Cobble from 7 to 7.5 ft	
								114.1		8.0	
	4D	24/18	8.0 - 10.0	4/5/4/7	9	9				Gray to grayish-brown, moist to wet, loose, silty fine SAND (SM) grading to a stiff, clayey SILT to silty CLAY with mottling and blocky texture -MARINE DEPOSIT-(CL)	
10								112.1		10.0	
										Bottom of Exploration at 10.0 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-303
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	115.7	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/17/11-2/17/11	**Drilling Method:**	HSA to 7.0 ft	**Core Barrel:**	--
Boring Location:	STA. 314+98, 4.4' LT.	**Casing ID/OD:**	--	**Water Level*:**	7.6 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA				
	1D	24/13	1.0 - 3.0	12/12/10/4	22	22				Light brown, dry to damp, medium dense, poorly graded fine to medium SAND, little coarse sand, trace silt and gravel -FILL-(SP)	G#11719c A-1-b, SP WC=2.8%
	2D	24/16	3.0 - 5.0	3/4/12/15	16	16					
										Brownish-gray to grayish-brown, damp to moist, very stiff, silty CLAY, some fine sand, trace medium to coarse sand -FILL-(CL)	G#11719d A-4(4), CL WC=18.8%
5	3D	24/17	5.0 - 7.0	7/9/10/11	19	19		110.2			
								110.1		Note: Evidence of former topsoil from 5.5 to 5.6 ft	5.5 LL=24, PL=15 PI=9
											5.6
								108.7		Grayish-brown, moist to wet, very stiff, fine sandy SILT (ML) to silty fine SAND -MARINE DEPOSIT-(SM)	
											7.0
10										**Bottom of Exploration at 7.0 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-304
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	118.1	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/17/11-2/17/11	**Drilling Method:**	HSA to 15.0 ft	**Core Barrel:**	--
Boring Location:	STA. 303+79, 71' RT.	**Casing ID/OD:**	--	**Water Level*:**	11.8 ft
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA				
	1D	24/20	1.0 - 3.0	2/2/5/8	7	7		116.6		-TOPSOIL- 1.5	
										Grayish-brown, damp, medium stiff, clayey SILT, trace fine sand (ML) grading to a silty CLAY with mottling and blocky texture (CL)	
	2D	24/19	3.0 - 5.0	4/4/9/9	13	13		115.1		3.0 Gray-brown, damp to moist, stiff, silty CLAY, with mottling and blocky texture -MARINE DEPOSIT-(CL)	
5	3D	24/21	5.0 - 7.0	5/9/10/14	19	19				Gray-brown, damp to moist, very stiff, silty CLAY, with mottling and blocky texture, occasional fine sandy silt seams -MARINE DEPOSIT-(CL)	
10	4D	24/18	10.0 - 12.0	2/2/3/4	5	5				Gray, wet, medium stiff, silty CLAY to clayey SILT, with occasional gray fine sandy silt seams -MARINE DEPOSIT-(CL)	
15								103.1		15.0 **Bottom of Exploration at 15.0 feet below ground surface.**	
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD 83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

U.S. Route 1
Test Boring Logs
(HB-YA-400 series)

Note: Station and offset information provided on the test boring logs reference the U.S. Route 1 baseline stationing, see Sheet Nos. 23-40 for plan locations.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-401
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	134.9	**Auger ID/OD:**	2.5 in. I.D.
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	CME 45 Truck	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/03/11-01/03/11	**Drilling Method:**	HSA to 10.4 ft	**Core Barrel:**	--
Boring Location:	STA. 452+00, 15' LT.	**Casing ID/OD:**	--	**Water Level*:**	5.6 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA	134.0		-BITUMINOUS CONCRETE- 0.9	
	1D	24/14	1.0 - 3.0	17/12/6/5	18	18				Brown, dry, medium dense, fine to medium SAND, little coarse sand, little gravel -FILL-(SW)	
	2D	24/14	3.0 - 5.0	4/3/2/9	5	5				Light brown, moist to wet, loose, fine SAND, little medium sand -FILL-(SP)	
5	3D	24/19	5.0 - 7.0	8/7/9/10	16	16		129.4		Dark gray, wet, medium dense, fine to medium SAND, little coarse sand with organics, trace silt -FILL-(SW) 5.5	
										Brown to gray, moist to wet, medium dense, fine SAND, some silt, mottled -MARINE DEPOSIT-(SM)	
								126.4		8.5	
										Gravel and clay encountered from 8.5 to 9 ft	
10	4D	0/0	10.0 - 10.0	50(0")				124.5		Note: Auger refusal on probable top of bedrock at 10.4 ft. 10.4	
										Bottom of Exploration at 10.4 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-402
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	139.7	**Auger ID/OD:**	2.5 in. I.D.
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	CME 45 Truck	**Hammer Wt./Fall:**	140/30 SS - 300/24 NW
Date Start/Finish:	01/04/11-01/04/11	**Drilling Method:**	HSA to 5 ft, NW Drive to 14 ft	**Core Barrel:**	--
Boring Location:	STA. 457+49, CL.	**Casing ID/OD:**	NW - 3.0 in. I.D.	**Water Level*:**	11.3 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0								139.3		-BITUMINOUS CONCRETE- 0.4	
	1D	24/14	1.0 - 3.0	20/20/20/30	40	40	HSA			Brown, dry, dense, fine to coarse SAND, some gravel, trace silt -FILL-(SP-SM)	G#11721a A-1-b, SP-SM WC=0.9%
	2D	24/4	3.0 - 5.0	30/18/15/28	33	33				Brown, dry, dense, fine to coarse SAND, some gravel, trace silt -FILL-(SP-SM)	
5	3D	24/18	5.0 - 7.0	15/13/13/13	26	26	19			Brown to rust-brown, dry, medium dense, silty fine SAND, little medium sand and gravel, contains rootlets -FILL-(SM)	G#11721b A-4, SM WC=9.5%
							30				
	4D	24/17	7.0 - 9.0	9/8/12/26	20	20	27			Brown to rust-brown, dry, medium dense, silty fine SAND, little medium sand and gravel, contains rootlets -FILL-(SM)	
							59				
	5D	24/10	9.5 - 11.5	12/13/12/13	25	25	41			Note: Encountered cobble at 9.0 ft. Brown, wet, medium dense, fine to medium SAND, some gravel, trace coarse sand, little silt -FILL-(SM)	G#11721c A-1-b, SM WC=9.2%
10							26				
	6D	24/5	11.5 - 13.5	9/8/11/19	19	19	26			Brown, wet, medium dense, fine to medium SAND, some gravel, trace coarse sand, little silt -FILL-(SM)	
							28				
							18				
	7D	24/14	14.0 - 16.0	10/5/9/11	14	14				Gray, wet, stiff, silty CLAY, some fine sand, trace medium to coarse sand, trace gravel, slightly mottled, contains rootlets -FILL-(CL)	G#11721d A-4(1), CL WC=15.0% LL=23, PL=15 PI=8
15											
	8D	24/15	16.0 - 18.0	11/8/17/20	25	25				Gray to brown, moist, medium dense, fine SAND, some silt and gravel, little medium sand, trace coarse sand, well bonded -FILL-(SM)	G#11721e A-2-4, SM WC=9.5%
								121.7		18.0	
	9D	24/14	18.0 - 20.0	8/5/10/5	15	15				Gray to brown, wet, medium dense, fine SAND, little medium to coarse sand, little silt, trace gravel, organics -MARINE DEPOSIT-(SP)	
								120.2		19.5	
20	10D	24/24	20.0 - 22.0	6/7/10/13	17	17				Thin (1 in.) layer of organics with wood fragments in bottom of split spoon Gray, wet, very stiff, silty CLAY, mottled, with rootlets -MARINE DEPOSIT-(CL)	
								117.7		22.0	
										Bottom of Exploration at 22.0 feet below ground surface.	
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-402

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-403
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	136.9	**Auger ID/OD:**	2.5 in. I.D.
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	CME 45 Truck	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/03/11-01/03/11	**Drilling Method:**	HSA to 11.0 ft	**Core Barrel:**	--
Boring Location:	STA. 461+00, 10' RT.	**Casing ID/OD:**	--	**Water Level*:**	Dry
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA	136.3		-BITUMINOUS CONCRETE- 0.6	
	1D	24/14	1.0 - 3.0	34/29/23/17	52	52				Brown, dry to damp, very dense, fine to coarse SAND, some gravel -FILL-(SW)	
	2D	24/17	3.0 - 5.0	9/13/14/28	27	27				Brown, dry to damp, medium dense, fine SAND, little medium to coarse sand, little gravel, trace silt, well bonded -FILL-(SW)	
5	3D	24/16	5.0 - 7.0	13/15/15/12	30	30				Light brown, dry to damp, medium dense, fine to medium SAND -FILL-(SP)	
	4D	24/18	7.0 - 9.0	14/13/9/11	22	22				Brown, dry to damp, medium dense, fine to medium SAND, little coarse sand, little gravel -FILL-(SW)	
	5D	24/18	9.0 - 11.0	6/6/13/14	19	19				Gray, moist, very stiff, silty CLAY, mottled, blocky (CL)	
10										Gray, moist, very stiff, silty CLAY, little fine to medium sand, trace coarse sand, contains 1 to 2 in. sand layers -FILL-(CL)	
								125.9		11.0	
15										**Bottom of Exploration at 11.0 feet below ground surface.**	
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-404
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	129.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	CME 45 Truck	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/04/11-01/04/11	**Drilling Method:**	HSA to 11.0 ft	**Core Barrel:**	--
Boring Location:	STA. 465+00, 13' LT.	**Casing ID/OD:**	--	**Water Level*:**	Dry
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA	128.8		-BITUMINOUS CONCRETE- 0.4	
	1D	24/19	1.0 - 3.0	18/15/15/15	30	30				Dark brown, dry to damp, medium dense, fine to medium SAND, little coarse sand and gravel -FILL-(SW)	
	2D	24/17	3.0 - 5.0	10/18/18/32	36	36				Brown, dry to damp, medium dense, fine SAND, little coarse sand, trace gravel, trace medium sand -FILL-(SP)	
5	3D	24/16	5.0 - 7.0	13/50/17/11	67	67				Gray-brown, dry to damp, dense, fine SAND, some silt, trace medium to coarse sand, contains layers of silty gray to brown sand, slightly mottled, clay layers -FILL-(SP-SM)	
	4D	24/6	7.0 - 9.0	5/4/5/10	9	9				Gray-brown, damp to moist, very dense, fine SAND, little gravel, little coarse sand, trace medium sand, trace silt, contains brick fragments -FILL-(SP)	
										Gray, wet, loose, fine SAND, little silt and gravel, trace coarse to medium sand -FILL-(SP)	
	5D	24/24	9.0 - 11.0	8/8/7/10	15	15		120.2		9.0	
10										Gray-brown, wet, stiff, sandy SILT, slightly mottled, frequent brown fine sand seams -MARINE DEPOSIT-(ML)	
								118.2		11.0	
										Bottom of Exploration at 11.0 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-405
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	121.3	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	CME 45 Truck	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/03/11-01/03/11	**Drilling Method:**	HSA to 12.0 ft	**Core Barrel:**	--
Boring Location:	STA. 469+00, 9' RT.	**Casing ID/OD:**	--	**Water Level*:**	Dry
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HSA			-BITUMINOUS CONCRETE-	
								120.3		-FORMER PAVEMENT-(frozen)	
	1D	24/18	1.0 - 3.0	18/17/13/10	30	30				1.0 Brown, dry to damp, medium dense, fine to medium SAND, little coarse sand, little gravel -FILL-(SW)	
	2D	24/10	3.0 - 5.0	22/12/6/7	18	18				Brown to dark brown, damp to moist, medium dense, fine SAND, little medium to coarse sand, little silt, little gravel -FILL-(SW)	
5	3D	24/19	5.0 - 7.0	4/7/6/8	13	13		116.3		5.0 Gray-brown, damp to moist, medium dense, silty fine SAND, trace medium sand, slightly mottled, with gray fine sand seams -MARINE DEPOSIT-(SM)	
								112.8		8.5	
10	4D	24/24	10.0 - 12.0	3/3/3/4	6	6				Gray, moist, medium stiff, sandy SILT, little clay, occasional sand seams 1 to 3 cm thick -MARINE DEPOSIT-(ML)	
								109.3		12.0 **Bottom of Exploration at 12.0 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

SB On-Ramp
Test Boring Logs
(HB-YA-500 series)

Note: Station and offset information provided on the test boring logs reference the SB On-Ramp baseline stationing, see Sheet Nos. 23-40 for plan locations.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-503
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	121.0	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	D. Dearden	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	2/18/11-2/18/11	**Drilling Method:**	SSA to 2.6 ft	**Core Barrel:**	--
Boring Location:	STA. 511+00, 7' LT.	**Casing ID/OD:**	--	**Water Level*:**	11.8 ft
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	120.5		-TOPSOIL- 0.5	
										Sandy GRAVEL with cobbles -FILL-(GW)	
								118.8		2.2	
								118.4		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 2.6 ft. 2.6	
										Bottom of Exploration at 2.6 feet below ground surface.	
5										Note: Moved borehole approximately 3 ft east and re-drilled. Encountered weathered bedrock at 2.6 ft; auger refusal at approximately 3.0 ft.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.
3. No split spoon samples taken. Soil descriptions provided based on observed auger cuttings. Actual soil descriptions will differ from those shown on the log.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-504
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	123.5	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/19/11-1/19/11	**Drilling Method:**	SSA to 10.5 ft	**Core Barrel:**	--
Boring Location:	STA. 516+00, 7' RT.	**Casing ID/OD:**	--	**Water Level*:**	3.0 ft
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/14	0.0 - 2.0	1/2/4/7	6	6	SSA	123.2		-TOPSOIL- 0.3	
								122.5		Gray, wet, loose, silty fine SAND, trace medium to coarse sand -MARINE DEPOSIT-(SM) 1.0	
										Dark brown, wet, loose, fine SAND, little silt -MARINE DEPOSIT-(SP)	
								120.5		Orange-brown, wet, loose, fine SAND, little medium sand, little silt -MARINE DEPOSIT-(SP) 3.0	
5	2D	24/24	5.0 - 7.0	5/8/11/11	19	19				Change to gray, slightly mottled, silty SAND observed in auger cuttings from 3.0 to 5.0 ft Gray, moist, very stiff, silty CLAY, some fine sand -MARINE DEPOSIT-(CL)	G#11722a A-4(4), CL WC=21.7% LL=25 PL=17, PI=8
	3D	24/24	7.0 - 9.0	2/3/6/8	9	9		116.5		7.0 Brown, moist to wet, medium dense, fine SAND, some silt, trace coarse sand Gray-brown, wet, silty fine SAND, trace medium sand, mottled -MARINE DEPOSIT-(SM)	
	4D	24/7	9.0 - 11.0	10/50(0")				114.0		Gray-brown, moist to wet, medium dense, fine SAND, some silt, trace medium sand (SM) 9.5	
10								113.0		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 10.5 ft. 10.5	
										Bottom of Exploration at 10.5 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-505
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	129.2	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/25/11-1/25/11	**Drilling Method:**	SSA to 7.4 ft	**Core Barrel:**	--
Boring Location:	STA. 519+01, 1' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/7	0.0 - 2.0	1/1/1/2	2	2	SSA	129.1		-TOPSOIL- (0.1)	
										Brown, dry to moist, very loose, fine SAND, trace medium to coarse sand, contains occasional rootlets (SP)	
	2D	24/16	2.0 - 4.0	3/6/6/7	12	12				Brown, moist to wet, medium dense, silty fine SAND, little gravel, trace medium to coarse sand, thin layers with higher silt content, contains trace decomposed rock -MARINE DEPOSIT-(SM)	G#11722b A-4, SM WC=18.0%
5	3D	24/15	5.0 - 7.0	9/22/50(4")				124.0		(5.2)	
								122.9		Brown, moist to wet, very dense, fine SAND, some gravel, little coarse to medium sand, trace silt, contains decomposed bedrock -GLACIAL TILL-(SW) Note: Gravel in spoon tip.	
								121.8		(6.3) -WEATHERED BEDROCK- Note: Auger refusal on top of probable bedrock at 7.4 ft. (7.4)	
10										**Bottom of Exploration at 7.4 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-506
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	128.2	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/25/11-1/25/11	**Drilling Method:**	SSA to 5.0 ft	**Core Barrel:**	--
Boring Location:	STA. 520+94, 1' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/9	0.0 - 2.0	1/1/1/1	2	2	SSA	128.0		-TOPSOIL- 0.2 Rusty-brown, dry to moist, very loose, fine SAND, some silt, trace medium to coarse sand and gravel, contains rootlets and wood fragments (SP)	
	2D	24/10	2.0 - 4.0	6/13/50(2")				125.7		Orange-brown, dry to moist, very dense, fine SAND, some medium sand, trace coarse sand and gravel, contains decomposed rock and iron-stained soils (SP)	
								125.0		2.5 Dark gray, moist, very dense, well graded SAND, some gravel, contains decomposed bedrock	
5								123.2		-GLACIAL TILL-(SW) 3.2 -WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 5.0 ft. 5.0 **Bottom of Exploration at 5.0 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-507
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.7	**Auger ID/OD:**	--
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS, 300/14 NW
Date Start/Finish:	1/25/11-1/25/11	**Drilling Method:**	NW to 28.3 ft	**Core Barrel:**	--
Boring Location:	STA. 523+32, 52' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/11	0.0 - 2.0	1/WOH/1/2			Auger	120.6		-TOPSOIL- 0.1 Olive-brown, wet, very loose, silty fine SAND, trace medium sand, little organic silt, strong organic odor, wood fragments and rootlets (SM)	
	2D	24/16	2.0 - 4.0	4/5/9/11	14	14				Olive-brown, wet, stiff, silty CLAY, trace fine sand, mottled with fine sand seams and pockets of fine sand -MARINE DEPOSIT-(CL)	G#11722c A-6(10), CL WC=20.4% LL=29, PL=17 PI=12
5	3D	24/22	5.0 - 7.0	6/9/12/17	19	19				Olive-brown, wet, very stiff, silty CLAY, little fine sand seams, slightly mottled -MARINE DEPOSITS-(CL)	G#11722d A-4(6), CL WC=20.9% LL=27, PL=18 PI=9
10	4D	24/24	10.0 - 12.0	5/5/7/8	12	12				Olive-brown, moist, stiff, silty CLAY, little fine sand, trace medium to coarse sand, trace organic silt, horizontal and vertical fine sand seams, some seams composed of coarser sand, occasional blocky texture -MARINE DEPOSIT-(CL)	G#11722e A-4(6), CL WC=23.9% LL=26, PL=17 PI=9
15	5D	24/11	15.0 - 17.0	15/15/17/17	32	32	38	105.7		Brown, wet, dense, medium SAND, some fine sand, little coarse sand, little gravel and silt, contains decomposed bedrock -GLACIAL TILL-(SW)	
							42				
							55				
							72				
							75				
20	6D	24/20	20.0 - 22.0	25/13/11/14	24	24	33			Gray grading to brown, wet, medium dense, fine to medium SAND, little gravel and coarse sand, trace silt -GLACIAL TILL-(SW)	
							52				
							82				
							69				
25							30				

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-507
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.7	**Auger ID/OD:**	--
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS, 300/14 NW
Date Start/Finish:	1/25/11-1/25/11	**Drilling Method:**	NW to 28.3 ft	**Core Barrel:**	--
Boring Location:	STA. 523+32, 52' RT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	7D	24/14	25.0 - 27.0	11/17/15/23	32	32	36	95.7			
							30			Gray, moist to wet, hard SILT, some gravel, some fine sand, trace coarse sand, bonded -GLACIAL TILL-(ML)	
							38				
							50(4")	92.4		Note: Casing refusal on probable top of bedrock at 28.3 ft.	
										25.0 — 28.3 — **Bottom of Exploration at 28.3 feet below ground surface.**	
30											
35											
40											
45											
50											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-508
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	121.7	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/25/11-1/25/11	**Drilling Method:**	SSA to 6.9 ft	**Core Barrel:**	--
Boring Location:	STA. 522+81, 60' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/14	0.0 - 2.0	1/2/4/5	6	6	SSA	121.5		-TOPSOIL- 0.2	
										Gray-brown, moist, loose, silty SAND grading to sandy SILT, trace medium sand, mottled, contains rootlets -MARINE DEPOSIT-(SM/ML)	
	2D	24/24	2.0 - 4.0	4/4/5/6	9	9				Gray-brown, moist to wet, SILT, some fine to coarse sand, trace medium sand, occasional vertical seams of fine sand, pockets of clay, mottled -MARINE DEPOSIT-(ML)	G#11723a A-4, ML WC=22.2%
5	3D	20/19	5.0 - 6.7	4/8/8/50(2")	16	16				Gray-brown, wet, medium dense, fine sandy SILT, trace medium to coarse sand and gravel, silt content increases with depth -MARINE DEPOSIT-(ML)	G#11723b A-4, ML WC=23.1%
								115.0		6.7	
								114.8		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 6.9 ft. 6.9	
10										**Bottom of Exploration at 6.9 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-509
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.0	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS, 300/14 NW
Date Start/Finish:	1/19/11-1/19/11	**Drilling Method:**	SSA to 4.5 ft	**Core Barrel:**	--
Boring Location:	STA. 508+98, 81' LT.	**Casing ID/OD:**	NW 3.0 in. I.D.	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/17	0.0 - 2.0	1/4/5/7	9	9	SSA	119.8		-TOPSOIL- 0.2	
										Gray, wet, loose, silty SAND, trace medium to coarse sand, slightly mottled -MARINE DEPOSIT-(SM)	
								117.1		2.9 -WEATHERED BEDROCK-	
										Note: Auger refusal on probable top of bedrock at 4.5 ft.	
5								115.5		4.5 **Bottom of Exploration at 4.5 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-510
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	120.9	**Auger ID/OD:**	NW 3.0 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS, 300/14 NW
Date Start/Finish:	1/26/11-1/26/11	**Drilling Method:**	NW Drive to 12.7 ft	**Core Barrel:**	--
Boring Location:	STA. 523+03, 3' LT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/8	0.0 - 2.0	1/1/1/2	2	2	SSA	120.7		-TOPSOIL- 0.2	
										Olive-gray, moist to wet, very soft, clayey SILT, little fine sand, trace medium sand, contains rootlets, slightly mottled -MARINE DEPOSIT-(ML)	
	2D	24/16	2.0 - 4.0	2/5/7/7	12	12				Olive-gray, moist to wet, stiff, silty CLAY, trace brown fine sand, slightly blocky texture -MARINE DEPOSIT-(CL)	G#11723c A-6(9), CL WC=22.8% LL=29, PL=18 PI=18
	3D	24/24	4.0 - 6.0	3/3/5/9	8	8				Olive-gray to brown, moist, medium stiff, SILT and silty CLAY, slightly mottled, little fine sand -MARINE DEPOSIT-(CL-ML)	G#11723d A-4(4), CL-ML WC=23.2% LL=25, PL=18 PI=7
5								114.9		6.0	
	4D	24/24	6.0 - 8.0	5/7/7/10	14	14	19			Gray-brown, wet, medium dense, silty fine SAND, with fine to coarse sand seams and layers -MARINE DEPOSIT-(SM)	
							29				
							35				
							20				
10	5D	14/13	10.0 - 11.2	15/16/50(2")				110.6		Gray, wet, hard, sandy SILT (ML) 10.3	
								109.7		Brown, wet, dense, well graded SAND, some gravel, weak to moderately bonded -GLACIAL TILL-(SW) 11.2	
								108.2		-WEATHERED BEDROCK- Note: Weathered rock in spoon tip and observed in wash water. Roller cone refusal on probable top of bedrock at 12.7 ft. 12.7	
										Bottom of Exploration at 12.7 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Interchange Improvements
Location: Yarmouth, Maine

Boring No.: HB-YA-511
PIN: 11086.00

Driller:	Maine Test Borings	**Elevation (ft.)**	123.5	**Auger ID/OD:**	SSA 4.0 in. O.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	1/26/11-1/26/11	**Drilling Method:**	SSA to 5.5 ft	**Core Barrel:**	--
Boring Location:	STA. 521+97, 14' RT.	**Casing ID/OD:**	--	**Water Level*:**	--
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
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MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/17	0.0 - 2.0	1/1/1/3	2	2	SSA			-TOPSOIL-	
								121.5		2.0	
	2D	24/18	2.0 - 4.0	5/10/13/17	23	23				Brown, wet, medium dense, fine SAND, some silt, little medium sand, trace coarse sand and gravel, 0.2 to 0.5 in. thick layers of iron staining, 1.2 in. layer of coarse/fine sand -GLACIAL TILL-(SM)	G#11723e A-2-4, SM WC=12.9%
5	3D	2/2	5.0 - 5.2	50(2")				118.5		5.0	
								118.0		Weathered rock in a maxtrix of fine brown SAND -WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 5.5 ft.	
										5.5	
										Bottom of Exploration at 5.5 feet below ground surface.	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provded in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Park and Ride Facility
Test Boring Logs
(HB-YA-600 series)

Note: Station and offset information provided on the test boring logs reference the Park and Ride Facility perimeter loop roadway baseline stationing, see Sheet Nos. 23-40 for plan locations.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-601
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	125.8	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/18/11-01/18/11	**Drilling Method:**	HSA to 13.0 ft	**Core Barrel:**	--
Boring Location:	STA. 601+92, 32'LT.	**Casing ID/OD:**	--	**Water Level*:**	7.8 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/17	0.0 - 2.0	1/2/3/6	5	5	HSA	124.8		-TOPSOIL- (1.0)	
										Light brown, moist, loose, fine SAND, little medium to coarse sand, contains decomposed wood (SP)	
	2D	24/24	2.0 - 4.0	3/5/6/16	11	11				Gray, moist, stiff, silty CLAY, little fine sand, trace medium to coarse sand (reworked native material) -FILL-(SP)	
5	3D	24/24	5.0 - 7.0	5/5/6/7	11	11		120.8		(5.0) Gray-brown, moist, stiff, fine sandy SILT, trace medium to coarse sand -MARINE DEPOSIT-(ML)	
10	4D	24/10	10.0 - 12.0	2/7/7/6	14	14		115.3		Brown, moist, stiff, silty CLAY, trace fine to coarse sand (CL) (10.5) Gray, wet, medium dense, fine SAND, little silt, one 2 in. gravel piece -MARINE DEPOSIT-(SP)	
	5D	24/3	13.0 - 15.0	5/13/10/10	23	23				Gray, wet, medium dense, fine SAND, trace medium to coarse sand and silt, little gravel, one 2 in. gravel piece -MARINE DEPOSIT-(SP)	
15								110.8		(15.0) **Bottom of Exploration at 15.0 feet below ground surface.**	
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-601

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-602
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	131.3	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/18/11-01/18/11	**Drilling Method:**	HSA to 8.1 ft	**Core Barrel:**	--
Boring Location:	STA. 605+91, 32'LT.	**Casing ID/OD:**	--	**Water Level*:**	5.3 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.0 - 2.0	2/3/6/8	9	9	HSA	131.0		-TOPSOIL-	
										0.3	
										Dark brown, moist, loose, fine SAND, little medium sand, trace coarse sand, trace silt, wood pieces, roots (SP)	
								129.3		2.0	
	2D	24/20	2.0 - 4.0	6/9/13/21	22	22				Olive to light brown, moist, medium dense, silty, fine to medium SAND, trace coarse sand, grading to sandy SILT, occasional organics, roots	
										-MARINE DEPOSIT-(SM/ML)	
5								126.3		5.0	
	3D	24/17	5.0 - 7.0	11/12/14/15	26	26				Orange-brown, wet, dense, fine to medium SAND, little coarse sand and gravel, trace silt	
										-MARINE DEPOSIT-(SW)	
								123.4		7.9	
	4D	0/0	8.1 - 8.1	50(0")				123.2		-WEATHERED BEDROCK-	
										Note: Auger and split spoon refusal on probable top of bedrock at 8.1 ft.	
10										8.1	
										Bottom of Exploration at 8.1 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-603
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	127.8	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/20/11-01/20/11	**Drilling Method:**	HSA to 9.0 ft	**Core Barrel:**	--
Boring Location:	STA. 617+09, 65'LT.	**Casing ID/OD:**	--	**Water Level*:**	4.6 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/14	0.0 - 2.0	1/1/1/4	2	2	HSA	127.6		-TOPSOIL- 0.2	
										Brown to orange-brown, wet, very loose, fine to medium SAND, trace coarse sand, little silt -MARINE DEPOSIT-(SM)	G#11713a A=2-4, SM WC=36.1%
	2D	24/16	2.0 - 4.0	3/4/4/6	8	8		125.3		Light brown, wet, loose, fine SAND, trace medium sand, trace silt (SP) 2.5	
										Gray-brown, moist, medium stiff, silty CLAY, little fine sand, trace medium to coarse sand and fine gravel, mottled -MARINE DEPOSIT-(CL)	G#11713b A-6(9), CL WC=22.8% LL=33, PL=20 PI=13
	3D	24/20	4.0 - 6.0	5/7/7/7	14	14				Gray-brown, moist, stiff, silty CLAY, little fine sand, trace medium to coarse sand and fine gravel, mottled -MARINE DEPOSIT-(CL)	
5											
	4D	24/24	6.0 - 8.0	15/12/12/11	24	24				Gray, moist, very stiff, silty CLAY, little fine sand, trace medium to coarse sand and fine gravel, mottled (CL)	
										Gray-brown/orange-brown, moist, very stiff, sandy CLAY, frequent sand seams and layers	
	5D	24/5	8.0 - 10.0	2/50(2")				119.8		-MARINE DEPOSIT-(CL) 8.0	
								119.1		Brown, wet, very dense, fine SAND, little silt (SP-SM) 8.7	
10								118.8		-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 9.0 ft. 9.0	
										Bottom of Exploration at 9.0 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-604
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	125.8	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/20/11-01/20/11	**Drilling Method:**	HSA to 11.0 ft	**Core Barrel:**	--
Boring Location:	STA. 613+07, 1'RT.	**Casing ID/OD:**	--	**Water Level*:**	2.9 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_V = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/11	0.0 - 2.0	1/1/1/5	2	2	HSA	125.3		-TOPSOIL- 0.5	
										Gray to brown, moist to wet, very loose, silty fine SAND, trace medium to coarse sand and fine gravel, slightly mottled -MARINE DEPOSIT-(SM)	G#11713c A-4, SM WC=23.6%
	2D	24/24	2.0 - 4.0	3/3/5/8	8	8				Gray-brown, moist to wet, loose, silty fine SAND, mottled -MARINE DEPOSIT-(SP-SM)	
								122.8		3.0	
										Gray-brown, moist to wet, stiff, sandy SILT mottled (ML)	
	3D	24/24	4.0 - 6.0	4/6/8/16	14	14		121.8		4.0	G#11713d A-6(16), CL WC=23.8% LL=36, PL=20 PI=16
5										Olive, moist, stiff, silty CLAY, trace fine to coarse sand and fine gravel, mottled, frequent light brown fine sand seams, increasing sand content with depth -MARINE DEPOSIT-(CL)	
	4D	24/24	6.0 - 8.0	5/6/7/11	13	13				Olive, moist, stiff, sandy SILT, mottled, trace gravel (ML)	
								118.5		7.3	
										Brown, wet, medium dense, fine SAND, some silt, occasional mottling -MARINE DEPOSIT-(SP-SM)	
10								115.8		10.0	
	5D	2/2	10.0 - 10.2	50(2")						-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 11.0 ft.	
								114.8		11.0	
										Bottom of Exploration at 11.0 feet below ground surface.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-604

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-605
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	125.7	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/19/11-01/19/11	**Drilling Method:**	HSA to 5.0 ft	**Core Barrel:**	--
Boring Location:	STA. 613+49, 182'RT.	**Casing ID/OD:**	--	**Water Level*:**	3.6 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Sample Information

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.0 - 2.0	2/3/3/3	6	6	HSA	125.5		-TOPSOIL- 0.2 Brown, wet, loose, fine SAND, some silt, little medium sand, trace coarse sand, contains rootlets (reworked topsoil with fill) -FILL-(SP-SM)	
	2D	24/15	2.0 - 4.0	1/2/5/10	7	7		123.4 123.2		2.3 -FORMER TOPSOIL- with organics 2.5 Gray, wet, loose, clayey fine SAND, trace medium to coarse sand, some brown mottling -MARINE DEPOSIT-(SC)	
5	3D	0/0	5.0 - 5.0	50(0")				121.0 120.7		4.7 -WEATHERED BEDROCK- Note: Auger and split spoon refusal on probable top of bedrock at 5.0 ft. 5.0 **Bottom of Exploration at 5.0 feet below ground surface.**	
10											
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-605

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-606
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	125.0	**Auger ID/OD:**	HSA 2.5 in. I.D.
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/21/11-01/21/11	**Drilling Method:**	HSA to 7.6 ft	**Core Barrel:**	--
Boring Location:	STA. 615+84, 15'LT	**Casing ID/OD:**	--	**Water Level*:**	3.0 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.0 - 2.0	1/1/2/2	3	3	HSA	124.8		-TOPSOIL- 0.2	
										Brown, moist, soft, sandy SILT, slightly mottled, organic odor -MARINE DEPOSIT-(ML)	
	2D	24/24	2.0 - 4.0	3/4/5/5	9	9				Gray-brown, moist to wet, stiff, silty CLAY, little fine sand, trace medium sand, mottled -MARINE DEPOSIT-(CL)	G#11714a A-6(10), CL WC=23.1% LL=32, PL=20 PI=12
	3D	24/24	4.0 - 6.0	3/4/10/9	14	14				Gray-brown, moist, stiff, silty CLAY, little fine sand, trace medium sand, mottled -MARINE DEPOSIT-(CL)	
5								119.5		5.5	
	4D	18/18	6.0 - 7.5	11/7/10/50(0")	17	17		119.0		Brown, wet, medium dense, silty fine SAND with clay layers (SM) 6.0	
								117.6		Olive brown, moist, medium dense, clayey SAND -MARINE DEPOSIT-(SC)	
								117.4		7.4	
										-WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 7.6 ft. 7.6	
10										**Bottom of Exploration at 7.6 feet below ground surface.**	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-606

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Interstate 295/U.S. Route 1 Park and Ride Facility
Location: Yarmouth, Maine

Boring No.: HB-YA-607
PIN: 17490.00

Driller:	Maine Test Borings	**Elevation (ft.)**	127.1	**Auger ID/OD:**	SSA
Operator:	T. Schaefer	**Datum:**	NAVD 88	**Sampler:**	Split Spoon 1.375 in. I.D.
Logged By:	M. Foley	**Rig Type:**	Mobile Drill B53 Bombardier	**Hammer Wt./Fall:**	140/30 SS
Date Start/Finish:	01/24/11-01/24/11	**Drilling Method:**	SSA to 8.7 ft	**Core Barrel:**	--
Boring Location:	STA. 622+13, 21'RT.	**Casing ID/OD:**	--	**Water Level*:**	3.7 ft
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample attempt
V = Insitu Vane Shear Test
MV = Unsuccessful Insitu Vane Shear Test attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = weight of 140lb. hammer
WOR = weight of rods
WO1P = Weight of one person
S_u = Insitu Field Vane Shear Strength (psf)
T_v = Pocket Torvane Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw field SPT N-value
Hammer Efficiency Factor = Annual Calibration Value
N_{60} = SPT N-uncorrected corrected for hammer efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
$S_{u(lab)}$ = Lab Vane Shear Strength (psf)
WC = water content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/12	0.0 - 2.0	1/1/1/3	2	2	SSA	126.9		-TOPSOIL- 0.2	
										Light brown, moist, very loose, fine to medium SAND, some silt, little coarse sand and fine gravel -MARINE DEPOSIT-(SM)	G#11714b A-2-4, SM WC=24.6%
	2D	24/19	2.0 - 4.0	4/9/19/20	28	28				Brown, moist, medium dense, fine to medium SAND, some silt, little gravel, trace coarse sand -MARINE DEPOSIT-(SM) Note: Augered through cobble at 2.0 ft.	G#11714c A-2-4, SM WC=9.1%
5	3D	24/20	5.0 - 7.0	15/25/23/30	48	48				Brown, moist to wet, dense, fine to medium SAND, some gravel, little silt, trace coarse sand -MARINE DEPOSIT-(SM)	G#11714d A-1-b, SM WC=8.0%
								119.8		7.3 -WEATHERED BEDROCK- Note: Auger refusal on probable top of bedrock at 8.7 ft.	
								118.4		8.7 **Bottom of Exploration at 8.7 feet below ground surface.**	
10										Note: Observation Well installed in completed borehole. See Well Installation and Groundwater Monitoring Reports for details.	
15											
20											
25											

Remarks:

1. As-drilled coordinates of test borings determined by MaineDOT and provided in NAD83 Maine 2000 West Zone Coordinate System. As-drilled coordinates related to Station and Offset information by FST. Station and offset information reference the Park and Ride Facility baseline.
2. Hammer consisted of rope and cathead and safety hammer.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Boring No.: HB-YA-607

APPENDIX B

Test Pit Logs & Photographs

VIEW OF I-295 NB DECELERATION LANE BENEATH THE EXISTING ROUTE 1 OVERPASS BRIDGE WITH PIER NO. 1 (LEFT) VISIBLE, LOOKING NORTH.

VIEW OF I-295 NB DECELERATION LANE BENEATH THE EXISTING ROUTE 1 OVERPASS BRIDGE WITH PIER NO. 1 (LEFT) VISIBLE, LOOKING NORTH.

VIEW OF CONCRETE PAVER SLOPE PROTECTION BENEATH THE EXISTING ROUTE 1 OVER PASS BRIDGE WITH ABUTMENT A (RIGHT) VISIBLE, LOOKING NORTHEAST.

VIEW OF CONCRETE PAVER SLOPE PROTECTION BENEATH THE EXISTING ROUTE 1 OVER PASS BRIDGE WITH ABUTMENT A (LEFT) AND PIER NO. 1 (RIGHT) VISIBLE, LOOKING SOUTHEAST.

VIEW OF CONCRETE PAVER SLOPE PROTECTION BENEATH THE EXISTING ROUTE 1 OVERPASS BRIDGE WITH PIER NO. 1 VISIBLE, LOOKING SOUTHWEST.

HALEY & ALDRICH

INTERSTATE 295 / U.S. ROUTE 1
INTERCHANGE IMPROVEMENTS
EXIT 15 - YARMOUTH, MAINE

PHOTOGRAPHS OF EXISTING SITE CONDITIONS IN THE VICINITY OF THE ROUTE 1 OVERPASS BRIDGE

NOT TO SCALE
JULY 2011

G:\PROJECTS\37579 - Exit 15 Interchange\Geotechnical Design Report\Appendix B - Test Pit Logs and Photographs\[2011_0722_HAI_Test Pit Photos_DRAFT.xls]General Site Photographs

VIEW OF TEST PIT NO. 1 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE IMMEDIATELY AFTER EXCAVATION, LOOKING SOUTHEAST, 20 JUNE 2011.

VIEW OF TEST PIT NO. 1 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE IMMEDIATELY AFTER EXCAVATION, LOOKING EAST, 20 JUNE 2011. THIN GRANULAR FILL OVERLYING FORMER TOPSOIL/ORGANIC LAYER AND UNDERLYING MARINE SILT/CLAY DEPOSIT.

VIEW OF TEST PIT NO. 1 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE IMMEDIATELY AFTER EXCAVATION, LOOKING EAST, 20 JUNE 2011. THIN GRANULAR FILL OVERLYING FORMER TOPSOIL/ORGANIC LAYER AND UNDERLYING MARINE SILT/CLAY DEPOSIT.

CLOSE-UP VIEW OF TEST PIT NO. 1 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE IMMEDIATELY AFTER EXCAVATION, LOOKING NORTHEAST, 20 JUNE 2011. THIN GRANULAR FILL OVERLYING FORMER TOPSOIL/ORGANIC LAYER AND UNDERLYING MARINE SILT/CLAY DEPOSIT.

VIEW OF TEST PIT NO. 1 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE APPROXIMATELY ONE WEEK AFTER EXCAVATION, LOOKING EAST, 30 JUNE 2011. THIN GRANULAR FILL OVERLYING FORMER TOPSOIL/ORGANIC LAYER AND UNDERLYING MARINE SILT/CLAY DEPOSIT.

HALEY & ALDRICH

INTERSTATE 295 / U.S. ROUTE 1
INTERCHANGE IMPROVEMENTS
EXIT 15 - YARMOUTH, MAINE

PHOTOGRAPHS OF TEST PIT NO. 1 (NORTH OF ROUTE 1 OVERPASS BRIDGE)

NOT TO SCALE
JULY 2011

G:\PROJECTS\37579 - Exit 15 Interchange\Geotechnical Design Report\Appendix B - Test Pit Logs and Photographs\[2011_0722_HAI_Test Pit Photos_DRAFT.xls]Test Pit No. 1 (North)

TEST PIT NO. 1 DESCRIPTION:

SOIL DESCRIPTIONS PRESENTED IN ORDER OF INCREASING DEPTH BELOW GROUND SURFACE.

1. SURFICIAL LAYER OF TOPSOIL RANGED IN THICKNESS FROM APPROXIMATELY 0.1 TO 0.3 FT.
2. TOPSOIL UNDERLAIN BY VARIABLE THICKNESS OF GRAY, SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE TO COARSE GRAVEL. THE THICKNESS RANGED FROM APPROXIMATELY 0.8 TO 2.0 FT IN THE NORTHERN AND SOUTHERN PORTIONS OF THE EXPOSED FACE.
3. VARIABLE THICKNESS OF LIGHT BROWN, WELL-GRADED SAND WITH GRAVEL (NORTHERN HALF OF TEST PIT), TO ORANGE-BROWN POORLY-GRADED SAND, TRACE FINE AND COARSE SAND AND FINE GRAVEL (SOUTHERN HALF OF TEST PIT). THE THICKNESS IN THE NORTHERN HALF OF THE TEST PIT RANGED FROM APPROXIMATELY 0.2 TO 1.3 FT AND THE THICKNESS IN THE SOUTHERN HALF OF THE TEST PIT RANGED FROM APPROXIMATELY 0.1 TO 0.8 FT.
4. VARIABLE THICKNESS OF DARK BROWN SILTY FINE TO BLACK ORGANIC SOIL. THE THICKNESS RANGED FROM APPROXIMATELY 0.1 TO 0.5-FT THICK.
5. VARIABLE THICKNESS OF LIGHT GRAY, FINE SAND. THE THICKNESS RANGED FROM APPROXIMATELY 0.1 TO 0.8 FT.
6. GRAY, MOTTLED, SILTY CLAY EXTENDING TO BOTTOM OF TEST PIT.
7. ENCOUNTERED EXISTING UNKNOWN UTILITY PIPE WITHIN LIMITS OF TEST PIT. PIPE CONSISTS OF 3.5-IN. DIAMETER, BITUMEN COATED METAL PIPE SLOPING DOWN FROM EAST TO WEST, TOWARDS INTERSTATE 295, AT APPROXIMATELY 3H:1V.

VIEW OF TEST PIT NO. 2 EXCAVATED ON THE SOUTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE IMMEDIATELY AFTER EXCAVATION, LOOKING EAST, 20 JUNE 2011.

CLOSE-UP VIEW OF THE LOWER PORTION OF TEST PIT NO. 2 IMMEDIATELY AFTER EXCAVATION WITH GRANULAR MATERIAL VISIBLE OVERLYING A FORMER TOPSOIL/ORGANIC LAYER AND MARINE SILT/CLAY DEPOSIT, LOOKING EAST, 20 JUNE 2011.

CLOSE-UP VIEW OF THE UPPER PORTION OF TEST PIT NO. 2 IMMEDIATELY AFTER EXCAVATION WITH GRANULAR MATERIAL VISIBLE OVERLYING SILT/CLAY DEPOSIT, LOOKING EAST, 20 JUNE 2011.

VIEW OF TEST PIT NO. 2 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE APPROXIMATELY ONE WEEK AFTER EXCAVATION, LOOKING EAST, 30 JUNE 2011.

CLOSE-UP VIEW OF TEST PIT NO. 2 EXCAVATED ON THE NORTH SIDE OF THE EXISTING ROUTE 1 OVERPASS BRIDGE APPROXIMATELY ONE WEEK AFTER EXCAVATION, LOOKING EAST, 30 JUNE 2011.

HALEY & ALDRICH

INTERSTATE 295 / U.S. ROUTE 1
INTERCHANGE IMPROVEMENTS
EXIT 15 - YARMOUTH, MAINE

PHOTOGRAPHS OF TEST PIT NO. 2 (SOUTH OF ROUTE 1 OVERPASS BRIDGE)

NOT TO SCALE
JULY 2011

G:\PROJECTS\37579 - Exit 15 Interchange\Geotechnical Design Report\Appendix B - Test Pit Logs and Photographs\[2011_0722_HAI_Test Pit Photos_DRAFT.xls]Test Pit No. 2 (South)

TEST PIT NO. 2 DESCRIPTION:

SOIL DESCRIPTIONS PRESENTED IN ORDER OF INCREASING DEPTH BELOW GROUND SURFACE.

UPPER PORTION OF TEST PIT (EAST):

1. SURFICIAL LAYER OF TOPSOIL RANGED IN THICKNESS FROM APPROXIMATELY 0.1 TO 0.3 FT.
2. TOPSOIL UNDERLAIN BY VARIABLE THICKNESS OF GRAY, SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE TO COARSE GRAVEL. THE THICKNESS RANGED FROM APPROXIMATELY 0.5 TO 1.2 FT IN THE NORTHERN AND SOUTHERN PORTIONS OF THE EXPOSED FACE.
3. VARIABLE THICKNESS OF GRAY AND BROWN, WELL-GRADED SAND WITH GRAVEL. CONTAINS SOME COBBLES AND SMALL BOULDERS. THE THICKNESS RANGED FROM APPROXIMATELY 0.7 TO 2.1 FT AND THE THICKNESS IN THE SOUTHERN HALF OF THE TEST PIT RANGED FROM APPROXIMATELY 0.1 TO 0.8 FT.
4. VARIABLE THICKNESS OF GRAY, SILTY FINE SAND, TRACE MEDIUM TO COARSE SAND AND FINE GRAVEL. VERY SILTY IN SOME AREAS AND CONTAINS LOCALIZED LENSES OF MEDIUM TO COARSE SAND AND FINE GRAVEL. THE THICKNESS RANGED FROM APPROXIMATELY 0.4 TO 1.2 FT AND TRANSITIONED INTO GRAY, MOTTLED, SILTY CLAY EXTENDING TO THE BOTTOM OF THE TEST PIT.
5. WATER OBSERVED SEEPING FROM EXPOSED FACE AT TOP OF GRAY, SILTY FINE SAND LAYER.

LOWER PORTION OF TEST PIT (WEST):

1. SAND AND GRAVEL ENCOUNTERED FROM GROUND SURFACE TO A DEPTH OF 6 FT AT THE NORTHERN FACE OF TEST PIT. THE TOP 1 TO 2 FT OF THIS MATERIAL CONSISTED OF GRAY, SILTY FINE SAND. THE MIDDLE 1 TO 2 FT CONSISTED OF SILTY FINE SAND WITH GRAVEL. THE LOWEST PORTION OF THIS LAYER CONSISTED OF WELL-GRADED SAND.
2. VARIABLE THICKNESS OF ORGANIC MATERAL MEASURING APPROXIMATELY 0.1 TO 0.4-FT THICK.
3. GRAY, SILTY FINE SAND AND MOTTLED, SILTY CLAY VISIBLE TO BOTTOM OF TEST PIT.
4. WATER OBSERVED ENTERING LOWER PORTION OF TEST PIT THROUGH ORAGANIC MATERIAL AND SILTY FINE SAND OVERLYING THE SILTY CLAY.

APPENDIX C

Existing NB Off-Ramp
Rock Mass Data

BEDROCK EXPOSURE MAPPING SUMMARY

NW N NE
W E
SW S SE

EXPOSURE NO.	EXPOSURE DESCRIPTION	DISCONT. TYPE	STRIKE	DIP	DIP DIRECTION	SPACING (BETWEEN JOINTS & BEDDING)	CONTINUITY (DISTANCE OF CONTINUITY)	ROUGHNESS	WEATHERING	APERTURE	FILLING	ROCK TYPE	REMARKS
	Mod. hard, sl. weathered, Gray f. grained to aphan GRANOFELS	FJ	N82°W	12°	SW	1'-4'	4'+	P/S to R	SL.	O	N	granofels	(A) consistent features parallel bedding 2-4" apart PHOTO 1, 2 reading in bedding plane
(A)		(A2) FJ.	N83°W	14°	SW	"	"	"	"	"	"	"	
		*CJ1	N46°E	77°	NW			U/S to R	SL	O	N	pegmatite	(B) pegmatite intrusion - photo 3
(B)	fr. to sl. Hard, tan-white, coarse grained PEGMATITE	CJ2	N80°W	89°	V	5'	1'	P/S	SL	O	N	pegmatite	* contact joint between pegmatite + granofels vertical feature - photo 4-6
(C)	Mod. hard, sl. weathered gray fine grained to aphan GRANOFELS	(C) VJ	N72°E	80°	V	1'-2.5'	2'-5'+	P/S	SL	O	N	granofels	(C) vertical feature photos 7-9
(D)	" GRANOFELS	(D) FJ	N54°E	24°	SE	0.5-2'	7"+	P to U/S	SL	T to O	N	"	
	"	(D) FJ	N56°E	25°	SE	0.5'-2'	7'+	P to U/S	SL	T to O	N	"	(D) Vertical features prominent - photos (D2)
	"	(D) VJ	N45°E	65°	NW	typical 1'-5'	~12'	P to U/S	SL	O	N	Granofels	
(D2)	"	(D2) FJ	N50°E	17°	SE	0.5-3'	5-10'	P to U/S	SL	O	N	"	
		(D2) FJ	N43°E	7°	SE	0.5'-3'	5'-10'	" "	SL	O	N	"	
		(D2) VJ	N50°E	72°	NW	0.5'	0.5'	P/S	SL	O	N	"	
		(D2) VJ	N76°E	82°	V	4'	7'+	P to U/S	SL	O	N	"	
		(D2) J	N8°E	39°	NW	1.5'	10'	P/S	SL	O	N	"	→ NOTE: Only 2 joints observed w/ this S+dip direction w/ in D2 area
(E)		E J	N67°W	88°	V	1.0	3'	P/S	SL	O	N		(E) 2-2.5' wide open "gapped" feature between rock faces, soil and talus infillet
	NOTE - bedrock adjacent to "gapped" feature: Tan, brecciated, (baked zone in granofels)	E J	N67°W	87°	V	1.0	3'	P/S	SL	O	N		
		J	N35°E	77°	SE	4.0	7'	P to U/S	SL	O	N	"	
		E T	N45°E	trend	on "gapped" feature								
		E VJ	N63°E	65°	NW	10'	3.5'	P to U/S	SL	O	N		
		E VJ	N60°E	70°	NW	10'	4'	P to U/S	SL	O	N		
		E FJ	N60°E	10°	SE	1'	2-4'	P to U/S	SL	O	N	granofels	

ABBREVIATIONS

J = Joint
JF = Filled Joint

S = Stepped R = Rough F = Fresh
U = undulatory Je = smooth D = Discolored
P = Planar Sl = slickensided Di = Dis. integrated
De = Decomposed

T = Tight O = open

CLIENT: _____
PROJECT: _____
DATE: _____
GEOLOGIST: _____

BEDROCK EXPOSURE MAPPING SUMMARY

EXPOSURE NO.	EXPOSURE DESCRIPTION INNER CIRCLE	DISCONT. TYPE	STRIKE	DIP	DIP DIRECTION	SPACING BETWEEN JOINTS & BEDDING	CONTINUITY DISTANCE OF CONTINUOUS	ROUGHNESS	WEATHERING	APERTURE	FILLING	ROCK TYPE	REMARKS
(F)	GRANOFELS (F)	fJ	N36°E	10°	NW	2'	1-2'	U/R	SL-M	O	N	GRANOFELS	MASSIVE structure
	"	fJ	N44°E	2°	H	1-3'	3-10'	U/R	SL/m	O	N	GRANOFELS	
	"	fJ	N42°E	2°	H	1-3'	3-10'	U/R	SL/m	O	N	"	
(H)	BORING YA-29 (H)	VJ	N72°E	84°	V(NW)	5'	1-4'	U/R	SL	O	N	GRANOFELS	
		fJ	N80°E	5°	H	1.5-2.5'	10-15'	P to U/R	Mod	Part O.	N	"	→ Tan, sl. to mod. weathered
		VJ	N62°W	83°	V	2'-4'	5'	U/R	SL	O	N	"	" "
		VJ	N73°W	90°	V	2'-4'	5'	P to U/R	SL	O	N	"	" "
		VJ	N72°W	83°	V(SW)	2'-4'	5'	"	SL	O	N	"	color change to Grey,
		VJ	N70°W	79°	V	2-4'	5'	"	SL	O	N	"	Moderately hard slightly to
	dipping low to → mod. toward rd	fJ	N32°E	19°	SE	1'-2' typ.	5'+	P to U/R	SL	O	N	"	moderately weathered, grey
													med. to fine grained GRANOFELS
	Area YA 29 +50' toward (F)	fJ	N24°E	11°	SE	1'-2' typ.	5'±	P to U/R	SL	O	N	"	
	+75'	VJ	N45°W	83°	NE	~5'	10'+	P to U/R	SL	O	N	"	
		fJ	N15°E	10°	SE	1'-1.5'	5+	P to U/R	SL	O	N	"	" "
		fJ	N40°E	18°	SE	0.5'-1.5'	5'	P to U/R	SL	O	N	"	
		VJ	N58°E	72°	NW	6'-7'	10'	P to U/R	SL	O	N	"	
(G)	+100'	fJ	N30°E	17°	SE	1'-2'	3'	P to U/R	SL	O	N	"	Massive structure compared w/
	"	VJ	N65°E	70°	NW	6'-7'	5'	P to U/R	SL	O	N	"	other areas
	" from G ↓ ~175 to area (F)	fJ	N7°E	11°	SE	0.5-1'	1'-2'	P to U/S to R	SL	O	N	"	

ABBREVIATIONS

J = Joint
JF = Filled Joint

S = Stepped R = Rough
U = undulitory Je smooth
P = Planar Sl = slickensided

T = Tight O = Open

F = Fresh
D = Discolored
Di = Disintegrated
De = Decomposed

CLIENT: _____
PROJECT: YARMOUTH
DATE: _____
GEOLOGIST: _____

BEDROCK EXPOSURE MAPPING SUMMARY

EXPOSURE NO.	EXPOSURE DESCRIPTION	OBSERV. TYPE	STRIKE	DIP	DIP DIRECTION	SPACING (BETWEEN JOINTS OF SAME SET)	CONTINUITY (DISTANCE OF JOINT CONTINUITY)	ROUGHNESS	WEATHERING	APERTURE	FILLING	ROCK TYPE	REMARKS
I	OUTER CIRCLE facing W/295 GRANOFELS w/ quartz intrusions AREA I	fJ	N25°E	30°	SE	1-2'	3'-4'	P to U/R	SL	O	N	GRANOFELS	thin foliation beds 3" - 1'
		fJ	N15°E	20°	SE	1'	3'	P to U/R	SL	O	N	GRANOFELS	consistent features throughout area I
		fJ	N13°W	7°	NE	0.5'	1'	P/S	SL	O	N	"	
		fJ	N24°E	20°	SE	0.3-0.5'	3'	P/S	SL	O	N	"	
		fJ	N24°E	18°	SE	0.3-0.5'	1'	P/S	SL	O	N	"	

(metamorphosed)
Hutchins Corner Formation (Stratified Rocks II) of the Central Maine Sequence

Biotite-quartz-plagioclase granofels w/ interbeds of greenish-gray calc-silicate granofels

Pegmatite layers conform to bedding.

ABBREVIATIONS

J = Joint
JF = Foliation Joint

S = Stepped R = Rough
U = undulatory Sm = smooth
P = Planar Sl = slickensided

T = Tight O = open

F = Fresh
D = Discolored
Di = Disintegrated
De = Decomposed

CLIENT: _____
PROJECT: _____
DATE: _____
GEOLOGIST: _____

BEDROCK EXPOSURE MAPPING SUMMARY

EXPOSURE NO.	EXPOSURE DESCRIPTION	DISCONT. TYPE	STRIKE	DIP	DIP DIRECTION	SPACING BETWEEN JOINTS & BEDDING	CONTINUITY DISTANCE OF CONTINUITY	ROUGHNESS	WEATHERING	APERTURE	FILLING	ROCK TYPE	REMARKS
(J) bor. 32 to 32'	moderately weathered rock face Bedding parallel to foliation increased thickness in beds moving NE along strike in area (J) continuing to bor. 31	fJ	N14°E	21°	SE	1'-6"	1'-3'	P to U/S	m.	T to O	N	GRANOFELS	Mod. hard, mod. weathered, purplish gray to tan, med. to fine grained GRANOFELS 1"-3" beds parallel to foliation
		fJ	N25°E	19°	SE	1'-6"	1'-3'	P to U/S	m.	T to O	N		
		*VJ	N25°E	40°	SE	3'-6+	1'-5'	P to U/R	in	O	N		
		fJ	N53°E	30°	SE	0.5-1.5	1'-3'	P/S	SL.	O	N		
		VJ	N27°E	90°	-	2.5'	3'-5'	P/R	SL	O	N		
		fJ	N35°E	26°	SE	1'-2'	5'-10'	P to U/R	SL to mod.	O	N		
(K) bor. 32 to bottom 29 + 30 (see plan)	Prominent featuresare vertical joints Bedding parallel to foliation (consistent in area K) *except one ~5' wide area across from bor. 29-30 color change to Tan-possible baked zone-see photo wedge shaped feature — rt. side of wedge	VJ	N60°E	80°	SE	1'-3'	3'-5+	P/R	SL	O	N	GRANOFELS	mod. weathering in + along joints up to 1" to ¼" - secondary stepped jointing between beds @ mod. angles ~5' disk apart (set) - secondary features in area K are moderately dipping from W to E across face, grass covered linear features (see photos) spacing approx. 5' 5-6'
		fJ	N36°E	23°	SE	1'-4'	2'	P/S	SL	O	N		
		VJ	N67°E	88°	L	1'-3'	7'+	P to ST/R	SL	O	N		
		VJ	N73°E	90°	L	1'-3'	7'+	P/S to R	SL	O	N		
		fJ	N40°E	18°	SE	1'-4'	5'	P/S	SL	O	N		
		fJ	N42°E	37°	SE	1-4'	4'	P/S	SL	O	N		
		fJ	N45°E	29°	SE	1-4'	5'	P/S	SL	O	N		
		*(	N52°E	58°)	-								
(L) bor. 29 + 7.5' (see plan)	- bedding increases in thickness in area L compared w/ area K ~3-4'+ beds primarily - difficult to get readings on vert. joints - only one exposed - wedge shaped feature + color change to tan - "baked zone" @ N end of (L) (see photo) (bor. 29+7.5')	fJ	N40°E	26°	SE	3'-4'	5'-10'	P/S to R	SL	O	N	GRANOFELS	Mod. hard, slightly to mod. weath. gray m to f. grained GRANOFELS bedding parallel to foliation (one tan metasedimentary bed ~8" from gs. + ~1.0' in thickness) * vertical joints along face are generally mod. weathered up to 1"-2" within joint
		fJ	N37°E	25°	SE	3'-4'	5'-10	P/S to R	SL	O	N		
		fJ	N30°E	26°	SE	2'-4'	4'-5'	P/S	SL	O	N		
		fJ	N23°E	32°	SE	2'-4'	4'-5'	P/S	SL	O	N		
		VJ	N77°E	42°	NW	~7'	8'-10+	U to ST/S to R	Mod.	O	*		
		fJ	N45°E	48°	SE	0.5'-2'	7'-10'	P/S	SL	O	N		
		fJ	N38°E	35°	SE	0.5'-2'	7'-10'	P/S	SL	O	N		
		VJ	N64°W	84°	-	5'	5'	P to U/S	SL	O	N		

ABBREVIATIONS

J = Joint

JF = Foliation Joint

S = Stepped R = Rough

U = undulitory Sm = smooth

P = Planar Sl = slickensided

T = Tight O = open

F = Fresh

D = Discolored

Di = Disintegrated

De = Decomposed

CLIENT: _____

PROJECT: _____

DATE: _____

GEOLOGIST: _____

General Notes

Area H

major vertical features ~20' apart - 1 gapped 1"-3" open / minor vertical fractures ~10' apart
bedding generally dipping toward road (south east)
mod. weathering along face in vertical sections (along vert. joint areas)

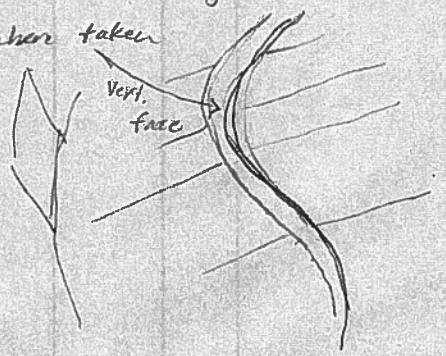
Area E - 75' from last reflector SEE PLAN on opposite side (inner circle) - large gapped (2' wide) feature location

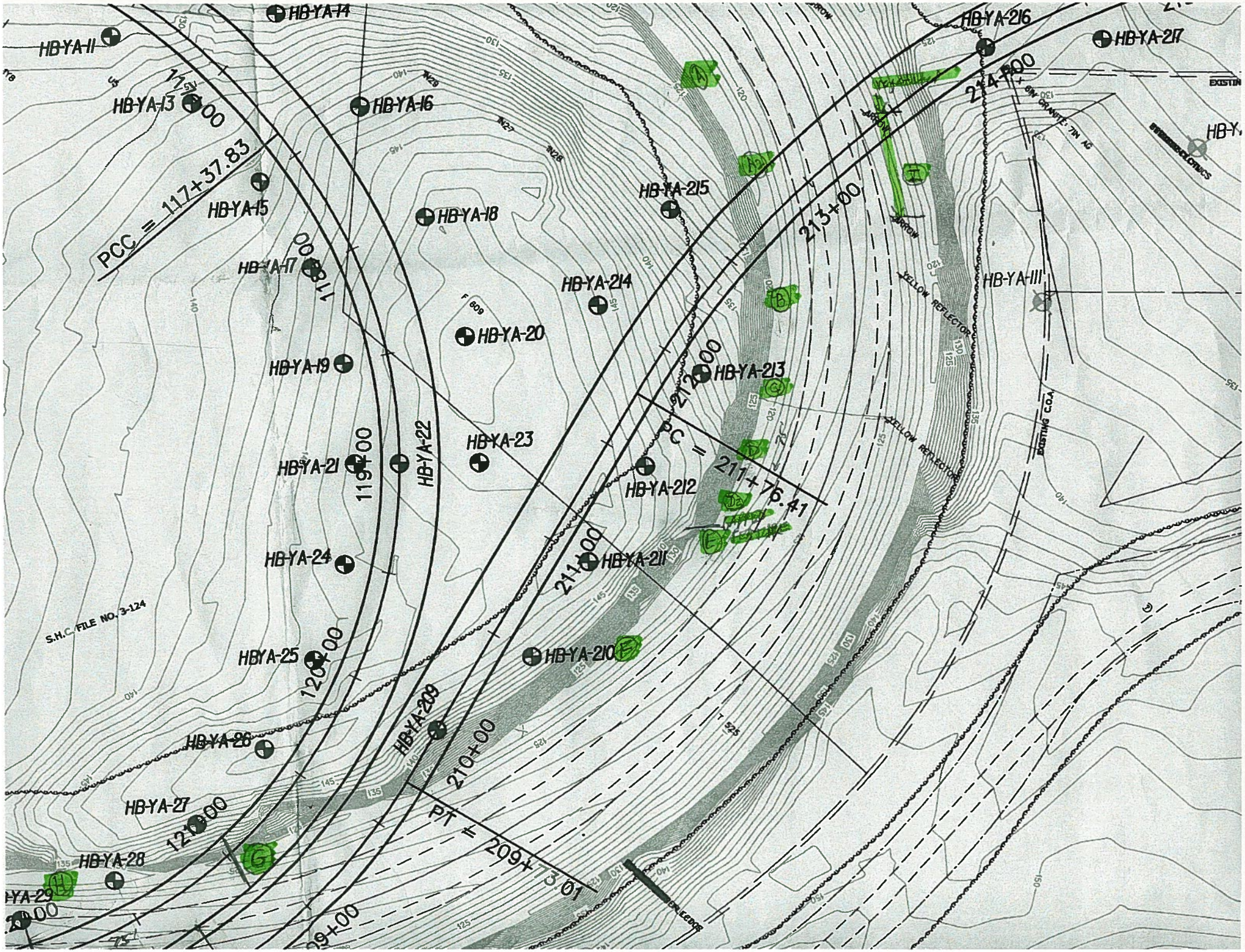
- Primary features - vertical beds 0.5' - 3' apart
- wedge shaped feature adjacent to 'gap' (to left of gap facing)

Area F - horizontal bedding features prominent - more massive structure in this area
secondary vertical features - four ~8 - 10' apart - not continuous from top to bottom
discontinuous / stepped

Area G 100' to ~125' from HA-29 stake toward (F)
more massive structure and parallel vertical joints ~5' apart

Area D blocky structure - beds appear to be parallel dipping SE low angle
vertical joints are undulating → different % of dip depending on where taken

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HB-YA-25
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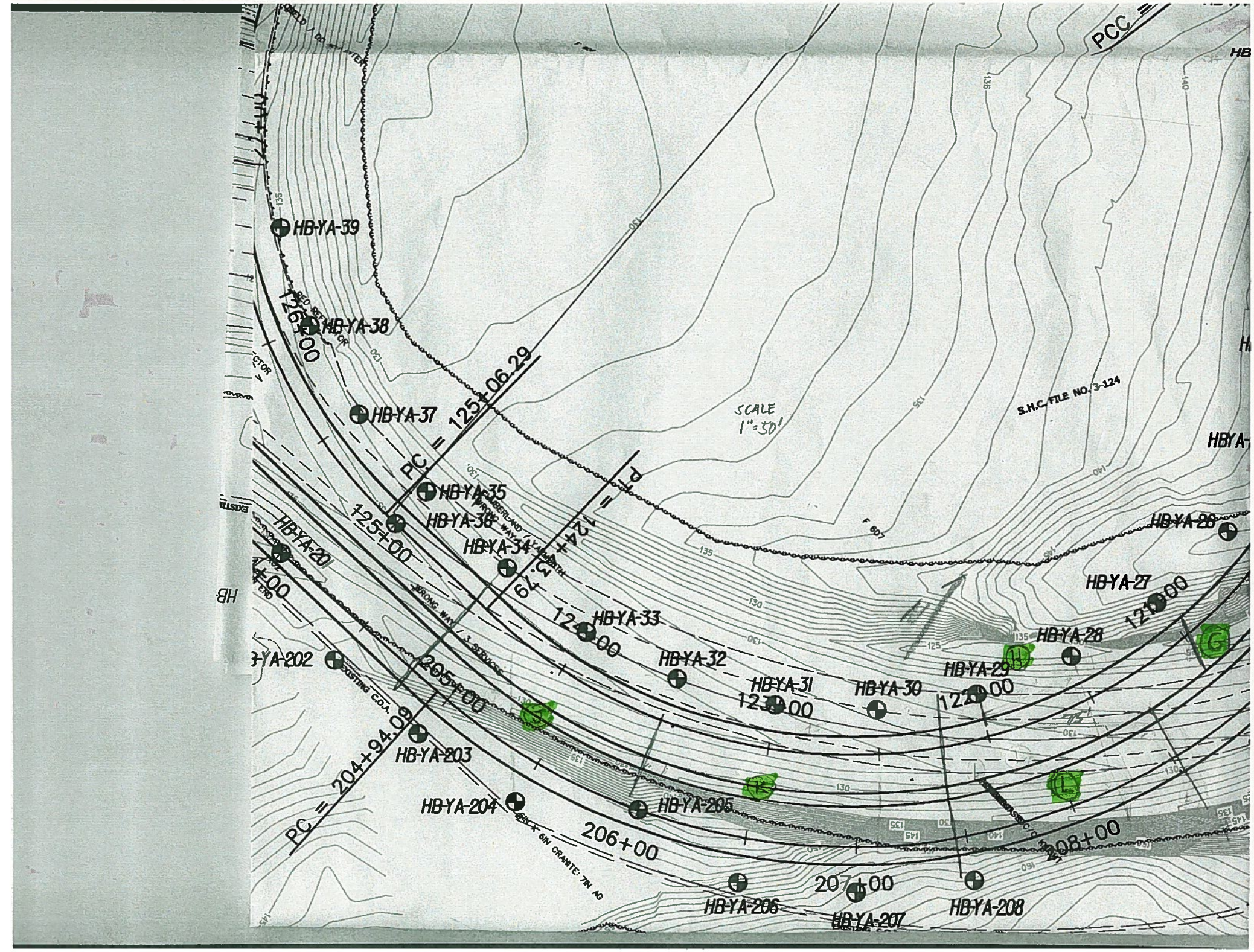
HB-YA-209
HB-YA-26
HB-YA-27
HB-YA-28
HB-YA-29
HB-YA-216
HB-YA-217
HB-YA-111
PCC = 117+37.83
PC = 211+76.41
PT = 209+73.01
117+00
118+00
119+00
120+00
121+00
210+00
211+00
212+00
213+00
214+00
209+00
S.H.C. FILE NO. 3-124
EXISTING C.O.A.
YELLOW REFLECTOR
ARROW
EXISTIN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HB-YA-26
HB-YA-202
HB-YA-203
HB-YA-204
HB-YA-205
HB-YA-206
HB-YA-207
HB-YA-208
126+00
125+06.29
125+00
124+00
123+00
122+00
121+00
120+00
205+00
204+94.09
206+00
207+00
208+00
SCALE 1"=30'
S.M.C. FILE NO. 3-124
PROPOSED WAY
EXISTING C.O.A.
6IN GRANITE: 7IN AG

APPENDIX D

Observation Well Installation and Groundwater Monitoring Reports

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. HB-YA-301(OW)

Boring No. HB-YA-301

PROJECT	Interstate 295 Interchange Improvements	**H&A FILE NO.**	37579-000
LOCATION	Exit 15 - Yarmouth, Maine	**PROJECT MGR.**	J. Weaver
CLIENT	Maine Department of Transportation	**FIELD REP.**	D. Dearden
CONTRACTOR	Maine Test Borings	**DATE INSTALLED**	2/9/2011
DRILLER	T. Schaefer	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____

Location _____

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
SAND and SILT	Filter Sand
-MARINE DEPOSIT-	
2.5 / 3.0	
Stiff silty CLAY	Bentonite
-MARINE DEPOSIT-	
6.0 / 7.0	
Very soft silty CLAY	Filter Sand
-MARINE DEPOSIT-	
15.0	**15.0**

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

L1, L2, L3

(Not to Scale)

Type of protective cover/lock: Master Lock

Height of top of guard pipe above ground surface: 3.0 ft

Height of top of riser pipe above ground surface: 2.8 ft

Type of protective casing: Steel guard pipe
Length: 5.4 ft
Inside Diameter: 4.0 in

Depth of bottom of guard pipe: 2.4 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Bentonite Seal	2.5	3.5

Type of riser pipe: Sch. 40 PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Filter Sand

Diameter of borehole: 6.0 in

Depth to top of well screen: 10.0 ft

Type of screen: Slotted PVC
Screen gauge or size of openings: 0.010 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 15.0 ft

Bottom of Silt trap: 15.0 ft

Depth of bottom of borehole: 15.0 ft

12.8 ft	+	5.0 ft	+	-- ft	=	17.8 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS:

Form 2007

HALEY & ALDRICH

GROUNDWATER MONITORING REPORT

OW/PZ NUMBER
BB-YA-301(OW)
Page 1 of 1

PROJECT	Interstate 295 / U.S. Route 1 Interchange Improvements	**H&A FILE NO.**	37579-000
LOCATION	Exit 15 - Yarmouth, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	D. Dearden
CONTRACTOR	Maine Test Borings	**DATE**	2/9/2011

ELEVATION OF REFERENCE POINT 130.5 (NAVD 88) **REFERENCE POINT:** **Ground Surface** ☐ **PVC** ☐ **Other** ☑

Date	Time	Elapsed Time (days)	Depth of Water from Reference Point	Elevation of Water	Remarks	Read By
2/18/2011	1200	9	7.3	123.2		DAD
3/28/2011	1230	47	6.6	123.9		DAD

APPENDIX E

Laboratory Test Results

Preliminary Phase
Laboratory Test Results
by MaineDOT

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Yarmouth Project Number: 11086.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
I-295 South On Ramp											
HB-YA-101, S1	149+75	4.0 Rt.	0.70-5.0	207212	1	8.4			SM	A-2-4	II
HB-YA-102, S3	153+65	6.0 Rt.	3.4-5.0	207213	1	12.8			SM	A-2-4	II
HB-YA-104, 1D	157+00	5.0 Rt.	0.0-2.0	207214	1	29.8			SP-SM	A-3	0
HB-YA-104, 2D	157+00	5.0 Rt.	5.0-7.0	207215	1	23.6			CL-ML	A-4	IV
HB-YA-104, 3D	157+00	5.0 Rt.	10.0-12.0	207216	1	24.8			ML	A-4	IV
HB-YA-105, 1D	159+07	CL	0.0-2.0	207217	2	23.2			CL-ML	A-4	IV
HB-YA-106, 2D	161+00	5.0 Lt.	5.0-7.0	207218	2	20.1	28	9	CL	A-4	IV
HB-YA-107, 1D	163+00	5.0 Lt.	0.0-2.0	207219	*2	22.8	22	5	CL-ML	A-4	IV
I-295 North On Ramp											
HB-YA-108, 1D	200+00	6.0 Lt.	0.0-2.0	207220	3	21.8			ML	A-4	IV
I-295 North Off Ramp											
HB-YA-113, 1D	16+00	3.0 Lt.	5.0-7.0	207222	*4	25.5	35	9	ML	A-4	IV
HB-YA-113, 2D	16+00	3.0 Lt.	10.0-12.0	207224	4	27.4			CL-ML	A-4	IV
HB-YA-113, 3D	16+00	3.0 Lt.	15.0-16.1	207225	4	24.3			ML	A-4	IV
HB-YA-114, 2D	17+10	CL	5.0-7.0	207223	4	25.2			CL-ML	A-4	IV
HB-YA-114, 4D	17+10	CL	15.0-17.0	207195	*4	32.4	24	6	CL-ML	A-4	IV
* Grain Size not tested.											

