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GEOTECHNICAL DATA REPORT

INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGES NOS. 5951 AND 1433
HAMPDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

by Haley & Aldrich, Inc.
Portland, Maine

for Maine Department of Transportation
Augusta, Maine

File No. 129380-005
February 2019

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22 February 2019
File No. 129380-005

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

Attention: Laura Krusinski, P.E.
Senior Geotechnical Engineer

Subject: Geotechnical Data Report
Interstate 95 over Souadabscook Stream West, Bridge Nos. 5951 and 1433
Hampden, Maine
MaineDOT WIN 21730.00 and WIN 21730.10

Ladies and Gentlemen:

This geotechnical data report (GDR) presents the results of subsurface investigation and geotechnical laboratory testing programs. This work has been completed in accordance with our proposal dated 10 April 2017, and your subsequent authorization.

Project Understanding

The project consists of the replacement of two existing bridges that carry Route 95 traffic northbound and southbound over the Souadabscook Stream West in Hampden, Maine. Historic drawings of the existing bridges were provided by MaineDOT and are included in this report in Appendix D. The location of the proposed pair of bridges is shown on Figure 1, Project Locus, and Figure 2, Boring Location Plan.

Horizontal Coordinate System and Elevation Datum

Plan locations of test borings are reported as northing and easting coordinates relative to the Maine State Plane Coordinate System, North American Datum of 1983 (NAD 83), Maine 2000 Central Zone (refer to Table I and boring logs in Appendix A). Elevations referenced herein are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).

Geologic Setting

According to Maine Geological Survey's Hermon Quadrangle, Maine (2013), surficial geologic units mapped within the site vicinity consist largely of Wetland Deposits and Presumpscot Formation. The historic test borings drilled at the site encountered Wetland Deposits (i.e., peat, silt and sand) overlying the Presumpscot Formation (i.e., glaciomarine clays, silts and sands), overlying glacial till (i.e. silt, sand and gravel). The recent test borings drilled at the site encountered man-placed fill overlying the Presumpscot Formation. Deposition of the Presumpscot Formation occurred as a result of melting glacial ice in conjunction with sea level rise during deglaciation in Late Wisconsinan time. At a few locations a thin alluvial deposit (i.e. fine to coarse gravel and sand) was encountered below the Fill and overlying the Presumpscot Formation. Beneath the Presumpscot Formation is a granular, glacial till deposit consisting of a heterogeneous mix of sand, silt, gravel, cobbles and boulders which directly overlies bedrock.

According to Maine Geological Survey's Bedrock Geology of the Bangor Quadrangle, Maine (1976), bedrock at the site is mapped as Silurian-Ordovician age rocks of the Vassalboro Formation. Bedrock core samples collected for this site investigation consisted of metamorphic rocks composed of phyllite and quartzite.

Subsurface Explorations

PRELIMINARY DESIGN PHASE EXPLORATIONS BY HALEY & ALDRICH

Haley & Aldrich conducted a preliminary design phase geotechnical exploration program at the site of the two bridges. A total of six test borings (BB-HSS-101 through BB-HSS-106) were completed to identify subsurface conditions along the proposed bridge alignment. Test borings BB-HSS-101, BB-HSS-102, BB-HSS-105, and BB-HSS-106 were drilled through the bridge approach embankments behind the existing abutments. Test borings BB-HSS-103 and BB-HSS-104 were drilled through the bridge deck and casing was advanced from the bridge deck to the river mudline below.

Boring locations were laid out in the field by taping distances from existing site features. "As-drilled" locations and ground surface elevations at boring locations were determined by MaineDOT using GPS survey methods. As-drilled boring locations are shown on Figure 2. Coordinate location data and ground surface elevations at exploration locations are provided on individual test boring logs provided in Appendix A and are summarized in Table I.

All test borings were drilled by New England Boring Contractors of Hermon, Maine using either a truck-mounted Mobile B59 drill rig or a track-mounted Mobile B53 drill rigs. Test borings were drilled to depths ranging from 30.4 ft to 66.2 ft below ground surface (BGS).

Test borings were advanced using cased-wash drilling methods by either driving or spinning casing. Casing consisted of 4.0-in. (HW-size) inside diameter (ID) steel casing and/or 3.0-in. (NW-size) ID steel casing. Casing blow count data is provided on the logs in Appendix A. Soil samples were generally collected continuously through the man-placed fill and then typically at 5-ft intervals once native soils

were encountered. The test borings were extended to bedrock and collected approximately 10 ft of rock core.

Soils samples were collected by driving a 1-3/8-in. ID split-spoon sampler with a 140-lb hammer dropped from a height of 30 in., as indicated on the test boring logs. Drilling and sampling were performed in accordance with MaineDOT specifications. The drill rigs were equipped with automatic hammers calibrated annually per MaineDOT requirements (Appendix A of MaineDOT Geotechnical Drilling Contract Specifications, revised June 2007). A calculated hammer efficiency of 0.75, 0.677 and 0.869 were used for the calibrated automatic hammer system for the steel track-mounted Mobile Drill B-53 rig, the rubber track-mounted Mobile Drill B-53 rig, and the truck-mounted Mobile Drill B-59 rig, respectively.

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 is defined as the total number of blows required to advance the sampler through the middle 12 in. of the 24-in. sampling interval. The energy-corrected SPT N-value (N60) is equal to the uncorrected N-value multiplied by the hammer efficiency factor divided by 0.6 (i.e., 60 percent theoretical hammer efficiency). Both the raw blow count data and the corrected N-values are shown on the boring logs.

Samples of the in-situ fill soils collected during the explorations were screened in the field with a photoionization detector (PID) to assess the presence of volatile organic compounds (VOCs). No elevated PID readings were detected during the subsurface explorations. No visual or olfactory signs of contamination/environmentally impacted soils were observed during the subsurface explorations. Refer to individual boring logs provided in Appendix A for actual PID readings.

The test borings sampled 9.5 to 13.6 ft of bedrock using a 2.0-in. (NQ-size) ID diamond-tipped core barrel. Refer to rock core photographs provided in Appendix B for detailed information on bedrock core samples collected.

All soil and bedrock samples were classified in accordance with MaineDOT classification system and were preserved in glass sample jars and wooden core boxes. The samples that were not submitted for laboratory testing are available for review upon request. Soil and bedrock samples are being stored at the Haley & Aldrich laboratory facility in Portland, Maine.

Generalized Subsurface Conditions

The subsurface conditions encountered at the site consist of the following geologic units presented in order of increasing depth below ground surface: man-placed fill, alluvial deposits, organic deposits, marine deposits, glacial till and bedrock.

SOIL UNIT AND BEDROCK DESCRIPTIONS

Soil

Refer to Table I for a summary of the soil units and encountered thicknesses at each test boring location. A description of each soil unit is provided separately, below. Detailed soil descriptions are provided on the test boring logs 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 will vary from those described and shown herein.

Unit		Approximate Range in Encountered Thickness (ft)	Generalized Description
Fill		11.3 to 14.2	Medium dense to dense silty SAND, trace to some gravel (SM); SAND, trace to some silt and gravel (SP, SP-SM, SW-SM, SW); medium dense sandy SILT, trace gravel (ML) *(encountered behind each abutment in BB-HSS-101, BB-HSS-102, BB-HSS-103 and BB-HSS-104)*
Alluvial Deposit		3.9 to 5.0	Very loose to loose GRAVEL, little to some coarse sand, trace medium sand (GP, GW); medium dense gravelly SAND, little silt (SW-GW) *(encountered within the stream in borings BB-HSS-103 and BB-HSS-104)*
Organic Deposit		0.5 to 1.6	Medium stiff SILT, some fine sand with 1-in. peat layers (ML); soft PEAT (OL) (*encountered west of the bridge in borings BB-HSS-101 and BB-HSS-102*)
Marine Deposit	Clay and Silt	9.8 to 19.4	Very soft to stiff fine sandy CLAY or silty CLAY, trace to some fine sand, occasionally mottled and/or varved, occasional trace organics, occasional less than 1-in. thick fine sand partings (CL); very soft to stiff fine sandy SILT or SILT, some fine sand, trace roots. (*encountered in all test borings except BB-HSS-104*)
	Sand	3.4 to 9.2	Very loose clayey fine SAND, occasional less than 1-in. thick clay laminae (SC); very loose to loose silty fine SAND to or fine SAND, trace to some silt and gravel, occasional silt laminae (SM); medium dense gravelly SAND, trace silt (SW) (*encountered in all test borings except BB-HSS-104*)
Glacial Till		4.9 to 18.2	Loose to very dense fine SAND or SAND, trace to some gravel, trace to little silt/clay (SW, SW-SM, SP-SM/SC); medium dense to dense sandy GRAVEL or GRAVEL, some sand, trace silt (GP, SW/GW); very stiff sandy SILT, some gravel (ML) The glacial till was loosely bonded to moderately bonded and contained occasional cobbles and boulders. *(encountered in all test borings except BB-HSS-105)*

Test borings performed behind the abutments encountered 0.5 to 1.2 ft of bituminous concrete with a 0.5 to 0.8-ft thick concrete approach slab underlying the bituminous concrete. Test borings performed at the midpoint of the bridge penetrated the concrete bridge deck, which had a thickness of 0.7 to 0.9 ft.

Bedrock

Bedrock was cored in each test boring. The top of the bedrock surface ranged from approximately 19.9 to 56.6 ft BGS (El. 77.9 to El. 95.2). Test boring BB-HSS-106 encountered 3.0 ft of weathered bedrock overlying the bedrock. Bedrock encountered at the site consisted of moderately hard to very hard PHYLLITE.

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 core run. RQD values for bedrock encountered at the site ranged between 0 and 100 percent, this correlates to a Rock Mass Quality rating of very poor to excellent.

WATER ELEVATIONS

The water level of the Souadabscook Stream was measured while performing test borings BB-HSS-103 and BB-HSS-104 by measuring from the bridge deck to the stream. The water level of the Souadabscook Stream was approximately El. 121.6 on 2 June 2017 (BB-HSS-103) and El. 123.8 on 16 May 2017 (BB-HSS-104).

