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GEOTECHNICAL DESIGN REPORT
DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

by Haley & Aldrich, Inc.
Portland, Maine

for Maine Department of Transportation
Augusta, Maine

File No. 130323-002
April 2018

HALEY & ALDRICH, INC.
75 Washington Avenue
Suite 1A
Portland, ME 04101
207.482.4600

9 April 2018
File No. 130323-002

Maine Department of Transportation
16 State House Station
Augusta, Maine 04333-0016

Attention: Kate Maguire, P.E.
Senior Geotechnical Engineer

Subject: Geotechnical Design Report
Downtown Improvements
MaineDOT WIN 021843.00
Wiscasset, Maine

Ladies and Gentlemen:

We are pleased to submit herewith our report entitled, "Geotechnical Design Report, Downtown Improvements, MaineDOT WIN 021843.00, Wiscasset, Maine," prepared in accordance with our proposal, dated 22 June 2017 and executed by your Bradford Foley on 27 July 2017.

This Geotechnical Design Report (GDR) presents the results of design phase subsurface explorations, geotechnical evaluations and also provides geotechnical design recommendations that were completed and developed by Haley & Aldrich, Inc. (Haley & Aldrich) in support of Vanasse Hangen Brustlin, Inc.'s (VHBs) development and submission of the 100 percent plans, specifications and engineer's estimate (PSE) package to the Maine Department of Transportation (MaineDOT).

It is our understanding that this report may be included as a reference document in the documents that will be provided to the prospective Contractors for bidding. Please note that the recommendations included herein are superseded by the information contained in the documents and that the information contained in the documents takes precedence over the information provided in this report.

Introduction

SITE LOCATION, EXISTING SITE CONDITIONS AND PROPOSED SITE DEVELOPMENT

In general, the project site is located along U.S. Route 1 (Route 1) in the downtown area of Wiscasset as shown in Figure 1, Project Locus. For the purposes of this GDR, the downtown generally includes the area bound by Fort Hill and Federal Street to the West, Bradbury Street to the South, the Sheepscot River to the East and the Wastewater Treatment Facility (WWTF) to the north.

It is our understanding that VHB has been retained by MaineDOT to design the proposed improvements, which generally include the following key elements:

- Up to eight mast arm overhead signs/traffic signals, four each at the intersection of Route 1 and Middle and Water Streets.
- Elimination of existing diagonal and parallel on-street parking along Route 1 and narrowing of the existing curb-to-curb roadway width.
- Construction of two new surface parking lots to replace the on-street parking spaces that are being eliminated, one on Water Street (south of Route 1) and one on Railroad Avenue (north of Route 1).
- Full-depth reconstruction of Railroad Avenue from Route 1 north to the new surface parking lot and intersection with Water Street.

HORIZONTAL COORDINATE SYSTEM AND ELEVATION DATUM

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 VHB for the various alignments as summarized below.

- Railroad Avenue: Sta. 200+00
- Water Street: Sta. 300+00
- Middle Street: Sta. 400+00
- Fort Hill Street: Sta. 500+00
- Railroad Avenue Parking Lot Retaining Wall: Sta. 900+00
- Route 1: Sta. 1300+00
- Water Street Parking Lot Sta. 2000+00

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

Subsurface Exploration Program

GENERAL

A total of 30 design phase test borings were completed in October 2017 for each of the proposed key project elements summarized above. A breakdown of the total number and designations of test borings completed for each key project element is provided below.

Key Project Element	Subsurface Explorations	
	No. of Test Borings	Test Boring Designations
Route 1 Improvements and Overhead Signs/Traffic Signals	7	HB-WISC-101 through HB-WISC-107
Water Street Parking Lot	8	HB-WISC-119 through HB-WISC-126
Railroad Avenue	6	HB-WISC-108 through HB-WISC-113
Railroad Avenue Parking Lot	9	HB-WISC-114 through HB-WISC-118 and HB-WISC-127 through HB-WISC-130
Total	30	

Please note that test boring HB-WISC-108 and HB-WISC-111 through HB-WISC-113 provide subsurface information for the Route 1 improvements and for the Railroad Avenue Parking Lot, respectively, in addition to the key project elements summarized above.

The test boring locations were laid out in the field by Haley & Aldrich prior to the start of drilling. "As-drilled" exploration locations and ground surface elevations at test boring locations were determined in the field by MaineDOT upon the completion of drilling. The coordinate location and station/offset information provided by MaineDOT for each test boring is shown on Table I. Please note that only station/offset information is provided on the test borings logs included in Appendix A. The plan locations of the test borings are shown on Figures 2 through 4, Site and Subsurface Exploration Location Plans.

A Haley & Aldrich geotechnical engineer monitored the drilling, logged and conducted visual inspection/classification of the soil and rock samples collected, prepared test boring logs documenting the conditions encountered and confirmed that all drilling and sampling was performed in accordance with MaineDOT requirements.

Additional details of the subsurface exploration program are provided below.

TEST BORINGS

The test borings were drilled by New England Boring Contractors of Hermon, Maine using either a Mobile Drill B-59 truck-mounted or Mobile Drill B-53 track-mounted drill rig. In general, the truck-mounted drill rig was used to drill test borings located in flat and/or paved areas and the track-mounted drill rig was used to drill test borings located on sloping ground. Test borings were advanced into or through the overburden soils to depths ranging from approximately 4 to 42 ft below existing ground surface (BGS) using 3-in. (NW-size) outside diameter (OD) steel casing. Please note that test borings HB-WISC-125 and HB-WISC-126 were drilled with 2-¼ in. inside diameter (ID) hollow stem augers (HSAs).

Soil samples were generally collected continuously through the fill soils and at standard, 5-ft intervals thereafter, by driving a 1-3/8-in. inside diameter (ID) split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., as indicated on the test boring logs. 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. Each drill rig was equipped with a calibrated automatic hammer per MaineDOT requirements. The energy-corrected SPT N-values (N_{60}) shown on the test boring logs are equal to the uncorrected N-value multiplied by the hammer efficiency factor (0.869 for the B-59 truck and 0.677 for the B-53 track-mounted drill rig) divided by 0.6.

A photoionization detector (PID) was used in the field to screen for the presence of volatile organic compounds (VOCs) in the recovered fill soil samples. Elevated PID readings were detected in some test borings as noted on the test boring logs provided in Appendix A and as discussed in subsequent sections of this report.

Select test borings were advanced up to approximately 15 ft into bedrock using either a rollercone (for penetrations into bedrock up to approximately 1 ft) or a 2.0-in. (NQ-size) ID diamond-tipped core barrel (for penetrations into bedrock between 1 and 15 ft). As discussed in the following section of this report, only test borings HB-WISC-103, -108, -109, and -119 did not encounter bedrock and were terminated within the overburden soils.

Three observation wells were installed in completed boreholes HB-WISC-111 and HB-WISC-117 (Railroad Avenue Parking Lot) and HB-WISC-119 (Water Street Parking Lot) to determine static groundwater levels in the areas where the wells were installed. The observation wells consisted of 2-in. ID machine-slotted PVC well screen and solid PVC riser pipe from the bottom of the borehole up to the existing ground surface. The observation wells were outfitted with a flush-mounted, locking steel roadway box assembly. Observation well installation and groundwater monitoring reports are provided in Appendix B.

All soil and bedrock samples were collected and preserved in glass jars and wooden boxes, respectively, and are available for review upon request. The available soil and bedrock samples are currently being stored at the Haley & Aldrich laboratory facility in Portland, Maine.

Generalized Subsurface Conditions

The subsurface conditions encountered in the design phase test borings generally consisted of man-placed fill soils overlying naturally-deposited marine silt/clay, glacial till and bedrock. Considering that the subsurface conditions are variable, a brief description of each soil unit encountered is presented in order of increasing depth below ground surface for each of the key project elements.

Detailed soil and bedrock descriptions are provided on the Haley & Aldrich test boring logs included in Appendix A. Please note that the soil descriptions provided on the test boring logs and summarized below do not represent actual field conditions other than at the specific test boring locations. The actual conditions may vary from those described and shown herein and may not become apparent until construction begins.

ROUTE 1 IMPROVEMENTS AND OVERHEAD SIGN/TRAFFIC SIGNALS

Test Borings HB-WISC-101 through HB-WISC-108

Soil Unit	Approximate Range in Encountered Thickness (ft)	Generalized Soil Description
Fill	3 to 11	A 0.3 to 0.8-ft thick layer of bituminous concrete was encountered at the ground surface in each testing boring. Fine to coarse SAND with variable amounts of gravel, trace to little silt or clay (SP-SM, SP, SW-SC, SW-SM and SW); clayey SAND, trace to little gravel (SC); fine sandy CLAY and silty CLAY, trace gravel (CL). Some portions of the layer contain wood, brick and asphalt fragments. No elevated PID readings were detected. *(encountered in each test boring)*
Marine Clay	3 to 25	Fine sandy CLAY or silty CLAY, variable amounts of fine sand (CL). Some portions of the deposit contain frequent 1/8-in. to 1.0-in. thick fine sand partings, is occasionally mottled and has trace organics. *(encountered in test borings HB-WISC-102 through -105 and -107)*
Glacial Till	0 to 10	Fine to coarse SAND, little to some gravel, trace to little silt, loose to moderately bonded (SW-SM, SM); sandy GRAVEL, trace to little silt, loosely bonded (GW, GM). *(encountered in test borings HB-WISC-102 and -104 through -106)*
Bedrock	Top of bedrock surface encountered at depths ranging from approximately 5 to 41 ft BGS and generally slopes down from west to east. *(not encountered in test borings HB-WISC-103 and -108)*	

WATER STREET PARKING LOT

Test Borings HB-WISC-119 through HB-WISC-126

Soil Unit	Approximate Range in Encountered Thickness (ft)	Generalized Soil Description
Fill	2 to 7	Fine to coarse SAND, little to some gravel, trace silt to gravelly SAND (SW); silty CLAY, trace to little sand (CL). Some portions of the layer contain occasional asphalt and brick fragments. PID readings up to 2,000 ppm were detected in test borings HB-WISC-124, -125 and -126). *(encountered in each test boring)*
Marine Clay	5 to 7	silty CLAY, variable amounts of fine sand (CL). Contains occasional 1/16-in. to 3-in. thick fine sand partings. *(encountered in test borings HB-WISC-119 and -121)*
Glacial Till	1 to 5	fine to coarse SAND, little to some gravel, trace to little silt, loosely to moderately bonded (SW-SM, SM). *(encountered in test borings HB-WISC-119 through -121 and -123)*
Bedrock	Top of bedrock surface encountered at depths ranging from approximately 3 to 10 ft BGS and generally slopes down from west to east and south to north. *(not encountered in test boring HB-WISC-119)*	

RAILROAD AVENUE

Test Borings HB-WISC-108 through HB-WISC-113

Soil Unit	Approximate Range in Encountered Thickness (ft)	Generalized Soil Description
Fill	3 to 11	A 0.3-ft thick layer of bituminous concrete was encountered at the ground surface in test boring HB-WISC-108 Fine to coarse SAND, variable amounts of gravel, trace to little silt (SW, SP-SM); sandy GRAVEL, trace silt (GW); clayey SAND or silty SAND, trace to little gravel (SC, SM); clayey GRAVEL, little fine sand (GC); sandy CLAY, trace gravel (CL). Some portions of the layer contain shells, wood, brick, concrete, and asphalt fragments. No elevation PID readings were detected. *(encountered in each test boring)*
Marine Clay	0 to 6	Silty CLAY, trace to little fine sand (CL). Some portions of the deposit contain frequent 1/16-in. thick fine sand partings. *(encountered in test borings HB-WISC-109 and -113)*
Glacial Till	3 to 9	Fine to coarse SAND, some gravel, little silt, loosely to moderately bonded (SM); gravelly SAND or fine SAND, little gravel, trace silt (SW-SM, SP-SM). Some portions of the deposit contain occasional cobbles. *(encountered in test borings HB-WISC-110, -112 and -113)*
Bedrock	Top of bedrock surface encountered at depths ranging from approximately 8 to 18 ft BGS and generally slopes down from south to north. *(bedrock not encountered in test boring HB-WISC-109)*	

RAILROAD AVENUE PARKING LOT

Test Borings HB-WISC-111 through HB-WISC-118 and HB-WISC-127 through HB-WISC-130

Soil Unit		Approximate Range in Encountered Thickness (ft)	Generalized Description
Fill		0 to 8	A 0.3 to 2.2-ft thick layer of topsoil was present at the ground surface in test borings HB-WISC-114 through -118 and -128. Fine to coarse SAND, variable amounts of silt and gravel (SW-SM, SP-SM, SM, SW); sandy GRAVEL, trace silt (GW); sandy CLAY, trace gravel (CL); clayey fine SAND, trace gravel (SC). Some portions of the layer contain variable amounts of roots, wood, brick, concrete, asphalt, coal and ash fragments. *(encountered in test borings HB-WISC-111 through -118, and -128 through -130)*
Marine Deposit	Sand	2 to 4	Clayey fine SAND, trace medium and coarse sand (SC). Contains mottled and varved silty clay, frequent 1-in. to 2-in. thick fine sand partings. (*encountered in test borings HB-WISC-115 and -118)*
	Clay	2 to 6	Silty CLAY, trace to little fine sand (CL). Contains occasional to frequent 1/16-in. to ¼-in. thick fine sand partings. *(encountered in test borings HB-WISC-113, -116 through, -127 and -130)*
Glacial Till		0 to 11	Fine to coarse SAND or gravelly SAND, variable amounts of gravel and trace silt, loosely bonded (SP-SM, SW-SM); fine to coarse SAND or silty SAND, variable amounts of gravel and sand, loosely to moderately bonded (SM). *(encountered in test borings HB-WISC-112, -113, -115 through -118, -129 and -130)*
Bedrock		Top of bedrock surface encountered at depths ranging from approximately 2 to 18 ft BGS and generally slopes down from west to east and south to north. *(not encountered in each test boring)*	

BEDROCK CONDITIONS

As stated previously, approximately 4 to 15 ft of bedrock was sampled in select test borings. The sampled and recovered bedrock generally consisted of one of the following:

- Hard to very hard, fresh PEGMATITE. Primary joints dip at horizontal to low angles and are close to moderately spaced. Joints are tight to open, and some joint surfaces are planar to stepped and smooth to rough with some oxidation present *(encountered in test boring HB-WISC-101)*.
- Hard to very hard, fresh to slightly weathered, fine to coarse-grained SCHIST with granitic intrusions or granofels. Primary joints dip at low to high angles (parallel to foliation) and are very close to widely spaced. Joints are tight to open and joint surfaces are healed, planar to undulating, and smooth to rough with some oxidation and silt coatings present *(encountered in test borings HB-WISC-104, -114, -117, -121, -122, -128 and -129)*.
- Hard to very hard, fresh, fine to coarse-grained MIGMATITE or MIGMATITE SCHIST with granitic instructions. Primary joints dip at near horizontal to high angles and are very close to moderately spaced. Joints are tight to open and joint surfaces are undulating to planar and rough with some oxidation and silt coatings present *(encountered in test borings HB-WISC-106, -107, -111, -113, -118, -120, -123, -127 and -130)*.
- Hard to very hard, fresh to moderately weathered GRANOFELS. Primary joints dip at near horizontal to high angles and are very close to moderately spaced. Joints are tight to open and joint surfaces are planar to stepped, rough and are slightly weathered or have some oxidation present *(encountered in test borings HB-WISC-111, -115 and -116)*.
- Very hard, slightly weathered, medium to coarse-grained GRANITE. Primary and secondary joints dip at moderate to horizontal angles, respectively, and are very close to closely spaced. Joints are tight to open and joint surfaces are planar to stepped and smooth to rough *(encountered in test boring HB-WISC-112)*.

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 the bedrock core run. RQD values for bedrock encountered at the site ranged from 0 to 100 percent (average of approximately 76 percent) indicating very poor to excellent rock mass quality.

Photographs of the sampled bedrock are provided for reference in Appendix A.

GROUNDWATER CONDITIONS

As discussed in previous sections of this report, one observation well was installed in completed boreholes HB-WISC-111, -117 and -119 during the subsurface exploration program. The observation wells were installed to provide information on the static groundwater levels in the areas where the wells were installed. A summary of the groundwater levels measured in the observation wells during the time periods noted is provided below.

Key Project Element	Test Boring/ Observation Well No.	Approximate Range in Measured Water Level (ft, NAVD 88)	Time Period
Water Street Parking Lot	HB-WISC-119	El. 28 to El. 30	9 October to 30 November 2017
Railroad Avenue Parking Lot	HB-WISC-111	El. 5 to El. 5.5	5 October to 30 November 2017
	HB-WISC-117	El. 20 to El. 23	10 October to 30 November 2017

In general, water levels may fluctuate with season, precipitation, local soil/bedrock conditions, excavation means and methods, temperature, and tidal conditions. Therefore, water levels may vary from those summarized above, provided on the testing boring logs included in Appendix A and shown on the groundwater monitoring reports included in Appendix B.

Geotechnical Design Recommendations

Technical evaluations used as the basis for development of geotechnical design recommendations were coordinated with VHB, the highway designer, throughout the design development phase of the project. Engineering calculations that support the recommendations outlined in this section are provided for reference in Appendix C.

ANTICIPATED SUBGRADE CONDITIONS

It is our understanding that the proposed pavement sections, which have been designed by MaineDOT, for the key project elements will vary between approximately 24 and 30 in. Based on the range in pavement section thickness and the subsurface soil conditions encountered in the design phase test borings, we anticipate that subgrade conditions will vary as summarized below.

Key Project Element	Anticipated Soil Unit(s) at Subgrade Level
Route 1 Improvements	Fill
Water Street Parking Lot	Fill, Marine Clay, Glacial Till
Railroad Avenue	Fill
Railroad Avenue Parking Lot	Fill, Glacial Till, Bedrock

Note:
Refer to previous sections of this report for a more detailed description of the soil units that are anticipated to be present at subgrade level.

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, fill, and other unsuitable material be excavated (removed) prior to subgrade preparation and placement of pavement section materials. Subgrade preparation and protection recommendations are provided in the Construction Considerations section of this report.

Please note that the actual subgrade conditions may vary from those summarized above and may not become apparent until construction begins.