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MaineDOT and Corps of Engineers Classification Systems.

GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207212	**HB-YA-101/S1**	**GEOTECHNICAL (DISTURBED)**	**12/29/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **149+75** Offset, ft: **4.0** **RT** Dbfg, ft: **0.7-5.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	**100.0**
⅜ in. [9.5 mm]	**96.2**
¼ in. [6.3 mm]	**92.5**
No. 4 [4.75 mm]	**89.4**
No. 10 [2.00 mm]	**78.8**
No. 20 [0.850 mm]	**63.5**
No. 40 [0.425 mm]	**50.5**
No. 60 [0.250 mm]	**40.3**
No. 100 [0.150 mm]	**29.9**
No. 200 [0.075 mm]	**20.5**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

8.4

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207213	**HB-YA-102/S3**	**GEOTECHNICAL (DISTURBED)**	**12/29/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **153+65** Offset, ft: **6.0** **RT** Dbfg, ft: **3.4-5.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	**100.0**
¾ in. [19.0 mm]	**97.8**
½ in. [12.5 mm]	**95.3**
⅜ in. [9.5 mm]	**94.8**
¼ in. [6.3 mm]	**92.1**
No. 4 [4.75 mm]	**91.1**
No. 10 [2.00 mm]	**86.5**
No. 20 [0.850 mm]	**80.7**
No. 40 [0.425 mm]	**73.7**
No. 60 [0.250 mm]	**63.1**
No. 100 [0.150 mm]	**46.9**
No. 200 [0.075 mm]	**33.3**

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

12.8

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Wash Method
Procedure A

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207214	**HB-YA-104/1D**	**GEOTECHNICAL (DISTURBED)**	**12/19/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **157+00** Offset, ft: **5.0** **RT** Dbfg, ft: **0.0-2.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	**100.0**
No. 10 [2.00 mm]	**99.7**
No. 20 [0.850 mm]	**98.4**
No. 40 [0.425 mm]	**94.7**
No. 60 [0.250 mm]	**81.1**
No. 100 [0.150 mm]	**35.3**
No. 200 [0.075 mm]	**8.4**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

29.8

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207215	**HB-YA-104/2D**	**GEOTECHNICAL (DISTURBED)**	**12/19/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **157+00** Offset, ft: **5.0** **RT** Dbfg, ft: **5.0-7.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	**100.0**
No. 10 [2.00 mm]	**99.9**
No. 20 [0.850 mm]	**99.8**
No. 40 [0.425 mm]	**99.6**
No. 60 [0.250 mm]	**99.3**
No. 100 [0.150 mm]	**98.8**
No. 200 [0.075 mm]	**96.7**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

23.6

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207216	**HB-YA-104/3D**	**GEOTECHNICAL (DISTURBED)**	**12/19/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **157+00** Offset, ft: **5.0** **RT** Dbfg, ft: **10.0-12.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	**100.0**
⅜ in. [9.5 mm]	**99.4**
¼ in. [6.3 mm]	**99.4**
No. 4 [4.75 mm]	**99.4**
No. 10 [2.00 mm]	**99.4**
No. 20 [0.850 mm]	**99.3**
No. 40 [0.425 mm]	**99.2**
No. 60 [0.250 mm]	**98.9**
No. 100 [0.150 mm]	**96.1**
No. 200 [0.075 mm]	**61.7**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

24.8

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207217	**HB-YA-105/1D**	**GEOTECHNICAL (DISTURBED)**	**12/19/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **159+07** Offset, ft: **CL** Dbfg, ft: **0.0-2.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	**100.0**
¼ in. [6.3 mm]	**99.9**
No. 4 [4.75 mm]	**99.7**
No. 10 [2.00 mm]	**99.3**
No. 20 [0.850 mm]	**98.7**
No. 40 [0.425 mm]	**98.0**
No. 60 [0.250 mm]	**97.1**
No. 100 [0.150 mm]	**93.4**
No. 200 [0.075 mm]	**62.0**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

23.2

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207218	**HB-YA-106/2D**	**GEOTECHNICAL (DISTURBED)**	**12/19/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **161+00** Offset, ft: **5.0** **LT** Dbfg, ft: **5.0-7.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	**100.0**
No. 4 [4.75 mm]	**99.7**
No. 10 [2.00 mm]	**99.5**
No. 20 [0.850 mm]	**99.2**
No. 40 [0.425 mm]	**98.4**
No. 60 [0.250 mm]	**97.5**
No. 100 [0.150 mm]	**96.2**
No. 200 [0.075 mm]	**85.8**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

28

Plastic Limit (T 90), %

19

Plasticity Index (T 90), %

9

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

20.1

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

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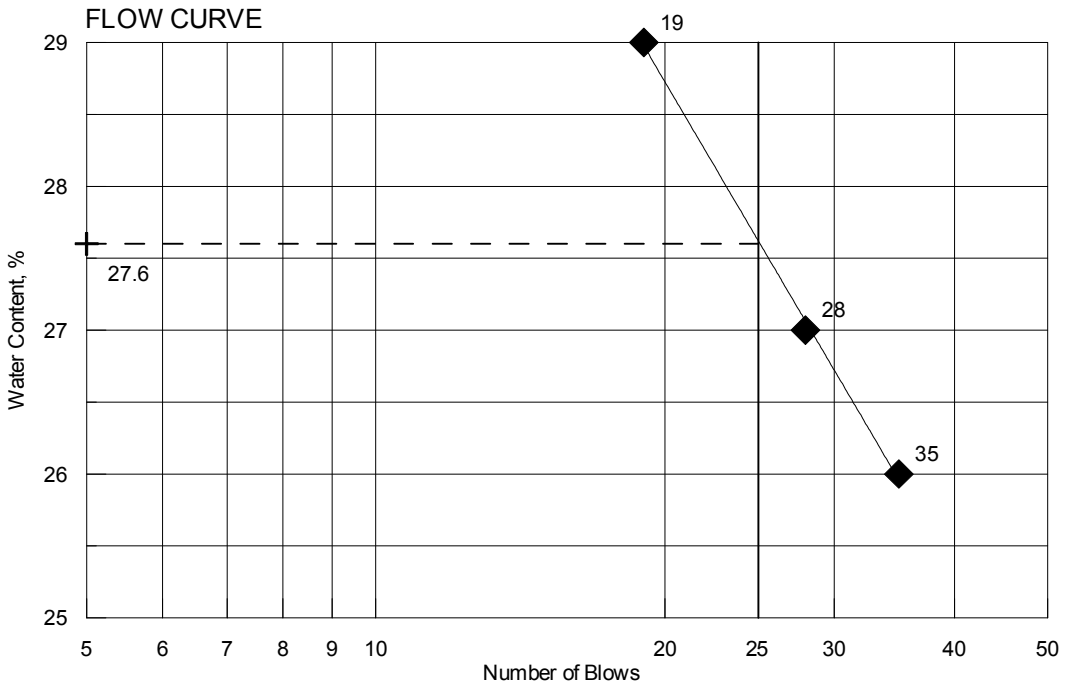
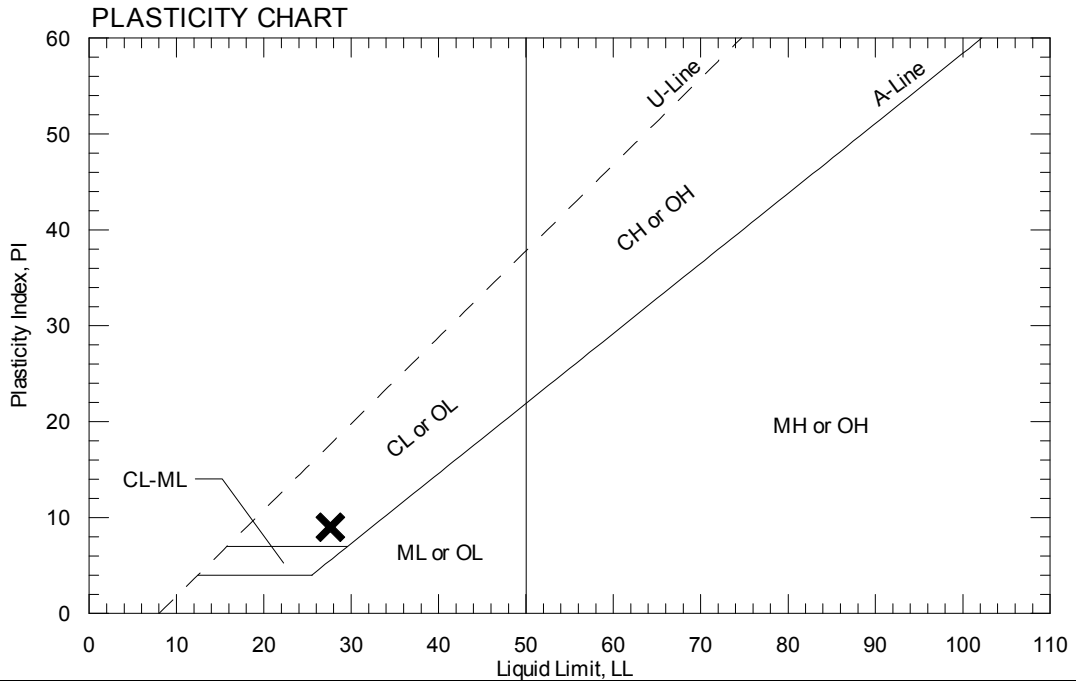
TOWN	Yarmouth	Reference No.	207218
PIN	011086.00	Water Content, %	20.1
Sampled	12/19/2008	Plastic Limit	19
Boring No./Sample No.	HB-YA-106/2D	Liquid Limit	28
Station	161+00	Plasticity Index	9
Depth	5.0-7.0	Tested By	BBURR





AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207219	**HB-YA-107/1D**	**GEOTECHNICAL (DISTURBED)**	**12/19/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **163+00** Offset, ft: **5.0** **LT** Dbfg, ft: **0.0-2.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

22

Plastic Limit (T 90), %

17

Plasticity Index (T 90), %

5

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

22.8

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Wash Method

Comments:

2

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

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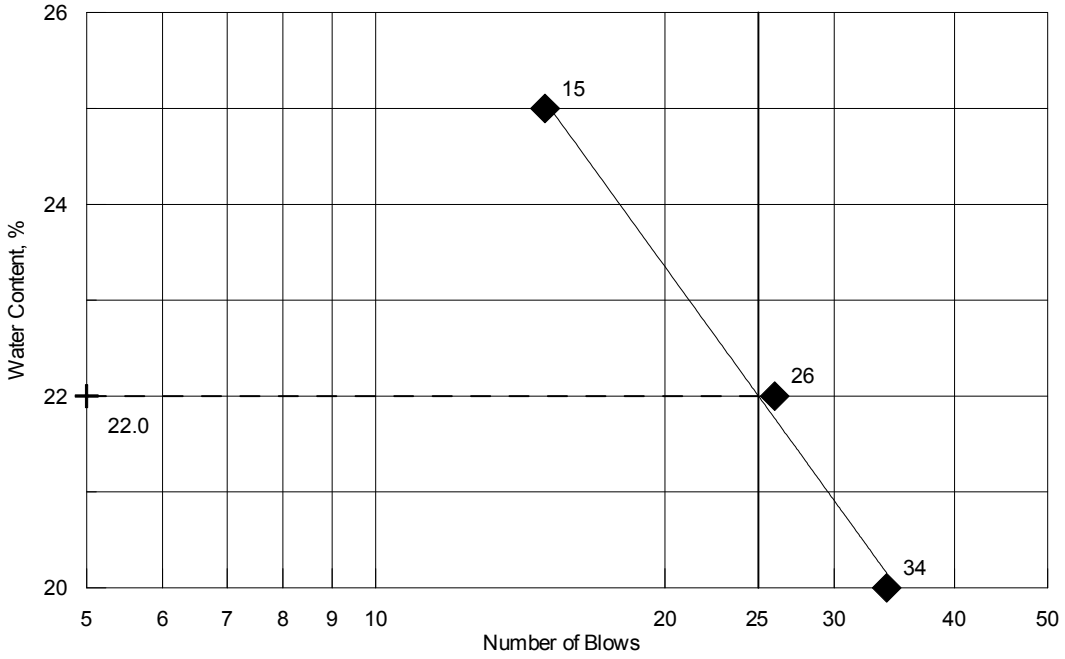
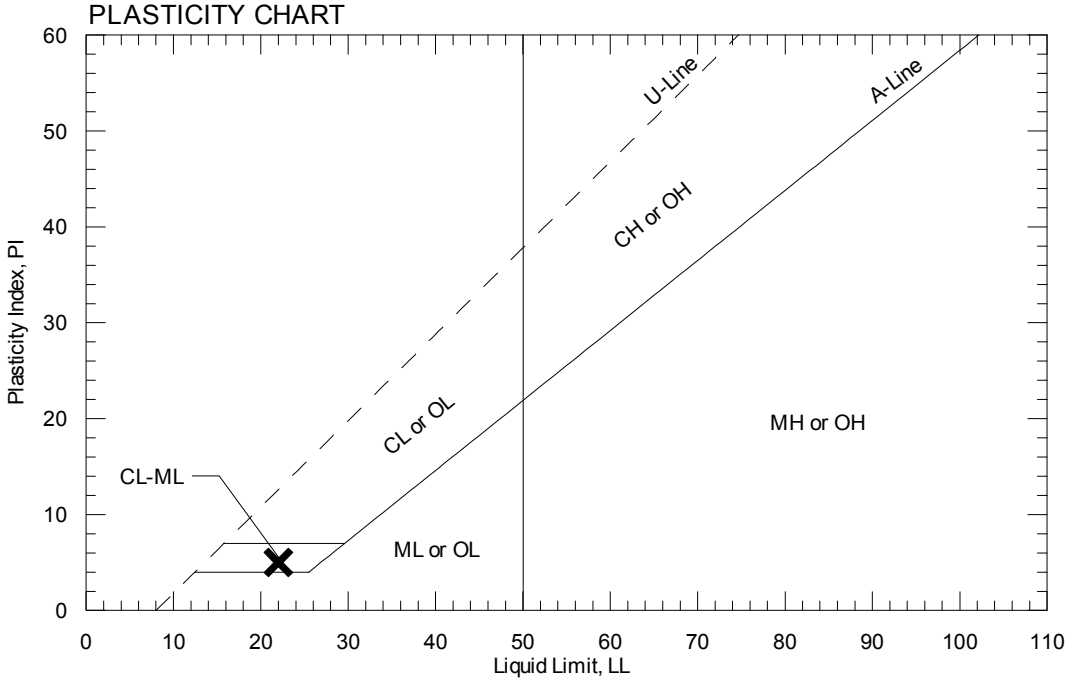
TOWN	Yarmouth	Reference No.	207219
PIN	011086.00	Water Content, %	22.8
Sampled	12/19/2008	Plastic Limit	17
Boring No./Sample No.	HB-YA-107/1D	Liquid Limit	22
Station	163+00	Plasticity Index	5
Depth	0.0-2.0	Tested By	BBURR

FLOW CURVE



PLASTICITY CHART



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Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207220	**HB-YA-108/1D**	**GEOTECHNICAL (DISTURBED)**	**12/22/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **200+00** Offset, ft: **6.0** **LT** Dbfg, ft: **0.0-2.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	**100.0**
⅜ in. [9.5 mm]	**99.6**
¼ in. [6.3 mm]	**99.6**
No. 4 [4.75 mm]	**99.4**
No. 10 [2.00 mm]	**99.0**
No. 20 [0.850 mm]	**97.9**
No. 40 [0.425 mm]	**96.8**
No. 60 [0.250 mm]	**95.9**
No. 100 [0.150 mm]	**89.7**
No. 200 [0.075 mm]	**54.0**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

21.8

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

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Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207222	**HB-YA-113/1D**	**GEOTECHNICAL (DISTURBED)**	**12/24/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **16+00** Offset, ft: **3.0** **LT** Dbfg, ft: **5.0-7.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

35

Plastic Limit (T 90), %

26

Plasticity Index (T 90), %

9

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

25.5

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Wash Method

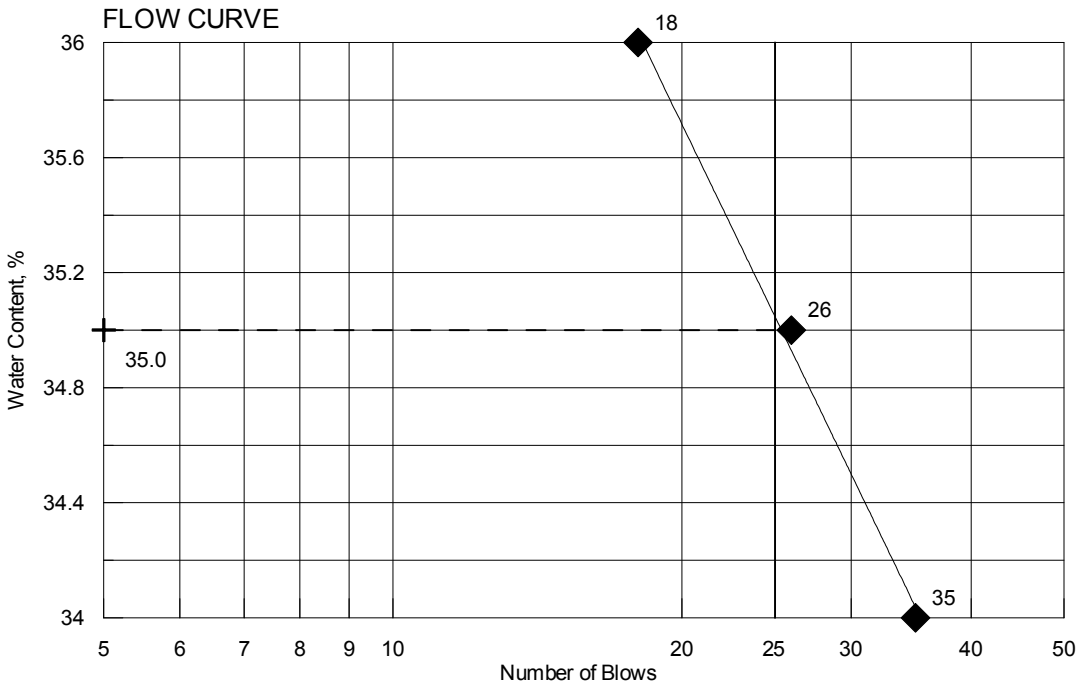
Comments:

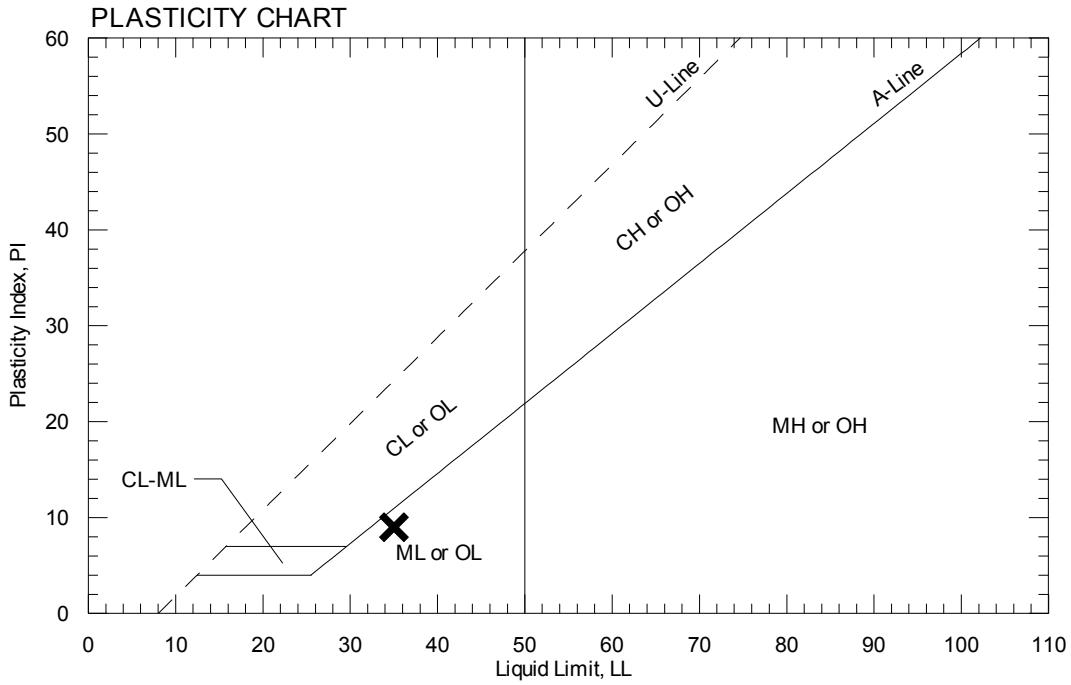
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Yarmouth	Reference No.	207222
PIN	011086.00	Water Content, %	25.5
Sampled	12/24/2008	Plastic Limit	26
Boring No./Sample No.	HB-YA-113/1D	Liquid Limit	35
Station	16+00	Plasticity Index	9
Depth	5.0-7.0	Tested By	BBURR





AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207224	**HB-YA-113/2D**	**GEOTECHNICAL (DISTURBED)**	**12/24/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **16+00** Offset, ft: **3.0** **LT** Dbfg, ft: **10.0-12.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T-88)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	**100.0**
No. 4 [4.75 mm]	**99.9**
No. 10 [2.00 mm]	**99.9**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**99.7**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**89.9**
[0.0284 mm]	**68.2**
[0.0186 mm]	**62.5**
[0.0110 mm]	**56.8**
[0.0079 mm]	**51.1**
[0.0057 mm]	**45.5**
[0.0031 mm]	**39.8**
[0.0012 mm]	**31.3**

Wash Method

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)
2.71

Loss on Ignition (T 267)
Loss, % H2O, %

Water Content (T 265), %
27.4

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/23/2009**

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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207225	**HB-YA-113/3D**	**GEOTECHNICAL (DISTURBED)**	**12/24/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **16+00** Offset, ft: **3.0** **LT** Dbfg, ft: **15.0-16.1**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	**100.0**
No. 10 [2.00 mm]	**99.7**
No. 20 [0.850 mm]	**99.4**
No. 40 [0.425 mm]	**99.1**
No. 60 [0.250 mm]	**98.5**
No. 100 [0.150 mm]	**95.1**
No. 200 [0.075 mm]	**64.4**

Wash Method
Procedure A

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

24.3

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/15/2009**

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GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207223	**HB-YA-114/2D**	**GEOTECHNICAL (DISTURBED)**	**12/24/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **17+10** Offset, ft: **CL** Dbfg, ft: **5.0-7.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T-88)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	**100.0**
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	**100.0**
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	**98.7**
[0.0264 mm]	**85.7**
[0.0172 mm]	**79.8**
[0.0101 mm]	**76.9**
[0.0076 mm]	**65.0**
[0.0054 mm]	**62.1**
[0.0029 mm]	**53.2**
[0.0012 mm]	**41.4**

Wash Method

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %	

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

Plastic Limit (T 90), %

Plasticity Index (T 90), %

Specific Gravity, Corrected to 20°C (T 100)
2.72

Loss on Ignition (T 267)
Loss, % H2O, %

Water Content (T 265), %
25.2

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In. U. Shear tons/ft²	3 In. Remold tons/ft²	6 In. U. Shear tons/ft²	6 In. Remold tons/ft²	Water Content, %	Description of Material Sampled at the Various Tube Depths

Comments:

AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/23/2009**

Paper Copy: Lab File; Project File; Geotech File

Maine DOT, Materials Testing & Exploration, 219 Hogan Road, Bangor, Maine 04401

GEOTECHNICAL TEST REPORT
Central Laboratory

SAMPLE INFORMATION

Reference No.	Boring No./Sample No.	Sample Description	Sampled	Received
207195	**HB-YA-114/4D**	**GEOTECHNICAL (DISTURBED)**	**12/24/2008**	**1/14/2009**

Sample Type: **GEOTECHNICAL** Location: **ROADWAY** Station: **17+10** Offset, ft: **CL** Dbfg, ft: **15.0-17.0**

PIN: **011086.00** Town: **Yarmouth** Sampler: **GROSS, KAREN L**

TEST RESULTS

Sieve Analysis (T 27, T 11)

SIEVE SIZE U.S. [SI]	% Passing
3 in. [75.0 mm]	
1 in. [25.0 mm]	
¾ in. [19.0 mm]	
½ in. [12.5 mm]	
⅜ in. [9.5 mm]	
¼ in. [6.3 mm]	
No. 4 [4.75 mm]	
No. 10 [2.00 mm]	
No. 20 [0.850 mm]	
No. 40 [0.425 mm]	
No. 60 [0.250 mm]	
No. 100 [0.150 mm]	
No. 200 [0.075 mm]	

Direct Shear (T 236)

Shear Angle, °			
Initial Water Content, %			
Normal Stress, psi			
Wet Density, lbs/ft³			
Dry Density, lbs/ft³			
Specimen Thickness, in			

Consolidation (T 216)

Trimmings, Water Content, %

	Initial	Final		Void Ratio	% Strain
Water Content, %			Pmin		
Dry Density, lbs/ft³			Pp		
Void Ratio			Pmax		
Saturation, %			Cc/C'c		

Miscellaneous Tests

Liquid Limit @ 25 blows (T 89), %

24

Plastic Limit (T 90), %

18

Plasticity Index (T 90), %

6

Specific Gravity, Corrected to 20°C (T 100)

Loss on Ignition (T 267)

Loss, % H2O, %

Water Content (T 265), %

32.4

Vane Shear Test on Shelby Tubes (Maine DOT)

Depth taken in tube, ft	3 In.		6 In.		Water Content, %	Description of Material Sampled at the Various Tube Depths
	U. Shear tons/ft²	Remold tons/ft²	U. Shear tons/ft²	Remold tons/ft²		

Wash Method

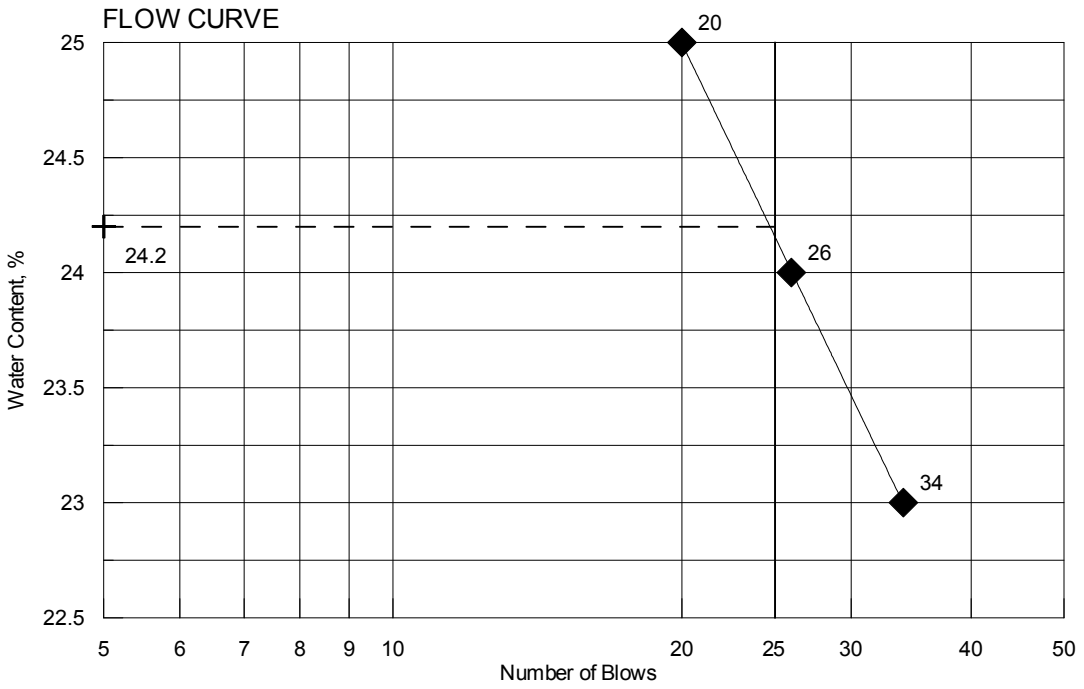
Comments:

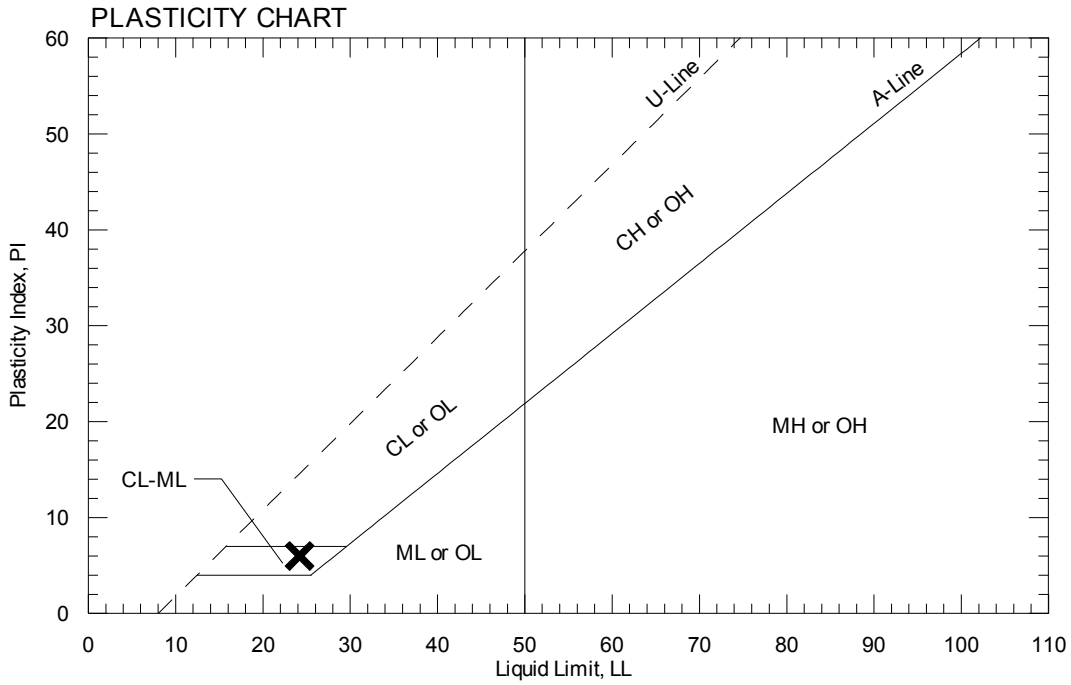
AUTHORIZATION AND DISTRIBUTION

Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

Paper Copy: Lab File; Project File; Geotech File

TOWN	Yarmouth	Reference No.	207195
PIN	011086.00	Water Content, %	32.4
Sampled	12/24/2008	Plastic Limit	18
Boring No./Sample No.	HB-YA-114/4D	Liquid Limit	24
Station	17+10	Plasticity Index	6
Depth	15.0-17.0	Tested By	BBURR





AUTHORIZATION AND DISTRIBUTION

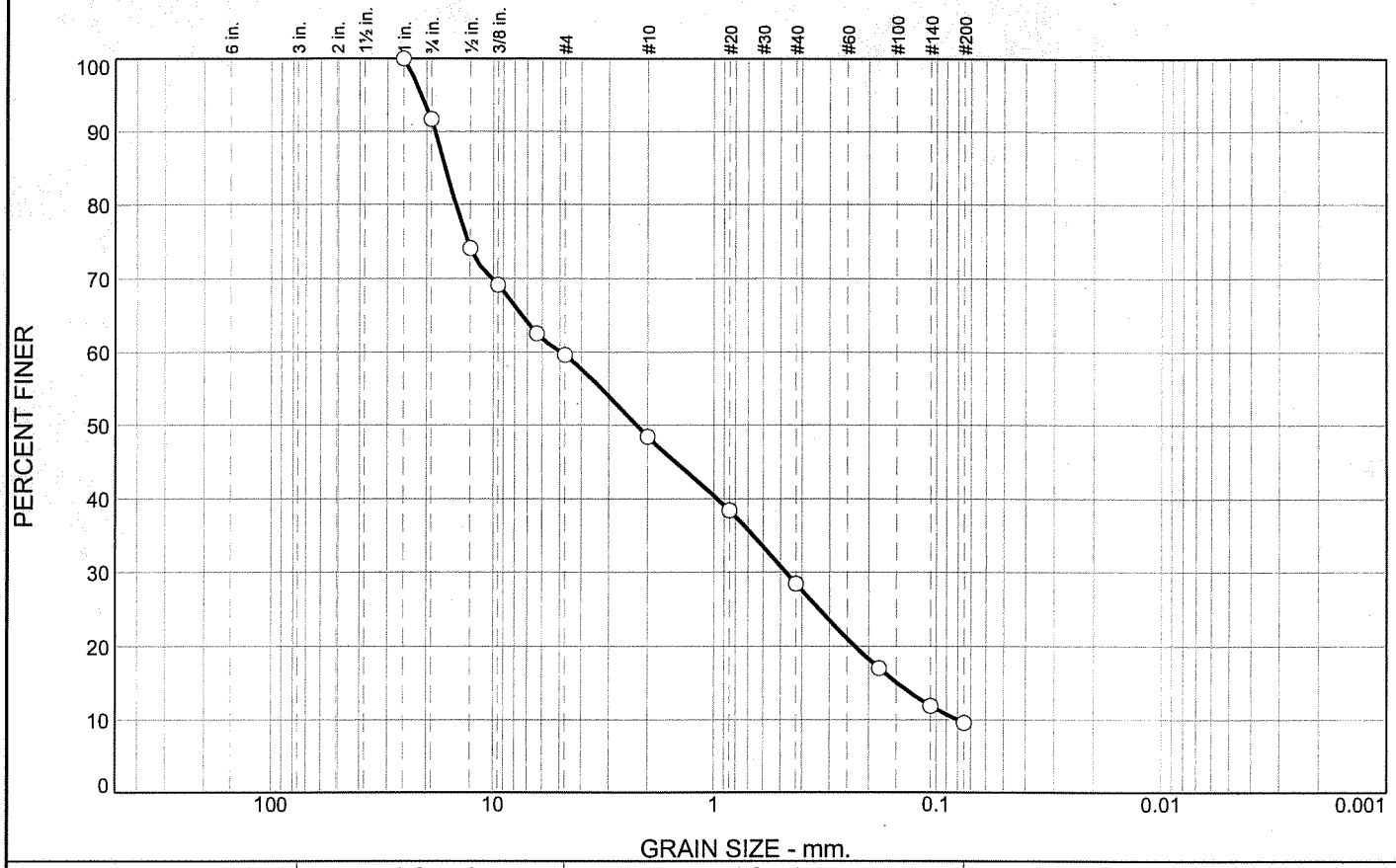
Reported by: **FOGG, BRIAN** Date Reported: **1/22/2009**

Paper Copy: Lab File; Project File; Geotech File

Design Phase
Laboratory Test Results
by Haley & Aldrich, Inc.

Northbound Off-Ramp
Laboratory Test Results
(HB-YA-1 series)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.3	32.1	11.2	20.0	18.8	9.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	91.7		
1/2"	74.1		
3/8"	69.1		
1/4"	62.6		
#4	59.6		
#10	48.4		
#20	38.4		
#40	28.4		
#80	17.0		
#140	11.9		
#200	9.6		

* (no specification provided)

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 16.4138 D_{60}= 4.9567 D_{50}= 2.2528
D_{30}= 0.4729 D_{15}= 0.1496 D_{10}= 0.0805
C_u= 61.55 C_c= 0.56

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

Moisture Content: 8.5%

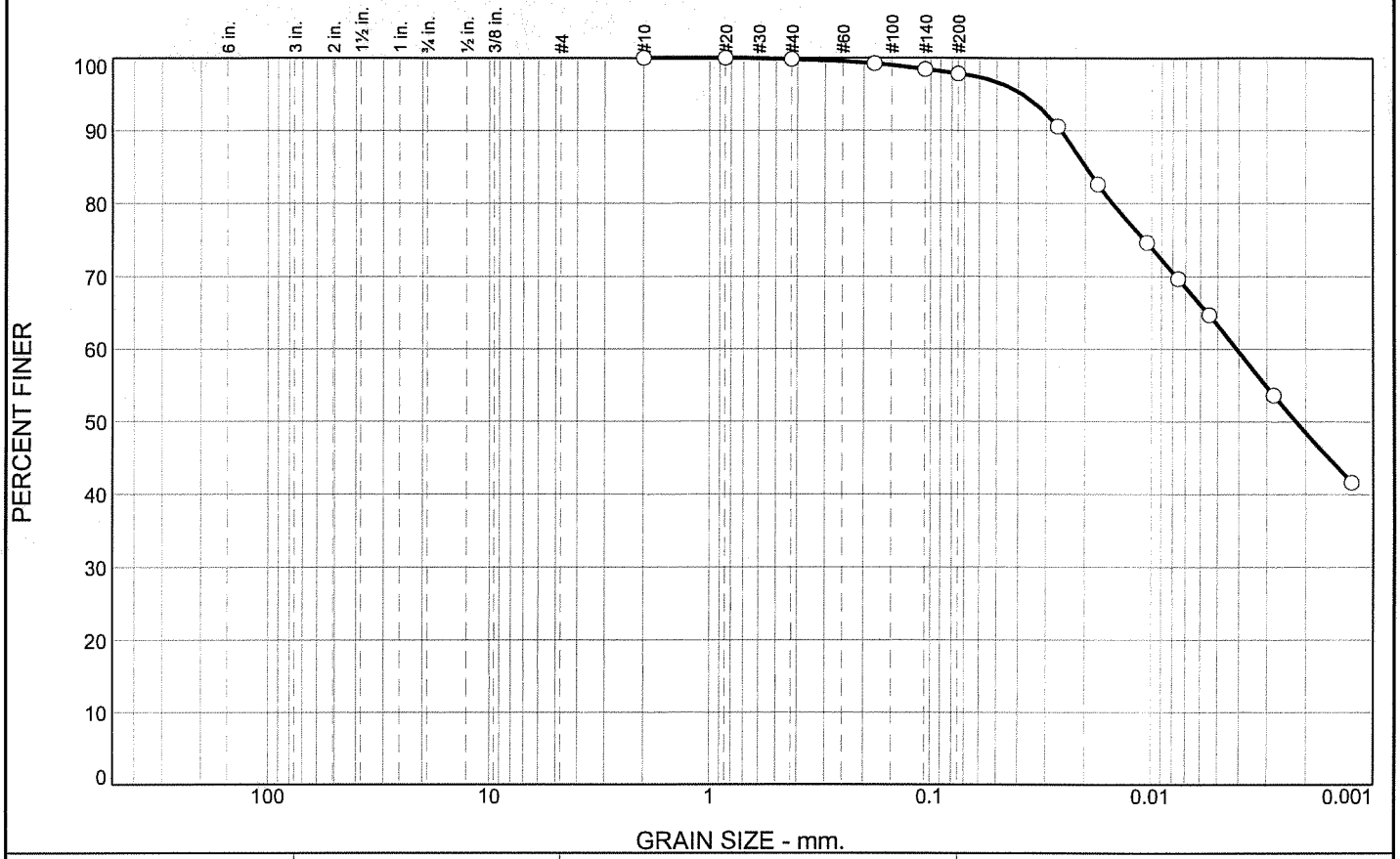
Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-1 **Elev./Depth:** 0.5'-2.5'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11716a

Tested By: GSM/JJH **Checked By:** MTG MTG

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	2.0	34.5	63.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.8		
#80	99.2		
#140	98.4		
#200	97.8		
0.0266 mm.	90.5		
0.0175 mm.	82.6		
0.0105 mm.	74.6		
0.0076 mm.	69.7		
0.0055 mm.	64.7		
0.0028 mm.	53.6		
0.0012 mm.	41.6		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 24 LL= 49 PI= 25

Coefficients

D_{85}= 0.0199 D_{60}= 0.0041 D_{50}= 0.0022
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(28)

Remarks

Moisture Content: 24.5%

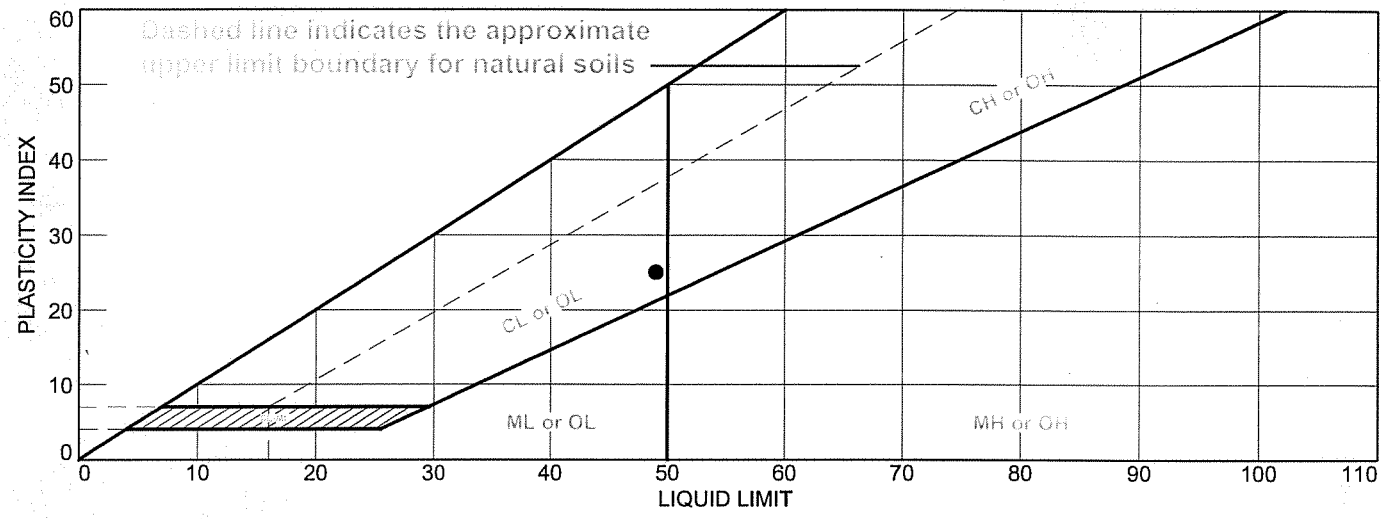
Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-1 **Elev./Depth:** 5'-7'

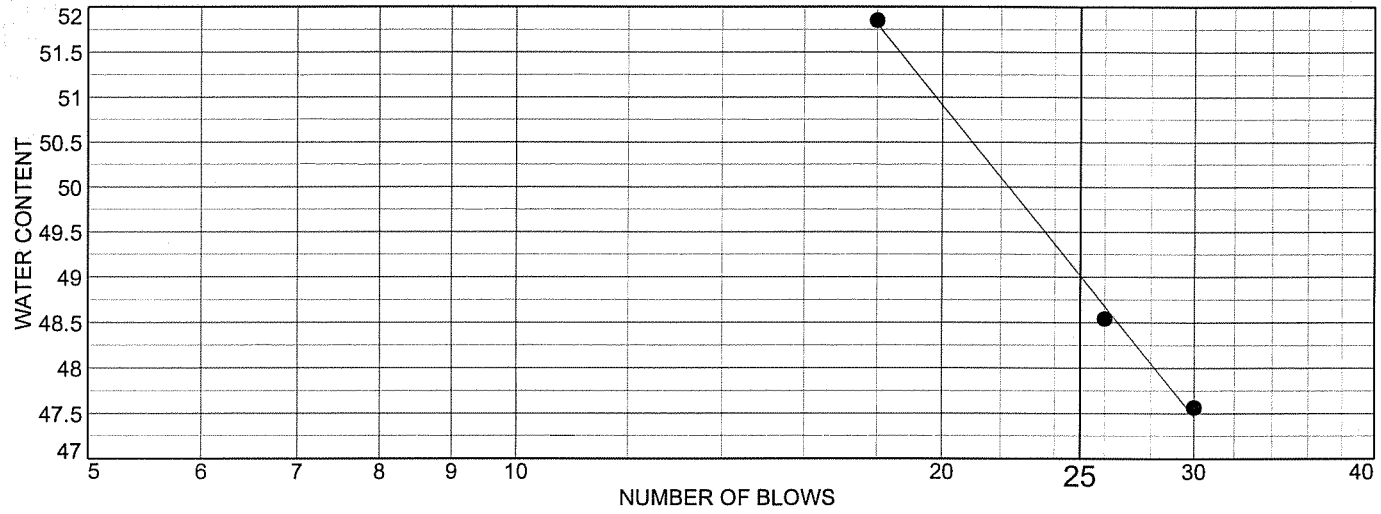
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11716b

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	49	24	25	99.8	97.8	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-1 **Depth:** 5'-7' **Sample Number:** 2D

Remarks:

● Moisture Content: 24.5%

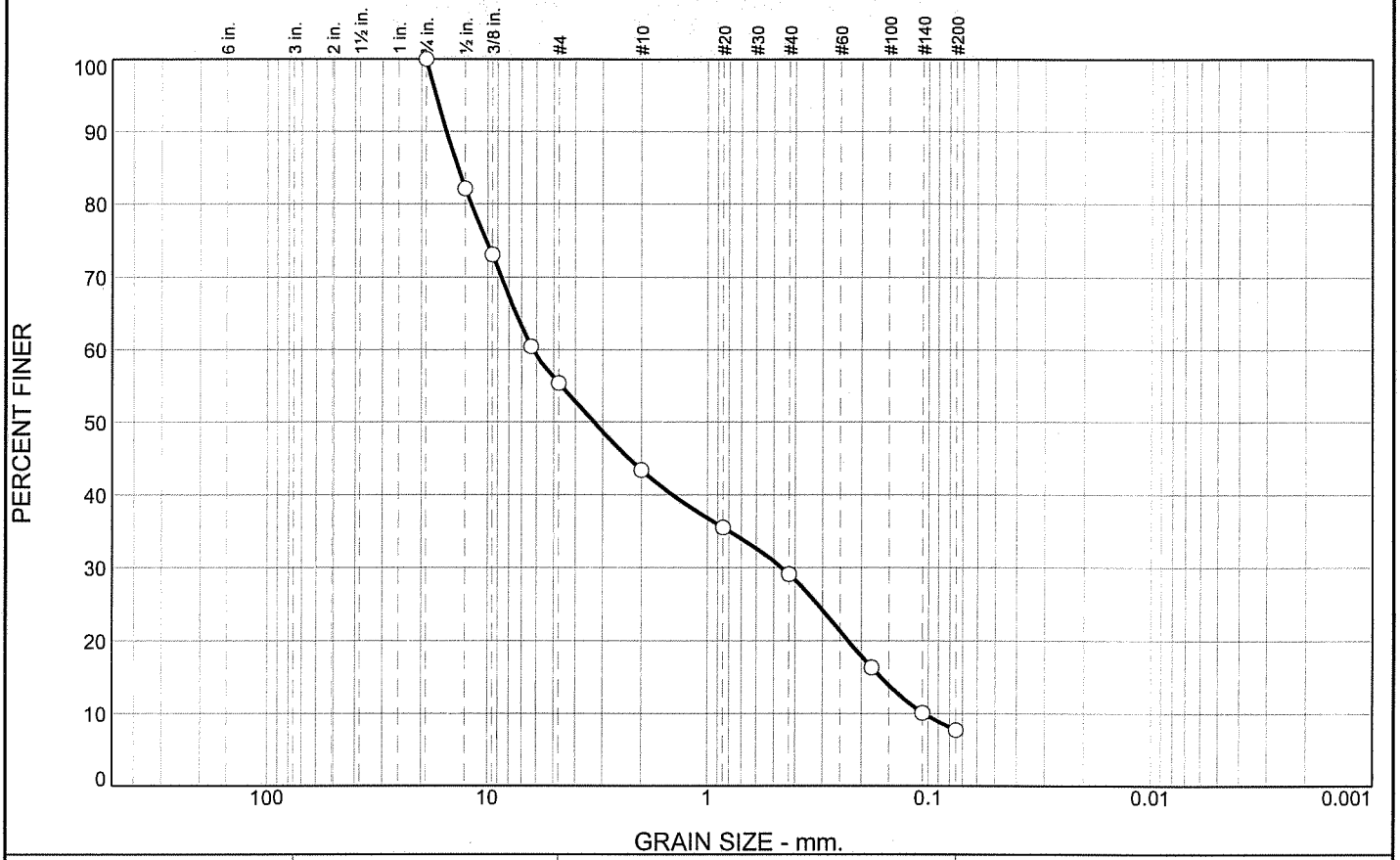
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11716b

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	44.6	12.0	14.3	21.4	7.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	82.1		
3/8"	73.1		
1/4"	60.5		
#4	55.4		
#10	43.4		
#20	35.5		
#40	29.1		
#80	16.3		
#140	10.1		
#200	7.7		

* (no specification provided)

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 13.6970 D_{60}= 6.2274 D_{50}= 3.2888
D_{30}= 0.4586 D_{15}= 0.1640 D_{10}= 0.1048
C_u= 59.41 C_c= 0.32

Classification

USCS= SP-SM AASHTO= A-1-a

Remarks

Moisture Content: 11.2%

Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-2 **Elev./Depth:** 2'-4'

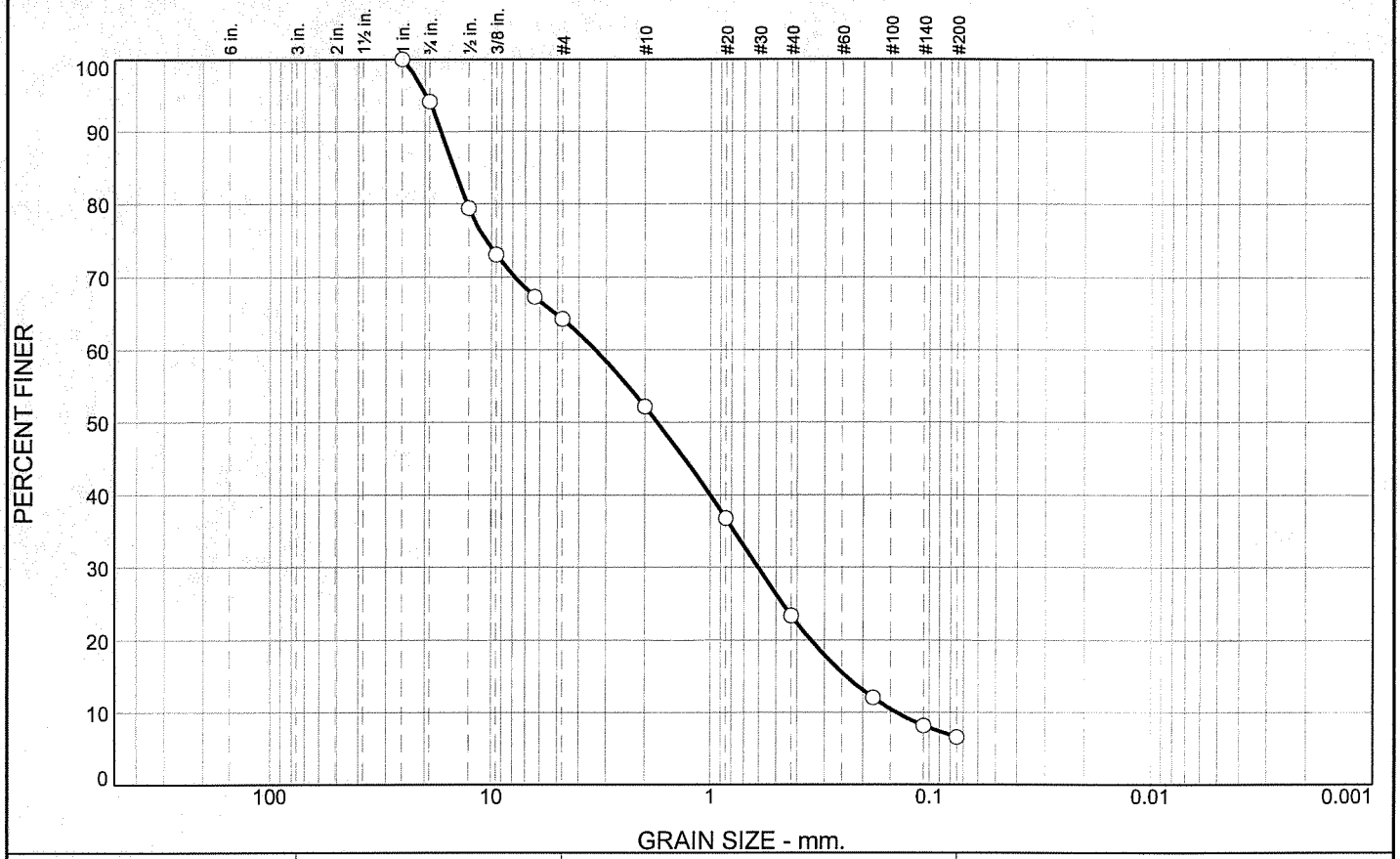
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11716c

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.9	29.8	12.1	28.9	16.7	6.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	94.1		
1/2"	79.4		
3/8"	73.1		
1/4"	67.3		
#4	64.3		
#10	52.2		
#20	36.8		
#40	23.3		
#80	12.0		
#140	8.1		
#200	6.6		

* (no specification provided)

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 14.8393 D_{60}= 3.3510 D_{50}= 1.7553
D_{30}= 0.6049 D_{15}= 0.2384 D_{10}= 0.1413
C_u= 23.72 C_c= 0.77

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 5.2%

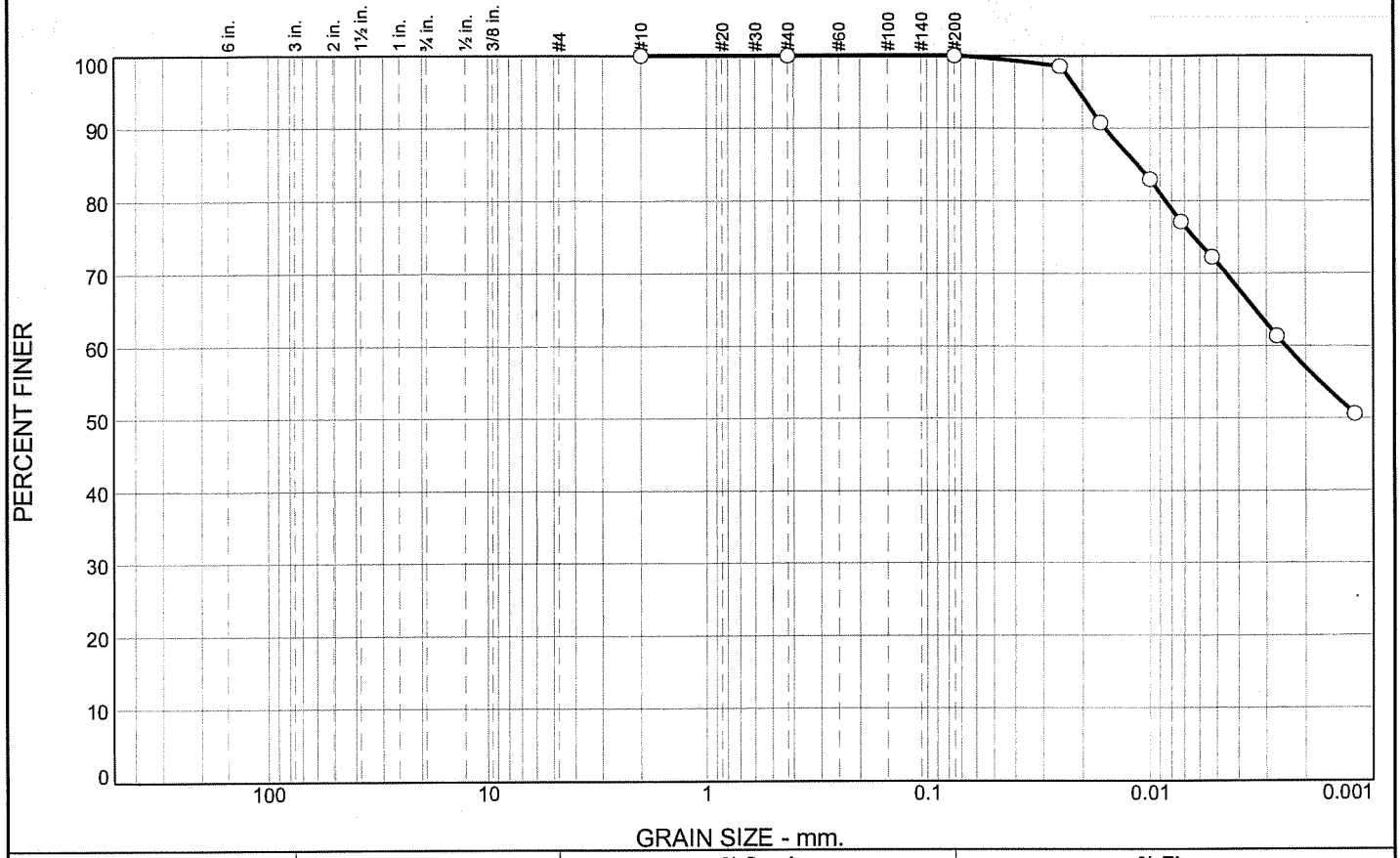
Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-3 **Elev./Depth:** 0.5'-2.5'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11716d

Tested By: GSM/JJH **Checked By:** MTG MTG

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	28.5	71.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	100.0		
#200	100.0		
0.0252 mm.	98.6		
0.0167 mm.	90.8		
0.0100 mm.	83.0		
0.0073 mm.	77.1		
0.0053 mm.	72.2		
0.0027 mm.	61.4		
0.0012 mm.	50.6		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 22 LL= 42 PI= 20

Coefficients

D_{85}= 0.0114 D_{60}= 0.0025 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(22)

Remarks

Moisture Content: 27.6%

Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-3 **Elev./Depth:** 5'-7'

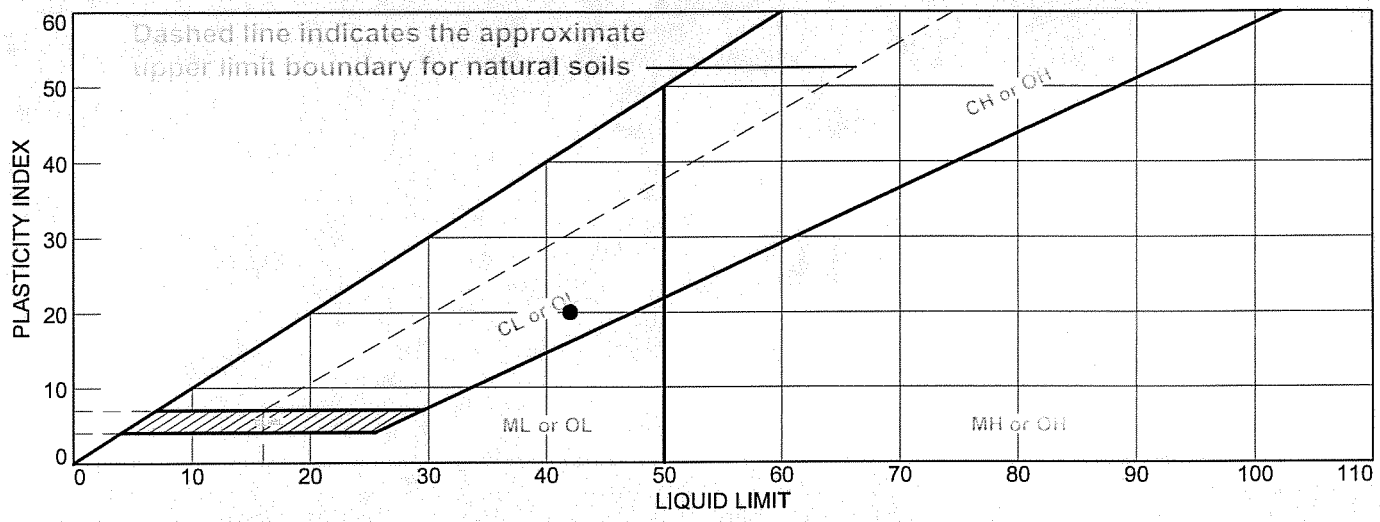
R.W. Gillespie & Associates, Inc.
Saco, Maine

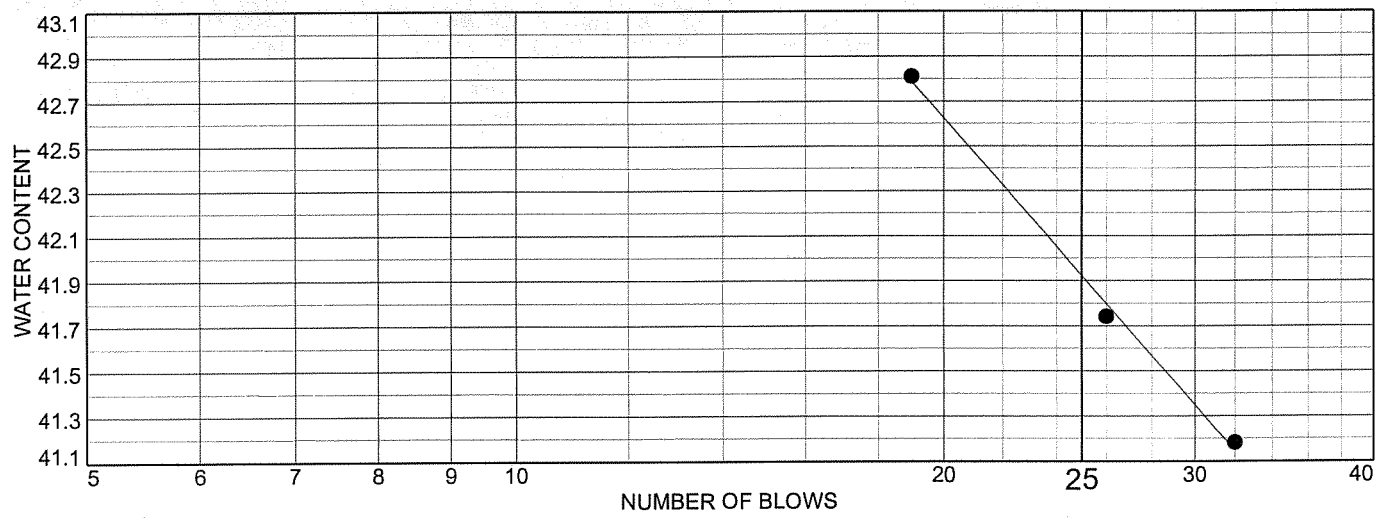
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11716e

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	42	22	20	100.0	100.0	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-3 **Depth:** 5'-7' **Sample Number:** 2D

Remarks:

● Moisture Content: 27.6%

R.W. Gillespie & Associates, Inc.

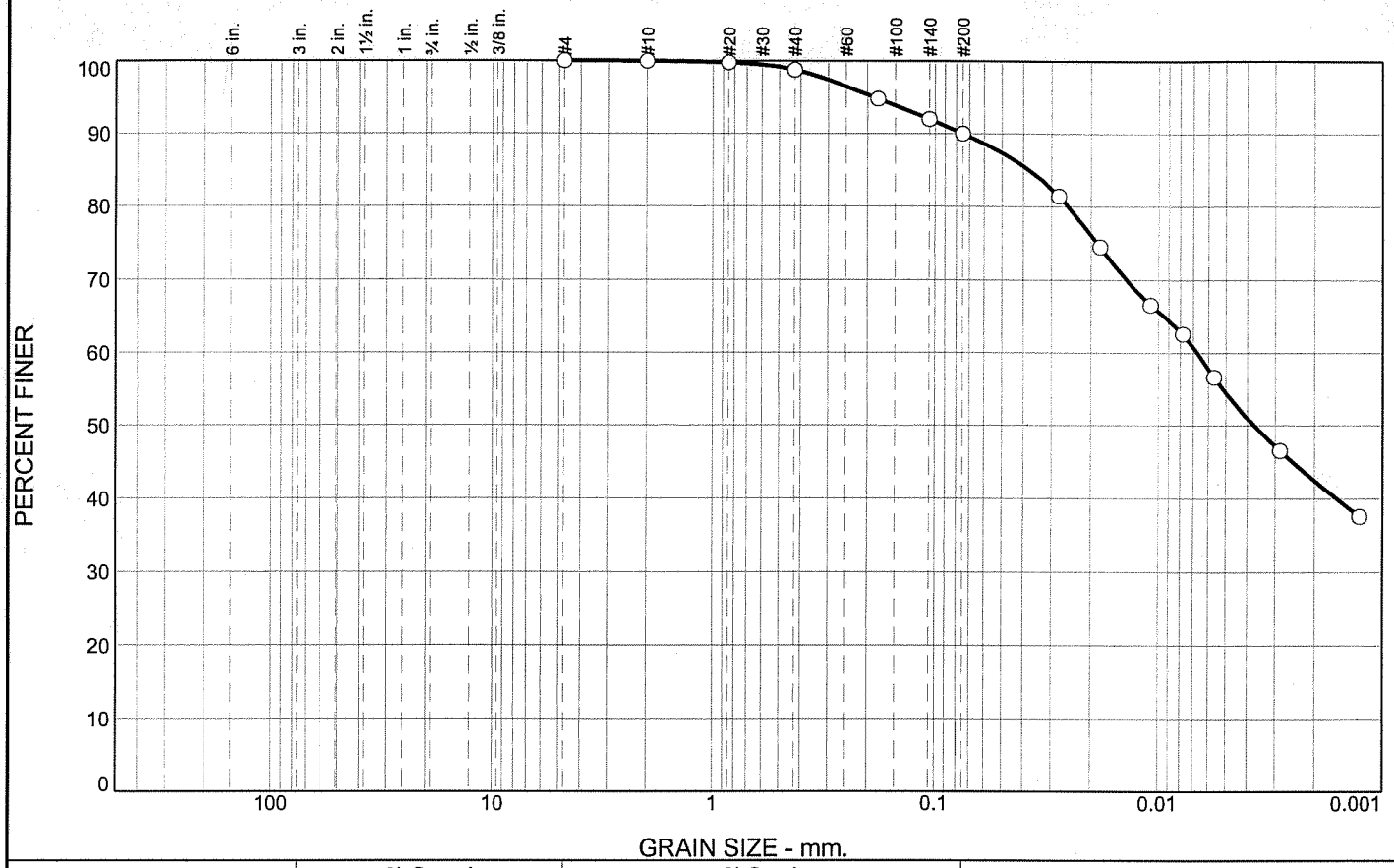
Saco, Maine

Lab No. 11716e

Tested By: DCH **Checked By:** MTG MTG

Northbound On-Ramp
Laboratory Test Results
(HB-YA-200 series)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.2	8.7	35.5	54.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.7		
#40	98.7		
#80	94.8		
#140	92.0		
#200	90.0		
0.0278 mm.	81.4		
0.0182 mm.	74.5		
0.0109 mm.	66.6		
0.0078 mm.	62.6		
0.0056 mm.	56.6		
0.0029 mm.	46.6		
0.0013 mm.	37.6		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 20 LL= 38 PI= 18

Coefficients

D_{85}= 0.0376 D_{60}= 0.0067 D_{50}= 0.0037
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Moisture Content: 23.5%

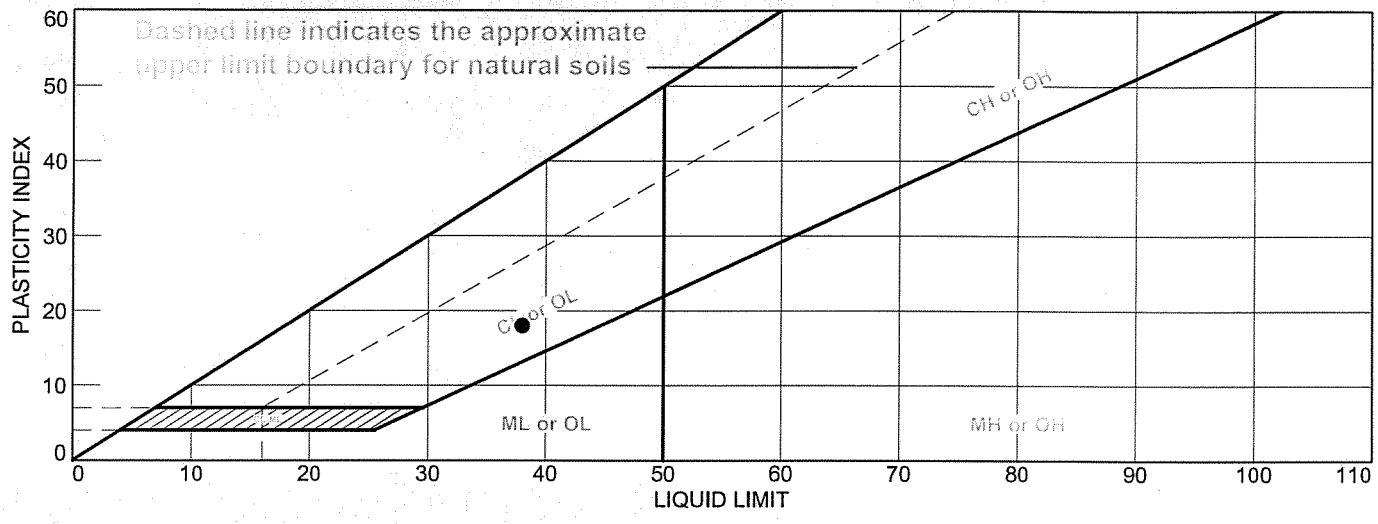
Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-201 **Elev./Depth:** 0-2'

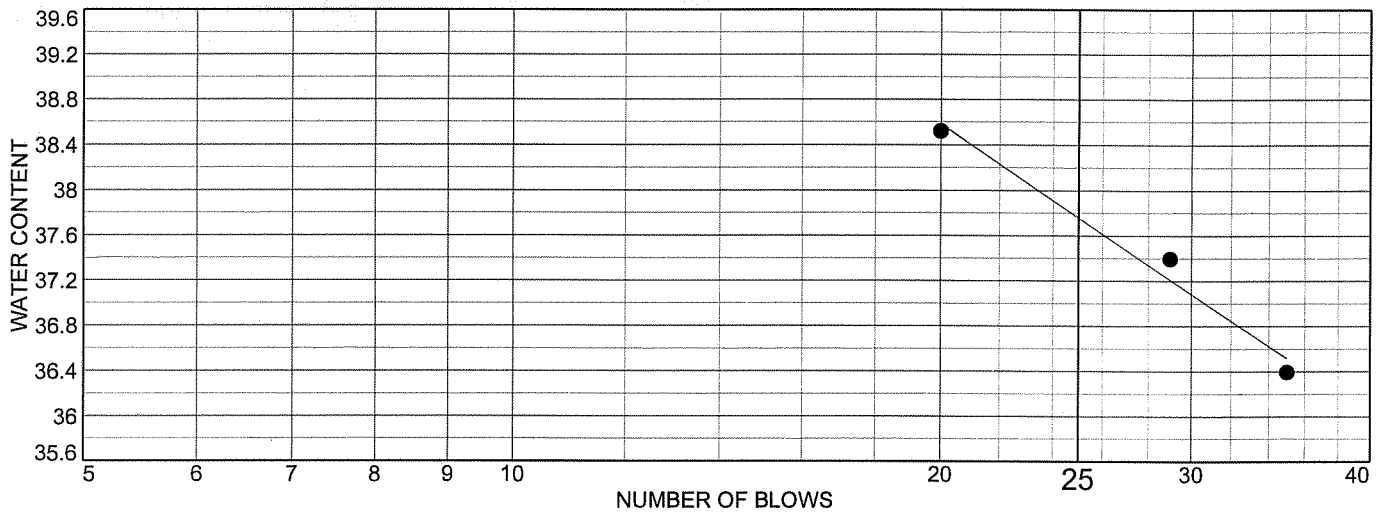
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11717a

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	38	20	18	98.7	90.0	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-201 **Depth:** 0-2' **Sample Number:** 1D

R.W. Gillespie & Associates, Inc.