Observation wells were not installed in any of the completed boreholes. As a result, long term static water levels at test boring locations were not determined. Water levels were taken in the completed boreholes after the casing had been extracted from the borehole and are noted on the boring logs in Appendix A. Water depths ranged from 11.7 to 13.2 ft BGS (El. 121.5 to El. 122.8). Please note that the visual observations made during drilling and water levels measured in the completed boreholes may have been affected by drilling means/methods and may not be representative of actual static water levels at the site.

In general, groundwater levels can be expected to fluctuate, subject to seasonal variation, local soil conditions, topography and precipitation. Groundwater levels encountered during construction may differ from those observed in the test borings.

Flood levels in the Soudabscook Stream, as provided by McFarland Johnson, are summarized below.

Discharge	Headwater (ft, NAVD 88)
$Q_{1.1}$	El. 122.07
Q_{50}	El. 127.18
Q_{100}	El. 128.55 (FEMA)
Record Flood	El. 130.05 (FEMA)

Laboratory Testing Program

A preliminary laboratory testing program was undertaken on soil samples collected during the field investigation to assist in soil classification/identification and scour evaluations. In general, laboratory

testing was performed on disturbed soil samples collected during SPT sampling. All laboratory soil testing was performed by GeoTesting Express, Inc. of Acton, Massachusetts. Geotechnical laboratory testing was performed in accordance with applicable American Society for Testing Materials (ASTM) testing procedures.

The preliminary design phase testing program includes seven grain size analyses (sieve only, no hydrometer), two moisture and organic matter analyses, five Atterberg Limits analyses and four compressive strength/elastic moduli of rock analyses. A summary of laboratory test results is provided below. Refer to the laboratory test results provided in Appendix C of this report.

Laboratory Test	ASTM Test Designation	Soil Unit	No. of Tests Completed	Range in Test Results
Grain Size	ASTM D 422 (Sieve Only)	Fill	2	AASHTO Classification: A-1-a(0), A-1-b(1), A-3(1) USCS Classification: SP, GW, GM
		Marine Clay and Silt	3	AASHTO Classification: A-4(0) USCS Classification: CL, ML
		Alluvial Deposit	1	AASHTO Classification: A-1-a(0) USCS Classification: SM
		Marine Sand	1	AASHTO Classification: A-2-4(0) USCS Classification: SM
Moisture content and organic matter	ASTM D 2974	Organic Deposit	2	Moisture Content: 37% to 215% Organic Matter: 4.1% to 32.4%
Atterberg Limits	ASTM D 4318	Marine Clay	5	USCS Classification: CL Moisture Content: 20% to 24% Liquid Limit: 29 to 33 Plastic Limit: 17 to 20 Plasticity Index: 12 to 15
Compressive Strength / Elastic Moduli of Rock	ASTM D 7012	Bedrock	4	Peak Compressive Stress: 1,558 psi to 5,960 psi Young's Modulus: 674,000 psi to 16,400,000 psi Poisson's Ratio: 0.03 to 0.39

Closure

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

Sincerely yours,
HALEY & ALDRICH, INC.

Erin A. Force, P.E.
Project Manager

Wayne A. Chadbourne, P.E.
Senior Associate

Enclosures:

- Table I – Summary of Subsurface Explorations
- Figure 1 – Project Locus
- Figure 2 – Boring Location Plan
- Appendix A – Test Boring Logs
- Appendix B – Rock Core Photographs
- Appendix C – Laboratory Test Results
- Appendix D – Historic Drawings

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References

1. Griffin, John R., *Bedrock Geology of the Bangor Quadrangle, Maine*, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 76-23, 1976.

2. Weddle, Thomas K., *Surficial Geology Hermon Quadrangle, Maine*, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 13-13, 2013.

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TABLES

TABLE I
Summary of Subsurface Explorations
Interstate 95 over Souadabscook Stream West
Bridge Nos. 5951 and 1433
Hampden, Maine
MaineDOT WIN 21730.00 and 21730.10

	Test Boring No.[1]	Coordinates[2] Easting	Northing
North bound	BB-HSS-102	1,693,754	460,639
	BB-HSS-104	1,693,822	460,617
	BB-HSS-106	1,693,895	460,605
South bound	BB-HSS-101	1,693,711	460,789
	BB-HSS-103	1,693,776	460,777
	BB-HSS-105	1,693,851	460,753

	Test Boring No.[1]	Ground Surface Elevation[3,4]	Approximate Strata Thickness[5] (ft) Bituminous Concrete	Fill	Alluvial Deposit	Organic Deposit	Marine Clay and Silt	Marine Sand	Glacial Till	Weathered Bedrock	Approximate Top of Bedrock Depth (ft)	Approximate Elevation of Top of Bedrock[3,4]	Approximate Bottom of Exploration Depth (ft)	Approximate Elevation of Bottom of Exploration[3,4]
North bound	BB-HSS-102	134.6	1.2	11.3	NE	0.5	18.0	9.2	5.0	NE	45.2	89.4	58.8	75.8
	BB-HSS-104	113.2	NE[6]	NE	3.9	NE	NE	8.9	7.1	NE	19.9	93.3	30.4	82.8
	BB-HSS-106	134.8	0.5	12.0	NE	NE	17.5	7.1	4.9	3.0	45.0	89.8	54.5	80.3
South bound	BB-HSS-101	134.5	1.2	12.8	NE	1.6	19.4	3.4	18.2	NE	56.6	77.9	66.2	68.3
	BB-HSS-103	111.6	NE[6]	NE	5.0	NE	9.8	NE	6.0	NE	20.8	90.8	30.9	80.7
	BB-HSS-105	134.7	0.8	14.2	NE	NE	19.3	5.2	NE	NE	39.5	95.2	53.0	81.7

Notes:
1 Test boring locations are shown on Figure 2, Boring Location Plan.
2 As-drilled coordinates of test borings were determined by MaineDOT using GPS survey equipment and reference NAD 83, Maine 2000 Central Zone coordinate system.
3 Ground surface elevations at as-drilled test boring locations were determined by MaineDOT using GPS survey equipment.
4 Elevations are measured in feet and reference the National Geodetic Vertical Datum of 1988 (NAVD 88).
5 "NE" indicates stratum was not encountered in test boring.
6 Existing concrete bridge deck thickness encountered at BB-HSS-103 and BB-HSS-104 was 0.7 ft and 0.9 ft, respectively.

	Individual	Date
Prepared By:	KAR	1/11/2019
Checked By:	EAF	2/18/2019
Reviewed By:	WAC	2/21/2019

FIGURES

MAP SOURCE: ESRI

SITE COORDINATES: 44°45'49"N, 68°55'10"W

HALEY ALDRICH

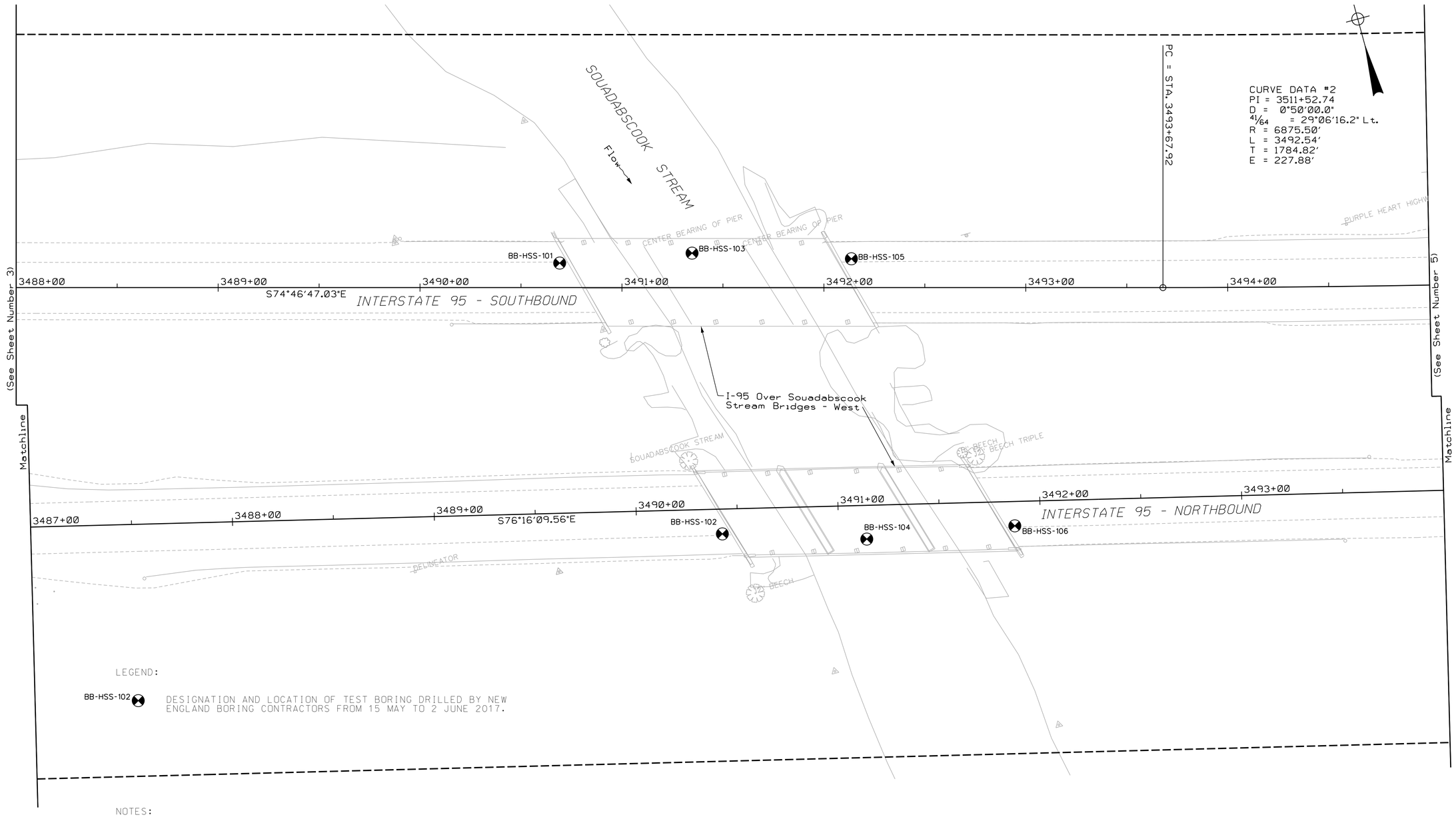
INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGE NOS. 5951 AND 1433
HAMPDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
FEBRUARY 2019

FIGURE 1

129380-005_1_LOCUS.PDF



LEGEND:

BB-HSS-102 — DESIGNATION AND LOCATION OF TEST BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS FROM 15 MAY TO 2 JUNE 2017.