DRAINAGE

Excess moisture within pavement section materials, moisture-susceptible subgrade materials, and seasonal freeze/thaw effects can substantially reduce the service life of the roadways and parking lots. 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 use of the following items be considered by VHB and MaineDOT:

- Free-draining base and subbase gravels
- Underdrains within the curbed sections of the Water Street and Railroad Avenue Parking Lots
- Drainage structures (catch basins, culverts, etc.) to remove water from the underdrains
- Shattering bedrock below the design subgrade level where bedrock is anticipated at subgrade level (i.e., Railroad Avenue Parking Lot and small portion of Water Street Parking Lot). We recommend that a geosynthetic separation fabric be placed over the shattered bedrock subgrade to prevent migration (i.e., loss) of fine-grained material from the pavement section into the subgrade.

MAST ARM FOUNDATIONS

As discussed in previous sections of this report, it is our understanding that up to eight mast arm overhead signs/traffic signals, four each at the intersection of Route 1 and Middle and Water Streets, will be constructed as part of the subject project.

It is also our understanding, based on discussions with you, that VHB will be determining the minimum foundation size (i.e., diameter and length) for each mast arm utilizing the design charts included in the MaineDOT Standard Details. Design charts are provided for various foundation diameters (2.5 to 5 ft) based on a range of applied loads (moment and torsion) and soil properties ($28° < \phi < 34°$ for a uniform granular soil profile; 400 psf < Su < 1,200 psf for a uniform cohesive soil profile). It should be noted that the design charts were developed for an assumed uniform soil profile consisting entirely of either granular (friction angle, ϕ) or cohesive (undrained shear strength, Su) soil.

In general, we recommend that the mast arm foundations be designed in accordance with the current edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals as well as the MaineDOT Standard Details and Specifications. Recommended subsurface profiles and associated soil properties for use in determining the minimum mast arm foundation sizes are provided below.

Design Subsurface Profiles

Based on the soil/rock conditions encountered in the test borings drilled along Route 1, we recommend that VHB use the following generalized subsurface profiles for design of the mast arm foundations:

Mast Arm No.	Location	Reference Test Borings	Generalized Subsurface Profile & Approximate Layer Thickness (ft)						Water Level (ft, BGS)
			Granular Fill	Cohesive Fill	Marine Clay 1	Marine Clay 2	Glacial Till	Bedrock	
1	NW corner of intersection of Route 1 and Middle Street	no test boring drilled; linearly interpolate between HB-WISC-102 and -105	1.5	2	10	9	6	--	8.5
2	NE corner of intersection of Route 1 and Middle Street	HB-WISC-105	3	3	7.5	17.5	10	--	8.5
3	SW corner of intersection of Route 1 and Middle Street	HB-WISC-104	2.5	3	3	NE	8.5	--	8.5
4	SE corner of intersection of Route 1 and Middle Street	no test boring drilled; linearly interpolate between HB-WISC-103 and -104	2.5	3.5	5	10	9	--	8.5
5	NW corner of intersection of Route 1 and Water Street	HB-WISC-106	2.5	2.5	NE	NE	NE	--	5
6	NE corner of intersection of Route 1 and Water Street	HB-WISC-107	4.5	0.5	6	NE	NE	--	11
7	SW corner of intersection of Route 1 and Water Street	no test boring drilled; assume conditions similar to HB-WISC-106	2.5	2.5	NE	NE	NE	--	5
8	SE corner of intersection of Route 1 and Water Street	no test boring drilled; assume conditions similar to HB-WISC-107	4.5	0.5	6	NE	NE	--	11

Notes:
1. Layers presented from left to right in order of increasing depth BGS.
2. Groundwater depths shown based on moisture condition of soil samples collected during drilling.

Please recall that that each test boring was drilled as close to the proposed mast arm locations as practicable as judged by Haley & Aldrich considering drill rig accessibility, the location of existing utilities and impacts to pedestrian and vehicular traffic prior the start of drilling. In addition, test borings were not drilled at each proposed mast arm location as is normal MaineDOT practice. As a result, it is possible that the subsurface conditions at the proposed mast arm locations may be different than the generalized soil profiles shown above and those encountered in the test borings. We recommend that VHB consider this in their evaluations and note that adjustments to mast arm foundation lengths may

necessary and may require re-evaluation during construction based on the actual subsurface conditions encountered at the proposed mast arm locations.

Design Soil Properties

For the recommended design soil profiles summarized above, associated design soil properties were estimated based on engineering judgment after review of select soil samples, consideration of the SPT N-values shown on the test boring logs and "typical" ranges in values for various soil types and density and groundwater conditions. Soil property estimates were determined for each soil unit and soil profile and the recommended values summarized below.

<table>
<tr><th rowspan="2">Mast Arm No.</th><th colspan="6">Recommended Soil Properties</th></tr>
<tr><th>Granular Fill</th><th>Cohesive Fill</th><th>Marine Clay 1</th><th>Marine Clay 2</th><th>Glacial Till</th><th>Bedrock</th></tr>
<tr><td>1</td><td rowspan="8">γt=120 pcf; ϕ=28°</td><td>γt=115 pcf; Su = 250 psf</td><td rowspan="4">γt=118 pcf; Su = 1,000 psf</td><td>γt=115 pcf; Su = 500 psf</td><td rowspan="4">γt=130 pcf; ϕ=34°</td><td>--</td></tr>
<tr><td>2</td><td rowspan="3">γt=115 pcf; Su = 1,000 psf</td><td rowspan="2">--</td></tr>
<tr><td>3</td><td>NE</td></tr>
<tr><td>4</td><td>γt=115 pcf; Su = 500 psf</td><td>--</td></tr>
<tr><td>5</td><td>γt=118 pcf; Su = 750 psf</td><td>NE</td><td rowspan="4">NE</td><td rowspan="4">NE</td><td>--</td></tr>
<tr><td>6</td><td>γt=115 pcf; Su = 250 psf</td><td>γt=118 pcf; Su = 1,000 psf</td><td>--</td></tr>
<tr><td>7</td><td>γt=118 pcf; Su = 750 psf</td><td>NE</td><td>--</td></tr>
<tr><td>8</td><td>γt=115 pcf; Su = 250 psf</td><td>γt=118 pcf; Su = 1,000 psf</td><td>--</td></tr>
</table>

RAILROAD AVENUE PARKING LOT RETAINING WALL

Based on our review of preliminary design drawings provided by VHB, it is our understanding that excavation of up to approximately 16 ft (maximum; varies) and construction of a permanent retaining wall will be needed along the south and west edges of the parking lot. Based on our discussions with you and VHB, it is our understanding that MaineDOT prefers to construct a mechanically-stabilized earth (MSE) wall in lieu of relying on a bedrock slope due to concerns about variability in the top of rock surface between test borings, which will require substantially more excavation (soil and rock). It is also our understanding that the MSE wall will consist of a Wet Cast Small Landscape Block Retaining Wall

Considering the plan location of the retaining wall and the subsurface conditions encountered in the test borings, we anticipate that excavation of 4 to 5 ft of soil and 11 to 12 ft of bedrock will be required to construct the wall. The subgrade conditions along the length of the wall will vary and will likely consist of either bedrock or glacial till. A relatively thin (i.e., less than approximately 1 to 2 ft) of fill may be present near the eastern end of the wall closest to Railroad Avenue.

MaineDOT Standard Specification Section 673 (Section 673) requires that the Contractor's Engineer design the wall (internal and external stability) based on bearing resistances provided on the Drawings. As a result, bearing resistance evaluations were completed assuming that the entire length of the wall

would bear on naturally-deposited glacial till (limiting subgrade condition along the length of the wall). Retaining wall design recommendations are as follows:

- The retaining wall should be supported on undisturbed, naturally-deposited glacial till, bedrock or gravel borrow placed and compacted after removal of fill soils down to the top of naturally-deposited, inorganic soils.
- In accordance with MaineDOT Highway Program practice, the retaining wall should bear a minimum of 2 ft below the lowest adjacent ground surface exposed to freezing. It is our opinion that the retaining wall should bear at full frost depth (i.e., approximately 4.5 ft) to limit the potential for post-construction, frost-induced movements from occurring.
- The retaining wall should be designed to accommodate french drains and filter protected weep holes or outlet and tie into the existing storm drain system.
- The retaining wall should be designed at the Service Limit State not to exceed a presumptive bearing resistance equal to 5 kips per square foot (ksf) in accordance with AASHTO LRFD Table C10.6.2.6.1-1, which is indicative of a glacial till subgrade.
- The retaining wall should be designed at the Strength Limit State not to exceed a factored bearing resistance equal to 8 ksf, which is also indicative of a glacial till subgrade. The factored bearing resistance is based on a resistance factor (ϕ_f) equal to 0.55 in accordance with AASHTO LRFD Table 11.5.7.1.
- External (i.e., global stability, sliding, eccentricity) and internal stability evaluations should be completed in accordance with the requirements of Section 673.

We also recommend that consistent with the requirements of Section 673, the Contractor's Engineer submit the wall design to MaineDOT for review prior to the start of construction.

Construction Considerations

The primary purpose of this section is to comment on geotechnical aspects of proposed construction. This section is written primarily for the individuals having responsibility for preparation of geotechnical related plans and specifications as well as personnel appointed to monitor construction activities. Prospective Contractors should evaluate the potential for construction problems on the basis of their own knowledge and experience in the Wiscasset, Maine area, and on the basis of similar projects in other localities, taking into account their proposed construction methods, procedures, equipment and personnel. Please note that the construction considerations provided below relate to the subject project only.

SOIL EXCAVATION

Excavation will be required for general site grading and for general construction of various aspects of the project. We anticipate that excavation of the in-situ soils (primarily fill, marine clay and/or glacial till) can be accomplished using normal earth-excavating equipment. Marine clay 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.

BEDROCK EXCAVATION

As discussed in previous sections of this report, shallow bedrock was encountered within the central portion of the Water Street Parking Lot and along the Railroad Avenue Parking Lot retaining wall. As noted above and on the test boring logs, several feet of soil overburden soil exists overlying bedrock.

Based on the subsurface conditions encountered in test boring HB-WISC-122 and proposed grading information, up to approximately 1 to 2 ft of bedrock excavation will be required within the central portion of the Water Street Parking Lot. Based on the condition of the rock and the limited depth of removal, we anticipate that the rock in this area could be removed using conventional earth-moving equipment (e.g., excavator, hoe-ram, etc.).

As discussed above, rock excavation of up to approximately 11 to 12 ft (maximum) will be required along a portion of the Railroad Avenue Parking Lot retaining wall. As shown in Figures 5 and 6, the majority of the rock excavation is concentrated near the turn in wall (i.e., where the wall changes from east-west to north-south orientation) with lesser amounts to the east and north. Based on observations of the character of the bedrock as observed by Haley & Aldrich in the bedrock core samples (see Appendix A for photographs), it is anticipated that excavation will require systematic drilling and blasting. As stated previously, the sampled and recovered bedrock in the general vicinity of the Railroad Avenue Parking Lot generally consists of one or more of the following:

- Hard to very hard, fresh PEGMATITE. Primary joints dip at horizontal to low angles and are close to moderately spaced. Joints are tight to open, and some joint surfaces are planar to stepped and smooth to rough with some oxidation present *(encountered in test boring HB-WISC-101)*.
- Hard to very hard, fresh to slightly weathered, fine to coarse-grained SCHIST with granitic intrusions or granofels. Primary joints dip at low to high angles (parallel to foliation) and are very close to widely spaced. Joints are tight to open and joint surfaces are healed, planar to undulating, and smooth to rough with some oxidation and silt coatings present *(encountered in test borings HB-WISC-114, -117, -128 and -129)*.
- Hard to very hard, fresh, fine to coarse-grained MIGMATITE or MIGMATITE SCHIST with granitic instructions. Primary joints dip at near horizontal to high angles and are very close to moderately spaced. Joints are tight to open and joint surfaces are undulating to planar and rough with some oxidation and silt coatings present *(encountered in test borings HB-WISC-111, -113, -118, -127 and -130)*.
- Hard to very hard, fresh to moderately weathered GRANOFELS. Primary joints dip at near horizontal to high angles and are very close to moderately spaced. Joints are tight to open and joint surfaces are planar to stepped, rough and are slightly weathered or have some oxidation present *(encountered in test borings HB-WISC-111, -115 and -116)*.

- Very hard, slightly weathered, medium to coarse-grained GRANITE. Primary and secondary joints dip at moderate to horizontal angles, respectively, and are very close to closely spaced. Joints are tight to open and joint surfaces are planar to stepped and smooth to rough *(encountered in test boring HB-WISC-112)*.

We recommend that systematic drilling and blasting of rock be managed to prevent damage to adjacent residential structures, the railroad and existing utilities in accordance with the requirements of MaineDOT Standard Specification Section 203 (Section 203). We also recommend that the Contractor take necessary measures to prevent flyrock from impacting the residential area in the immediate vicinity of the Railroad Avenue Parking Lot. Section 203 also includes provisions that require the Contractor to conduct pre-blast condition survey's, blast vibration monitoring and traffic control (if needed) 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.

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.

SUBGRADE PREPARATION

As discussed in previous sections of this report, we anticipate that subgrade conditions will vary from location to location within the downtown area. Marine clay soils in particular can easily be disturbed by construction activities if care is not taken in excavating within a few feet of design subgrade levels and in protecting the subgrade surfaces after preparation and prior to backfilling. 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 clay soils). We 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 clay to the extent possible.
- 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 the Resident and/or Geotechnical Engineer.
- Exposed subgrades should be examined in the field by the Resident and/or Geotechnical Engineer to verify strength and bearing capacity. Excavation may be necessary to remove weak, disturbed or otherwise unacceptable soils.
- All topsoil, organic matter, debris fill, and other unsuitable material be excavated (removed) prior to subgrade preparation and placement of pavement section materials.
- Granular subgrade surfaces could be proofrolled with a self-propelled static roller/compactor until firm prior to fill placement if the soil appears dry and no "free" water is observed. To minimize disturbance, we recommend that marine silt clay soils exposed at subgrade level not be proofrolled.
- 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 the Resident and/or Geotechnical Engineer, by placing backfill materials.
- Limit equipment traffic across the exposed soil bearing surfaces.
- If disturbance and rutting occur, the disturbed materials should be removed and replaced with compacted sand and gravel.
- We recommend that the Contractor be made responsible for protecting subgrade surfaces. Any damage to the subgrade surface resulting from Contractor means and methods should be repaired at no additional expense to MaineDOT.

Limitations and Closure

This report is prepared for the exclusive use of MaineDOT relative to the subject project. There are no intended beneficiaries other than MaineDOT. 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 for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from MaineDOT and Haley & Aldrich. 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.

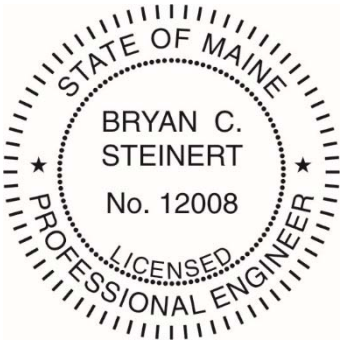
Use of this report by any person or entity, including by MaineDOT, for a purpose other than relative to the subject project is expressly prohibited unless such person or entity obtains written authorization from Haley & Aldrich indicating that the report is adequate for such other use. Use of this report by any other person or entity for such other purpose without written authorization by Haley & Aldrich shall be at such person's or entities sole risk and shall be without legal exposure or liability to Haley & Aldrich.

The information provided herein is 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.

It is our understanding that this report may be included as a reference document in the documents that will be provided to the prospective Contractors for bidding. Please note that the recommendations included herein are superseded by the information contained in the documents and that the information contained in the documents takes precedence over the information provided in this report.

We appreciate the opportunity to provide geotechnical consulting services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.



Bryan C. Steinert, P.E.
Project Manager

Wayne A. Chadbourne, P.E.
Senior Associate

Enclosures:

Table I –	Subsurface Exploration Location Data
Figure 1 –	Project Locus
Figure 2 –	Site and Subsurface Exploration Location Plan (1 of 3)
Figure 3 -	Site and Subsurface Exploration Location Plan (2 of 3)
Figure 4 -	Site and Subsurface Exploration Location Plan (3 of 3)
Figure 5 -	Railroad Avenue Parking Lot Retaining Wall Plan and Profile (1 of 2)
Figure 6 -	Railroad Avenue Parking Lot Retaining Wall Plan and Profile (2 of 2)
Appendix A -	Test Boring Logs and Rock Core Photographs
Appendix B -	Observation Well Installation and Groundwater Monitoring Reports
Appendix C -	Calculations

TABLE I
Exploration Location Data
Downtown Improvements
MaineDOT WIN 021843.00
Wiscasset, Maine

Haley & Aldrich, Inc. File No.: 130323-002

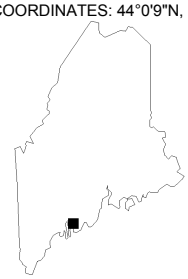
Test Boring No.[1]	Ground Surface[3,4]	Station[5]	Offset Distance & Direction (ft)[5]	Coordinates[2]	
				Northing	Easting
HB-WISC-101	52.2	509+77.7	11.8 LT	183,729	1,498,090
HB-WISC-102	43.2	1320+43.8	39.8 LT	183,741	1,498,212
HB-WISC-103	29.5	1322+46.7	21.2 RT	183,621	1,498,385
HB-WISC-104	37.4	1321+14	19.0 RT	183,664	1,498,260
HB-WISC-105	32.9	1321+80.8	27.8 LT	183,689	1,498,338
HB-WISC-106	23.1	320+7.1	31.7 LT	183,654	1,498,478
HB-WISC-107	20.3	320+37.1	11.5 RT	183,642	1,498,520
HB-WISC-108	12.2	200+38	1.6 RT	183,615	1,498,595
HB-WISC-109	10.1	201+99.9	16.6 RT	183,765	1,498,661
HB-WISC-110	9.8	203+42.7	14.2 RT	183,902	1,498,699
HB-WISC-111	10.7	205+10.4	7.1 RT	184,063	1,498,744
HB-WISC-112	12.2	206+09.4	0.2 LT	184,158	1,498,772
HB-WISC-113	11.8	206+97.5	10.7 RT	184,236	1,498,815
HB-WISC-114	26.9	325+05.5	39.9 RT	184,084	1,498,677
HB-WISC-115	19.8	902+03.8	2.5 LT	184,178	1,498,714
HB-WISC-116	16.8	326+97.6	16.0 RT	184,253	1,498,736
HB-WISC-117	29.7	325+02.9	15.5 RT	184,089	1,498,653
HB-WISC-118	24.8	326+10.8	20.8 RT	184,185	1,498,692
HB-WISC-119	33.7	2316+33.4	53.0 LT	183,283	1,498,302
HB-WISC-120	32.3	2316+99.2	51.1 LT	183,346	1,498,321
HB-WISC-121	29.3	2317+72.7	49.2 LT	183,417	1,498,342
HB-WISC-122	27.0	2317+24.4	12.1 LT	183,360	1,498,365
HB-WISC-123	23.2	317+80.5	28.7 LT	183,405	1,498,414
HB-WISC-124	27.1	316+41	10.3 LT	183,266	1,498,396
HB-WISC-125	26.1	316+83	11.0 LT	183,306	1,498,406
HB-WISC-126	25.1	317+02.2	11.4 LT	183,325	1,498,410
HB-WISC-127	26.2	901+53.3	3.4 LT	184,131	1,498,695
HB-WISC-128	15.7	900+74.5	2.0 LT	184,072	1,498,710
HB-WISC-129	12.9	902+04.6	28.7 RT	184,167	1,498,743
HB-WISC-130	11.7	206+93.7	28.4 LT	184,247	1,498,777

Notes:
[1] Test boring locations are shown on Figures 2 through 4, Site and Subsurface Exploration Location Plans.
[2] As-drilled coordinates of test borings were determined by MaineDOT using GPS survey equipment, are measured in feet and reference NAD83, Maine 2000 West Zone coordinate system.
[3] Ground surface elevations at test boring locations were determined in the field by MaineDOT using GPS survey equipment.
[4] Elevations are measured in feet and reference the North American Vertical Datum of 1988 (NAVD 88).
[5] Station and offset information determined by MaineDOT and provided to Haley & Aldrich.