Saco, Maine

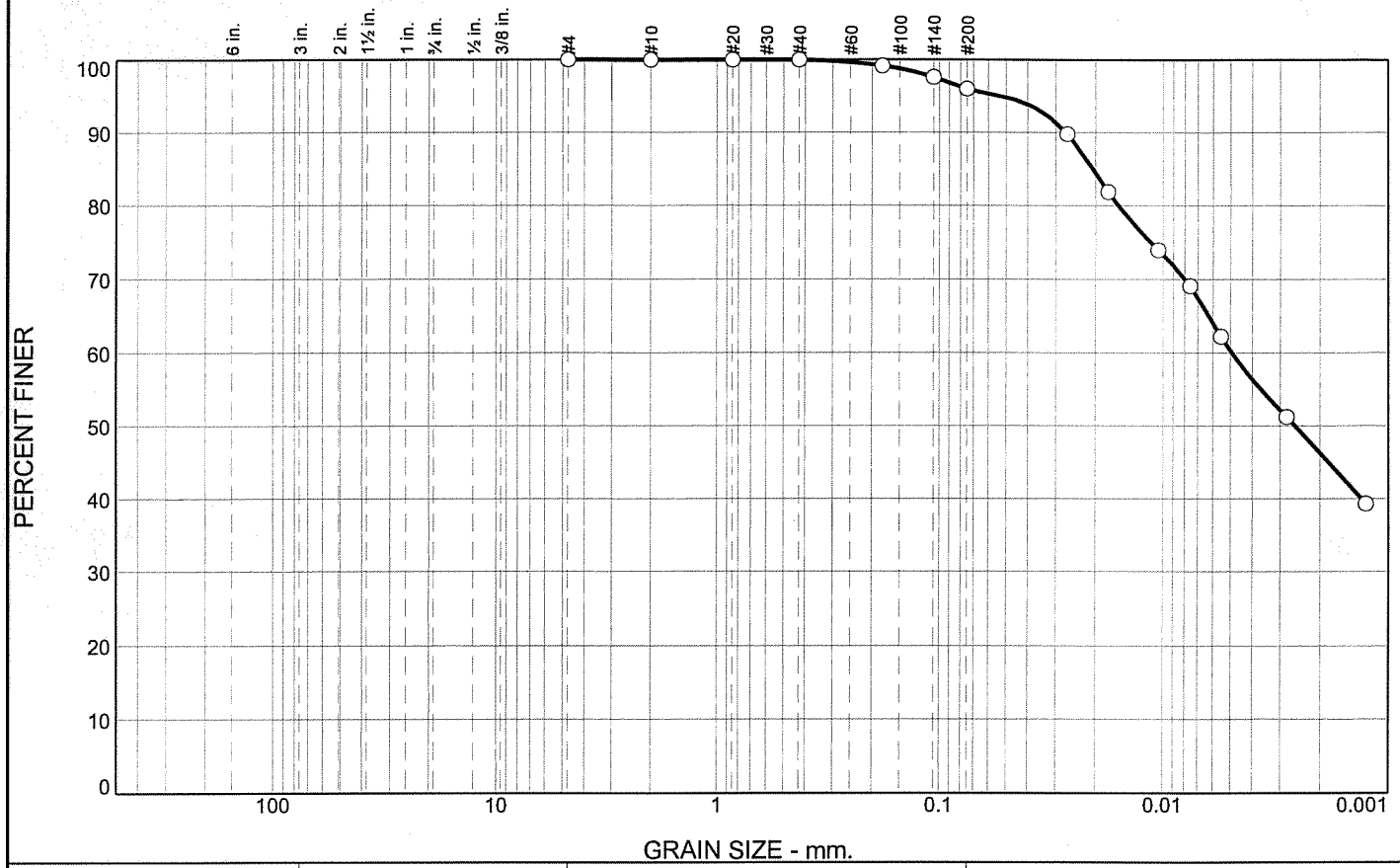
Remarks:

● Moisture Content: 23.5%

Lab No. 11717a

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	0.0	3.9	35.8	60.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.9		
#40	99.9		
#80	99.1		
#140	97.6		
#200	96.0		
0.0266 mm.	89.8		
0.0175 mm.	81.9		
0.0105 mm.	74.0		
0.0076 mm.	69.1		
0.0055 mm.	62.2		
0.0028 mm.	51.2		
0.0013 mm.	39.3		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 22 LL= 40 PI= 18

Coefficients

D_{85}= 0.0205 D_{60}= 0.0049 D_{50}= 0.0026
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(19)

Remarks

Moisture Content: 25.1%

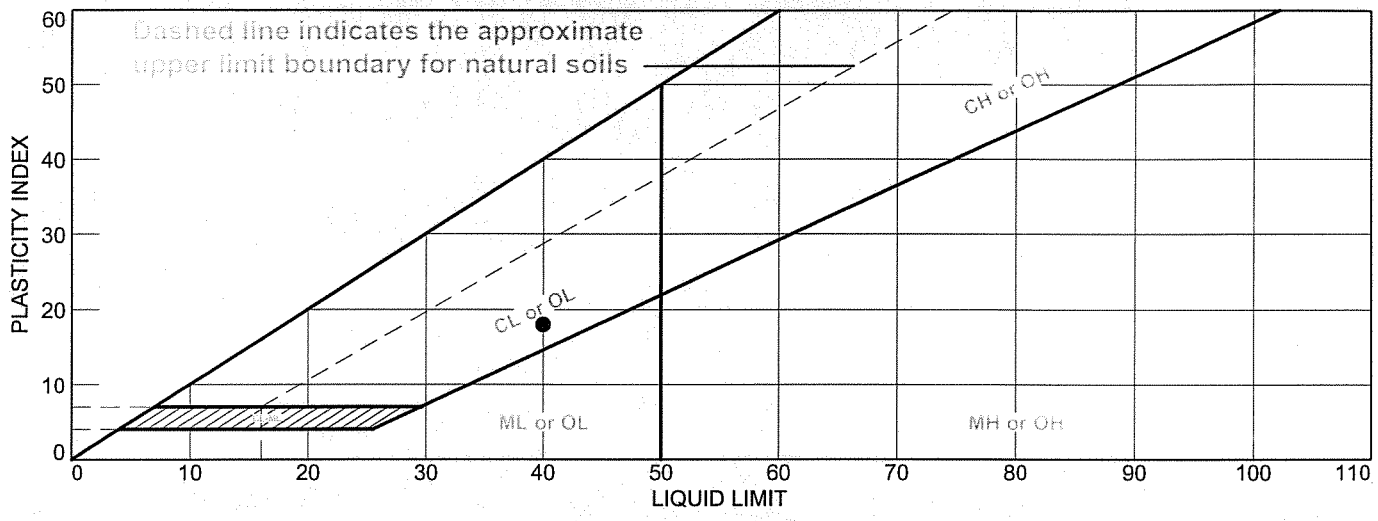
Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-201 **Elev./Depth:** 2'-4'

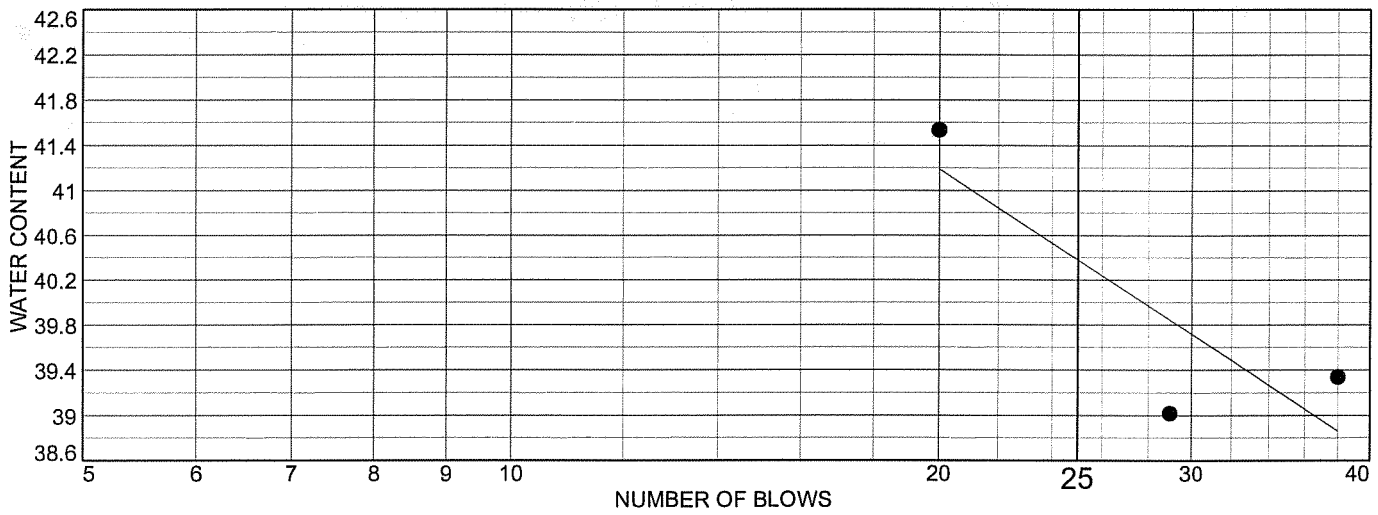
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11717b

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	40	22	18	99.9	96.0	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-201 **Depth:** 2'-4' **Sample Number:** 2D

Remarks:

● Moisture Content: 25.1%

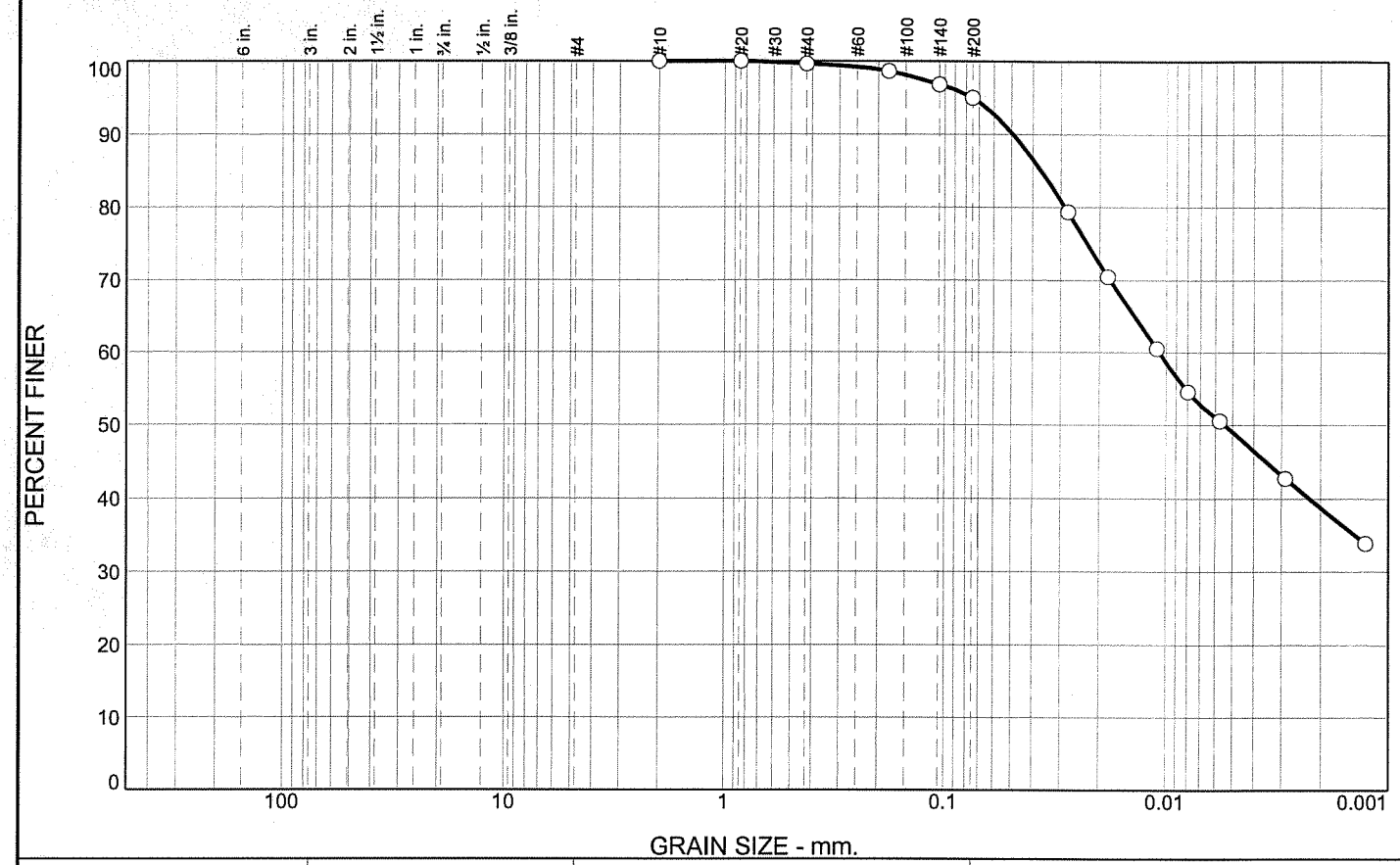
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11717b

Tested By: DCH **Checked By:** MTG MTG

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	4.6	45.9	49.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.6		
#80	98.6		
#140	96.8		
#200	95.0		
0.0278 mm.	79.4		
0.0183 mm.	70.4		
0.0110 mm.	60.5		
0.0080 mm.	54.5		
0.0057 mm.	50.6		
0.0029 mm.	42.8		
0.0013 mm.	33.9		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 20 LL= 39 PI= 19

Coefficients

D_{85}= 0.0367 D_{60}= 0.0108 D_{50}= 0.0054
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(19)

Remarks

Moisture Content: 23.2%

Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-201 **Elev./Depth:** 4'-6'

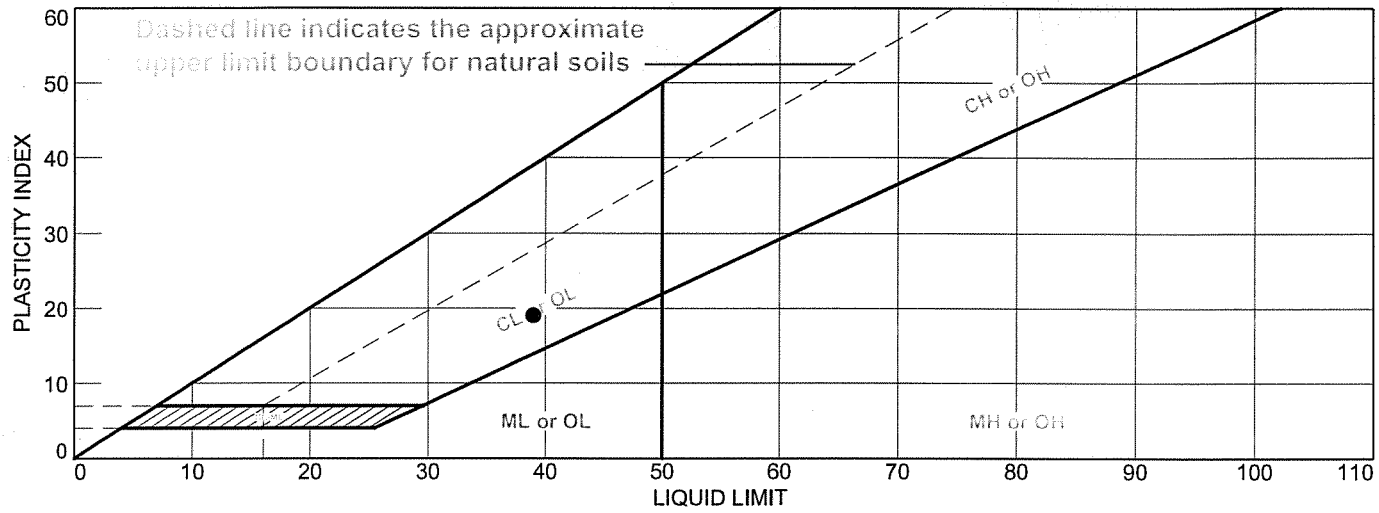
R.W. Gillespie & Associates, Inc.
Saco, Maine

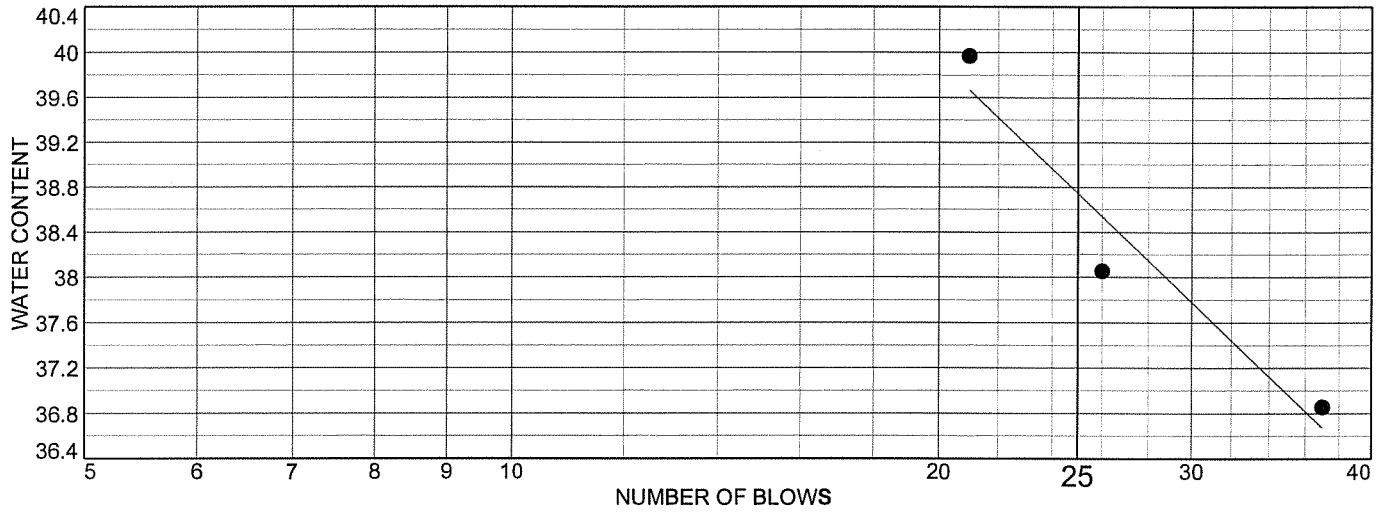
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11717c

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	39	20	19	99.6	95.0	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-201 **Depth:** 4'-6' **Sample Number:** 3D

Remarks:

● Moisture Content: 23.2%

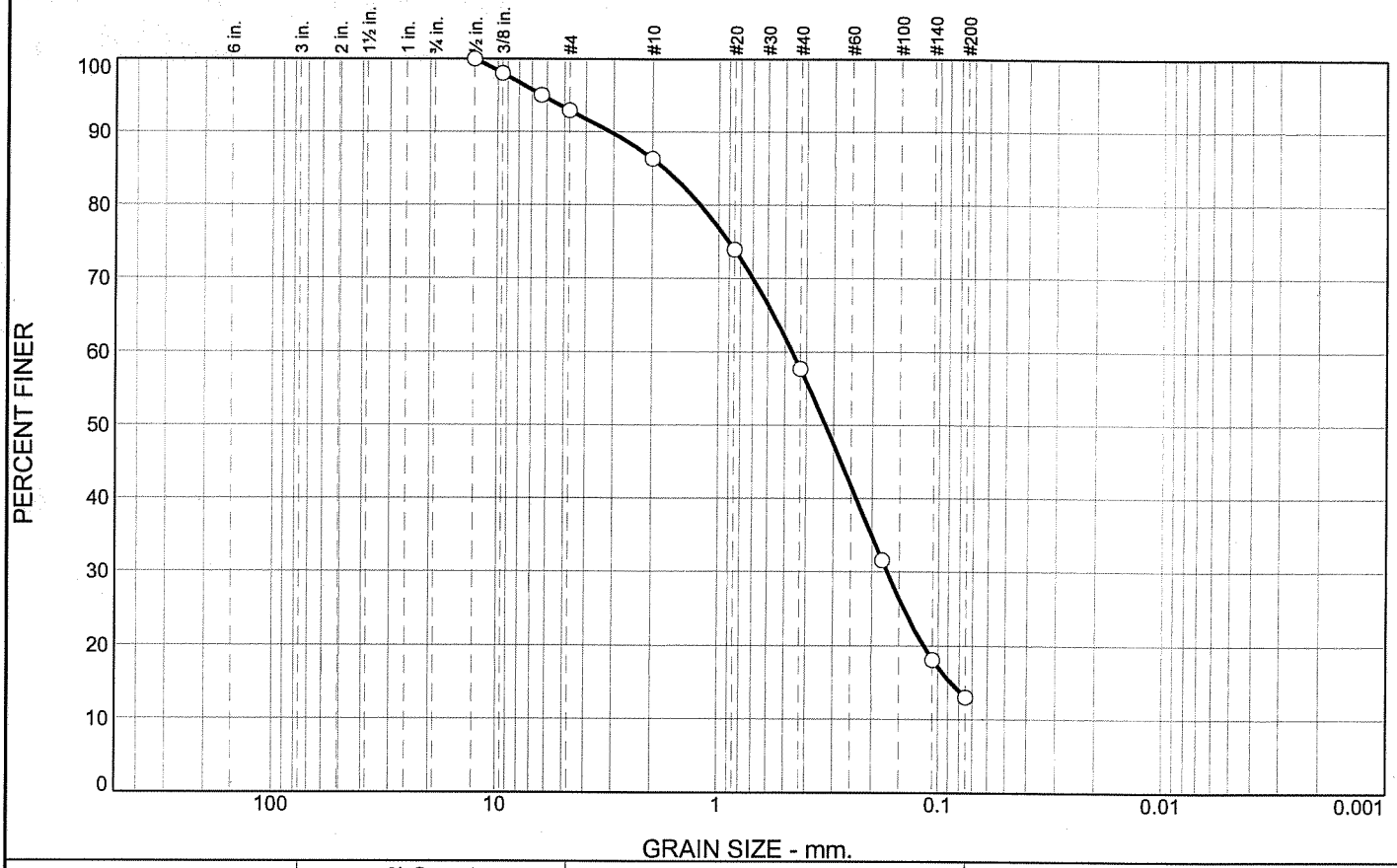
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11717c

Tested By: DCH/MCS **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.1	6.6	28.6	44.7	13.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	98.0		
1/4"	95.0		
#4	92.9		
#10	86.3		
#20	73.9		
#40	57.7		
#80	31.5		
#140	18.1		
#200	13.0		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 1.7694 D_{60}= 0.4622 D_{50}= 0.3265
D_{30}= 0.1709 D_{15}= 0.0874 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 10.1%

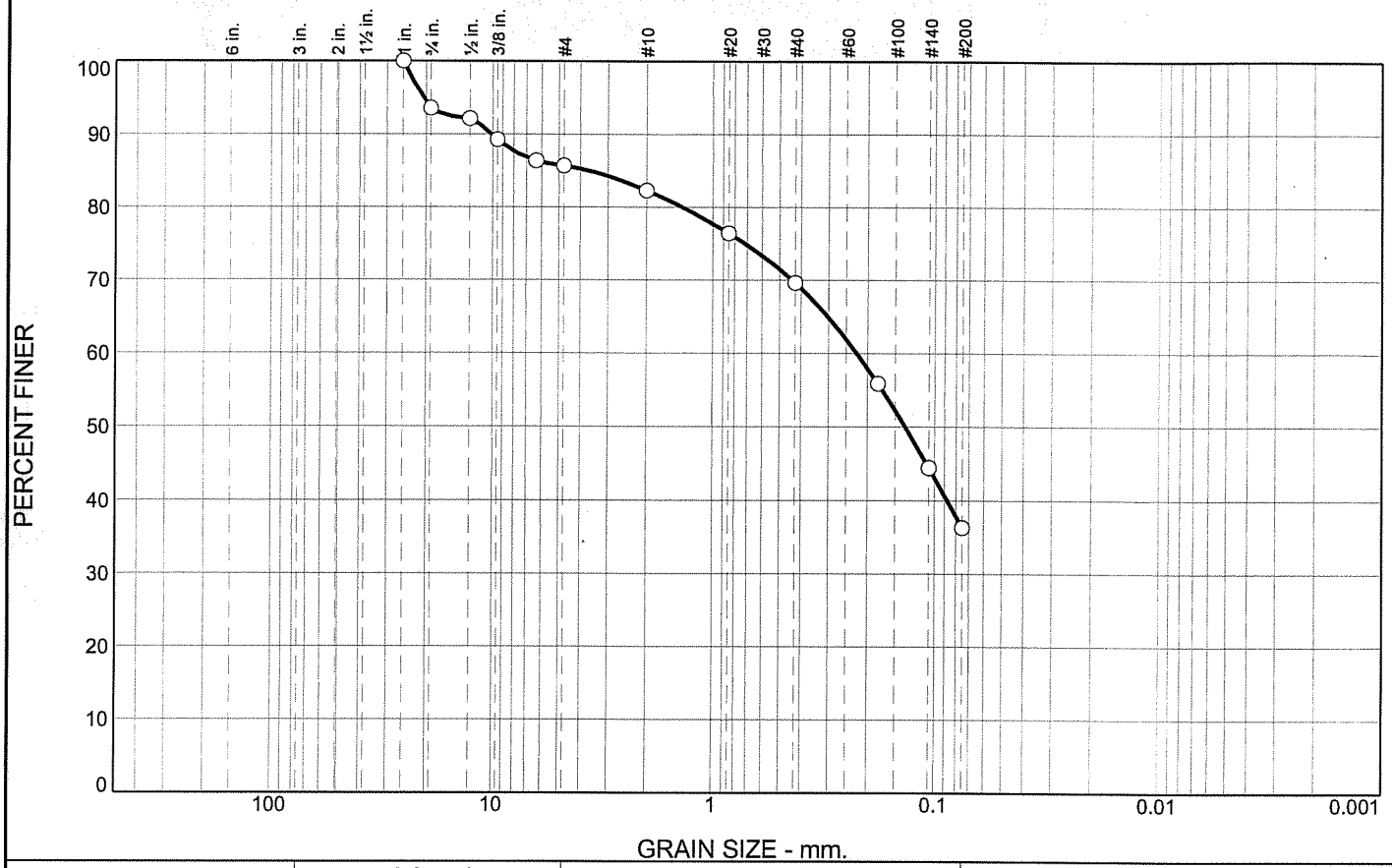
Sample No.: 1DB+2DA **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-204 **Elev./Depth:** 0-4'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11717d

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.4	7.9	3.4	12.7	33.3	36.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	93.6		
1/2"	92.1		
3/8"	89.3		
1/4"	86.4		
#4	85.7		
#10	82.3		
#20	76.4		
#40	69.6		
#80	55.9		
#140	44.5		
#200	36.3		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 3.6528 D_{60}= 0.2237 D_{50}= 0.1356
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content: 12.8%

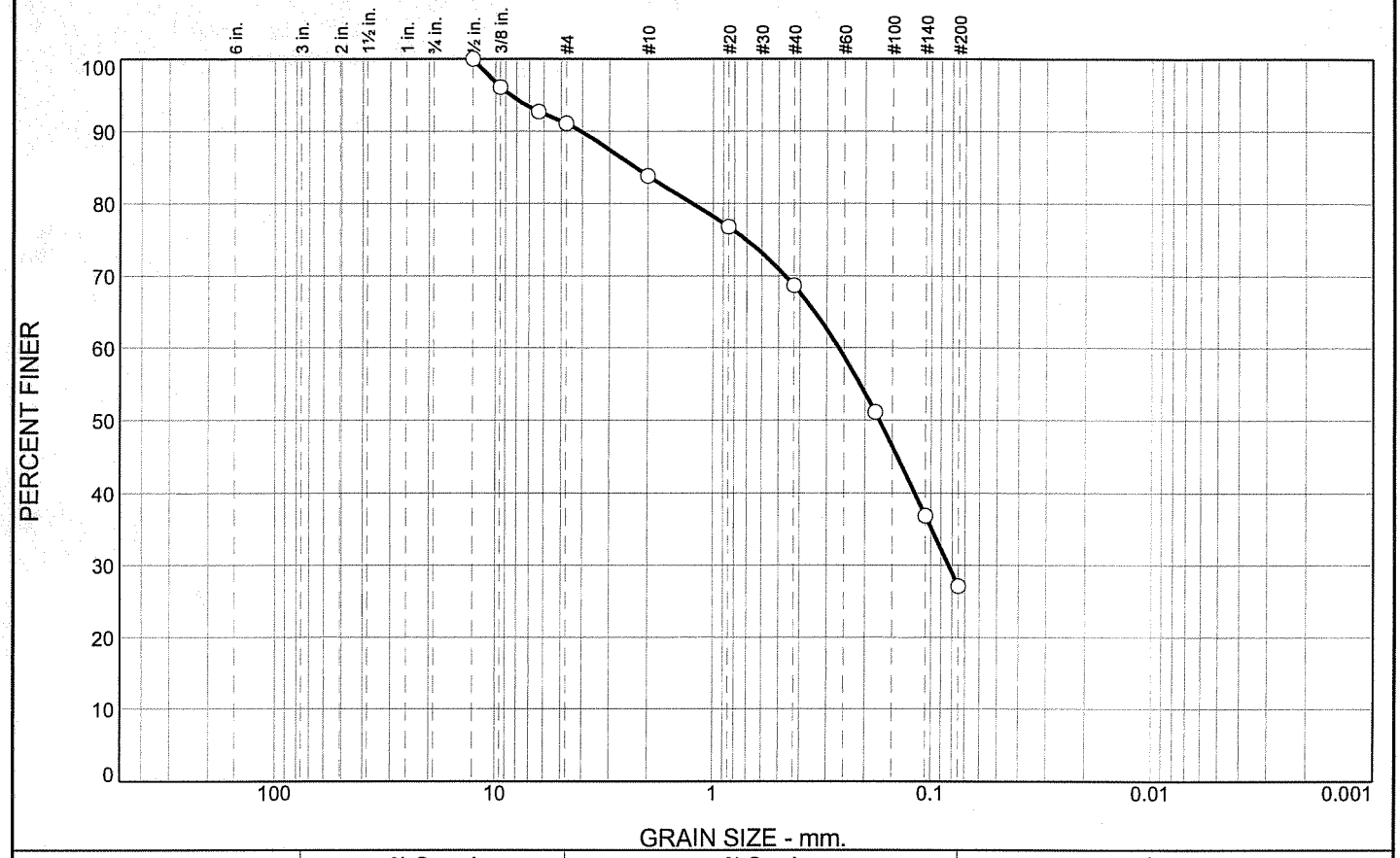
Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-204 **Elev./Depth:** 4'-5.5'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11718a

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.9	7.3	15.2	41.5	27.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	96.1		
1/4"	92.7		
#4	91.1		
#10	83.8		
#20	76.8		
#40	68.6		
#80	51.1		
#140	36.8		
#200	27.1		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 2.2902 D_{60}= 0.2643 D_{50}= 0.1722
D_{30}= 0.0832 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 9.1%

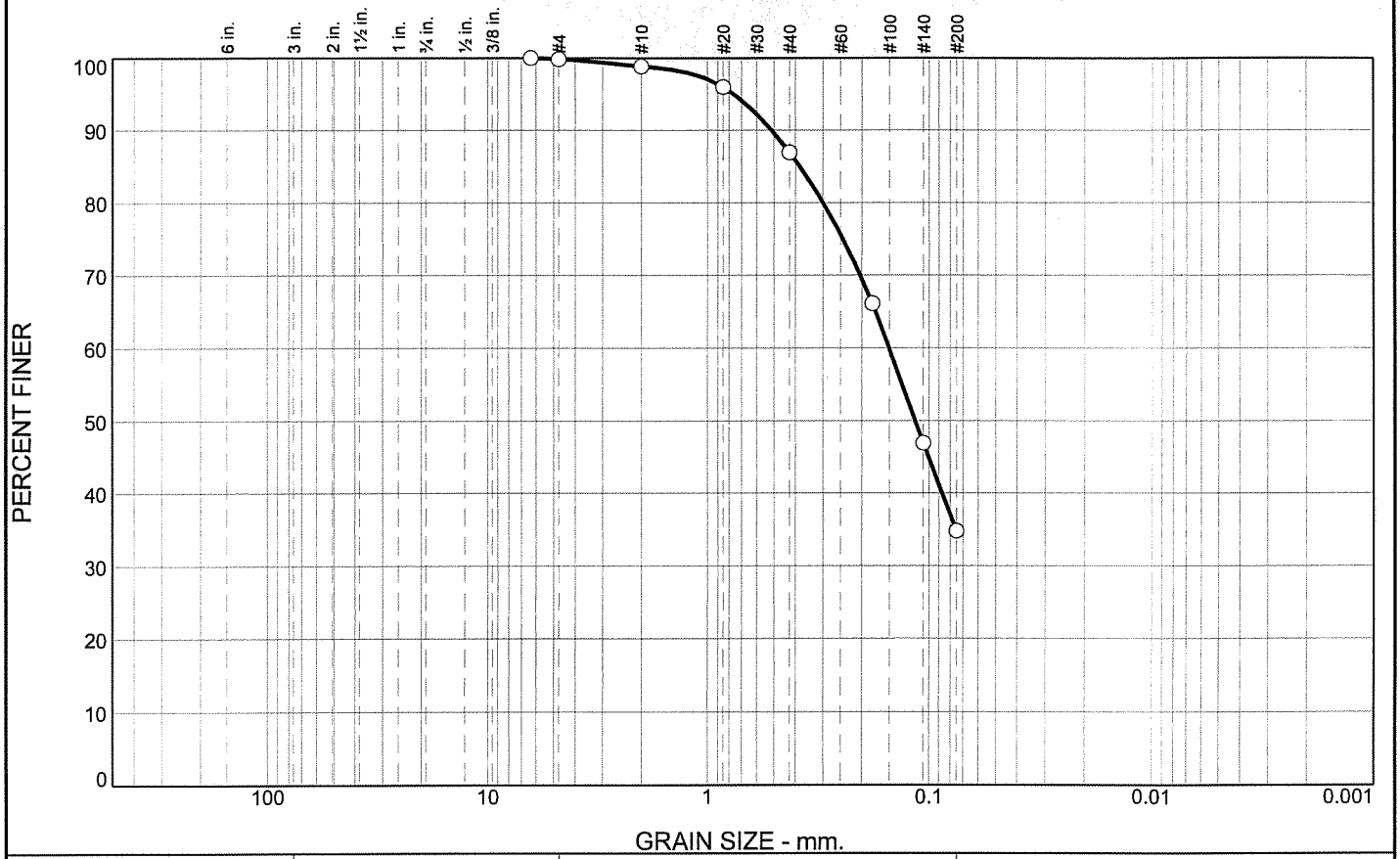
Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-205 **Elev./Depth:** 0-5'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11718b

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.0	11.9	52.1	34.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/4"	100.0		
#4	99.8		
#10	98.8		
#20	96.0		
#40	86.9		
#80	66.1		
#140	46.9		
#200	34.8		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 0.3820 D_{60}= 0.1510 D_{50}= 0.1153
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 17.8%

Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-210 **Elev./Depth:** 4'-5'

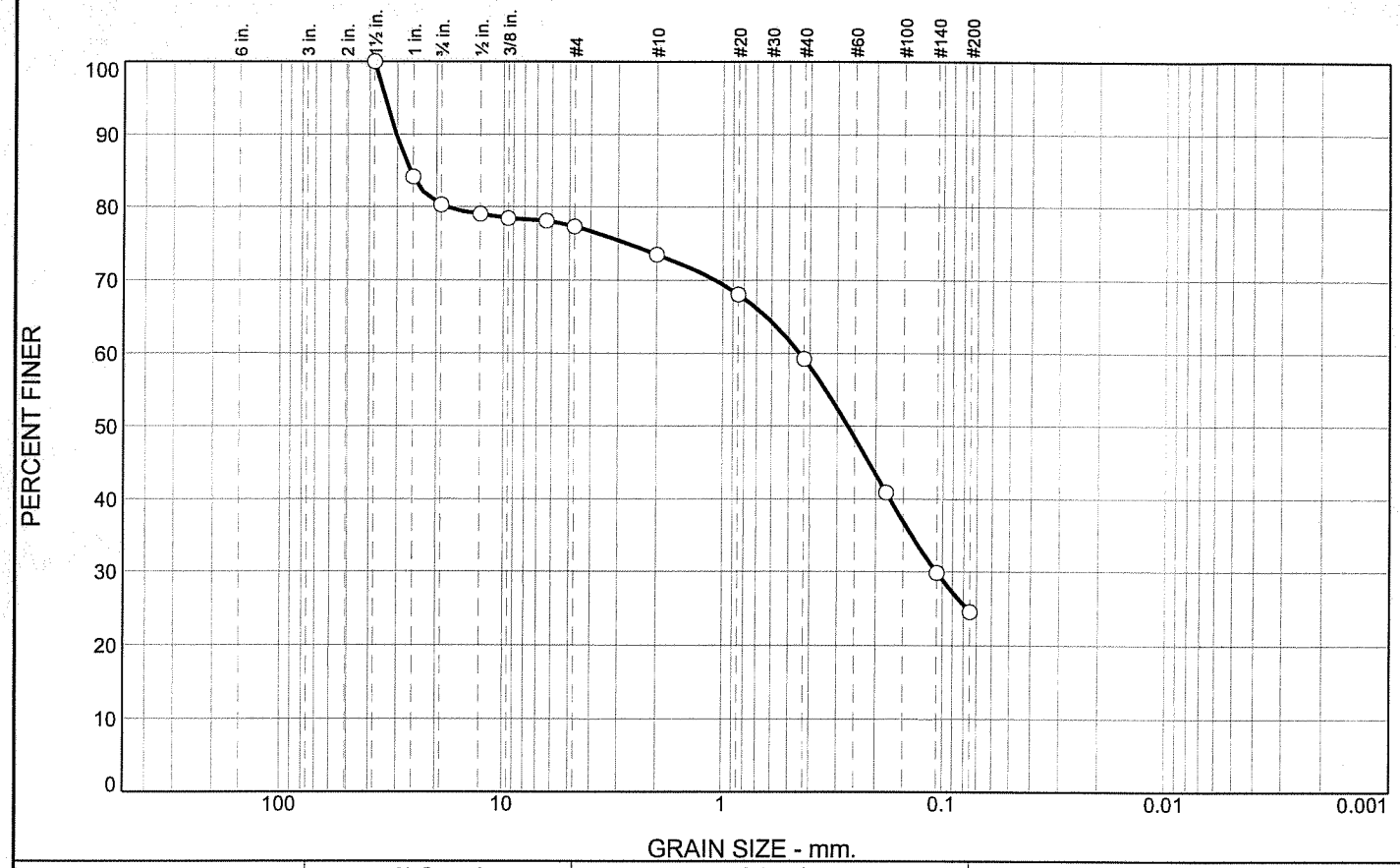
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11718c

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.7	3.0	3.8	14.3	34.7	24.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	84.1		
3/4"	80.3		
1/2"	79.0		
3/8"	78.4		
1/4"	78.1		
#4	77.3		
#10	73.5		
#20	68.1		
#40	59.2		
#80	40.9		
#140	29.8		
#200	24.5		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 26.2520 D_{60}= 0.4443 D_{50}= 0.2681
D_{30}= 0.1071 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 10.1%

Sample No.: 2D+3DA **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-220 **Elev./Depth:** 2'-6'

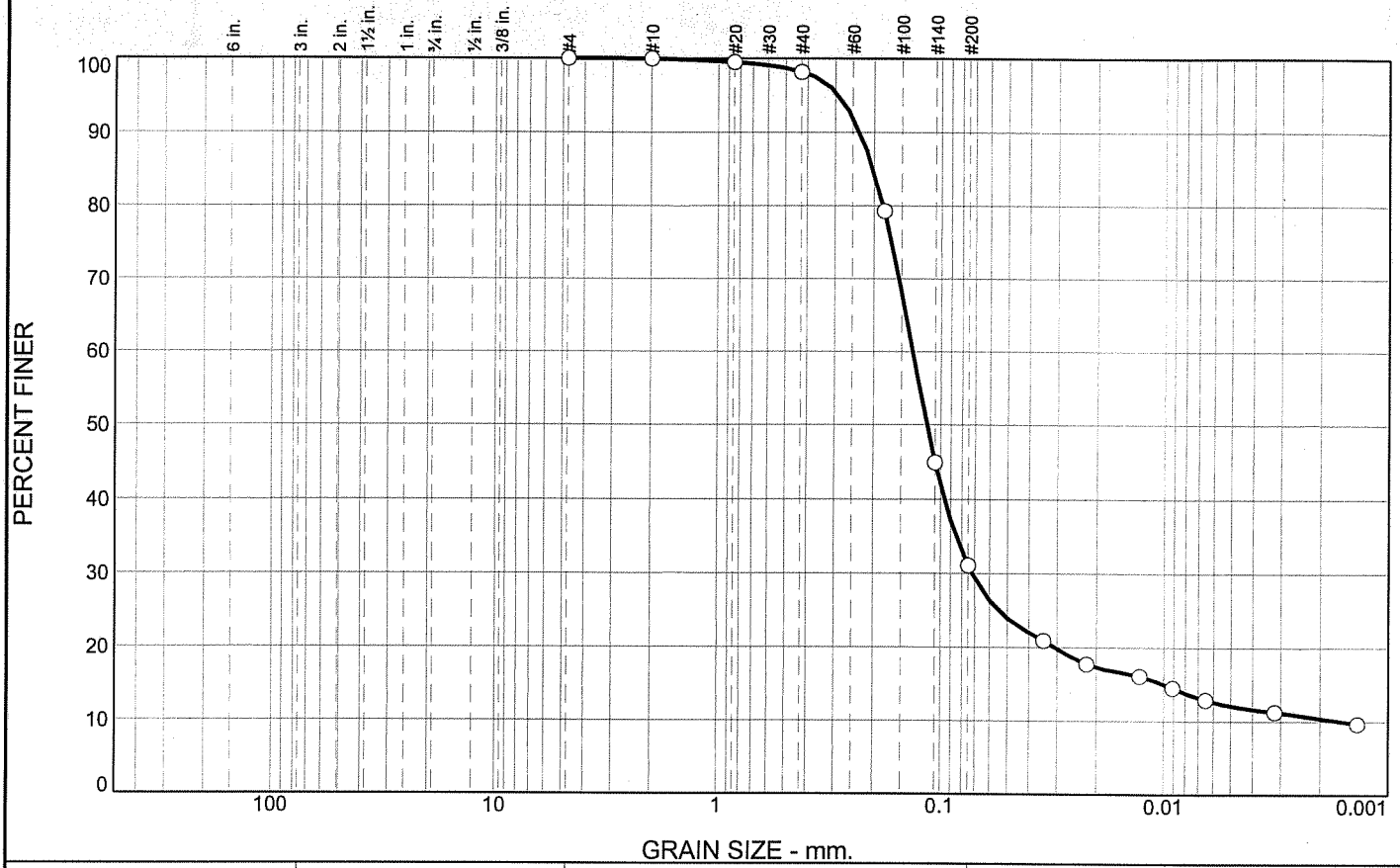
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11718d

Tested By: GSM/JJH **Checked By:** MTG MTG

Southbound Off-Ramp
Laboratory Test Results
(HB-YA-300 series)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.7	67.1	19.0	12.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.5		
#40	98.2		
#80	79.3		
#140	44.9		
#200	31.1		
0.0345 mm.	20.9		
0.0221 mm.	17.7		
0.0128 mm.	16.1		
0.0091 mm.	14.5		
0.0065 mm.	12.9		
0.0032 mm.	11.3		
0.0014 mm.	9.6		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= NP LL= 29 PI= NP

Coefficients

D_{85}= 0.2025 D_{60}= 0.1339 D_{50}= 0.1154
D_{30}= 0.0719 D_{15}= 0.0101 D_{10}= 0.0016
C_u= 82.21 C_c= 23.69

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 20.3%

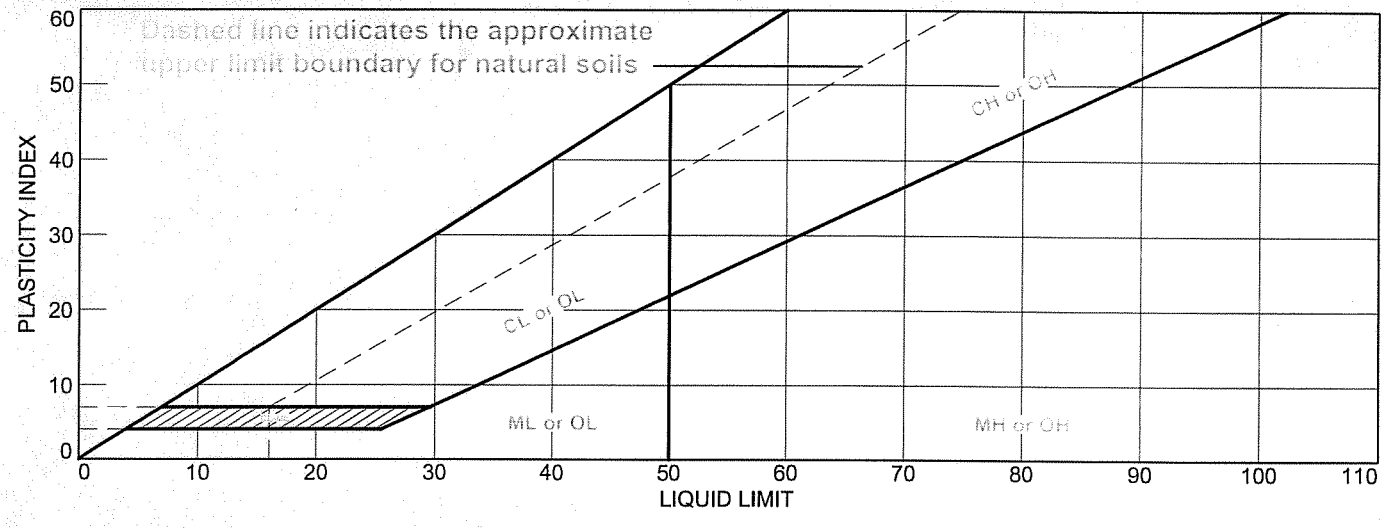
Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-301 **Elev./Depth:** 1'-3'

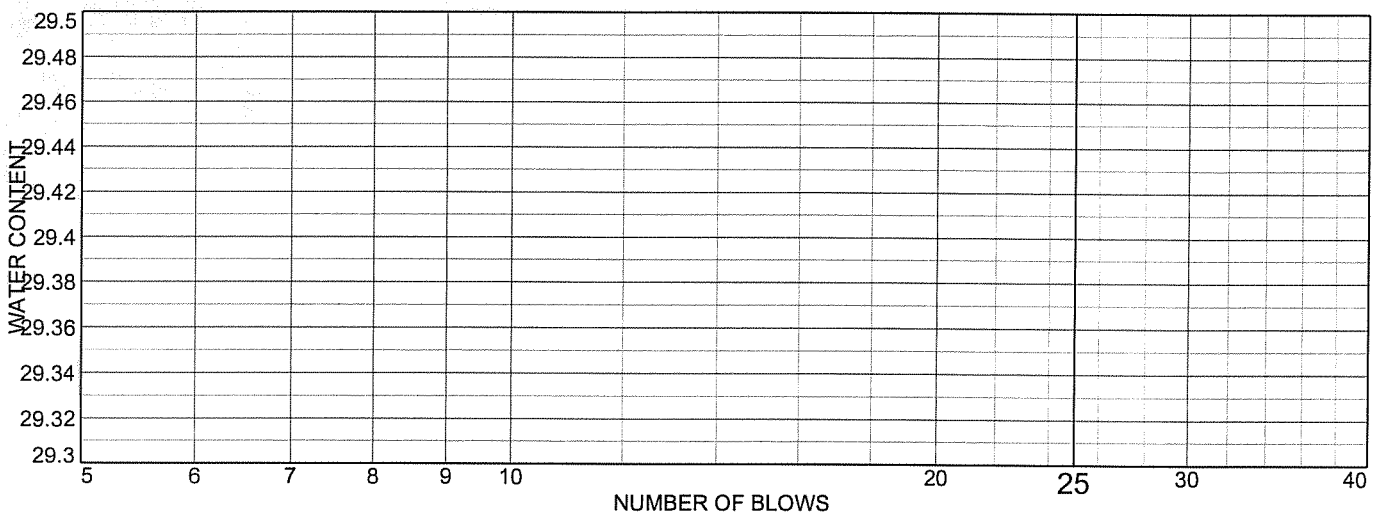
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11719a

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	silty sand	29	NP	NP	98.2	31.1	SM

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-301 **Depth:** 1'-3' **Sample Number:** 1D

Remarks:

● Moisture Content: 20.3%

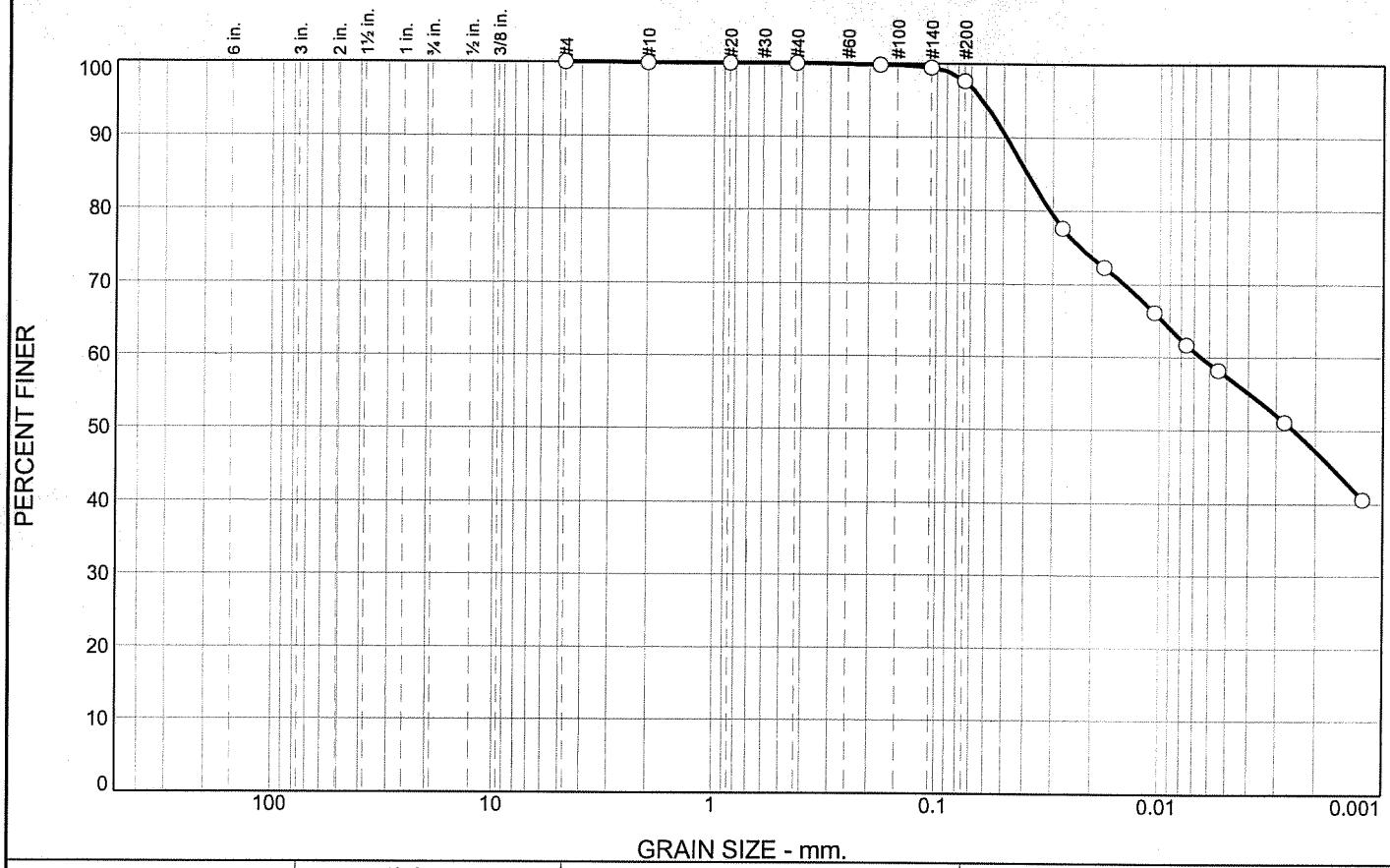
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11719a

Tested By: DCH **Checked By:** MTG MTG

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	2.4	40.3	57.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	100.0		
#40	100.0		
#80	99.8		
#140	99.4		
#200	97.6		
0.0272 mm.	77.6		
0.0177 mm.	72.3		
0.0105 mm.	66.2		
0.0076 mm.	61.7		
0.0055 mm.	58.2		
0.0028 mm.	51.2		
0.0012 mm.	40.6		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 18 LL= 34 PI= 16

Coefficients

D_{85}= 0.0389 D_{60}= 0.0065 D_{50}= 0.0025
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Moisture Content: 31.8%

Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-301 **Elev./Depth:** 10'-12'

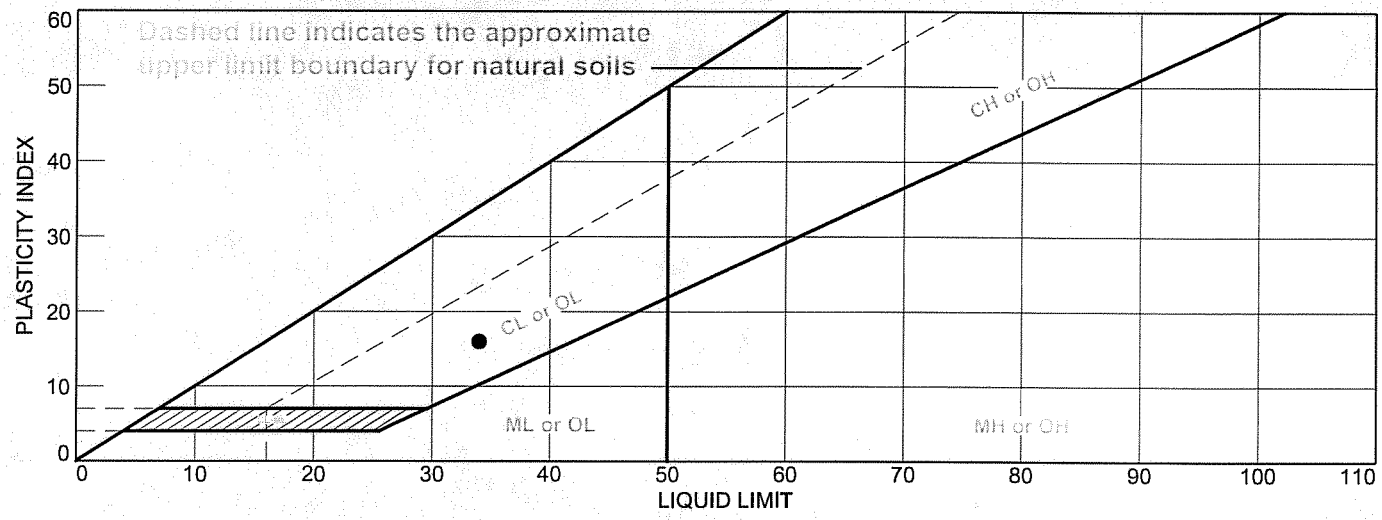
R.W. Gillespie & Associates, Inc.
Saco, Maine

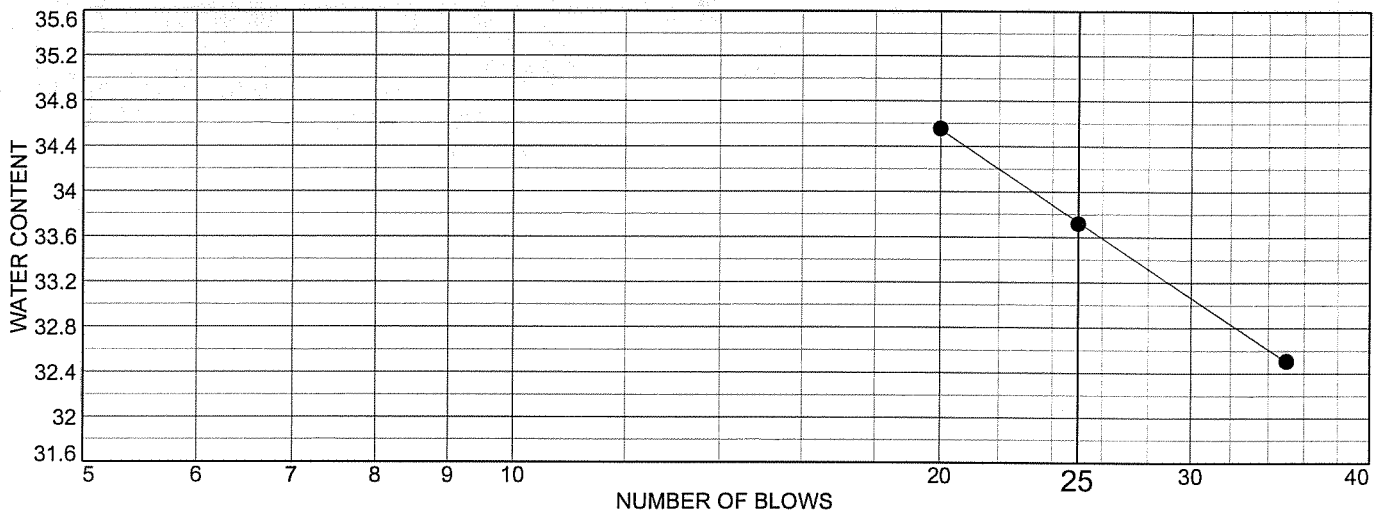
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11719b

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	34	18	16	100.0	97.6	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-301 **Depth:** 10'-12' **Sample Number:** 3D

Remarks:

● Moisture Content: 31.8%

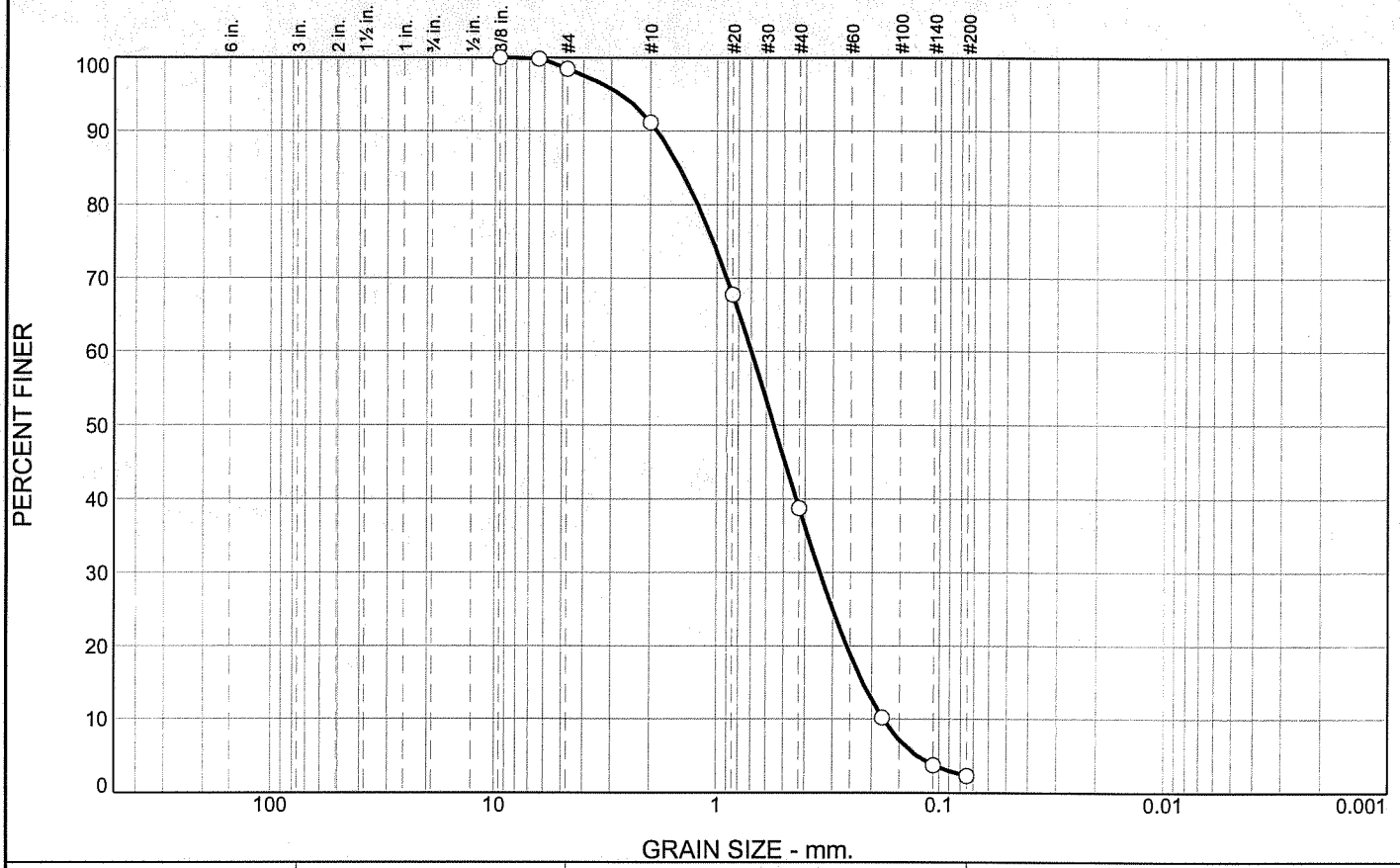
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11719b

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	7.3	52.4	36.4	2.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
1/4"	99.8		
#4	98.4		
#10	91.1		
#20	67.8		
#40	38.7		
#80	10.2		
#140	3.7		
#200	2.3		

* (no specification provided)

Soil Description

poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.4754 D_{60}= 0.6992 D_{50}= 0.5527
D_{30}= 0.3427 D_{15}= 0.2198 D_{10}= 0.1785
C_u= 3.92 C_c= 0.94

Classification

USCS= SP AASHTO=

Remarks

Moisture Content: 6.7%

Sample No.: 1DB **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-302 **Elev./Depth:** 1'-3'

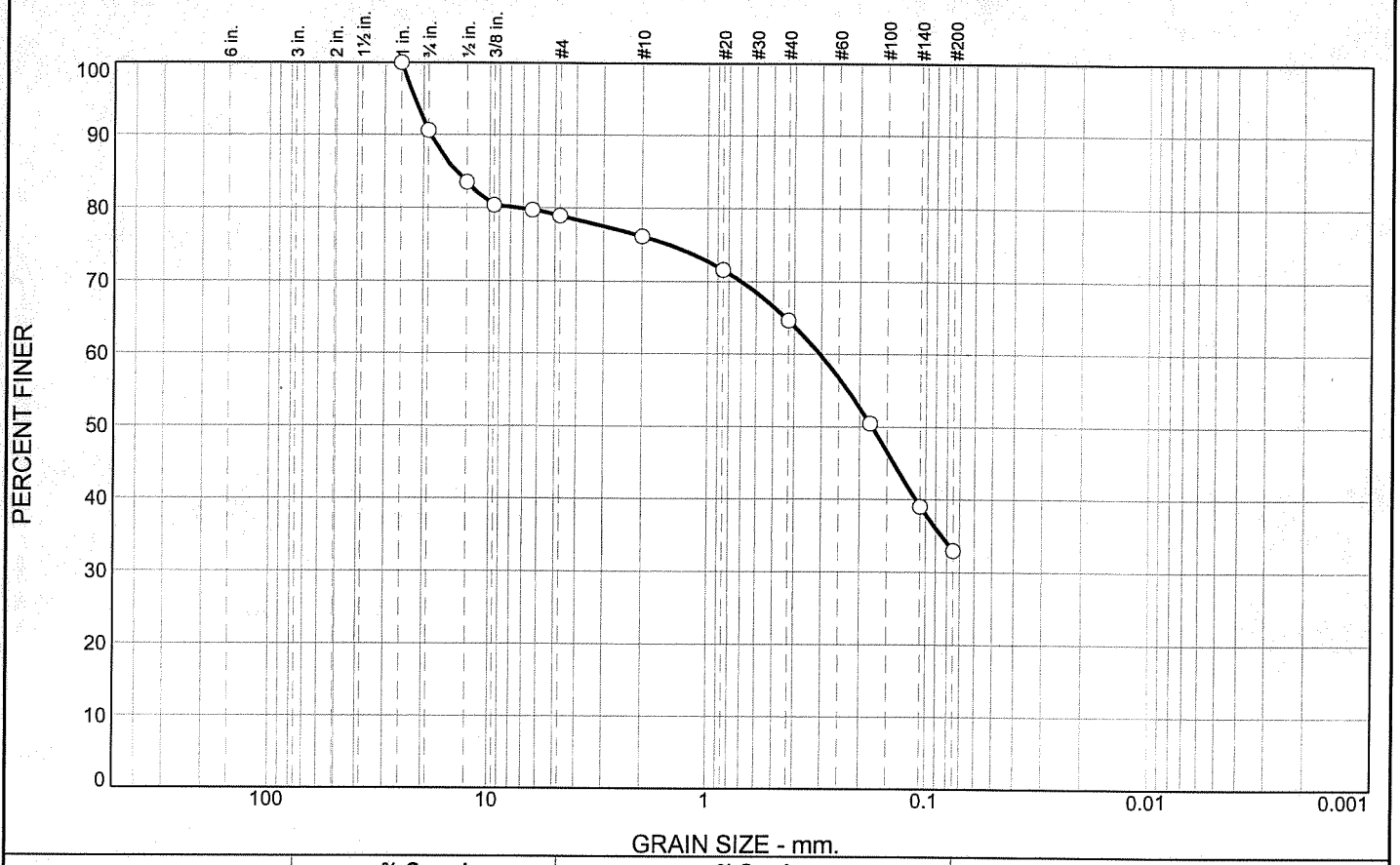
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11720a

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.4	11.7	2.7	11.5	31.7	33.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	90.6		
1/2"	83.5		
3/8"	80.4		
1/4"	79.7		
#4	78.9		
#10	76.2		
#20	71.6		
#40	64.7		
#80	50.5		
#140	39.0		
#200	33.0		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 14.1959 D_{60}= 0.3043 D_{50}= 0.1759
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 13.8%

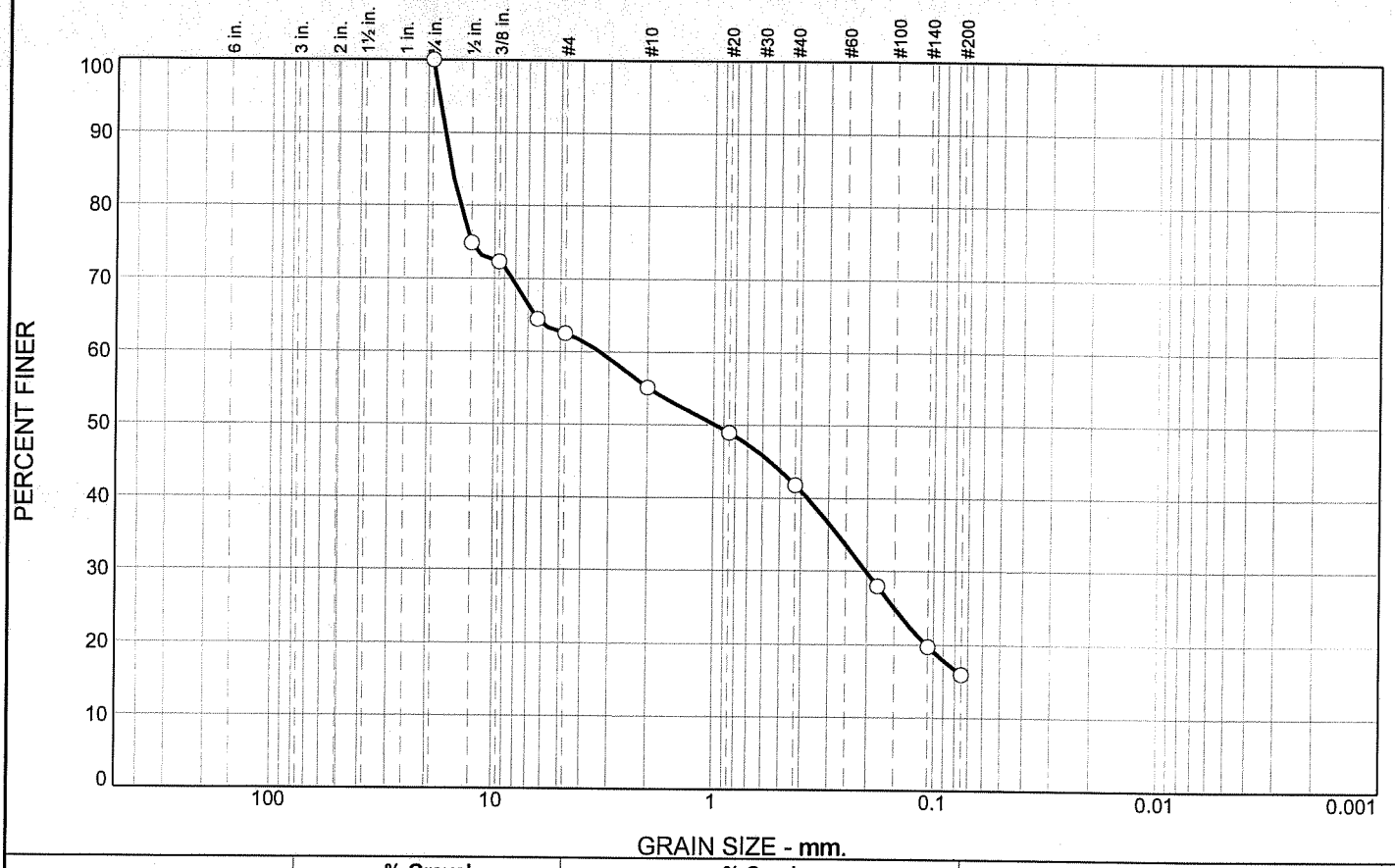
Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-302 **Elev./Depth:** 3'-5'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11720b

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	37.5	7.3	13.4	25.8	16.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	74.9		
3/8"	72.3		
1/4"	64.5		
#4	62.5		
#10	55.2		
#20	48.9		
#40	41.8		
#80	27.9		
#140	19.7		
#200	16.0		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 15.5948 D_{60}= 3.3001 D_{50}= 0.9825
D_{30}= 0.2030 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture Content: 6.8%

Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-302 **Elev./Depth:** 5'-7'

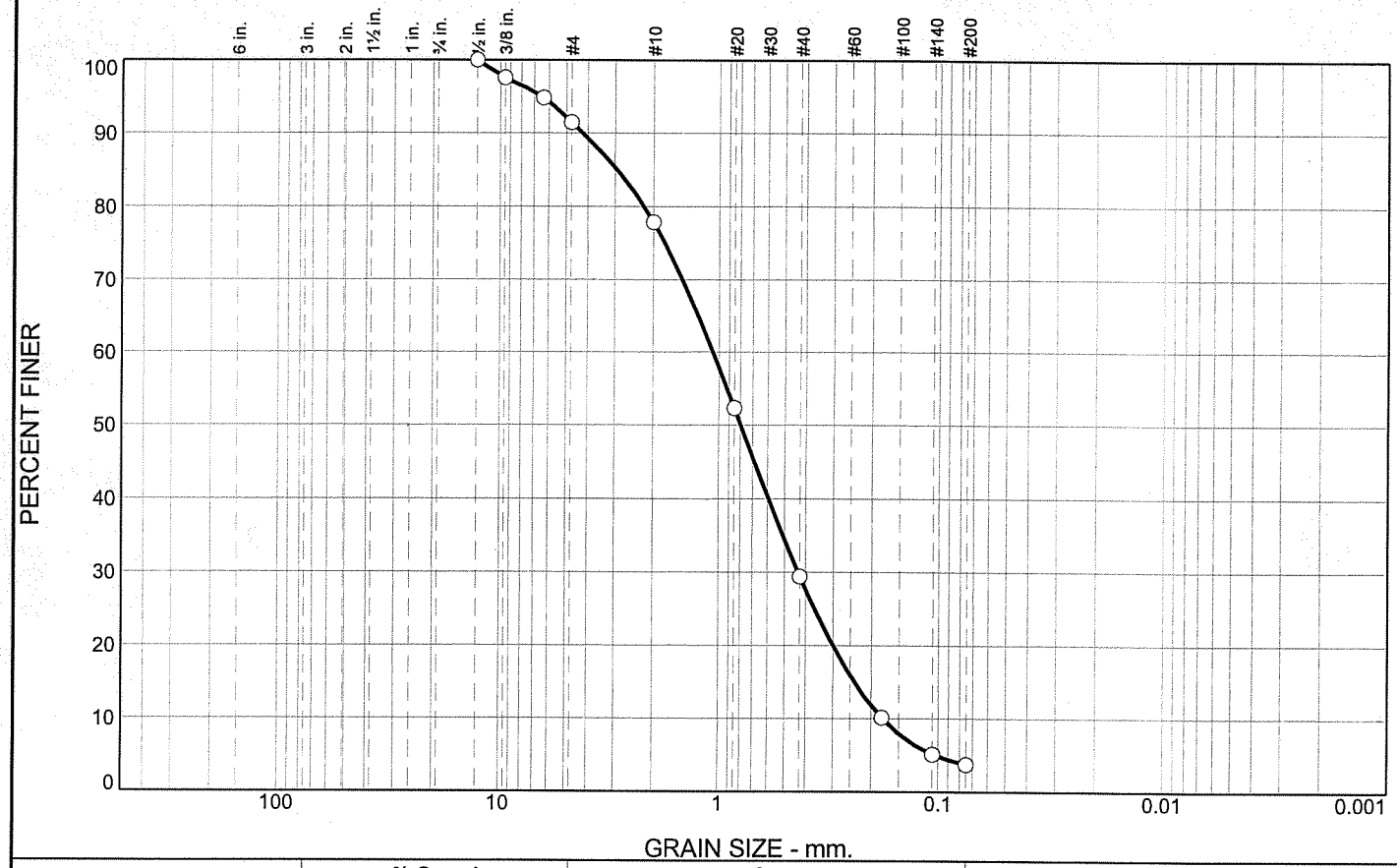
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11720c

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.5	13.6	48.5	25.7	3.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	97.6		
1/4"	94.8		
#4	91.5		
#10	77.9		
#20	52.3		
#40	29.4		
#80	10.1		
#140	5.1		
#200	3.7		

* (no specification provided)

Soil Description

poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.9395 D_{60}= 1.0680 D_{50}= 0.7939
D_{30}= 0.4333 D_{15}= 0.2390 D_{10}= 0.1782
C_u= 5.99 C_c= 0.99

Classification

USCS= SP AASHTO=

Remarks

Moisture Content: 2.8%

Sample No.: 1D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-303 **Elev./Depth:** 1'-3'

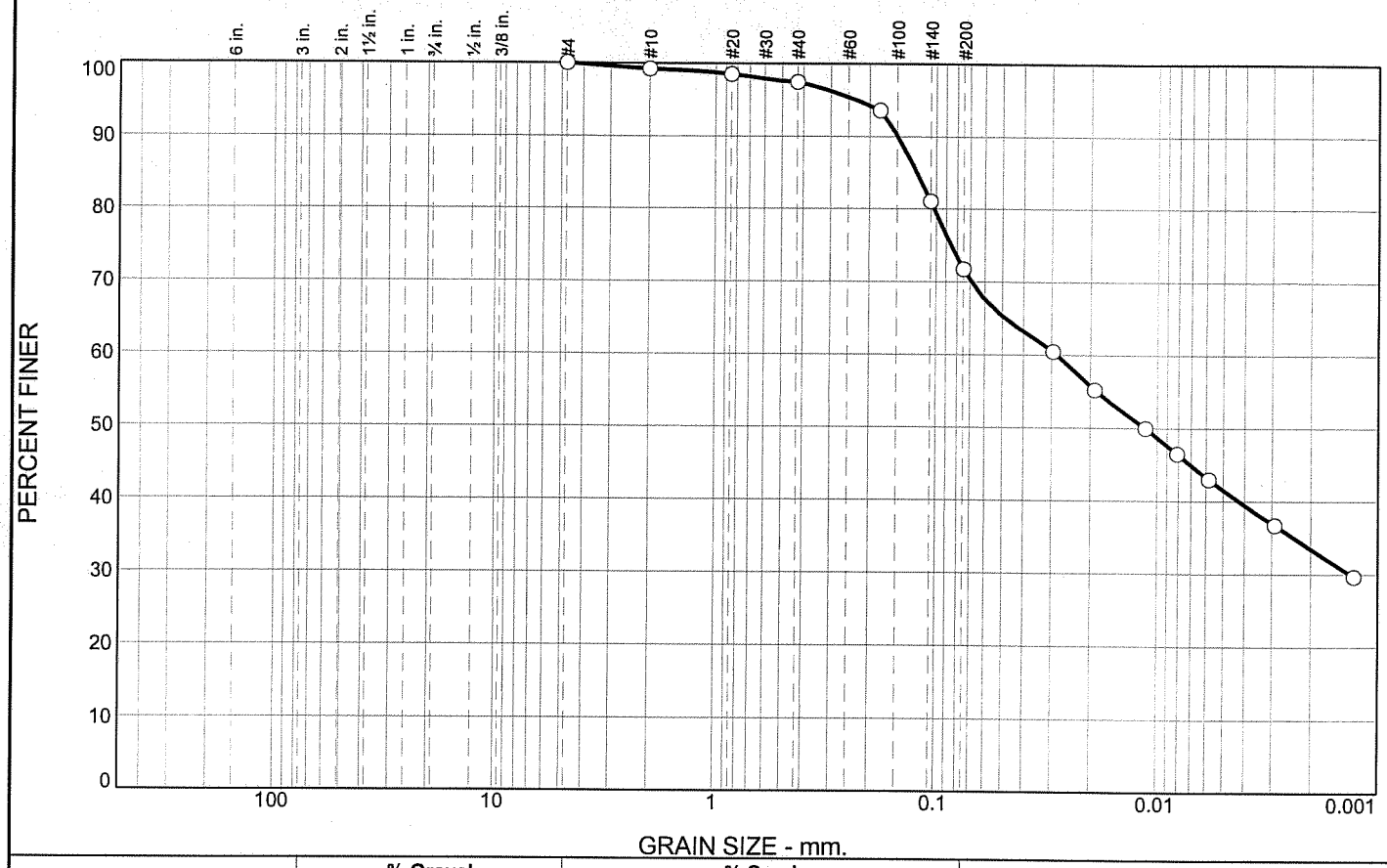
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11719c

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.8	1.8	25.7	30.2	41.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.2		
#20	98.5		
#40	97.4		
#80	93.6		
#140	81.1		
#200	71.7		
0.0295 mm.	60.5		
0.0191 mm.	55.2		
0.0113 mm.	50.0		
0.0081 mm.	46.5		
0.0058 mm.	43.0		
0.0029 mm.	36.7		
0.0013 mm.	29.7		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 15 LL= 24 PI= 9

Coefficients

D_{85}= 0.1221 D_{60}= 0.0282 D_{50}= 0.0113
D_{30}= 0.0013 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(4)

Remarks

Moisture Content: 18.8%

Sample No.: 2DB **Source of Sample:** Proposed Interchange Improvements **Date:** 4/6/2011
Location: HB-YA-303 **Elev./Depth:** 3'-5'

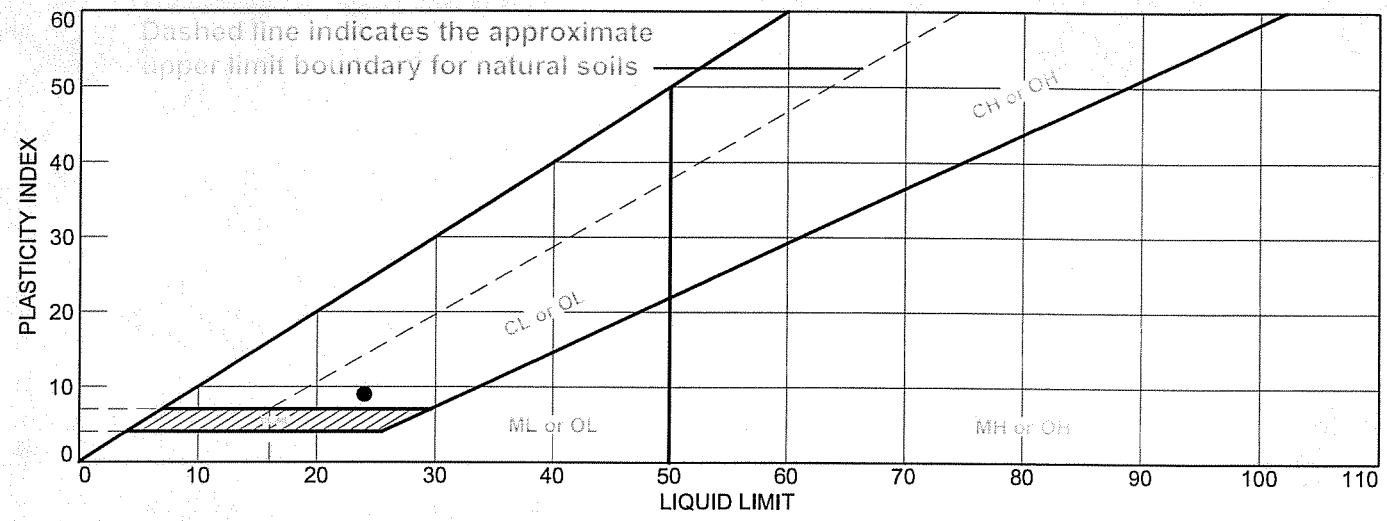
R.W. Gillespie & Associates, Inc.
Saco, Maine

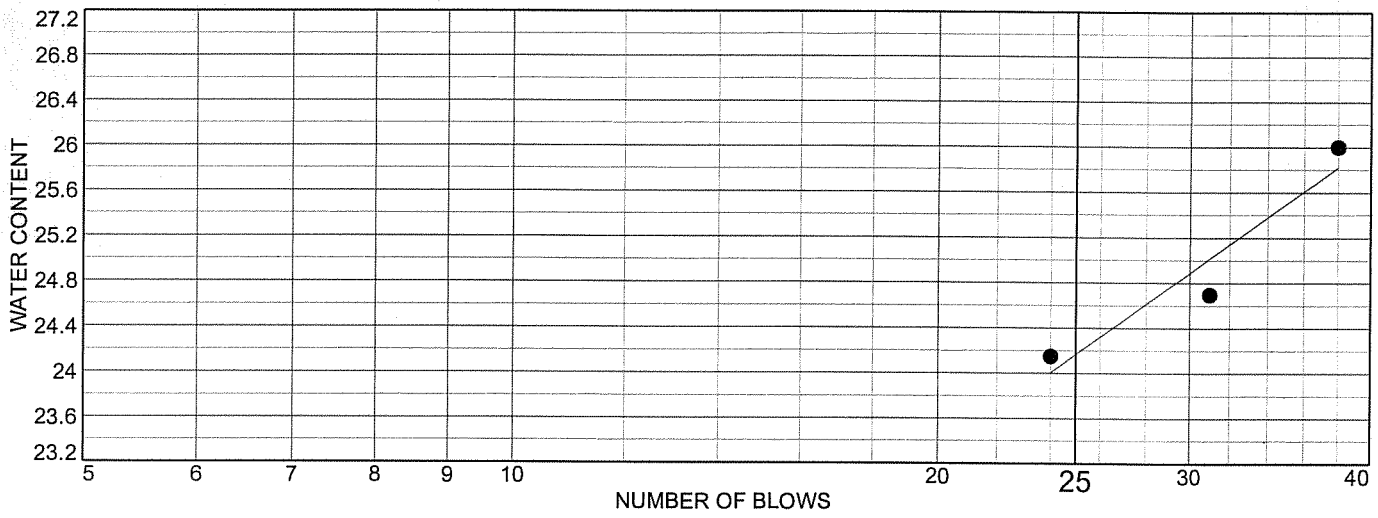
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11719d

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay with sand	24	15	9	97.4	71.7	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-303 **Depth:** 3'-5' **Sample Number:** 2DB

Remarks:

● Moisture Content: 18.8%

R.W. Gillespie & Associates, Inc.