NOTES:

1. BASE PLAN TAKEN FROM ELECTRONIC MICROSTATION FILES PROVIDED BY MCFARLAND JOHNSON ON 15 FEBRUARY 2019.
2. AS-DRILLED LOCATIONS OF TEST BORINGS WERE DETERMINED IN THE FIELD BY MAINEDOT USING GPS SURVEY EQUIPMENT.
3. SUBSURFACE EXPLORATIONS SHOWN WERE MONITORED BY HALEY & ALDRICH, INC. PERSONNEL.

PLAN

25 0 25 50

Scale of Feet

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

BRIDGE NOS. 5951 & 1433 WIN 21730.00 - 21730.10 BRIDGE PLANS

		BY	DATE
PROJ. MANAGER	E. FORCE		
DESIGN-DETAILED	K. POST	K. POST	02-21-19
CHECKED-REVIEWED	E.FORCE	E.FORCE	02-21-19
DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
REVISIONS 1			
REVISIONS 2			
REVISIONS 3			
REVISIONS 4			
FIELD CHANGES			

SIGNATURE

P.E. NUMBER

DATE

HAMPDEN BRIDGE BUNDLE
INTERSTATE 95
HAMPDEN, MAINE PENOBSCOT COUNTY

BORING LOCATION PLAN

SHEET NUMBER
2
OF 2

Filename: ...\129380_Hampden West BLP.dgn Division: Username: Date:2/22/2019

APPENDIX A

Test Boring Logs

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-101
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.5	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-31-2017/6-1-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693711; N460789	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.7 ft
Hammer Efficiency Factor:	0.750	**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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA		-BITUMINOUS CONCRETE-	
	1D	6/4	1.0 - 1.5	50(6.0)				133.3	1.2	
	2D	24/15	2.5 - 4.5	6/8/12/10	20	25		133.0 / 132.3	Brown, dry, very dense, fine to coarse SAND, trace gravel, well graded -FILL-(SW) PID=0.0 ppm 1.5 -CONCRETE- 2.2	
	3D	24/16	4.5 - 6.5	11/10/11/15	21	26		129.7	Brown, dry, medium dense, fine to coarse SAND, trace gravel, well graded -FILL-(SW) PID=0.0 ppm Note: Split spoon sampler to 8.5 ft, spun HW to 5.0 ft, drove casing to 10.5 ft.	
5							41			
	4D	24/18	6.5 - 8.5	10/8/8/18	16	20	50	128.1	4.8 Brown, dry, medium dense, fine SAND, little medium sand, trace silt, coase sand and fine to coarse gravel, poorly graded -FILL-(SW) PID=0.0 ppm	
							46			
	5D	24/12	8.5 - 10.5	17/9/13/22	22	28	64		6.4 Brown, dry, medium dense, fine to coarse SAND, some gravel, some silt -FILL-(SM) PID=0.0 ppm Note: Drill wash water from 8.5 to 10.5 ft contains brown sand and gravel.	G#426904 A-1-b (0) SM
							69			
10	6D	24/14	10.5 - 12.5	15/20/25/31	45	56	65		Brown, dry, medium dense, fine to medium SAND, little coarse sand and coarse gravel, trace silt and fine gravel -FILL-(SW-SM) PID=0.0 ppm	
							51			
	7D	24/14	12.5 - 14.5	28/33/40/12	63	79	75		Brown, wet (drill water), dense, fine to coarse SAND, some coarse gravel, little fine gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm Note: Drill wash water from 10.5 to 14.5 ft contains brown sand and gravel.	
							66			
	8D	24/12	14.5 - 16.5	3/5/5/6	10	13	36	120.5	Brown, wet, very dense, medium to coarse SAND, little fine SAND and fine gravel, trace silt and coarse gravel, well graded -FILL-(SW) PID=0.0 ppm	
15							21		14.0	
	9D	24/16	16.5 - 18.5	6/4/4/4	8	10	24	118.1	Olive-grey, moist, stiff SILT, some fine sand, contains trace roots -MARINE DEPOSIT-(ML)	
							35		16.4 Olive-grey to olive-brown, wet medium stiff SILT, some fine sand, contains frequent 1-in. peat layers -MARINE DEPOSIT-(ML/OL)	G#426917 WC=37% OC=4.1%
							46	116.5		
							40		18.0	
20	U1	24/24	20.0 - 22.0				44		Olive-grey, wet, silty CLAY observed in recovered tube -MARINE DEPOSIT-(CL)	
							35			
	10D		22.0 - 24.0	WOR/WOR/WOR/ WOR			38		Olive-grey, wet, stiff, silty CLAY -MARINE DEPOSIT-(CL) 65x130 mm vane raw torque readings: V1: >50 ft-lbs V2: >50 ft-lbs	G#426911 A-6 CL WC=20% LL=32,PL=17 PI=15
	V1		22.5 - 23.0	Su>1,420 psf						
	V2		23.5 - 24.0	Su>1,420 psf			41			
25							43			

Remarks:

OC=Organic Content

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

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

Boring No.: BB-HSS-101

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-101
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.5	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-31-2017/6-1-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693711; N460789	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.7 ft
Hammer Efficiency Factor:	0.750	**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 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

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	U2	24/24	25.0 - 27.0				48		Olive-grey, wet, silty CLAY observed in recovered tube -MARINE DEPOSIT-(CL)	
							40			
	11D	24/24	27.0 - 29.0	WOR/WOR/WOR/ WOR			39		Olive-grey, wet, soft to medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	
	V3		27.5 - 28.0	Su=655/115 psf					65x130 mm vane raw torque readings: V3: 23/4 ft-lbs	
	V4		28.5 - 29.0	Su=455/85 psf			34		V4: 16/3 ft-lbs	
							32			
30	U3	24/24	30.0 - 32.0				32		Olive-grey silty CLAY observed in recovered tube -MARINE DEPOSIT-(CL)	
							27		Note: 12D - hammer sank 6 in. below bottom of sample depth at 34.0 ft.	
	12D	30/28	32.0 - 34.5	WOR(18)/WOH(12)			30		Olive-grey, wet, soft, silty CLAY -MARINE DEPOSIT-(CL)	
	V5		32.5 - 33.0	Su=425/55 psf					65x130 mm vane raw torque readings: V5: 15/2 ft-lbs	
							32	100.6	Note: Attempt vane shear test, vane refual at 33.9 ft.	
							34		33.9	
35	13D	24/24	35.0 - 37.0	WOH/WOH/WOH/ WOH			30	99.5	Olive-grey, wet, soft, fine sandy CLAY, frequent 1-in. fine sand partings -MARINE DEPOSIT-(CL/SC)	
							27		35.0	
							32		Olive-grey, wet, very loose, clayey fine SAND, frequent 1-in. to 0.06-in. clay laminae -MARINE DEPOSIT-(SC)	
							53	96.1	Note: Drill wash water contents indicate strata change at 38.4 ft.	
							52		38.4	
40	14D	24/8	40.0 - 42.0	4/7/9/38	16	20	31		Olive-brown, moist, very stiff, sandy SILT, some gravel, loosely bonded -GLACIAL TILL-(ML)	
							86	92.9	41.6	
							120		Note: Noticeable difference in density when driving 140 spoon and casing. Drill wash from 40.0 to 45.0 ft contains silt, sand and gravel.	
							98			
							89			
45	15D	24/8	45.0 - 47.0	38/18/21/24	39	49	38		Olive-brown, wet, dense, fine to coarse SAND, some gravel, trace silt, loosely bonded, well graded -GLACIAL TILL-(SW-SM)	
							22			
							27		Note: Drill wash water contents indicate strata change at 48.0 ft.	
							49	86.5	48.0	
50							47			