	Individual	Date
Prepared By:	KAR	3/28/2018
Checked By:	BCS	3/28/2018
Reviewed By:	WAC	4/6/2018

MAP SOURCE: ESRI

SITE COORDINATES: 44°0'9"N, 69°39'54"W



HALEY ALDRICH

DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
APRIL 2018

FIGURE 1

130323-002_1_LOCUS.PDF

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

CAPITAL PROJECTS

WIN
W.I.N. 021843.00 HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	----------	---
DESIGN-DETAILED	----------	---
CHECKED-REVIEWED	-----	----- SIGNATURE
DESIGN2-DETAILED2	E.F.LYNN	MAR 2018
DESIGN3-DETAILED3	----------	------ P.E. NUMBER
REVISIONS 1	------	------
REVISIONS 2	------	------
REVISIONS 3	------	------ DATE
REVISIONS 4	------	------
FIELD CHANGES	------	------

WISCASSET
U. S. ROUTE 1

BORING LOCATION PLAN

HALEY ALDRICH

DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN (1 OF 3)

SCALE: AS SHOWN
APRIL 2018

FIGURE 2

G:\PROJECTS\130323 - Wiscasset\Geotechnical Design Report\Figures\21843 WISCASSET BLP bsteinert

Filename: ...\00\geotech\mslo\007_BLP7.dgn Division: GEOTECH Username: Terry.White Date:3/9/2018

Username: Terry.White Date:3/9/2018

Division: GEOTECH

Filename: ...\00\geotech\wsto\004_BLP4.dgn

PC = STA. 314+68.95

POB = STA. 2315+81.98

PT = STA. 316+09.80

POE = STA. 2318+31.98

PI = STA. 1321+85.75

PC = STA. 1321+96.01

PT = STA. 1323+21.55

PI = STA. 1323+87.53

PC = STA. 1324+23.24

PT = STA. 1324+77.40

PI = STA. 319+59.45

PC = STA. 321+20.57

POB = STA. 200+00.00

HB-WISC-119(OW)
HB-WISC-120
HB-WISC-121
HB-WISC-122
HB-WISC-123
HB-WISC-124
HB-WISC-125
HB-WISC-126
HB-WISC-103
HB-WISC-104
HB-WISC-105
HB-WISC-106
HB-WISC-107
HB-WISC-108

N15°21'03.74"E
N14°59'50.27"E
S71°27'55.24"E
S74°59'36.83"E
N15°27'39.28"E
S69°57'36.82"E
N18°51'08.29"E
S69°32'43.89"E

WATER ST
CURVE DATA #1
PI = 315+39.38
D = 1°39'38.7"
Δ = 2°20'21.2" Lt.
R = 3450.00'

WATER ST
CURVE DATA #3
PI = 321+87.95
D = 0°42'58.3"
Δ = 0°57'54.4" Rt.
R = 8000.00'

ROUTE 1
CURVE DATA #4
PI = 1322+58.78
D = 0°45'58.8"
Δ = 0°57'43.6" Rt.
R = 7476.54'

ROUTE 1
CURVE DATA #6
PI = 1324+50.32
D = 0°45'56.8"
Δ = 0°24'52.9" Rt.
R = 7483.04'

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

CAPITAL PROJECTS

WIN
W.I.N. 021843.00

HIGHWAY PLANS

	DATE	BY	SIGNATURE
PROJ. MANAGER			
DESIGN-DETAILED			
CHECKED-REVIEWED	MAR 2018	T.WHITE	
DESIGN2-DETAILED2		E.FLYNN	
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

P.E. NUMBER

DATE

WISCASSET
U.S. ROUTE 1

ORING LOCATION PLAN

HALEY ALDRICH

DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

SITE AND SUBSURFACE EXPLORATION LOCATION PLAN (2 OF 3)

SCALE: AS SHOWN
APRIL 2018

FIGURE 3

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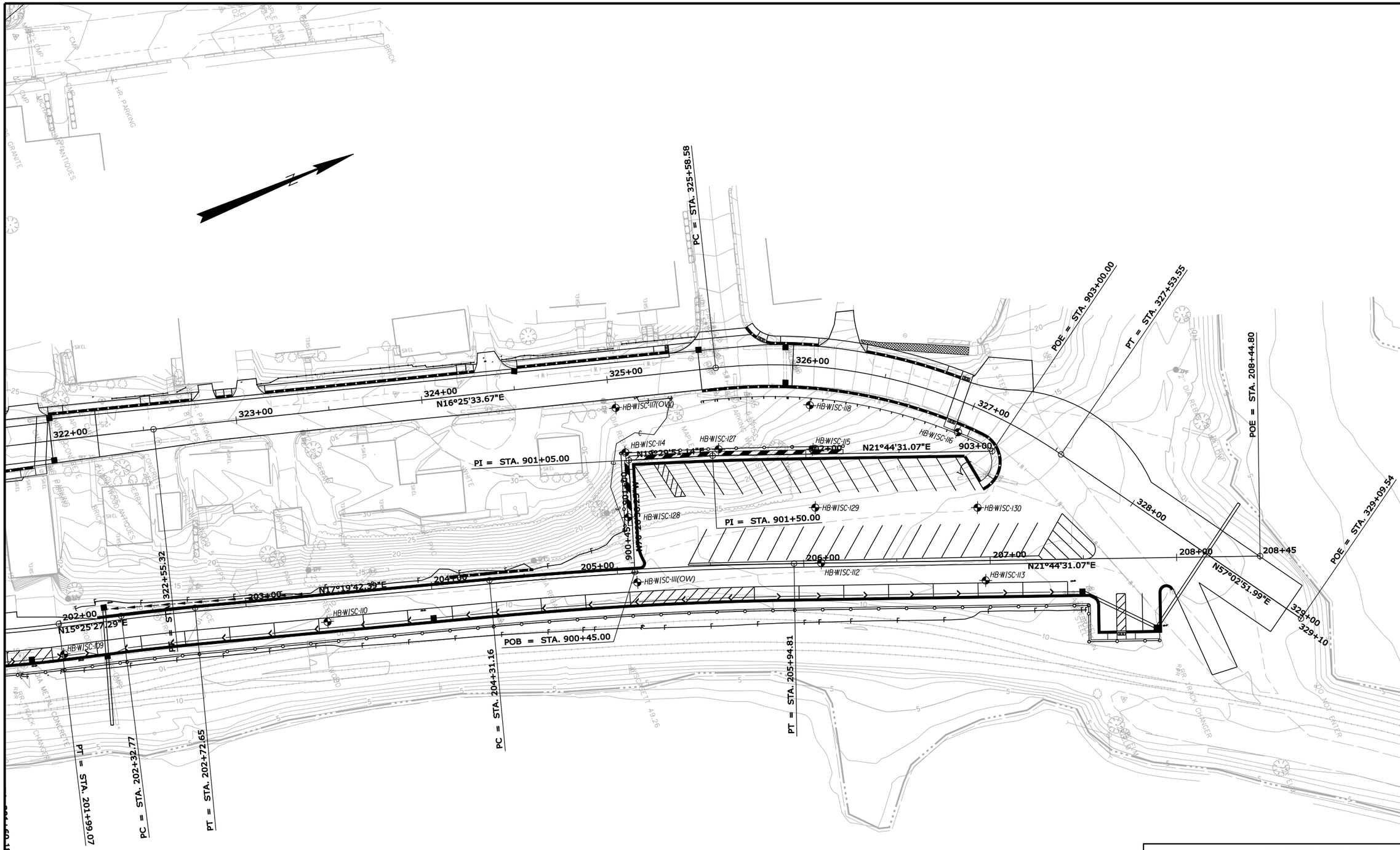


STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

CAPITAL PROJECTS

WIN
W.I.N. 021843.00 HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	-----	-----
DESIGN-DETAILED	-----	-----
CHECKED-REVIEWED	-----	-----
DESIGN2-DETAILED2	E.FLYNN	MAR 2018
DESIGN3-DETAILED3	-----	-----
REVISIONS 1	-----	-----
REVISIONS 2	-----	-----
REVISIONS 3	-----	-----
REVISIONS 4	-----	-----
FIELD CHANGES	-----	-----

SIGNATURE

P.E. NUMBER

DATE

WISCASSET
U.S. ROUTE 1

BORING LOCATION PLAN

HALEY ALDRICH

DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

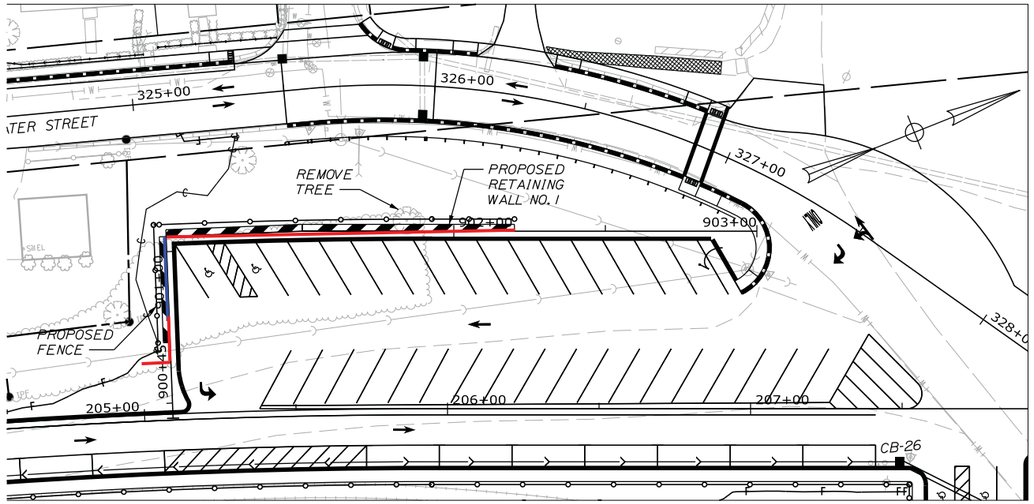
SITE AND SUBSURFACE
EXPLORATION LOCATION PLAN
(3 OF 3)

SCALE: AS SHOWN
APRIL 2018

FIGURE 4

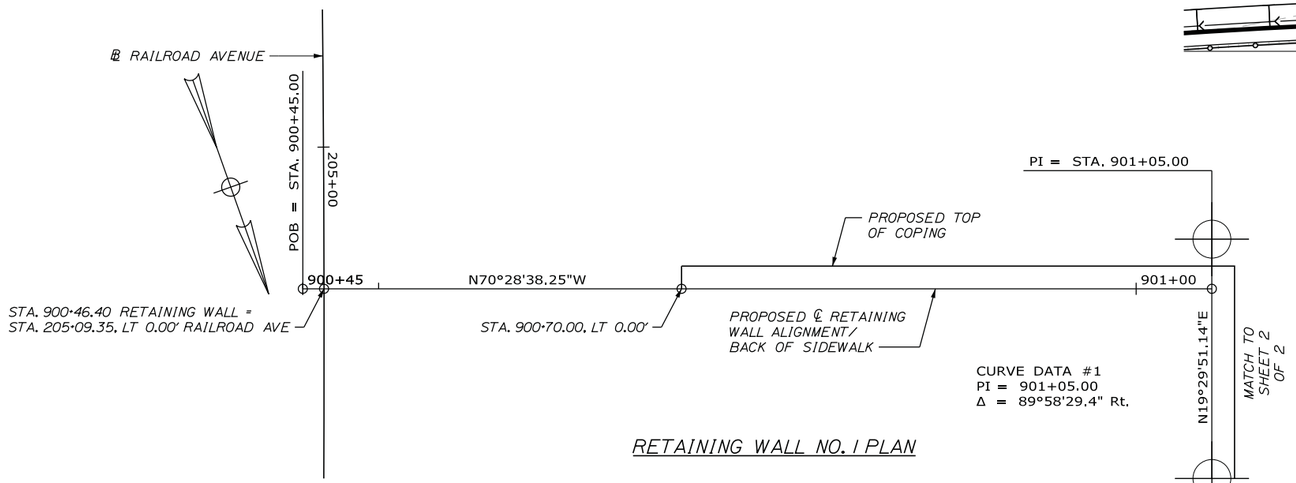
G:\PROJECTS\130323 - Wiscasset\Geotechnical Design Report\Figures\21843 WISCASSET BLP bsteinert

Filename: ...\00\geotech\vmsta\005_BLP5.dgn Division: GEOTECH Username: Terry.White Date:3/9/2018

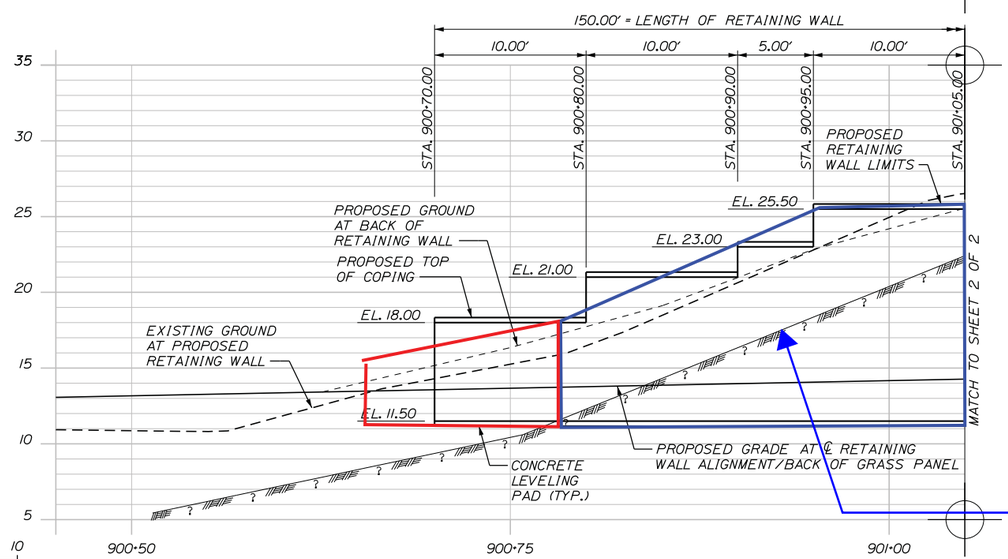


LOCATION PLAN

25 0 25 50
Scale of Feet



RETAINING WALL NO. 1 PLAN



Horiz. 5 0 5 10
Vert. 5 0 5 10
Scale of Feet

RETAINING WALL NO. 1 DEVELOPED ELEVATION

APPROXIMATE TOP OF ROCK SURFACE ALONG RETAINING WALL AS ESTIMATED BY HALEY & ALDRICH BY LINEAR INTERPOLATION BETWEEN TEST BORINGS SHOWN ON FIGURE4

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

WIN 21843.00
HIGHWAY PLANS

vhb

	BY	DATE
PROJ. MANAGER	E. MARTIN	
DESIGN-DETAILED	ECF	9/17
CHECKED-REVIEWED	ECF	9/17
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

WISCASSET
DOWNTOWN IMPROVEMENTS
RETAINING WALL NO. 1
(SHEET 1 OF 2)

HALEY ALDRICH

DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

RAILROAD AVENUE PARKING LOT
RETAINING WALL PLAN AND
PROFILE (1 OF 2)

SCALE: AS SHOWN
APRIL 2018

FIGURE 5

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bsteinert

Filename: ...\MSTA\006_Retaining Wall_01.dgn Division: HIGHWAY Username: EFlynn Date:2/2/2018

DOWNTOWN IMPROVEMENTS
MAINEDOT WIN 021843.00
WISCASSET, MAINE

RAILROAD AVENUE PARKING LOT RETAINING WALL PLAN AND PROFILE (2 OF 2)

SCALE: AS SHOWN
APRIL 2018

FIGURE 6

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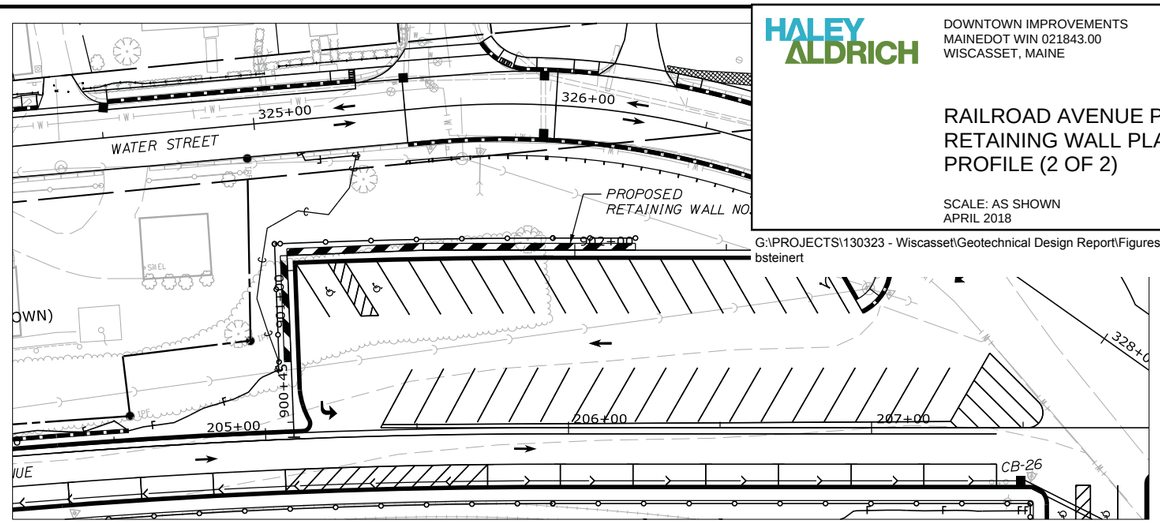
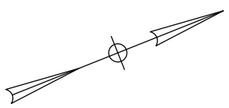
bsteinert



LOCATION PLAN

25 0 25 50
Scale of Feet



CURVE DATA #1
PI = 901+05.00
Δ = 89°58'29.4" Rt.