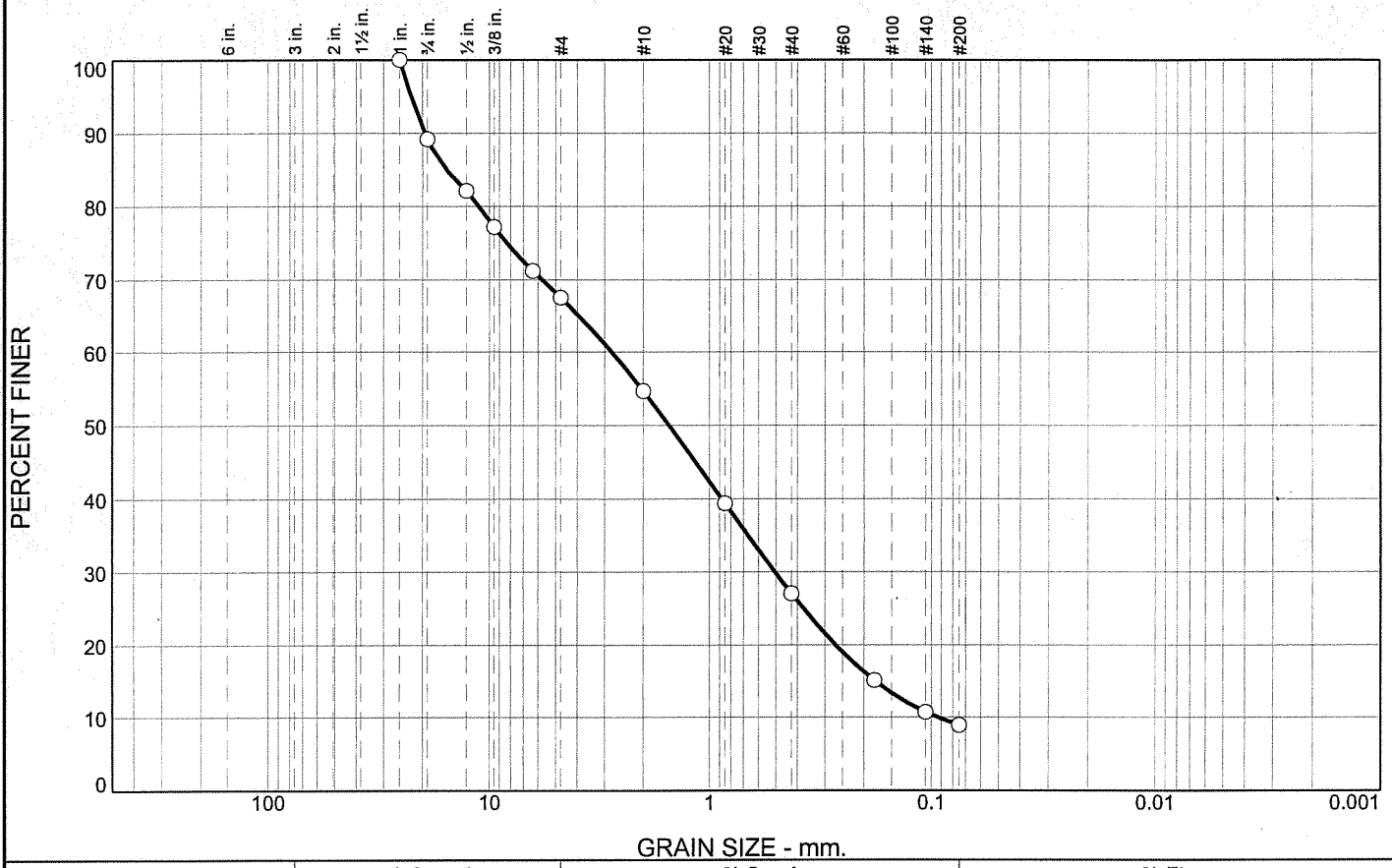
Saco, Maine

Lab No. 11719d

Tested By: DCH **Checked By:** MTG MTG

U.S. Route 1
Laboratory Test Results
(HB-YA-400 series)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.8	21.7	12.8	27.7	18.1	8.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	89.2		
1/2"	82.1		
3/8"	77.2		
1/4"	71.2		
#4	67.5		
#10	54.7		
#20	39.4		
#40	27.0		
#80	15.1		
#140	10.7		
#200	8.9		

* (no specification provided)

Soil Description

poorly graded sand with silt and gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 15.5749 D_{60}= 2.7876 D_{50}= 1.5247
D_{30}= 0.5057 D_{15}= 0.1790 D_{10}= 0.0939
C_u= 29.69 C_c= 0.98

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

Moisture Content: 0.9%

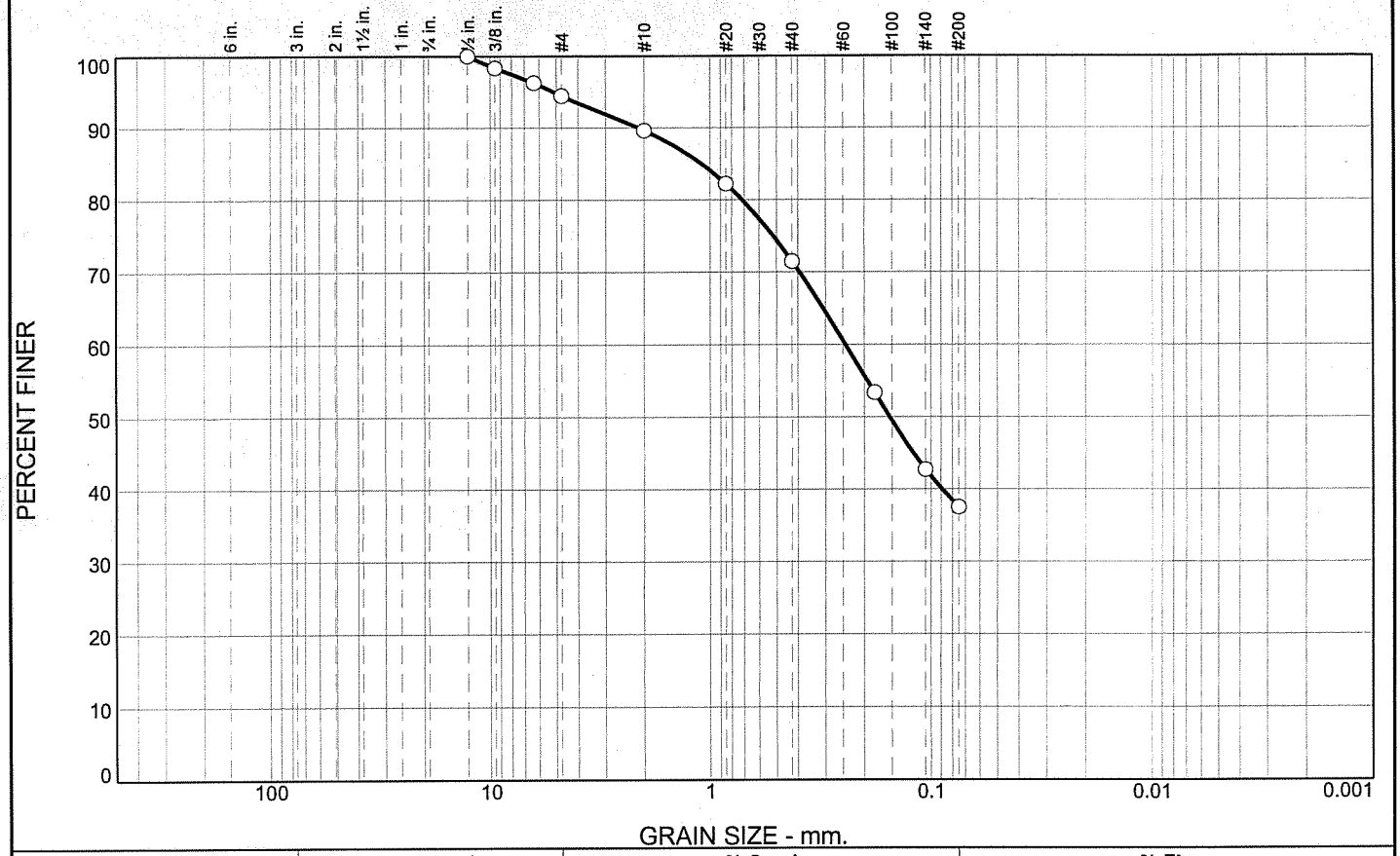
Sample No.: 1D+2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-402 **Elev./Depth:** 1'-3'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11721a

Tested By: GSM/JJH **Checked By:** MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.5	4.9	18.1	34.0	37.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	98.3		
1/4"	96.2		
#4	94.5		
#10	89.6		
#20	82.3		
#40	71.5		
#80	53.4		
#140	42.7		
#200	37.5		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 1.0938 D_{60}= 0.2430 D_{50}= 0.1539
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content: 9.5%

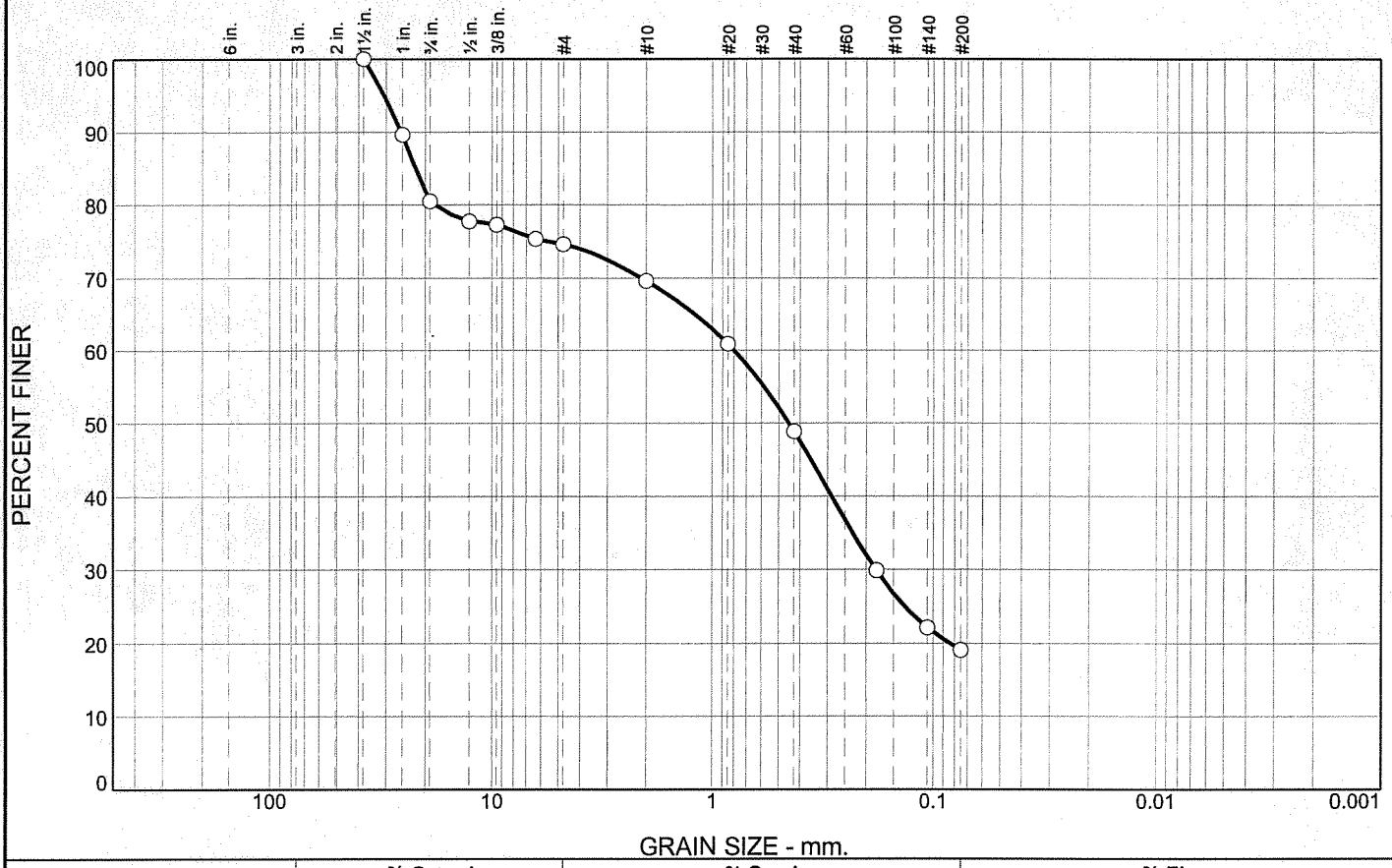
Sample No.: 3D+4D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-402 **Elev./Depth:** 5'-9'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11721b

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	19.5	5.9	5.0	20.7	29.8	19.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	89.6		
3/4"	80.5		
1/2"	77.8		
3/8"	77.3		
1/4"	75.3		
#4	74.6		
#10	69.6		
#20	60.9		
#40	48.9		
#80	29.9		
#140	22.1		
#200	19.1		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 22.1812 D_{60}= 0.7958 D_{50}= 0.4488
D_{30}= 0.1811 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture Content: 9.2%

Sample No.: 5D+6D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-402 **Elev./Depth:** 9.5'-13.5'

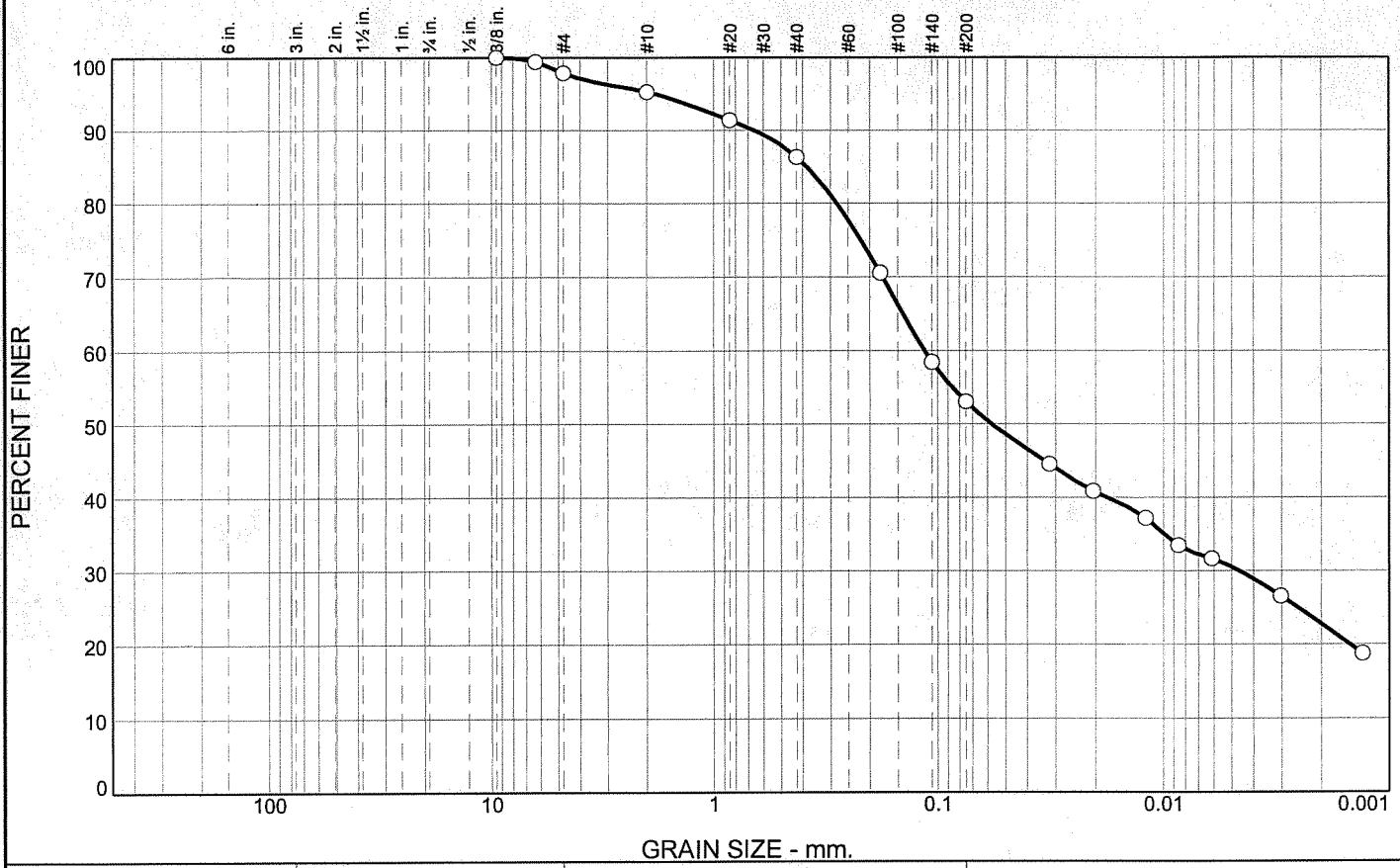
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11721c

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	2.5	8.9	33.3	22.6	30.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
1/4"	99.4		
#4	97.8		
#10	95.3		
#20	91.4		
#40	86.4		
#80	70.6		
#140	58.5		
#200	53.1		
0.0320 mm.	44.5		
0.0205 mm.	40.9		
0.0120 mm.	37.2		
0.0086 mm.	33.5		
0.0061 mm.	31.7		
0.0030 mm.	26.5		
0.0013 mm.	18.7		

* (no specification provided)

Soil Description

sandy lean clay

Atterberg Limits

PL= 15 LL= 23 PI= 8

Coefficients

D_{85}= 0.3819 D_{60}= 0.1144 D_{50}= 0.0575
D_{30}= 0.0046 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(1)

Remarks

Moisture Content: 15.0%

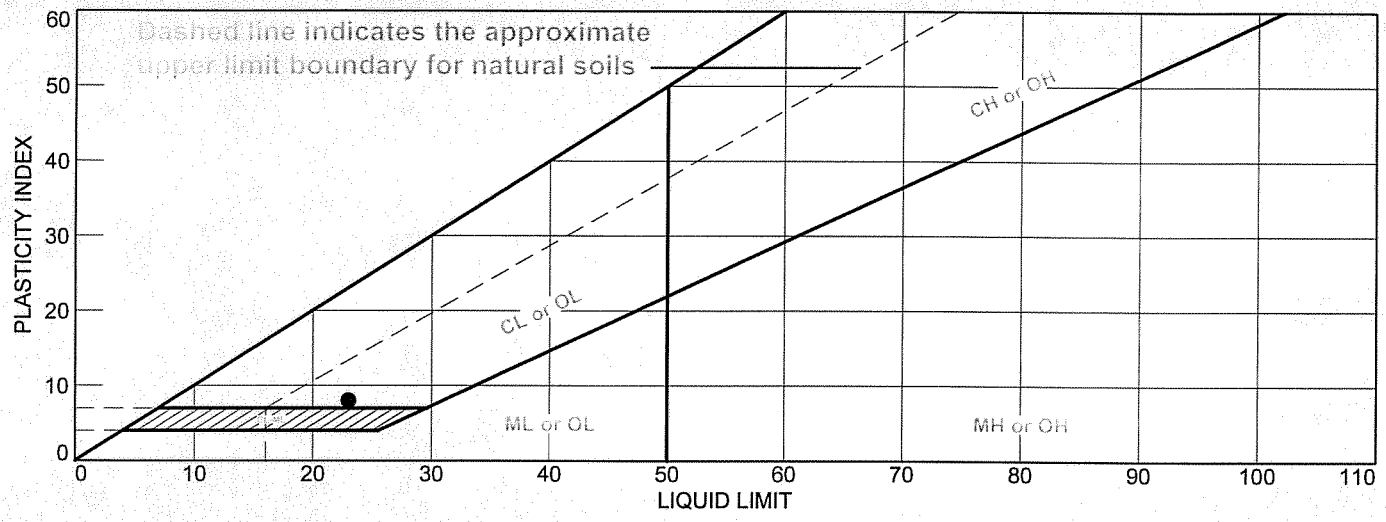
Sample No.: 7D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-402 **Elev./Depth:** 14'-16'

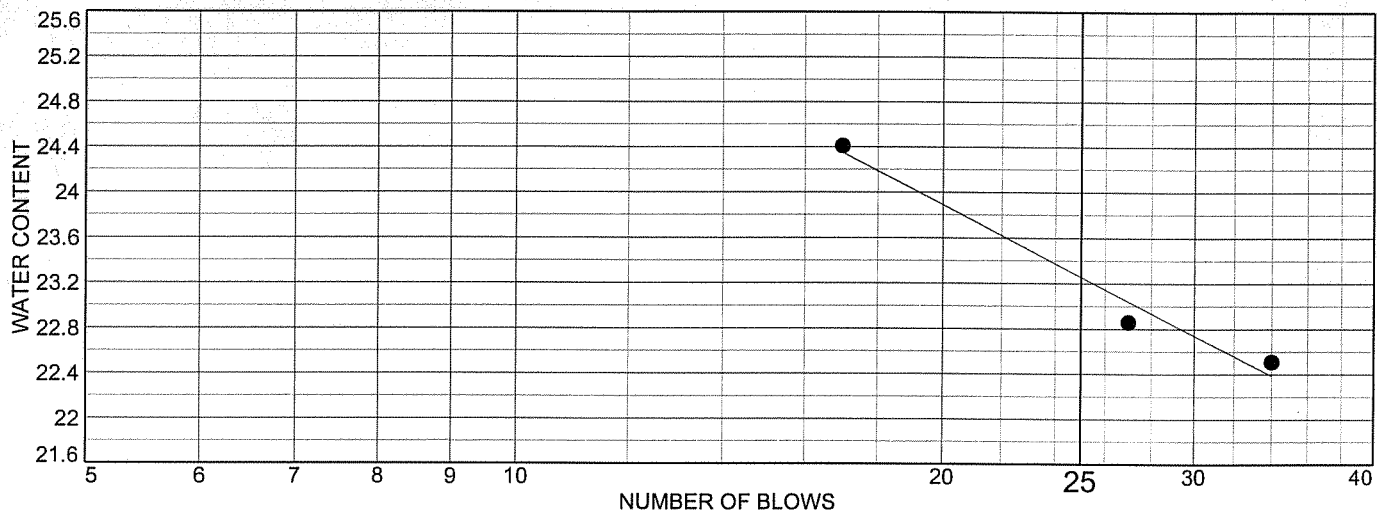
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11721D

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	sandy lean clay	23	15	8	86.4	53.1	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-402 **Depth:** 14'-16' **Sample Number:** 7D

Remarks:

● Moisture Content: 15.0%

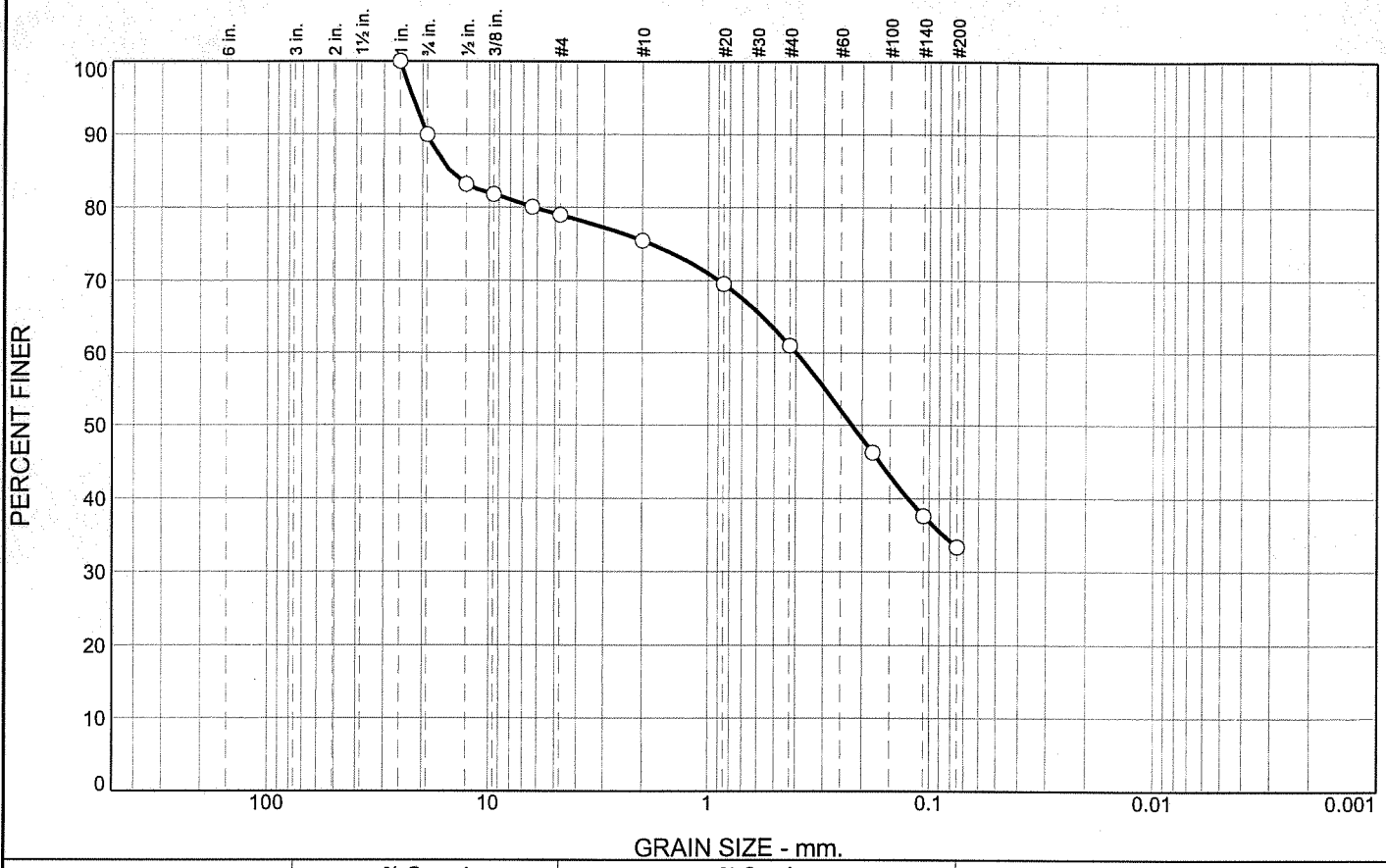
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11721d

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.0	11.0	3.5	14.5	27.6	33.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	90.0		
1/2"	83.2		
3/8"	81.8		
1/4"	80.0		
#4	79.0		
#10	75.5		
#20	69.5		
#40	61.0		
#80	46.2		
#140	37.6		
#200	33.4		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 15.0320 D_{60}= 0.3978 D_{50}= 0.2221
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 9.5%

Sample No.: 8D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-402 **Elev./Depth:** 16'-18'

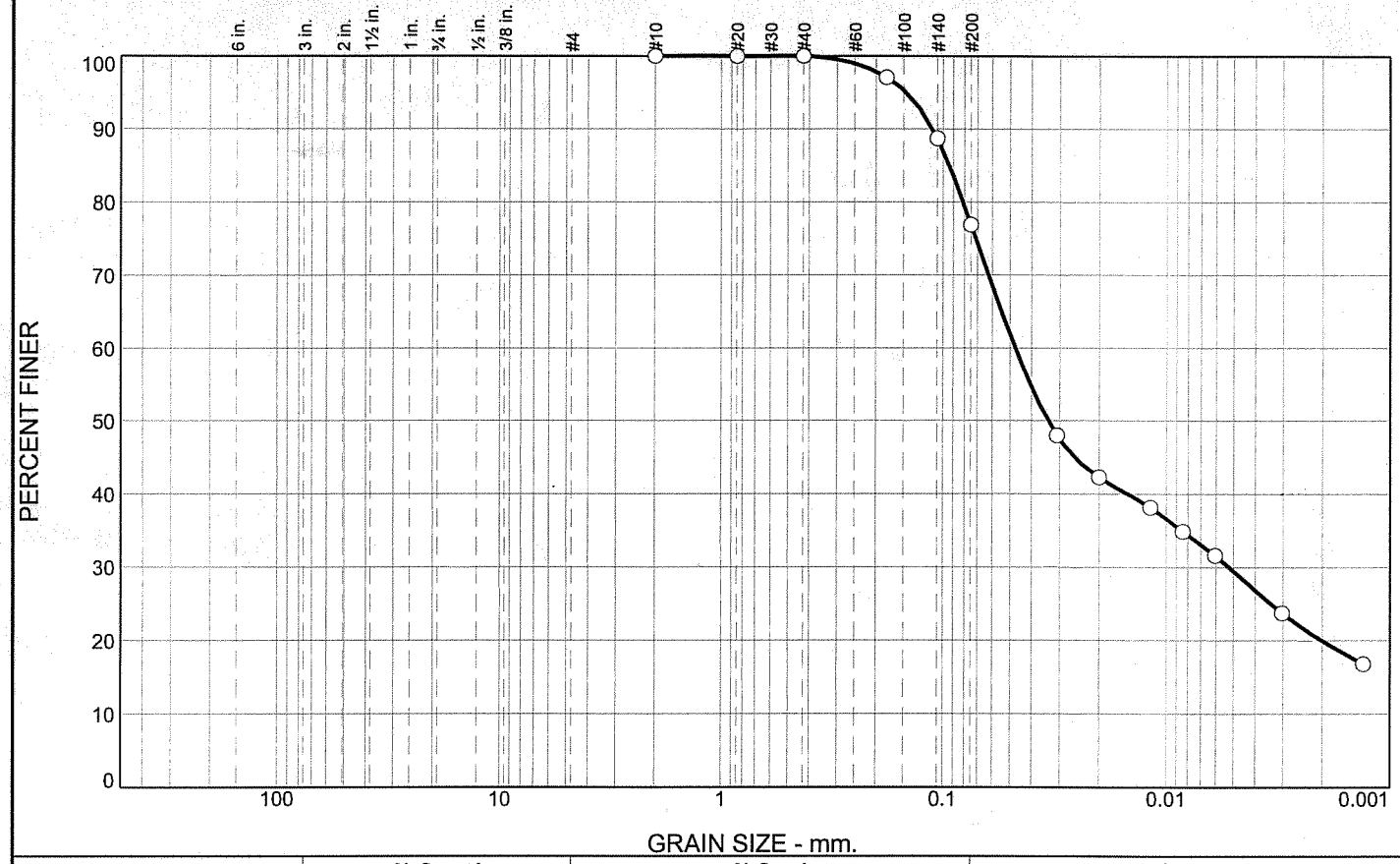
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11721e

Tested By: GSM/JJH **Checked By:** MTG

SB On-Ramp
Laboratory Test Results
(HB-YA-500 series)

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	23.1	47.4	29.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#80	97.0		
#140	88.7		
#200	76.9		
0.0308 mm.	48.0		
0.0200 mm.	42.3		
0.0118 mm.	38.2		
0.0084 mm.	34.9		
0.0061 mm.	31.6		
0.0030 mm.	23.7		
0.0013 mm.	16.7		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 17 LL= 25 PI= 8

Coefficients

D_{85}= 0.0938 D_{60}= 0.0473 D_{50}= 0.0337
D_{30}= 0.0052 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(4)

Remarks

Moisture Content: 21.7%

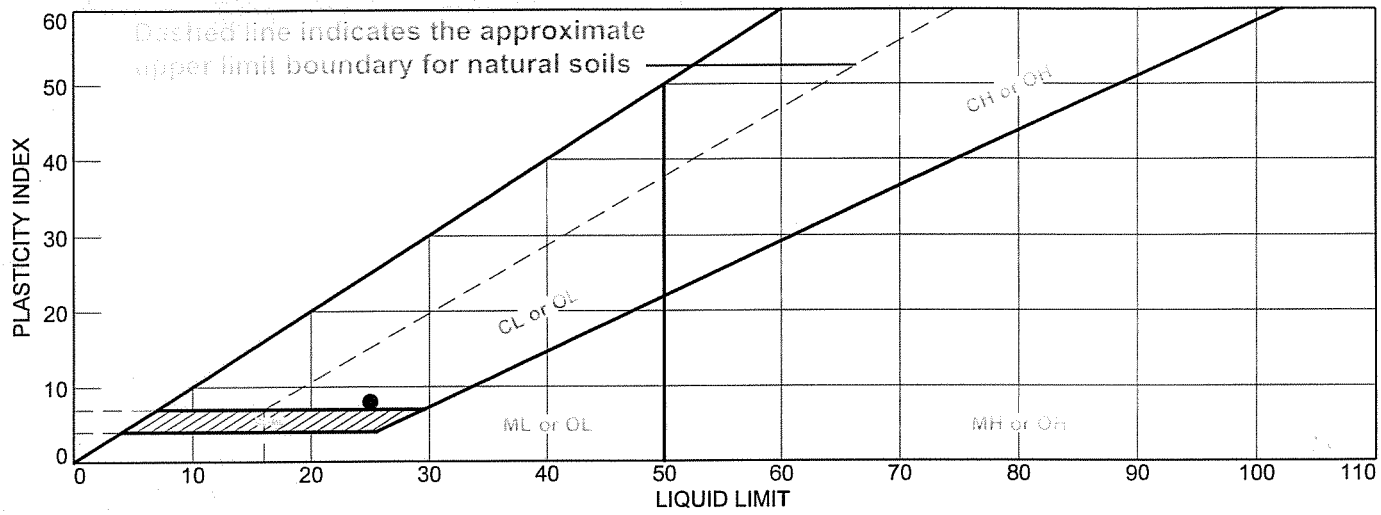
Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-504 **Elev./Depth:** 5'-7'

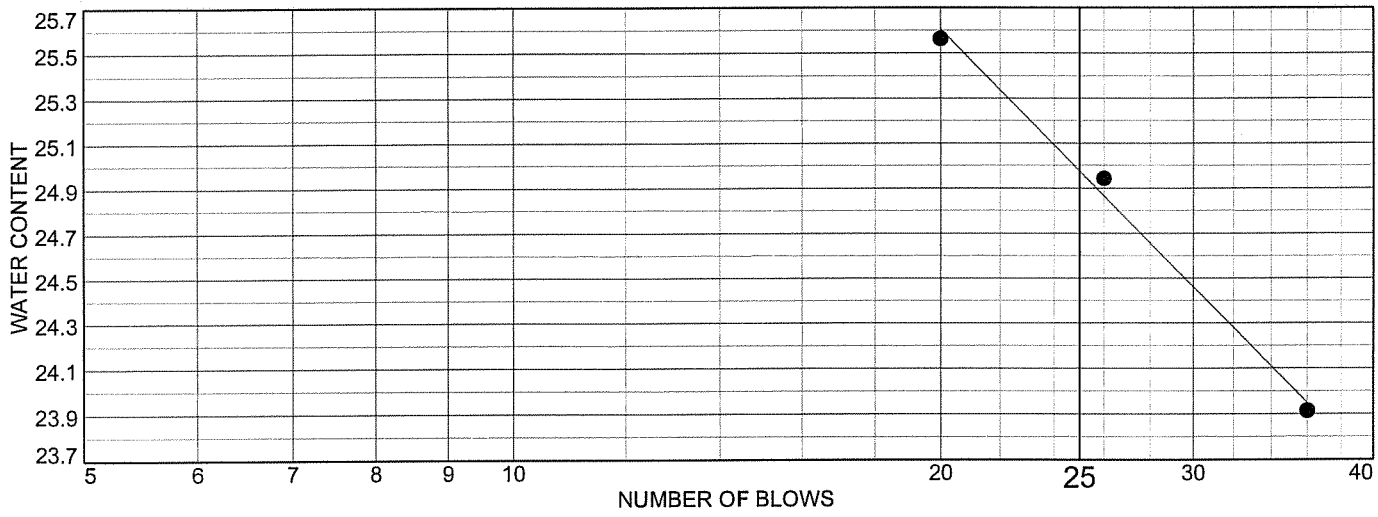
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11722a

Tested By: DCH/JJH **Checked By:** MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay with sand	25	17	8	100.0	76.9	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-504 **Depth:** 5'-7' **Sample Number:** 2D

Remarks:

● Moisture Content: 21.7%

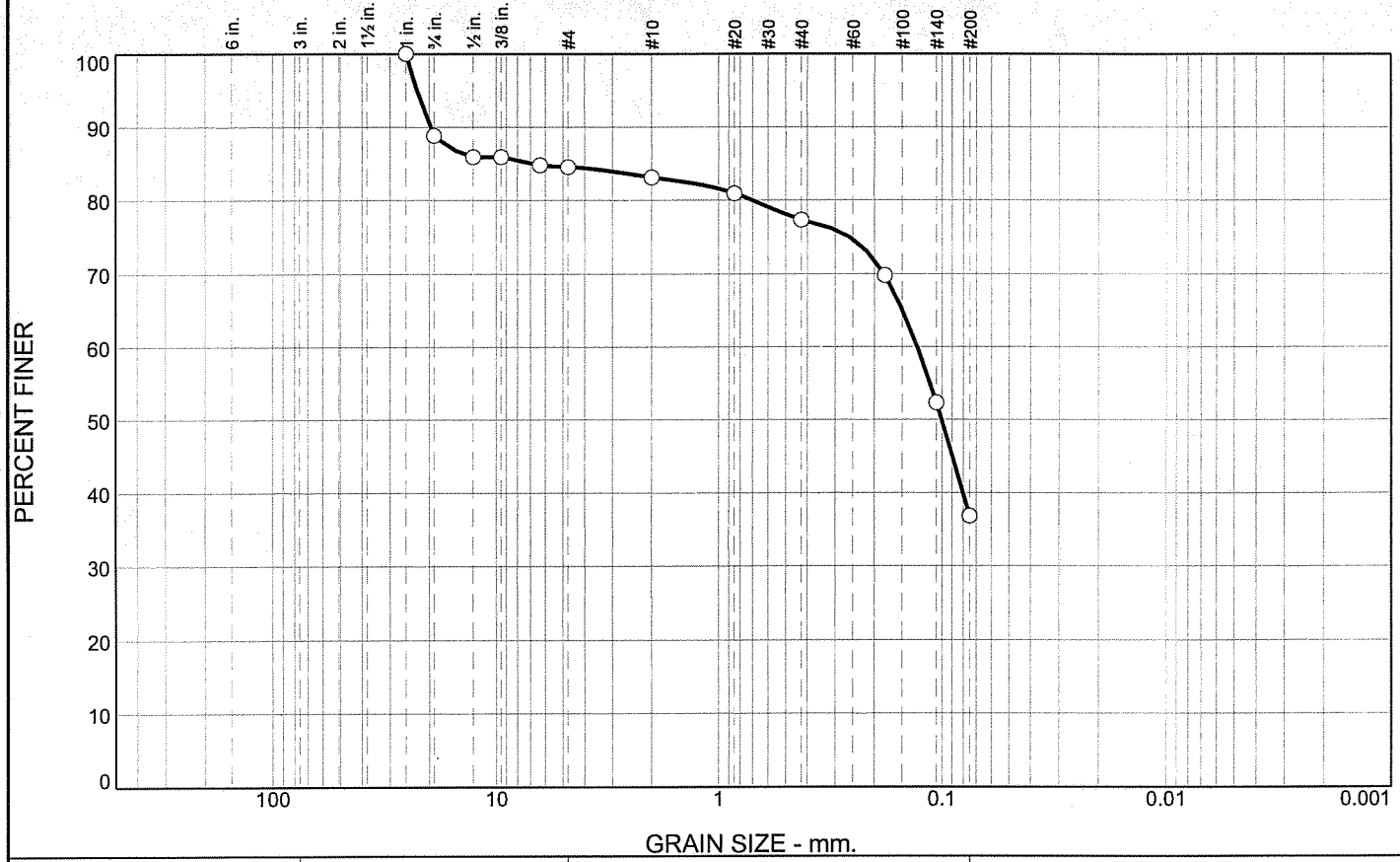
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11722a

Tested By: DCH/MCS **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	11.2	4.2	1.5	5.8	40.5	36.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	88.8		
1/2"	85.9		
3/8"	85.9		
1/4"	84.8		
#4	84.6		
#10	83.1		
#20	80.9		
#40	77.3		
#80	69.8		
#140	52.3		
#200	36.8		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 6.8565 D_{60}= 0.1290 D_{50}= 0.1004
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content: 18.0%

Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-505 **Elev./Depth:** 2'-4'

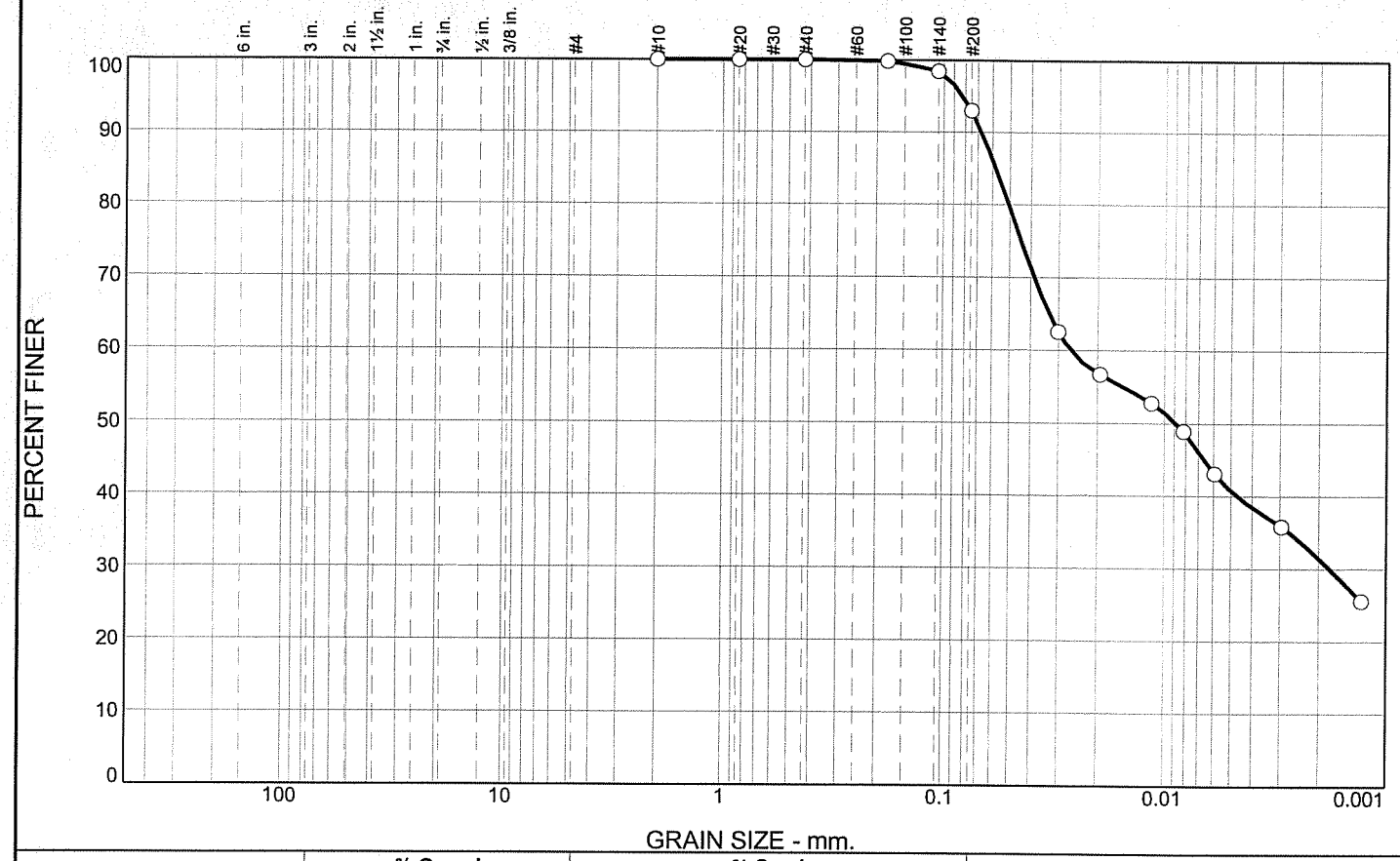
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11722b

Tested By: GSM/JJH **Checked By:** MTG MTG

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	7.0	52.3	40.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#80	99.8		
#140	98.4		
#200	93.0		
0.0301 mm.	62.5		
0.0195 mm.	56.7		
0.0114 mm.	52.8		
0.0082 mm.	48.9		
0.0059 mm.	43.1		
0.0030 mm.	35.8		
0.0013 mm.	25.6		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 17 LL= 29 PI= 12

Coefficients

D_{85}= 0.0579 D_{60}= 0.0264 D_{50}= 0.0088
D_{30}= 0.0018 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Moisture Content: 20.4%

Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-507 **Elev./Depth:** 2'-4'

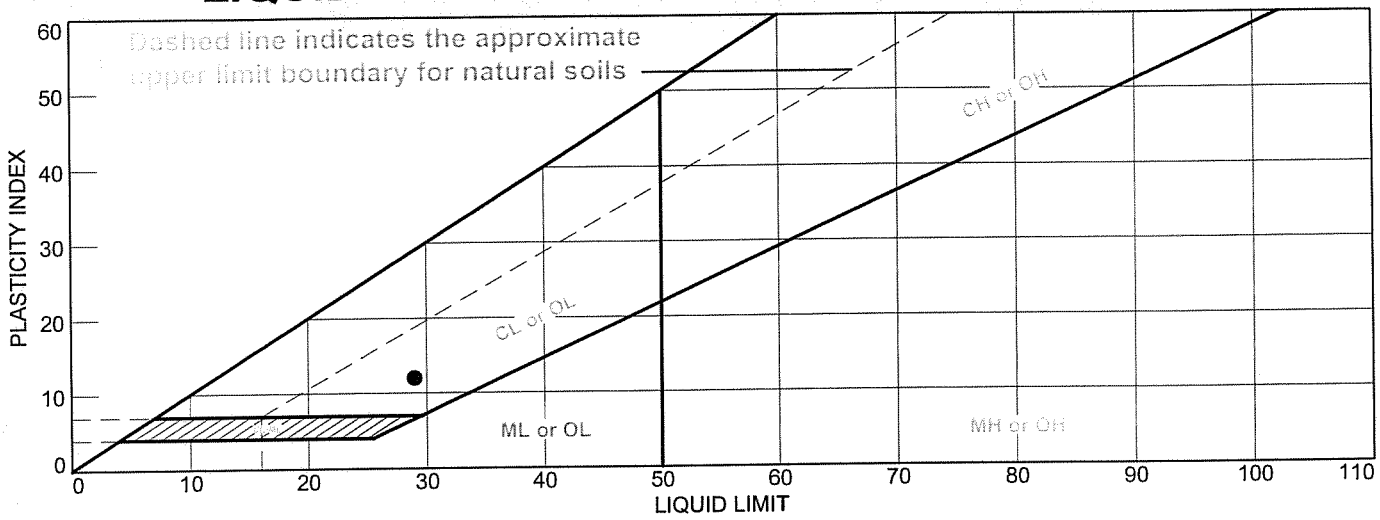
R.W. Gillespie & Associates, Inc.
Saco, Maine

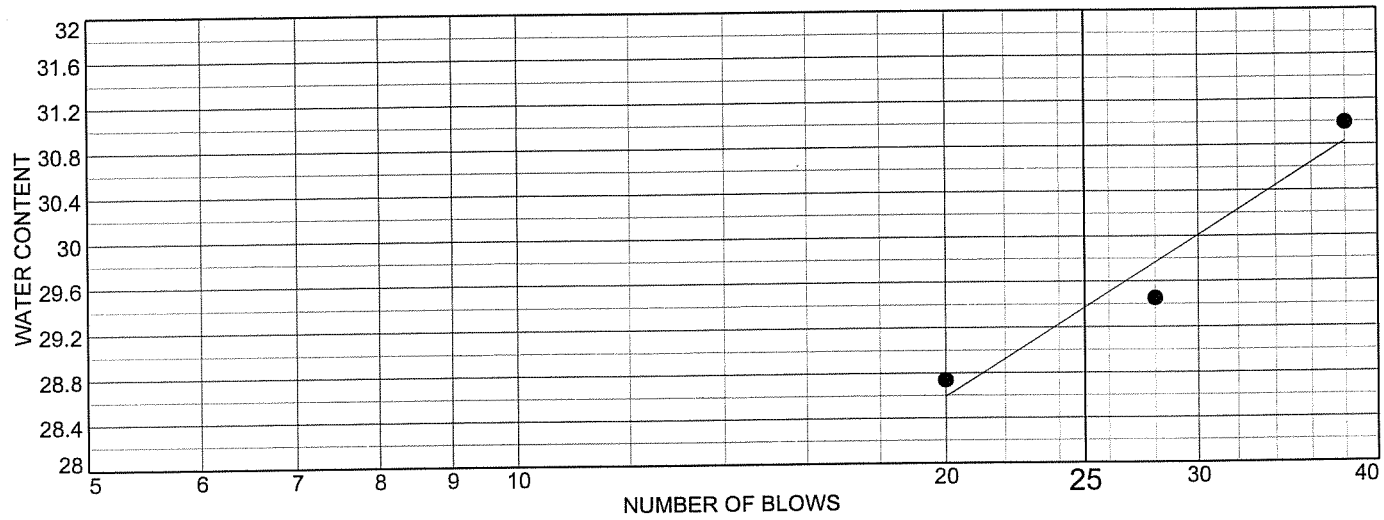
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11722c

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	29	17	12	100.0	93.0	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-507 **Depth:** 2'-4' **Sample Number:** 2D

Remarks:

● Moisture Content: 20.4%

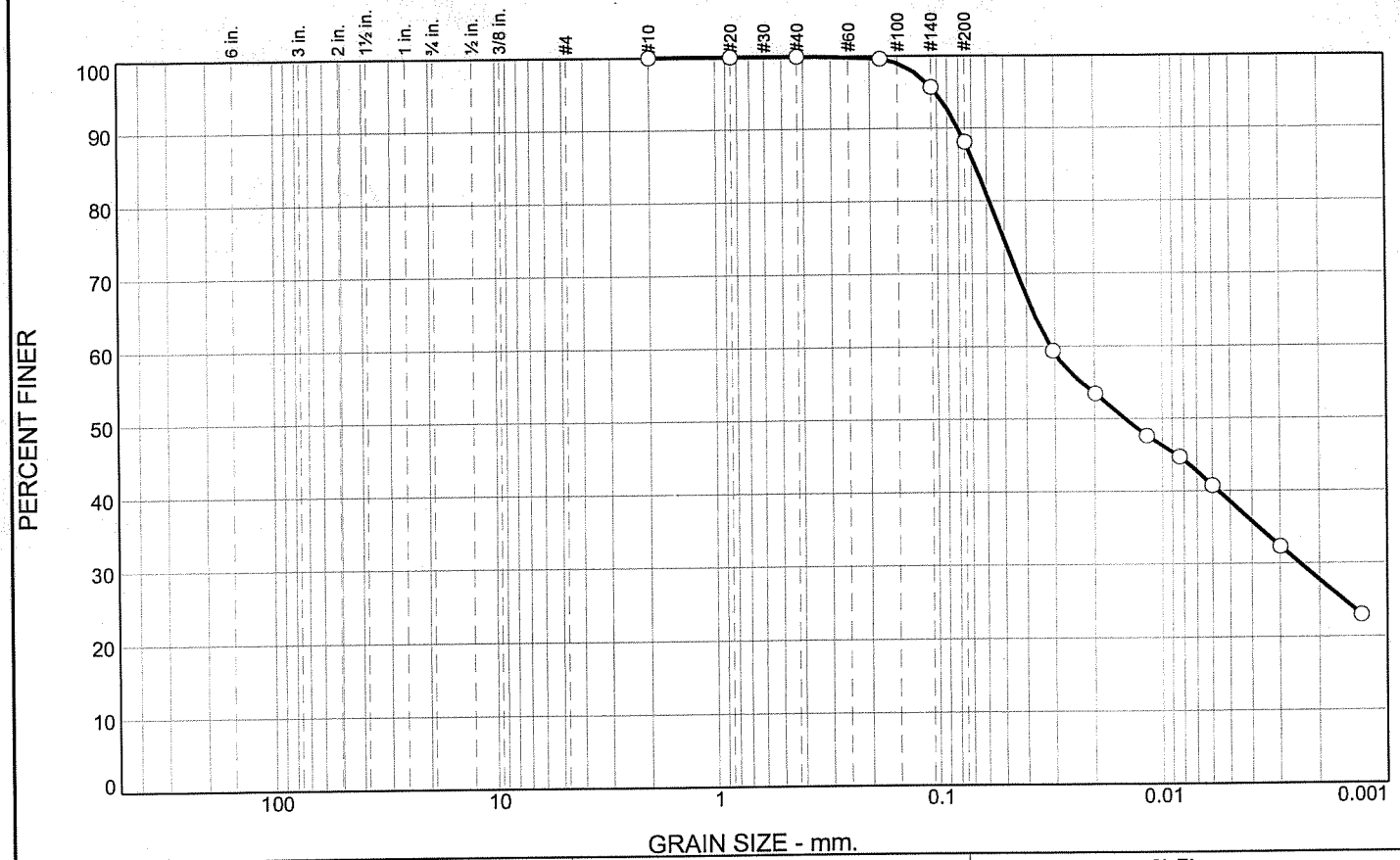
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11722c

Tested By: DCH/MCS **Checked By:** MTG MTG

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	11.9	49.6	38.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#80	99.6		
#140	95.6		
#200	88.1		
0.0306 mm.	59.4		
0.0198 mm.	53.5		
0.0117 mm.	47.6		
0.0084 mm.	44.7		
0.0060 mm.	40.7		
0.0030 mm.	32.3		
0.0013 mm.	23.0		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 18 LL= 27 PI= 9

Coefficients

D_{85}= 0.0677 D_{60}= 0.0314 D_{50}= 0.0146
D_{30}= 0.0024 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(6)

Remarks

Moisture Content: 20.9%

Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-507 **Elev./Depth:** 5'-7'

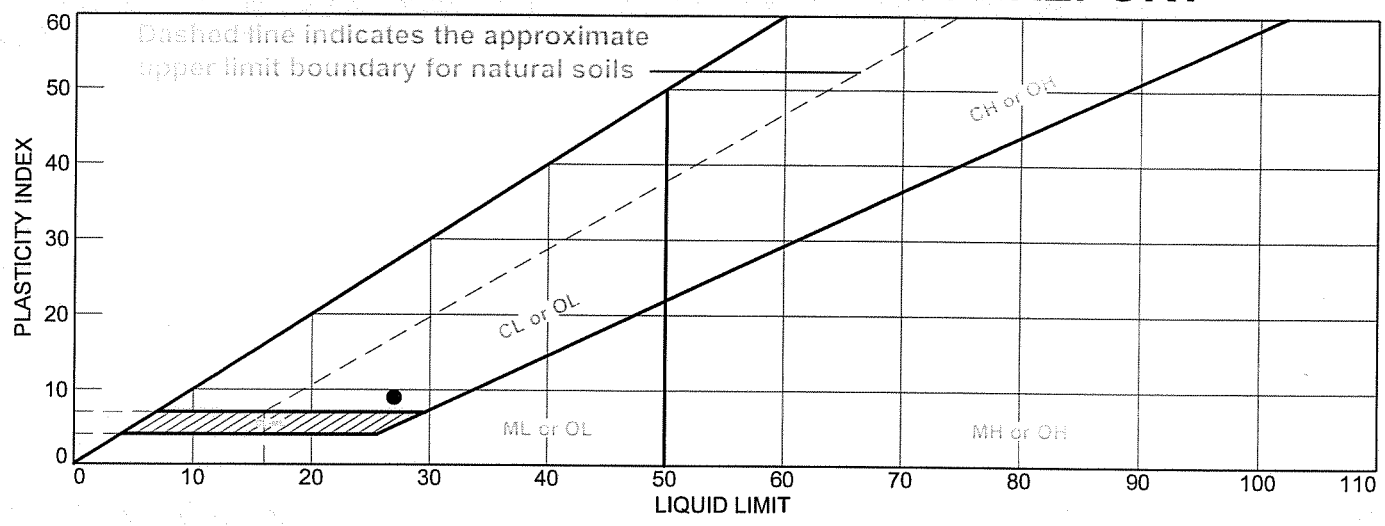
R.W. Gillespie & Associates, Inc.
Saco, Maine

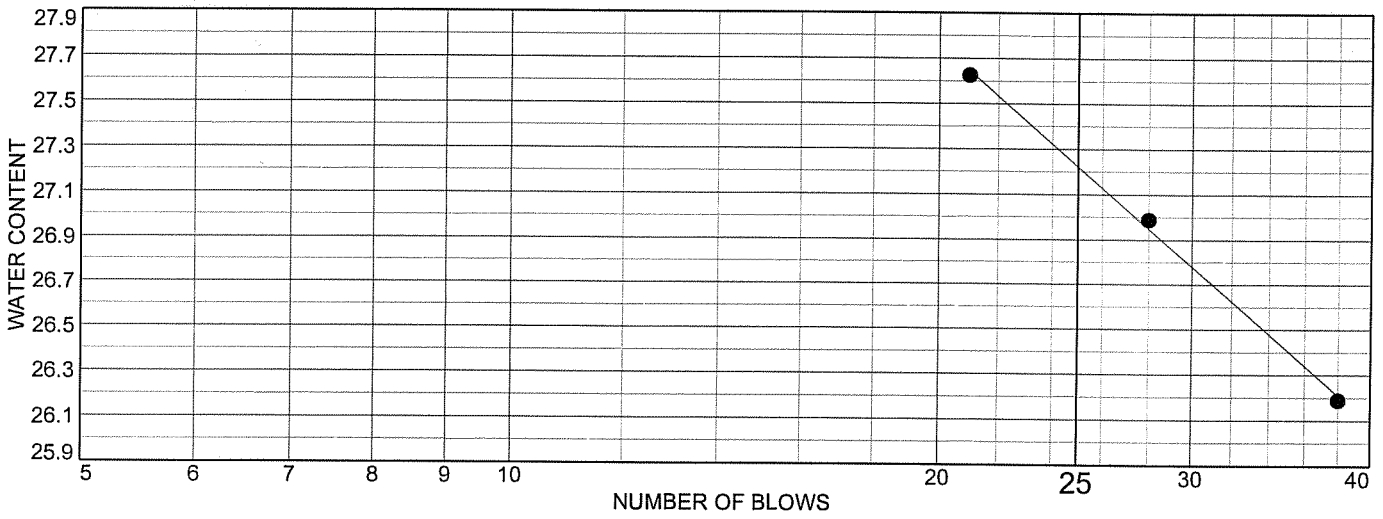
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

Project No: 956-11 **Lab No.** 11722d

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	27	18	9	100.0	88.1	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-507 **Depth:** 5'-7' **Sample Number:** 3D

Remarks:

● Moisture Content: 20.9%

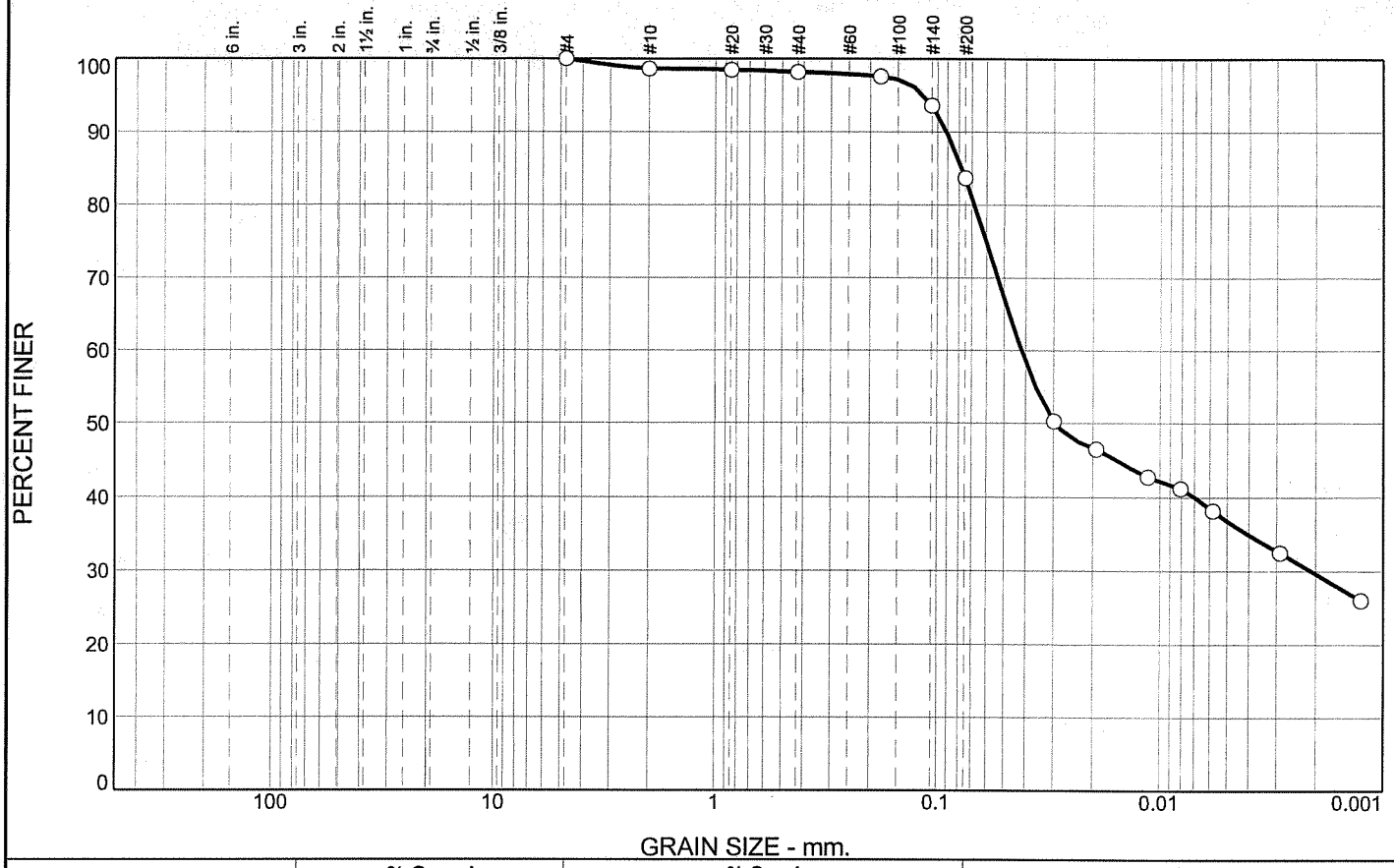
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11722d

Tested By: DCH/MCS **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.4	0.5	14.4	46.9	36.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.6		
#20	98.5		
#40	98.1		
#80	97.5		
#140	93.6		
#200	83.7		
0.0298 mm.	50.3		
0.0193 mm.	46.5		
0.0113 mm.	42.7		
0.0081 mm.	41.2		
0.0058 mm.	38.2		
0.0029 mm.	32.5		
0.0013 mm.	26.0		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 17 LL= 26 PI= 9