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-101
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.5	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-31-2017/6-1-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693711; N460789	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.7 ft
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = 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 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.
50	16D	24/6	50.0 - 52.0	6/3/3/6	6	8	27			Olive-brown, wet, loose, fine SAND, little silt/clay, trace gravel, poorly graded -GLACIAL TILL-(SP-SM)	
							37				
							68	82.0		52.5	
							76			Note: Advanced rollerbit to 55.0 ft, drill wash from 50.0 to 55.0 ft contains sand and gravels. Hole collapsed, drove casing to 55.0 ft.	
							73				
55	17D	20/4	55.0 - 56.7	8/6/8/50(2.0)	14	18	58			Olive-brown, moist, medium dense, fine to coarse SAND, some gravel, trace silt, moderately bonded, well graded -GLACIAL TILL-(SW)	
							56(7.0)	77.9		56.6	
	R1	50/48	57.0 - 61.2	RQD = 70%						Top of Bedrock at El. 77.9 Note: Advanced rollerbit to 57.0 ft, set N casing, begin NQ rock core at 57.0 ft. R1: Grey, aphanitic, PHYLLITE, very hard to hard, fresh. Primary joints moderately dipping, parallel to foliation, very close to close, tight, planar, smooth, slightly oxidized joint surfaces. Secondary joints dipping horizontally, moderately close, tight, planar, smooth, slightly oxidized joint surfaces. Single steeply dipping joint from 59.0 to 60.0 ft, wide, tight, undulating, smooth, slightly oxidized joint surfaces. Note: R1 took three attempts to recover, frequent drill breaks in rock core. Rock Mass Quality=Fair Recovery=96% R1 Core Times (min:sec): 57.0-58.0' (3:16); 58.0-59.0' (1:40); 59.0-60.0' (3:25); 60.0-61.0' (2:33)	
60											
	R2	60/58	61.2 - 66.2	RQD = 78%						R2: Light grey, aphanitic PHYLLITE, very hard to hard, fresh. Joints dipping low to moderate angles, very close to moderately close, tight to open, planar or stepped, rough, oxidized joint surfaces. Frequent 1-in. to 2-in. quartz veins from 64.1 to 65.7 ft. Rock Mass Quality=Good Recovery=97% R2 Core Times (min:sec): 61.2-62.2' (1:57); 62.2-63.2' (2:04); 63.2-64.2' (1:58); 64.2-65.2' (2:08); 65.2-66.2' (2:48)	
65								68.3		66.2 **Bottom of Exploration at 66.2 feet below ground surface.**	
70											
75											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-102
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.6	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-15-2017/5-16-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693754; N460639	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.9 ft
Hammer Efficiency Factor:	0.750	**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
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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0									-BITUMINOUS CONCRETE-	
								133.4	1.2	
	1D	8/7	1.0 - 1.7	37/50(2.0)				132.9	Brown, dry, very dense, fine to coarse SAND, little gravel, well graded	
	2D	24/8	2.5 - 4.5	5/7/8/8	15	19		132.1	-FILL-(SW) PID=0.0 ppm	
							10		1.7 -CONCRETE- 2.5	
	3D	24/19	4.5 - 6.5	7/5/7/8	12	15	15	130.2	Brown, dry, medium dense, fine SAND, little medium sand, trace coarse sand, little gravel, poorly graded -FILL-(SP) PID=0.0 ppm	G#426905 A-2-4 (0) SM
5							19		4.4	
	4D	24/13	6.5 - 8.5	7/9/8/12	17	21	45		Brown, dry, medium dense, fine SAND, little medium sand, little silt, trace coarse sand and gravel -FILL-(SM) PID=0.0 ppm	
							55		Brown, moist, medium dense, fine to medium SAND, trace coarse sand and gravel, trace silt, poorly graded -FILL-(SP) PID=0.0 ppm	
	5D	24/9	8.5 - 10.5	11/14/11/18	25	31	67	126.3	8.3	
							80		Brown, moist, medium dense, fine to coarse SAND, little fine gravel, trace coarse gravel and silt, well graded -FILL (Reworked Glacial Till)-(SW-SM) PID=0.0 ppm	
10	6D	24/8	10.5 - 12.5	9/14/12/12	26	33	6		Brown, wet, medium dense, fine to coarse SAND, little fine gravel, trace silt and coarse gravel, well graded -FILL-(SW-SM) PID=0.0 ppm	
							8			
	MD		12.5 - 14.5	7/1/2/3	3	4	10	122.1	12.5 No recovery, silty fine sand in return wash water from 12.5 to 14.5 ft -MARINE DEPOSIT-(SP)	
							52			
							53	120.1	14.5	
15	7D	24/13	15.0 - 17.0	6/3/2/1	5	6	45		Olive-grey, wet, medium stiff, silty CLAY, some fine sand -MARINE DEPOSIT-(CL)	
							51	117.8	16.8	
	8D	24/13	17.0 - 19.0	1/4/5/4	9	11	73	117.3	Dark brown, soft PEAT (OL) 17.3	G#426917 WC=215% OC=32.4%
							74		Olive-grey, wet, stiff, silty CLAY little fine sand, occasional roots -MARINE DEPOSIT-(CL)	G#426906 A-4 (0) CL
							80			
20							77	114.6	20.0	
							78			
							94			
							104			
25							105			

Remarks:

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Boring No.: BB-HSS-102

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-102
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.6	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-15-2017/5-16-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693754; N460639	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.9 ft
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
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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.
25	9D	24/24	25.0 - 27.0	1/3/4/4	7	9	95			Olive-grey to olive-brown, wet, medium stiff, silty CLAY, trace fine sand, mottled -MARINE DEPOSIT-(CL)	G#426912 A-6 CL WC=23% LL=33, PL=20 PI=13
							80			Note: Attempted tube sample and field vane shear test at 25.0 ft; no penetration. Refusal at 25.0 ft.	
							93				
							81				
							73				
30							48			Note: Attempted tube sample at 30.0 ft, recovered approximately 6 in., collected in jar.	
							46				
	10D V1	24/24	32.0 - 34.0 32.5 - 33.0	WOR/WOH/WOH/ WOH Su=881/114 psf			42			65x130 mm vane raw torque readings: V1: 31.0/4.0 ft-lbs V2: Refusal at 33.0 ft, could not penetrate	
							41	101.6		33.0	
							31			Olive-grey, wet, very loose, clayey fine SAND -MARINE DEPOSIT-(SC)	
35	11D	24/24	35.0 - 37.0	WOH/WOH/WOH/ WOH			43			Olive-grey, wet, very loose, clayey fine SAND -MARINE DEPOSIT-(SC)	
							31				
							33				
							37			Note: 10.0 ft of casing left in hole during removal between approximately 30.0 and 40.0 ft.	
							43				
40	12D	6/3	40.0 - 40.5	7/50(0.0)			50(6.0) NW Spun	94.4		40.2	
								94.1		Olive-brown, moist, very dense, gravelly fine to coarse SAND, trace silt, well graded, loosely bonded -GLACIAL TILL-(SW)	
								93.1		40.5	
										-BOULDER- Note: Set NW-casing, cored 40.5 to 43.5 ft, soil from 41.5 to 43.5 ft.	
										41.5	
	13D	14/5	44.0 - 45.2	8/8/50(2.0)						Olive-brown, moist, very dense, fine to coarse SAND, some gravel, trace silt, well graded, loosely bonded -GLACIAL TILL-(SW)	
45	R1	30/29	45.6 - 48.1	RQD = 87%				89.4		45.2	
										Top of Bedrock at El. 89.4 Note: Advanced roller bit to 45.6 ft and began NQ rock core. R1: Grey, aphanitic, PHYLLITE, hard, fresh. Joints moderately dipping, parallel to foliation, moderately close, tight, smooth and planar, slightly oxidized joint surfaces. Rock Mass Quality=Good Recovery=97% R1 Core Times (min:sec): 45.6-46.6' (2:53); 46.6-47.6' (2:21); 47.6-48.1' (2:23)	
	R2	24/22	48.1 - 50.1	RQD = 67%							
50											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-102
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.6	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-15-2017/5-16-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693754; N460639	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.9 ft
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
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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 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.
50	R3	31/30	50.1 - 52.7	RQD = 45%						R2: Grey, aphanitic, PHYLLITE, hard to moderately hard, fresh to slightly weathered. Primary joints moderately dipping, parallel to foliation, moderately close, smooth and planar, tight, slightly oxidized joint surfaces. Secondary joint set dipping horizontally, very close, open, rough and undulating. Rock Mass Quality-Fair Recovery=92% R2 Core Times (min:sec): 48.1-49.1' (1:29); 49.1-50.1' (2:17) R3: Grey, aphanitic, PHYLLITE, moderately hard, slightly to moderately weathered. Primary joints moderately dipping, parallel to foliation, moderately close, tight, smooth and planar, oxidized. Secondary joints dipping horizontally and vertically, very close, open, rough and undulating, highly weathered. Single quartz intrusion from 50.6 to 51.1 ft. Rock Mass Quality=Poor Recovery=97% R3 Core Times (min:sec): 50.1-51.1' (2:04); 51.1-52.7' (1:33) R4: Grey, aphanitic, PHYLLITE, hard to moderately hard, single soft zone from 52.2 to 52.5 ft, slightly weathered. Primary joints moderately dipping, parallel to foliation, close, tight, smooth, planar, slightly oxidized. Secondary joints horizontal and vertical, close to very close, tight to open, rough and undulating, oxidized surfaces. Rock Mass Quality=Fair Recovery=100% R4 Core Times (min:sec): 52.7-53.7' (3:15); 53.7-54.8' (2:01) R5: Grey, aphanitic, PHYLLITE, hard, fresh to slightly weathered. Primary joints moderately dipping, parallel to foliation, moderately close, tight, smooth, planar, slightly oxidized. Secondary joints horizontal, very close, open, rough and undulating, highly oxidized. Rock Mass Quality=Fair Recovery=98% R5 Core Times (min:sec): 54.8-55.8' (3:01); 55.8-56.8' (1:53); 56.8-57.8' (2:12); 57.8-58.8' (3:04)	qp=4,762 psi
	R4	25/25	52.7 - 54.8	RQD = 52%							
	R5	48/47	54.8 - 58.8	RQD = 75%							
55											
								75.8			
60											
65											
70											
75											

58.8

Bottom of Exploration at 58.8 feet below ground surface.

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-103
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	111.6	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	6-2-2017/6-2-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693776; N460777	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	13.0 ft from bridge deck
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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N-uncorrected = Raw Field SPT N-value
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N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
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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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							PUSH		Note: Concrete bridge deck thickness 0.7 ft, bridge deck to river level 13.0 ft, brick deck to mudline 23.0 ft. All samples are referenced to depth below mudline.	
									Yellow-brown, wet, very loose, fine to coarse GRAVEL, some coarse sand, trace medium sand, well graded -ALLUVIAL DEPOSIT-(GW)	
	1D	24/1	2.0 - 4.0	1/1/1/1	2	3	4			
							3			
							1		Note: Probable thin gravel layer at mudline, then very loose yellow-brown sand.	
5							WOH	106.6	Note: Drill wash water contents indicate strata change at 5.0 ft. 5.0	
							3		Note: Attempt tube from 7.0 to 9.0 ft, no recovery.	
	2D	24/4	7.0 - 9.0	WOR/WOR/WOR/ WOR			WOH		Olive-grey, wet, very soft, silty CLAY -MARINE DEPOSIT-(CL)	G#426913 A-6 CL WC=22% LL=29, PL=17 PI=12
							1			
							6	102.1	Note: Drill wash water contents indicate strata change at 9.5 ft. 9.5	
10							4			
							6			
	3D	24/15	12.0 - 14.0	1/1/1/1	2	3	7		Olive-grey, wet, very loose, fine sandy SILT -MARINE DEPOSIT-(ML)	G#426907 A-4 (0) ML
							13			
							34		Note: Drill wash water contents and drill action indicate strata change at 14.8 ft.	
15							50	96.8	14.8	
							44			
	4D	24/5	17.0 - 19.0	4/3/2/4	5	6	15		Olive-grey, wet, loose, fine SAND, some coarse to medium sand, little silt, trace gravel, loosely bonded, poorly graded -GLACIAL TILL-(SM)	
							21			
							30			
20	R1	50/47	20.9 - 25.1	RQD = 68%			50(10.0)	90.8	20.8	
									Top of Bedrock at El. 90.8 Note: Drove HW casing to 20.8 ft, advanced rollerbit to 20.9 ft, set NW casing, begin NQ rock core. R1: Grey, aphanitic, PHYLLITE, very hard to hard, fresh. Joints dipping at moderate to low angles, parallel to foliation, very close to close, tight to open, planar to stepped, smooth to rough, slightly oxidized joint surfaces. Occasional 0.25-in. to 1-in quartz veins. Rock Mass Quality=Fair	
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.