CURVE DATA #2
PI = 901+50.00
Δ = 2°14'40.6" Rt.

PI = STA. 901+05.00

PI = STA. 901+50.00

PROPOSED TOP OF COPING

902+00

STA. 902+20.00, LT 0.00'

901+00

PROPOSED ℄ RETAINING WALL ALIGNMENT/ BACK OF SIDEWALK

MATCH TO SHEET 1 OF 2

RETAINING WALL NO. 1 PLAN

APPROXIMATE TOP OF ROCK SURFACE ALONG RETAINING WALL AS ESTIMATED BY HALEY & ALDRICH BY LINEAR INTERPOLATION BETWEEN TEST BORINGS SHOWN ON FIGURE4

150.00' = LENGTH OF RETAINING WALL

15.00' 10.00' 10.00' 10.00' 10.00' 10.00' 10.00' 10.00' 10.00' 10.00' 10.00'

STA. 901+05.00
STA. 901+20.00
STA. 901+30.00
STA. 901+40.00
STA. 901+50.00
STA. 901+60.00
STA. 901+70.00
STA. 901+80.00
STA. 901+90.00
STA. 902+00.00
STA. 902+10.00
STA. 902+20.00

EXISTING GROUND AT PROPOSED RETAINING WALL

PROPOSED RETAINING WALL LIMITS

PROPOSED GROUND AT BACK OF RETAINING WALL

PROPOSED TOP OF COPING

EL. 25.50
EL. 24.00
EL. 23.00
EL. 22.00
EL. 21.00
EL. 20.00
EL. 19.50
EL. 18.50
EL. 17.50
EL. 17.00
EL. 16.00
EL. 11.50

MATCH TO SHEET 1 OF 2

CONCRETE LEVELING PAD (TYP.)

PROPOSED GRADE AT ℄ RETAINING WALL ALIGNMENT/BACK OF GRASS PANEL

35 30 25 20 15 10 5

901+25 901+50 901+75 902+00 902+25

RETAINING WALL NO. 1 DEVELOPED ELEVATION

Horiz. 5 0 5 10
Vert. 5 0 5 10
Scale of Feet

DEPARTM

vhb

	E. MARTIN	DATE
DESIGN-DETAILED	ECF	9/17
CHECKED-REVIEWED	ECF	9/17
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

PROJ. MANAGER: JBD
BY: AG

WISCASSET
US 1-DOWNTOWN IMPROVEMENTS

RETAINING WALL NO. 1
(SHEET 2 OF 2)

SHEET NUMBER

Filename: ...\MSTA\007_Retaining Wall_02.dgn Division: HIGHWAY Username: EFlynn Date:2/2/2018