Coefficients

D_{85}= 0.0778 D_{60}= 0.0417 D_{50}= 0.0293
D_{30}= 0.0021 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(6)

Remarks

Moisture Content: 23.9%

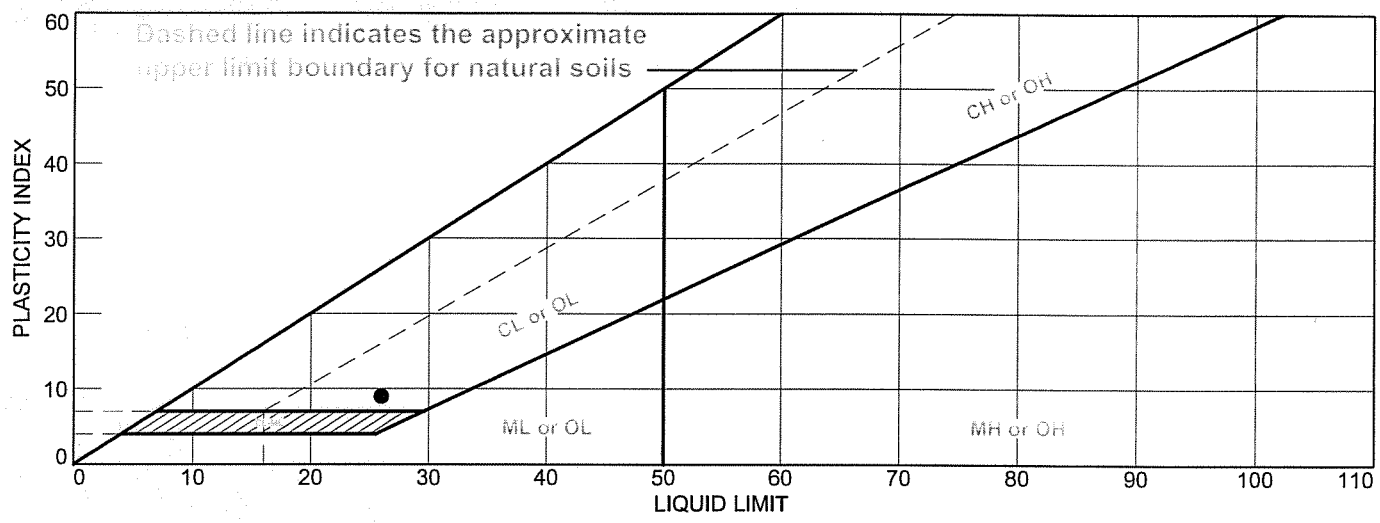
Sample No.: 4D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-507 **Elev./Depth:** 10'-12'

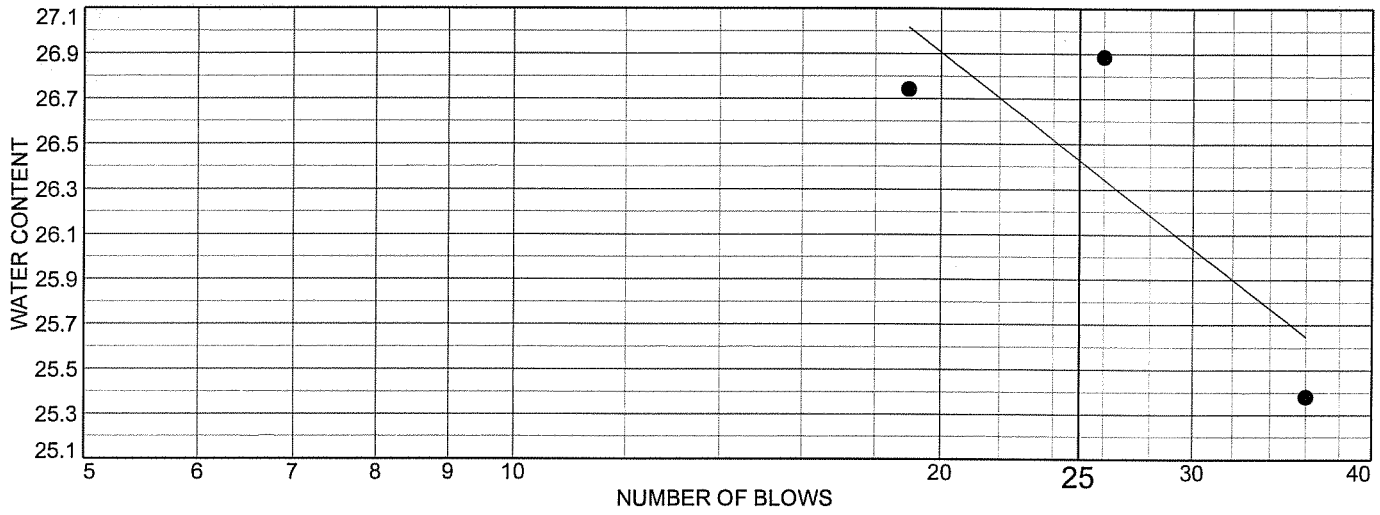
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11722e

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay with sand	26	17	9	98.1	83.7	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-507 **Depth:** 10'-12' **Sample Number:** 4D

Remarks:

● Moisture Content: 23.9%

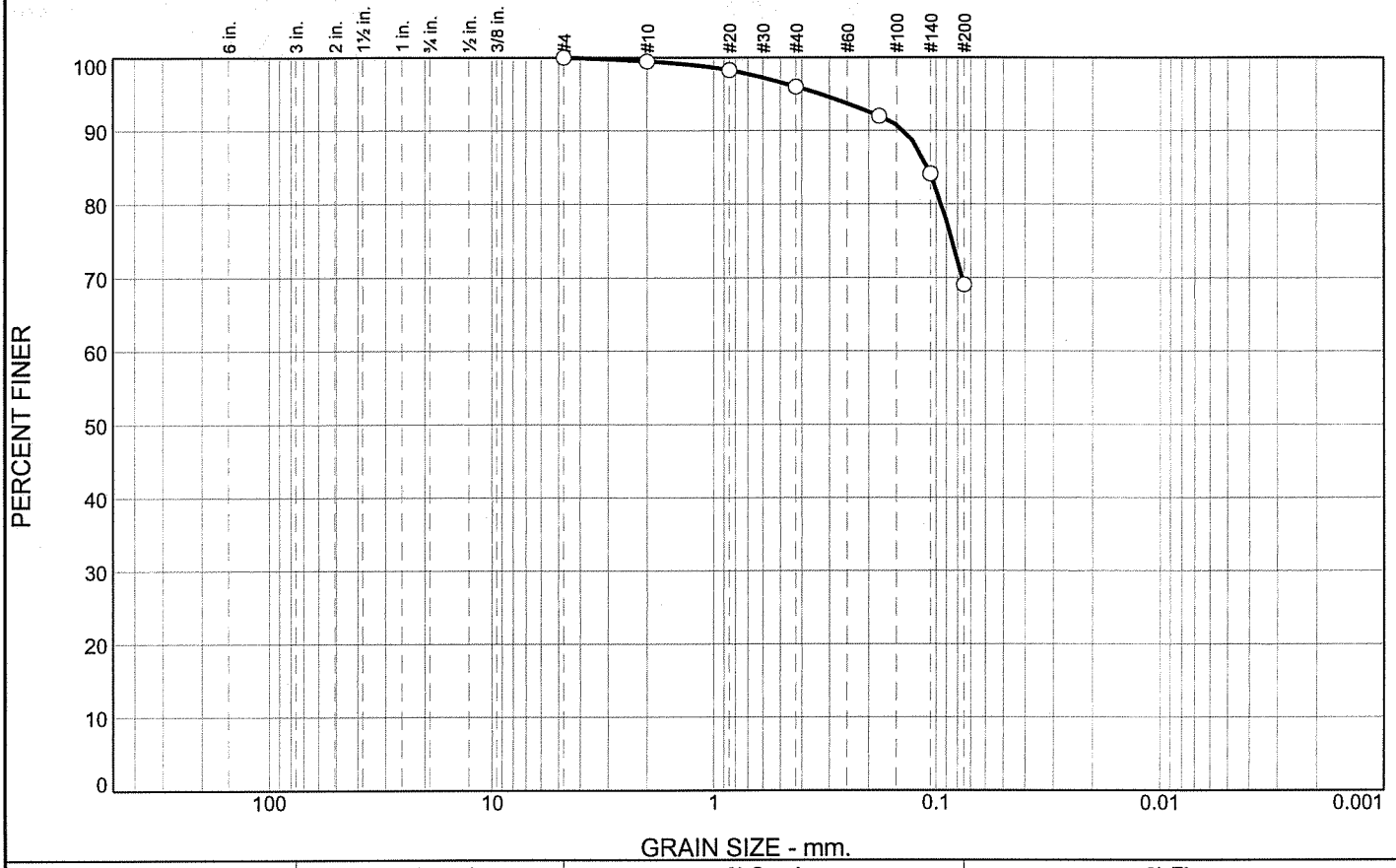
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11722e

Tested By: DCH/MCS **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	3.5	26.9	69.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.5		
#20	98.3		
#40	96.0		
#80	92.0		
#140	84.2		
#200	69.1		

* (no specification provided)

Soil Description

sandy silt

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 0.1089 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content: 22.2%

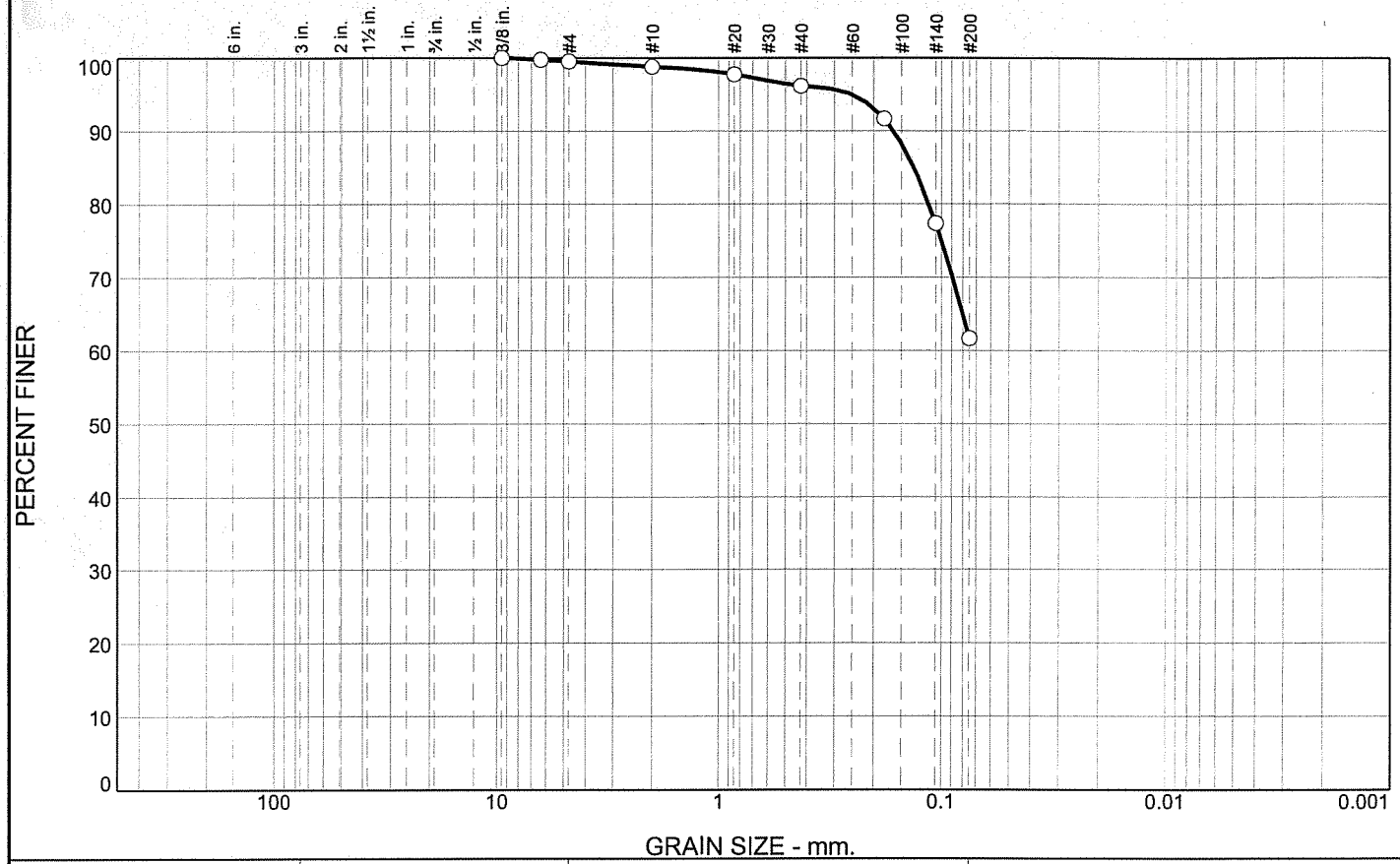
Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-508 **Elev./Depth:** 2'-4'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11723a

Tested By: GSM/JJH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.5	0.7	2.6	34.5	61.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
1/4"	99.8		
#4	99.5		
#10	98.8		
#20	97.8		
#40	96.2		
#80	91.7		
#140	77.4		
#200	61.7		

* (no specification provided)

Soil Description

sandy silt

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 0.1327 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content: 23.1%

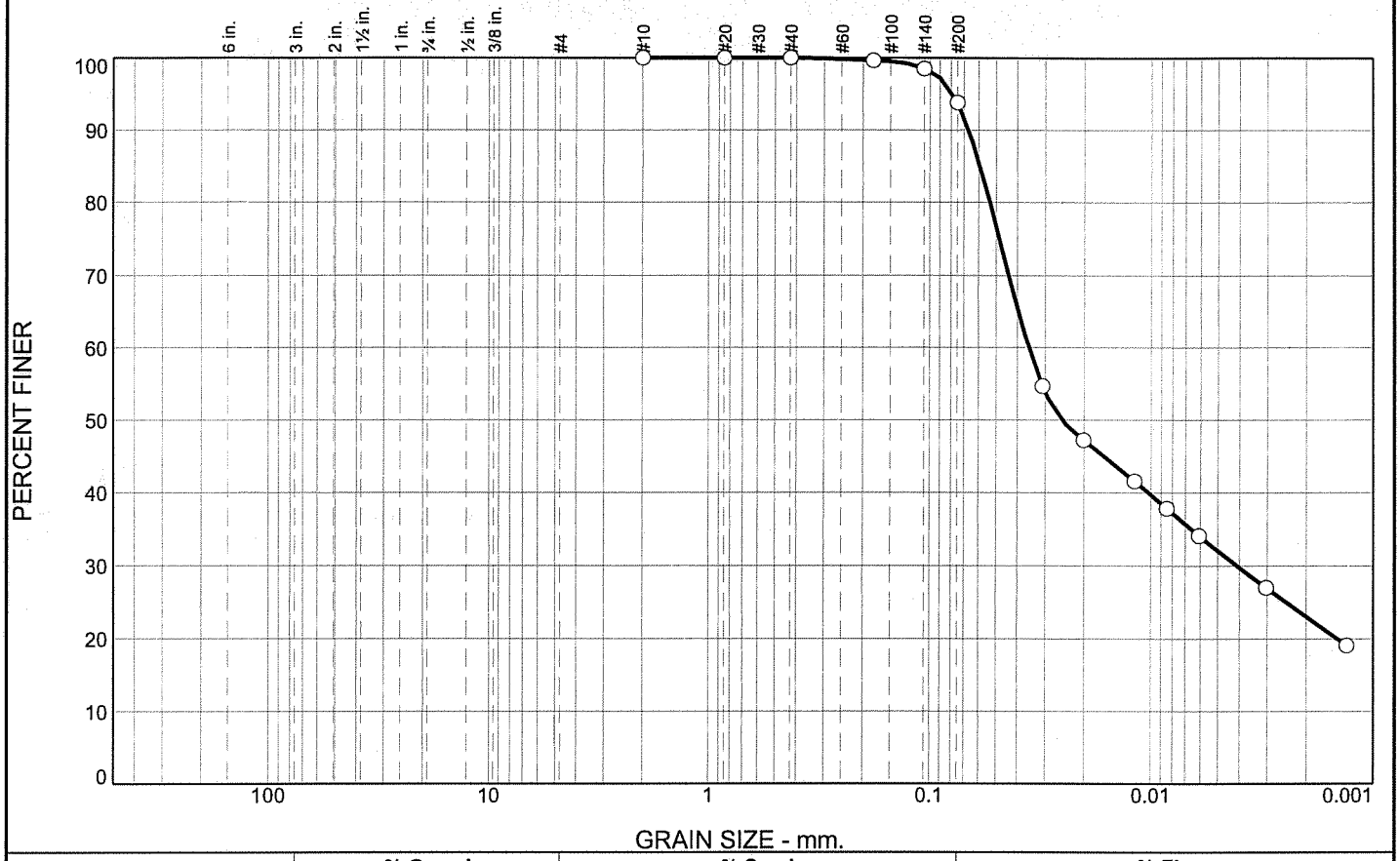
Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-508 **Elev./Depth:** 5'-6.7'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11723b

Tested By: GSM'JJH **Checked By:** MTG MTG

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	6.2	61.8	32.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#80	99.6		
#140	98.5		
#200	93.8		
0.0308 mm.	54.7		
0.0201 mm.	47.2		
0.0119 mm.	41.6		
0.0085 mm.	37.9		
0.0061 mm.	34.1		
0.0030 mm.	27.0		
0.0013 mm.	19.1		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 18 LL= 29 PI= 11

Coefficients

D_{85}= 0.0592 D_{60}= 0.0355 D_{50}= 0.0251
D_{30}= 0.0041 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Moisture Content: 22.8%

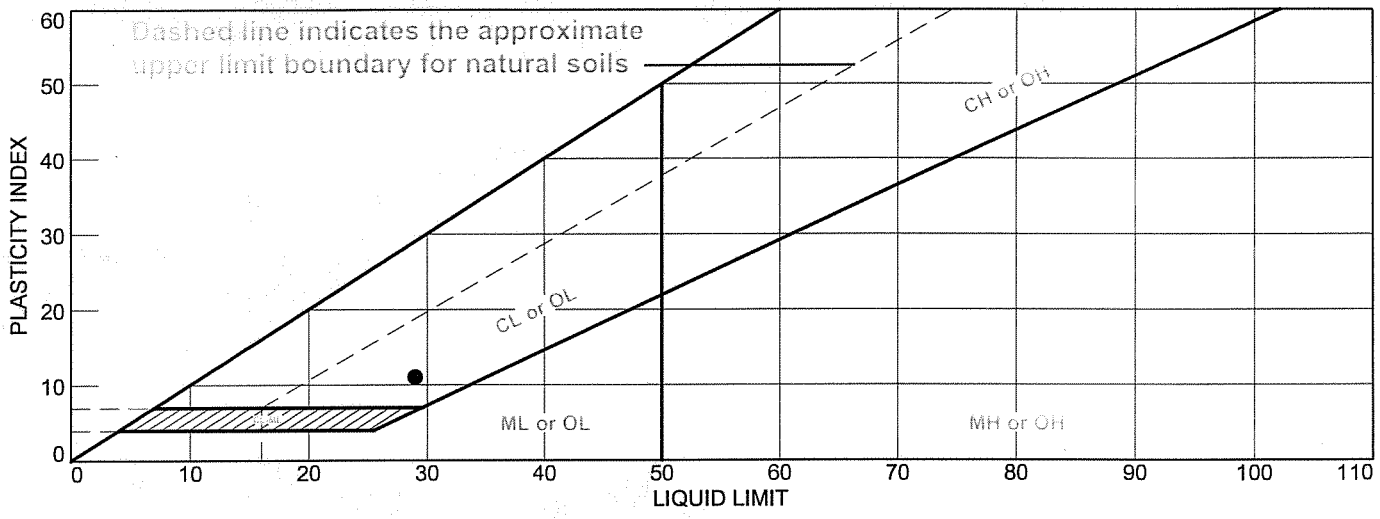
Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-510 **Elev./Depth:** 2'-4'

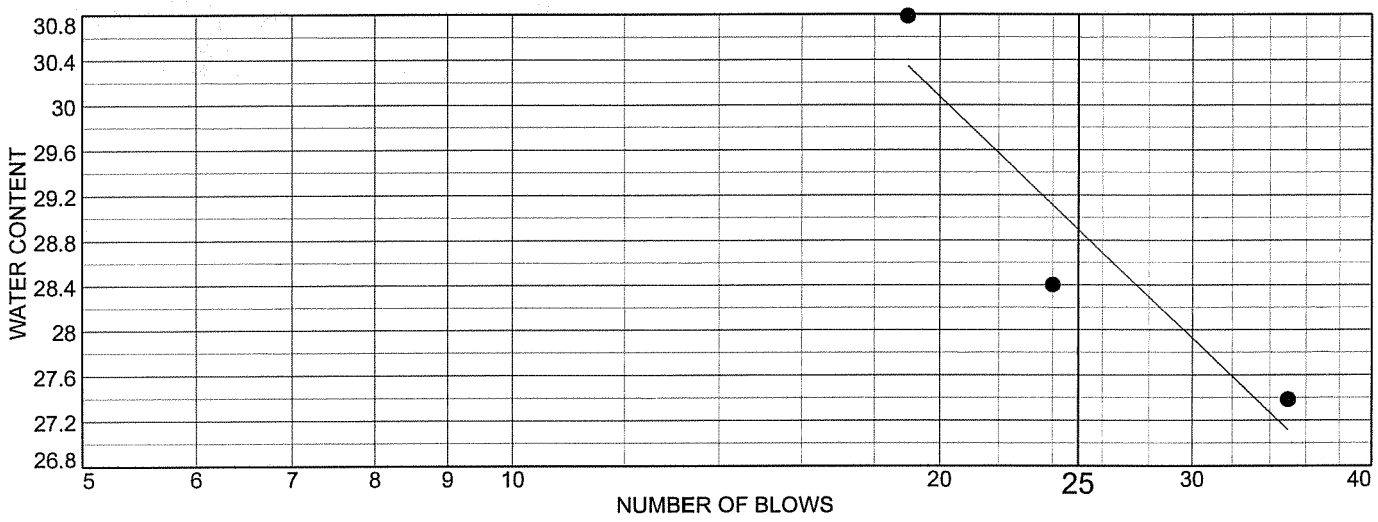
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11723c

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	29	18	11	100.0	93.8	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-510 **Depth:** 2'-4' **Sample Number:** 2D

Remarks:

● Moisture Content: 22.8%

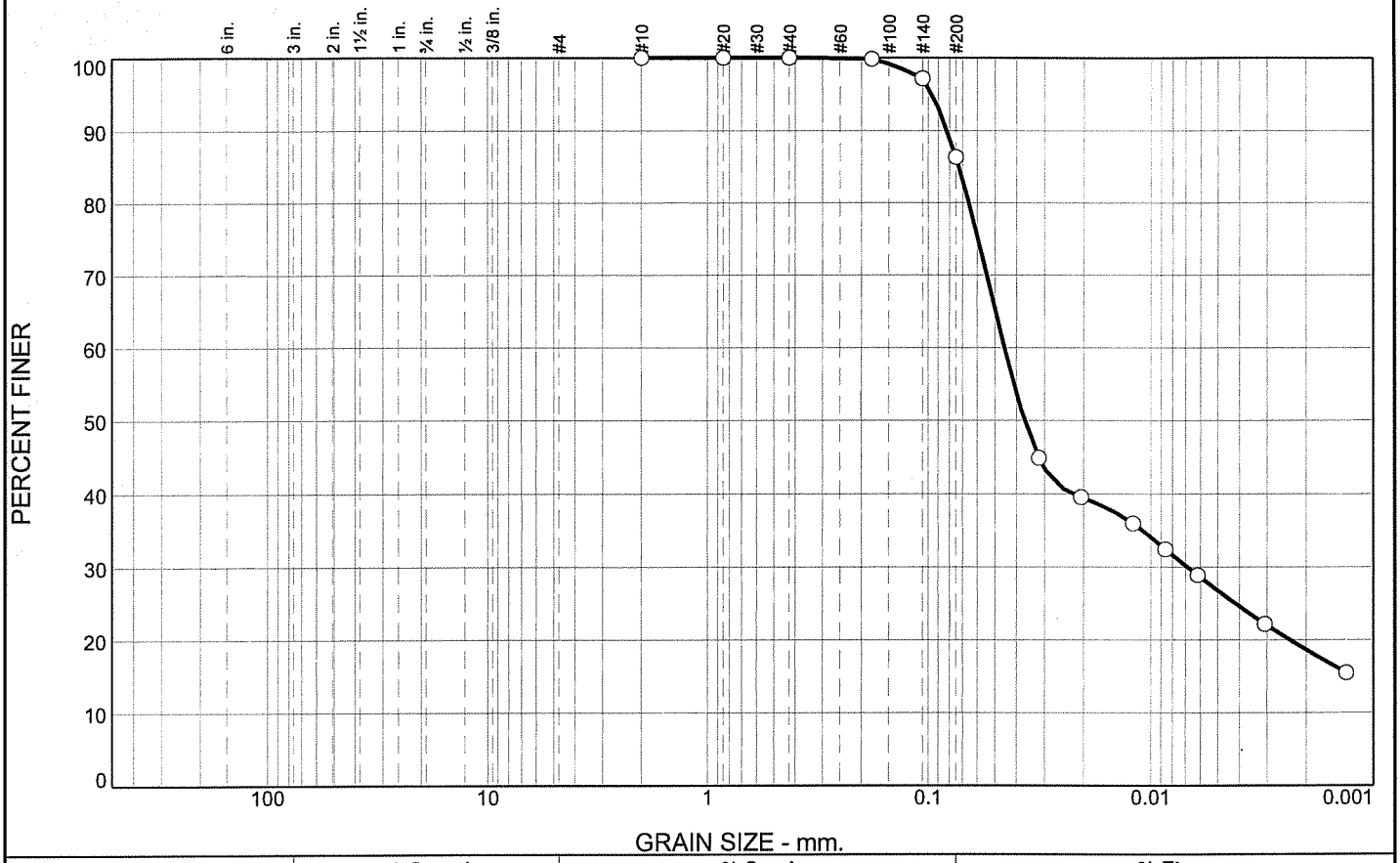
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11723c

Tested By: DCH/MCS **Checked By:** MTG MTG

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	13.6	59.7	26.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#80	99.8		
#140	97.1		
#200	86.4		
0.0318 mm.	44.9		
0.0205 mm.	39.6		
0.0120 mm.	36.0		
0.0086 mm.	32.4		
0.0062 mm.	28.9		
0.0031 mm.	22.1		
0.0013 mm.	15.5		

* (no specification provided)

Soil Description

silty clay

Atterberg Limits

PL= 18 LL= 25 PI= 7

Coefficients

D_{85}= 0.0727 D_{60}= 0.0454 D_{50}= 0.0368
D_{30}= 0.0069 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(4)

Remarks

Moisture Content: 23.2%

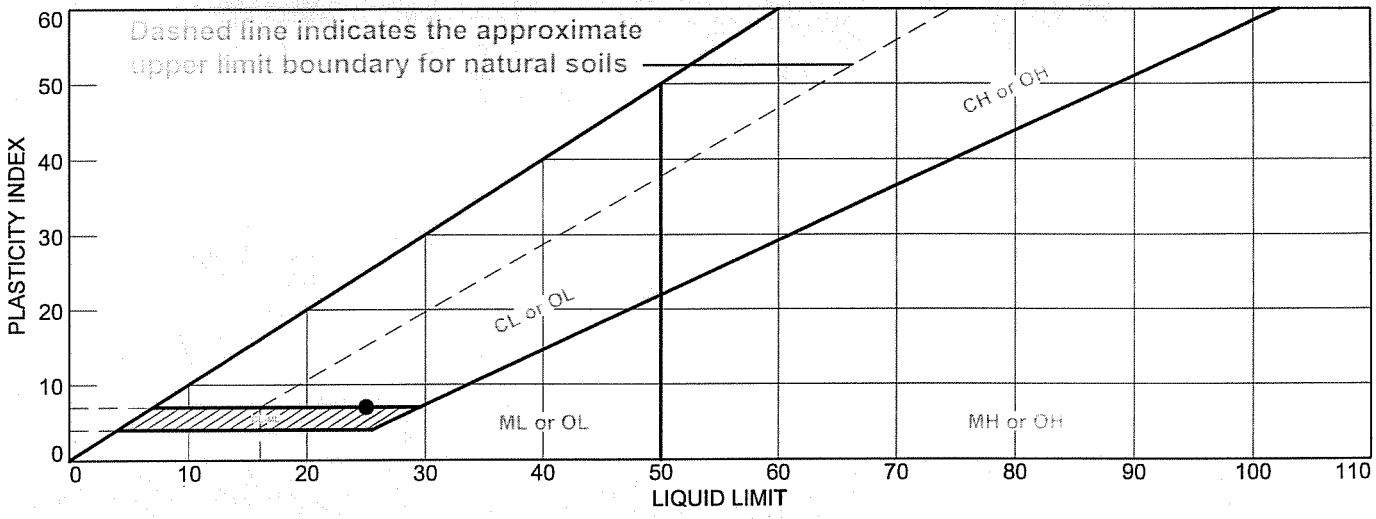
Sample No.: 3D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-510 **Elev./Depth:** 4'-6'

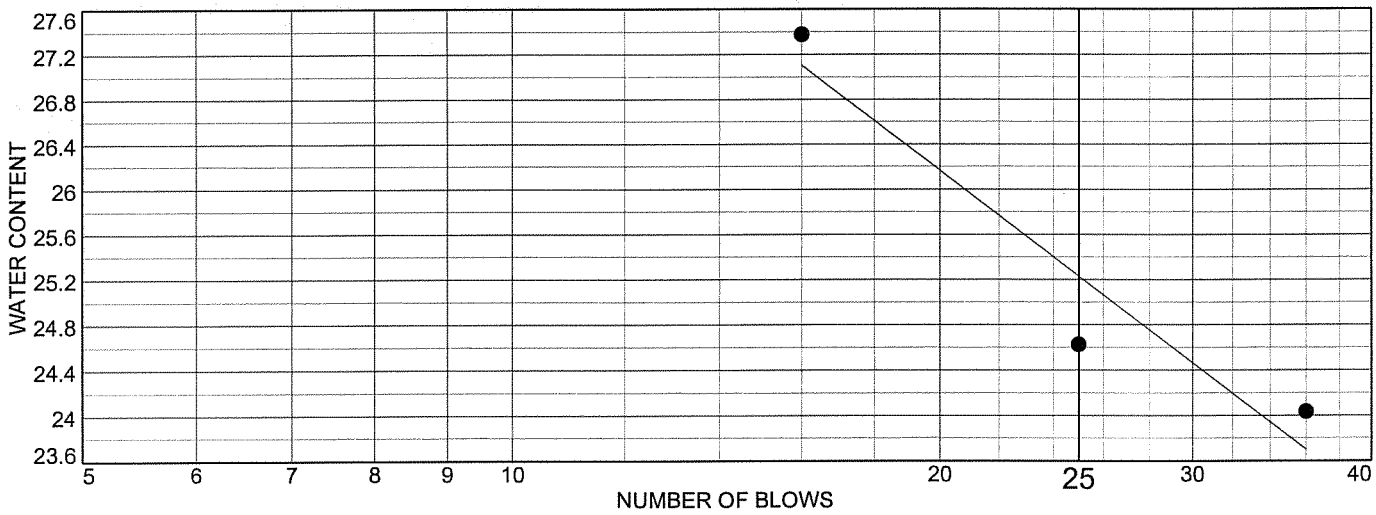
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11723d

Tested By: DCH/JJH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	silty clay	25	18	7	100.0	86.4	CL-ML

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00

● **Location:** HB-YA-510 **Depth:** 4'-6' **Sample Number:** 3D

Remarks:

● Moisture Content: 23.2%

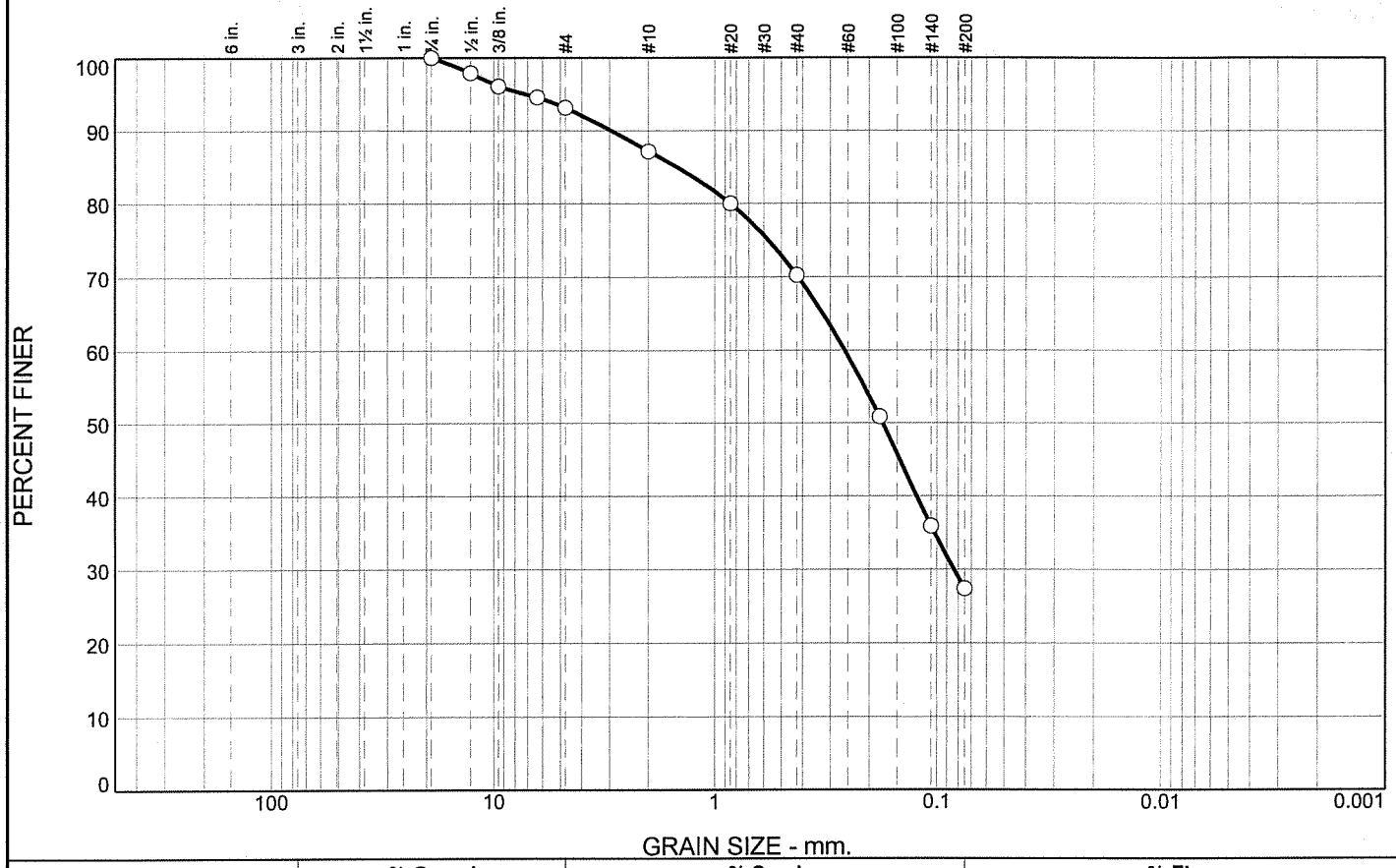
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11723d

Tested By: DCH/MCS **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.9	5.9	17.0	42.8	27.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	97.9		
3/8"	96.1		
1/4"	94.6		
#4	93.1		
#10	87.2		
#20	80.0		
#40	70.2		
#80	50.9		
#140	35.9		
#200	27.4		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 1.4863 D_{60}= 0.2574 D_{50}= 0.1743
D_{30}= 0.0837 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 12.9%

Sample No.: 2D **Source of Sample:** Proposed Interchange Improvements **Date:** 4/7/2011
Location: HB-YA-511 **Elev./Depth:** 2'-4'

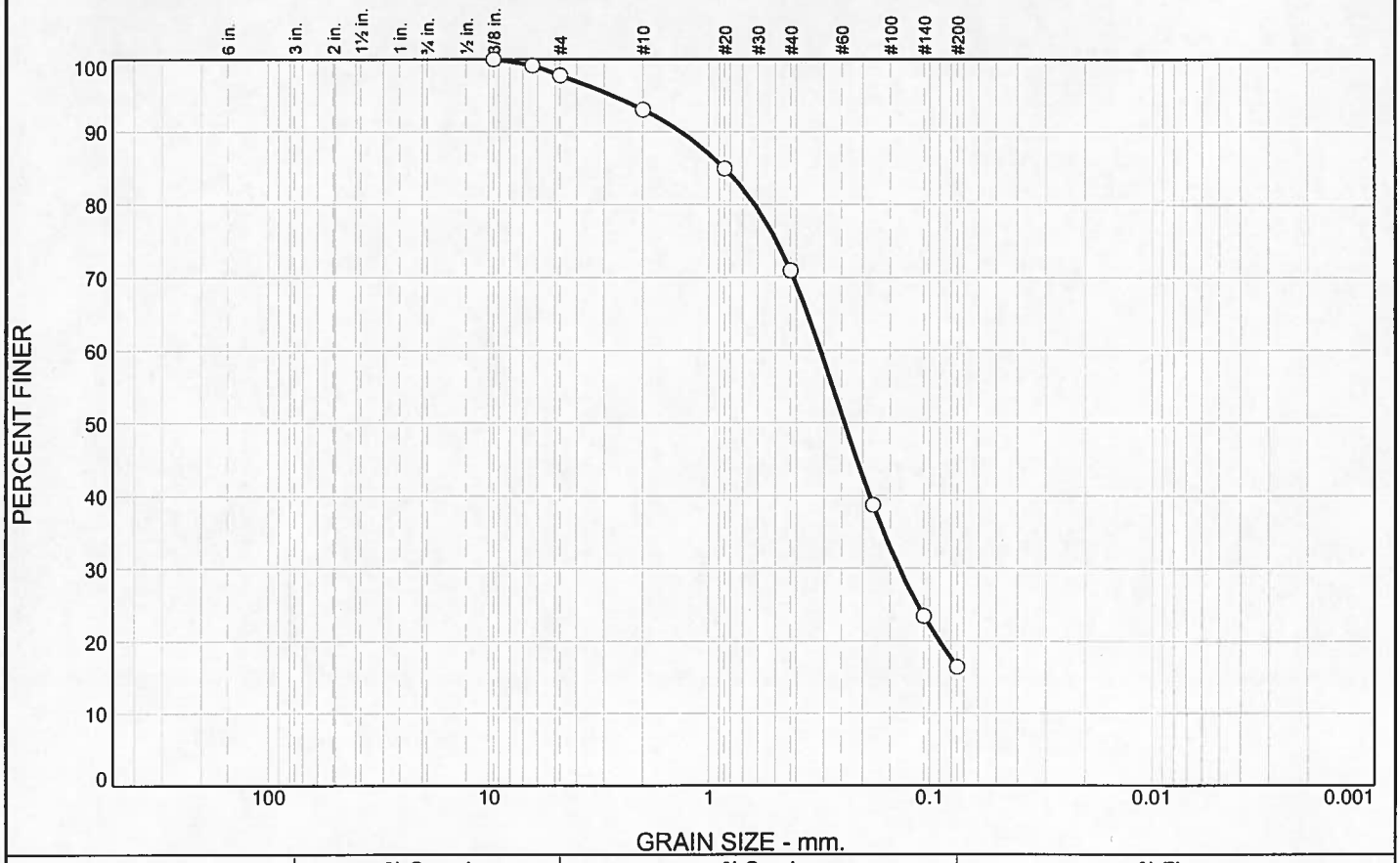
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN# 11086.00
Project No: 956-11 **Lab No.** 11723e

Tested By: GSM/JJH **Checked By:** MTG

Park and Ride Facility
Laboratory Test Results
(HB-YA-600 series)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	4.8	22.1	54.5	16.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
1/4"	99.1		
#4	97.8		
#10	93.0		
#20	84.9		
#40	70.9		
#80	38.7		
#140	23.4		
#200	16.4		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 0.8539 D_{60}= 0.3112 D_{50}= 0.2419
D_{30}= 0.1371 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 36.1%

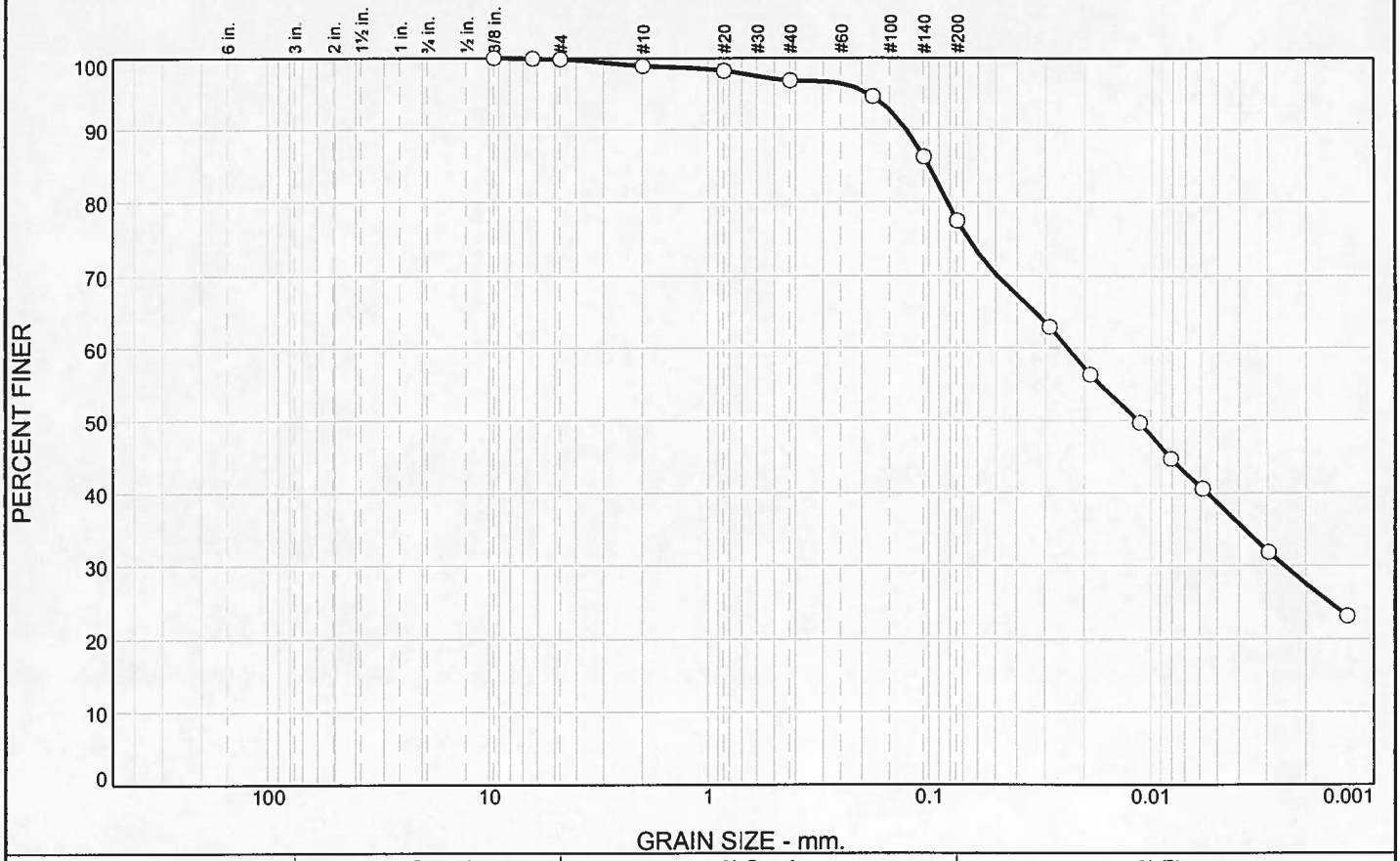
Sample No.: 1D **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-603 **Elev./Depth:** 0-2'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00
Project No: 956-11 **Lab No.** 11713a

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.9	2.0	19.4	38.9	38.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
1/4"	99.9		
#4	99.8		
#10	98.9		
#20	98.2		
#40	96.9		
#80	94.7		
#140	86.3		
#200	77.5		
0.0288 mm.	63.0		
0.0189 mm.	56.4		
0.0113 mm.	49.7		
0.0082 mm.	44.8		
0.0059 mm.	40.6		
0.0030 mm.	31.9		
0.0013 mm.	23.2		

* (no specification provided)

Soil Description

lean clay with sand

Atterberg Limits

PL= 20 LL= 33 PI= 13

Coefficients

D_{85}= 0.1005 D_{60}= 0.0239 D_{50}= 0.0115
D_{30}= 0.0025 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Moisture Content: 22.8%

Sample No.: 2D+3D+4D **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-603 **Elev./Depth:** 2'-8'

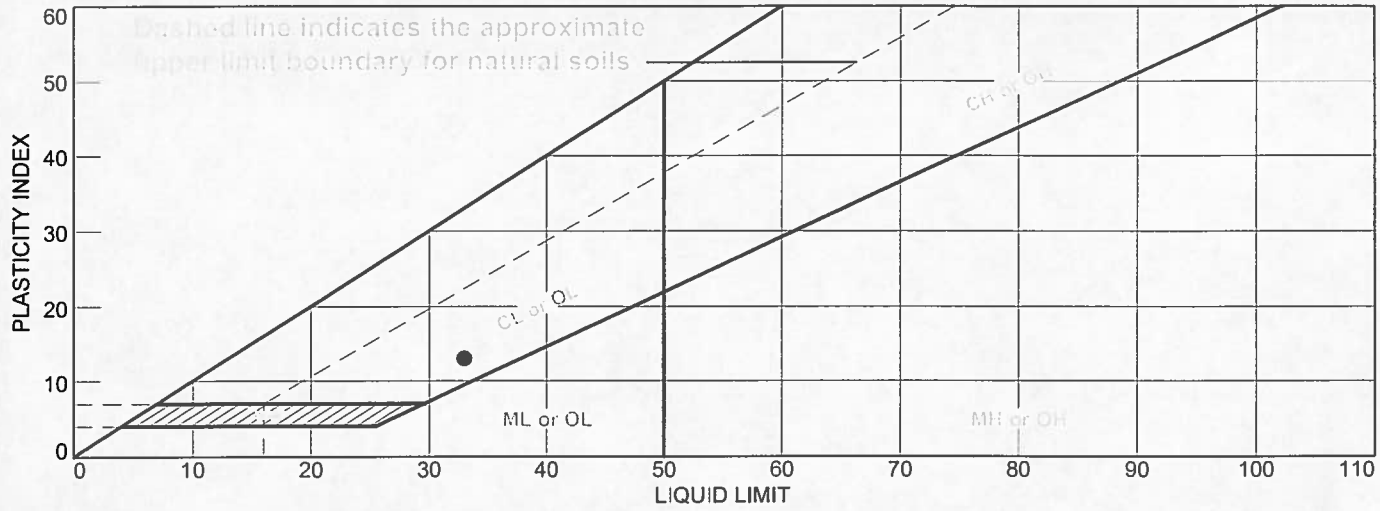
R.W. Gillespie & Associates, Inc.
Saco, Maine

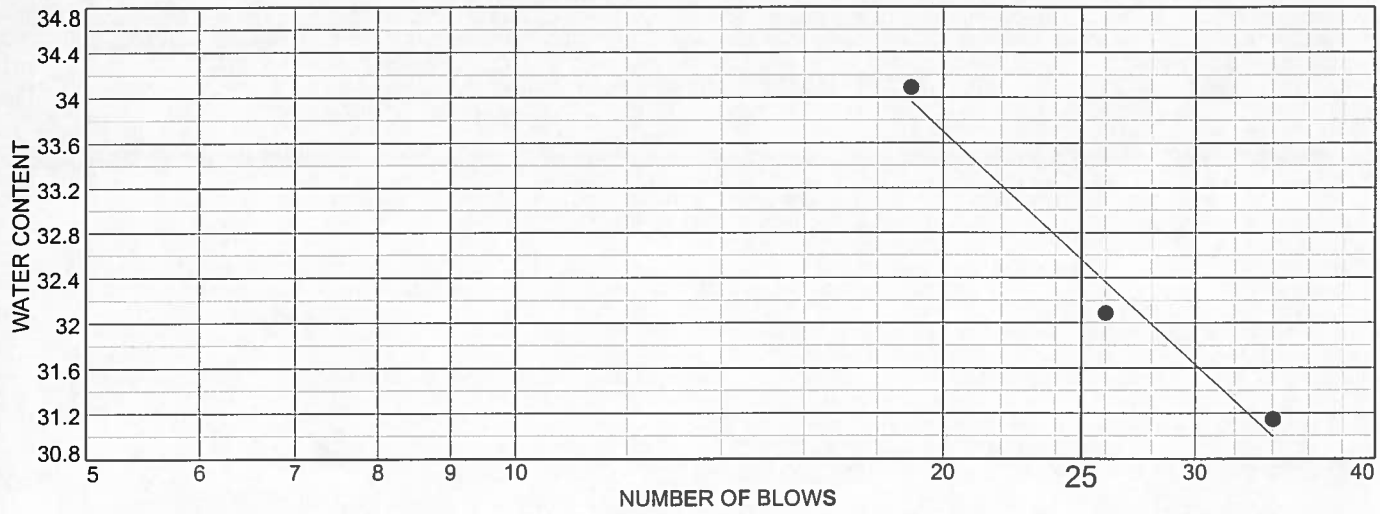
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00

Project No: 956-11 **Lab No.** 11713b

Tested By: JJH/DCH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay with sand	33	20	13	96.9	77.5	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN#17490.00

● **Location:** HB-YA-603 **Depth:** 2'-8' **Sample Number:** 2D+3D+4D

Remarks:

● Moisture Content: 22.8%

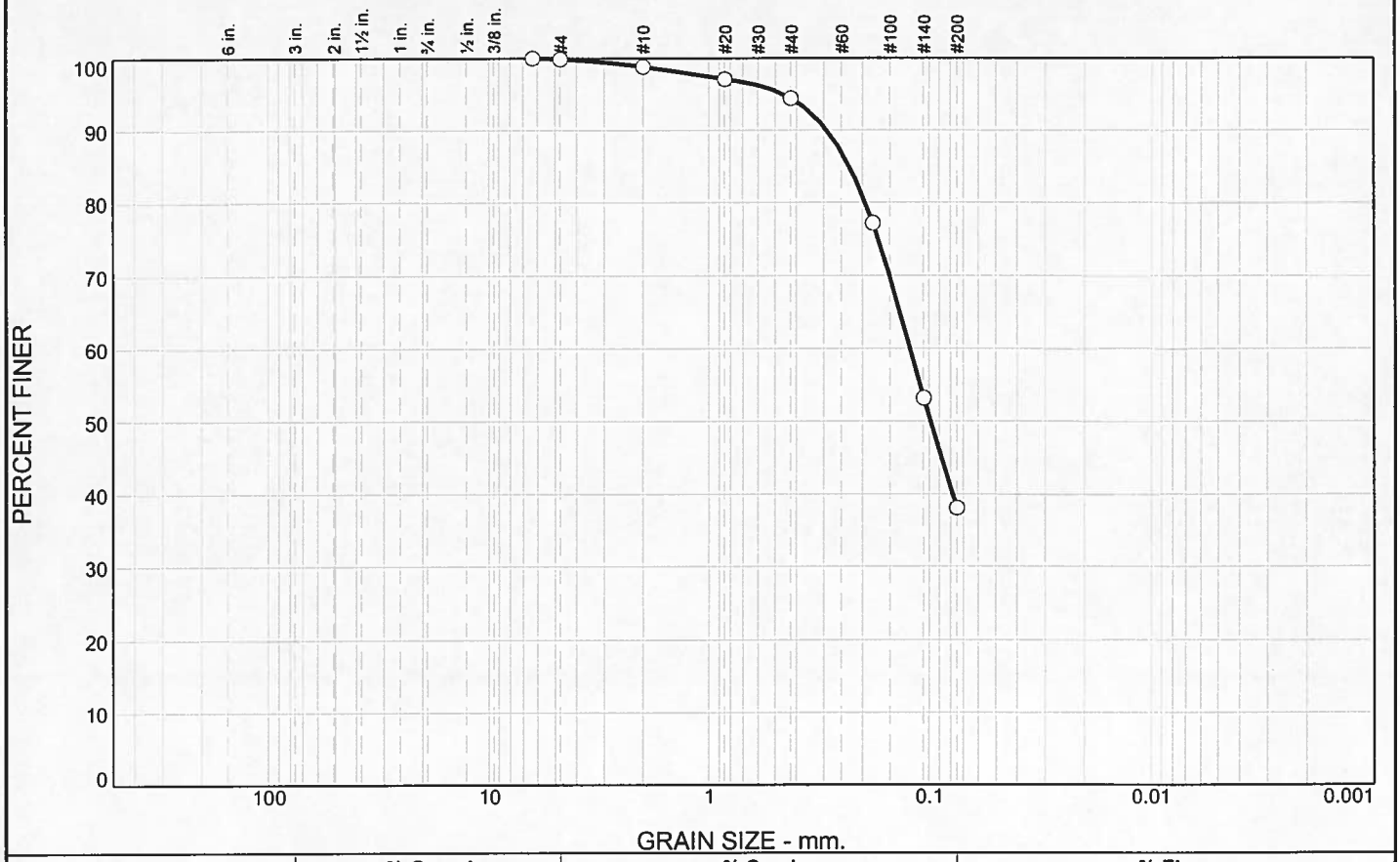
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11713b

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	1.1	4.4	56.3	38.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/4"	100.0		
#4	99.9		
#10	98.8		
#20	97.1		
#40	94.4		
#80	77.2		
#140	53.2		
#200	38.1		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 0.2305 D_{60}= 0.1224 D_{50}= 0.0988
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Moisture Content: 23.6%

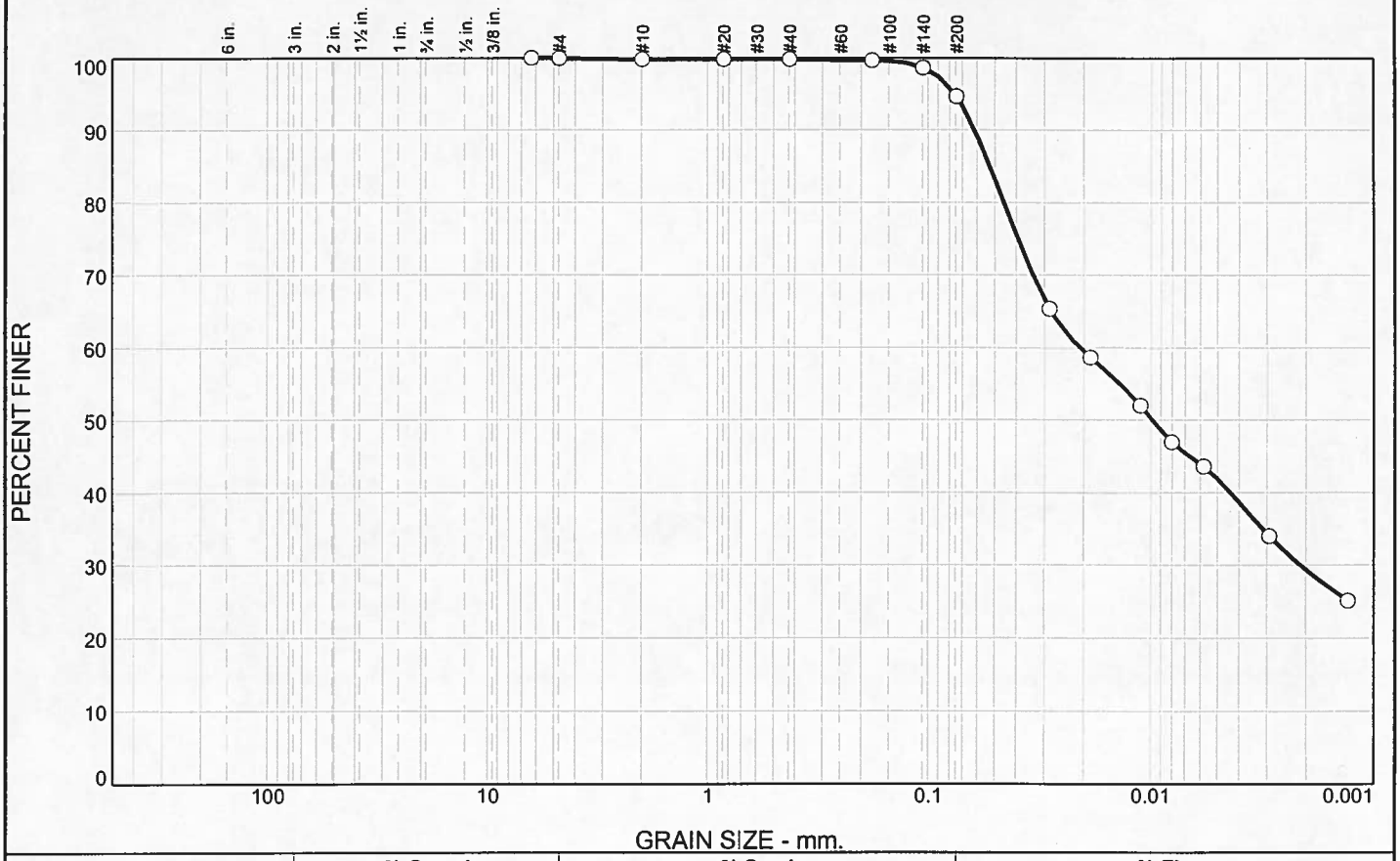
Sample No.: ID **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-604 **Elev./Depth:** 0-2'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00
Project No: 956-11 **Lab No.** 11713c

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	0.0	5.1	52.9	41.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/4"	100.0		
#4	99.9		
#10	99.8		
#20	99.8		
#40	99.8		
#80	99.6		
#140	98.6		
#200	94.7		
0.0286 mm.	65.4		
0.0187 mm.	58.7		
0.0112 mm.	52.0		
0.0081 mm.	47.0		
0.0058 mm.	43.7		
0.0029 mm.	34.0		
0.0013 mm.	25.1		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 20 LL= 36 PI= 16

Coefficients

D_{85}= 0.0527 D_{60}= 0.0208 D_{50}= 0.0099
D_{30}= 0.0021 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(16)

Remarks

Moisture Content: 23.8%

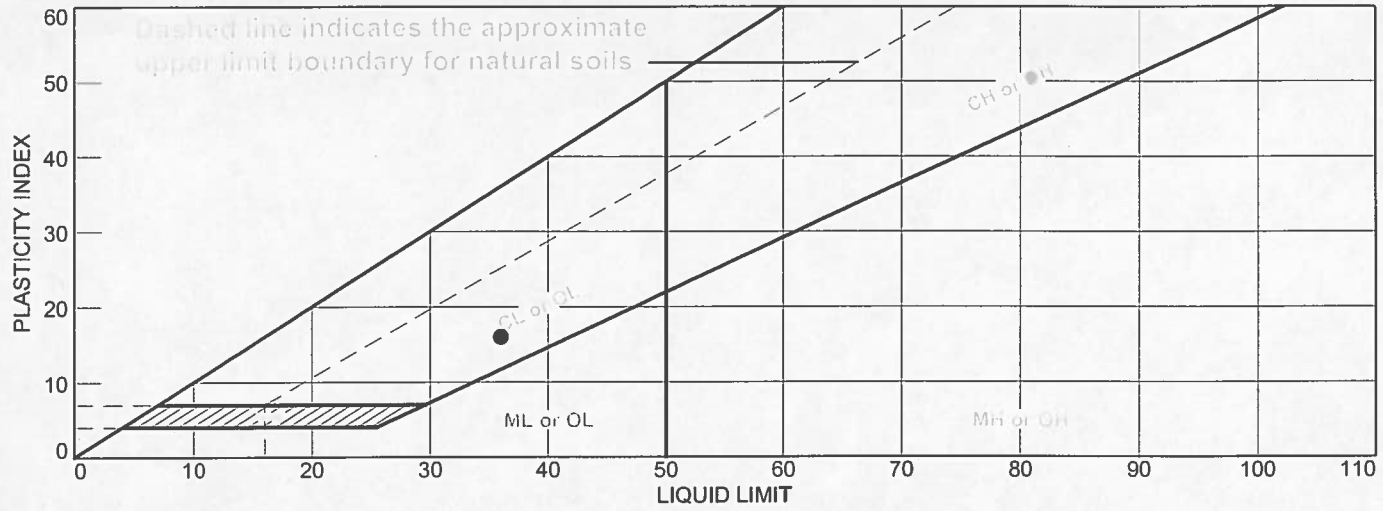
Sample No.: 3D **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-604 **Elev./Depth:** 4'-6'

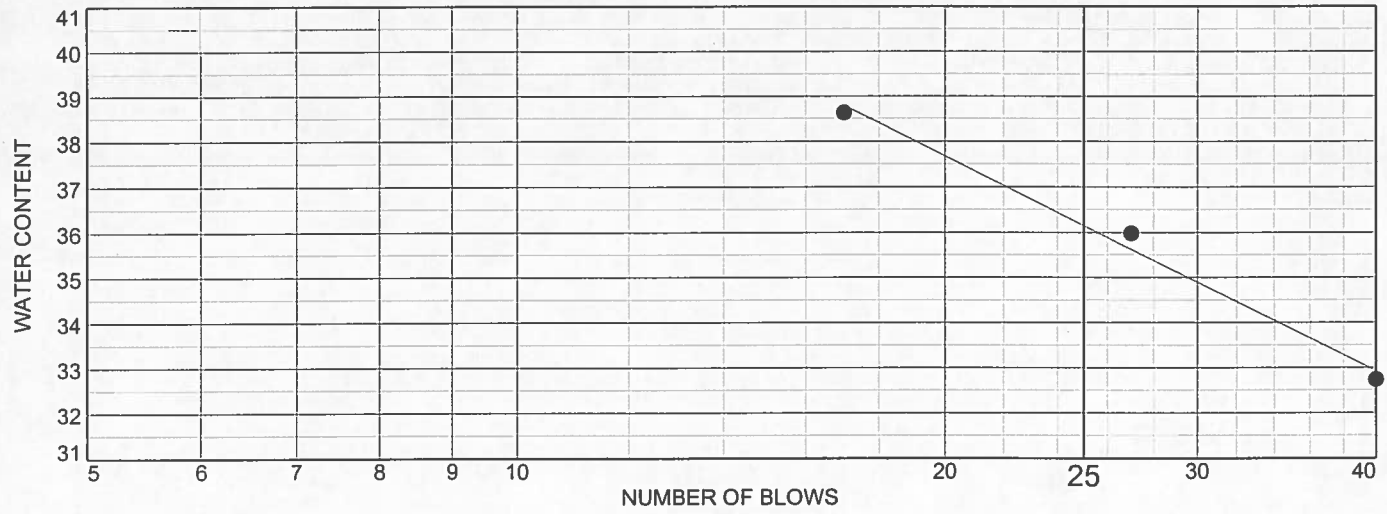
R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00
Project No: 956-11 **Lab No.** 11713d

Tested By: JJH/DCH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	36	20	16	99.8	94.7	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN#17490.00

● **Location:** HB-YA-604 **Depth:** 4'-6' **Sample Number:** 3D

Remarks:

● Moisture Content: 23.8%

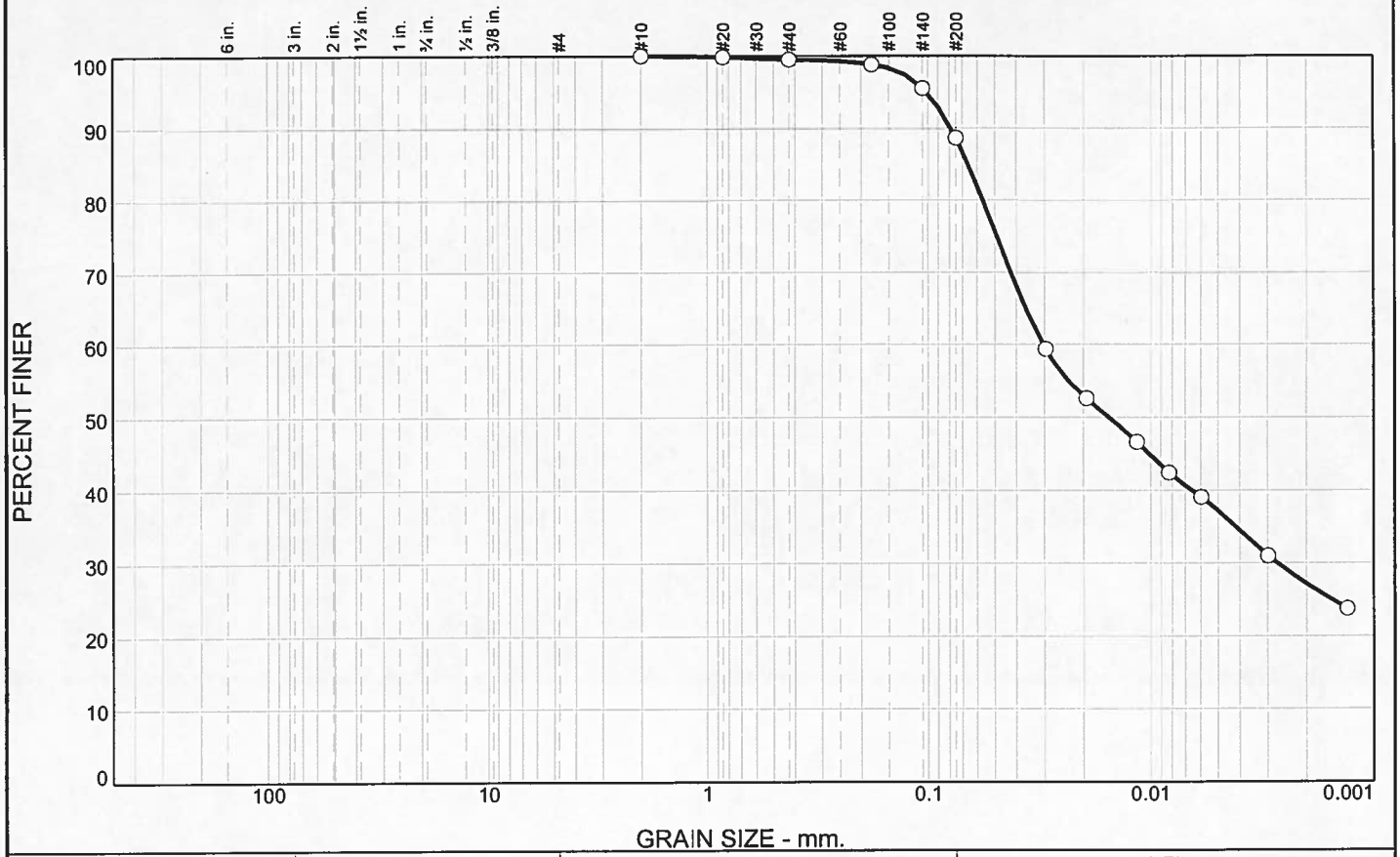
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11713d

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	10.8	51.6	37.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	99.5		
#80	98.8		
#140	95.5		
#200	88.7		
0.0296 mm.	59.4		
0.0194 mm.	52.6		
0.0115 mm.	46.7		
0.0083 mm.	42.4		
0.0059 mm.	39.0		
0.0030 mm.	31.0		
0.0013 mm.	23.7		

* (no specification provided)

Soil Description

lean clay

Atterberg Limits

PL= 20 LL= 32 PI= 12

Coefficients

D_{85}= 0.0661 D_{60}= 0.0304 D_{50}= 0.0153
D_{30}= 0.0027 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

Moisture Content: 23.1%

Sample No.: 2D+3D **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-606 **Elev./Depth:** 2'-6'

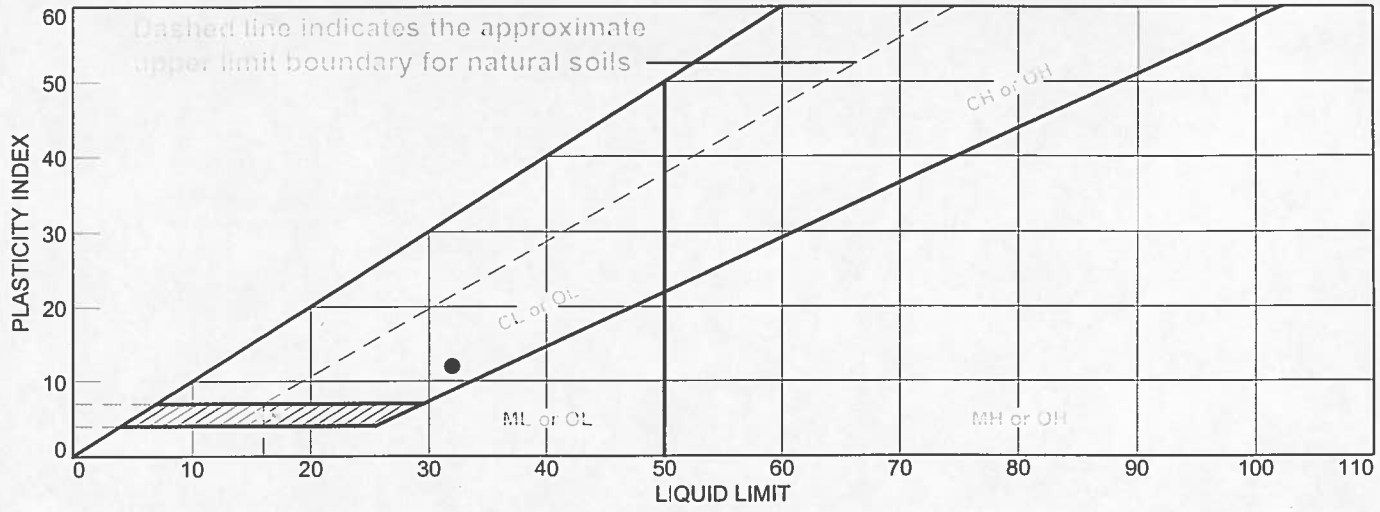
R.W. Gillespie & Associates, Inc.
Saco, Maine

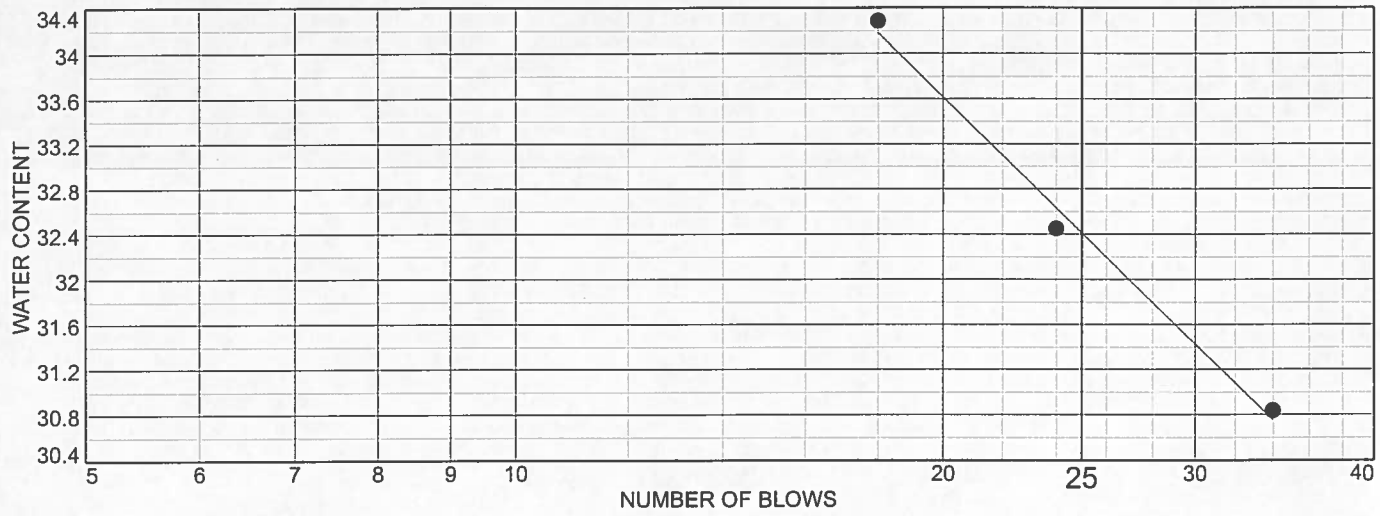
Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00

Project No: 956-11 **Lab No.** 11714a

Tested By: JJH/DCH **Checked By:** MTG MTG

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	lean clay	32	20	12	99.5	88.7	CL

Project No. 956-11 **Client:** Haley & Aldrich, Inc.