Boring No.: BB-HSS-103

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-103
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	111.6	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	6-2-2017/6-2-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693776; N460777	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	13.0 ft from bridge deck
Hammer Efficiency Factor:	0.750	**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 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 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	R2	26/25	25.1 - 27.3	RQD = 96%						Recovery=94% R1 Core Times (min:sec): 20.9-21.9' (3:11); 21.9-22.9' (3:22); 22.9-23.9' (3:00); 23.9'-25.1' (2:35) R2: Grey, aphanitic, PHYLLITE, very hard to hard, fresh. Frequent drill breaks on possible healed joints, parallel to foliation. Occasional 0.25-in. quartz veins. Rock Mass Quality=Excellent	
	R3	43/42	27.3 - 30.9	RQD = 98%						Recovery=96% R2 Core Times (min:sec): 25.1-26.1' (4:45); 26.1-27.1' (2:26) R3: Grey, aphanitic, PHYLLITE, very hard to hard, fresh. Frequent drill breaks on possible healed joints, parallel to foliation/or adjacent to quartz veins. Occasional 0.125-in. to 0.5-in. quartz veins. Rock Mass Quality=Excellent	qp=3,996 psi
30								80.7		Recovery=98% R3 Core Times (min:sec): 27.3-28.3' (2:09); 28.3-29.3' (2:09); 29.3-30.3' (3:18); 30.3-30.9' (3:15) -BREWER FORMATION-	
										30.9 **Bottom of Exploration at 30.9 feet below ground surface.**	
35											
40											
45											
50											

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: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-104
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	113.2	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-16-2017/5-17-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693822; N460617	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.0 ft from bridge deck
Hammer Efficiency Factor:	0.750	**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

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/2	0.0 - 2.0	5/2/3/2	5	6	-		Note: Concrete bridge deck thickness 0.9 ft, bridge deck to river level 11.0 ft, bridge deck to mudline 21.6 ft. All samples are referenced to depth below mudline. Brown, wet, loose, coarse GRAVEL, little coarse sand and fine gravel, trace medium sand, poorly graded -ALLUVIAL DEPOSIT-(GP) Note: Drill wash from 0 to 3.4 ft contains brown fine sand, trace coarse sand and wood.	
							9			
							12			
	2D	24/9	3.4 - 5.4	23/7/2/1	9	11	23	109.8		
								109.3	3.4	G#426908 A-1-a (0) SW-SM
							24		Yellow-brown, wet, medium dense, gravelly SAND, little silt, well graded -ALLUVIAL DEPOSIT-(SW-SM)	
5							4		3.9	
							5		Olive-grey, wet, loose, fine SAND, some silt, trace gravel, poorly graded -MARINE DEPOSIT-(SM)	
							5			
	3D	24/4	8.4 - 10.4	2/1/1/1	2	3	6		Olive-grey, wet, very loose, fine SAND, little coarse gravel, trace silt, poorly graded -MARINE DEPOSIT-(SP-SM)	
							12			
10							10		Note: Drill wash water from 8.4 to 11.4 ft contains fine grey sand, trace medium to coarse sand.	
							11			
							15			
								100.4	12.8	
	4D	24/7	13.4 - 15.4	5/9/14/8	23	29	67		Olive-grey, wet, medium dense, gravelly fine SAND, trace medium to coarse sand, trace silt, loosely bonded, well graded -GLACIAL TILL-(SW-SM)	
							47			
15							42			
							46		Note: Drill wash water from 13.4 to 18.4 ft contains grey fine to coarse sand and fine gravel.	
							55			
	5D	18/2	18.4 - 19.9	7/6/6/50(0)			46	94.8	18.4	
							23(6.0)		Olive-grey, wet, medium dense, coarse GRAVEL, some fine sand, trace medium to coarse sand and fine gravel, trace silt, loosely bonded, poorly-graded -GLACIAL TILL-(GP)	
20	R1	24/20	20.4 - 22.4	RQD = 42%				93.3	Note: Rock stuck in spoon tip, Split spoon refusal at 19.9 ft. Advance rollerbit to 20.4 ft and begin NQ rock core.	
									19.9	
	R2	48/48	22.4 - 26.4	RQD = 92%					Top of Bedrock at El. 93.3 R1: Light grey to greenish-grey, aphanitic, PHYLLITE, hard, fresh. Joints moderately dipping, parallel to foliation, close, tight, planar, smooth, slightly oxizided. Rock Mass Quality=Poor Recovery=83% R1 Core Times (min:sec): 20.4-21.4' (2:30); 21.4-22.4' (3:33)	qp=1,558 psi
25										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-104
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	113.2	**Auger ID/OD:**	--
Operator:	M. Porter	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	K. Russ	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;HW/NW-300#/18
Date Start/Finish:	5-16-2017/5-17-2017	**Drilling Method:**	HW/NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693822; N460617	**Casing ID/OD:**	HW-4.0 in. ID/NW-3.0 in. ID	**Water Level*:**	11.0 ft from bridge deck
Hammer Efficiency Factor:	0.750	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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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 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 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										R2: Light grey to greenish-grey, aphanitic, PHYLLITE, hard, fresh. Joints moderately dipping, parallel to foliation, moderately close, tight to open, slightly weathered joint surfaces. Rock Mass Quality=Excellent Recovery=100% R2 Core Times (min:sec): 22.4-23.4' (1:40); 23.4-24.4' (1:50); 24.4-25.4' (2:08); 25.4-26.4' (2:13)	
	R3	48/48	26.4 - 30.4	RQD = 90%							
30								82.8		R3: Light grey to greenish-grey, aphanitic, PHYLLITE, hard to moderately hard, slightly weathered to fresh. Primary joints moderately dipping, parallel to foliation, close to moderately close, smooth and planar, tight to open, highly oxidized joint surfaces. Secondary joints horizontally dipping, close to moderately close, open, rough and undulating, highly oxidized. Several 0.5 to 2 in. quartz veins throughout rock core run. Rock Mass Quality=Good Recovery=100% R3 Core Times (min:sec): 26.4-27.4' (1:44); 27.4-28.4' (2:13); 28.4-29.4' (2:41); 29.4-30.4' (2:22)	
										30.4	
35										**Bottom of Exploration at 30.4 feet below ground surface.**	
40											
45											
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-105
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;HW-300#/18
Date Start/Finish:	6-1-2017/6-2-2017	**Drilling Method:**	HW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693851; N460753	**Casing ID/OD:**	HW-4.0 in. ID	**Water Level*:**	13.2 ft
Hammer Efficiency Factor:	0.869	**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

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	133.9	-BITUMINOUS CONCRETE- 0.8	
	1D	7/5	1.0 - 1.6	14/20(2.0)				133.1	Brown, dry, dense, fine to medium SAND, little silt and coarse sand, trace gravel	
	2D	24/11	2.0 - 4.0	7/9/15/10	24	35		132.6	-FILL-(SM) PID=0.1 ppm 1.6	
									-CONCRETE- 2.1	
	3D	24/20	4.0 - 6.0	15/11/8/12	19	28			Brown, dry, medium dense, fine to coarse SAND, little gravel, trace silt -FILL-(SW) PID=0.0 ppm	
5								129.2	Brown, moist, medium dense, fine to coarse SAND, little silt, trace gravel (silty bottom 6 in.) -FILL-(SM) PID=0.0 ppm 5.5	
	4D	24/21	6.0 - 8.0	11/14/11/8	25	36			Brown, moist, medium dense, fine to coarse SAND, little silt, trace gravel, silty 7.2 to 7.8 ft -FILL-(SM) PID=0.0 ppm	
	5D	24/13	8.0 - 10.0	10/8/11/13	19	28			Brown, moist, medium dense, fine to coarse SAND, little gravel, trace silt -FILL-(SW) PID=0.0 ppm	
10	6D	24/21	10.0 - 12.0	9/8/9/10	17	25	78		Brown, moist, medium dense, fine to coarse SAND, trace silt and gravel -FILL-(SW) PID=0.0 ppm	
							95			
	7D	24/11	12.0 - 14.0	14/13/15/16	28	41	57		Brown, wet, medium dense, medium to coarse SAND, lilttle fine sand and silt, trace gravel, weakly bonded, well graded -FILL-(SM) PID=0.0 ppm	
							84			
	8D	24/11	14.0 - 16.0	13/9/3/4	12	17	49			
15							37	119.7	15.0 Grey, wet, stiff, silty CLAY, varved, trace organics -MARINE DEPOSIT-(ML/CL)	
	9D	24/14	16.0 - 18.0	5/2/1/1	3	4	41		Grey, wet, soft, silty CLAY, varved, trace organics, sand and gravel from 16.0 to 16.5 ft -MARINE DEPOSIT-(CL)	
							39			
							47			
							53			
20	10D	24/22	20.0 - 22.0	1/1/3/3	4	6	50		Grey, wet, soft, silty CLAY, varved -MARINE DEPOSIT-(CL)	
							53			
							51			
							48			
25							44			

Remarks:

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Boring No.: BB-HSS-105

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-105
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;HW-300#/18
Date Start/Finish:	6-1-2017/6-2-2017	**Drilling Method:**	HW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693851; N460753	**Casing ID/OD:**	HW-4.0 in. ID	**Water Level*:**	13.2 ft
Hammer Efficiency Factor:	0.869	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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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 No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	11D	24/24	25.0 - 27.0	WOR/WOR/WOR/ WOR			31		Grey, wet, medium stiff to stiff, silty CLAY -MARINE DEPOSIT-(CL) 55x110 mm vane raw torque readings: V1: 260/65 in-lbs V2: 190/45 in-lbs	G#426914 A-6 CL WC=24% LL=30, PL=18 PI=12
	V1		25.5 - 26.0	Su=1,030/250 psf						
	V2		26.5 - 27.0	Su=735/175 psf			23			
							17	107.2	27.5	
	U1	24/13	28.0 - 30.0				20		Note: Wet, very soft, sandy SILT at top and bottom of tube.	
							19			
30	12D	24/19	30.0 - 32.0	WOH/WOH/WOH/1			24		Grey, wet, very soft, fine sandy SILT -MARINE DEPOSIT-(ML)	G#426909 A-4 (0) ML
							23			
							41			
							77	101.2	33.5	
							83	100.4	Note: Probable layer of stiffer CLAY at 33.5 ft based on drill action. Note: Drill action indicates probable gravelly SAND at 34.3 ft. 34.3	
35	13D	24/7	35.0 - 37.0	9/12/8/5	20	29	72		Grey, wet, medium dense, gravelly coarse SAND, little medium to fine sand, trace silt -MARINE DEPOSIT-(GW)	
							69			
							78			
							81		Note: Advance HW casing to 39.5 ft. Advance rollerbit to 41.0 ft. Begin NQ rock core at 41.0 ft.	
								95.2	39.5	
40									Top of Bedrock at El. 95.2	
	R1	60/60	41.0 - 46.0	RQD = 85%					R1: Grey, fine grained to aphanitic, pyrite-chlorite PHYLLITE, slightly weathered joint surfaces (oxidation). Primary foliation joints high angle, very close to wide, open, smooth to rough, planar. Secondary joints horizontal, close to moderately close, open, smooth to rough, planar to stepped. Occasional <0.25 in. quartz veins. Silt infilling from 44.0 to 44.2 ft and 45.5 to 45.7 ft (drill wash water changed from grey to light brown). Rock Mass Quality=Good Recovery=100% R1 Core Times (min:sec): 41.0-42.0' (3:00); 42.0-43.0' (3:00); 43.0-44.0' (3:15); 44.0-45.0' (2.45); 45.0-46.0' (2:45)	qp=5,960 psi
45	R2	48/47	46.0 - 50.0	RQD = 89%					R2: Grey, fine grained to aphanitic, pyrite-chlorite PHYLLITE, slightly weathered joint surfaces (oxidation). Primary foliation joints high angle, close to moderately close, open, smooth to rough, planar. Secondary joints horizontal, close to moderately close, open, smooth to rough, planar to slightly undulating, occasional quartz veins. Rock Mass Quality=Good Recovery=98% R2 Core Times (min:sec): 46.0-47.0' (3:30); 47.0-48.0' (3:00);	
50										

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-105
WIN: 21730.10

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.7	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-59	**Hammer Wt./Fall:**	SS-140#/30;HW-300#/18
Date Start/Finish:	6-1-2017/6-2-2017	**Drilling Method:**	HW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #1433: E1693851; N460753	**Casing ID/OD:**	HW-4.0 in. ID	**Water Level*:**	13.2 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 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 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.
50	R3	36/36	50.0 - 53.0	RQD = 86%						48.0-49.0' (2:45); 49.0-50.0' (3:00) R3: Grey, fine grained to aphanitic, pyrite-chlorite PHYLLITE, slightly weathered joint surfaces (oxidation). Primary foliation joints high angle, close to moderately close open, smooth to rough, planar. Frequent quartz veins/intrusions. Rock Mass Quality=Good Recovery=100% R3 Core Times (min:sec): 50.0-51.0' (3:15); 51.0-52.0' (3:00); 52.0-53.0' (3:15)	
								81.7		53.0 **Bottom of Exploration at 53.0 feet below ground surface.**	
55											
60											
65											
70											
75											

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: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-106
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.8	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-15-2017/5-15-2017	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693895; N460605	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.2 ft
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
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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

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.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	134.3	-BITUMINOUS CONCRETE- 0.5	
	1D	5/5	1.5 - 1.9	75(5.0)				132.9	Brown, dry, very dense, fine to coarse SAND, little gravel, trace silt, well graded	
								132.2	-FILL-(SW) PID=0.0 ppm 1.9	
	2D	24/11	3.0 - 5.0	6/11/10/10	21	24			-CONCRETE- 2.6	
									Brown, dry, medium dense, fine to coarse SAND, little gravel, trace silt, well graded -FILL-(SW) PID=0.0 ppm	
5	3D	24/13	5.0 - 7.0	10/6/5/6	11	12			Brown, dry, medium dense, fine to medium SAND, trace coarse sand, trace gravel, trace silt -FILL-(SP) PID=0.0 ppm	
	4D	24/20	7.0 - 9.0	11/9/10/10	19	21			Brown, moist, medium dense, fine to coarse SAND, trace silt, trace gravel	
								126.9	-FILL-(SW) PID=0.0 ppm 7.9	
	5D	24/16	9.0 - 11.0	6/4/7/20	11	12		125.3	Brown, moist, medium dense, fine to medium sandy SILT, trace coarse sand, trace gravel -FILL-(ML) PID=0.0 ppm 9.5	
10							NW Drive			
	6D	24/6	11.0 - 13.0	19/14/8/4	22	25	33		Brown, moist, medium dense, fine to coarse SAND, little gravel, little silt -FILL-(SM) PID=0.0 ppm	
							36	122.3	Brown, wet, medium dense, fine to coarse SAND, little silt, trace gravel -FILL-(SM) PID=0.0 ppm 12.5	
							20			
	MD	24/0	14.5 - 16.5	4/3/3/4	6	7	15		Note: Attempt vane shear test; vane refusal at 14.5 ft. Switched to spilt spoon sample: No recovery, grey, wet, silty CLAY observed on split spoon sampler. -MARINE DEPOSIT-(CL)	
15							18			
	U1	24/20	16.5 - 18.5				17			
							26			
							46		Note: Attempt vane shear test; vane refusal at 18.5 ft.	
							48			
20	7D	24/23	20.0 - 22.0	3/3/4/6	7	8	130		Grey grading to olive-brown, wet, medium stiff, silty CLAY -MARINE DEPOSIT-(CL)	G#426915 A-6 CL WC=24% LL=32, PL=19 PI=13
							105			
							115			
							98			
25							80			

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-106
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.8	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-15-2017/5-15-2017	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693895; N460605	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.2 ft
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
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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 No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	U2	24/24	25.0 - 27.0				84		Note: Olive-brown, wet, silty CLAY in top and bottom of tube sample. -MARINE DEPOSIT-(CL)	
							63			
							64			
							69			
							59			
30	9D	24/14	30.0 - 32.0	2/2/2/2	4	5	54	104.8	30.0 — Grey, wet, very loose, fine SAND, little silt, occasional silt laminae -MARINE DEPOSIT-(SM)	
							46			
							40			
							37			
							35			
35	10D	24/8	35.0 - 37.0	1/2/1/2	3	3	27		Grey, wet, very loose, silty fine SAND, trace medium sand, occasional silt laminae -MARINE DEPOSIT-(SM)	G#426910 A-2-4 (0) SM
							28			
							40	97.7	37.1 — Note: Drill action indicated gravelly sands at 37.1 ft.	
							72			
							110			
40	11D	24/9	40.0 - 42.0	25/18/29/75(2.0)	47	53	-		Grey, wet, dense, fine to coarse SAND and GRAVEL, trace silt -GLACIAL TILL-(SW/GW)	
							-	92.8	42.0 — Note: Drill action indicated probable weathered bedrock at 42.0 ft.	
							-			
							-			
							-		Note: Advanced rollerbit to 45.0 ft. Split spoon refusal at 45.0 ft; begin NQ core at 45.0 ft. -WEATHERED BEDROCK-	
45	R1	26/16	45.0 - 47.2	RQD = 0%				89.8	45.0 — Top of Bedrock at El. 89.8 R1: Grey to brown, fine grained to aphanitic, PHYLLITE, hard, slightly to moderately weathered. Primary joints dipping at high angles, close, open, smooth to rough, weathered joint surfaces. Rock Mass Quality=Very Poor Recovery=62% R1 Core Times (min:sec): 45.0-46.0' (2:00); 46.0-47.2' (1:15)	
	R2	17/14	47.2 - 48.6	RQD = 24%						
	R3	31/31	48.6 - 51.2	RQD = 26%						
50									R2: Grey, fine grained to aphanitic, PHYLLITE, hard, slightly weathered. Primary joints dipping at high angles, close, open to tight,	

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Souadabscook Stream West Bridges
Location: Hampden, Maine

Boring No.: BB-HSS-106
WIN: 21730.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	134.8	**Auger ID/OD:**	--
Operator:	B. Enos	**Datum:**	NAVD 88	**Sampler:**	Split Spoon-1.375 in. ID
Logged By:	T. Snow	**Rig Type:**	Mobile Drill B-53	**Hammer Wt./Fall:**	SS-140#/30;NW-300#/18
Date Start/Finish:	5-15-2017/5-15-2017	**Drilling Method:**	NW Drive	**Core Barrel:**	NQ-2.0 in. ID
Boring Location:	Bridge #5951: E1693895; N460605	**Casing ID/OD:**	NW-4.0 in. ID	**Water Level*:**	12.2 ft
Hammer Efficiency Factor:	0.677	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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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 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.
50										smooth to rough, slightly weathered joint surfaces. Rock Mass Quality=Very Poor Recovery=82% R2 Core Times (min:sec): 47.2-48.6' (2:00)	
	R4	40/39	51.2 - 54.5	RQD = 55%						R3: Grey, fine grained to aphanitic, PHYLLITE, hard, slightly weathered. Primary joints dipping at high angles, close, open to tight, smooth to rough, slightly weathered joint surfaces. Secondary joints vertically dipping, moderate to wide, open, rough, slightly weathered joint surfaces.	
								80.3		Rock Mass Quality=Poor Recovery=100% R3 Core Times (min:sec): 48.6-49.6' (3:00); 49.6-50.6' (2:00); 50.6-51.2' (2:00)	
55										R4: Grey, fine grained to aphanitic, PHYLLITE, hard, slightly weathered. Primary joints dipping at high angles, moderate to close, open to tight, smooth, slightly weathered joint surfaces. Secondary joints horizontal, moderately close, open, smooth, undulating, slightly weathered joint surfaces. Frequent quartz veins. Rock Mass Quality=Fair Recovery=98% R4 Core Times (min:sec): 51.2-52.2' (2:30); 52.2-53.2' (2:15); 53.2-54.2' (2:00); 54.2-54.5' (1:00) -BREWER FORMATION-	
60										54.5 **Bottom of Exploration at 54.5 feet below ground surface.**	
65											
70											
75											