APPENDIX A

Test Boring Logs and
Rock Core Photographs

Test Boring Logs

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-101
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	52.2	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-4-17/10-4-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	509+77.7, 11.8 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	7.6 ft
Hammer Efficiency Factor: 0.869		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	51.5		-BITUMINOUS CONCRETE- 0.8	
	1D/A	24/16	1.00 - 3.00	6/5/3/3	8	12				Light brown, moist, medium dense, fine SAND, little medium sand, trace silt, coarse sand and fine gravel, poorly-graded	
								50.2		-FILL-(SP) PID=0.0 ppm 2.0	
	2D	20/13	3.00 - 4.67	9/5/11/50(0.0)	16	23	NW Drive			Olive-brown, moist, medium stiff, fine sandy CLAY, trace medium sand, reworked native soil	
	R1	60/59	4.70 - 9.70	RQD = 95%			10 32(8.0) NQ Core			-FILL-(CL) PID=0.0 ppm	
5								47.5		Olive-brown, moist, medium dense, fine to coarse SAND, little clay and gravel, well graded, reworked native soil	
										-FILL-(SW/SC) PID=0.0 ppm 4.7	
										Top of Bedrock El. 47.5	
										R1: Light gray to dark gray, fine to coarse-grained PEGMATITE. Very hard to hard, fresh. Joints dipping at horizontal to low angles, close to moderately close, tight to open, planar to stepped, smooth to rough, oxidized joint surfaces.	
										Rock Mass Quality=Excellent	
										Recovery=98%	
10								42.5		-CAPE ELIZABETH FORMATION-	
										R1 Core Times (min:sec): 4.7-5.7' (1:24); 5.7-6.7' (1:10); 6.7-7.7' (1:19); 7.7-8.7' (1:34); 8.7-9.7' (1:27)	
										9.7	
										Bottom of Exploration at 9.7 feet below ground surface.	
15											
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-102
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	43.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-11-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	1320+43.8, 39.8 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	4.5 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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MV = Unsuccessful Field 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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	42.7		-BITUMINOUS CONCRETE- 0.5	
	1D	24/7	1.00 - 3.00	6/5/4/3	9	10				Brown, moist, loose, fine to coarse SAND, little fine gravel, trace silt, well graded FILL-(SW-SM) PID=0.0 ppm	
								40.5		2.7	
	2D/A	24/23	3.00 - 5.00	6/7/7/6	14	16				Olive-brown, moist to dry, stiff silty CLAY, little fine sand, reworked native soil	
								39.2		-FILL-(CL) PID=0.0 ppm 4.0	
5	3D	24/24	5.00 - 7.00	5/5/7/13	12	14	15			Olive-brown, moist, stiff, fine sandy CLAY, frequent 0.5 to 1-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							27			Olive-brown, moist, stiff, fine sandy CLAY, frequent 0.5 to 1-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							31			Note: Strata change at 8 ft based on casing blows and drill wash water contents.	
							40	35.2		8.0	
							45				
10	4D/A	11/10	10.00 - 10.92	25/80(5.0)			RC	33.0		Olive-brown, wet, medium dense, fine to coarse SAND, little silt and gravel, moderately bonded -GLACIAL TILL-(SM)	
								31.7		10.2	
										Top of Bedrock El. 32.0 Note: Advanced rollerbit to 11.5 ft. 11.5	
										Bottom of Exploration at 11.5 feet below ground surface.	
15											
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-103
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	29.5	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-4-17/10-4-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	1322+46.7, 21.2 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	3.4 ft
Hammer Efficiency Factor: 0.869		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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U = Thin Wall Tube Sample
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V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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							Push	28.9		-BITUMINOUS CONCRETE- 0.6	
	1D/A	24/11	1.00 - 3.00	7/6/4/3	10	14	4			Brown, dry, medium dense, fine to coarse SAND, little gravel, well graded	
							8	27.4		-FILL-(SW) PID=0.0 ppm 2.1	
	2D	24/24	3.00 - 5.00	5/5/6/9	11	16	14			Olive-brown, moist, medium stiff, sandy CLAY, reworked native soil -FILL-(CL) PID=0.0 ppm	
							24			Olive-brown, moist, very stiff, silty CLAY, little fine sand, reworked native soil -FILL-(CL) PID=0.0 ppm	
5	3D/A	24/22	5.00 - 7.00	4/4/4/5	8	12	Open			Olive-brown, wet, stiff, silty CLAY, little fine sand, reworked native soil	
								23.4		-FILL-(CL) PID=0.0 ppm 6.1	
										Olive-brown, wet, stiff, silty CLAY, little fine sand, mottled, contains roots -MARINE DEPOSIT-(CL) PID=0.0 ppm	
10	4D	24/24	10.00 - 12.00	WOH/WOH/WOH/2						Olive-brown, wet, very soft, silty CLAY, trace fine sand, mottled, contains occasional 1/8-in. to 1/4-in. thick fine sand partings -MARINE DEPOSIST-(CL) PID=0.0 ppm	
								17.5		12.0	
15										**Bottom of Exploration at 12.0 feet below ground surface.**	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-104
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	37.4	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-6-17/10-6-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	1321+14, 19.0 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	7.9 ft
Hammer Efficiency Factor: 0.677		**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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
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N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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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	36.9		-BITUMINOUS CONCRETE- 0.5	
	1D	24/11	1.00 - 3.00	15/11/9/5	20	23				Brown, dry, medium dense, fine to coarse SAND, little gravel, well graded -FILL-(SW) PID=0.0 ppm	
								34.8		2.6	
	2D	24/18	3.00 - 5.00	3/4/6/9	10	11				Olive-brown, dry, stiff, silty CLAY, little fine sand, reworked native soil -FILL-(CL) PID=0.0 ppm	
5											
	3D	24/24	5.00 - 7.00	4/5/7/7	12	14	4	32.1		5.3	
							10			Olive-brown, moist, stiff, silty CLAY, trace fine sand, mottled -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							17				
							27	29.4		Note: Strata change at 8 ft based on casing blows and drill wash water contents. 8.0	
							33				
10	4D	24/7	10.00 - 12.00	7/10/11/9	21	24	25			Brown, wet, medium dense, fine to coarse SAND, some gravel, trace silt, well graded, loosely bonded -GLACIAL TILL-(SW-SM) PID=0.0 ppm	
							34				
							53				
							40			Note: Strata change at 14.1 ft based on drill action observations.	
							79	23.3		14.1	
15	5D	17/12	15.00 - 16.42	58/73/33	106	120	141			Brown, wet, very dense, sandy GRAVEL, trace silt, well graded, loosely bonded, contains weathered bedrock -GLACIAL TILL-(GW) PID=0.0 ppm	
	R1	44/44	16.50 - 20.17	RQD = 59%			100(0.3) NQ Core	21.0		16.4	
										Top of Bedrock El. 21.0 R1: Dark gray to gray, fine to coarse-grained SCHIST with granitic intrusion from 19.8 to 20.2 ft. Very hard to hard, slightly weathered to fresh. Single vertical joint from 16.5 to 18 ft, parallel to foliation, tight to healed, undulating, rough, oxidized joint surface. Rock Mass Quality=Fair Recovery=100% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 16.5-17.5' (3:35); 17.5-18.5' (1:37); 18.5-19.5' (1:49); 19.5-20.2' (2:33)	
20	R2	29/29	20.20 - 22.62	RQD = 79%						R2: Light gray to gray, fine to coarse-grained SCHIST with granitic intrusion from 20.2 to 20.8 ft. Very hard to hard, fresh. Single vertical joint from 22.1 to 22.6 ft, parallel to foliation, spacing difficult to discern, tight, undulating, rough, oxidized joint surfaces. Rock Mass Quality=Good Recovery=100% -CAPE ELIZABETH FORMATION- R2 Core Times (min:sec): 20.2-21.2' (1:57); 21.2-22.6' (1:48)	
								14.8			
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-104
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	37.4	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-6-17/10-6-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	1321+14, 19.0 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	7.9 ft
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
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N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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										22.6 **Bottom of Exploration at 22.6 feet below ground surface.**	
30											
35											
40											
45											
50											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-105
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	32.9	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	1321+80.8, 27.8 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.3 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
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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	32.3		-BITUMINOUS CONCRETE- 0.6	
	1D/A	24/15	1.00 - 3.00	11/11/10/10	21	24				Brown, dry, medium dense, fine to coarse SAND, some gravel, well graded -FILL-(SW) PID=0.0 ppm	
								30.4		2.5	
	2D	24/14	3.00 - 5.00	4/3/2/5	5	6		29.9		Olive-brown, dry, medium dense, clayey SAND, little gravel -FILL-(SC) PID=0.0 ppm 3.0	
5	3D	24/12	5.00 - 7.00	5/6/8/11	14	16	10			Olive-brown, moist, medium stiff, silty CLAY, little fine sand, reworked native soil -FILL-(CL) PID=0.0 ppm	
							15	26.9		6.0	
							20			Olive-brown, moist, stiff silty CLAY, trace fine sand, mottled -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							23				
							28				
10	4D	24/20	10.00 - 12.00	2/3/3/4	6	7	10			Olive-brown, wet, medium stiff, silty CLAY, trace fine sand, mottled -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							12				
							15				
							12	19.4		13.5	
							8				
15	5D	24/24	15.00 - 17.00	WOH/WOH/WOH/1			5			Olive-gray with black streaks, wet, very soft, silty CLAY, contains trace organics -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							6				
							6				
							7				
							8				
20	6D	24/24	20.00 - 22.00	WOH/WOH/WOH/ WOH			OPEN			Olive-gray, wet, very soft, silty CLAY -MARINE DEPOSIT-(CL) PID=0.0 ppm	
25											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-105
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	32.9	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	1321+80.8, 27.8 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.3 ft
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
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V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_V = Pocket Torvane 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	7D	24/24	25.00 - 27.00	WOR/WOR/WOR/ WOR			OPEN			Olive-gray, wet, very soft, silty CLAY -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							RC				
30								1.9		31.0 Note: Advanced rollerbit to 31 ft. Encountered sand and gravel (Glacial Till) from 31 to 40.9 ft.	
35											
40								-8.0		40.9 Top of Bedrock El. -8.0 Note: Advanced rollerbit to 42 ft.	
								-9.1		42.0 **Bottom of Exploration at 42.0 feet below ground surface.**	
45											
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-106
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	23.1	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-3-17/10-3-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	320+7.1, 31.7 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	4.8 ft
Hammer Efficiency Factor: 0.869		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
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MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/16	0.50 - 2.50	11/8/5/3	13	19	PUSH	22.8		-BITUMINOUS CONCRETE- 0.3	
								21.6		Brown, dry, medium dense, fine to coarse SAND, little gravel, trace silt, contains asphalt, well graded -FILL-(SW) PID=0.0 ppm	
	2D	24/7	2.50 - 4.50	4/3/3/3	6	9		20.8		1.5 Light brown, dry, loose to medium dense, fine to medium SAND, trace silt, coarse sand and gravel, poorly-graded -FILL-(SP) PID=0.0 ppm 2.3	
	3D	7/4	4.50 - 5.08	3/50(1.0)			15	18.3		Olive-brown, moist, medium stiff, sandy CLAY, reworked native soil -FILL-(CL) PID=0.0 ppm	
5	R1	60/56	5.20 - 10.20	RQD = 83%			21(1.0) NQ Core	18.0		4.8 Olive-brown, moist, very dense, sandy GRAVEL, little silt, well graded, contains weathered bedrock -GLACIAL TILL-(GM) PID=0.0 ppm 5.1	
										Top of Bedrock El. 18.0 R1: Gray, fine to coarse-grained MIGMATITE. Very hard, fresh. Joints dipping at low angles, close to moderately close, tight, rough, undulating, oxidized joint surfaces. Rock Mass Quality=Good Recovery=93%	
10								12.9		-CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 5.2-6.2' (1:38); 6.2-7.2' (1:38); 7.2-8.2' (1:19); 8.2-9.2' (1:26); 9.2-10.2' (1:21) 10.2	
										Bottom of Exploration at 10.2 feet below ground surface.	
15											
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-107
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	20.3	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-3-17/10-3-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	320+37.1, 11.5 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	4.6 ft
Hammer Efficiency Factor: 0.869		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/15	0.50 - 2.50	10/10/11/8	21	30	PUSH	20.0		-BITUMINOUS CONCRETE- 0.4 Brown, dry, medium dense, fine to coarse SAND, little gravel, well graded, contains asphalt -FILL-(SW) PID=0.0 ppm	
	2D	24/9	2.50 - 4.50	8/4/4/7	8	12		18.3		2.0 Brown, dry, medium dense, fine to medium SAND, trace coarse sand and fine gravel, poorly-graded -FILL-(SP) PID=0.0 ppm	
	3D	24/15	4.50 - 6.50	2/3/4/5	7	10	6	15.8		Brown, moist, medium dense, fine to medium SAND, trace coarse sand and fine gravel, poorly-graded	
5							7	15.4		-FILL-(SP) PID=0.0 ppm 4.5 Olive-brown, moist, medium stiff, fine sandy CLAY, depositional layering at 4.9 ft, reworked native soil -FILL-(CL) PID=0.0 ppm	
	MD	24/0	6.50 - 8.50	6/6/8/9	14	20	14			4.9 Olive-brown, moist, medium stiff, fine sandy CLAY, varved and mottled -MARINE DEPOSIT-(CL) PID=0.0 mm. Note: Drill wash water contains stiff clay from 6.5 to 10 ft.	
							28				
							33				
							35				
10	4D	10/8	10.00 - 10.83	4/50(4.0)			31(10.0) NQ Core	9.5		Olive-brown, moist, medium stiff, fine sandy CLAY, varved and mottled, occasional 1/8-in. to 1-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
	R1	52/46	11.00 - 15.33	RQD = 74%						10.8 Top of Bedrock El. 9.5 R1: Gray, fine to coarse-grained MIGMATITE. Very hard, fresh. Joints dipping moderately, single joint set at 14 ft. Very close, open to tight, oxidized joint surfaces, <1/16-in. thick silt coating. Rock Mass Quality=Fair Recovery=89% -CAPE ELIZABETH FORMATION-	
15								5.0		R1 Core Times (min:sec): 11.0-12.0' (3:01); 12.0-13.0' (1:42); 13.0-14.0' (1:28); 14.0-15.3' (1:43) 15.3 **Bottom of Exploration at 15.3 feet below ground surface.**	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-108
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	12.2	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-3-17/10-3-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	200+38, 1.6 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.8 ft
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
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V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	0.50 - 2.50	8/9/9/4	18	26	SSA	11.9		-BITUMINOUS CONCRETE- 0.3 Brown, dry, medium dense, fine to coarse SAND, some gravel, trace silt, well graded, contains asphalt	
								10.2		-FILL-(SW) PID=0.0 ppm 2.0 Brown, dry, loose, fine to medium SAND, trace silt, coarse sand and gravel, poorly-graded, contains brick	
	2D	24/6	2.50 - 4.50	4/5/5/4	10	14				-FILL-(SP-SM) PID=0.0 ppm	
								7.8		4.4 Olive-brown, moist, medium stiff, sandy CLAY, trace fine gravel, wood in spoon tip, contains pieces of concrete	
5	3D	24/9	4.50 - 6.50	3/2/2/8	4	6				-FILL-(CL) PID=0.0 ppm	
								6.1		6.1	
	4D	24/5	6.50 - 8.50	28/8/12/9	20	29		5.9		-WOOD- 6.3 Olive-brown, wet, medium dense, clayey SAND, trace fine gravel, contains wood pieces, reworked native soil	
										-FILL-(SC) PID=0.0 ppm	
	5D	24/8	8.50 - 10.50	4/3/5/5	8	12				Olive-brown, wet, medium dense, clayey SAND, trace fine gravel, contains brick pieces, reworked native soil	
10										-FILL-(SC)	
								1.7		10.5 **Bottom of Exploration at 10.5 feet below ground surface.**	
15											
20											
25											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-109
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	10.1	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-2-17/10-2-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	201+99.9, 16.6 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.6 ft
Hammer Efficiency Factor: 0.869		**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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/21	0.00 - 2.00	29/25/15/14	40	58	NW Drive	9.7		Brown, dry, dense, fine to medium SAND, little coarse sand, trace silt and fine gravel, well graded -FILL-(SW) PID=0.0 ppm	
										0.4	
	2D	24/12	2.00 - 4.00	9/6/5/3	11	16		8.0		Black, moist, dense, fine to medium SAND, trace silt, coarse sand and fine gravel, well graded, contains brick fragments and reclaimed asphalt -FILL-(SM) PID=2.0 ppm	
										2.1	
	3D/A	24/15	4.00 - 6.00	WOH/5/7/7	12	17		5.6		Olive-brown, moist, very stiff, sandy CLAY, trace fine gravel, reworked native soil -FILL-(CL) PID=0.0 ppm	
5										Olive-brown, wet, very stiff, sandy CLAY, trace fine gravel, reworked native soil -FILL-(CL) PID=4.0 ppm	
	4D	24/4	6.00 - 8.00	24/8/6/9	14	20		3.6		4.5	
										Note: Recovered 10 in. of wood -WOOD- PID=4.0 ppm	
	5D	24/20	8.00 - 10.00	47/14/4/4	18	26		2.1		6.5	
								0.4		Olive-gray, wet, medium dense, clayey GRAVEL, little fine sand, trace medium sand and fine gravel, contains wood, reworked native soil -FILL-(GC) PID=3.0 ppm	
10								0.1		8.0	
										Olive-gray, wet, medium dense, clayey SAND, some gravel, contains wood and shells, occasional 1/8-in. thick fine sand partings in tip of spoon, reworked native soil -FILL-(SC) PID=2.0 ppm	
										9.7	
										Olive-brown, wet, medium stiff, silty CLAY with fine sand seams -MARINE DEPOSIT-(CL)	
										10.0	
15										**Bottom of Exploration at 10.0 feet below ground surface.**	
20											
25											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-110
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	9.8	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-2-17/10-2-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	203+42.7, 14.2 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	3.8 ft
Hammer Efficiency Factor: 0.869		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/19	0.00 - 2.00	16/17/9/6	26	38	NW Drive	8.8		Brown, dry, dense, fine to coarse SAND, little fine gravel, trace clay nodules, well graded -FILL-(SW) PID=0.0 ppm 1.0	
	2D	24/16	2.00 - 4.00	4/6/7/5	13	19		7.6		Black, dry, medium dense, fine to medium SAND, trace silt, coarse sand and gravel, well graded, contains brick and ash -FILL-(SW-SM) PID=0.0 ppm 2.2	
	3D	24/3	4.00 - 6.00	5/2/13/2	15	22		4.8		Olive-gray, moist, stiff to very stiff, sandy CLAY, contains wood pieces, reworked native soil -FILL-(CL) PID=0.0 ppm	
5								4.3		Olive-gray, moist, medium stiff, sandy CLAY, contains wood pieces, reworked native soil -FILL-(CL) PID=0.0 ppm 5.0 -WOOD- 5.5	
	4D	24/6	6.00 - 8.00	2/2/5/11	7	10		1.8		Olive-gray, wet, loose, clayey SAND, some gravel, contains wood fibers throughout, reworked native soil -FILL-(SC) PID=0.0 ppm	
	5D	5/5	8.00 - 8.42	100(5.0)				1.5			
	6D	13/6	9.50 - 10.58	22/29/50(1.0)	79+	114	SSA	0.8		8.0 Olive-gray, wet, very dense, fine to coarse SAND, some gravel, little silt, moderately bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
10								-0.8		8.3 Note: Augered through cobble from 8.3 to 9 ft. -COBBLE-	
								-1.2		9.0 Olive-gray, wet, very dense, fine to coarse SAND, some gravel, little silt, moderately bonded -GLACIAL TILL-(SM)	
										10.6 Top of Probable Bedrock El. -1.2 Note: Advanced solid-stem auger to 11 ft. -PROBABLE BEDROCK-	
15										11.0 **Bottom of Exploration at 11.0 feet below ground surface.**	
20											
25											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-111
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	10.7	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-4-17/10-4-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	205+10.4, 7.1 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	5.7 ft
Hammer Efficiency Factor: 0.869		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/16	0.00 - 2.00	15/22/13/9	35	51	0	9.6		Dark brown, dry, dense, fine to coarse SAND, little gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm	
							2			1.1	
	2D	24/8	2.00 - 4.00	16/15/14/9	29	42	9	8.7		Black, dry, medium dense, fine to coarse SAND, trace silt and fine gravel, well graded -FILL-(SW) PID=1.0 ppm	
							10			2.0	
	3D	24/16	4.00 - 6.00	2/1/2/2	3	4	22	6.9		Red-brown, dry, dense, sandy GRAVEL, trace silt, well graded, contains 50% brick, trace concrete -FILL-(GW) PID=0.0 ppm	
5							20			3.8	
	4D	23/7	6.00 - 7.92	13/5/3/50(5.0)	8	12	57	4.8		Olive-brown, wet, soft, sandy CLAY, wood in spoon tip, reworked native soil -FILL-(CL) PID=1.0 ppm	
							38(11.0)	4.0		5.9	
							NQ Core			Note: Recovered 7 in. wood. -WOOD- PID=0.0 ppm	
	R1	40/36	8.00 - 11.33	RQD = 53%				2.8		6.7	
										Note: Drill wash water contains silty clay from 6 to 7.9 ft, reworked native soil. -FILL-(CL)	
10										7.9	
										Top of Bedrock El. 2.8	
	R2	20/20	11.30 - 12.97	RQD = 100%						R1: Orange-gray to gray, fine to coarse-grained GRANOFELS. Very hard to hard, slightly weathered. Joints dipping at low to moderate angles, very close to close, tight to open, slightly weathered joint surfaces. Rock Mass Quality=Fair Recovery=90% -CAPE ELIZABETH FORMATION-	
								-2.3		R1 Core Times (min:sec): 8.0-9.0' (2:12); 9.0-10.0' (1:57); 10.0-11.3' (1:41) R2: Light gray to dark gray, fine to coarse-grained MIGMATITE SCHIST with granitic intrusions. Very hard to hard, fresh. Joints horizontal to steeply dipping, close to moderately close, tight, planar, rough. Rock Mass Quality=Excellent Recovery=100% R2 Core Times (min:sec): 11.3-12.3' (2:04); 12.3-13.0' (2:45)	
15										13.0	
										Bottom of Exploration at 13.0 feet below ground surface.	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-112
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	12.2	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-2-17/10-3-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	206+09.4, 0.2 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.4 ft
Hammer Efficiency Factor: 0.869		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	12/11/5/5	16	23	SSA			Brown, moist, medium dense, fine to coarse SAND, little silt and fine gravel -FILL-(SM) PID=0.0 ppm	
								10.2		2.0	
	2D	24/14	2.00 - 4.00	5/5/11/5	16	23				Olive-brown to brown, moist, medium dense, fine SAND, little silt and coarse gravel, trace medium sand, coarse sand and fine gravel, reworked native soil -FILL-(SM) PID=0.0 ppm	
								8.2		4.0	
	3D	24/9	4.00 - 6.00	8/7/10/10	17	25	21			Olive-brown, moist, medium dense, gravelly SAND, trace silt, well graded, loosely bonded GLACIAL TILL-(SW-SM) PID=0.0 ppm	
5							33				
	4D	24/17	6.00 - 8.00	8/11/7/9	18	26	33			Olive-brown, moist, medium dense, fine SAND, little medium sand and coarse gravel, trace silt, coarse sand and fine gravel, poorly-graded, loosely bonded -GLACIAL TILL-(SP-SM) PID=0.0 ppm	
							40				
							49				
							21	3.2		9.0	
10										Note: Low penetration resistance and color change to gray from 9 to 10 ft.	
	5D	24/13	10.00 - 12.00	1/2/9/7	11	16	10			Gray, wet, medium dense, fine SAND, little silt, medium sand and gravel, trace coarse sand, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
							23	1.2		11.0	
							47			Note: Color change to olive-brown from 11 to 12 ft, single 1/2-in. medium sand parting at 11.7 ft.	
							20(10.0)	-0.8		13.0	
	R1	28/26	14.60 - 16.93	RQD = 22%			NQ			Top of Bedrock at El. -0.8 R1: Gray-brown, medium to coarse-grained GRANITE. Very hard to slightly weathered. Primary joint set dipping moderately, secondary joint set dipping horizontally, very close to close, tight to open, planar to stepped, smooth to rough. Rock Mass Quality=Very Poor Recovery=93% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 14.6-15.6' (1:57); 15.6-16.9' (2:33)	
15											
	R2	35/31	16.90 - 19.82	RQD = 57%						R2: Gray-brown, medium-grained GRANITE. Very hard, slightly weathered. Primary joint set dipping moderately, secondary joint set dipping horizontally, very close to close, tight to open, planar to stepped, smooth to rough. Rock Mass Quality=Fair Recovery=89% -CAPE ELIZABETH FORMATION- R2 Core Times (min:sec): 16.9-17.9' (4:43); 17.9-18.9' (2:21); 18.9-19.8' (2:38)	
								-7.6		19.8	
20										**Bottom of Exploration at 19.8 feet below ground surface.**	
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-113
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	11.8	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-59 Truck	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-3-17/10-4-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	206+97.5, 10.7 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	5.0 ft
Hammer Efficiency Factor: 0.869		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/14	0.00 - 2.00	6/11/14/11	25	36	SSA			Brown, dry, medium dense, fine to coarse SAND, some gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm	
								10.4		1.4	
	2D	24/22	2.00 - 4.00	8/7/9/11	16	23		10.0		Black, dry, medium dense, fine to medium SAND, trace silt, coarse sand and fine gravel, poorly-graded, contains asphalt -FILL-(SP-SM) PID=2.0 ppm	
								8.8		1.8	
	3D	24/24	4.00 - 6.00	3/2/2/3	4	6	5			Olive-brown, dry, stiff, sandy CLAY, reworked native soil -FILL-(CL) PID=0.0 ppm	
5							7			3.0 Olive-brown, moist, very stiff, silty CLAY, little fine sand, mottled, contains frequent 1/16-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							11			Olive-brown, moist, medium stiff, silty CLAY, trace fine sand, mottled, contains frequent fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							17				
							16				
							28	2.6		Note: Strata change at 9.2 ft based on drill action and wash water contents.	
10	4D	24/13	10.00 - 12.00	9/8/7/6	15	22	37			9.2 Olive-brown to olive-gray with depth, wet, medium dense, fine to coarse SAND, some gravel, little silt, moderately bonded to loosely bonded with depth -GLACIAL TILL-(SM) PID=0.0 ppm	
							26				
							16				
							15				
							20				
15	5D	24/12	15.00 - 17.00	3/2/1/1	3	4	15			Olive-gray, wet, very loose, fine to medium SAND, little silt, trace coarse sand and gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
							10				
							17				
							30(5.0)				
	R1	60/60	18.40 - 23.40	RQD = 98%			NQ Core	-6.6		18.4 Top of Bedrock El. -6.6 R1: Gray, fine to coarse-grained MIGMATITE. Very hard, fresh. Joints horizontal to moderately dipping, moderately close, open, planar, rough, >1/8-in. thick silt laminae on joint surfaces, oxidized joint surfaces. Rock Mass Quality=Excellent Recovery=100% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 18.4-19.4' (3:17); 19.4-20.4' (1:55); 20.4-21.4' (1:46); 21.4-22.4' (1:45); 22.4-23.4' (1:41)	
20											
								-11.6		23.4 **Bottom of Exploration at 23.4 feet below ground surface.**	
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-114
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	26.9	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-5-17/10-5-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	325+05.5, 39.9 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	2.0 ft
Hammer Efficiency Factor:	0.677	**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	0.00 - 2.00	1/2/2/5	4	5	SSA	26.5		Brown ORGANIC SOIL with roots -TOPSOIL-(OL/OH) 0.4	
	2D	5/2	2.00 - 2.42	50(5.0)			NQ Core	24.7		Brown, dry, loose, fine to medium SAND, little silt and gravel, trace fine sand, contains roots -TOPSOIL-(SM) PID=0.0 ppm 2.2	
	R1	60/60	2.50 - 7.50	RQD = 83%				24.5		Olive-brown, dry, very dense, sandy CLAY, contains roots, reworked native soil -FILL-(CL) PID=0.0 ppm 2.4	
5										Top of Bedrock El. 24.5 R1: Dark gray, fine to coarse-grained SCHIST with granofels. Very hard, fresh to slightly weathered. Joints dipping steeply, parallel to foliation, moderately close, tight, planar to undulating, rough, oxidized joint surfaces. Rock Mass Quality=Good Recovery=100% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 2.5-3.5' (1:39); 3.5-4.5' (1:33); 4.5-5.5' (1:53); 5.5-6.5' (1:18); 6.5-7.5' (1:31)	
	R2	12/12	7.50 - 8.50	RQD = 0%							
	R3	58/52	8.50 - 13.33	RQD = 90%							
10										R2: Gray to dark gray, fine to medium-grained SCHIST. Very hard to hard, slightly weathered. Single joint dipping steeply, parallel to foliation, wide, tight, planar, rough, oxidized joint surface. Rock Mass Quality=Very Poor Recovery=100% -CAPE ELIZABETH FORMATION- R2: Core Times (min:sec): 7.5-8.5' (2:31)	
	R4	54/54	13.30 - 17.80	RQD = 89%						R3: Gray, fine to medium-grained, SCHIST with granofels. Very hard, fresh. Primary joints dipping steeply, parallel to foliation, moderately close to wide, tight, planar, smooth to rough, oxidized joint surfaces. Secondary joint horizontal, wide, open, undulating, rough, oxidized. Rock Mass Quality=Good Recovery=90% -CAPE ELIZABETH FORMATION- R3 Core Times (min:sec): 8.5-9.5' (1:46); 9.5-10.5' (1:30); 10.5-11.5' (1:54); 11.5-12.5' (1:55); 12.5-13.3' (1:42)	
15								9.1		R4: Dark gray, fine to medium-grained, SCHIST. Very hard, fresh. Joints horizontal, very close to moderately close, tight to open, undulating, rough, oxidized joint surfaces. Rock Mass Quality=Good Recovery=100% -CAPE ELIZABETH FORMATION- R4 Core Times (min:sec): 13.3-14.3' (1:57); 14.3-15.3' (1:38); 15.3-16.3' (1:40); 16.3-17.8' (1:37) 17.8	
20										**Bottom of Exploration at 17.8 feet below ground surface.**	
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-115
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	19.8	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-5-17/10-5-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	902+03.8, 2.5 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	3.5 ft
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/6	0.00 - 2.00	1/4/5/5	9	10	SSA	19.3		Brown, dry, very loose, silty fine SAND, little medium sand, trace coarse sand and fine gravel, contains roots -TOPSOIL-(SM) PID=0.0 ppm 0.5	
	2D	24/13	2.00 - 4.00	5/4/3/15	7	8		17.6		Olive-brown, dry, loose, clayey fine SAND, trace medium sand, coarse sand and fine gravel, contains roots, coal pieces and ash -FILL-(SC) PID=0.0 ppm 2.2	
	3D	24/13	4.00 - 6.00	3/9/4/5	13	15	20	15.8		Red-brown to olive-brown, moist, loose, clayey fine SAND, trace medium to coarse sand, mottled and varved, wet at 3.7 ft -MARINE DEPOSIT-(SC) PID=0.0 ppm 4.0	
5							22			Olive-brown, wet, medium dense, fine to coarse SAND, some silt and gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
	4D	24/14	6.00 - 8.00	10/10/12/15	22	25	20			Olive-brown, moist, medium dense, fine to coarse SAND, some gravel, little silt, well graded, loosely bonded -GLACIAL TILL-(SW-SM) PID=0.0 ppm Note: Drill wash from 6 to 10 ft returns silty sand.	
							25				
							32				
							31				
10	5D	12/12	10.00 - 11.00	7/12/50(0.0)			38			Olive-brown, wet, medium dense, fine to coarse SAND, some silt, little gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
	R1	60/58	11.10 - 16.10	RQD = 88%			NQ Core	8.8		11.0 Top of Bedrock El. 8.8 R1: Gray, medium to coarse-grained GRANOFELS. Very hard, fresh. Joints horizontal to moderately dipping, very close to moderately close, tight to open, oxidized joint surfaces. Rock Mass Quality=Good Recovery=97% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 11.1-12.1' (1:47); 12.1-13.1' (1:32); 13.1-14.1' (1:17); 14.1-15.1' (1:03); 15.1-16.1' (1:03)	
15								3.7		16.1 **Bottom of Exploration at 16.1 feet below ground surface.**	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-116
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	16.8	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-5-17/10-5-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	326+97.6, 16.0 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	9.0 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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.
				Sample Information							
0	1D	24/10	0.00 - 2.00	3/14/14/11	28	32	SSA	16.3		Brown ORGANIC SOIL -TOPSOIL-(OL/OH)	
										0.5	
	2D	24/18	2.00 - 4.00	7/4/5/5	9	10		14.7		Brown, dry, hard, sandy CLAY, contains roots, reworked native soil -FILL-(CL) PID=0.0 ppm	
										2.1	
	3D	24/24	4.00 - 6.00	3/3/4/4	7	8	15			Olive-brown, moist, stiff, silty CLAY, trace fine sand, occasional 1/16-in. thick fine sand partings, mottled -MARINE DEPOSIT-(CL) PID=0.0 ppm	
5							18			Olive-brown, moist, medium stiff, silty CLAY, trace fine sand, occasional 1/16-in. thick fine sand partings, mottled -MARINE DEPOSIT-(CL)	
							21				
							25			Note: Drill action and wash water contents indicate strata change at 8.5 ft.	
							24	8.3		8.5	
							27				
10	4D	13/11	10.00 - 11.08	1/2/50(1.0)			21			Olive-brown, wet, very loose, silty SAND, trace fine gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
	R1	60/54	11.20 - 16.20	RQD = 7%			NQ Core	5.7		11.1	
										Top of Bedrock El. 5.7 R1: Gray, medium to coarse-grained GRANOFELS. Hard to very hard, moderately weathered. Primary joints dipping vertically. Secondary joints intersecting primary joints at low to moderate angles, close to very close, tight to open, planar to stepped, rough, oxidized and weathered joint surfaces. Rock Mass Quality=Very Poor Recovery=90% -CAPE ELIZABETH FORMATION- Note: Core times not recorded.	
15								0.6		16.2	
										Bottom of Exploration at 16.2 feet below ground surface.	
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: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-117
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	29.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	325+02.9, 15.5 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	N/A
Hammer Efficiency Factor: 0.677		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	24/5	0.00 - 2.00	WOH/3/12/17	15	17	SSA	29.2		-TOPSOIL-	
										0.5	
										Brown, dry, loose, fine to coarse SAND, some gravel, trace silt, contains roots and brick fragments, well graded	
								27.7		-FILL-(SW) PID=0.0 ppm	
	2D	24/7	2.00 - 4.00	12/12/9/9	21	24	12			2.0	
							22			Olive-brown, dry, very stiff, sandy CLAY, trace fine gravel, contains brick and coal fragments, reworked native soil	
	3D	24/9	4.00 - 6.00	8/26/25/13	51	58	72	25.2		-FILL-(CL) PID=0.0 ppm	
5							37			Olive-brown, dry, very stiff, sandy CLAY, trace fine gravel, contains mostly brick, reworked native soil	
								24.2		-FILL-(CL) PID=0.0 ppm	
	4D	24/20	6.00 - 8.00	8/10/12/14	22	25	60			4.5	
							55			-BRICK-	
							68			5.5	
							155			Olive-brown to red-brown, moist, very stiff, silty CLAY, trace fine sand, mottled	
10	5D	18/9	10.00 - 11.50	36/14/8/50(0.0)	22	25	--	21.8		-MARINE DEPOSIT-(CL) PID=0.0 ppm	
	R1	60/60	11.60 - 16.60	RQD = 93%			NQ Core			7.9	
										Brown, moist, medium dense, fine to coarse SAND, some gravel, trace silt, well graded, loosely bonded	
										-GLACIAL TILL-(SW-SM) PID=0.0 ppm	
								18.2		11.5	
										Top of Bedrock El. 18.2	
										R1: Dark gray, fine to coarse-grained SCHIST. Hard to very hard, fresh. Joints dipping at low angles, very close to moderately close, tight to open, planar, rough, oxidized joint surfaces.	
										Rock Mass Quality=Excellent	
15										Recovery=100%	
										-CAPE ELIZABETH FORMATION-	
										R1 Core Times (min:sec): 11.6-12.6' (1:32); 12.6-13.6' (1:29); 13.6-14.6' (1:51); 14.6-15.6' (1:43); 15.6-16.6' (1:11)	
								13.1		16.6	
										Bottom of Exploration at 16.6 feet below ground surface.	
										Note: Installed well upon completion. See Observation Well Installation Report HB-WISC-117 for well details.	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-118
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	24.8	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	326+10.8, 20.8 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.3 ft
Hammer Efficiency Factor: 0.677		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	0.00 - 2.00	WOH/4/9/14	13	15	SSA	24.5		-TOPSOIL- 0.3 Olive-brown, dry, medium dense, clayey SAND, contains coal pieces, reworked native soil -FILL-(SC) PID=0.0 ppm	
	2D	24/13	2.00 - 4.00	6/5/4/5	9	10				Olive-brown, dry, stiff, sandy CLAY, single coarse gravel piece, reworked native soil -FILL-(CL) PID=0.0 ppm	
	3D	24/18	4.00 - 6.00	2/4/5/6	9	10	22	20.3		4.5 Olive-brown, moist, stiff, silty CLAY, trace fine sand, motted -MARINE DEPOSIT-(CL) PID=0.0 ppm	
5							25				
							29			Note: Strata change at 7.5 ft based on drill wash and casing blows.	
							21	17.3		7.5	
							18				
							17				
10	4D	20/19	10.00 - 11.67	1/1/1/50(2.0)	2	2	5			Olive-brown, wet, very loose, clayey SAND, frequent 1 to 2-in. thick fine sand partings -MARINE DEPOSIT-(SC) PID=0.0 ppm	
	R1	60/59	11.80 - 16.80	RQD = 93%			15	13.3		11.5	
							NQ Core	13.1		-GLACIAL TILL- 11.7 Top of Bedrock El. 13.1 R1: Gray, fine to coarse-grained MIGMATITE. Very hard to hard, fresh. Joints dipping at low angles, very close to close, tight to open, stepped to planar, rough, oxidized joint surfaces. Rock Mass Quality=Excellent Recovery=98% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 11.8-12.8' (1:30); 12.8-13.8' (1:28); 13.8-14.8' (1:27); 14.8-15.8' (1:49); 15.8-16.8' (2:08)	
15								8.0		16.8 **Bottom of Exploration at 16.8 feet below ground surface.**	
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: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-119
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	33.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-9-17/10-9-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	2316+33.4, 53.0 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	5.5 ft
Hammer Efficiency Factor: 0.677		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	24/8	0.00 - 2.00	8/7/8/9	15	17	SSA			Brown, moist, medium dense, fine to coarse SAND, some gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm	
	2D	24/16	2.00 - 4.00	8/7/9/10	16	18		31.5		2.2 Olive-brown, moist, very stiff silty CLAY, little fine sand, contains brick fragments, reworked native soil -FILL-(CL) PID=0.0 ppm	
	3D	24/24	4.00 - 6.00	5/8/9/12	17	19		29.2		4.5 Olive-brown, moist, very stiff, silty CLAY, trace fine sand, mottled -MARINE DEPOSIT-(CL) PID=0.0 ppm	
5											
10	4D	23/12	10.00 - 11.92	2/2/7/50(5.0)	9	10		22.6		Olive-brown, wet, soft to medium stiff, fine sandy CLAY, contains 1 to 3-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
								21.8		11.1 Olive-brown, wet, very dense, fine to coarse SAND, some gravel, little silt, well graded, moderately bonded -GLACIAL TILL-(SM) PID=0.0 ppm Note: Advanced SSA to 11.9 ft, removed augers. Advanced HW casing to 11.9 ft.	
15										11.9 **Bottom of Exploration at 11.9 feet below ground surface.** Note: See Observation Well Installation Report HB-WISC-119 for well details.	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-120
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	32.3	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-9-17/10-9-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	2316+99.2, 51.1 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.0 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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/A	24/18	0.00 - 2.00	5/7/8/9	15	17	Push	31.7		Dark brown, moist, loose to medium dense, fine to coarse SAND, little gravel, trace silt, well graded -FILL-(SW-SM) PID=0.0 ppm	
										0.6	
	2D/A	24/14	2.00 - 4.00	7/8/9/12	17	19				Olive-brown, moist, very stiff, silty CLAY, trace medium and coarse sand, reworked native soil -FILL-(CL) PID=0.0 ppm	
								28.2		Olive-brown, dry, very stiff, silty CLAY, little fine sand, contains brick fragments, reworked native soil -FILL-(CL) PID=0.0 ppm	
	3D	24/14	4.00 - 6.00	13/15/13/11	28	32	27			4.1	
5							32	26.6		Olive-brown, wet, medium dense, fine to coarse SAND, little gravel, trace silt, well graded, contains asphalt pieces, reworked native soil -FILL-(SW-SM) PID=78.6 ppm	
	4D	24/6	6.00 - 8.00	10/14/13/11	27	30	22			5.7	
							24			Olive-brown, wet, medium dense, fine to coarse SAND, little gravel, trace silt, loosely bonded, well graded -GLACIAL TILL-(SW-SM) PID=0.0 pmm	
							29				
							33				
10								22.3		10.0	
	5D R1	5/4 60/52	10.00 - 10.42 10.50 - 15.50	50(5.0) RQD = 80%			46(6.0) NQ Core	21.9		Note: Sample 5D contains weathered bedrock. -WEATHERED BEDROCK-	
										10.4	
										Top of Bedrock El. 21.9 R1: Gray and white, fine to coarse-grained SCHIST/MIGMATITE. Hard, fresh. Single joint at 11 ft steeply dipping, widely spaced, tight, planar, rough, oxidized joint surfaces. Rock Mass Quality=Good Recovery=87% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 10.5-11.5' (1:37); 11.5-12.5' (1:39);	
15								16.8		12.5-13.5' (1:22); 13.5-14.5' (1:41); 14.5-15.5' (1:30)	
										15.5	
										Bottom of Exploration at 15.5 feet below ground surface.	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-121
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	29.3	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-9-17/10-9-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	2317+72.7, 49.2 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	4.5 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	0.00 - 2.00	5/7/6/4	13	15	SSA			Brown to light-brown, moist, medium dense, fine to coarse SAND, little gravel, well graded -FILL-(SW) PID=0.0 ppm	
								27.6		1.7	
	2D	24/15	2.00 - 4.00	3/4/5/5	9	10				Olive-brown, moist, stiff, silty CLAY, trace fine sand, occasional 1/16-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
	3D	24/24	4.00 - 6.00	7/5/6/6	11	12				Olive-brown, wet, stiff, silty CLAY, little fine sand, frequent 0.25-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
5										Note: Strata change at 7 ft based on drill action.	
								22.3		7.0	
										-PROBABLE GLACIAL TILL-	
								20.2		9.1	
	R1	60/60	9.50 - 14.50	RQD = 95%			NQ Core			Top of Bedrock El. 20.2 R1: Gray, fine to coarse-grained SCHIST with granitic intrusions from 12.5 to 14 ft. Very hard, fresh. Solid core stem. Rock Mass Quality=Excellent Recovery=100% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 9.5-10.5' (1:18); 10.5-11.5' (1:41); 11.5-12.5' (1:59); 12.5-13.5' (1:20); 13.5-14.5' (1:19)	
10											
								14.8		14.5	
15										**Bottom of Exploration at 14.5 feet below ground surface.**	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-122
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	27.0	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-9-17/10-9-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	2317+24.4, 12.1 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	1.0 ft
Hammer Efficiency Factor: 0.677		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	24/13	0.00 - 2.00	11/10/4/14	14	16	SSA			Brown, moist, medium dense, fine to coarse SAND, some gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm	
	2D	13/7	2.00 - 3.08	26/13/50(1.0)	63+	71				Brown, dry, very dense, gravelly SAND, well graded -FILL-(SW) PID=7.8 ppm	
								23.9		3.1	
										Top of Bedrock El. 23.9	
	R1	53/53	4.20 - 8.62	RQD = 70%			NQ Core			R1: Dark gray, fine to coarse-grained SCHIST. Hard, fresh. Primary joints dipping at steep angles, parallel to foliation. Joints moderately close, tight, planar, rough, slightly oxidized. Secondary joints dipping at low angles perpendicular to foliation. Rock Mass Quality=Fair Recovery=100% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 4.2-5.2' (1:51); 5.2-6.2' (1:44); 6.2-7.2' (1:43); 7.2-8.2' (1:38)	
5											
	R2	13/13	8.60 - 9.68	RQD = 100%						R2: Dark gray, fine to coarse-grained SCHIST. Hard, fresh. Solid core stem. Rock Mass Quality=Excellent Recovery=100% -CAPE ELIZABETH FORMATION- R2 Core Times (min:sec): 8.2-8.6' (1:38); 8.6-9.7' (1:30)	
10								17.3		9.7	
										Bottom of Exploration at 9.7 feet below ground surface.	
15											
20											
25											