Project: Misc. Testing 2011 - MaineDOT PIN#17490.00

● **Location:** HB-YA-606 **Depth:** 2'-6' **Sample Number:** 2D+3D

Remarks:

● Moisture Content: 23.1%

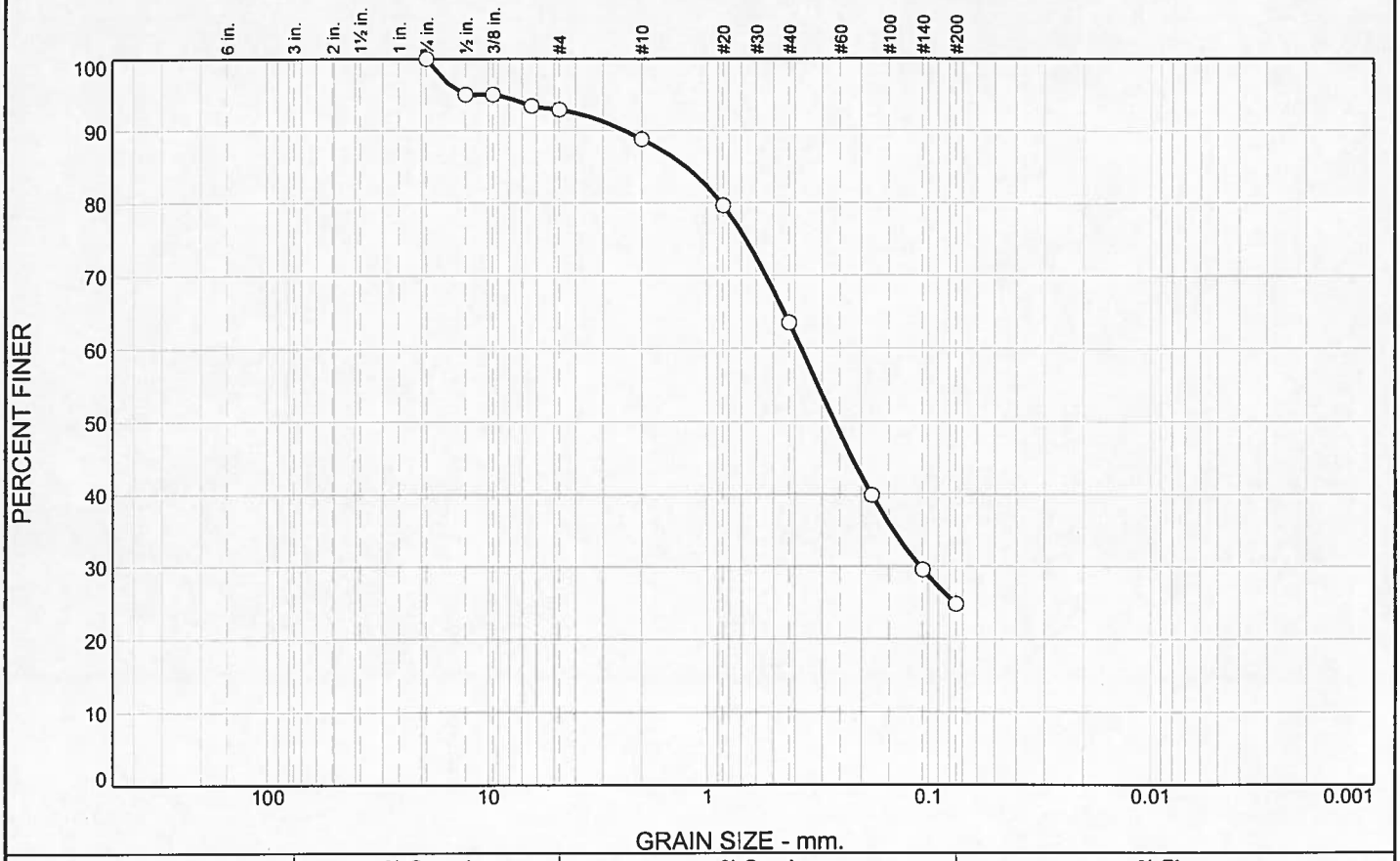
R.W. Gillespie & Associates, Inc.

Saco, Maine

Lab No. 11714a

Tested By: DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.1	4.1	25.3	38.7	24.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	95.0		
3/8"	95.0		
1/4"	93.5		
#4	92.9		
#10	88.8		
#20	79.6		
#40	63.5		
#80	39.8		
#140	29.5		
#200	24.8		

* (no specification provided)

Soil Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 1.2605 D_{60}= 0.3753 D_{50}= 0.2646
D_{30}= 0.1097 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 24.6%

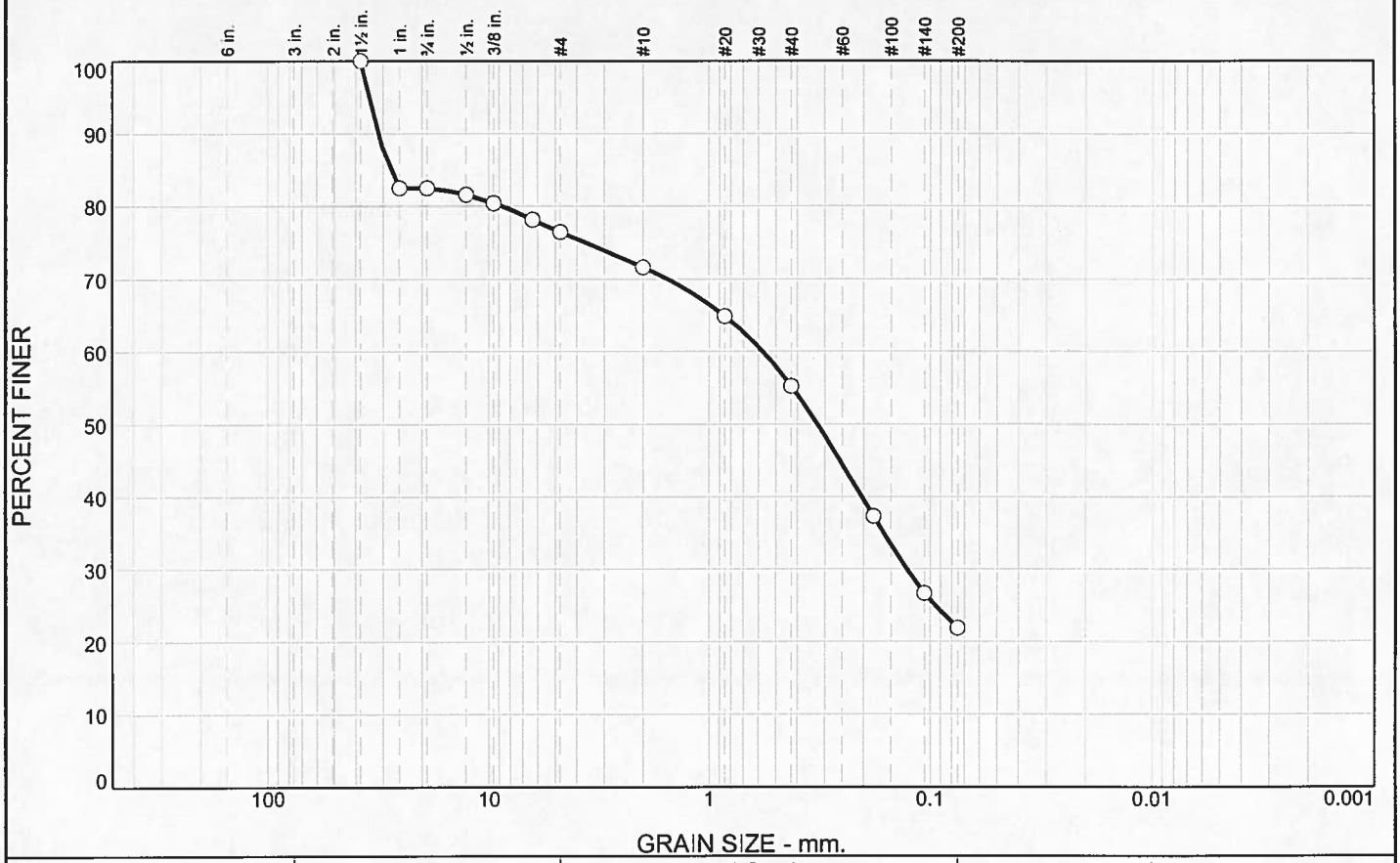
Sample No.: ID **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-607 **Elev./Depth:** 0-2'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00
Project No: 956-11 **Lab No.** 11714b

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	17.5	6.0	4.9	16.4	33.4	21.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	82.5		
3/4"	82.5		
1/2"	81.6		
3/8"	80.4		
1/4"	78.2		
#4	76.5		
#10	71.6		
#20	64.9		
#40	55.2		
#80	37.3		
#140	26.7		
#200	21.8		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 28.0633 D_{60}= 0.5726 D_{50}= 0.3230
D_{30}= 0.1275 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Moisture Content: 9.1%

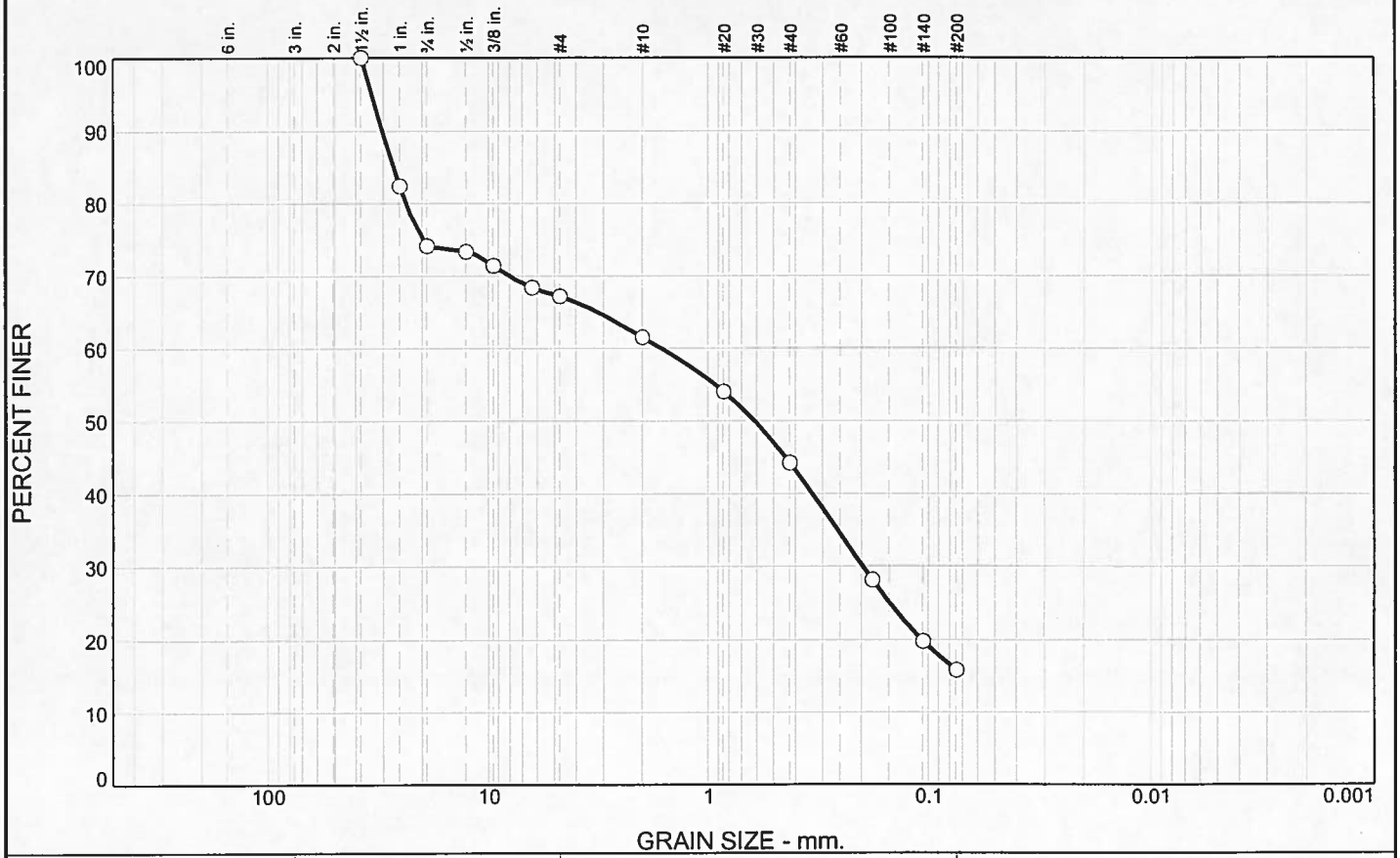
Sample No.: 2D **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-607 **Elev./Depth:** 2'-4'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00
Project No: 956-11 **Lab No.** 11714c

Tested By: JJH/DCH **Checked By:** MTG MTG

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	26.0	6.9	5.7	17.2	28.5	15.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100.0		
1"	82.3		
3/4"	74.0		
1/2"	73.3		
3/8"	71.3		
1/4"	68.3		
#4	67.1		
#10	61.4		
#20	53.9		
#40	44.2		
#80	28.1		
#140	19.7		
#200	15.7		

* (no specification provided)

Soil Description

silty sand with gravel

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{85}= 27.1743 D_{60}= 1.6649 D_{50}= 0.6193
D_{30}= 0.1996 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Moisture Content: 8.0%

Sample No.: 3D **Source of Sample:** Proposed Park & Ride Facility **Date:** 3/31/2011
Location: HB-YA-607 **Elev./Depth:** 5'-7'

R.W. Gillespie & Associates, Inc.
Saco, Maine

Client: Haley & Aldrich, Inc.
Project: Misc. Testing 2011 - MaineDOT PIN#17490.00

Project No: 956-11 **Lab No.** 11714d

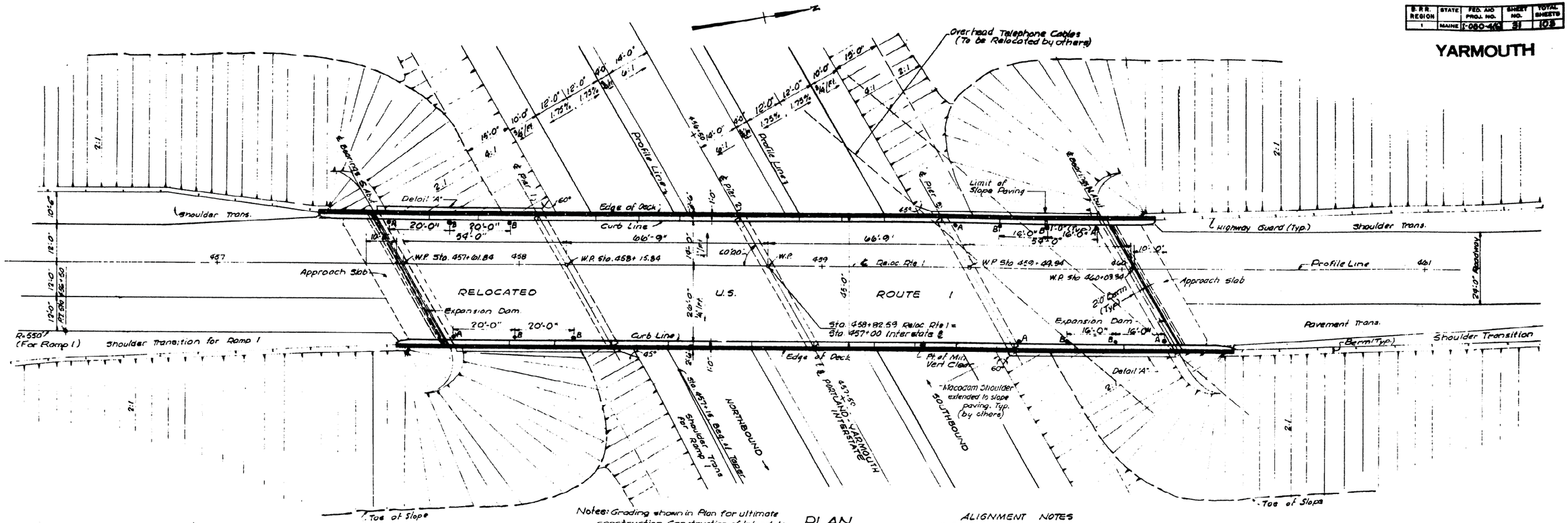
Tested By: JJH/DCH **Checked By:** MTG MTG

APPENDIX F

Existing Route 1 Overpass
Bridge Drawings

B.R.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-080-4(4)	31	103

YARMOUTH

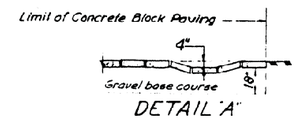


PLAN
Scale: 1" = 1'-0"

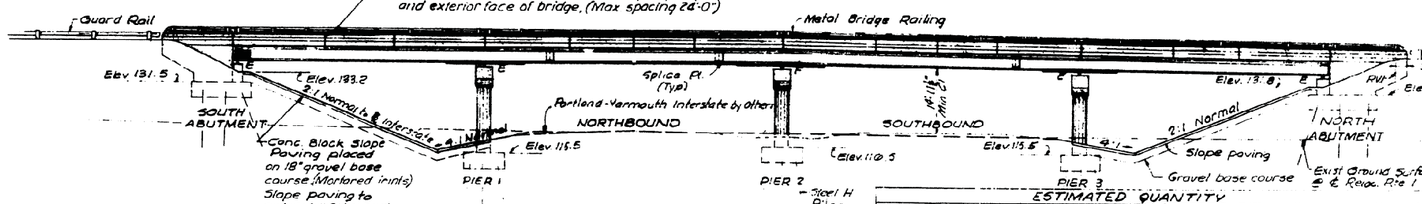
Notes: Grading shown in Plan for ultimate construction. Construction of Interstate not in this contract.
- •A denotes Type A Scupper
- •B denotes Type B Scupper

ALIGNMENT NOTES

1. All Piers and Abutments are parallel to Portland - Yarmouth Interstate ℄
2. All Stringers and Wingwalls are parallel to ℄ Reloc Rte 1

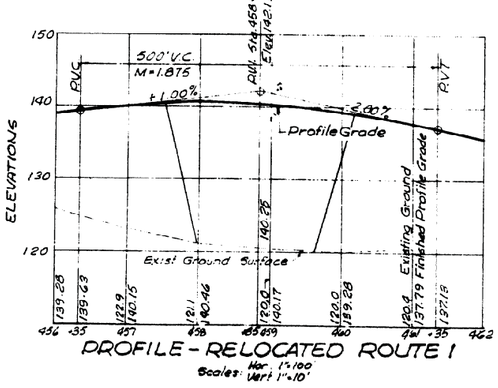


DETAIL 'A'

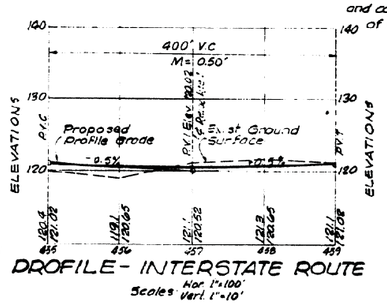


ELEVATION
Scale: 1" = 10'-0"

Notes.
Grading shown in Elevation for present construction.
Provide 1'-6" minimum cover over all footings.
Fill under abutments shall be placed and compacted to elevation of bottom of footings before piles are driven.



PROFILE - RELOCATED ROUTE 1
Scales: Hor. 1"=100' Vert 1"=10'



PROFILE - INTERSTATE ROUTE
Scales: Hor. 1"=100' Vert 1"=10'

GENERAL NOTES

1. SPECIFICATIONS: AASHO 1953 Maine State Highway Commission Standard Specifications and Special Provisions
2. LIVE LOAD H20-S16-44 Modified
3. FOUNDATIONS Steel H piles driven to firm, end bearing Design Capacity of Piles - 35 Tons
4. ALLOWABLE STRESSES
   Structural Steel, 18,000 p.s.i.
   Reinforcing Steel, 18,000 p.s.i.
   Concrete, 1,200 p.s.i.
5. CONCRETE: Class A, Footings, Piers, Abutments, Approach Slabs and Deck
6. ELEVATIONS: Elevations are based on Elev. 100.00 at Mean Sea Level

ESTIMATED QUANTITY

ITEM	DESCRIPTION	UNIT	QUANTITY
204-14	Structural Earth Excavation - Piers	C.Y.	385
302-1	Gravel Base Course - In Place Measurement	C.Y.	360
607-8	Reinforced Portland Cement Concrete Approach Slabs	S.Y.	90
404-28	Bituminous Concrete Surface Course, Type A	Ton	141
701-33	Portland Cement Concrete, Abutments and Retaining Walls	C.Y.	290
701-37	Portland Cement Concrete, Substructure Columns, Column Bases, Bents, Collision Walls, Girders, Struts, etc.	C.Y.	260
701-40	Portland Cement Concrete Roadway and Sidewalk Slabs on Steel Bridges	C.Y.	315
701-47	Portland Cement	Bbl.	1298
701-50	Wrought Iron Scuppers	Each	14
703-105	Structural Steel, Fabricated and Delivered	Lb.	280,000
703-104	Structural Steel, Erection	Lb.	280,000
705-13	Reinforcing Steel, Delivered	Lb.	150,000
705-14	Reinforcing Steel, Placing	Lb.	150,000
708-16	Steel H beam Piles 42 lbs/ft	L.F.	4,600
709-6	Membrane Waterproofing	S.Y.	1100
710-6	Waterproofing Joints	L.F.	45
806-6	French Drains	C.Y.	80
806-7	Aluminum Rail, Delivered and Erected	L.F.	555
907-12	Slope Paving for Bridge	S.Y.	650

DES.	PWA
DR.	J.McG
TR.	—
CHK.	RPK
APP'D	H.J.W

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

GENERAL PLAN AND ELEVATION

SHEET NO. 31 OF 103 | SCALE: AS NOTED

AS BUILT - NO REVISION

FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS BOSTON, MASS.

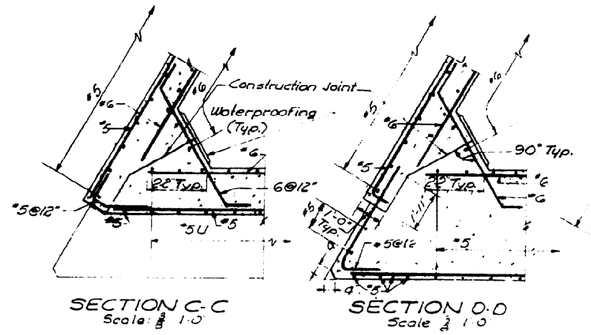
Qm-14 29

M-1085

Boston Blue Print-300-4-61

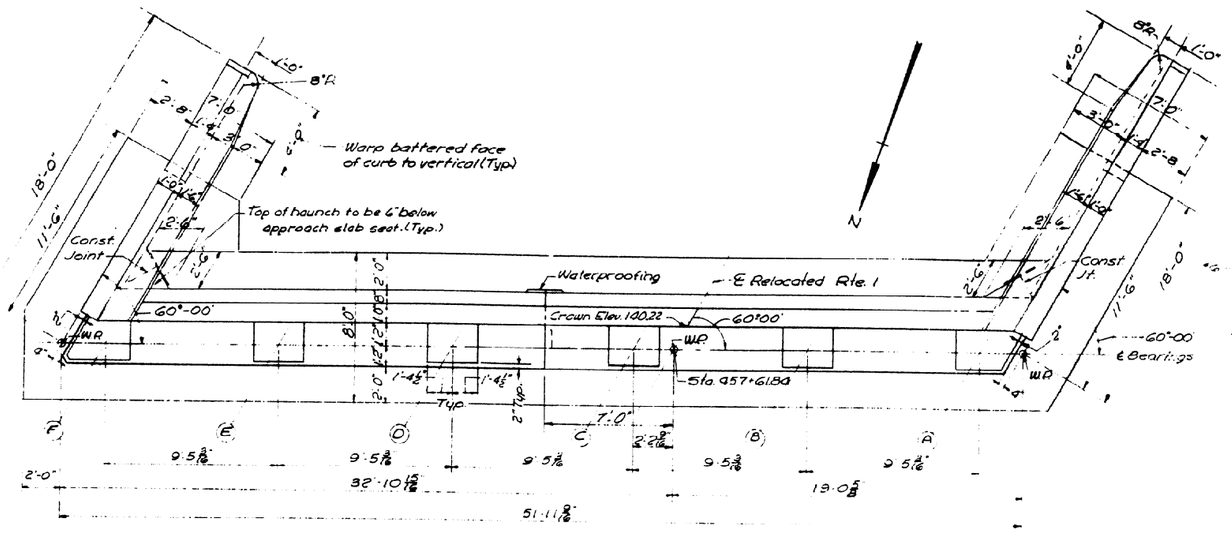
B.R.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-080-4(6)	32	103

YARMOUTH

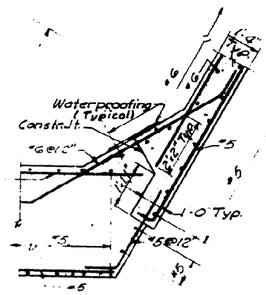


SECTION C-C
Scale: 3/8" 1'0

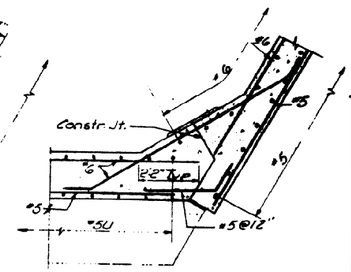
SECTION D-D
Scale 3/4" 1'0



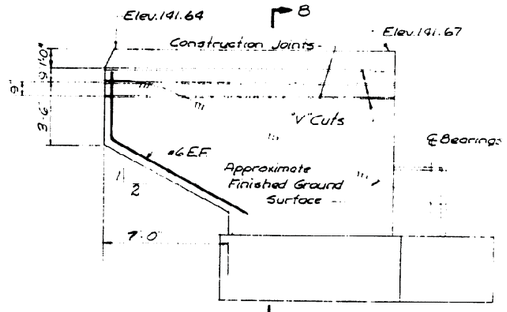
PLAN
Scale 1/4" 1'0"



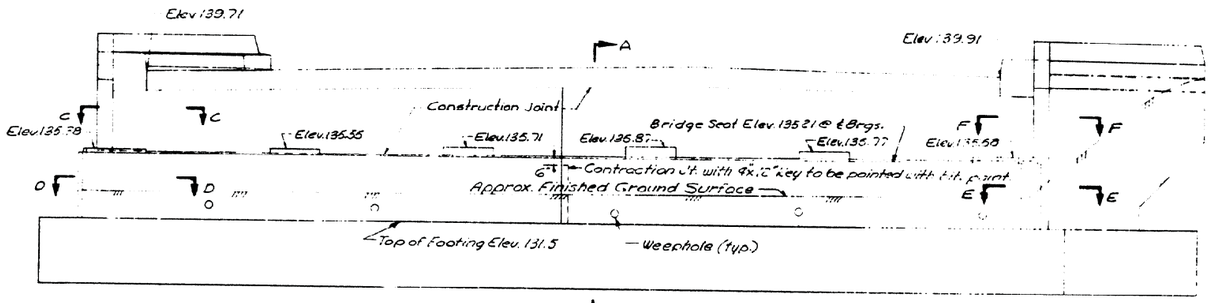
SECTION E-E
Scale 3/4" 1'0"



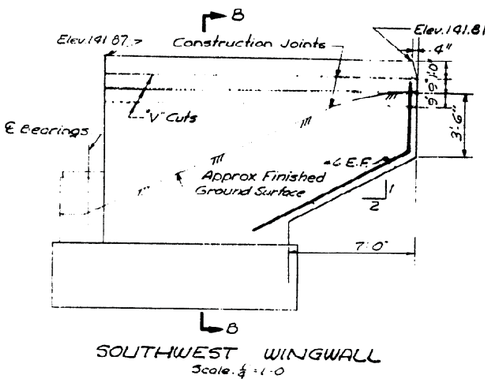
SECTION F-F
Scale 3/8" 1'-0"



SOUTHEAST WINGWALL
Scale 3/8" 1'-0"

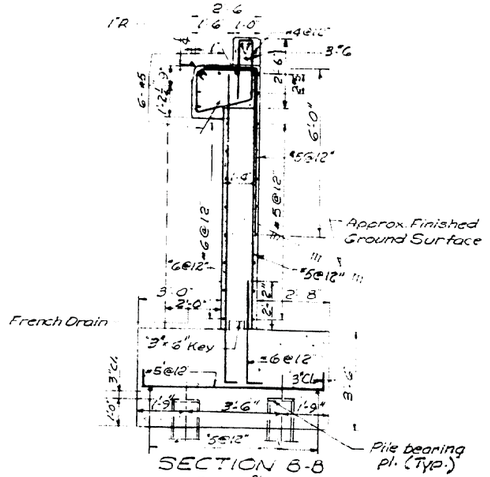


ELEVATION
Scale 3/8" 1'-0"

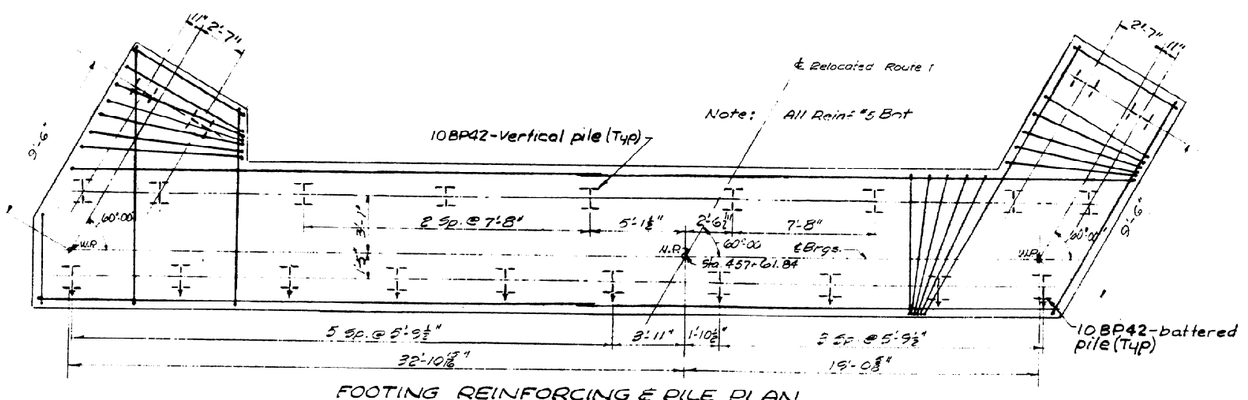


SOUTHWEST WINGWALL
Scale 3/8" 1'-0"

LEGEND
E.F.- Each Face
W.P.- Working Point



SECTION B-B
Scale 3/8" 1'-0"



FOOTING REINFORCING & PILE PLAN
Scale: 1/4" 1'-0"

Note: For typical details see Sheet No. 31
For Construction notes see Sheet No. 24
For Section A-A see Sheet No. 33

AS BUILT - NO REVISION

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

SOUTH ABUTMENT

SHEET NO. 32 OF 103	SCALE: AS NOTED	

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS BOSTON, MASS.

Qm-14
90

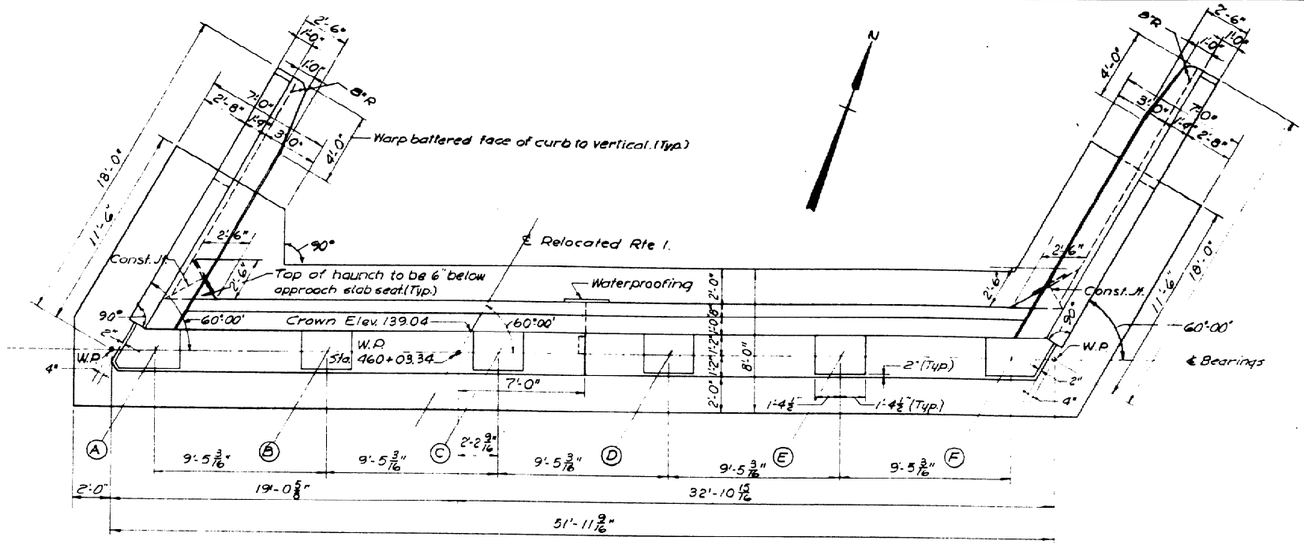
DES.	R.W.
DR.	RMM
TR.	
CHK.	R.P.K.
APP'D	H.J.W.

Bruning Blue Print-380-4-57

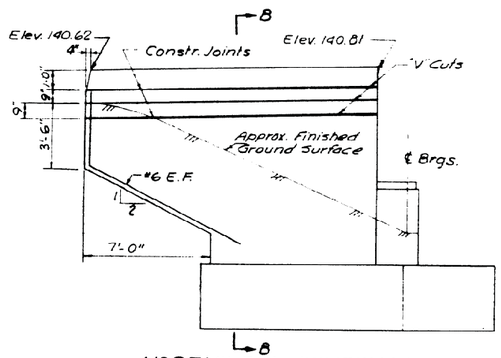
M-1086

B.P.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-080-4(6)	33	103

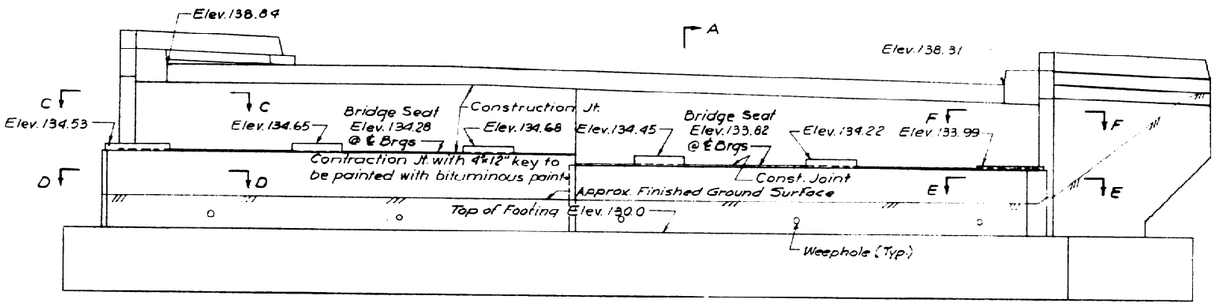
YARMOUTH



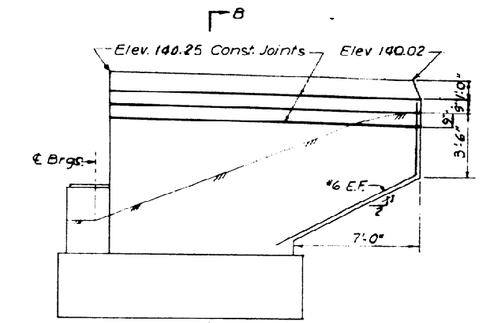
PLAN
Scale: 1/4" = 1'-0"



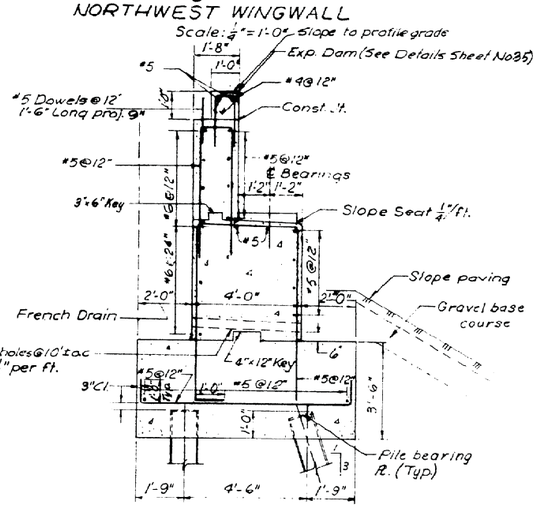
NORTHWEST WINGWALL
Scale: 1/4" = 1'-0"



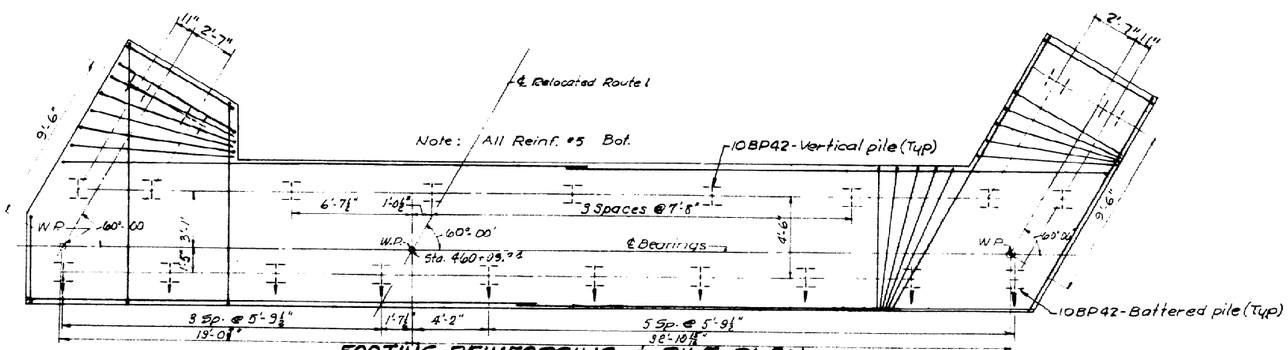
ELEVATION
Scale: 1/4" = 1'-0"



NORTHEAST WINGWALL
Scale: 1/4" = 1'-0"



SECTION A-A
Scale: 3/8" = 1'-0"



FOOTING REINFORCING & PILE PLAN
Scale: 1/4" = 1'-0"

LEGEND
E.F. = Each Face
W.P. = Working Point

Note: For typical details see Sheet No. 34

For Construction Notes see Sheet No. 34
For Sections B-B, C-C, D-D, F-F & E-E see Sheet No. 32

AS BUILT - NO REVISION

DES	R.W.
DR	C.A.K.
TR	—
CK.	R.P.K.
APPD	H.J.W.

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

NORTH ABUTMENT

SHEET NO. 33 OF 103 | SCALE: AS NOTED

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS BOSTON, MASS.

Om-14
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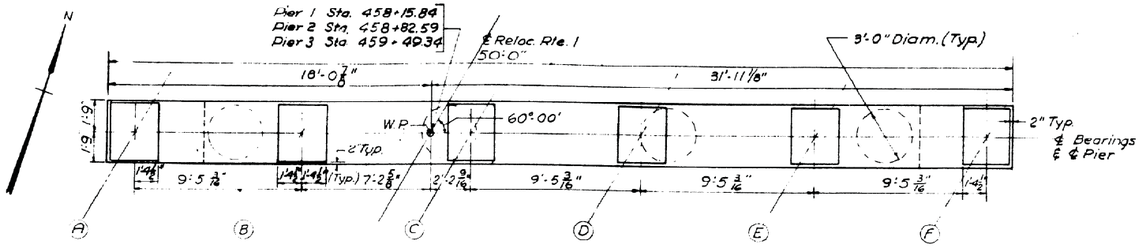
Boston Blue Print-300-4-57

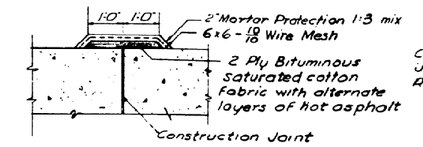
B.R.B. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-080-4(6)	34	103

YARMOUTH

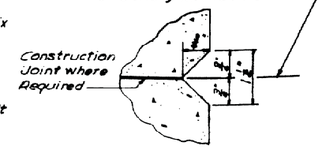


PLAN PIER 1, 2 & 3
Scale: 1/4"=1'-0"

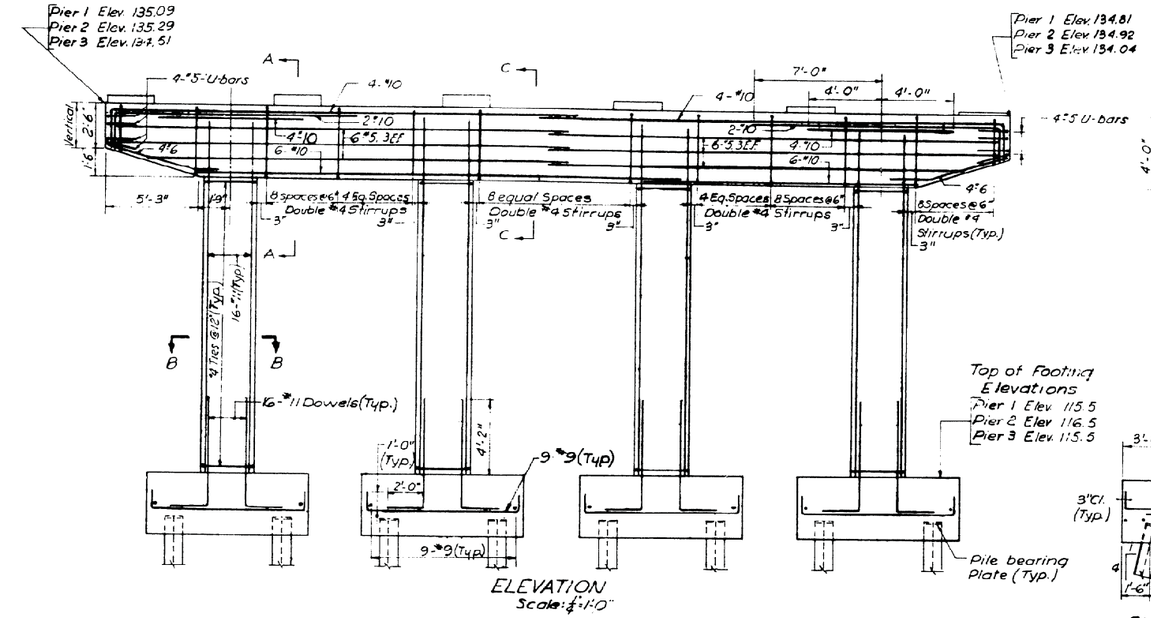
BEARING PAD ELEVATIONS			
STRINGER	PIER 1	PIER 2	PIER 3
A	135.26	135.46	134.68
B	135.40	135.57	134.79
C	135.49	135.64	134.83
D	135.32	135.44	134.62
E	135.14	135.25	134.41
F	134.98	135.09	134.21



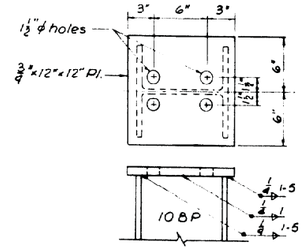
WATERPROOFING DETAIL
Scale: 1/2"=1'-0"



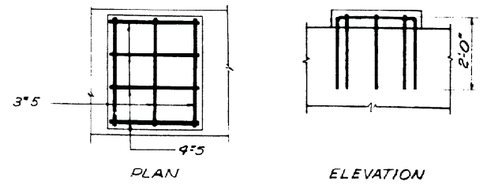
TYPICAL V-CUT DETAIL
Half Size



ELEVATION
Scale: 1/4"=1'-0"

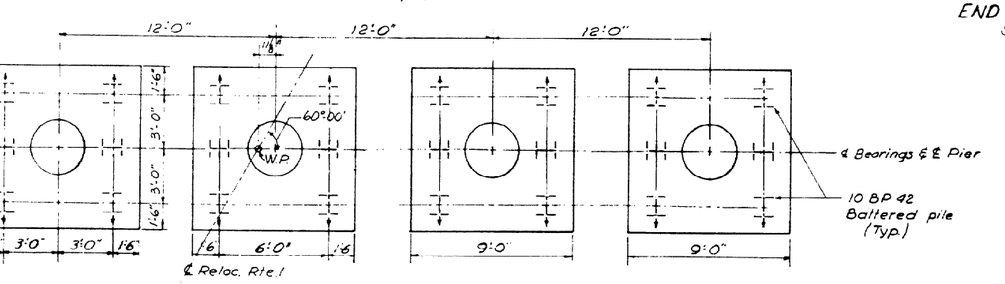


PILE BEARING PLATE
Scale: 1 1/2"=1'-0"

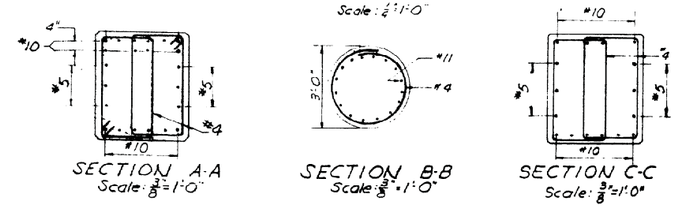


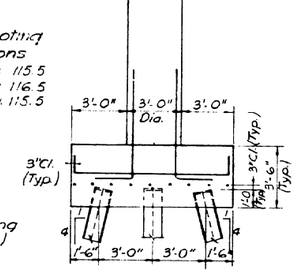
BEARING PAD DISTRIBUTION STEEL
Scale: 1/2"=1'-0"
TO BE USED WHERE PAD ELEVATION IS 4" OR MORE ABOVE ABUTMENT BRIDGE SEAT OR PIER CAP.

TYPICAL DETAILS
Scales as noted



PLAN OF FOOTINGS
Scale: 1/4"=1'-0"





END ELEVATION
Scale: 1/4"=1'-0"

CONSTRUCTION NOTES

1. Reinforcing steel to have 2" min. concrete cover unless otherwise noted.
2. All bar splices to lap 20 diameters (12" min.) unless otherwise noted.
3. All bar embedments to be 35 diameters unless otherwise noted.
4. Bearing pads to be of sufficient height to permit bush hammering to proper elevation.
5. All bearing pads to be placed integrally with the piers and abutments.
6. All exposed corners except on bearing pads to have 3/4" chamfer. Bearing pads to have tooled edges.
7. Reinforcing steel in or beneath bearing pads to be positioned to clear swedge anchor bolts. For swedge anchor bolts see bearing types on Sheet No. 39

AS BUILT - NO REVISION

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

PIER DETAILS

SHEET NO. 34 OF 103 | SCALE: AS NOTED

DES.	W.G.
DR.	R.W.A.
TR.	—
CHK.	R.P.K.
APPD.	H.J.W.

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS BOSTON, MASS.

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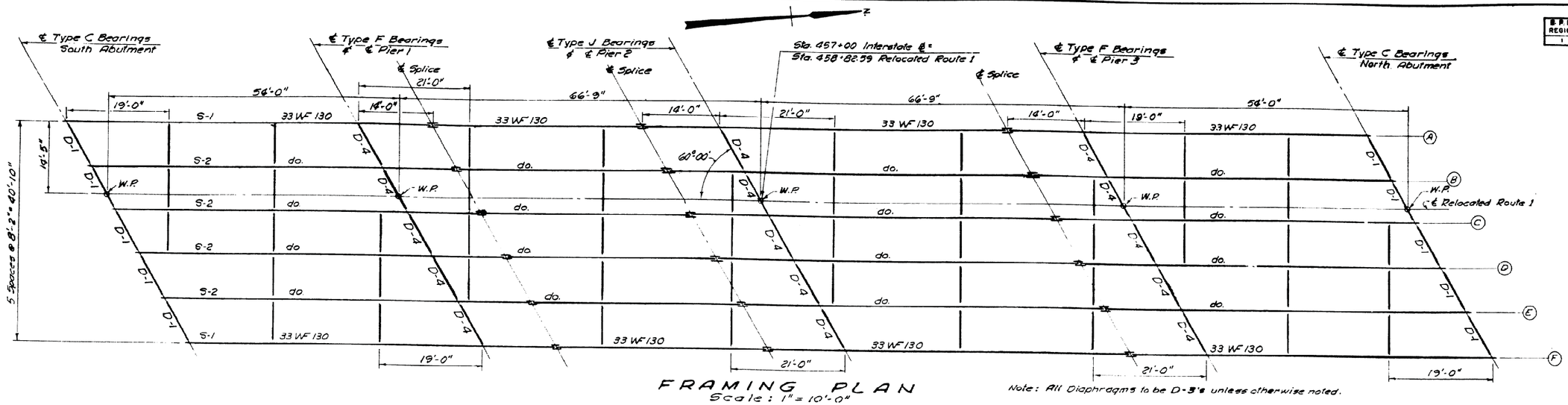
Boston Blue Print-500-4-57

M-1088

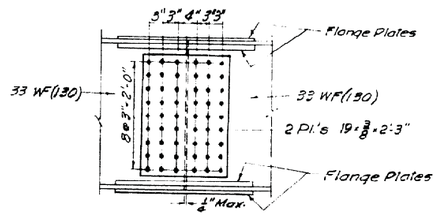
B.P.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-080-4(4)	35	103

YARMOUTH

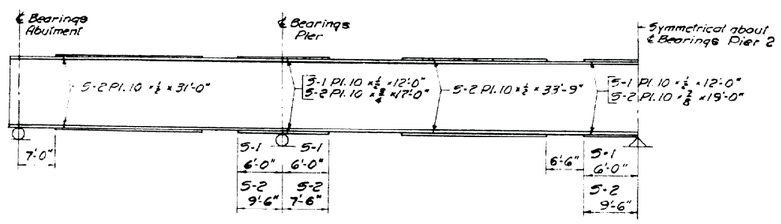


FRAMING PLAN
Scale: 1" = 10'-0"

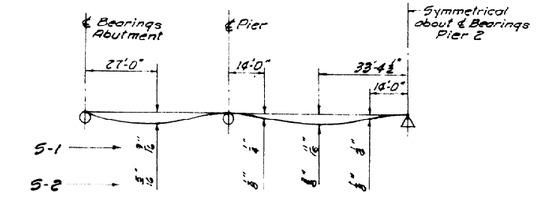
Note: All Diaphragms to be D-3's unless otherwise noted.



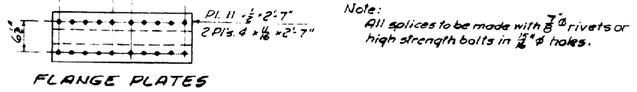
ELEVATION
Scale: ⅜" = 1'-0"



STRINGER ELEVATION
(Splices Not shown)
No Scale



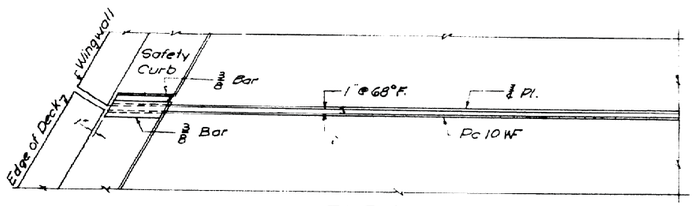
DEAD LOAD DEFLECTION DIAGRAM
No Scale



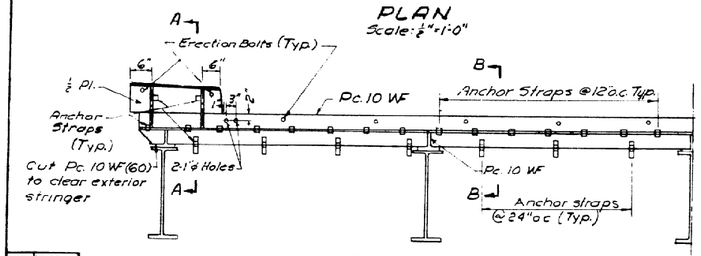
FLANGE PLATES

Note: All splices to be made with ⅞" ℄ rivets or high strength bolts in 15/16" ℄ holes.

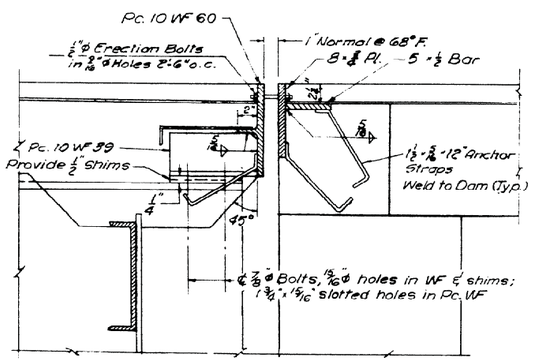
STRINGER SPLICE DETAILS
Scale: ⅜" = 1'-0"



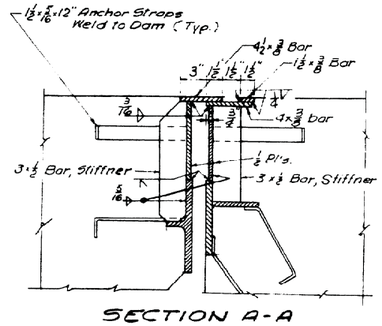
PLAN
Scale: ½" = 1'-0"



ELEVATION
Scale: ½" = 1'-0"



SECTION B-B



SECTION A-A

EXPANSION DAM DETAILS
AT ABUTMENTS
Scale: 1½" = 1'-0"

Framing Notes

1. For diaphragm and bearing details, see sheet No. 39
2. All dimensions shown on "Framing Plan" are horizontal.
3. Stringers not to be cambered, but shall be erected with natural bow up. Camber to follow road profile to be obtained by angular adjustment at splices.

AS BUILT - NO REVISION

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND–YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

FRAMING PLAN AND DETAILS

SHEET NO. 35 OF 103 | SCALE: AS NOTED

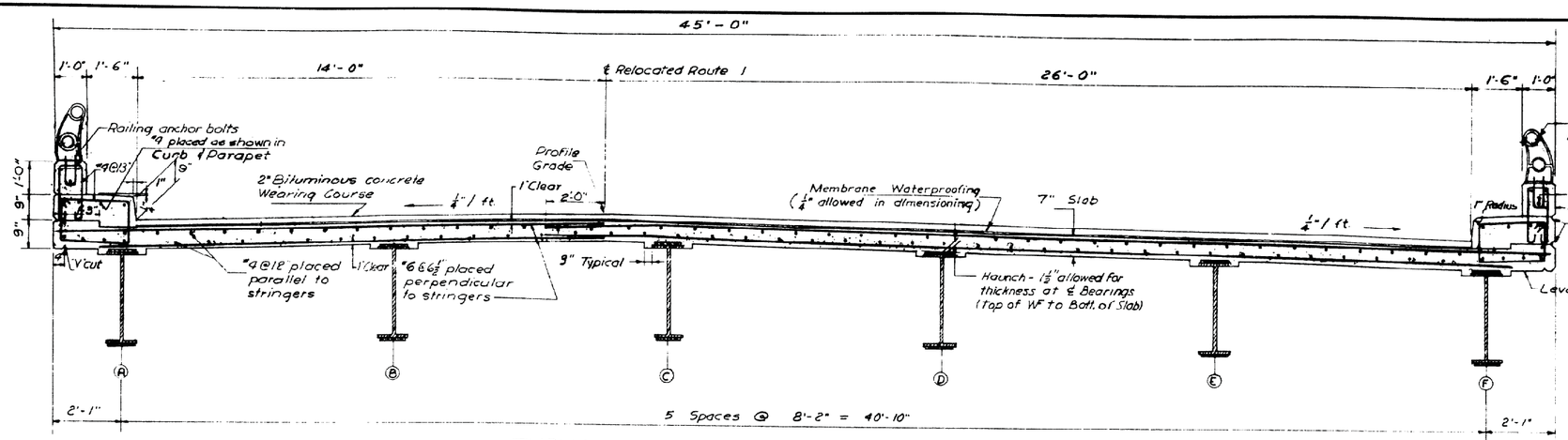
FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS BOSTON, MASS.

Qm-14
35

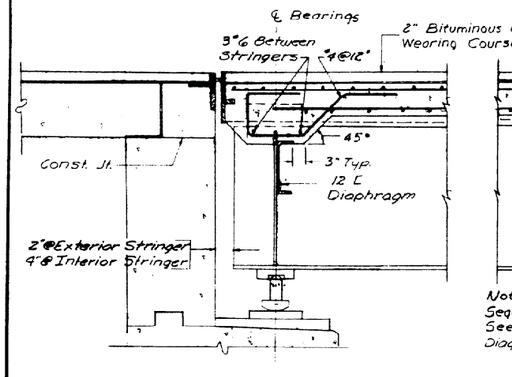
DES	NAG & RMA
DR.	RB.
TR.	R.B.
CHK.	R.P.K.
APP'D	H.J.W.

Boston Blue Print-300-4-57

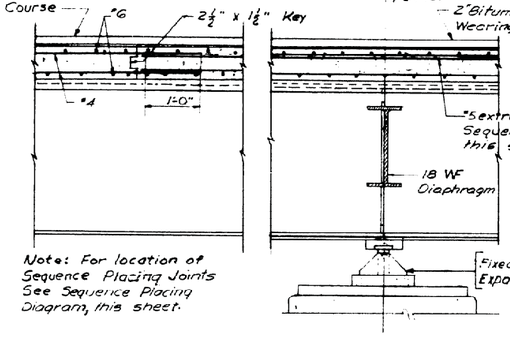
M-1089



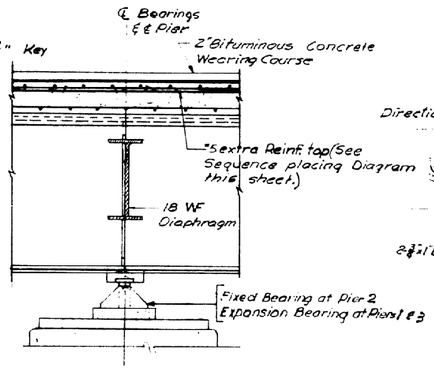
TYPICAL CROSS SECTION OF DECK
Scale: 1/2" = 1'-0"



AT ABUTMENTS

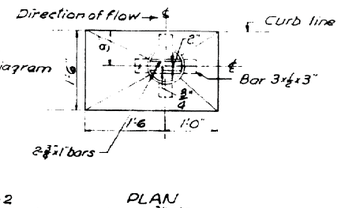


SEQUENCE PLACING JOINT

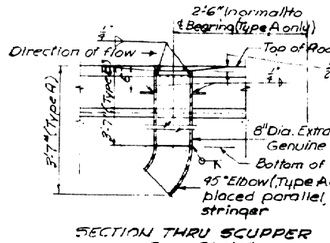


AT PIERS

LONGITUDINAL SECTIONS
Scale: 3/4" = 1'-0"

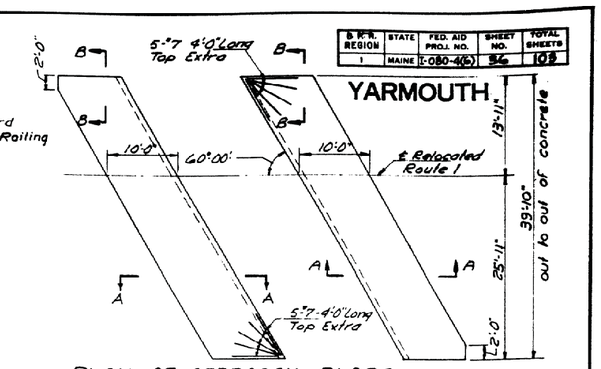


PLAN
Scale: 3/4" = 1'-0"

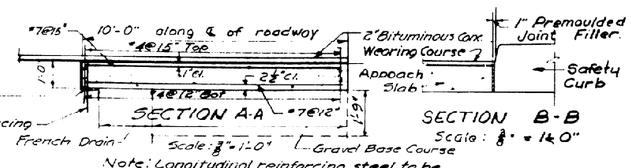


SECTION THRU SCUPPER
Scale: 3/4" = 1'-0"

SCUPPER DETAILS TYPE A & B
Note: For location of Scuppers see Sheet No.



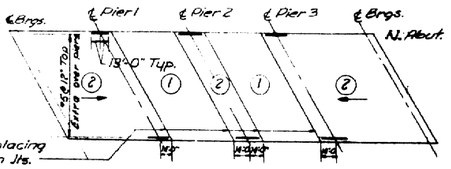
PLAN OF APPROACH SLABS
Scale: 1" = 10'



SECTION A-A

SECTION B-B
Scale: 3/8" = 1'-0"

Note: Longitudinal reinforcing steel to be placed parallel to ℄ Relocated Route 1. Transverse reinforcing steel to be placed parallel to ℄ Bearings.

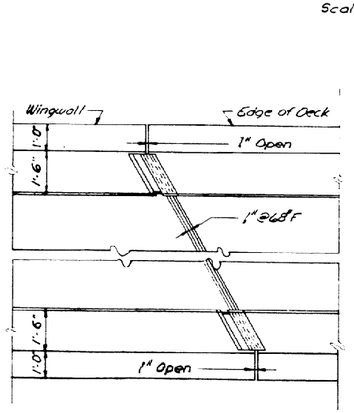


SEQUENCE PLACING DIAGRAM
No Scale

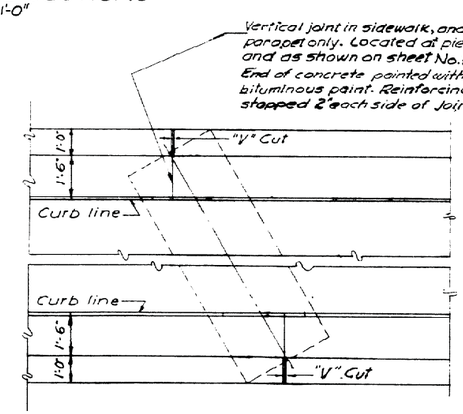
Notes For Placing:
Slabs designated by (1) shall be placed before those marked (2). Slabs of the same number may be placed simultaneously or in sequence. Slabs may be placed starting from either end unless the direction of placing concrete is shown with an arrow. Once the placing of a slab has been started it shall be completed without interruption.

Note for Screeds:
After structural steel has been erected, levels are to be run on top flanges of stringers. Screeds for slab are to be set on the basis of these levels corrected for 3/4 of the dead load deflection shown on Sheet No. 35.
Changes in screed elevations will not be allowed on continuous structures after any portion of the deck slab has been placed.

For Construction Notes see Sheet No. 34



AT ABUTMENT



AT PIER

PART PLAN OF DECK
Scale: 3/8" = 1'-0"

DES.	R.W.
DR.	R.F.C.
TR.	—
CHK.	RPK
APP'D	H.J.W.

AS BUILT - NO REVISION

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND–YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

CROSS SECTION AND DETAILS

SHEET NO. 36 OF 103	SCALE: AS NOTED	

FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS BOSTON, MASS.

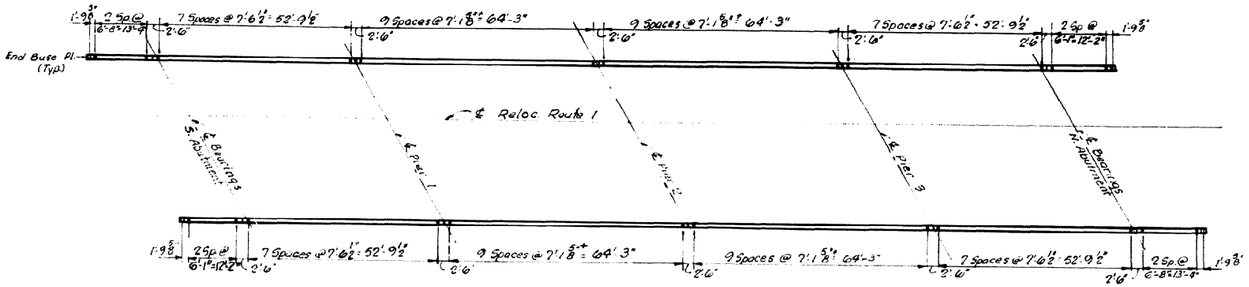
Qm-14
34

M-1090

Boston Blue Print-300-4-57

B.P.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I 050-4(6)	37	103

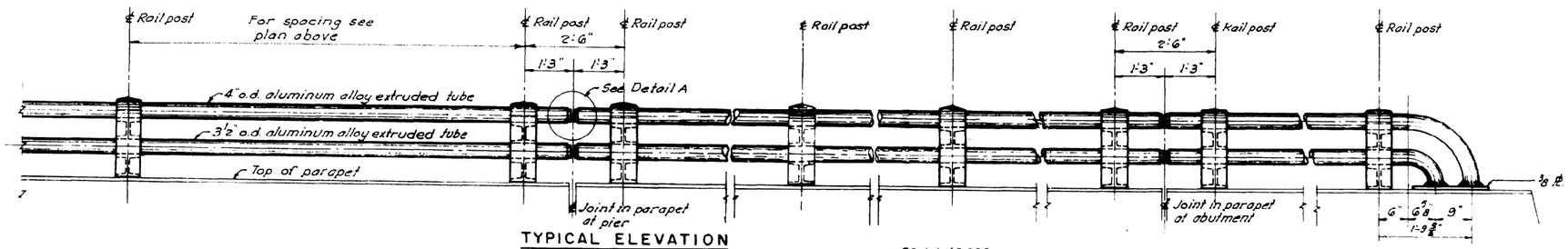
YARMOUTH



PLAN OF RAILING

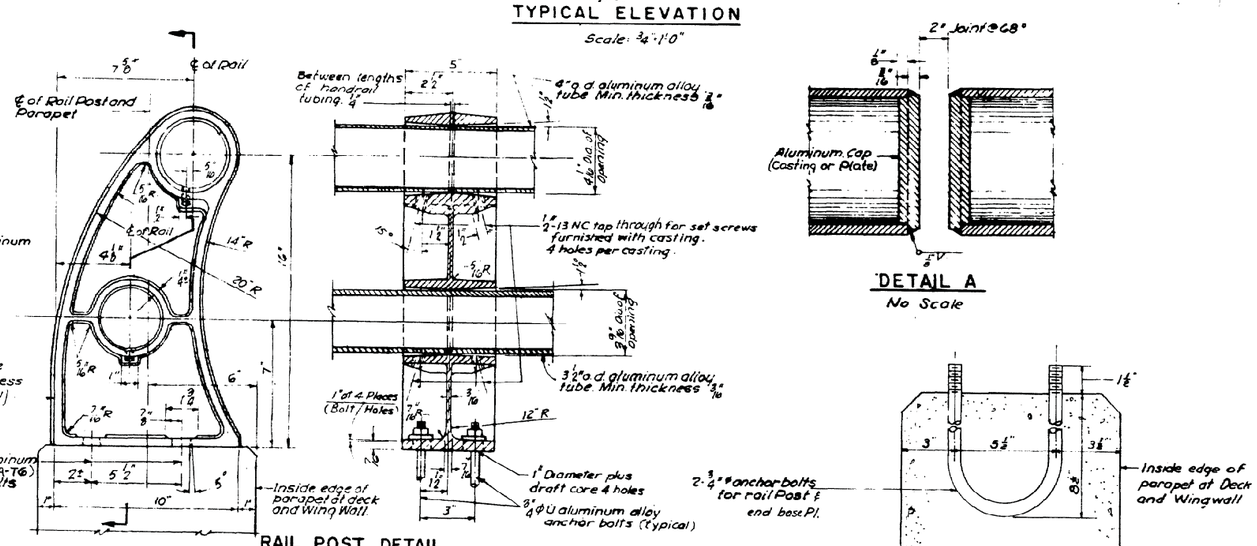
Scale: 1"=20'

All dimensions are horizontal



TYPICAL ELEVATION

Scale: ¾"=1'-0"



RAIL POST DETAIL

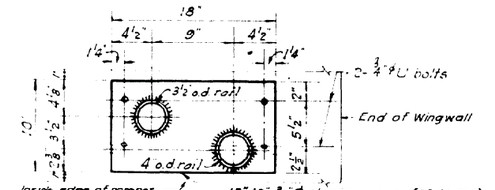
Scale: 3"=1'-0"

DETAIL A

No Scale

DETAIL OF U BOLT FOR RAIL POST

Scale: 3"=1'-0"



DETAIL OF END BASE PLATE

Scale: 1½"=1'-0"

NOTES:

1. The bottom of each railing post shall be thoroughly coated with an aluminum impregnated caulking compound before installation.
2. Railing post to be set normal to parapet

DES.	—
DR.	J.McG.
TR.	—
CHK.	R.P.K.
APP'D.	H.J.W.

Boston Blue Print-300-4-57

AS BUILT

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

RAILING DETAILS

SHEET NO. 37 OF 103	SCALE: AS NOTED	

FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS BOSTON, MASS.

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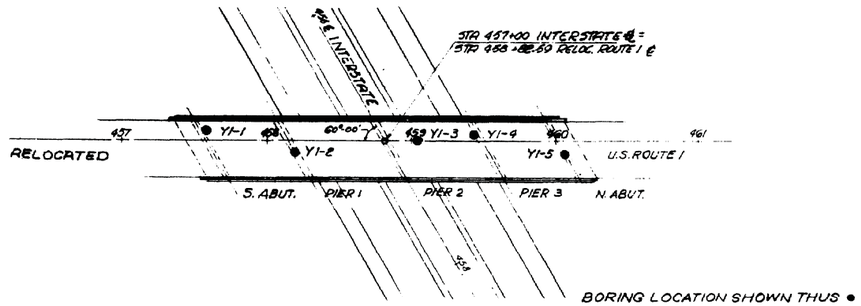
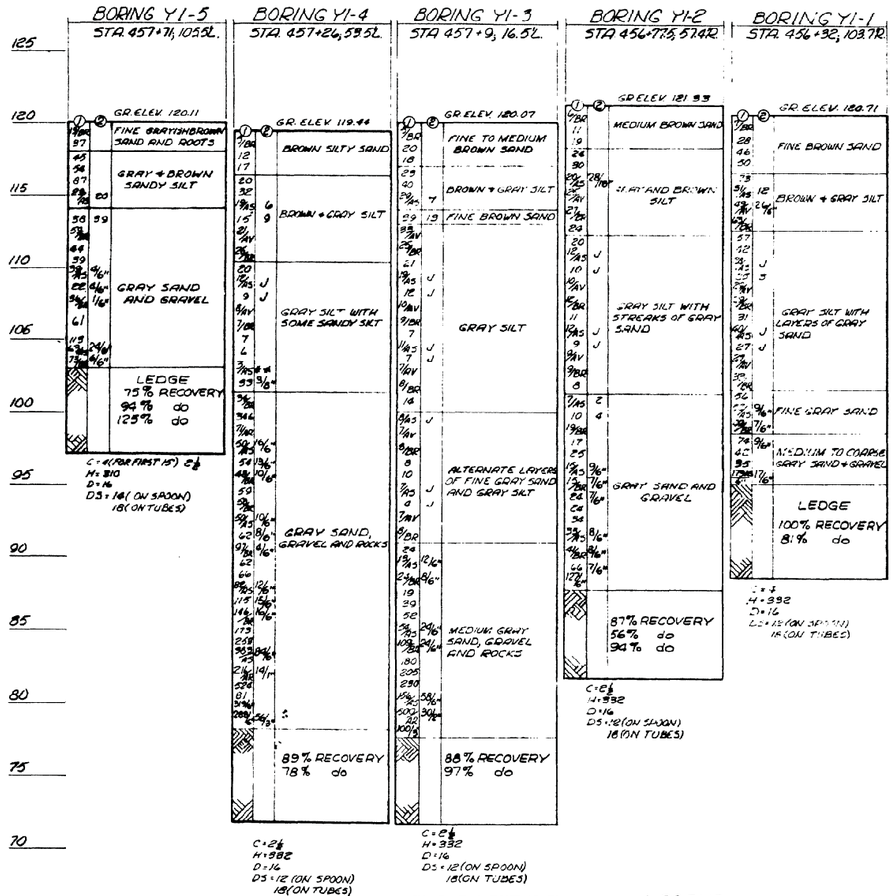
M-1091

B.R.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I-095-4(6)	38	103

YARMOUTH



BORING LOCATION PLAN
SCALE 1"=50'



SCALE: VERT. 1"=5'

GENERAL NOTES

1. BORINGS WERE MADE BY THE MAINE STATE HIGHWAY COMMISSION APRIL 1967.
2. FIGURES IN COLUMN ① = BLOWS PER FOOT ON CASING. FIGURES IN COLUMN ② = BLOWS PER FOOT ON SAMPLER ROD EXCEPT AS NOTED
3. ELEVATIONS ARE REFERRED TO MEAN SEA LEVEL.

LEGEND

** = WEIGHT OF RODS
AS = CASING WAS DRIVEN AFTER SAMPLING
C = DIAMETER OF CASING IN INCHES
H = WEIGHT OF HAMMER IN POUNDS
D = DROP ON CASING IN INCHES
AR = CASING WAS DRIVEN WASHING AHEAD OF CASING
BR =
DV =
DS = DROP ON SAMPLER ROD IN INCHES
J = SAMPLER DRIVEN BY STATIC LOAD NOT EXCEEDING ½ TON

DES.	—
DR	CFG.
TR	—
CHK.	R.F.C.
APP'D.	H.J.W.