Remarks:

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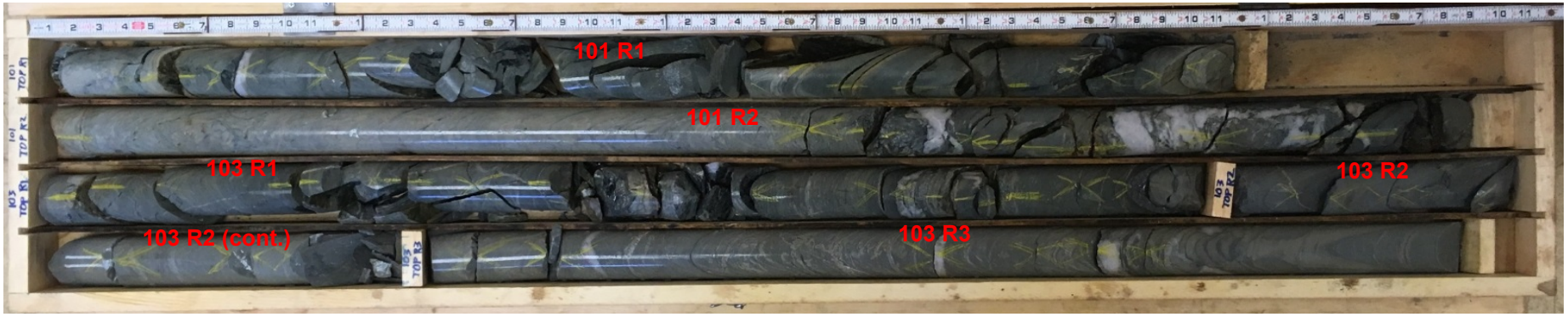
APPENDIX B

Rock Core Photographs



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-101	R1	57.0 to 61.2	77.5 to 73.3	48	96	35	70
BB-HSS-101	R2	61.2 to 66.2	73.3 to 68.3	58	97	47	78
BB-HSS-103	R1	20.9 to 25.1	90.7 to 86.5	47	94	34	68
BB-HSS-103	R2	25.1 to 27.3	86.5 to 84.3	25	96	25	96
BB-HSS-103	R3	27.3 to 30.9	84.3 to 80.7	42	98	42	98

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).

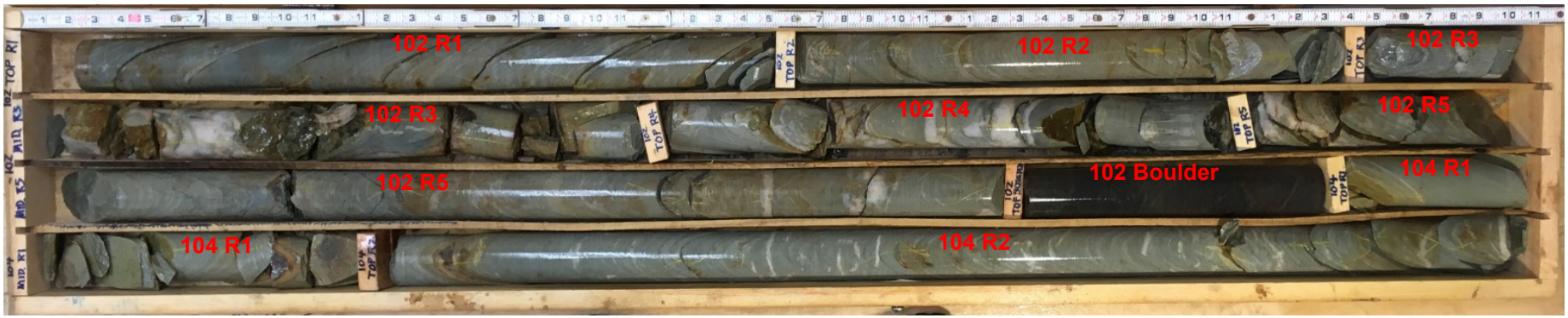
HALEY ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGE NOS. 5951 AND 1433
HAMDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-101 AND BB-HSS-103

FILE NO. 129380-005 February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-102	R1	45.6 to 48.1	89.0 to 86.5	29	97	26	87
BB-HSS-102	R2	48.1 to 50.1	86.5 to 84.5	22	92	16	67
BB-HSS-102	R3	50.1 to 52.7	84.5 to 81.9	30	97	14	45
BB-HSS-102	R4	52.7 to 54.8	81.9 to 79.8	25	100	13	52
BB-HSS-102	R5	54.8 to 58.8	79.8 to 75.8	47	98	36	75
BB-HSS-102	Boulder	40.5 to 41.5	94.1 to 93.1	NA	NA	NA	NA
BB-HSS-104	R1	20.4 to 22.4	92.8 to 90.8	20	83	10	42
BB-HSS-104	R2	22.4 to 26.4	90.8 to 86.8	48	100	44	92

NOTES:

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2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).

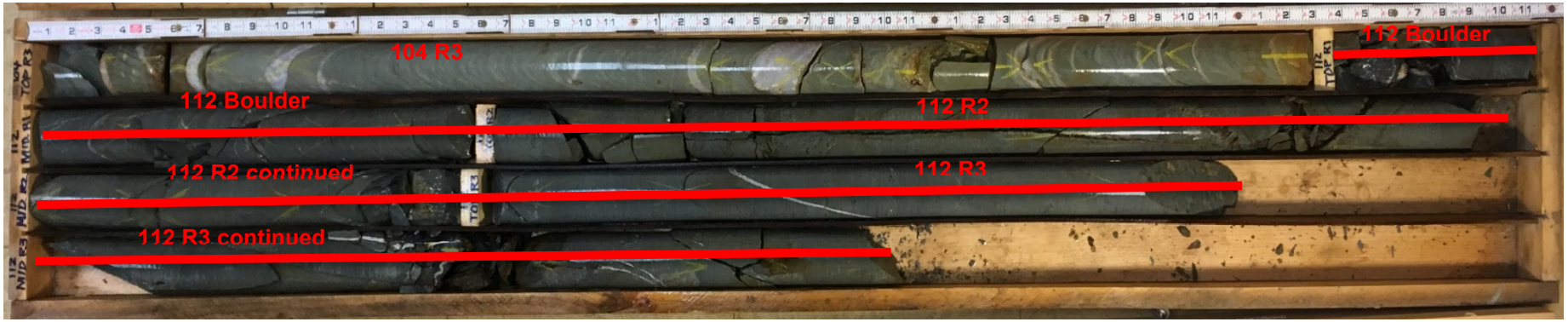
HALEY ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGE NOS. 5951 AND 1433
HAMDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-102 AND BB-HSS-104

FILE NO. 129380-005 February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-104	R3	26.4 to 30.4	86.8 to 82.8	48	100	43	90
~~BB-HSS-112~~	~~Boulder~~	~~46.0 to 48.2~~	~~84.6 to 86.8~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~
~~BB-HSS-112~~	~~R2~~	~~56.0 to 61.0~~	~~79.0 to 74.0~~	~~54~~	~~90~~	~~41~~	~~68~~
~~BB-HSS-112~~	~~R3~~	~~61.0 to 66.0~~	~~74.0 to 69.0~~	~~60~~	~~100~~	~~57~~	~~95~~

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).
3. RED LINES DRAWN THROUGH ROCK CORE PHOTOGRAPHS/TABLE TO INDICATE THAT ROCK CORE WAS COLLECTED FROM AN ADJACENT BRIDGE STRUCTURE. REFER TO OTHER BRIDGE REPORTS.

HALEY ALDRICH

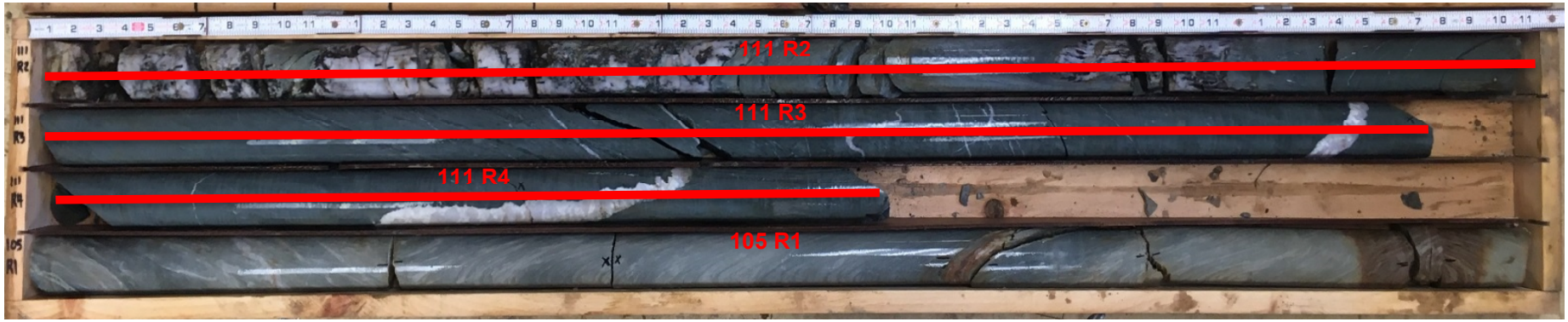
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGE NOS. 5951 AND 1433
HAMDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-104

FILE NO. 129380-005

February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
~~BB-HSS-111~~	~~R2~~	~~47.4 to 51.9~~	~~87.1 to 82.6~~	~~54~~	~~100~~	~~13~~	~~24~~
~~BB-HSS-111~~	~~R3~~	~~51.9 to 56.4~~	~~82.6 to 78.1~~	~~51~~	~~94~~	~~38~~	~~63~~
~~BB-HSS-111~~	~~R$~~	~~56.4 to 61.4~~	~~78.1 to 73.1~~	~~59~~	~~98~~	~~57~~	~~95~~
BB-HSS-105	R1	41.0 to 46.0	93.7 to 88.7	60	100	51	85

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).
3. RED LINES DRAWN THROUGH ROCK CORE PHOTOGRAPHS/TABLE TO INDICATE THAT ROCK CORE WAS COLLECTED FROM AN ADJACENT BRIDGE STRUCTURE. REFER TO OTHER BRIDGE REPORTS.