Remarks:

Note: Water level recorded is influenced by water added during the drilling process and may not represent actual water level.

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: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-123
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	23.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-9-17/10-9-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	317+80.5, 28.7 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.8 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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MV = Unsuccessful Field 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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	MD	24/0	0.50 - 2.50	4/6/5/6	11	12	SSA			No recovery, rock in spoon tip -FILL-	
								21.2		2.0	
	1D	16/16	3.00 - 4.33	5/18/50(4.0)	68+	77				Olive-brown, dry, very dense, fine to coarse SAND, some gravel, trace silt, well graded, loosely bonded -GLACIAL TILL-(SW-SM) PID=0.0 ppm	
								18.8		4.4	
5								18.4		-COBBLE-	
	2D	24/11	5.00 - 7.00	2/8/8/20	16	18				4.8 Olive-brown, moist, medium dense, fine to medium SAND, little silt coarse sand, and gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
								16.2		7.0	
	R1	52/51	7.20 - 11.53	RQD = 94%			NQ Core			Top of Bedrock El. 16.2 R1: Gray, fine to coarse-grained MIGMATITE. Very hard, fresh. Joints dipping moderately, moderately close, tight, planar, rough, oxidized joint surfaces. Rock Mass Quality=Excellent Recovery=98%	
10										-CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 7.2-8.2' (1:37); 8.2-9.2' (2:28); 9.2-10.2' (1:21); 10.2-11.2' (1:32); 11.2-11.5' (1:19)	
								11.7		11.5	
										Bottom of Exploration at 11.5 feet below ground surface.	
15											
20											
25											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements

Location: Wiscasset, Maine

Boring No.: HB-WISC-124

WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	27.1	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-9-17/10-9-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	316+41, 10.3 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	Dry
Hammer Efficiency Factor: 0.677		**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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	26.6		-BITUMINOUS CONCRETE- 0.5	
	1D	24/11	1.00 - 3.00	7/4/4/3	8	9		25.6		Brown, dry, loose, fine to coarse SAND, well graded -FILL-(SW) 1.5	
										Brown, dry, medium stiff, silty CLAY -FILL-(CL) PID=>2,000 ppm	
	2D	9/9	3.00 - 3.75	2/50(3.0)						Brown, dry, hard, silty CLAY -FILL-(CL) PID=>2,000 ppm	
								23.3		Note: Split-spoon refusal on top of probable bedrock at 3.8 ft. 3.8	
5										**Bottom of Exploration at 3.8 feet below ground surface.**	
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: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-125
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	26.1	**Auger ID/OD:**	3.0-in. ID
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-6-17/10-6-17	**Drilling Method:**	HSA	**Core Barrel:**	NQ-2.0 in.
Boring Location:	316+83, 11.0 ft Lt.	**Casing ID/OD:**	--	**Water Level*:**	dry
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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							HSA	25.5		-BITUMINOUS CONCRETE- 0.6	
	1D	24/8	1.00 - 3.00	10/4/3/2	7	8		24.4		Brown, dry, medium dense, fine to coarse SAND, little gravel, well graded -FILL-(SW) PID=0.0 ppm 1.7	
	2D/A	24/16	3.00 - 5.00	2/2/4/2	6	7		22.1		Olive-brown to olive, moist, soft to medium stiff, silty CLAY, little fine sand, trace medium to coarse sand, reworked native soil -FILL-(CL) PID=248 ppm 4.0	
5	3D	20/18	5.00 - 6.67	3/4/8/50(2.0)	12	14				Olive, moist, medium stiff, silty CLAY, little fine sand, trace medium to coarse sand, reworked native soil -FILL-(CL) PID=1,395 ppm	
								19.4		Olive, moist, stiff, silty CLAY, little fine sand, trace medium to coarse sand, reworked native soil	
								19.2		-FILL-(CL) PID=>2,000 ppm Note: Split-spoon refusal on top of probable bedrock at 6.7 ft. 6.7	
10										Note: Advanced rollerbit to 6.9 ft. -PROBABLE BEDROCK- 6.9	
15										**Bottom of Exploration at 6.9 feet below ground surface.**	
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-126
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	25.1	**Auger ID/OD:**	3.0-in. ID
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-6-17/10-6-17	**Drilling Method:**	HSA	**Core Barrel:**	NQ-2.0 in.
Boring Location:	317+02.2, 11.4 ft Lt.	**Casing ID/OD:**	--	**Water Level*:**	Dry
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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MV = Unsuccessful Field 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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	24.6		-BITUMINOUS CONCRETE- 0.5	
	1D	24/7	1.00 - 3.00	9/5/3/3	8	9		23.3		Brown, dry, medium dense, fine to coarse SAND, little gravel, well graded -FILL-(SW) PID=11.0 ppm 1.8	
	2D	24/11	3.00 - 5.00	1/5/4/4	9	10				Olive-brown, moist, stiff, sandy CLAY, trace fine gravel, contains brick fragments, reworked native soil -FILL-(CL) PID=2.0 ppm	
5	3D	20/7	5.00 - 6.67	8/9/15/50(2.0)	24	27				Olive to olive-brown, moist, very stiff, sandy CLAY, reworked native soil -FILL-(CL) PID=226 ppm Note: Split-spoon refusal on top of probable bedrock at 6.7 ft.	
								18.4 18.3		6.7 Note: Advanced rollerbit to 6.8 ft. -PROBABLE BEDROCK- 6.8	
10										**Bottom of Exploration at 6.8 feet below ground surface.**	
15											
20											
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-127
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	26.2	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	901+53.3, 3.4 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	6.1 ft
Hammer Efficiency Factor:	0.677	**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/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	0.00 - 2.00	1/4/5/8	9	10	SSA	25.7		-TOPSOIL- (0.5)	
								24.6		Brown, dry, loose to medium dense, fine SAND, little silt and medium sand, trace coarse sand -FILL-(SM) PID=0.0 ppm (1.6)	
	2D	24/10	2.00 - 4.00	11/8/8/9	16	18				Brown, dry, very stiff, silty CLAY, little fine sand, trace medium sand, reworked native soil -FILL-(CL) PID=0.0 ppm	
	3D	24/10	4.00 - 6.00	6/10/23/20	33	37	22			Brown, dry, hard, silty CLAY, little coarse gravel, trace fine to medium sand -FILL-(CL) PID=0.0 ppm	
5							25				
	4D	24/15	6.00 - 8.00	17/10/14/15	24	27	38	20.0		(6.2)	
							37			Olive-brown to orange-brown, moist, very stiff, sandy CLAY, frequent 0.25-in. thick fine to medium sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
							43	18.3		(7.9)	
							59			Note: Glacial till in spoon tip.	
10	5D	24/14	10.00 - 12.00	11/11/15/21	26	29	53			Olive-brown to red-brown, moist, medium dense, fine to coarse SAND, some gravel, little silt, moderately bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
							71				
							48				
	R1	60/60	13.00 - 18.00	RQD = 100%			NQ Core	13.2		(13.0)	
										Top of Bedrock El. 13.2 R1: Dark gray to gray, fine to coarse-grained MIGMATITE. Hard, fresh. Joints moderately dipping, moderately close, tight, stepped, rough, oxidized joint surfaces. Rock Mass Quality=Excellent Recovery=100% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 13.0-14.0' (1:47); 14.0-15.0' (1:43); 15.0-16.0' (1:31); 16.0-17.0' (1:57); 17.0-18.0' (1:47)	
15											
								8.2		(18.0)	
										Bottom of Exploration at 18.0 feet below ground surface.	
20											
25											