Boston Blue Print-300-4-67

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

RELOCATED ROUTE 1 OVER INTERSTATE

BORING DATA

SHEET NO. 38 OF 103	SCALE: AS NOTED	

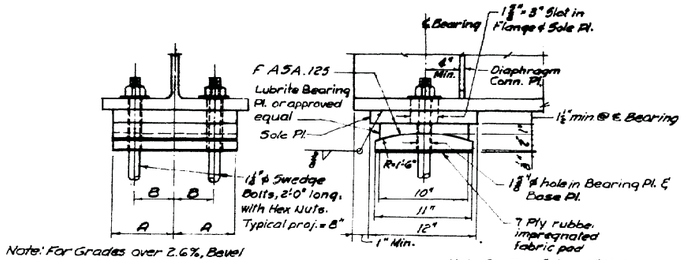
FAY, SPOFFORD & THORNDIKE, INC.
ENGINEERS BOSTON, MASS.

Qm-14
36

M-1092

S.P.R. REGION	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
1	MAINE	I 080-4(6)	39	103

YARMOUTH

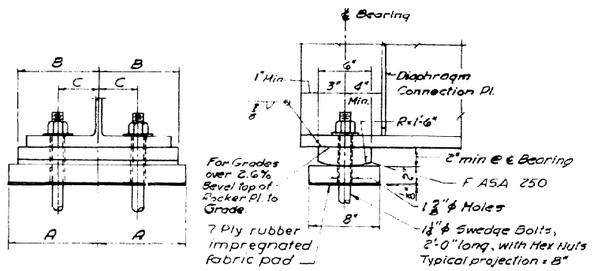


Note: For Grades over 2.6%, Bevel top of Sole Plate to Grade

TYPE A
(EXPANSION BEARING)
Scale: 1½"=1'-0"

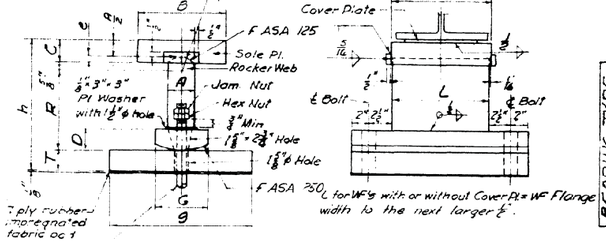
TYPE A (EXPANSION)		
FLANGE WIDTH	A	B
16½"	7"	4½"
12"	5"	2⅞"
11½"	5"	2⅝"
10½"	4½"	2⅜"
10"	4⅛"	2⅜"
9"	4"	2¼"

Note for Type "A" and "B" Bearings
All nuts to be drawn up finger tight, then backed off one turn and the threads of the bolts burred off at the face of the nuts with a pointed tool.



TYPE B
(FIXED BEARING)
Scale: 1½"=1'-0"

TYPE B (FIXED)			
FLANGE WIDTH	A	B	C
16½"	10"	9"	4½"
12"	8"	7"	2⅞"
11½"	8"	7"	2¾"
10½"	7"	6"	2⅝"
10"	7"	6"	2⅜"
9"	7"	6"	2⅛"

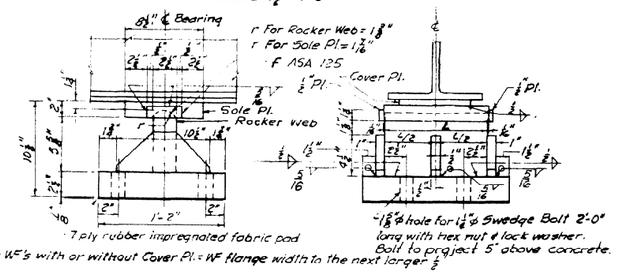


L for WF's with or without Cover Pl.= WF flange width to the next larger ⅛".

TYPE C, D, E, F, G, H
(EXPANSION BEARING)
Scale: 1½"=1'-0"

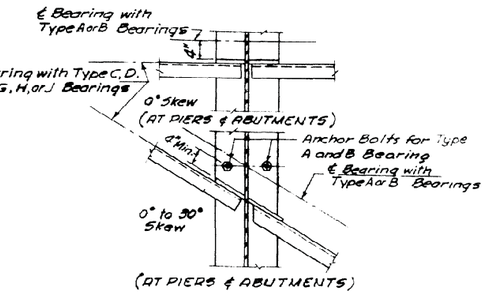
DIMENSIONS										
BEARING TYPE	A	B	C	D	e	G	h	R	S	T
C	2½"	8½"	2"	2½"	⅞"	6"	10⅛"	6"	12"	1⅜"
D	2½"	8½"	2"	2⅝"	⅞"	6"	11⅜"	7"	14"	1⅜"
E	3"	10"	2½"	2⅝"	1"	6"	13⅜"	8"	14"	2"
F	3"	10"	2½"	2½"	1"	6"	14⅜"	9"	16"	2⅛"
G	3½"	10"	3"	2½"	1¼"	7"	16⅜"	10"	16"	2⅝"
H	3½"	10"	3"	2½"	1¼"	7"	17⅞"	11"	18"	2⅞"

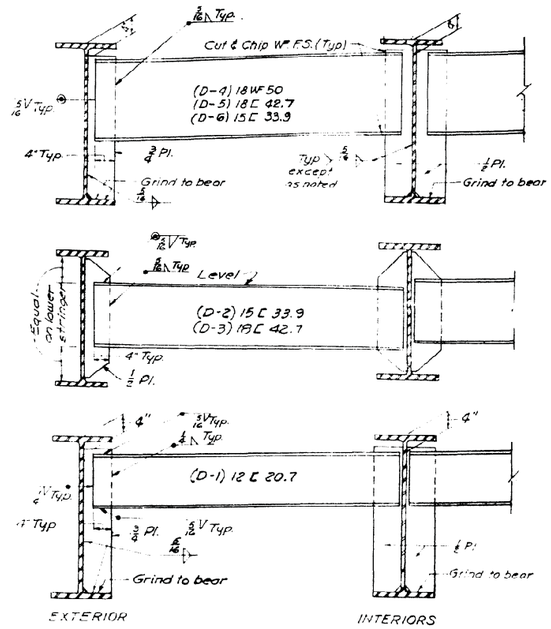
r for Sole Plate = ⅜ + 3/16"
r for Rocker Web = ⅜ + ⅛"



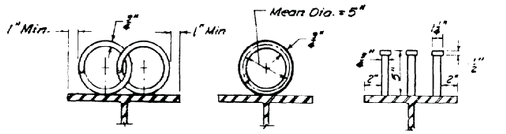
L for WF's with or without Cover Pl.= WF flange width to the next larger ⅛"

TYPE J
(FIXED BEARING)
Scale: 1½"=1'-0"



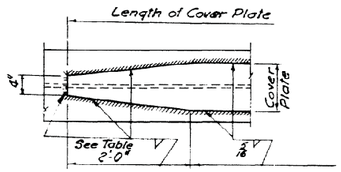


TYPICAL DIAPHRAGM DETAILS
Scale: ¾"=1'-0"



SHEAR CONNECTOR DETAILS
Scale: 1½"=1'-0"

Spiral Notes
1. All spirals to be fabricated with ⅜" ϕ plain bars and to have a mean diameter of 5 inches.
2. Spirals to be welded to stringer flange with two ⅜" fillet welds, 2½" long at each point of contact.
3. Spiral lengths given on framing plan are net lengths and do not include any allowance for laps.
4. Where spiral sections are joined, they shall be lapped for a distance of one-half the smaller pitch.



TYPICAL COVER PLATE DETAIL
No Scale

Plate Thickness	Fillet Weld
⅜" to ¾"	5/16"
⅞" & 1"	½"
1⅛" & 1¼"	⅝"

DIVISION

STATE HIGHWAY COMMISSION
AUGUSTA, MAINE

PORTLAND-YARMOUTH INTERSTATE

STANDARD FRAMING DETAILS

SHEET NO. 39 OF 103 | SCALE: AS NOTED

FAY, SPOFFORD & THORNDIKE, INC. ENGINEERS BOSTON, MASS.

Qm-14
44

DES	RWC&DZ
DR	RB
TR	—
CHK	R.K.
APP'D	H.J.W.

Boston Blue Print-300-4-61

M-1093

APPENDIX G

Calculations

HALEY & ALDRICH

CALCULATIONS

		File No.	37578-000
		Sheet	1 of 1
Client	MaineDOT	Date	7/22/2011
Project	I-295 / U.S. Route 1 Park and Ride Facility - Yarmouth, Maine	Computed By	BCS
Subject	Maximum Depth of Frost Penetration Calculation	Checked By	JWW

GOAL: Estimate maximum depth of frost penetration

EVALUATION:

Geographic Location:

The site is located at the intersection of U.S. Route 1 and I-295 in Yarmouth, Maine. The nearest weather recording stations to the site are:

Portland International Jetport - Portland, ME. (~ 14 miles from site, 1,195 °F-days)
Brunswick Naval Air Station - Brunswick, ME (~ 20 miles from site, 1,276 °F-days)

From MaineDOT HDG Figure 13-2 the design freezing index for Yarmouth, ME. is approximately 1,300 °F-days.

Recommend taking average of maximum frost penetration depth calculated using weather data from above sites.

Assumed Design Pavement Section:

Assume a 30-in. thick pavement section: 6 in. bituminous concrete, 6 in. Type B base course (crushed), 18 in. Type D subbase course.

Assumed Soil Properties:

Soil Unit	Moisture Content (%)	Dry Unit Weight (pcf)
bituminous concrete	0%	140
Type B base	6%	135
Type D subbase	8%	125
granular borrow/rock fill	10%	120
marine sand	10%	118
marine silt/clay	23%	115

Note: moisture content values are assumed except where laboratory test data is available for soil samples collected during the subsurface exploration program (marine sand, marine silt/clay)

Frost Penetration Calculation:

Maximum depth of seasonal frost penetration into the ground evaluated using the computer program ModBerg version 99.2 using input data summarized above. Program output is attached. Results are summarized below.

Subgrade Material	Maximum Depth of Frost Penetration (in.)		
	Brunswick, ME.	Portland, ME.	Average
granular borrow/rock fill	49.5	47.8	48.7
marine sand	49.7	47.8	48.8
marine silt/clay	40.0	38.9	39.5
		Average =	45.6

Recommend using a maximum depth of frost penetration equal to 4 ft (1.5 ft of penetration into subgrade for a 30 in. pavement section). This value should be considered in pavement design.

"

--- ModBerg Results ---

Project Location: Brunswick, Maine

Air Design Freezing Index = 1276 F-days
N-Factor = 0.70
Surface Design Freezing Index = 893 F-days
Mean Annual Temperature = 45.9 deg F
Design Length of Freezing Season = 118 days

Layer #:Type	t	w%	d	Cf	Cu	Kf	Ku	L
1-Asphalt	6.0	.0	140.0	28	28	.9	.9	0
2-Coarse	6.0	6.0	135.0	27	31	1.9	1.8	1,166
3-Coarse	18.0	8.0	125.0	26	31	1.7	1.5	1,440
4-Coarse	19.5	10.0	120.0	26	32	1.7	1.5	1,728

t = Layer thickness, in inches.
w% = Moisture content, in percentage of dry density.
d = Dry density, in lbs/cubic ft.
Cf = Heat Capacity of frozen phase, in BTU/(cubic ft degree F).
Cu = Heat Capacity of thawed phase, in BTU/(cubic ft degree F).
Kf = Thermal conductivity in frozen phase, in BTU/(ft hr degree).
Ku = Thermal conductivity in thawed phase, in BTU/(ft hr degree).
L = Latent heat of fusion, in BTU / cubic ft.

****
Total Depth of Frost Penetration = 4.12 ft = 49.5 in.
**********"

"

--- ModBerg Results ---

Project Location: Brunswick, Maine

Air Design Freezing Index = 1276 F-days
N-Factor = 0.70
Surface Design Freezing Index = 893 F-days
Mean Annual Temperature = 45.9 deg F
Design Length of Freezing Season = 118 days

Layer #:Type	t	w%	d	Cf	Cu	Kf	Ku	L
1-Asphalt	6.0	.0	140.0	28	28	.9	.9	0
2-Coarse	6.0	6.0	135.0	27	31	1.9	1.8	1,166
3-Coarse	18.0	8.0	125.0	26	31	1.7	1.5	1,440
4-Coarse	19.7	10.0	118.0	26	32	1.6	1.4	1,699

t = Layer thickness, in inches.
w% = Moisture content, in percentage of dry density.
d = Dry density, in lbs/cubic ft.
Cf = Heat Capacity of frozen phase, in BTU/(cubic ft degree F).
Cu = Heat Capacity of thawed phase, in BTU/(cubic ft degree F).
Kf = Thermal conductivity in frozen phase, in BTU/(ft hr degree).
Ku = Thermal conductivity in thawed phase, in BTU/(ft hr degree).
L = Latent heat of fusion, in BTU / cubic ft.

****
Total Depth of Frost Penetration = 4.14 ft = 49.7 in.
**********"

"

--- ModBerg Results ---

Project Location: Brunswick, Maine

Air Design Freezing Index = 1276 F-days
N-Factor = 0.70
Surface Design Freezing Index = 893 F-days
Mean Annual Temperature = 45.9 deg F
Design Length of Freezing Season = 118 days

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2-Coarse	6.0	6.0	135.0	27	31	1.9	1.8	1,166
3-Coarse	18.0	8.0	125.0	26	31	1.7	1.5	1,440
4-Fine	10.0	23.0	115.0	33	46	1.6	1.2	3,809

t = Layer thickness, in inches.
w% = Moisture content, in percentage of dry density.
d = Dry density, in lbs/cubic ft.
Cf = Heat Capacity of frozen phase, in BTU/(cubic ft degree F).
Cu = Heat Capacity of thawed phase, in BTU/(cubic ft degree F).
Kf = Thermal conductivity in frozen phase, in BTU/(ft hr degree).
Ku = Thermal conductivity in thawed phase, in BTU/(ft hr degree).
L = Latent heat of fusion, in BTU / cubic ft.

****
Total Depth of Frost Penetration = 3.33 ft = 40.0 in.
**********"

"

--- ModBerg Results ---

Project Location: Portland Wsfo Airport, Maine

Air Design Freezing Index = 1195 F-days
N-Factor = 0.70
Surface Design Freezing Index = 837 F-days
Mean Annual Temperature = 45.5 deg F
Design Length of Freezing Season = 118 days

Layer #:Type	t	w%	d	Cf	Cu	Kf	Ku	L
1-Asphalt	6.0	.0	140.0	28	28	.9	.9	0
2-Coarse	6.0	6.0	135.0	27	31	1.9	1.8	1,166
3-Coarse	18.0	8.0	125.0	26	31	1.7	1.5	1,440
4-Coarse	17.8	10.0	120.0	26	32	1.7	1.5	1,728

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w% = Moisture content, in percentage of dry density.
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Cu = Heat Capacity of thawed phase, in BTU/(cubic ft degree F).
Kf = Thermal conductivity in frozen phase, in BTU/(ft hr degree).
Ku = Thermal conductivity in thawed phase, in BTU/(ft hr degree).
L = Latent heat of fusion, in BTU / cubic ft.

****
Total Depth of Frost Penetration = 3.98 ft = 47.8 in.
**********"

"

--- ModBerg Results ---

Project Location: Portland Wsfo Airport, Maine

Air Design Freezing Index = 1195 F-days
N-Factor = 0.70
Surface Design Freezing Index = 837 F-days
Mean Annual Temperature = 45.5 deg F
Design Length of Freezing Season = 118 days

Layer #:Type	t	w%	d	Cf	Cu	Kf	Ku	L
1-Asphalt	6.0	.0	140.0	28	28	.9	.9	0
2-Coarse	6.0	6.0	135.0	27	31	1.9	1.8	1,166
3-Coarse	18.0	8.0	125.0	26	31	1.7	1.5	1,440
4-Coarse	17.8	10.0	118.0	26	32	1.6	1.4	1,699

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Cu = Heat Capacity of thawed phase, in BTU/(cubic ft degree F).
Kf = Thermal conductivity in frozen phase, in BTU/(ft hr degree).
Ku = Thermal conductivity in thawed phase, in BTU/(ft hr degree).
L = Latent heat of fusion, in BTU / cubic ft.

****
Total Depth of Frost Penetration = 3.98 ft = 47.8 in.
**********"

"

--- ModBerg Results ---

Project Location: Portland Wsfo Airport, Maine

Air Design Freezing Index = 1195 F-days
N-Factor = 0.70
Surface Design Freezing Index = 837 F-days
Mean Annual Temperature = 45.5 deg F
Design Length of Freezing Season = 118 days

Layer #:Type	t	w%	d	Cf	Cu	Kf	Ku	L
1-Asphalt	6.0	.0	140.0	28	28	.9	.9	0
2-Coarse	6.0	6.0	135.0	27	31	1.9	1.8	1,166
3-Coarse	18.0	8.0	125.0	26	31	1.7	1.5	1,440
4-Fine	8.9	23.0	115.0	33	46	1.6	1.2	3,809

t = Layer thickness, in inches.
w% = Moisture content, in percentage of dry density.
d = Dry density, in lbs/cubic ft.
Cf = Heat Capacity of frozen phase, in BTU/(cubic ft degree F).
Cu = Heat Capacity of thawed phase, in BTU/(cubic ft degree F).
Kf = Thermal conductivity in frozen phase, in BTU/(ft hr degree).
Ku = Thermal conductivity in thawed phase, in BTU/(ft hr degree).
L = Latent heat of fusion, in BTU / cubic ft.

****
Total Depth of Frost Penetration = 3.24 ft = 38.9 in.
**********"

HALEY & ALDRICH	CALCULATIONS	File No.	37579-001
		Sheet	1 of 2
Client	MaineDOT	Date	4/23/2012
Project	I-295 / U.S. Route 1 Interchange Improvements - Yarmouth, Maine	Computed By	BCS
Subject	Subgrade Resilient Modulus Estimates	Checked By	JWW

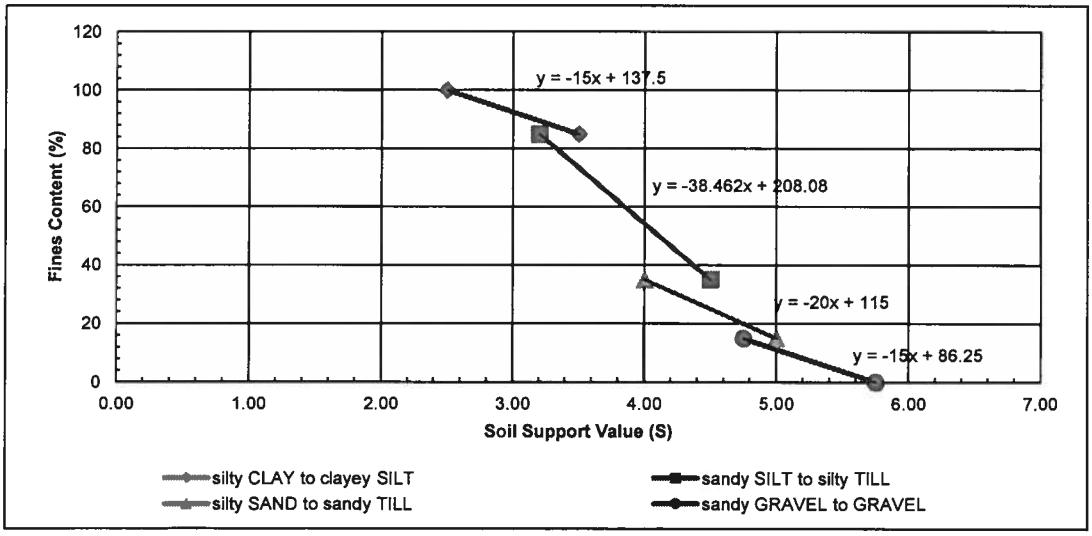
GOAL: Estimate subgrade resilient modulus values for use in pavement design.

EVALUATION:

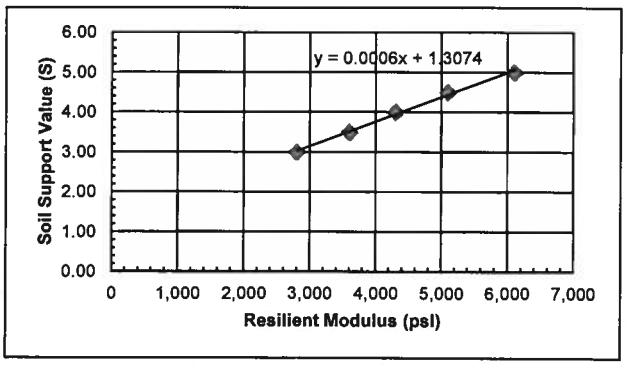
Define station limits for cut/fill areas and magnitude of cut/fill based on ramp centerline profiles provided by FST on 17 April 2012. Round station limits to the nearest 25-ft station increment and determine subgrade material type based on "as-drilled" test boring locations completed within the defined station limits. A summary of this information is provided in the attached table.

Determine resilient modulus values for each of the material types anticipated at the design subgrade level. Subgrade resilient modulus values are determined based on relating subgrade material type to a soil support value (S), which is then related to subgrade resilient modulus based on correlations provided by MaineDOT.

No.	Soil Type	Fines Content (%)	Soil Support Value (S)	
			Low	High
1	silty CLAY to clayey SILT	85 to 100	2.50	3.50
2	sandy SILT to silty Till	35 to 85	3.20	4.50
3	silty SAND to sandy Till	15 to 35	4.00	5.00
4	sandy GRAVEL to GRAVEL	0 to 15	4.75	5.75



Soil Support Value (S)	Subgrade Resilient Modulus (psi)
3.0	2,800
3.5	3,600
4.0	4,300
4.5	5,100
5.0	6,100



EVALUATION: (CONT.)

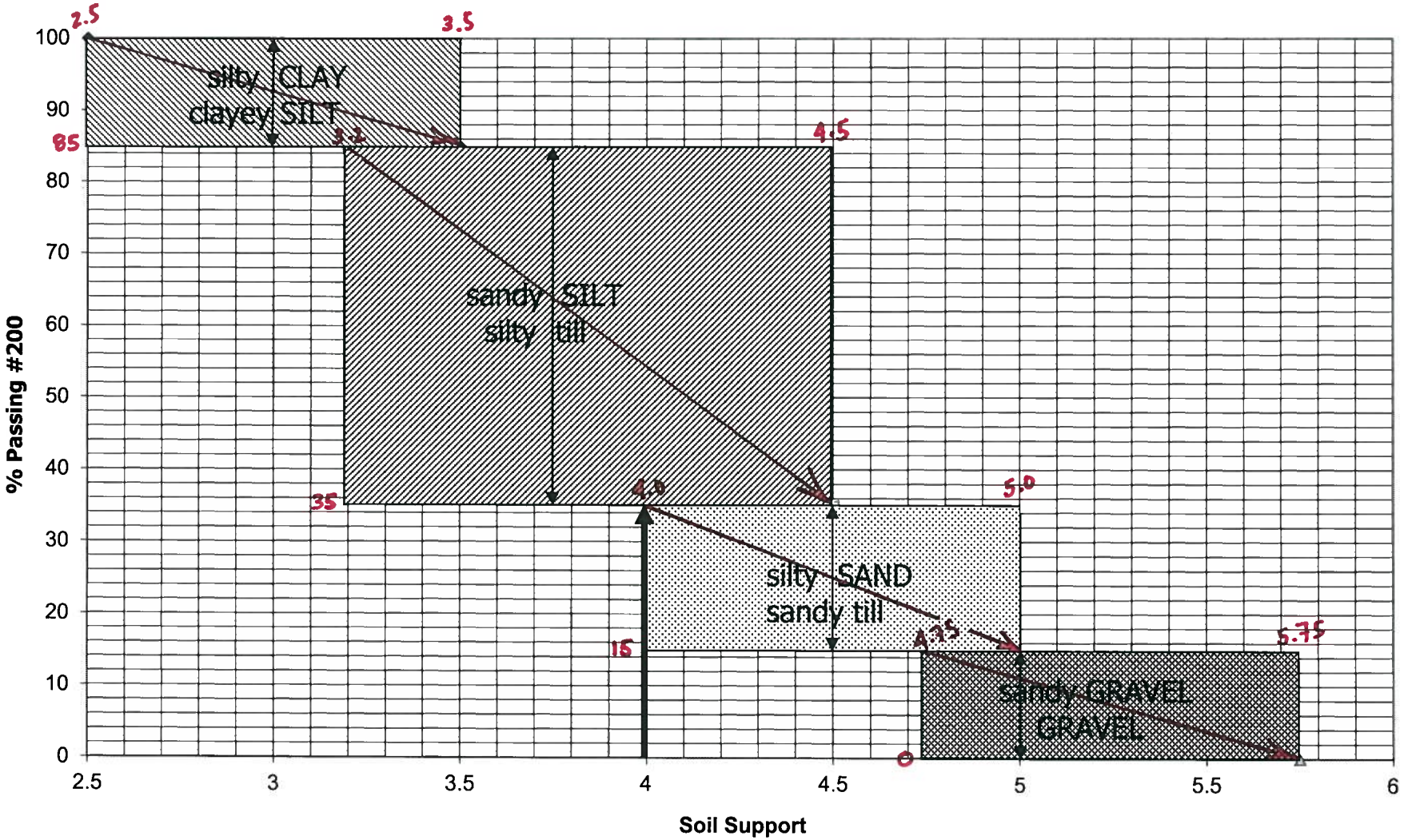
Soil Type	Fines Content (%)	Soil Support Value (S)	Resilient Modulus (psi)
silty CLAY to clayey SILT	100	2.50	1,988
	85	3.50	3,654
sandy SILT to silty Till	85	3.20	3,154
	35	4.50	5,321
silty SAND to sandy Till	35	4.00	4,488
	15	5.00	6,154
sandy GRAVEL to GRAVEL	15	4.75	5,738
	0	5.75	7,404

Provide recommendations for resilient modulus for anticipated subgrade conditions along portions of proposed on/off ramp alignments....

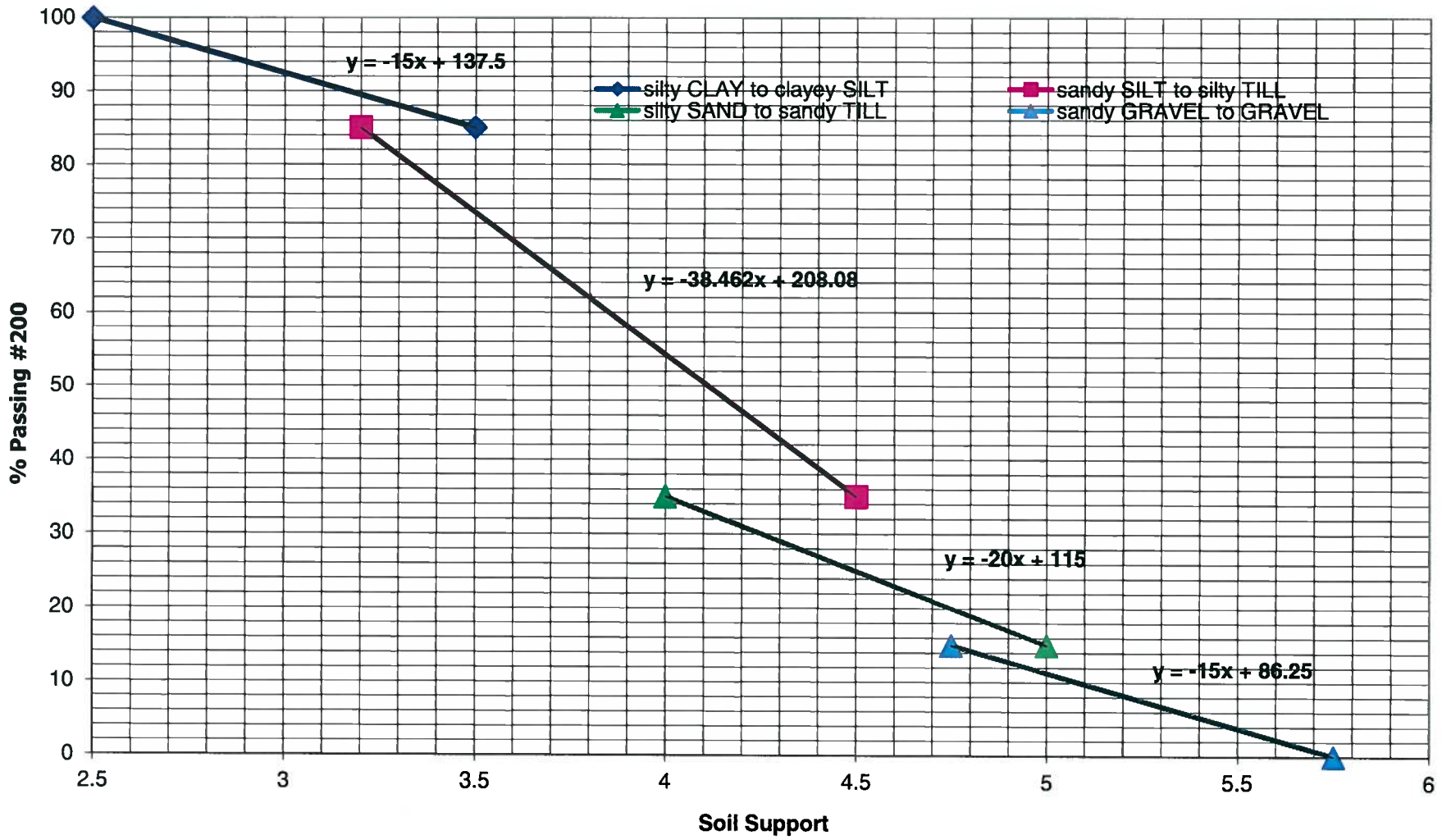
Soil Type	Resilient Modulus (psi)
Silt/Clay	3,600
Glacial Till	5,000
Bedrock	6,500
Granular Borrow	6,000

Refer to the attached table for a summary of anticipated subgrade conditions along portions of proposed on/off ramp alignments.

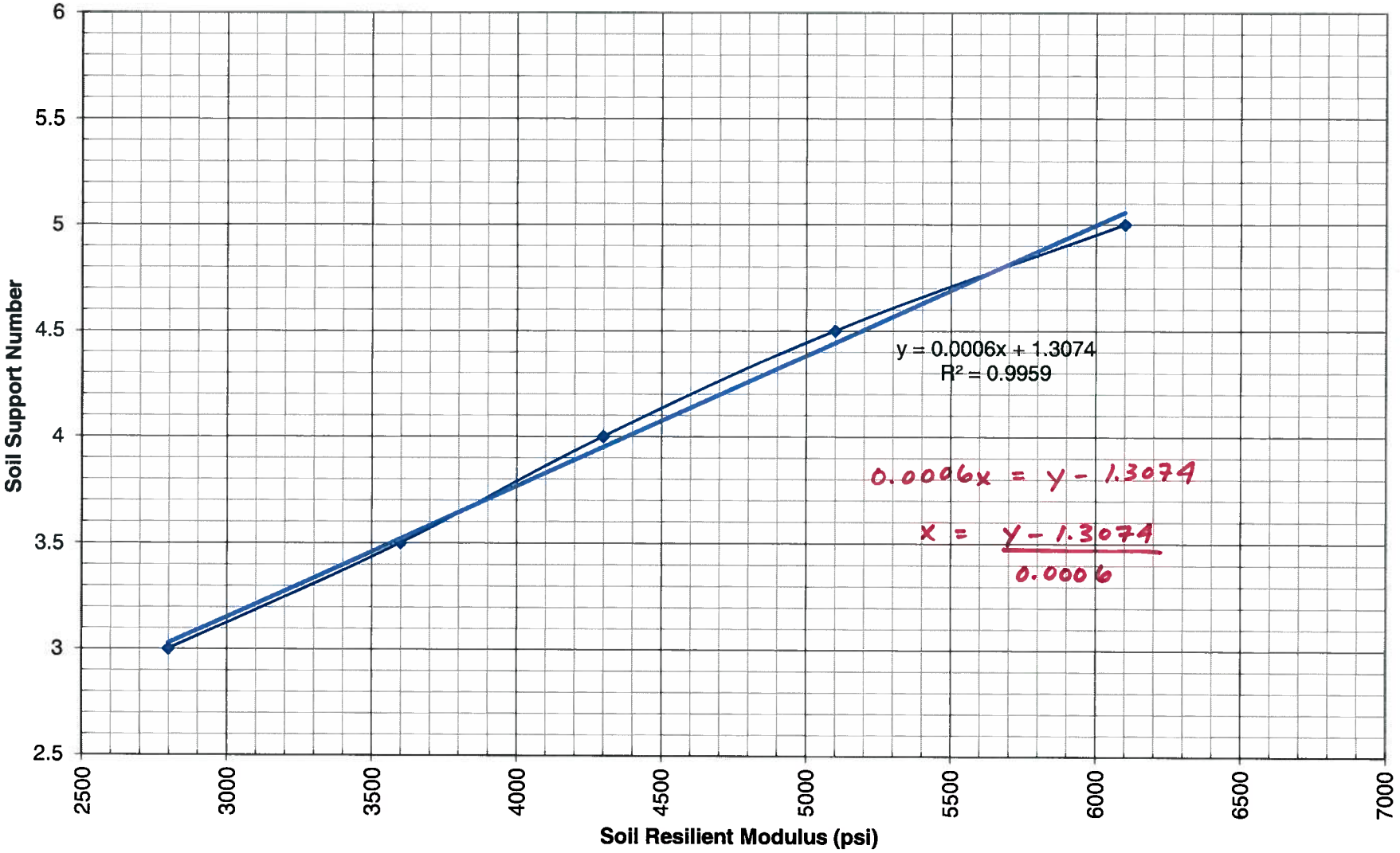
Guidelines for Selection of Soil Support Values for Pavement Design

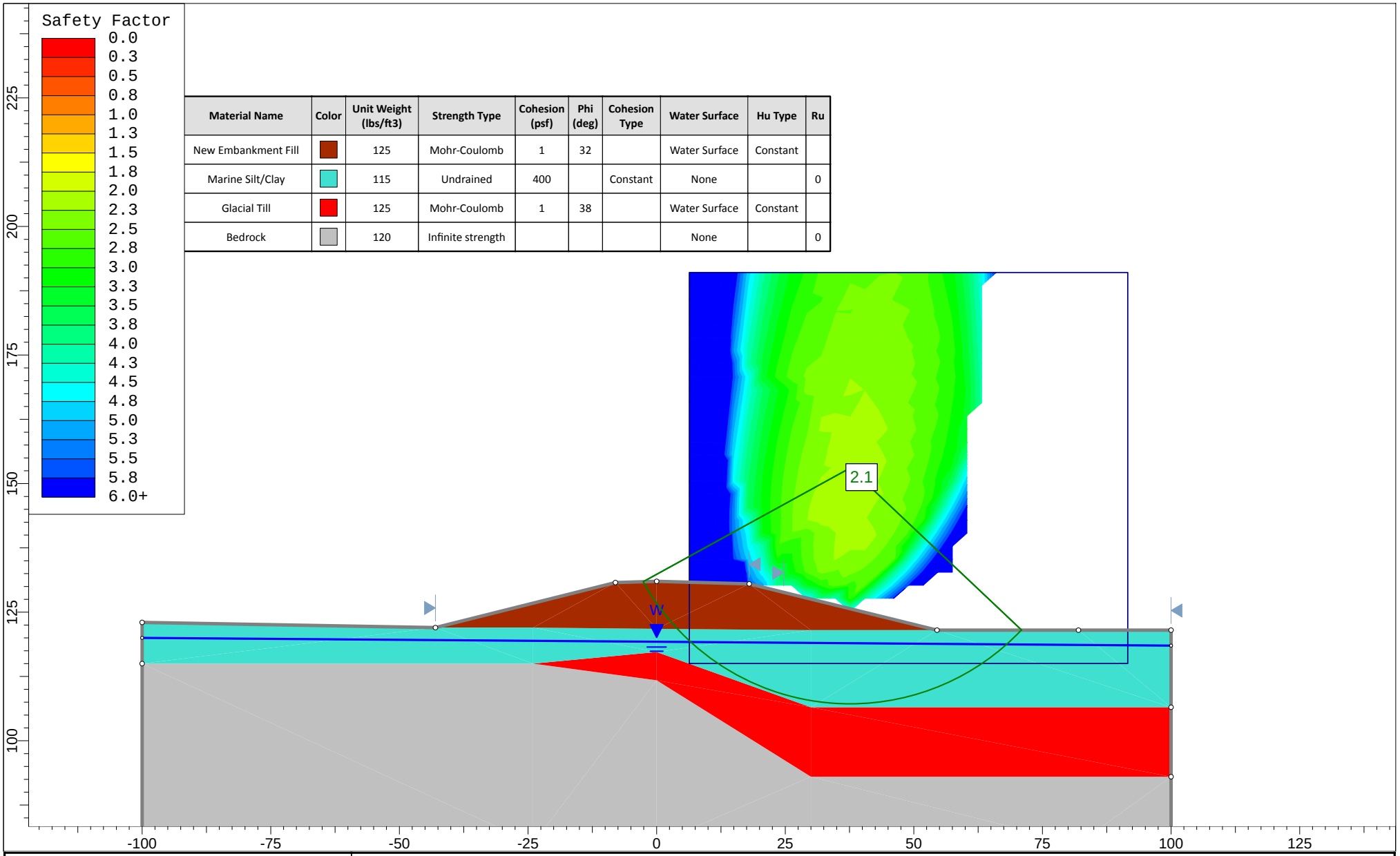


Guidelines for Selection of Soil Support Values for Pavement Design



Determination of Soil Resilient Mondulus



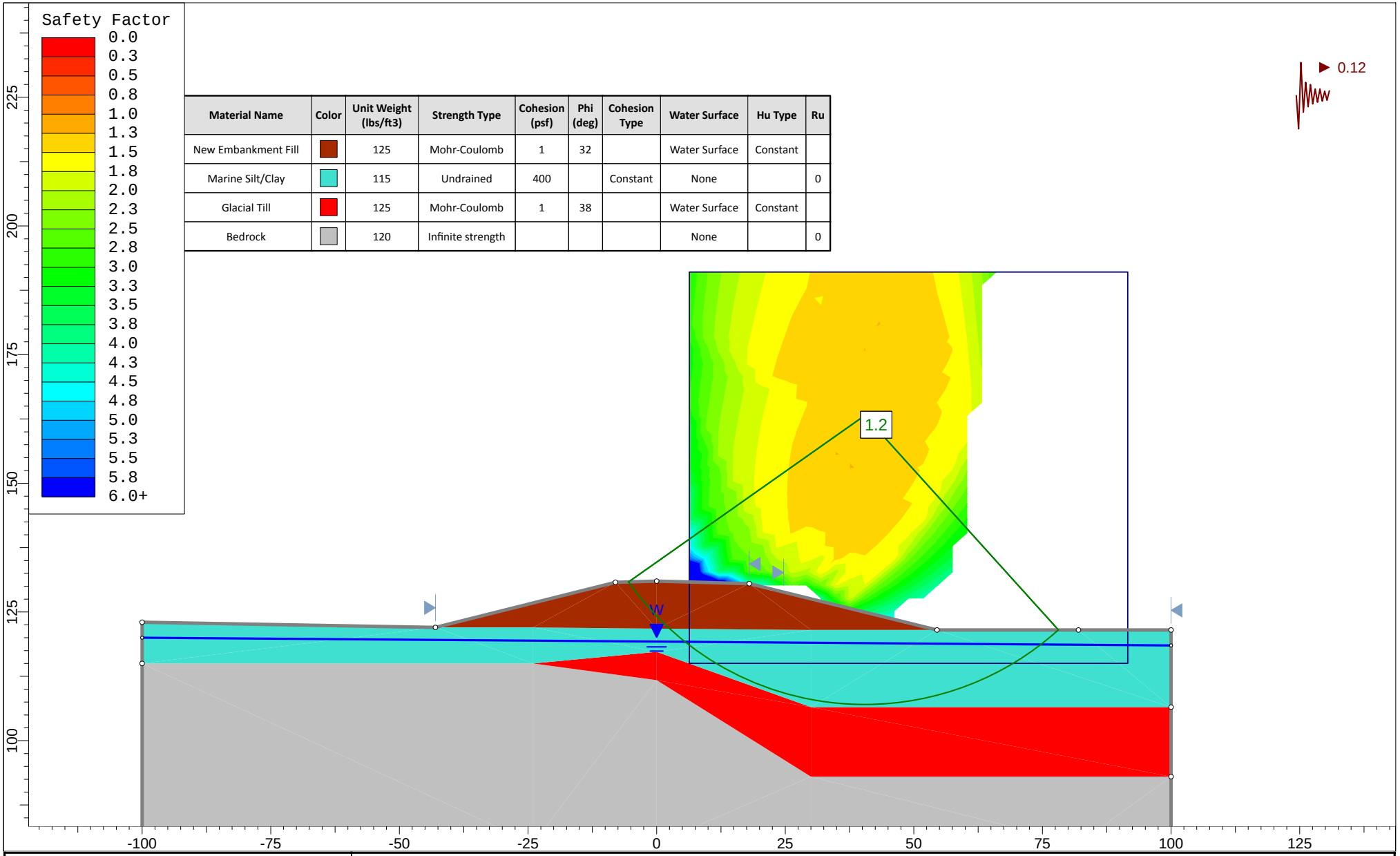


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Water Surface	Hu Type	Ru
New Embankment Fill		125	Mohr-Coulomb	1	32		Water Surface	Constant	
Marine Silt/Clay		115	Undrained	400		Constant	None		0
Glacial Till		125	Mohr-Coulomb	1	38		Water Surface	Constant	
Bedrock		120	Infinite strength				None		0

rocscience

SLIDEINTERPRET 6.019

Project	Yarmouth SB On-Ramp - STA 522+50		
Analysis Description			
Drawn By		*Scale* 1:309	*Company*
Date			*File Name* 2011_0923_HAI_SB On Ramp_N to S.sli



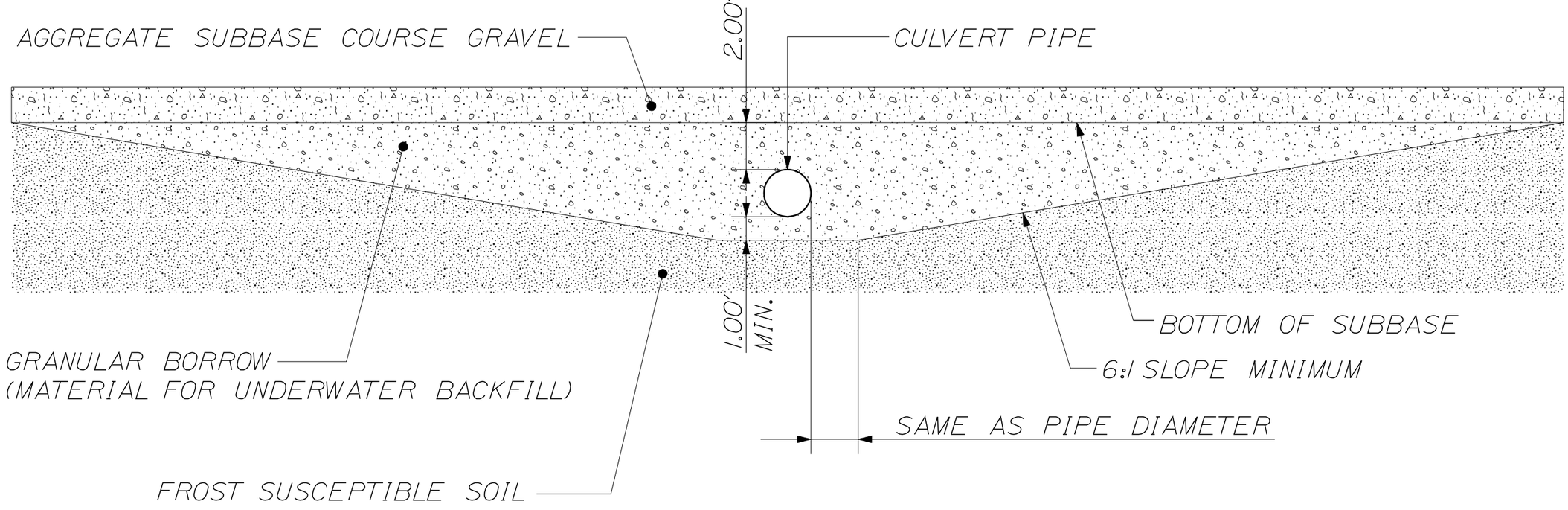
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Cohesion Type	Water Surface	Hu Type	Ru
New Embankment Fill		125	Mohr-Coulomb	1	32		Water Surface	Constant	
Marine Silt/Clay		115	Undrained	400		Constant	None		0
Glacial Till		125	Mohr-Coulomb	1	38		Water Surface	Constant	
Bedrock		120	Infinite strength				None		0

rocscience

SLIDEINTERPRET 6.019

Project	Yarmouth SB On-Ramp - STA 522+50		
Analysis Description			
Drawn By		*Scale* 1:309	*Company*
Date			*File Name* 2011_0923_HAI_SB On Ramp_N to S.sli

CROSS CULVERT IN FROST SUSCEPTIBLE SOILS



Username: jonathon.french Date:12/19/2007
Division: HIGHWAY
Filename: ...\chapter 2\SD_FrostCulvert1.dgn

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-0000(000)X

PIN
00000.00

HIGHWAY PLANS

PROJ. MANAGER			
DESIGN-DETAILED	M.M.	E.M.	3-5-2007
CHECKED-REVIEWED		M.R.P.	
DESIGN2-DETAILED2		M.B.	
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

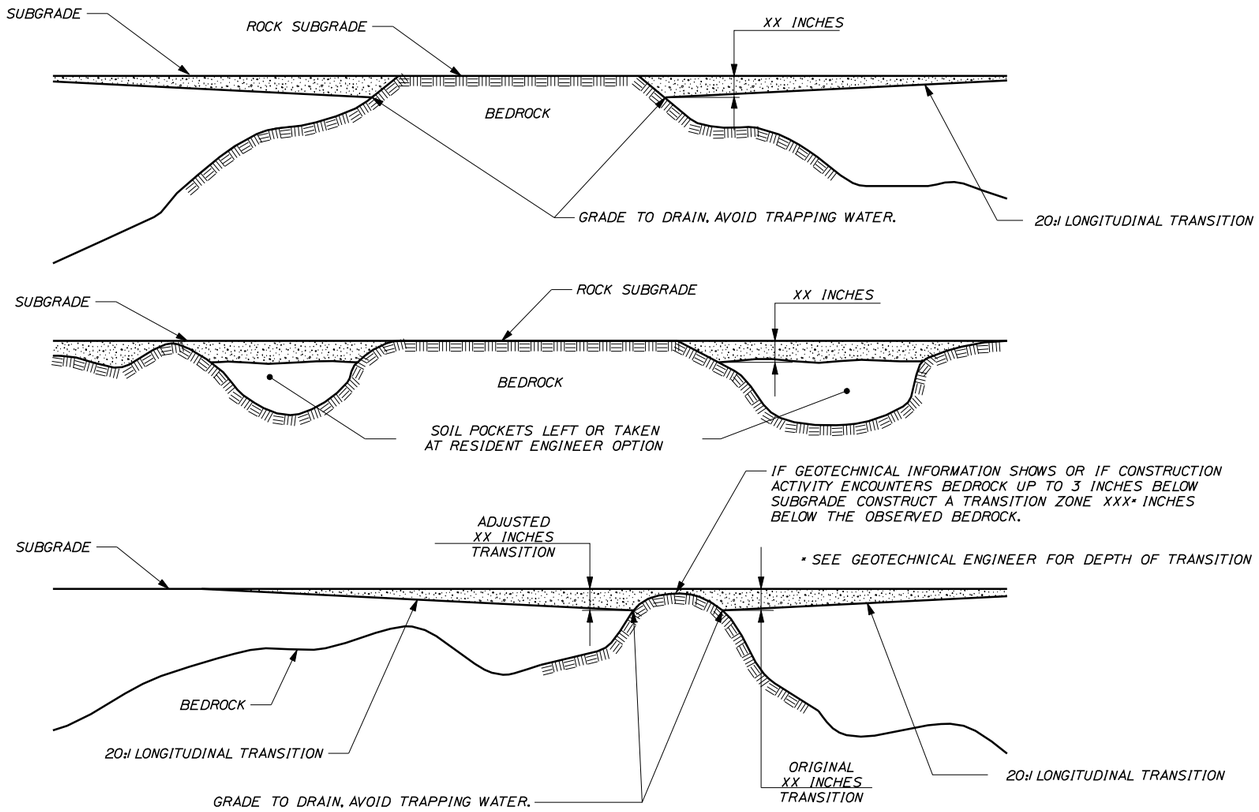
TOWN
ROUTE

SPECIAL DETAILS

SHEET NUMBER

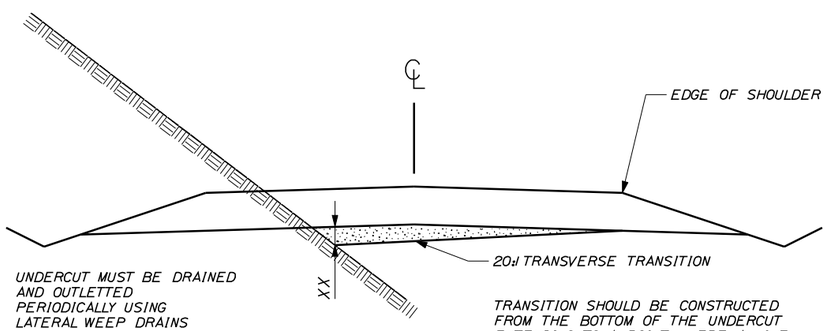
OF

PROFILE OF UNDERCUT OF FROST SUSCEPTIBLE SOILS OVER LEDGE



IF A SOIL SECTION BETWEEN LEDGE SUBGRADE IS OF SUCH LENGTH THAT THE TRANSITION FROM EACH EDGE WOULD MEET, IT SHOULD BE TREATED AS AN EARTH POCKET

TRANSVERSE UNDERCUT OF FROST SUSCEPTIBLE SOILS OVER LEDGE



UNDERCUT MUST BE DRAINED AND OUTLETTED PERIODICALLY USING LATERAL WEEP DRAINS

TRANSITION SHOULD BE CONSTRUCTED FROM THE BOTTOM OF THE UNDERCUT EXTENDING TO A POINT WHERE A LINE PROJECTED DOWNWARD FROM THE EDGE OF SHOULDER INTERCEPTS SUBGRADE

NOTES:

1. EXCAVATION OF THE TRANSITION ZONES SHALL BE PAID FOR AS COMMON EXCAVATION. THE CONTRACTOR SHALL REPLACE THE FROST SUSCEPTIBLE SOILS WITH GRAVEL BORROW AND SHALL BE PAID FOR UNDER THE GRAVEL BORROW PAY ITEM.
2. FOR POTENTIAL BEDROCK LOCATIONS, REFER TO THE BORING LOG SHEETS AND CROSS SECTIONS. ACTUAL BEDROCK LOCATIONS WILL VARY.
3. REFER TO MAINEDOT SOILS REPORT _____ FOR ADDITIONAL TRANSITION ZONE DETAILS.
4. APPROXIMATE ANTICIPATED AREAS OF LEDGE TRANSITIONS ARE LISTED BELOW:

   XX+XX TO XX+XX
   XX+XX TO XX+XX
   XX+XX TO XX+XX
   XX+XX TO XX+XX

   ADDITIONAL AREAS OF LEDGE MAY BE ENCOUNTERED AND THE NEED FOR UNDERCUT SHOULD BE VERIFIED BY THE RESIDENT

SOLID BEDROCK

FROST SUSCEPTIBLE SOIL TO BE UNDERCUT AND REPLACED WITH NON FROST SUSCEPTIBLE MATERIAL

FROST SUSCEPTIBLE SOIL

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

STP-0000(000)X

PIN
00000.00

HIGHWAY PLANS

	E.M.	BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED	M.M.	M.R.P.	3-5-2007
CHECKED-REVIEWED		M.B.	
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

TOWN
ROUTE

SPECIAL DETAILS

SHEET NUMBER

OF

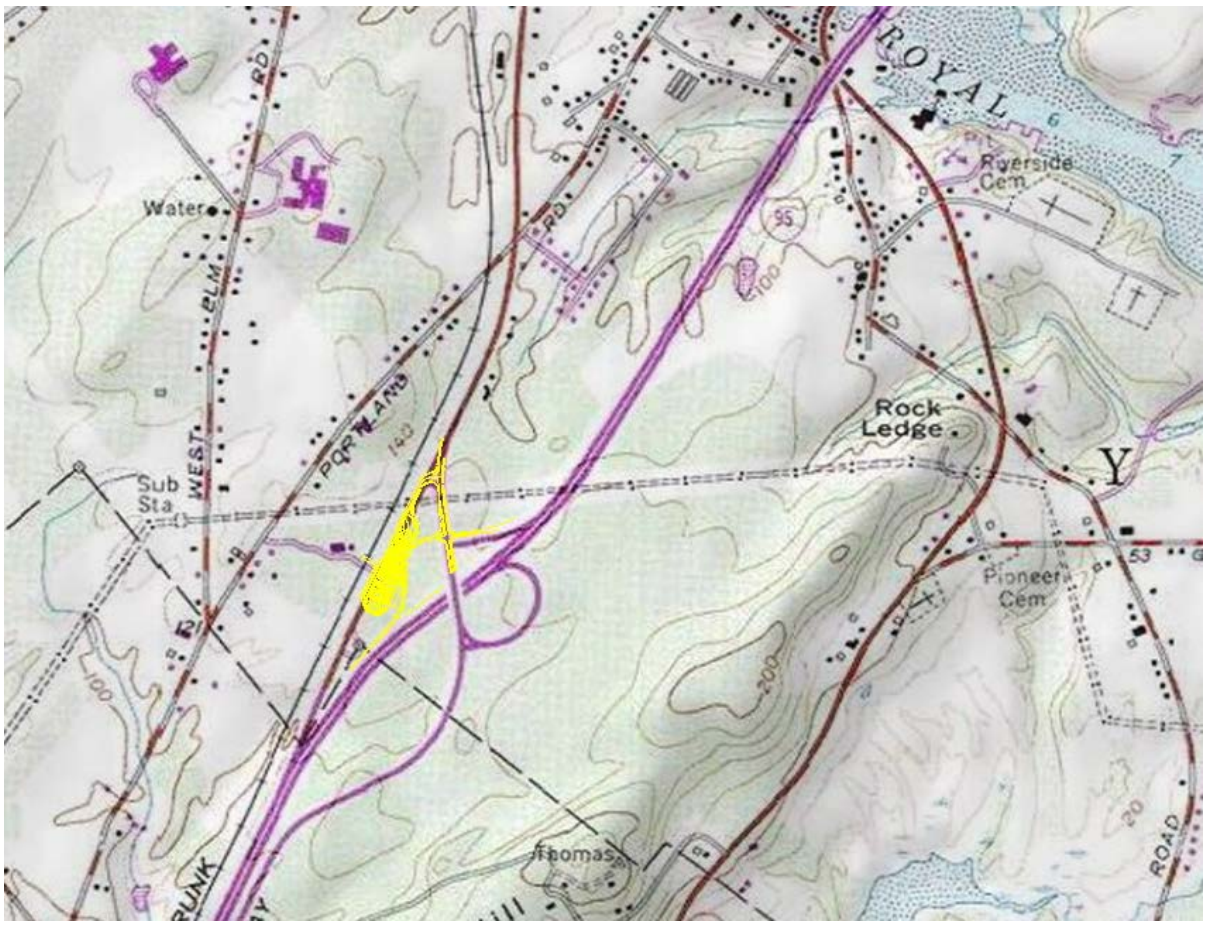
Filename: k:\chapter 2\SD_LEDGE_CUT.dgn Division: HIGHWAY Username: jonathon.french Date:12/19/2007

Final Design Report,

Stormwater Drainage and Treatment,

Park and Ride Facility at Routes 1 and 295

Yarmouth, Maine



PIN 17490.00

By: ***Northstar Hydro, Inc.***

For: FST and Maine Dept. of Transportation

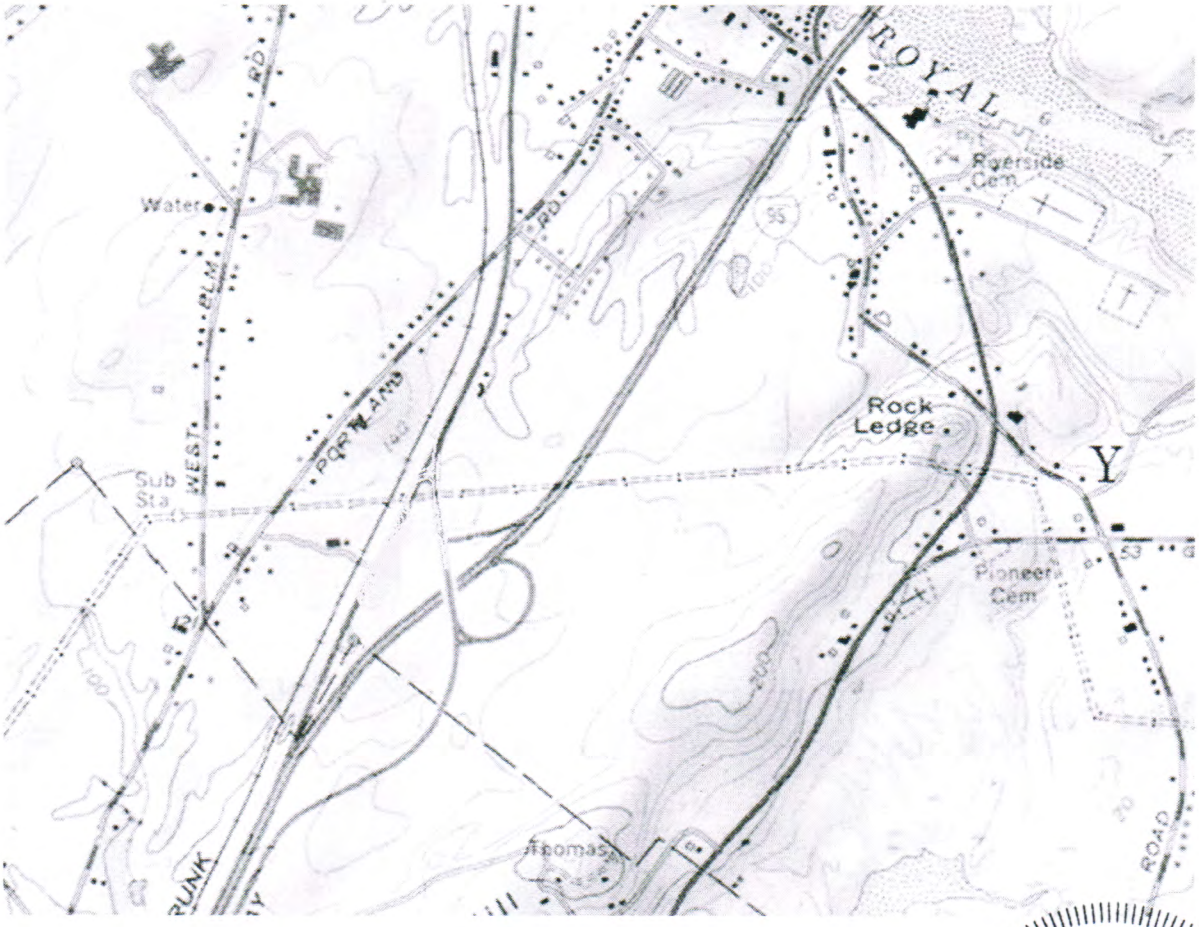
November, 2012

Final Design Report,

Stormwater Drainage and Treatment,

Park and Ride Facility at Routes 1 and 295

Yarmouth, Maine



PIN 17490.00

By: *Northstar Hydro, Inc.*

For: FST and Maine Dept. of Transportation

November, 2012

STATE OF MAINE
ELLEN KNIGHT O'BRIEN
No. 7945
LICENSED PROFESSIONAL ENGINEER
11/30/2012

Final Design Report, Stormwater Drainage and Treatment, Yarmouth Park and Ride Facility at Route 1 and 295

1.0 Introduction

A park and ride facility is proposed near Exit 15 in Yarmouth, at the junction of Route 1 and Route 295. The parking lot is proposed in the wooded area between the existing entrance ramp to Route 295 from Route 1 to Route 295 Southbound. Figure 1 shows the layout for changes to ramps and parking area for the northern side of the Exit 15 interchange.

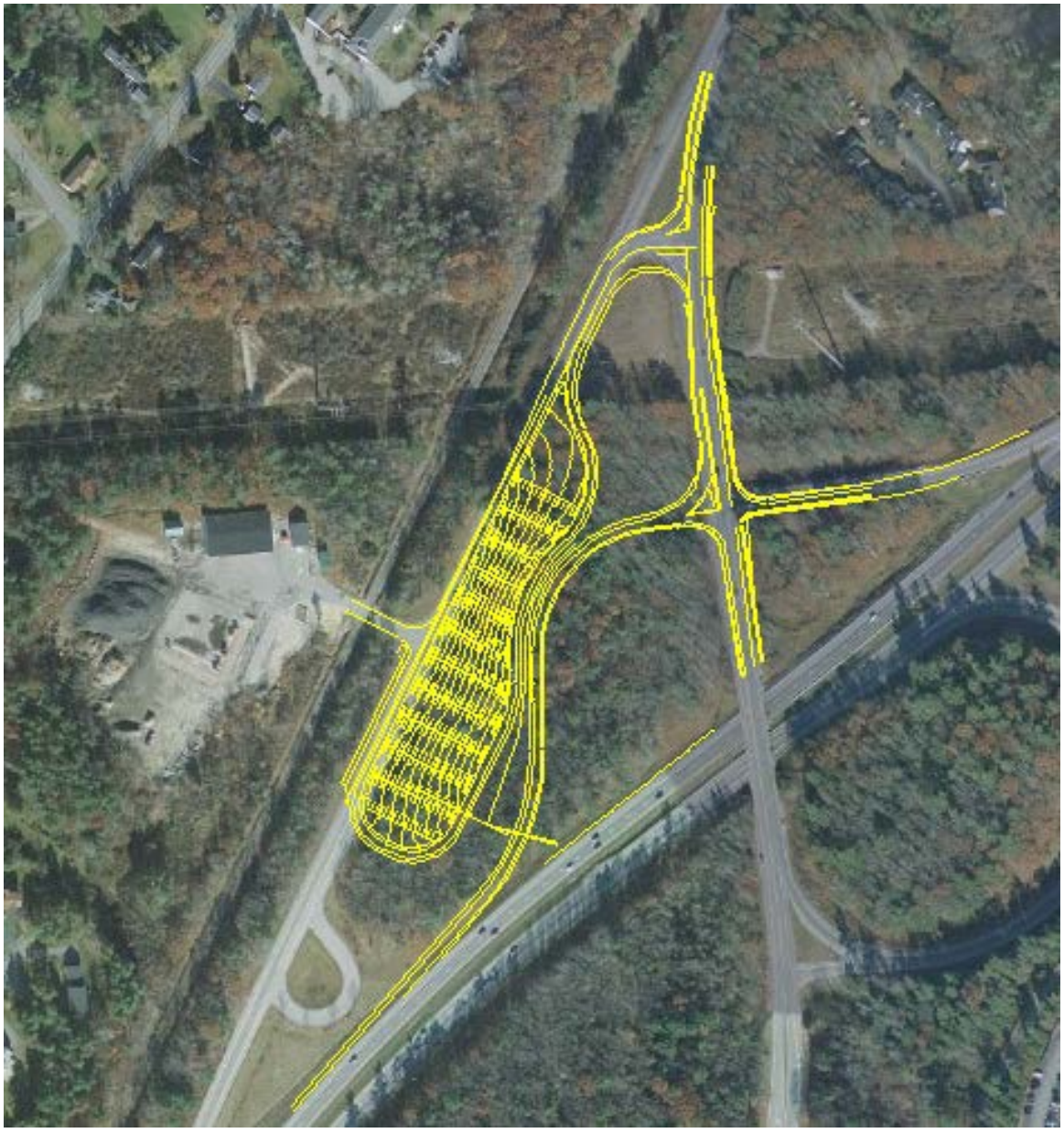


Figure 1. Project Layout

2.0 Existing Conditions

Drainage in the general area drains in three directions. Drainage from the turnaround at the southwest end of the proposed lot flows to the southwest from the roadways. Nearly all of the proposed park and ride lot and surrounding woods drain to the east near the bridge where Route 1 crosses over Route 295. A 24" RCP culvert carries this flow under Route 1 where it flows to the northeast along the north side of Route 295. A small area of woods drains northeast towards the south side of Route 1. Drainage to the south and southwest enters a stream that flows through Cumberland Foreside and into Broad Cove and drainage to the northeast joins a stream that flows to the Royal River. No drainage flows to an "urban impaired stream" or "lake most at risk". Figure 2 shows drainage in the general area of the new park and ride.

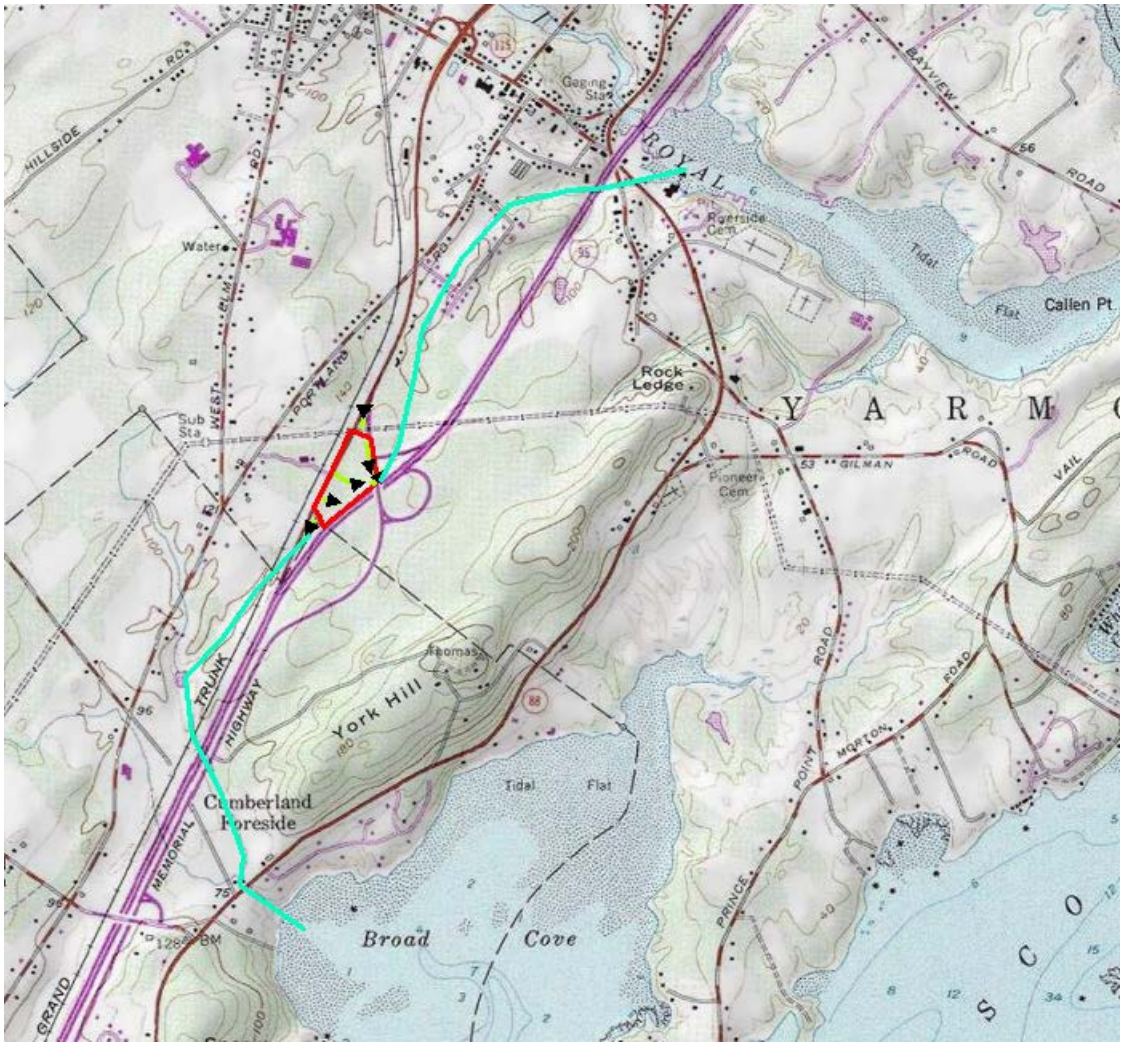


Figure 2. Regional Drainage Map

Figure 3 shows site drainage under existing conditions.

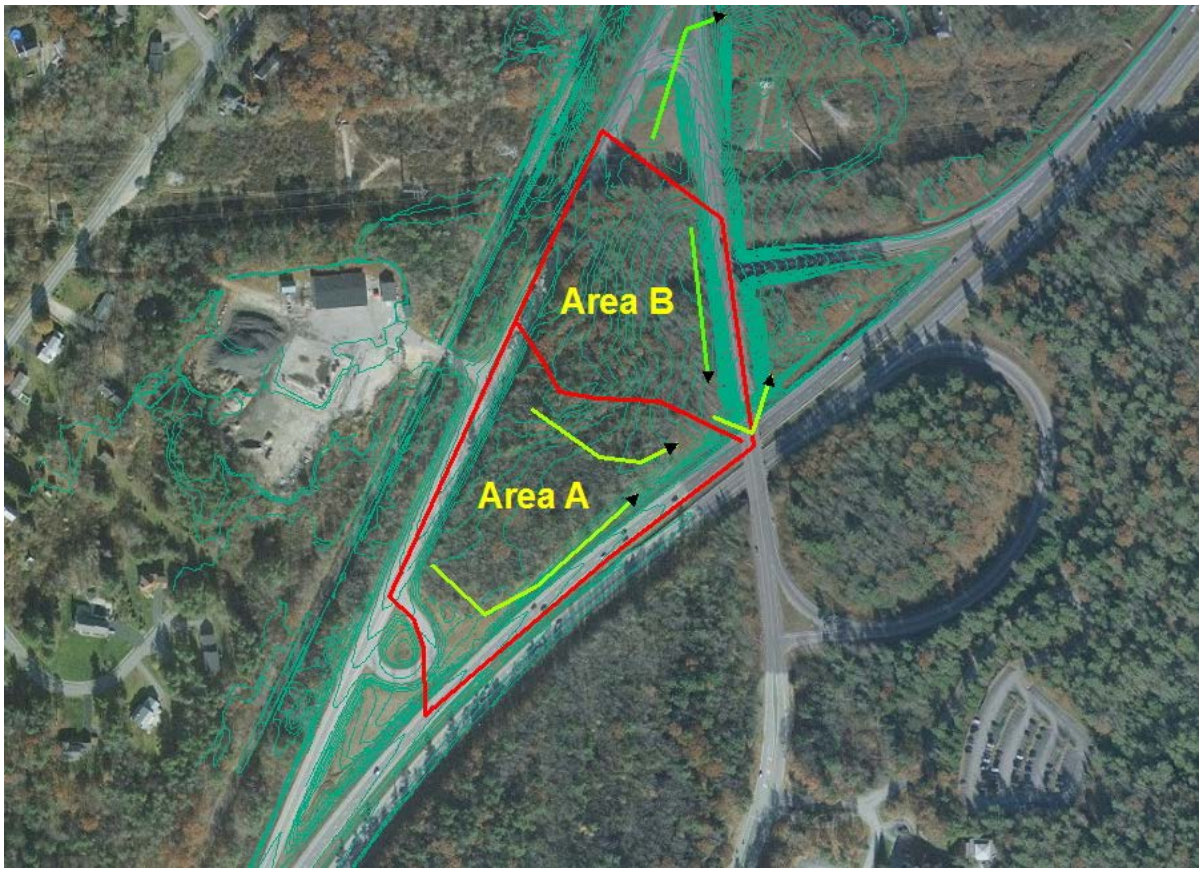


Figure 3. Existing Drainage Map.

Under existing conditions, the site can be divided into two basins that eventually flow to the 24" culvert at Route 1/295. The southwest drainage basin is labeled as Area A, and the northeast basin will is labeled as Area B in Hydrocad computations.

Area A comprises a total of 6.74 acres with 1.23 acres of existing pavement. Area B comprises 5.79 acres with 0.76 acres of existing pavement. Within the area that flows to the 24" culvert, the total existing drainage area for design purposes is 12.53 acres, with 1.99 acres paved.

Site soils are a mix of Hydrologic Soil group B, C and D with the soil's properties dependent on depth to bedrock and water table. Most of these soils are characterized as of the Swanton group (B and D), described in the NRCS Soil Survey of Cumberland County as deep, but poorly drained, over a clay layer. There is also a small area of Hollis soil, hydrologic group C, which is described as shallow to bedrock with outcrops. This is the highest point in the proposed parking area.

Site soil information was taken from the NRCS Soil Survey of Cumberland County., with hydrologic soil types ranging from A – D, with A being most permeable, D being the least permeable. Although site soils are primarily B with some C, some site soils are listed as B/D and C/D.

Existing drainage was modeled using model Hydrocad, a formulation of the NRCS TR20/TR55 rainfall/runoff modeling technique. The following table summarizes flows to the 24" outlet pipe for existing conditions.