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Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-128
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	15.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-5-17/10-5-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	900+74.5, 2.0 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	5.1 ft
Hammer Efficiency Factor: 0.677		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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WC = Water Content, percent
LL = Liquid Limit
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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	MD	24/0	0.00 - 2.00	1/4/14/17	18	20	SSA	15.2		Brown ORGANIC SOIL -TOPSOIL-(OL/OH)	
										0.5	
										Note: Rock in spoon tip, no recovery.	
	1D	24/8	2.00 - 4.00	9/9/9/8	18	20				Brown, dry, very stiff, sandy CLAY, contains trace brick fragments, reworked native soil -FILL-(CL) PID=0.0 ppm	
	2D	14/10	4.00 - 5.17	7/10/50(2.0)	60+	68				Brown, dry, medium dense, clayey fine SAND, trace medium sand and coarse gravel, reworked native soil -FILL-(SC) PID=0.0 ppm	
5	R1	60/59	5.70 - 10.70	RQD = 98%			NQ Core	10.5		5.2	
										Top of Bedrock El. 10.5 R1: Dark gray, aphanitic to medium-grained SCHIST. Very hard, fresh. Single primary joint dipping moderately, parallel to foliation, wide, tight, planar, rough, oxidized joint surface. Secondary horizontal joint, wide, open, undulating, smooth. Rock Mass Quality=Excellent Recovery=98% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 5.7-6.7' (1:57); 6.7-7.7' (2:20); 7.7-8.7' (2:26); 8.7-9.7' (2:17); 9.7-10.7' (1:48)	
10								5.0		10.7	
										Bottom of Exploration at 10.7 feet below ground surface.	
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: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-129
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	12.9	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	902+04.6, 28.7 ft Rt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	N/A
Hammer Efficiency Factor:	0.677	**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	17/4	0.00 - 1.42	10/22/75(5.0)	97+	109	SSA			Brown, moist, very dense, fine to coarse SAND, trace silt and fine gravel, well graded, rock in spoon tip -FILL-(SW) PID=0.0 ppm	
	2D	24/14	2.00 - 4.00	5/8/13/18	21	24				Light brown to brown, dry, medium dense, fine to coarse SAND, little silt and gravel, contains reworked glacial till -FILL-(SM) PID=0.0 ppm	
	3D	24/14	4.00 - 6.00	13/17/11/8	28	32		8.8		4.1	
5	4D	24/11	6.00 - 8.00	20/10/4/4	14	16				Olive-brown to red-brown, moist, dense, fine to coarse SAND, little silt and gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm Olive-brown, wet, medium dense, fine to coarse SAND, little silt and gravel, loosely bonded -GLACIAL TILL-(SM) PID=0.0 ppm	
							NW Split NQ Core	4.5		8.4	
	R1	60/58	9.00 - 14.00	RQD = 53%						Top of Bedrock El. 4.5 R1: Gray, fine to medium-grained SCHIST. Very hard to hard, fresh. Primary joints dipping steep to vertical, parallel to foliation, secondary joints dipping at low angles, perpendicular to foliation. Joints very close to moderately close, tight to open, planar, rough, oxidized joint surfaces with frequent 1/16-in. thick silt coatings. Rock Mass Quality=Fair Recovery=97% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 9.0-10.0' (1:29); 10.0-11.0' (2:10); 11.0-12.0' (1:30); 12.0-13.0' (1:30); 13.0-14.0' (1:45)	
10								-1.1		14.0 **Bottom of Exploration at 14.0 feet below ground surface.**	
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: Downtown Improvements
Location: Wiscasset, Maine

Boring No.: HB-WISC-130
WIN: 21843.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	11.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split-Spoon Sampler-1.375 in.
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53 Track	**Hammer Wt./Fall:**	SS-140#/30; NW-300#/18
Date Start/Finish:	10-10-17/10-10-17	**Drilling Method:**	SSA/NW Drive	**Core Barrel:**	NQ-2.0 in.
Boring Location:	206+93.7, 28.4 ft Lt.	**Casing ID/OD:**	NW-3.0 in. ID	**Water Level*:**	3.5
Hammer Efficiency Factor: 0.677		**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 = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field 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 = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane 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	14/21/14/10	35	39	SSA			Brown, moist, dense, fine to coarse SAND, trace silt and fine gravel, well graded -FILL-(SW-SM) PID=0.0 ppm	
								10.0		1.7	
	2D/A	24/13	2.00 - 4.00	5/4/4/5	8	9	12	9.2		Olive-brown, dry, stiff, sandy CLAY, contains brick, asphalt pieces, reworked native soil -FILL-(CL) PID=0.0 ppm	
							18			2.5	
							30			Olive-brown, wet, medium stiff, silty CLAY, trace fine sand, occasional 0.25-in. thick fine sand partings -MARINE DEPOSIT-(CL) PID=0.0 ppm	
5							36				
							12	5.7		Note: Strata change at 6 ft based on casing blows and drill wash water contents.	
							18			6.0	
							22				
							24				
10	3D	24/8	10.00 - 12.00	1/1/3/5	4	5	12			Olive-gray, wet, very loose, fine to coarse SAND, little silt, trace fine gravel -GLACIAL TILL-(SM) PID=0.0 ppm	
							16				
							18				
							26				
							41	-3.0		14.7	
15	4D	23/12	15.00 - 16.92	10/16/14/50(5.0)	30	34	NW Drive			Olive-brown to red-brown, wet, medium dense, fine to coarse SAND, trace silt and gravel, loosely bonded, well graded -GLACIAL TILL-(SW-SM) PID=0.0 ppm Note: Advanced NW casing to 16.9 ft. Advanced rollerbit to 17 ft, begin NQ rock core.	
								-5.2		16.9	
	R1	60/59	17.00 - 22.00	RQD = 97%			NQ Core			Top of Bedrock El. -5.2 R1: Gray, fine to medium-grained MIGMATITE. Very hard to hard, fresh. Joints dipping at low to moderate angles, close to moderately close, tight to open, planar to undulating, rough, slightly oxidized. Rock Mass Quality=Excellent Recovery=98% -CAPE ELIZABETH FORMATION- R1 Core Times (min:sec): 17.0-18.0' (1:41); 18.0-19.0' (1:56); 19.0-20.0' (1:37); 20.0-21.0' (1:42); 21.0-22.0' (1:50)	
20								-10.3		22.0	
										Bottom of Exploration at 22.0 feet below ground surface.	
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.

Rock Core Photographs

Wiscasset Downtown Improvements
MaineDOT WIN 021843.00
Wiscasset, Maine
File No. 130323-002
Rock Core Photographs

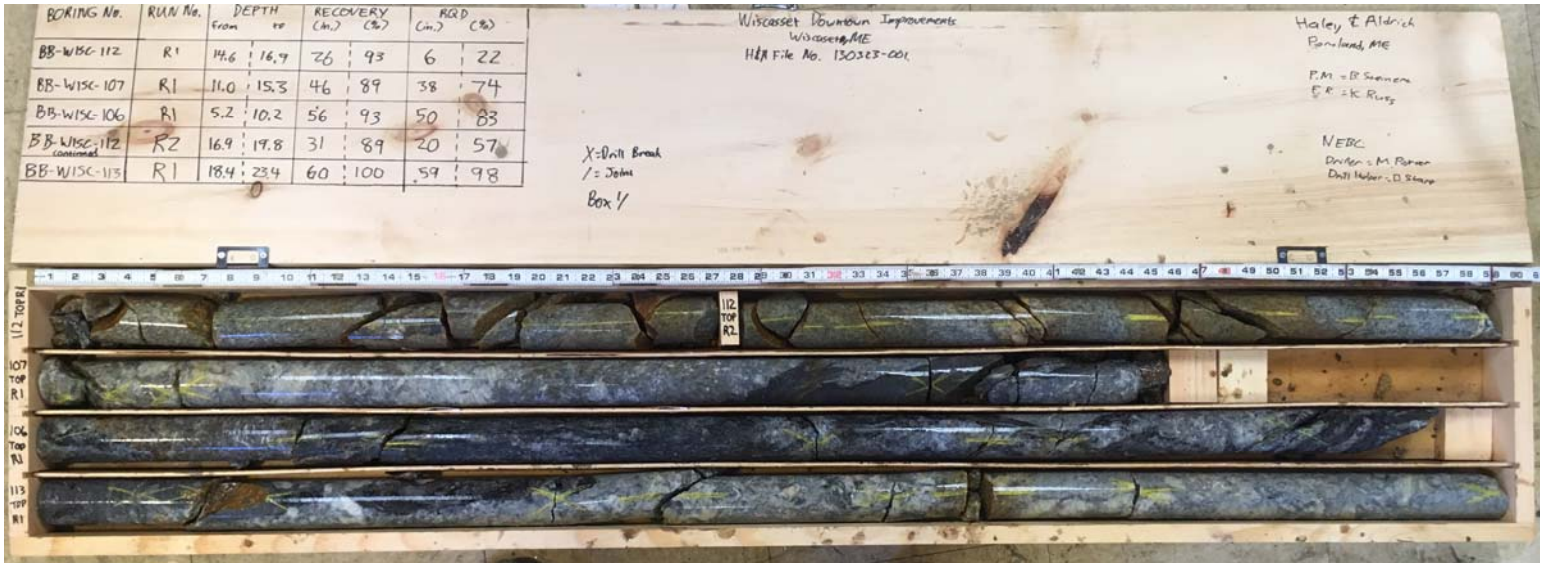


Photo 1: **Top Row**: HB-WISC-112, Run No. R1, 14.6 ft (left) to 16.9 ft (middle) and Run No. R2, 16.9 ft (middle) to 19.8 ft (right); **Top Middle Row**: HB-WISC-107, Run No. R1, 11.0 ft (left) to 15.3 ft (right); **Bottom Middle Row**: HB-WISC-106, Run No. R1, 5.2 ft (left) to 10.2 ft (right); B**ottom Row**: HB-WISC-113, Run No. R1, 18.4 ft (left) to 23.4 ft (right)

Photo 2: **Top Row**: HB-WISC-101, Run No. R1, 4.7 ft (left) to 9.7 ft (right); **Top Middle Row**: HB-WISC-111, Run No. R1, 8.0 ft (left) to 11.3 ft (middle) and Run No. R2, 11.3 ft (middle) to 13.0 ft (right) ; **Bottom Middle Row**: HB-WISC-115, Run No. R1, 11.1 ft (left) to 16.1 ft (right); **Bottom Row**: HB-WISC-114, Run No. R1, 2.5 ft (left) to 7.5 ft (right)

Photo 3: **Top Row**: HB-WISC-114, Run No. R1, 7.5 ft (left) to 8.5 ft (middle), Run No. R2, 8.5 ft (middle) to 13.3 ft (right); **Top Middle Row**: HB-WISC-114, Run No. R3, 13.3 ft (left) to 17.8 ft (right); **Bottom Middle Row**: HB-WISC-116, Run No. R1, 11.2 ft (left) to 16.2 ft (right); **Bottom Row**: HB-WISC-128, Run No. R1, 5.7 ft (left) to 10.7 ft (right)

Photo 4: **Top Row**: HB-WISC-104, Run No. R1, 16.5 ft (left) to 20.2 ft (right); **Top Middle Row**: HB-WISC-104, Run No. R2, 20.2 ft (left) to 22.6 ft (middle); HB-WISC-122, Run No. R2, 8.6 ft (middle) to 9.7 ft (right); **Bottom Middle Row**: HB-WISC-122, Run No. R1, 4.2 ft (left) to 8.6 ft (right); **Bottom Row**: HB-WISC-121, Run No. R1, 9.5 ft (left) to 14.5 ft (right)

Photo 5: **Top Row**: HB-WISC-123, Run No. R1, 7.2 ft (left) to 11.5 ft (right); **Top Middle Row**: HB-WISC-120, Run No. R1, 10.5 ft (left) to 15.5 ft (right); **Bottom Middle Row**: HB-WISC-129, Run No. R1, 9.0 ft (left) to 14.0 ft (right); **Bottom Row**: HB-WISC-130, Run No. R1, 17.0 ft (left) to 22.0 ft (right)

Photo 6: **Top Row**: HB-WISC-118, Run No. R1, 11.8 ft (left) to 16.8 ft (right); **Top Middle Row**: HB-WISC-127, Run No. R1, 13.0 ft (left) to 18.0 ft (right); **Bottom Middle Row**: HB-WISC-117, Run No. R1, 11.6 ft (left) to 16.6 ft (right);

APPENDIX B

Observation Well Installation and Groundwater Monitoring Reports

OBSERVATION WELL INSTALLATION REPORT

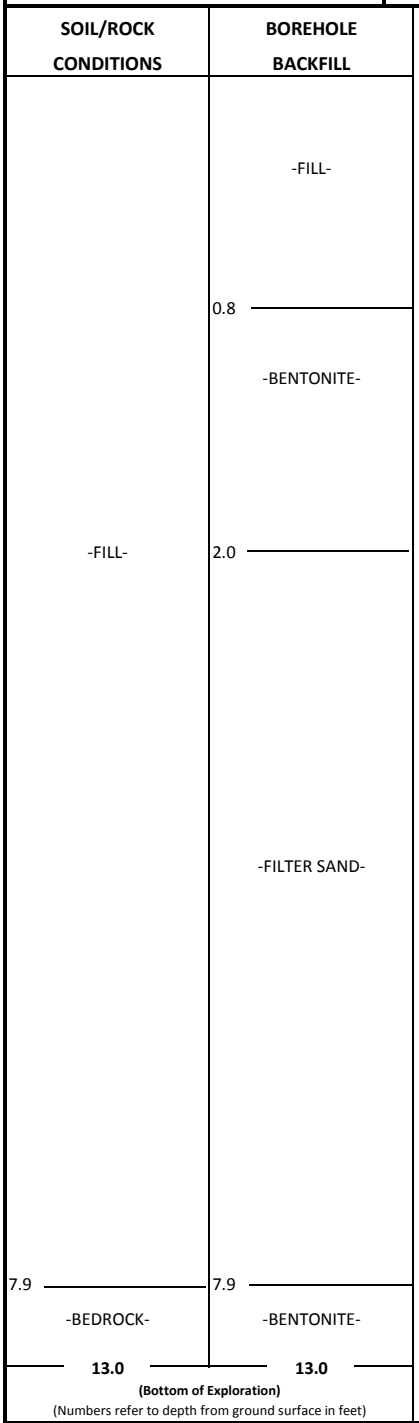
HALEY ALDRICH

Well No.

Boring No. HB-WISC-111

PROJECT	Downtown Improvements	**H&A FILE NO.**	130323-002
LOCATION	Wiscasset, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	K. Russ
CONTRACTOR	New England Boring Contractors	**DATE INSTALLED**	10/4/2017
DRILLER	M. Porter	**WATER LEVEL**	5.7 ft

Ground El.	10.7 ft	**Location**	See Plan	☐	**Guard Pipe**
El. Datum	NAVD 88			☑	**Roadway Box**



Type of protective cover/lock: Single 5-sided Bolt

Height/Depth of top of guard pipe/roadway box above/below ground surface: 0.0 ft

Height/Depth of top of riser pipe above/below ground surface: 0.2 ft

Type of protective casing: Roadway Box

Length: 0.8 ft

Inside Diameter: 4.0 in

Depth of bottom of guard pipe/roadway box: 0.8 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Bentonite Seal	0.8	1.2

Type of riser pipe: 2-in. Sch. 40 PVC

Inside diameter of riser pipe: 2.0 in

Type of backfill around riser: Filter Sand

Diameter of borehole: 4.0 in

Depth to top of well screen: 2.8 ft

Type of screen: Machine-slotted 2-in. Sch. 40 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: 7.8 ft

Bottom of Silt trap: 8.0 ft

Depth of bottom of borehole: 8.0 ft

(Not to Scale)

2.6 ft	+	5.0 ft	+	0.2 ft	=	7.8 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS:

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HALEY ALDRICH

GROUNDWATER MONITORING REPORT

BORING NUMBER
BB-WISC-111

PROJECT	Downtown Improvements	**H&A FILE NO.**	130323-002
LOCATION	Wiscasset, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	K. Russ
CONTRACTOR	New England Boring Contractors	**DATE**	10/6/2017

ELEVATION OF REFERENCE POINT 10.7 **REFERENCE POINT:** **Ground Surface** ☑ **PVC** ☐ **Other** ☐

Date	Time	Elapsed Time (days)	Depth of Water from Reference Point	Elevation of Water	Remarks	Read By
10/5/2017	08:30	0	5.5	5.2	Initial reading, developed well	KAR
10/6/2017	12:30	1	5.3	5.4		KAR
10/10/2017	12:30	5	5.3	5.4		KAR
10/11/2017	12:00	6	5.5	5.2		KAR
11/9/2017	8:15	35	5.3	5.4	Developed well	KAR
11/9/2017	10:10	35	5.3	5.4		KAR
11/15/2017	17:10	41	5.5	5.2		KAR
11/30/2017	14:26	56	5.3	5.4		KAR

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OBSERVATION WELL INSTALLATION REPORT

HALEY ALDRICH

Well No.

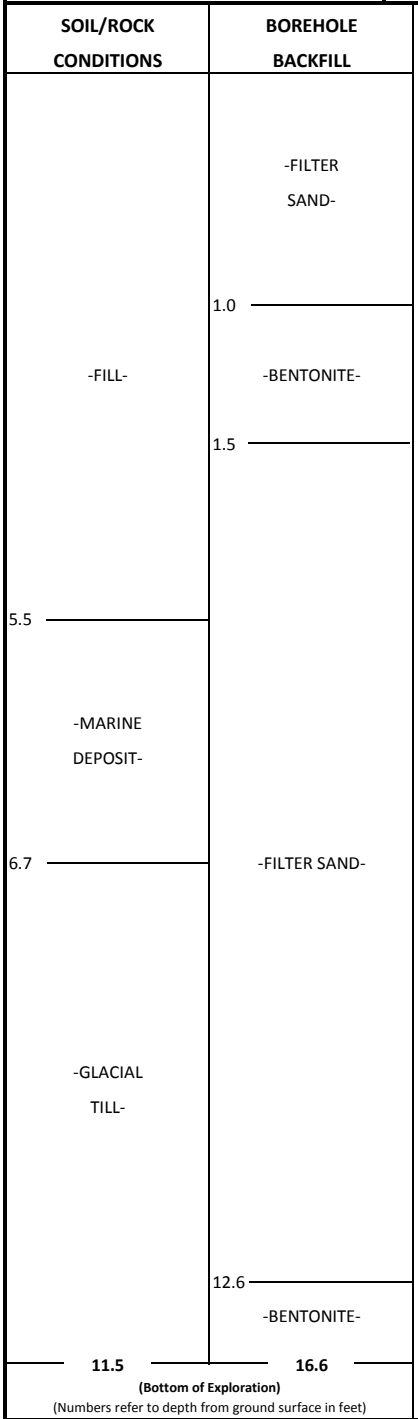
Boring No. HB-WISC-117

PROJECT	Downtown Improvements	**H&A FILE NO.**	130323-002
LOCATION	Wiscasset, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	K. Russ
CONTRACTOR	New England Boring Contractors	**DATE INSTALLED**	10/10/2017
DRILLER	B. Enos	**WATER LEVEL**	6.4 ft

Ground El. 29.7 ft
El. Datum NAVD 88

Location See Plan

☐ **Guard Pipe**
☑ **Roadway Box**



Type of protective cover/lock: Single 5-sided Bolt

Height/Depth of top of guard pipe/roadway box above/below ground surface: 0.0 ft

Height/Depth of top of riser pipe above/below ground surface: 0.2 ft

Type of protective casing: Roadway Box
- **Length:** 0.8 ft
- **Inside Diameter:** 6.0 in

Depth of bottom of guard pipe/roadway box: 0.8 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Bentonite Seal	1.0	0.5

Type of riser pipe: 2-in. Sch. 40 PVC
- **Inside diameter of riser pipe:** 2.0 in
- **Type of backfill around riser:** Filter Sand

Diameter of borehole: 4.0 in

Depth to top of well screen: 1.5 ft

Type of screen: Machine-slotted 2-in. Sch. 40 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: 11.5 ft

Bottom of Silt trap: 11.7 ft

Depth of bottom of borehole: 16.6 ft

(Not to Scale)

1.3 ft	+	10.0 ft	+	0.2 ft	=	11.5 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS:

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HALEY ALDRICH

GROUNDWATER MONITORING REPORT

BORING NUMBER BB-WISC-117

PROJECT	Downtown Improvements	**H&A FILE NO.**	130323-002
LOCATION	Wiscasset, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	K. Russ
CONTRACTOR	New England Boring Contractors	**DATE**	10/10/2017

ELEVATION OF REFERENCE POINT 29.7 **REFERENCE POINT:** **Ground Surface** ☑ **PVC** ☐ **Other** ☐

Date	Time	Elapsed Time (days)	Depth of Water from Reference Point	Elevation of Water	Remarks	Read By
10/10/2017	17:30	0	6.6	23.1	Initial reading, developed well	KAR
10/11/2017	12:10	1	9.3	20.4		KAR
11/9/2017	8:15	30	7.6	22.1	Developed well	KAR
11/9/2017	10:10	30	9.2	20.5		KAR
11/15/2017	17:10	36	8.0	21.7		KAR
11/30/2017	14:35	51	7.6	22.1		KAR

OBSERVATION WELL INSTALLATION REPORT

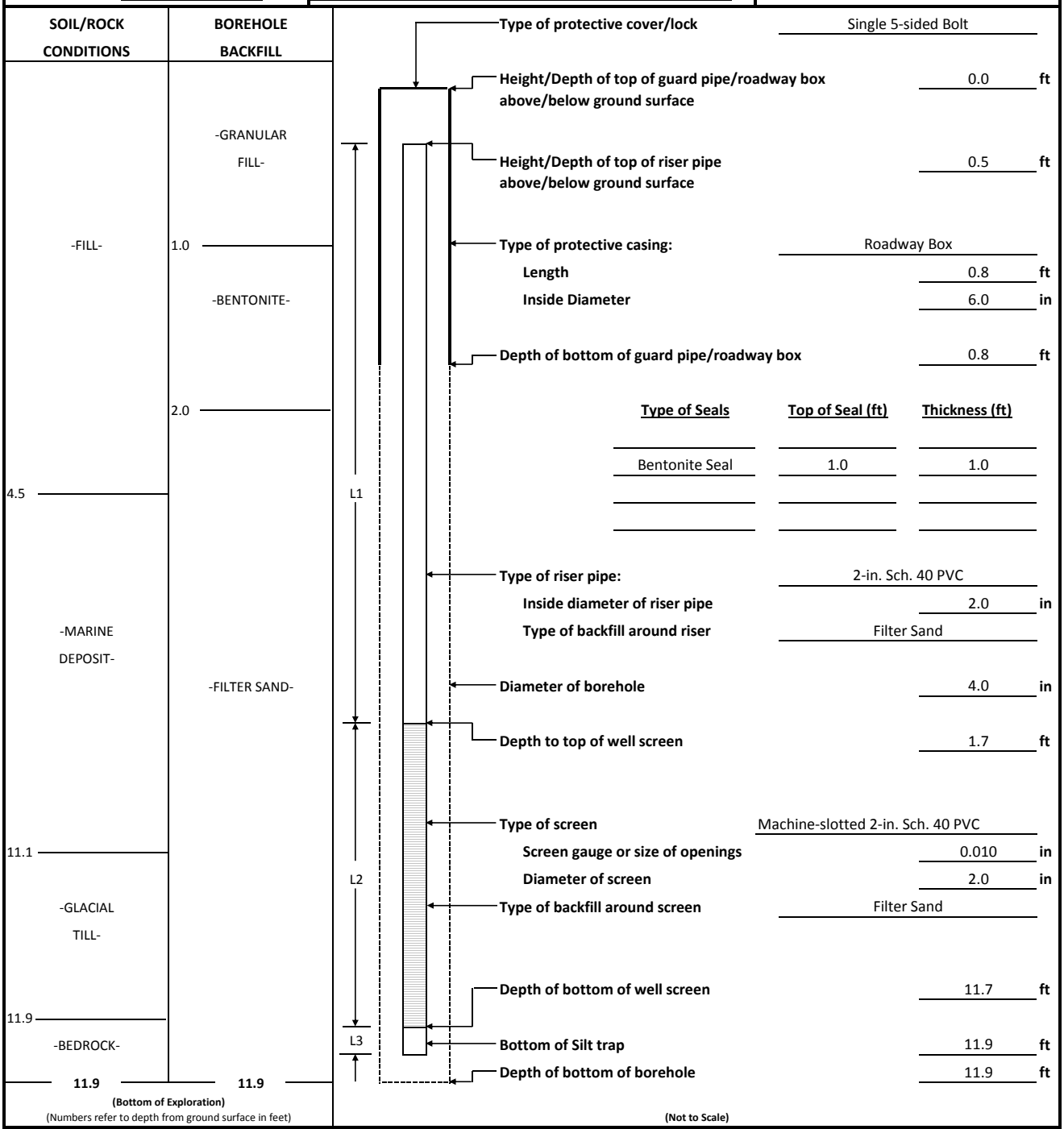
HALEY ALDRICH

Well No.

Boring No. HB-WISC-119

PROJECT	Downtown Improvements	**H&A FILE NO.**	130323-002
LOCATION	Wiscasset, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	K. Russ
CONTRACTOR	New England Boring Contractors	**DATE INSTALLED**	10/4/2017
DRILLER	B. Enos	**WATER LEVEL**	5.5 ft

Ground El.	33.7 ft	**Location**	See Plan	☐	**Guard Pipe**
El. Datum	NAVD 88			☑	**Roadway Box**



1.2 ft	+	10.0 ft	+	0.2 ft	=	11.4 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS:

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HALEY ALDRICH

GROUNDWATER MONITORING REPORT

BORING NUMBER
BB-WISC-119

PROJECT	Downtown Improvements	**H&A FILE NO.**	130323-002
LOCATION	Wiscasset, Maine	**PROJECT MGR.**	B. Steinert
CLIENT	Maine Department of Transportation	**FIELD REP.**	K. Russ
CONTRACTOR	New England Boring Contractors	**DATE**	10/9/2017

ELEVATION OF REFERENCE POINT 33.7 **REFERENCE POINT:** **Ground Surface** ☑ **PVC** ☐ **Other** ☐

Date	Time	Elapsed Time (days)	Depth of Water from Reference Point	Elevation of Water	Remarks	Read By
10/9/2017	13:00	0	6.0	27.7	Initial reading, developed well	KAR
10/10/2017	17:05	1	5.2	28.5		KAR
10/11/2017	12:20	2	5.2	28.5		KAR
11/9/2017	7:00	31	3.4	30.3	Developed well	KAR
11/9/2017	10:00	31	3.5	30.2		KAR
11/15/2017	17:00	37	3.7	30.0		KAR
11/30/2017	14:40	52	3.5	30.2		KAR

APPENDIX C

Calculations

PROBLEM STATEMENT & OBJECTIVE

Estimate the bearing resistance for the footing/s supporting the proposed retaining wall.

EXECUTIVE SUMMARY

The estimated Strength Limit State factored bearing resistance is estimated to be 8 ksf. The estimated Service Limit State bearing resistance is about 5 ksf based on AASHTO LRFD presumptive values.

REFERENCES

1. AASHTO LRFD Bridge Design Specifications, 2014 Edition (AASHTO LRFD).

AVAILABLE INFORMATION

1. Drawings for Wiscasset US-1 Downtown Improvements by VHB dated March 2018.
2. Cross-Section drawings for Wiscasset Railroad Avenue by VHB dated March 2018.
3. Boring logs for Wiscasset US-1 dated March 2018.
4. Elevations are in NAVD88 Datum.

ASSUMPTIONS

1. Footing bearing elevation is at El. +11.
2. Depth to bottom of footing (Df) from ground surface is 3 ft.
3. Width of footing assumed to range from 3 ft to 5.25 ft (drawings show something closer to 5 ft) to calculate a range of bearing resistance. Length of footing is assumed to be 200 ft (i.e., very long relative to width).
4. Borings HB-WISC-114, 115, 127, and 128 were considered due to their proximity to the proposed wall. However, the least favorable bearing conditions were found at boring 115. Rock was found at or very close to the bearing
5. elevation at borings 114, 127, and 128. Therefore, bearing resistance was evaluated assuming that the bearing material is Glacial Till consistent with boring 115.
6. Presence of bedrock below Glacial Till was not considered in the bearing resistance calculations.
7. Glacial Till assumed to be cohesionless with total unit weight of 125 pcf. Friction angle ranges from 32 to 34 degrees.
8. Groundwater assumed to be at bottom of footing (El. +11).
9. Load eccentricity assumed equal to 1/6 of the footing width (i.e., load is edge of middle third of the footing).
10. The Strength Limit State Resistance factor is 0.55 (bearing resistance for gravity and semi-gravity walls, AASHTO LRFD).

CALCULATIONS

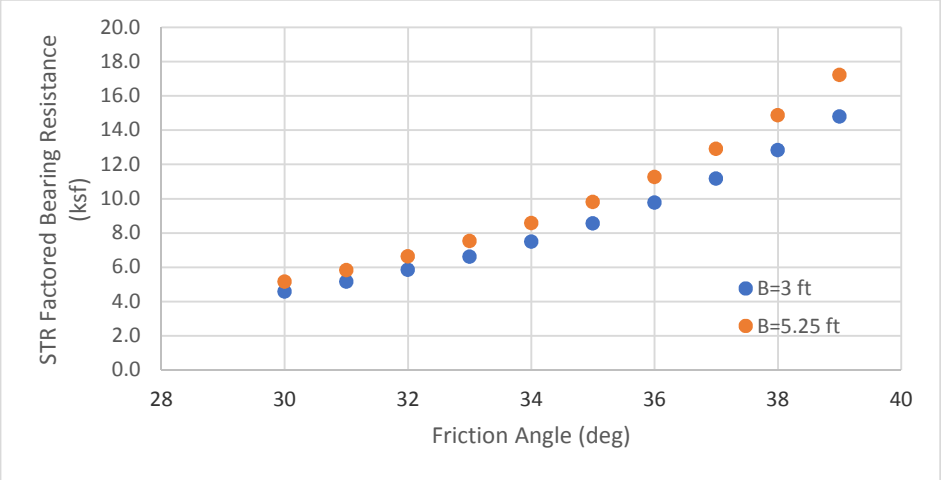
1. Nominal bearing resistance is calculated using the following equation from AASHTO LRFD.

$$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma \quad BN_{\gamma m} C_{w\gamma}$$

the first term is zero (c=0 for cohesionless material). The values of the parameters are calculated as prescribed in AASHTO LRFD.

CALCULATIONS (continued)

2. The Strength Limit State factored bearing resistance for the range of footing widths is shown in the plot below. The estimated factored bearing resistance is about 6 to 8 ksf for friction angle 32 to 34 degrees.



3. The Service Limit State bearing resistance is estimated to be 5 ksf based on presumptive values in AASHTO LRFD for Medium Dense Silty coarse sand.

	ϕ	γ_t (pcf)	c (psf)	D_f (ft)	D_w, (ft)	B	Eccentricity (Applies to B only) =	B'	L	L'	$N_\phi = f(\phi)$	$N_c = f_1(\phi)$	$N_q = f_2(\phi)$	$N\gamma = f_3(\phi)$	s_c	s_q	s_γ	Depth Correction, Y or N?	d_q	C_{wq}	$C_{w\gamma}$	N_{cm}	N_{qm}	$N_{\gamma m}$	q_n (psf)	q_n (ksf)	RF	RF×q_n (ksf)
1	30	125	0	3	3	3	0.5	2.0	200	200	3.00	30.1	18.4	22.4	1.01	1.01	1.00	N	1.00	1.00	0.50	30.28	18.51	22.31	8,334	8.3	0.55	4.6
2	31	125	0	3	3	3	0.5	2.0	200	200	3.12	32.6	20.6	26.0	1.01	1.01	1.00	N	1.00	1.00	0.50	32.81	20.72	25.90	9,390	9.4	0.55	5.2
3	32	125	0	3	3	3	0.5	2.0	200	200	3.25	35.5	23.2	30.2	1.01	1.01	1.00	N	1.00	1.00	0.50	35.73	23.34	30.08	10,634	10.6	0.55	5.8
4	33	125	0	3	3	3	0.5	2.0	200	200	3.39	38.7	26.1	35.2	1.01	1.01	1.00	N	1.00	1.00	0.50	38.96	26.27	35.06	12,042	12.0	0.55	6.6
5	34	125	0	3	3	3	0.5	2.0	200	200	3.54	42.1	29.4	41.0	1.01	1.01	1.00	N	1.00	1.00	0.50	42.39	29.60	40.84	13,652	13.7	0.55	7.5
6	35	125	0	3	3	3	0.5	2.0	200	200	3.69	46.1	33.3	48.0	1.01	1.01	1.00	N	1.00	1.00	0.50	46.43	33.53	47.81	15,563	15.6	0.55	8.6
7	36	125	0	3	3	3	0.5	2.0	200	200	3.85	50.7	37.8	56.4	1.01	1.01	1.00	N	1.00	1.00	0.50	51.08	38.07	56.17	17,789	17.8	0.55	9.8
8	37	125	0	3	3	3	0.5	2.0	200	200	4.02	55.6	42.9	66.2	1.01	1.01	1.00	N	1.00	1.00	0.50	56.03	43.22	65.94	20,330	20.3	0.55	11.2
9	38	125	0	3	3	3	0.5	2.0	200	200	4.20	61.3	48.9	78.0	1.01	1.01	1.00	N	1.00	1.00	0.50	61.79	49.28	77.69	23,336	23.3	0.55	12.8
10	39	125	0	3	3	3	0.5	2.0	200	200	4.40	67.9	56.0	92.3	1.01	1.01	1.00	N	1.00	1.00	0.50	68.46	56.45	91.93	26,916	26.9	0.55	14.8
1	30	125	0	3	3	5.25	0.875	3.50	200	200	3.00	30.1	18.4	22.4	1.01	1.01	0.99	N	1.00	1.00	0.50	30.42	18.59	22.24	9,403	9.4	0.55	5.2
2	31	125	0	3	3	5.25	0.875	3.50	200	200	3.12	32.6	20.6	26.0	1.01	1.01	0.99	N	1.00	1.00	0.50	32.96	20.82	25.82	10,630	10.6	0.55	5.8
3	32	125	0	3	3	5.25	0.875	3.50	200	200	3.25	35.5	23.2	30.2	1.01	1.01	0.99	N	1.00	1.00	0.50	35.91	23.45	29.99	12,075	12.1	0.55	6.6
4	33	125	0	3	3	5.25	0.875	3.50	200	200	3.39	38.7	26.1	35.2	1.01	1.01	0.99	N	1.00	1.00	0.50	39.16	26.40	34.95	13,722	13.7	0.55	7.5
5	34	125	0	3	3	5.25	0.875	3.50	200	200	3.54	42.1	29.4	41.0	1.01	1.01	0.99	N	1.00	1.00	0.50	42.61	29.75	40.71	15,608	15.6	0.55	8.6
6	35	125	0	3	3	5.25	0.875	3.50	200	200	3.69	46.1	33.3	48.0	1.01	1.01	0.99	N	1.00	1.00	0.50	46.68	33.71	47.66	17,854	17.9	0.55	9.8
7	36	125	0	3	3	5.25	0.875	3.50	200	200	3.85	50.7	37.8	56.4	1.01	1.01	0.99	N	1.00	1.00	0.50	51.36	38.28	56.01	20,481	20.5	0.55	11.3
8	37	125	0	3	3	5.25	0.875	3.50	200	200	4.02	55.6	42.9	66.2	1.01	1.01	0.99	N	1.00	1.00	0.50	56.35	43.47	65.74	23,490	23.5	0.55	12.9
9	38	125	0	3	3	5.25	0.875	3.50	200	200	4.20	61.3	48.9	78.0	1.01	1.01	0.99	N	1.00	1.00	0.50	62.16	49.57	77.45	27,060	27.1	0.55	14.9
10	39	125	0	3	3	5.25	0.875	3.50	200	200	4.40	67.9	56.0	92.3	1.01	1.01	0.99	N	1.00	1.00	0.50	68.88	56.79	91.65	31,322	31.3	0.55	17.2