Drainage Area: 12.53 Acres, paved area 1.99 acres
Runoff Curve Number: 67
Time of Concentration: 88.0 min.

	Rainfall, in	Flow, cfs	Volume, AF
Water Quality	1.35"	0.04	0.03
2-year:	3.0	2.2	0.6
10-year	4.7	7.0	1.6
25-year	5.5	9.8	2.2
50-year	6.1	11.9	2.7

3.0 Proposed Parking Area

The new parking area is proposed to be approximately 4.06 acres for final design, including the access road, and two bio-retention cell areas. Grading will be generally towards Route 295. For drainage to the 24" culvert, existing pavement totals 1.99 acres existing, and 4.93 acres proposed, for a net increase of 2.94 acres, with a net decrease in paved area occurring in each of the north and south drainage basins that do not outlet at the 24". The area draining to the 24" changes slightly from 12.56 acres existing to 12.41 acres proposed due to regrading. This area includes both linear and non-linear type of development. Total project impervious is discussed in section 4.0 as well. Developed condition hydrology was modeled with Hydrocad, and is summarized below.

Area	Total Acres	Paved Acres	Time of Concentration min.
A1	0.5	0.31	8.6
A2-3	2.87	2.80	7.0
A4	0.36	0.27	7.1
B1	1.84	0.40	49.7
C1	0.33	0.29	6.7
C2	4.41	0.56	85.6
C3	0.43	0.10	15.6
C4	1.67	0.20	26.3
Total:	12.41	4.93	

Figure 4 is an ArcMap version of the project with drainage highlighted is shown below.

Figure 4. Proposed Drainage Map

Summary of Flow at 24” Outlet
Drainage Area: 12.41 Acres, paved area 4.93 acres

	Rainfall, in	Flow, cfs	Volume, AF
Water Quality	1.35”	1.15	.25
2-year:	3.0	4.75	0.93
10-year	4.7	11.6	1.99
25-year	5.5	14.5	2.55
50-year	6.0	15.7	2.92

While these flows are somewhat higher than existing, the capacity of the 24” outlet pipe is approximately 23 cfs, more than adequate to convey up to at least the 50-year storm.

4.0 Stormwater Quality

Pavement within the overall existing area at the park and ride area includes 3.12 acres of pavement as shown in Figure 5.

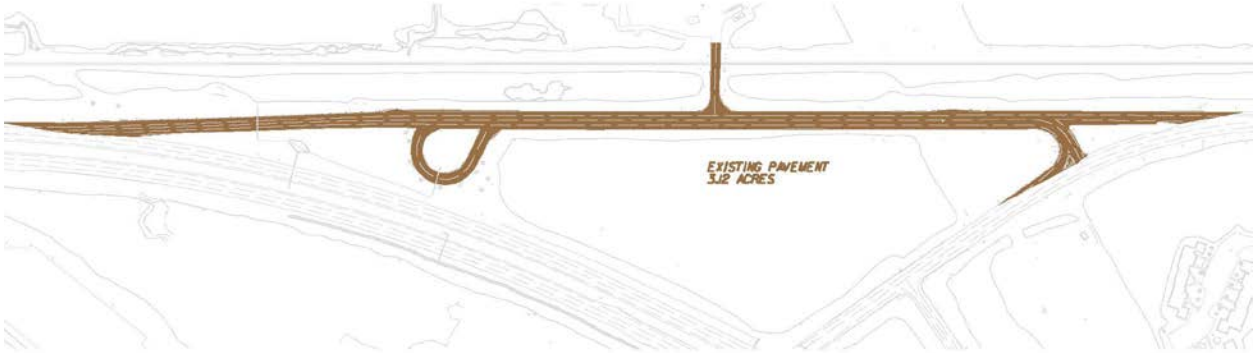


Figure 5. Existing Impervious Area

Proposed developed pavement area is shown on the following figure and totals 5.16 acres for a net increase of 2.04 acres of pavement as shown in Figure 6.

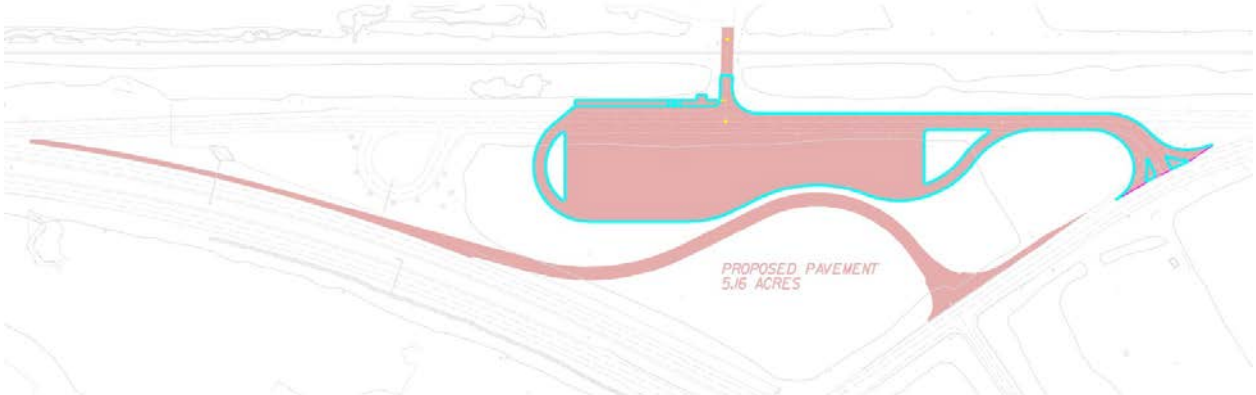


Figure 6. Proposed Impervious Area

The Memorandum of Agreement (MOA) between MDOT and MDEP applies to this project since it is both a linear project and a nonlinear project.

1. "Basic" Standards apply to this project because the project disturbs more than 1 acre. The project is not in the watershed of a "Lake Most at Risk" (LAMAR) or Urban Impaired Stream (UIS). The Basic standards are generally met by applying MDOT's BMP manual. This includes stormwater measures such as inlet/outlet protection for culverts, properly constructed ditches, etc. These standards include basic

- Erosion and Sedimentation Control
- Inspection and Maintenance
- Housekeeping

2. The General Standards apply to the project because a portion is not linear, and it adds more than 1 acre of impervious and disturbs more than 5 acres. According to DEP's Chapter 500:

> "To meet the general standards, a project's stormwater management system must include treatment measures that will mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms, provide for effective treatment of pollutants in stormwater, and mitigate potential temperature impacts. This must be achieved by using one or more of the following methods to control runoff from no less than 95% of the impervious area and no less than 80% of the developed area that is impervious or landscaped. Where treatment of 95% of the impervious area is not practicable, the department may allow treatment on as low as 90% of the impervious area if the applicant is able to demonstrate that treatment of a greater depth of runoff than specified in the standards will result in at least an equivalent amount of overall treatment for the impervious area…
>
> And according to the MOA between MDOT and DEP: "a linear portion of a project that is not associated with an existing travel corridor shall meet the General Standards" to the extent practicable."

Therefore, for this site, ideal treatment goal is to treat 95% of new impervious area, and 80% of the total developed area for the non-linear portion of the site. For the linear portions of the project, treatment shall be "to the extent practicable".

4. The total new pavement for the project is less than 3.0 acres. The project does not need to meet the Phosphorous Standard because it is not in an LMAR watershed and the total new pavement is less than 3.0 acres.

5. The Flooding Standard applies to the extent practicable, but is not mandated because new impervious is less than 3.0 acres.

Meeting the Basic Standards:

All culvert outlets will include standard size plunge pools or aprons depending on downstream topography.

Ditches will be protected with erosion protection material sufficient to prevent erosion and to promote treatment, including Turf Reinforcement Mats as appropriate. Erosion protection measures are detailed on project plans.

Site Goals:

For this site, it is proposed to maintain the existing 24" culvert at the Route 1/295 intersection as the primary egress for stormwater from the site. The system is designed to minimize the 2-, 10-, and 25- year storms to the extent practicable and to provide treatment for 1" of pavement runoff and 0.4" of landscaped area runoff.

In preliminary design, MDOT requested LID measures rather than "end-of-pipe" such as a retention/detention pond first discussed. Measures will include:

- Water quality ditches along the downhill side of the parking area,
- Level Lip spreader(s)
- Buffer flow through undisturbed woods
- Bio-retention cells within parking area

This design is shown on Plan Sheets 15-17 with key elements and inverts identified on the cross sections.

Water Quality Ditch and Bio-retention cells:

The water quality ditch at the base of the parking lot will have the following layout:

- Minimum Bottom width 3'(wider if possible near outlet), 1.5' depth above filtration media near outlet, side slopes 4:1 (target bottom width is 3 X depth, but space between ramp and parking lot limit depth).
- Elevation of top of filter bed at outlet 124.39.
- Drainage layer to include 18" of un-compacted soil filter media, 12" aggregate subbase course with 8" underdrain in center. Geotextile fabric to be placed under the aggregate.
- Overflow beehive grate for higher flows: 18" diameter drop inlet to 18" cross culvert.
- Slope: 0.0% in bio-cell and 0.2- 0.5% in water quality ditch.

Detailed design for the water quality ditch and filter media are shown on project plans, and were based on new recommendations provided by MDOT Environmental staff.

The water quality ditch will be augmented by a bio-retention cell surrounding the outlet of the water quality ditch, and underlain by a set of underdrain pipes and similar filter media to the water quality ditch.

Two additional bio-retention cells will be placed at either end of the parking lot with details, planting and mulching specifications, and filter media as shown on project plans.
The water quality ditch and bio-retention areas will trap and filter all of the parking lot drainage for water quality storms (see summary below).

Level Lip Spreader:

One level lip spreader is used at the base of the ditch along the ramp, area C1 on Hydrocad diagrams based on the following Chapter 500 guidelines for level lip spreaders, and as shown on project plans.

- Stone berm, stone size distribution prescribed in BMP guidance, allows flows to slowly seep through
- Length of berm should be 75-100' PER ACRE of impervious area. One berm is treating approximately 0.31 acres of pavement in area C1, for a minimum berm length of approximately 30'.
- Top of berm must be 0%, base of berm must be on a 0% grade also (on contour), 2' top width
- Minimum height of 18"
- 3' wide 6-12" deep channel along the upstream side to help distribute flows (should convey up to Q10.
- Berms outlet to undisturbed woods buffer area in sheet flow
- Other than the berm, channel sides and bottom should be seeded and covered with erosion control blankets.

The final design allows at least 100' of wooded buffer flow from this level lip area before runoff re-enters a drainage ditch and the 24" culvert.

Chapter 500 guidance for buffer zones for this type of soil and land cover includes:

- The ditches and berms should outlet to undisturbed wooded areas.
- Flow length through the buffer should be at least 100'

LID Treatment Summary:

Summary of Treated areas:

Treatment detail is listed in Table 1 following. The following table is a summary of site treatment.

100%	Non Linear New Paved Area Treated
100%	Non Linear Developed Treated
42%	Linear New Pavement Treated
30%	Linear Landscaped/Developed Area Treated

This design exceeds the standard for non-linear new impervious and developed area and meets the standards to the extent practicable for new linear impervious and developed areas.

Table 1. Yarmouth Park and Ride, Summary of Stormwater Treatment.

NONLINEAR AREA **Goal: Treat 95% new impervious area, and 80% of new developed area.**

Area	Total Area	Total	Existing	New	Total	Existing	New	Impervious	Percent of Total	Developed	Percent of Total	WQ Storm	WQ Storm	BMP and NOTES
A1	0.50	0.31	0.07	0.24	0.16	0.00	0.16	0.31	100%	0.16	100%	0.031	1,360	Water quality ditch and rain garden. Rain garden retains up to 2800 ft^3 below beehive grate for inflitration.
A2-3	2.87	2.80	0.51	2.29	0.07	0.00	0.07	2.80	100%	0.07	100%	0.24	10,266	Water quality ditch with filtration media and underdrain runs along the eastern edge of the park and ride area.
A4	0.36	0.27	0.04	0.23	0.06	0	0.06	0.27	100%	0.06	100%	0.025	1,067	Water quality ditch and rain garden. Rain garden retains up to 3000 ft^3 below beehive grate for inflitration.
TOTAL	3.73	3.38	0.62	2.76	0.29	0.00	0.29	3.38	100%	0.29	100%	0.30	12,693	Note: treatment includes 100% of new impervious plus 0.6 acres of existing impervious

LINEAR AREA **Goal: Treat impervious runoff volume and new developed area runoff volume to extent practicable**

Area	Total Area	Total	Existing	New	Total	Existing	New	Impervious	Percent of Total	Developed	Percent of Total	WQ Storm	WQ Storm	BMP and NOTES
B1	1.84	0.40	0.23	0.17	0.00	0.00	0.00	0.17	43%	0.00	0%	N/A	N/A	Unconcentrated buffer flow through woods. Flow length = 150-300 ft. 100% of new area buffer flow.
C1	0.33	0.29	0.00	0.29	0.04	0.00	0.04	0.29	100%	0.04	100%	N/A	N/A	Ramp area to level lip spreader and woods buffer. 100% treated. Buffer flow = 150-300'
C2	4.41	0.56	0.30	0.26	0.10	0.00	0.10	0.26	46%	0.10	100%	N/A	N/A	Buffer flow. New pavement. Travels wooded buffer of at least 200'.
C3	0.43	0.10	0.00	0.10	0.10	0.00	0.10	0.00	0%	0.00	0%	N/A	N/A	Flow in grassed swale to culvert.
C4	1.67	0.2	0.2	0	0.17	0.2	0.17	0.00	0%	0.00	0%	N/A	N/A	Note: Approximately 0.18 acres of pavement removed in this section. No specific treatment. Flow in grass swale.
TOTAL	8.68	1.55	0.73	0.82	0.41	0.20	0.41	0.72	46%	0.14	34%	N/A	N/A	

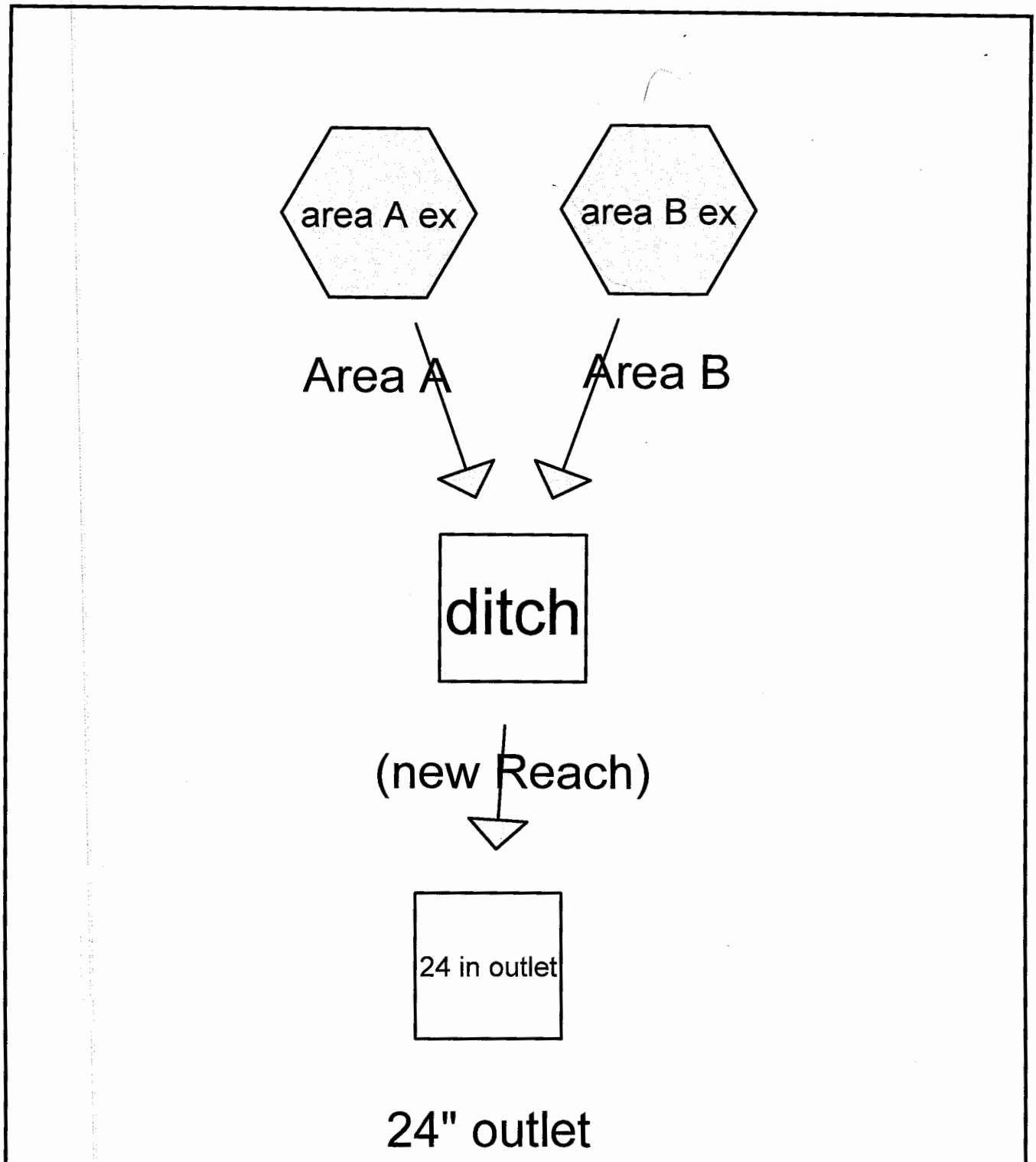
5.0 References

1. Computer Model Hydrocad, Stormwater Modeling System, Version 5.01 and Version 6.0. Applied Microcomputer Systems. www.Hydrocad.net
2. Computer Model Hydraflow, Storm Sewers, Intelisolve. www.Intelisolve.com
3. Maine Dept of Transportation. Best Management Practices for Erosion and Sediment Control.
4. U.S. Dept. of Agriculture. Soil Conservation Service. Soil Survey of Cumberland County. August, 1978
5. ESRI, ARCMAP Version 9.3.1, and ArcGIS Desktop Version 9.3.1

Yarmouth Park and Ride
Final Stormwater Design
Calculations

Hydrocad

- Existing Conditions
  - Water Quality Storm
  - 10-year storm
  - 25-year storm
  - 50-year storm
- Proposed Conditions
  - Water Quality Storm
  - 10-year storm
  - 25-year storm
  - 50-year storm



Subcat Reach Pond Link

Drainage Diagram for yarmouth park and ride existing rev 6-13
Prepared by Microsoft, Printed 6/13/2012
HydroCAD® 9.10 s/n 01047 © 2010 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.330	55	Woods, Good, HSG B (area A ex, area B ex)
3.210	74	>75% Grass cover, Good, HSG C (area A ex, area B ex)
1.990	98	Paved parking, HSG C (area A ex, area B ex)
12.530	67	**TOTAL AREA**

Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment area A ex: Area A Runoff Area=6.740 ac 18.25% Impervious Runoff Depth=2.70"
Flow Length=870' Slope=0.0050 '/' Tc=88.0 min CN=68 Runoff=6.48 cfs 1.515 af

Subcatchment area B ex: Area B Runoff Area=5.790 ac 13.13% Impervious Runoff Depth=2.42"
Flow Length=540' Slope=0.0150 '/' Tc=68.5 min CN=65 Runoff=5.78 cfs 1.170 af

Reach 24 in outlet: 24" outlet Avg. Flow Depth=1.03' Max Vel=7.30 fps Inflow=11.92 cfs 2.685 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=11.92 cfs 2.685 af

Reach ditch: (new Reach) Avg. Flow Depth=0.79' Max Vel=3.46 fps Inflow=11.94 cfs 2.685 af
n=0.030 L=400.0' S=0.0125 '/' Capacity=247.23 cfs Outflow=11.92 cfs 2.685 af

Summary for Subcatchment area A ex: Area A

Runoff = 6.48 cfs @ 13.21 hrs, Volume= 1.515 af, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr Rainfall=6.10"

Area (ac)	CN	Description
3.510	55	Woods, Good, HSG B
1.230	98	Paved parking, HSG C
2.000	74	>75% Grass cover, Good, HSG C
6.740	68	Weighted Average
5.510		81.75% Pervious Area
1.230		18.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.2	100	0.0050	0.02		**Sheet Flow, upper** Woods: Dense underbrush n= 0.800 P2= 3.00"
7.5	80	0.0050	0.18		**Shallow Concentrated Flow, middle** Forest w/Heavy Litter Kv= 2.5 fps
13.3	690	0.0050	0.87	5.20	**Channel Flow, channel** Area= 6.0 sf Perim= 8.0' r= 0.75' n= 0.100 Very weedy reaches w/pools
88.0	870	Total			

Summary for Subcatchment area B ex: Area B

Runoff = 5.78 cfs @ 12.97 hrs, Volume= 1.170 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr Rainfall=6.10"

Area (ac)	CN	Description
3.820	55	Woods, Good, HSG B
0.760	98	Paved parking, HSG C
1.210	74	>75% Grass cover, Good, HSG C
5.790	65	Weighted Average
5.030		86.87% Pervious Area
0.760		13.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
59.9	150	0.0150	0.04		**Sheet Flow, upper** Woods: Dense underbrush n= 0.800 P2= 3.00"
5.4	100	0.0150	0.31		**Shallow Concentrated Flow, middle** Forest w/Heavy Litter Kv= 2.5 fps
3.2	290	0.0150	1.50	9.01	**Channel Flow, lower** Area= 6.0 sf Perim= 8.0' r= 0.75' n= 0.100 Very weedy reaches w/pools

68.5 540 Total

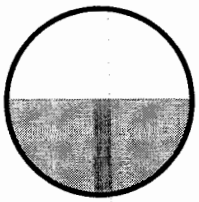
Summary for Reach 24 in outlet: 24" outlet

Inflow Area = 12.530 ac, 15.88% Impervious, Inflow Depth = 2.57"
Inflow = 11.92 cfs @ 13.13 hrs, Volume= 2.685 af
Outflow = 11.92 cfs @ 13.14 hrs, Volume= 2.685 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.30 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.29 fps, Avg. Travel Time= 0.5 min

Peak Storage= 163 cf @ 13.14 hrs
Average Depth at Peak Storage= 1.03'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 22.62 cfs

24.0" Round Pipe
n= 0.013
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 115.00', Outlet Invert= 114.00'



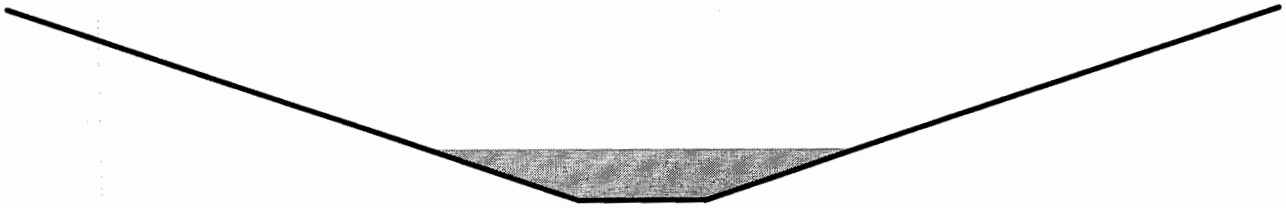
Summary for Reach ditch: (new Reach)

Inflow Area = 12.530 ac, 15.88% Impervious, Inflow Depth = 2.57"
Inflow = 11.94 cfs @ 13.08 hrs, Volume= 2.685 af
Outflow = 11.92 cfs @ 13.13 hrs, Volume= 2.685 af, Atten= 0%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.46 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 4.2 min

Peak Storage= 1,380 cf @ 13.10 hrs
Average Depth at Peak Storage= 0.79'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 247.23 cfs

2.00' x 3.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 20.00'
Length= 400.0' Slope= 0.0125 '/'
Inlet Invert= 120.00', Outlet Invert= 115.00'



Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment area A ex: Area A Runoff Area=6.740 ac 18.25% Impervious Runoff Depth=2.24"
Flow Length=870' Slope=0.0050 '/' Tc=88.0 min CN=68 Runoff=5.33 cfs 1.260 af

Subcatchment area B ex: Area B Runoff Area=5.790 ac 13.13% Impervious Runoff Depth=1.99"
Flow Length=540' Slope=0.0150 '/' Tc=68.5 min CN=65 Runoff=4.69 cfs 0.962 af

Reach 24 in outlet: 24" outlet Avg. Flow Depth=0.92' Max Vel=6.93 fps Inflow=9.74 cfs 2.222 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=9.74 cfs 2.222 af

Reach ditch: (new Reach) Avg. Flow Depth=0.72' Max Vel=3.28 fps Inflow=9.76 cfs 2.222 af
n=0.030 L=400.0' S=0.0125 '/' Capacity=247.23 cfs Outflow=9.74 cfs 2.222 af

Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment area A ex: Area A Runoff Area=6.740 ac 18.25% Impervious Runoff Depth=1.67"
Flow Length=870' Slope=0.0050 '/' Tc=88.0 min CN=68 Runoff=3.88 cfs 0.937 af

Subcatchment area B ex: Area B Runoff Area=5.790 ac 13.13% Impervious Runoff Depth=1.46"
Flow Length=540' Slope=0.0150 '/' Tc=68.5 min CN=65 Runoff=3.32 cfs 0.703 af

Reach 24 in outlet: 24" outlet Avg. Flow Depth=0.76' Max Vel=6.35 fps Inflow=7.00 cfs 1.641 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=7.00 cfs 1.641 af

Reach ditch: (new Reach) Avg. Flow Depth=0.61' Max Vel=3.00 fps Inflow=7.01 cfs 1.641 af
n=0.030 L=400.0' S=0.0125 '/' Capacity=247.23 cfs Outflow=7.00 cfs 1.641 af

Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment area A ex: Area A Runoff Area=6.740 ac 18.25% Impervious Runoff Depth=0.63"
Flow Length=870' Slope=0.0050 '/' Tc=88.0 min CN=68 Runoff=1.25 cfs 0.352 af

Subcatchment area B ex: Area B Runoff Area=5.790 ac 13.13% Impervious Runoff Depth=0.51"
Flow Length=540' Slope=0.0150 '/' Tc=68.5 min CN=65 Runoff=0.94 cfs 0.244 af

Reach 24 in outlet: 24" outlet Avg. Flow Depth=0.42' Max Vel=4.53 fps Inflow=2.14 cfs 0.596 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=2.14 cfs 0.596 af

Reach ditch: (new Reach) Avg. Flow Depth=0.33' Max Vel=2.15 fps Inflow=2.15 cfs 0.596 af
n=0.030 L=400.0' S=0.0125 '/' Capacity=247.23 cfs Outflow=2.14 cfs 0.596 af

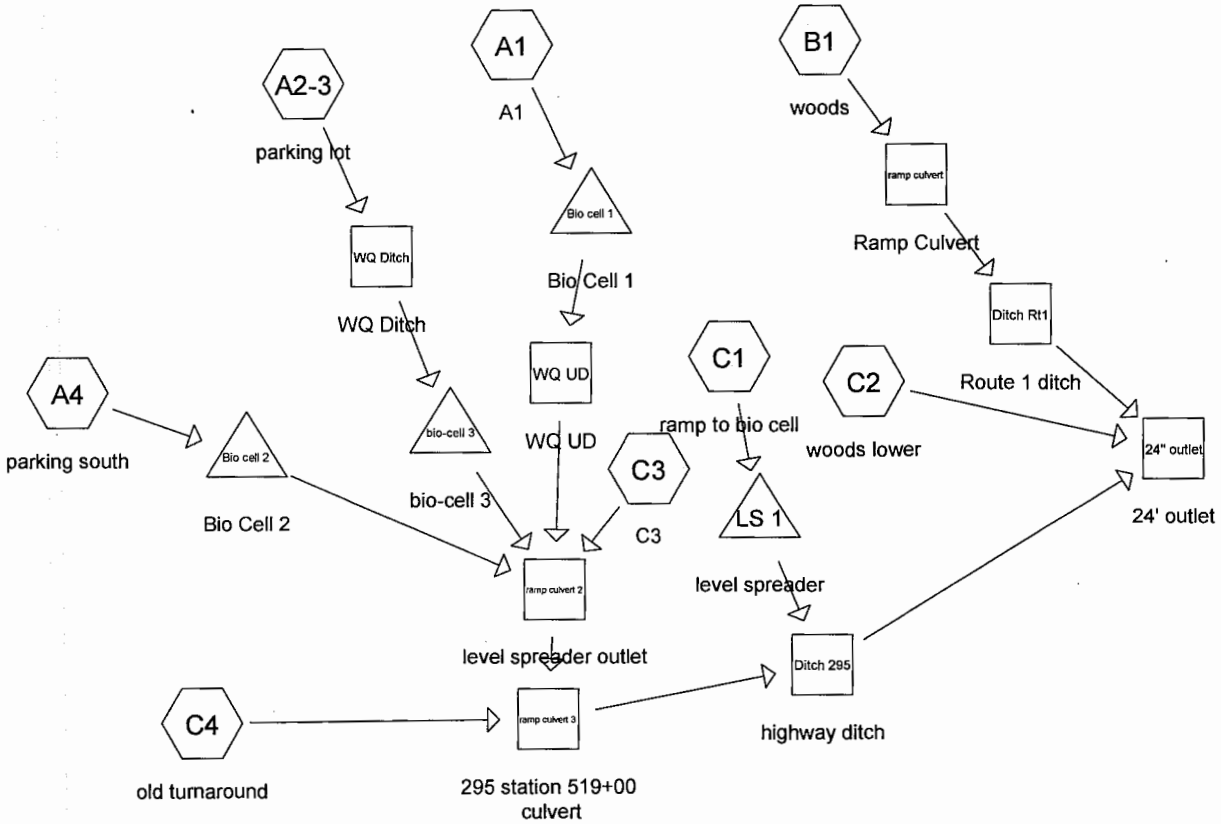
Time span=5.00-72.00 hrs, dt=0.05 hrs, 1341 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment area A ex: Area A Runoff Area=6.740 ac 18.25% Impervious Runoff Depth=0.03"
Flow Length=870' Slope=0.0050 '/' Tc=88.0 min CN=68 Runoff=0.03 cfs 0.018 af

Subcatchment area B ex: Area B Runoff Area=5.790 ac 13.13% Impervious Runoff Depth=0.01"
Flow Length=540' Slope=0.0150 '/' Tc=68.5 min CN=65 Runoff=0.01 cfs 0.006 af

Reach 24 in outlet: 24" outlet Avg. Flow Depth=0.06' Max Vel=1.32 fps Inflow=0.04 cfs 0.025 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=0.04 cfs 0.025 af

Reach ditch: (new Reach) Avg. Flow Depth=0.03' Max Vel=0.54 fps Inflow=0.04 cfs 0.025 af
n=0.030 L=400.0' S=0.0125 '/' Capacity=247.23 cfs Outflow=0.04 cfs 0.025 af



Subcat Reach Pond Link

Drainage Diagram for yarmouth P&R 6-13 proposed
Prepared by Microsoft, Printed 11/30/2012
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.070	55	Woods, Good, HSG B (B1, C2)
0.860	58	Woods/grass comb., Good, HSG B (C4)
1.230	61	>75% Grass cover, Good, HSG B (A2-3, C2, C3, C4)
3.380	98	Paved parking, HSG A (A1, A2-3, A4)
0.100	98	Paved parking, HSG B (C3)
1.450	98	Paved parking, HSG C (B1, C1, C2, C4)
0.090	98	Water Surface, 0% imp, HSG A (A4)
0.190	98	Water Surface, 0% imp, HSG C (A1)
0.040	98	Water Surface, HSG B (C1)

Time span=1.00-20.00 hrs, dt=0.01 hrs, 1901 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: A1 Runoff Area=0.500 ac 62.00% Impervious Runoff Depth>1.07"
Flow Length=125' Slope=0.0250 '/' Tc=8.6 min CN=98 Runoff=0.84 cfs 0.044 af

Subcatchment A2-3: parking lot Runoff Area=2.870 ac 97.56% Impervious Runoff Depth>0.97"
Flow Length=256' Slope=0.0018 '/' Tc=7.0 min CN=97 Runoff=4.81 cfs 0.233 af

Subcatchment A4: parking south Runoff Area=0.360 ac 75.00% Impervious Runoff Depth>1.07"
Flow Length=122' Slope=0.0200 '/' Tc=7.1 min CN=98 Runoff=0.63 cfs 0.032 af

Subcatchment B1: woods Runoff Area=1.840 ac 21.74% Impervious Runoff Depth>0.00"
Flow Length=396' Tc=49.7 min CN=64 Runoff=0.00 cfs 0.001 af

Subcatchment C1: ramp to bio cell Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>1.07"
Flow Length=330' Slope=0.0030 '/' Tc=6.7 min CN=98 Runoff=0.59 cfs 0.029 af

Subcatchment C2: woods lower Runoff Area=4.410 ac 12.70% Impervious Runoff Depth>0.00"
Flow Length=500' Tc=85.6 min CN=61 Runoff=0.00 cfs 0.000 af

Subcatchment C3: C3 Runoff Area=0.430 ac 23.26% Impervious Runoff Depth>0.04"
Flow Length=76' Slope=0.0100 '/' Tc=15.6 min CN=70 Runoff=0.00 cfs 0.001 af

Subcatchment C4: old turnaround Runoff Area=1.670 ac 11.98% Impervious Runoff Depth>0.00"
Flow Length=515' Tc=26.3 min CN=64 Runoff=0.00 cfs 0.001 af

Reach 24" outlet: 24' outlet Avg. Flow Depth=0.31' Max Vel=3.77 fps Inflow=1.15 cfs 0.247 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=1.15 cfs 0.247 af

Reach Ditch 295: highway ditch Avg. Flow Depth=1.04' Max Vel=0.36 fps Inflow=1.66 cfs 0.260 af
n=0.240 L=583.0' S=0.0086 '/' Capacity=19.59 cfs Outflow=1.15 cfs 0.247 af

Reach Ditch Rt1: Route 1 ditch Avg. Flow Depth=0.10' Max Vel=0.10 fps Inflow=0.00 cfs 0.001 af
n=0.240 L=300.0' S=0.0167 '/' Capacity=5.94 cfs Outflow=0.00 cfs 0.000 af

Reach ramp culvert: Ramp Culvert Avg. Flow Depth=0.02' Max Vel=0.54 fps Inflow=0.00 cfs 0.001 af
18.0" Round Pipe n=0.013 L=120.0' S=0.0083 '/' Capacity=9.59 cfs Outflow=0.00 cfs 0.001 af

Reach ramp culvert 2: level spreader Avg. Flow Depth=0.40' Max Vel=4.31 fps Inflow=1.62 cfs 0.235 af
18.0" Round Pipe n=0.013 L=73.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=1.62 cfs 0.234 af

Reach ramp culvert 3: 295 station Avg. Flow Depth=0.40' Max Vel=4.31 fps Inflow=1.62 cfs 0.235 af
18.0" Round Pipe n=0.013 L=63.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=1.62 cfs 0.235 af

Reach WQ Ditch: WQ Ditch Avg. Flow Depth=0.87' Max Vel=0.28 fps Inflow=4.81 cfs 0.233 af
n=0.240 L=713.0' S=0.0046 '/' Capacity=16.81 cfs Outflow=1.60 cfs 0.220 af

Reach WQ UD: WQ UD Avg. Flow Depth=0.09' Max Vel=1.12 fps Inflow=0.03 cfs 0.021 af
8.0" Round Pipe n=0.013 L=713.0' S=0.0046 '/' Capacity=0.82 cfs Outflow=0.03 cfs 0.020 af

Pond Bio cell 1: Bio Cell 1 Peak Elev=128.17' Storage=1,322 cf Inflow=0.84 cfs 0.044 af
Outflow=0.03 cfs 0.021 af

Pond Bio cell 2: Bio Cell 2 Peak Elev=125.34' Storage=1,230 cf Inflow=0.63 cfs 0.032 af
Outflow=0.01 cfs 0.004 af

Pond bio-cell 3: bio-cell 3 Peak Elev=125.08' Storage=624 cf Inflow=1.60 cfs 0.220 af
Outflow=1.59 cfs 0.210 af

Pond LS 1: level spreader Peak Elev=125.00' Storage=652 cf Inflow=0.59 cfs 0.029 af
Outflow=0.11 cfs 0.025 af

Summary for Subcatchment A1: A1

Runoff = 0.84 cfs @ 12.00 hrs, Volume= 0.044 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.310	98	Paved parking, HSG A
0.190	98	Water Surface, 0% imp, HSG C
0.500	98	Weighted Average
0.190		38.00% Pervious Area
0.310		62.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	75	0.0250	1.37		**Sheet Flow, paved** Smooth surfaces n= 0.011 P2= 3.00"
7.7	50	0.0250	0.11		**Sheet Flow, bio cell** Grass: Dense n= 0.240 P2= 3.00"
8.6	125	Total			

Summary for Subcatchment A2-3: parking lot

Runoff = 4.81 cfs @ 11.98 hrs, Volume= 0.233 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
1.350	98	Paved parking, HSG A
1.450	98	Paved parking, HSG A
0.070	61	>75% Grass cover, Good, HSG B
2.870	97	Weighted Average
0.070		2.44% Pervious Area
2.800		97.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	256	0.0018	0.61		**Sheet Flow, parking** Smooth surfaces n= 0.011 P2= 3.00"

Summary for Subcatchment A4: parking south

Runoff = 0.63 cfs @ 11.98 hrs, Volume= 0.032 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.090	98	Water Surface, 0% imp, HSG A
0.270	98	Paved parking, HSG A
0.360	98	Weighted Average
0.090		25.00% Pervious Area
0.270		75.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	90	0.0200	1.30		**Sheet Flow, parking** Smooth surfaces n= 0.011 P2= 3.00"
5.9	32	0.0200	0.09		**Sheet Flow, bio cell** Grass: Dense n= 0.240 P2= 3.00"
7.1	122	Total			

Summary for Subcatchment B1: woods

Runoff = 0.00 cfs @ 19.49 hrs, Volume= 0.001 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.400	98	Paved parking, HSG C
1.440	55	Woods, Good, HSG B
1.840	64	Weighted Average
1.440		78.26% Pervious Area
0.400		21.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
47.0	236	0.0170	0.08		**Sheet Flow, upper** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0380	0.97		**Shallow Concentrated Flow, lower** Woodland Kv= 5.0 fps
49.7	396	Total			

Summary for Subcatchment C1: ramp to bio cell

Runoff = 0.59 cfs @ 11.98 hrs, Volume= 0.029 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.290	98	Paved parking, HSG C
0.040	98	Water Surface, HSG B
0.330	98	Weighted Average
0.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	330	0.0030	0.82		**Shallow Concentrated Flow, grass swale** Grassed Waterway Kv= 15.0 fps

Summary for Subcatchment C2: woods lower

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.560	98	Paved parking, HSG C
3.630	55	Woods, Good, HSG B
0.220	61	>75% Grass cover, Good, HSG B
4.410	61	Weighted Average
3.850		87.30% Pervious Area
0.560		12.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
79.1	300	0.0300	0.06		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 3.00"
6.5	200	0.0100	0.51	3.07	**Channel Flow, route 1 ditch** Area= 6.0 sf Perim= 8.0' r= 0.75' n= 0.240 Sheet flow over Dense Grass
85.6	500	Total			

Summary for Subcatchment C3: C3

Runoff = 0.00 cfs @ 12.53 hrs, Volume= 0.001 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.330	61	>75% Grass cover, Good, HSG B
0.100	98	Paved parking, HSG B
0.430	70	Weighted Average
0.330		76.74% Pervious Area
0.100		23.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	76	0.0100	0.08		**Sheet Flow, grass** Grass: Dense n= 0.240 P2= 3.00"

Summary for Subcatchment C4: old turnaround

Runoff = 0.00 cfs @ 19.14 hrs, Volume= 0.001 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Type II 24-hr Rainfall=1.35"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG C
0.610	61	>75% Grass cover, Good, HSG B
0.860	58	Woods/grass comb., Good, HSG B
1.670	64	Weighted Average
1.470		88.02% Pervious Area
0.200		11.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	75	0.0670	0.17		**Sheet Flow, sheet** Grass: Dense n= 0.240 P2= 3.00"
6.7	200	0.0050	0.49		**Shallow Concentrated Flow, woods** Short Grass Pasture Kv= 7.0 fps
12.4	240	0.0040	0.32	1.94	**Channel Flow, road ditch** Area= 6.0 sf Perim= 8.0' r= 0.75' n= 0.240 Sheet flow over Dense Grass
26.3	515	Total			

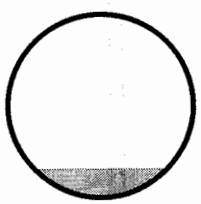
Summary for Reach 24" outlet: 24' outlet

Inflow Area = 12.410 ac, 40.05% Impervious, Inflow Depth > 0.24"
Inflow = 1.15 cfs @ 13.72 hrs, Volume= 0.247 af
Outflow = 1.15 cfs @ 13.73 hrs, Volume= 0.247 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.77 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 1.0 min

Peak Storage= 31 cf @ 13.72 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 22.62 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 100.0' Slope= 0.0100 '/'
Inlet Invert= 115.00', Outlet Invert= 114.00'



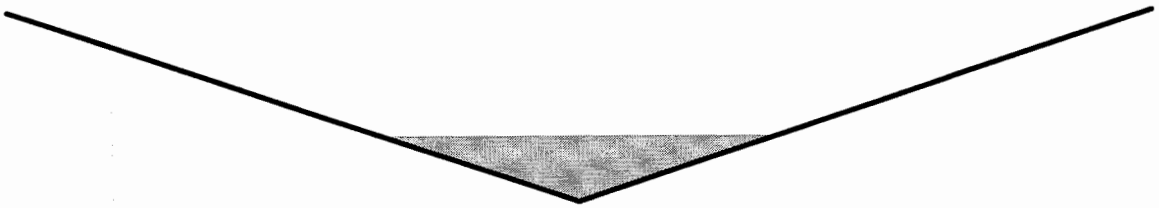
Summary for Reach Ditch 295: highway ditch

Inflow Area = 6.160 ac, 65.10% Impervious, Inflow Depth > 0.51"
Inflow = 1.66 cfs @ 12.85 hrs, Volume= 0.260 af
Outflow = 1.15 cfs @ 13.72 hrs, Volume= 0.247 af, Atten= 31%, Lag= 51.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.36 fps, Min. Travel Time= 27.2 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 59.0 min

Peak Storage= 1,879 cf @ 13.26 hrs
Average Depth at Peak Storage= 1.04'
Bank-Full Depth= 3.00', Capacity at Bank-Full= 19.59 cfs

0.00' x 3.00' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 3.0 '/' Top Width= 18.00'
Length= 583.0' Slope= 0.0086 '/'
Inlet Invert= 120.00', Outlet Invert= 115.00'



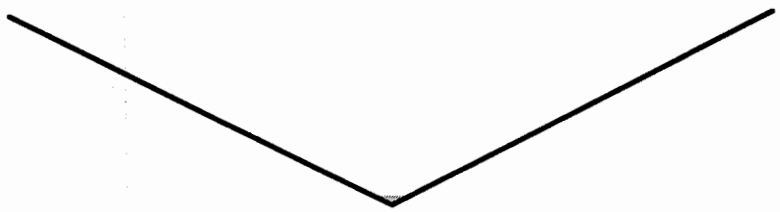
Summary for Reach Ditch Rt1: Route 1 ditch

Inflow Area = 1.840 ac, 21.74% Impervious, Inflow Depth > 0.00"
Inflow = 0.00 cfs @ 19.58 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 20.00 hrs, Volume= 0.000 af, Atten= 7%, Lag= 25.3 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.10 fps, Min. Travel Time= 50.6 min
Avg. Velocity = 0.08 fps, Avg. Travel Time= 62.6 min

Peak Storage= 6 cf @ 20.00 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 5.94 cfs

0.00' x 2.00' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 300.0' Slope= 0.0167 '/'
Inlet Invert= 120.00', Outlet Invert= 115.00'



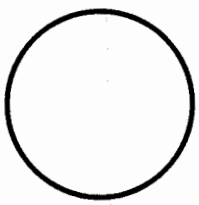
Summary for Reach ramp culvert: Ramp Culvert

Inflow Area = 1.840 ac, 21.74% Impervious, Inflow Depth > 0.00"
Inflow = 0.00 cfs @ 19.49 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 19.58 hrs, Volume= 0.001 af, Atten= 0%, Lag= 5.1 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.54 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 3.9 min

Peak Storage= 0 cf @ 19.52 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.59 cfs

18.0" Round Pipe
n= 0.013
Length= 120.0' Slope= 0.0083 '/'
Inlet Invert= 121.00', Outlet Invert= 120.00'



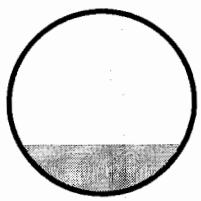
Summary for Reach ramp culvert 2: level spreader outlet

Inflow Area = 4.160 ac, 83.65% Impervious, Inflow Depth > 0.68"
Inflow = 1.62 cfs @ 12.84 hrs, Volume= 0.235 af
Outflow = 1.62 cfs @ 12.84 hrs, Volume= 0.234 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.31 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 0.7 min

Peak Storage= 27 cf @ 12.84 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 10.50 cfs

18.0" Round Pipe
n= 0.013
Length= 73.0' Slope= 0.0100 '/'
Inlet Invert= 121.06', Outlet Invert= 120.33'



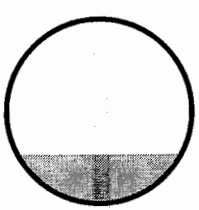
Summary for Reach ramp culvert 3: 295 station 519+00 culvert

Inflow Area = 5.830 ac, 63.12% Impervious, Inflow Depth > 0.48"
Inflow = 1.62 cfs @ 12.84 hrs, Volume= 0.235 af
Outflow = 1.62 cfs @ 12.85 hrs, Volume= 0.235 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.31 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 0.6 min

Peak Storage= 24 cf @ 12.85 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 10.50 cfs

18.0" Round Pipe
n= 0.013
Length= 63.0' Slope= 0.0100 '/'
Inlet Invert= 120.13', Outlet Invert= 119.50'



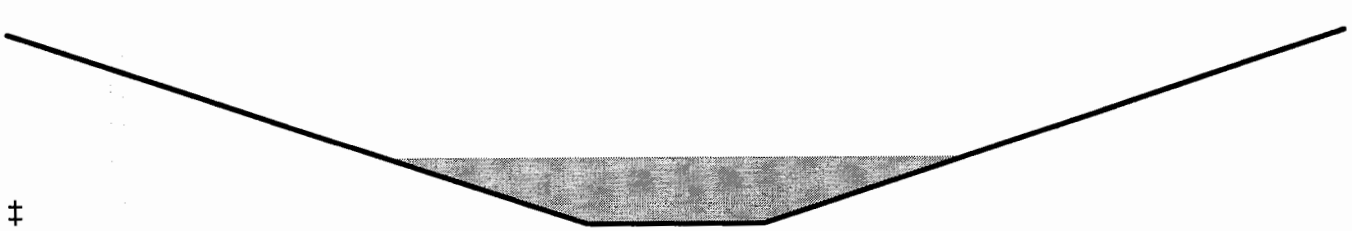
Summary for Reach WQ Ditch: WQ Ditch

Inflow Area = 2.870 ac, 97.56% Impervious, Inflow Depth > 0.97"
Inflow = 4.81 cfs @ 11.98 hrs, Volume= 0.233 af
Outflow = 1.60 cfs @ 12.81 hrs, Volume= 0.220 af, Atten= 67%, Lag= 49.8 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.28 fps, Min. Travel Time= 42.1 min
Avg. Velocity = 0.12 fps, Avg. Travel Time= 101.8 min

Peak Storage= 4,035 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.87'
Bank-Full Depth= 2.50', Capacity at Bank-Full= 16.81 cfs

3.00' x 2.50' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 4.0 '/' Top Width= 23.00'
Length= 713.0' Slope= 0.0046 '/'
Inlet Invert= 127.64', Outlet Invert= 124.39'



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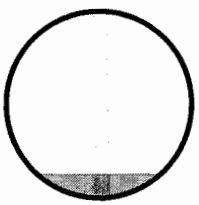
Summary for Reach WQ UD: WQ UD

Inflow Area = 0.500 ac, 62.00% Impervious, Inflow Depth > 0.49"
Inflow = 0.03 cfs @ 13.68 hrs, Volume= 0.021 af
Outflow = 0.03 cfs @ 13.99 hrs, Volume= 0.020 af, Atten= 0%, Lag= 18.6 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.12 fps, Min. Travel Time= 10.6 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 15.5 min

Peak Storage= 20 cf @ 13.81 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.67', Capacity at Bank-Full= 0.82 cfs

8.0" Round Pipe
n= 0.013
Length= 713.0' Slope= 0.0046 '/'
Inlet Invert= 124.81', Outlet Invert= 121.56'



Summary for Pond Bio cell 1: Bio Cell 1

Inflow Area = 0.500 ac, 62.00% Impervious, Inflow Depth > 1.07"
Inflow = 0.84 cfs @ 12.00 hrs, Volume= 0.044 af
Outflow = 0.03 cfs @ 13.68 hrs, Volume= 0.021 af, Atten= 96%, Lag= 100.8 min
Primary = 0.03 cfs @ 13.68 hrs, Volume= 0.021 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 128.17' @ 13.68 hrs Surf.Area= 2,908 sf Storage= 1,322 cf

Plug-Flow detention time= 269.6 min calculated for 0.021 af (46% of inflow)
Center-of-Mass det. time= 178.6 min (922.5 - 743.9)

Volume	Invert	Avail.Storage	Storage Description
#1	127.62'	9,156 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
127.62	1,900	0	0
129.20	4,794	5,288	5,288
129.80	8,098	3,868	9,156

← 128.6 ≈ 2800 ft³ ±

Device	Routing	Invert	Outlet Devices
#1	Primary	127.62'	**1.200 in/hr Exfiltration over Surface area above 127.62'** Conductivity to Groundwater Elevation = 125.00' Excluded Surface area = 1,900 sf
#2	Primary	129.20'	**40.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59
#3	Primary	128.60'	**12.0" Horiz. Orifice/Grate** C= 0.600 in 12.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 13.68 hrs HW=128.17' (Free Discharge)
- **1=Exfiltration** (Controls 0.03 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Bio cell 2: Bio Cell 2

Inflow Area = 0.360 ac, 75.00% Impervious, Inflow Depth > 1.07"
Inflow = 0.63 cfs @ 11.98 hrs, Volume= 0.032 af
Outflow = 0.01 cfs @ 19.01 hrs, Volume= 0.004 af, Atten= 99%, Lag= 421.9 min
Primary = 0.01 cfs @ 19.01 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 125.34' @ 19.01 hrs Surf.Area= 1,746 sf Storage= 1,230 cf

Plug-Flow detention time= 499.4 min calculated for 0.004 af (12% of inflow)
Center-of-Mass det. time= 264.7 min (1,007.4 - 742.7)

Volume	Invert	Avail.Storage	Storage Description
#1	124.40'	5,638 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.40	866	0	0
126.20	2,549	3,073	3,073 ←
127.00	3,862	2,564	5,638

Device	Routing	Invert	Outlet Devices
#1	Primary	125.20'	**2.400 in/hr Exfiltration over Surface area above 125.20'** Conductivity to Groundwater Elevation = 123.00' Excluded Surface area = 1,614 sf
#2	Primary	126.60'	**30.0' long x 40.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#3	Primary	126.10'	**24.0" Horiz. grate** C= 0.600 in 24.0" Grate Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 19.01 hrs HW=125.34' (Free Discharge)
- **1=Exfiltration** (Controls 0.01 cfs)
- **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **3=grate** (Controls 0.00 cfs)

Summary for Pond bio-cell 3: bio-cell 3

Inflow Area = 2.870 ac, 97.56% Impervious, Inflow Depth > 0.92"
Inflow = 1.60 cfs @ 12.81 hrs, Volume= 0.220 af
Outflow = 1.59 cfs @ 12.84 hrs, Volume= 0.210 af, Atten= 1%, Lag= 1.6 min
Primary = 1.59 cfs @ 12.84 hrs, Volume= 0.210 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 125.08' @ 12.84 hrs Surf.Area= 1,034 sf Storage= 624 cf

Plug-Flow detention time= 29.1 min calculated for 0.209 af (95% of inflow)
Center-of-Mass det. time= 13.4 min (851.1 - 837.6)

Volume	Invert	Avail.Storage	Storage Description
#1	124.40'	1,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.40	800	0	0
126.00	1,350	1,720	1,720

Device	Routing	Invert	Outlet Devices
#1	Primary	124.40'	**2.400 in/hr Exfiltration over Horizontal area above 124.40'** Conductivity to Groundwater Elevation = 119.00' Excluded Horizontal area = 800 sf
#2	Primary	124.90'	**24.0" Horiz. Orifice/Grate** C= 0.600 in 24.0" Grate Limited to weir flow at low heads
#3	Primary	126.00'	**200.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.59 cfs @ 12.84 hrs HW=125.08' (Free Discharge)
- **1=Exfiltration** (Controls 0.01 cfs)
- **2=Orifice/Grate** (Weir Controls 1.57 cfs @ 1.39 fps)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond LS 1: level spreader

Inflow Area = 0.330 ac,100.00% Impervious, Inflow Depth > 1.07"
Inflow = 0.59 cfs @ 11.98 hrs, Volume= 0.029 af
Outflow = 0.11 cfs @ 12.16 hrs, Volume= 0.025 af, Atten= 80%, Lag= 11.2 min
Primary = 0.11 cfs @ 12.16 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 1.00-20.00 hrs, dt= 0.01 hrs
Peak Elev= 125.00' @ 12.16 hrs Surf.Area= 763 sf Storage= 652 cf

Plug-Flow detention time= 170.8 min calculated for 0.025 af (87% of inflow)
Center-of-Mass det. time= 128.0 min (870.4 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1	123.50'	1,631 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
123.50	105	0	0
126.00	1,200	1,631	1,631

Device	Routing	Invert	Outlet Devices
#1	Primary	125.00'	**100.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	123.50'	**2.400 in/hr Exfiltration over Horizontal area above 123.50'** Conductivity to Groundwater Elevation = 120.00' Excluded Horizontal area = 105 sf

Primary OutFlow Max=0.06 cfs @ 12.16 hrs HW=125.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.11 fps)
└—**2=Exfiltration** (Controls 0.04 cfs)

Time span=1.00-20.00 hrs, dt=0.01 hrs, 1901 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: A1 Runoff Area=0.500 ac 62.00% Impervious Runoff Depth>2.62"
Flow Length=125' Slope=0.0250 '/' Tc=8.6 min CN=98 Runoff=1.95 cfs 0.109 af

Subcatchment A2-3: parking lot Runoff Area=2.870 ac 97.56% Impervious Runoff Depth>2.51"
Flow Length=256' Slope=0.0018 '/' Tc=7.0 min CN=97 Runoff=11.59 cfs 0.601 af

Subcatchment A4: parking south Runoff Area=0.360 ac 75.00% Impervious Runoff Depth>2.62"
Flow Length=122' Slope=0.0200 '/' Tc=7.1 min CN=98 Runoff=1.47 cfs 0.079 af

Subcatchment B1: woods Runoff Area=1.840 ac 21.74% Impervious Runoff Depth>0.39"
Flow Length=396' Tc=49.7 min CN=64 Runoff=0.36 cfs 0.060 af

Subcatchment C1: ramp to bio cell Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>2.62"
Flow Length=330' Slope=0.0030 '/' Tc=6.7 min CN=98 Runoff=1.37 cfs 0.072 af

Subcatchment C2: woods lower Runoff Area=4.410 ac 12.70% Impervious Runoff Depth>0.29"
Flow Length=500' Tc=85.6 min CN=61 Runoff=0.40 cfs 0.107 af

Subcatchment C3: C3 Runoff Area=0.430 ac 23.26% Impervious Runoff Depth>0.63"
Flow Length=76' Slope=0.0100 '/' Tc=15.6 min CN=70 Runoff=0.35 cfs 0.023 af

Subcatchment C4: old turnaround Runoff Area=1.670 ac 11.98% Impervious Runoff Depth>0.40"
Flow Length=515' Tc=26.3 min CN=64 Runoff=0.51 cfs 0.056 af

Reach 24" outlet: 24' outlet Avg. Flow Depth=0.62' Max Vel=5.70 fps Inflow=4.75 cfs 0.934 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=4.75 cfs 0.934 af

Reach Ditch 295: highway ditch Avg. Flow Depth=1.66' Max Vel=0.49 fps Inflow=5.35 cfs 0.794 af
n=0.240 L=583.0' S=0.0086 '/' Capacity=19.59 cfs Outflow=4.05 cfs 0.769 af

Reach Ditch Rt1: Route 1 ditch Avg. Flow Depth=0.67' Max Vel=0.36 fps Inflow=0.36 cfs 0.060 af
n=0.240 L=300.0' S=0.0167 '/' Capacity=5.94 cfs Outflow=0.32 cfs 0.058 af

Reach ramp culvert: Ramp Culvert Avg. Flow Depth=0.20' Max Vel=2.59 fps Inflow=0.36 cfs 0.060 af
18.0" Round Pipe n=0.013 L=120.0' S=0.0083 '/' Capacity=9.59 cfs Outflow=0.36 cfs 0.060 af

Reach ramp culvert 2: level spreader Avg. Flow Depth=0.73' Max Vel=5.88 fps Inflow=5.03 cfs 0.674 af
18.0" Round Pipe n=0.013 L=73.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=5.02 cfs 0.674 af

Reach ramp culvert 3: 295 station Avg. Flow Depth=0.75' Max Vel=5.95 fps Inflow=5.27 cfs 0.730 af
18.0" Round Pipe n=0.013 L=63.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=5.26 cfs 0.730 af

Reach WQ Ditch: WQ Ditch Avg. Flow Depth=1.44' Max Vel=0.37 fps Inflow=11.59 cfs 0.601 af
n=0.240 L=713.0' S=0.0046 '/' Capacity=16.81 cfs Outflow=4.73 cfs 0.579 af

Reach WQ UD: WQ UD Avg. Flow Depth=0.23' Max Vel=1.96 fps Inflow=0.22 cfs 0.056 af
8.0" Round Pipe n=0.013 L=713.0' S=0.0046 '/' Capacity=0.82 cfs Outflow=0.21 cfs 0.055 af

Pond Bio cell 1: Bio Cell 1 Peak Elev=128.66' Storage=2,969 cf Inflow=1.95 cfs 0.109 af
Outflow=0.22 cfs 0.056 af

Pond Bio cell 2: Bio Cell 2 Peak Elev=125.99' Storage=2,565 cf Inflow=1.47 cfs 0.079 af
Outflow=0.05 cfs 0.029 af

Pond bio-cell 3: bio-cell 3 Peak Elev=125.27' Storage=830 cf Inflow=4.73 cfs 0.579 af
Outflow=4.71 cfs 0.568 af

Pond LS 1: level spreader Peak Elev=125.03' Storage=673 cf Inflow=1.37 cfs 0.072 af
Outflow=1.37 cfs 0.064 af

Time span=1.00-20.00 hrs, dt=0.01 hrs, 1901 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: A1 Runoff Area=0.500 ac 62.00% Impervious Runoff Depth>4.23"
Flow Length=125' Slope=0.0250 '/' Tc=8.6 min CN=98 Runoff=3.08 cfs 0.176 af

Subcatchment A2-3: parking lot Runoff Area=2.870 ac 97.56% Impervious Runoff Depth>4.12"
Flow Length=256' Slope=0.0018 '/' Tc=7.0 min CN=97 Runoff=18.45 cfs 0.985 af

Subcatchment A4: parking south Runoff Area=0.360 ac 75.00% Impervious Runoff Depth>4.23"
Flow Length=122' Slope=0.0200 '/' Tc=7.1 min CN=98 Runoff=2.32 cfs 0.127 af

Subcatchment B1: woods Runoff Area=1.840 ac 21.74% Impervious Runoff Depth>1.22"
Flow Length=396' Tc=49.7 min CN=64 Runoff=1.40 cfs 0.187 af

Subcatchment C1: ramp to bio cell Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>4.23"
Flow Length=330' Slope=0.0030 '/' Tc=6.7 min CN=98 Runoff=2.16 cfs 0.116 af

Subcatchment C2: woods lower Runoff Area=4.410 ac 12.70% Impervious Runoff Depth>1.01"
Flow Length=500' Tc=85.6 min CN=61 Runoff=1.84 cfs 0.373 af

Subcatchment C3: C3 Runoff Area=0.430 ac 23.26% Impervious Runoff Depth>1.65"
Flow Length=76' Slope=0.0100 '/' Tc=15.6 min CN=70 Runoff=0.98 cfs 0.059 af

Subcatchment C4: old turnaround Runoff Area=1.670 ac 11.98% Impervious Runoff Depth>1.23"
Flow Length=515' Tc=26.3 min CN=64 Runoff=2.00 cfs 0.172 af

Reach 24" outlet: 24' outlet Avg. Flow Depth=1.02' Max Vel=7.25 fps Inflow=11.62 cfs 1.988 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=11.61 cfs 1.987 af

Reach Ditch 295: highway ditch Avg. Flow Depth=2.20' Max Vel=0.59 fps Inflow=10.45 cfs 1.465 af
n=0.240 L=583.0' S=0.0086 '/' Capacity=19.59 cfs Outflow=8.58 cfs 1.432 af

Reach Ditch Rt1: Route 1 ditch Avg. Flow Depth=1.13' Max Vel=0.51 fps Inflow=1.40 cfs 0.187 af
n=0.240 L=300.0' S=0.0167 '/' Capacity=5.94 cfs Outflow=1.30 cfs 0.183 af

Reach ramp culvert: Ramp Culvert Avg. Flow Depth=0.39' Max Vel=3.88 fps Inflow=1.40 cfs 0.187 af
18.0" Round Pipe n=0.013 L=120.0' S=0.0083 '/' Capacity=9.59 cfs Outflow=1.40 cfs 0.187 af

Reach ramp culvert 2: level spreader Avg. Flow Depth=1.11' Max Vel=6.72 fps Inflow=9.41 cfs 1.189 af
18.0" Round Pipe n=0.013 L=73.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=9.41 cfs 1.188 af

Reach ramp culvert 3: 295 station Avg. Flow Depth=1.20' Max Vel=6.78 fps Inflow=10.31 cfs 1.360 af
18.0" Round Pipe n=0.013 L=63.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=10.30 cfs 1.360 af

Reach WQ Ditch: WQ Ditch Avg. Flow Depth=1.84' Max Vel=0.43 fps Inflow=18.45 cfs 0.985 af
n=0.240 L=713.0' S=0.0046 '/' Capacity=16.81 cfs Outflow=8.24 cfs 0.955 af

Reach WQ UD: WQ UD Avg. Flow Depth=0.67' Max Vel=2.66 fps Inflow=1.62 cfs 0.118 af
8.0" Round Pipe n=0.013 L=713.0' S=0.0046 '/' Capacity=0.82 cfs Outflow=0.87 cfs 0.116 af

Pond Bio cell 1: Bio Cell 1 Peak Elev=128.88' Storage=3,858 cf Inflow=3.08 cfs 0.176 af
Outflow=1.62 cfs 0.118 af

Pond Bio cell 2: Bio Cell 2 Peak Elev=126.25' Storage=3,209 cf Inflow=2.32 cfs 0.127 af
Outflow=1.29 cfs 0.069 af

Pond bio-cell 3: bio-cell 3 Peak Elev=125.44' Storage=1,019 cf Inflow=8.24 cfs 0.955 af
Outflow=8.21 cfs 0.944 af

Pond LS 1: level spreader Peak Elev=125.04' Storage=681 cf Inflow=2.16 cfs 0.116 af
Outflow=2.16 cfs 0.105 af

Time span=1.00-20.00 hrs, dt=0.01 hrs, 1901 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: A1 Runoff Area=0.500 ac 62.00% Impervious Runoff Depth>4.99"
Flow Length=125' Slope=0.0250 '/' Tc=8.6 min CN=98 Runoff=3.61 cfs 0.208 af

Subcatchment A2-3: parking lot Runoff Area=2.870 ac 97.56% Impervious Runoff Depth>4.87"
Flow Length=256' Slope=0.0018 '/' Tc=7.0 min CN=97 Runoff=21.66 cfs 1.166 af

Subcatchment A4: parking south Runoff Area=0.360 ac 75.00% Impervious Runoff Depth>4.99"
Flow Length=122' Slope=0.0200 '/' Tc=7.1 min CN=98 Runoff=2.72 cfs 0.150 af

Subcatchment B1: woods Runoff Area=1.840 ac 21.74% Impervious Runoff Depth>1.70"
Flow Length=396' Tc=49.7 min CN=64 Runoff=2.02 cfs 0.260 af

Subcatchment C1: ramp to bio cell Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>4.99"
Flow Length=330' Slope=0.0030 '/' Tc=6.7 min CN=98 Runoff=2.53 cfs 0.137 af

Subcatchment C2: woods lower Runoff Area=4.410 ac 12.70% Impervious Runoff Depth>1.45"
Flow Length=500' Tc=85.6 min CN=61 Runoff=2.74 cfs 0.531 af

Subcatchment C3: C3 Runoff Area=0.430 ac 23.26% Impervious Runoff Depth>2.20"
Flow Length=76' Slope=0.0100 '/' Tc=15.6 min CN=70 Runoff=1.31 cfs 0.079 af

Subcatchment C4: old turnaround Runoff Area=1.670 ac 11.98% Impervious Runoff Depth>1.72"
Flow Length=515' Tc=26.3 min CN=64 Runoff=2.87 cfs 0.239 af

Reach 24" outlet: 24' outlet Avg. Flow Depth=1.16' Max Vel=7.64 fps Inflow=14.50 cfs 2.551 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=14.50 cfs 2.550 af

Reach Ditch 295: highway ditch Avg. Flow Depth=2.36' Max Vel=0.62 fps Inflow=11.27 cfs 1.800 af
n=0.240 L=583.0' S=0.0086 '/' Capacity=19.59 cfs Outflow=10.32 cfs 1.764 af

Reach Ditch Rt1: Route 1 ditch Avg. Flow Depth=1.30' Max Vel=0.56 fps Inflow=2.02 cfs 0.260 af
n=0.240 L=300.0' S=0.0167 '/' Capacity=5.94 cfs Outflow=1.90 cfs 0.256 af

Reach ramp culvert: Ramp Culvert Avg. Flow Depth=0.47' Max Vel=4.30 fps Inflow=2.02 cfs 0.260 af
18.0" Round Pipe n=0.013 L=120.0' S=0.0083 '/' Capacity=9.59 cfs Outflow=2.02 cfs 0.260 af

Reach ramp culvert 2: level spreader Avg. Flow Depth=1.36' Max Vel=6.78 fps Inflow=11.23 cfs 1.437 af
18.0" Round Pipe n=0.013 L=73.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=11.22 cfs 1.437 af

Reach ramp culvert 3: 295 station Avg. Flow Depth=1.50' Max Vel=6.78 fps Inflow=12.53 cfs 1.675 af
18.0" Round Pipe n=0.013 L=63.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=11.04 cfs 1.675 af

Reach WQ Ditch: WQ Ditch Avg. Flow Depth=2.00' Max Vel=0.45 fps Inflow=21.66 cfs 1.166 af
n=0.240 L=713.0' S=0.0046 '/' Capacity=16.81 cfs Outflow=9.95 cfs 1.133 af

Reach WQ UD: WQ UD Avg. Flow Depth=0.67' Max Vel=2.66 fps Inflow=2.27 cfs 0.147 af
8.0" Round Pipe n=0.013 L=713.0' S=0.0046 '/' Capacity=0.82 cfs Outflow=0.86 cfs 0.146 af

Pond Bio cell 1: Bio Cell 1 Peak Elev=128.96' Storage=4,181 cf Inflow=3.61 cfs 0.208 af
Outflow=2.27 cfs 0.147 af

Pond Bio cell 2: Bio Cell 2 Peak Elev=126.31' Storage=3,370 cf Inflow=2.72 cfs 0.150 af
Outflow=2.09 cfs 0.090 af

Pond bio-cell 3: bio-cell 3 Peak Elev=125.51' Storage=1,105 cf Inflow=9.95 cfs 1.133 af
Outflow=9.91 cfs 1.122 af

Pond LS 1: level spreader Peak Elev=125.05' Storage=685 cf Inflow=2.53 cfs 0.137 af
Outflow=2.53 cfs 0.125 af

Time span=1.00-20.00 hrs, dt=0.01 hrs, 1901 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment A1: A1 Runoff Area=0.500 ac 62.00% Impervious Runoff Depth>5.56"
Flow Length=125' Slope=0.0250 '/' Tc=8.6 min CN=98 Runoff=4.01 cfs 0.232 af

Subcatchment A2-3: parking lot Runoff Area=2.870 ac 97.56% Impervious Runoff Depth>5.44"
Flow Length=256' Slope=0.0018 '/' Tc=7.0 min CN=97 Runoff=24.07 cfs 1.302 af

Subcatchment A4: parking south Runoff Area=0.360 ac 75.00% Impervious Runoff Depth>5.56"
Flow Length=122' Slope=0.0200 '/' Tc=7.1 min CN=98 Runoff=3.02 cfs 0.167 af

Subcatchment B1: woods Runoff Area=1.840 ac 21.74% Impervious Runoff Depth>2.08"
Flow Length=396' Tc=49.7 min CN=64 Runoff=2.51 cfs 0.319 af

Subcatchment C1: ramp to bio cell Runoff Area=0.330 ac 100.00% Impervious Runoff Depth>5.56"
Flow Length=330' Slope=0.0030 '/' Tc=6.7 min CN=98 Runoff=2.81 cfs 0.153 af

Subcatchment C2: woods lower Runoff Area=4.410 ac 12.70% Impervious Runoff Depth>1.80"
Flow Length=500' Tc=85.6 min CN=61 Runoff=3.48 cfs 0.661 af

Subcatchment C3: C3 Runoff Area=0.430 ac 23.26% Impervious Runoff Depth>2.64"
Flow Length=76' Slope=0.0100 '/' Tc=15.6 min CN=70 Runoff=1.58 cfs 0.095 af

Subcatchment C4: old turnaround Runoff Area=1.670 ac 11.98% Impervious Runoff Depth>2.10"
Flow Length=515' Tc=26.3 min CN=64 Runoff=3.56 cfs 0.293 af

Reach 24" outlet: 24' outlet Avg. Flow Depth=1.24' Max Vel=7.80 fps Inflow=15.90 cfs 2.993 af
24.0" Round Pipe n=0.013 L=100.0' S=0.0100 '/' Capacity=22.62 cfs Outflow=15.90 cfs 2.992 af

Reach Ditch 295: highway ditch Avg. Flow Depth=2.38' Max Vel=0.62 fps Inflow=11.38 cfs 2.057 af
n=0.240 L=583.0' S=0.0086 '/' Capacity=19.59 cfs Outflow=10.59 cfs 2.018 af

Reach Ditch Rt1: Route 1 ditch Avg. Flow Depth=1.42' Max Vel=0.59 fps Inflow=2.51 cfs 0.319 af
n=0.240 L=300.0' S=0.0167 '/' Capacity=5.94 cfs Outflow=2.37 cfs 0.314 af

Reach ramp culvert: Ramp Culvert Avg. Flow Depth=0.52' Max Vel=4.57 fps Inflow=2.51 cfs 0.319 af
18.0" Round Pipe n=0.013 L=120.0' S=0.0083 '/' Capacity=9.59 cfs Outflow=2.51 cfs 0.319 af

Reach ramp culvert 2: level spreader Avg. Flow Depth=1.50' Max Vel=6.77 fps Inflow=12.62 cfs 1.625 af
18.0" Round Pipe n=0.013 L=73.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=11.21 cfs 1.624 af

Reach ramp culvert 3: 295 station Avg. Flow Depth=1.50' Max Vel=6.78 fps Inflow=13.26 cfs 1.917 af
18.0" Round Pipe n=0.013 L=63.0' S=0.0100 '/' Capacity=10.50 cfs Outflow=11.10 cfs 1.917 af

Reach WQ Ditch: WQ Ditch Avg. Flow Depth=2.11' Max Vel=0.47 fps Inflow=24.07 cfs 1.302 af
n=0.240 L=713.0' S=0.0046 '/' Capacity=16.81 cfs Outflow=11.26 cfs 1.267 af

Reach WQ UD: WQ UD Avg. Flow Depth=0.67' Max Vel=2.66 fps Inflow=2.52 cfs 0.170 af
8.0" Round Pipe n=0.013 L=713.0' S=0.0046 '/' Capacity=0.82 cfs Outflow=0.86 cfs 0.169 af

Pond Bio cell 1: Bio Cell 1 Peak Elev=129.01' Storage=4,421 cf Inflow=4.01 cfs 0.232 af
Outflow=2.52 cfs 0.170 af

Pond Bio cell 2: Bio Cell 2 Peak Elev=126.34' Storage=3,456 cf Inflow=3.02 cfs 0.167 af
Outflow=2.55 cfs 0.106 af

Pond bio-cell 3: bio-cell 3 Peak Elev=125.57' Storage=1,168 cf Inflow=11.26 cfs 1.267 af
Outflow=11.22 cfs 1.255 af

Pond LS 1: level spreader Peak Elev=125.05' Storage=688 cf Inflow=2.81 cfs 0.153 af
Outflow=2.80 cfs 0.140 af