HALEY ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGE NOS. 5951 AND 1433
HAMDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-105

FILE NO. 129380-005

February 2019

BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-105	R2	46.0 to 50.0	88.7 to 84.7	47	98	43	89
BB-HSS-105	R3	50.0 to 53.0	84.7 to 81.7	36	100	31	86

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).

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INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
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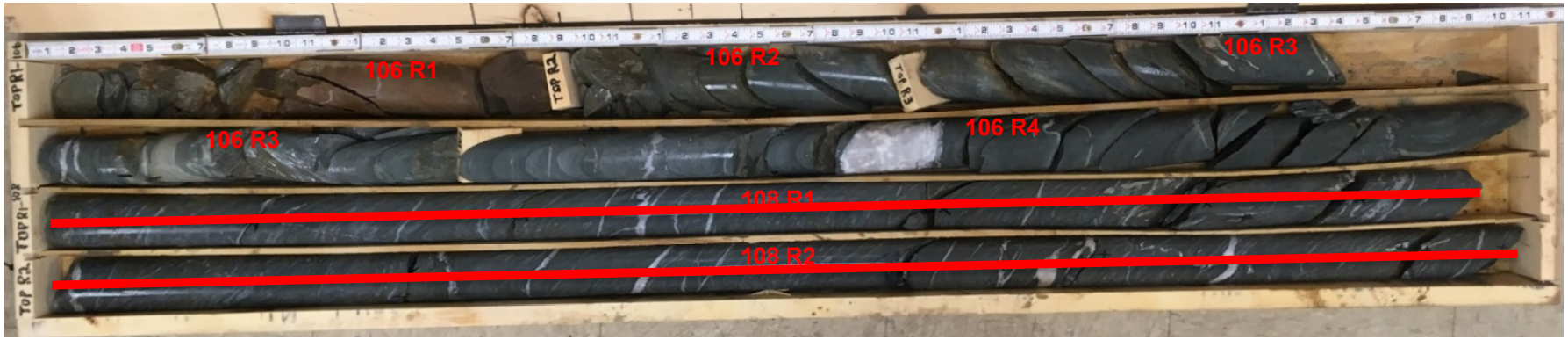
HAMDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-105

FILE NO. 129380-005

February 2019



BORING ID	CORE ID	CORE RUN DEPTH (FT)	CORE RUN EL.[NOTE 1]	RECOVERY		RQD[NOTE 2]	
				IN.	%	IN.	%
BB-HSS-106	R1	45.0 to 47.2	89.8 to 87.6	16	62	0	0
BB-HSS-106	R2	47.2 to 48.6	87.6 to 86.2	14	82	4	24
BB-HSS-106	R3	48.6 to 51.2	86.2 to 83.6	31	100	8	26
BB-HSS-106	R4	51.2 to 54.5	83.6 to 80.3	39	98	22	55
~~BB-HSS-108~~	~~R1~~	~~46.3 to 51.3~~	~~88.9 to 83.9~~	~~58~~	~~97~~	~~48~~	~~80~~
~~BB-HSS-108~~	~~R2~~	~~51.3 to 56.3~~	~~83.9 to 79.9~~	~~60~~	~~100~~	~~60~~	~~100~~

NOTES:

1. ELEVATIONS ARE MEASURED IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. "RQD" INDICATES ROCK QUALITY DESIGNATION (PERCENT OF ROCK PIECES RECOVERED EQUAL TO OR GREATER THAN 4 IN. IN LENGTH).
3. RED LINES DRAWN THROUGH ROCK CORE PHOTOGRAPHS/TABLE TO INDICATE THAT ROCK CORE WAS COLLECTED FROM AN ADJACENT BRIDGE STRUCTURE. REFER TO OTHER BRIDGE REPORTS.

HALEY ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

INTERSTATE 95 OVER SOUADABSCOOK STREAM WEST
BRIDGE NOS. 5951 AND 1433
HAMDEN, MAINE
MAINEDOT WIN 21730.00 AND WIN 21730.10

PHOTOGRAPH OF BEDROCK CORE BORING: BB-HSS-106

FILE NO. 129380-005

February 2019

APPENDIX C

Laboratory Test Results

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	10/06/17	Checked By:	emm
Depth :	---	Test Id:	426917		

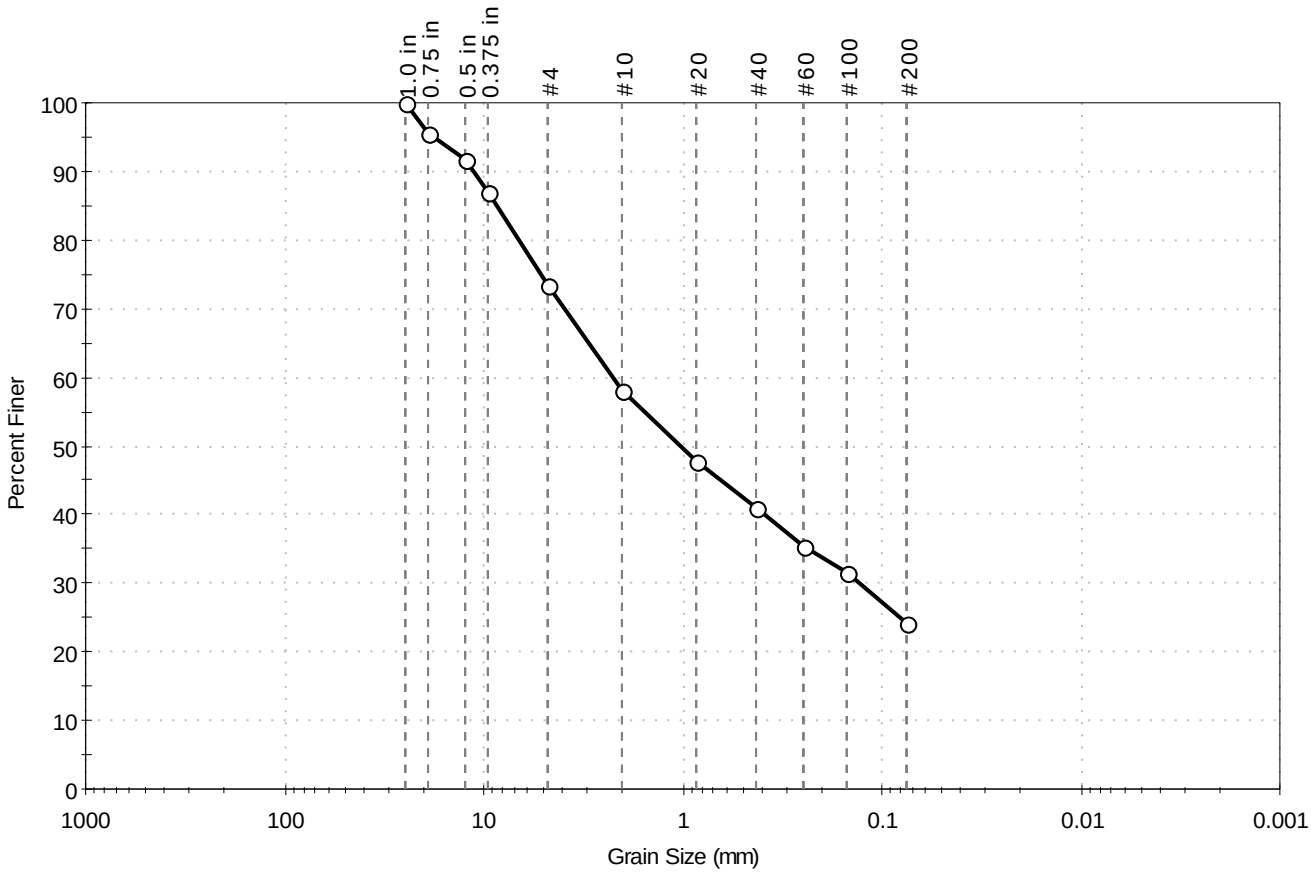
Moisture, Ash, and Organic Matter - ASTM D2974

Boring ID	Sample ID	Depth	Description	Moisture Content, %	Ash Content, %	Organic Matter, %
BB-HSS-101	9D	16.5-18.5 ft	Moist, very dark brown sandy clay	37	95.9	4.1
BB-HSS-102	8D	17.0-17.3 ft	Moist, very dark brown sandy clay with organics	215	67.6	32.4

Notes: Moisture content determined by Method A and reported as a percentage of oven-dried mass; dried to a constant mass at temperature of 105º C
Ash content and organic matter determined by Method C; dried to constant mass at temperature 440º C

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-101	Sample Type:	jar	Tested By:	GA
Sample ID:	4D	Test Date:	10/06/17	Checked By:	emm
Depth :	6.5-8.5 ft	Test Id:	426904		
Test Comment:	---				
Visual Description:	Moist, olive brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	26.4	49.4	24.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	96		
0.5 in	12.50	92		
0.375 in	9.50	87		
#4	4.75	74		
#10	2.00	58		
#20	0.85	48		
#40	0.42	41		
#60	0.25	36		
#100	0.15	32		
#200	0.075	24		

Coefficients

D_{85} = 8.5294 mm	D_{30} = 0.1285 mm
D_{60} = 2.2299 mm	D_{15} = N/A
D_{50} = 1.0239 mm	D_{10} = N/A
C_u = N/A	C_c = N/A

Classification

ASTM N/A

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

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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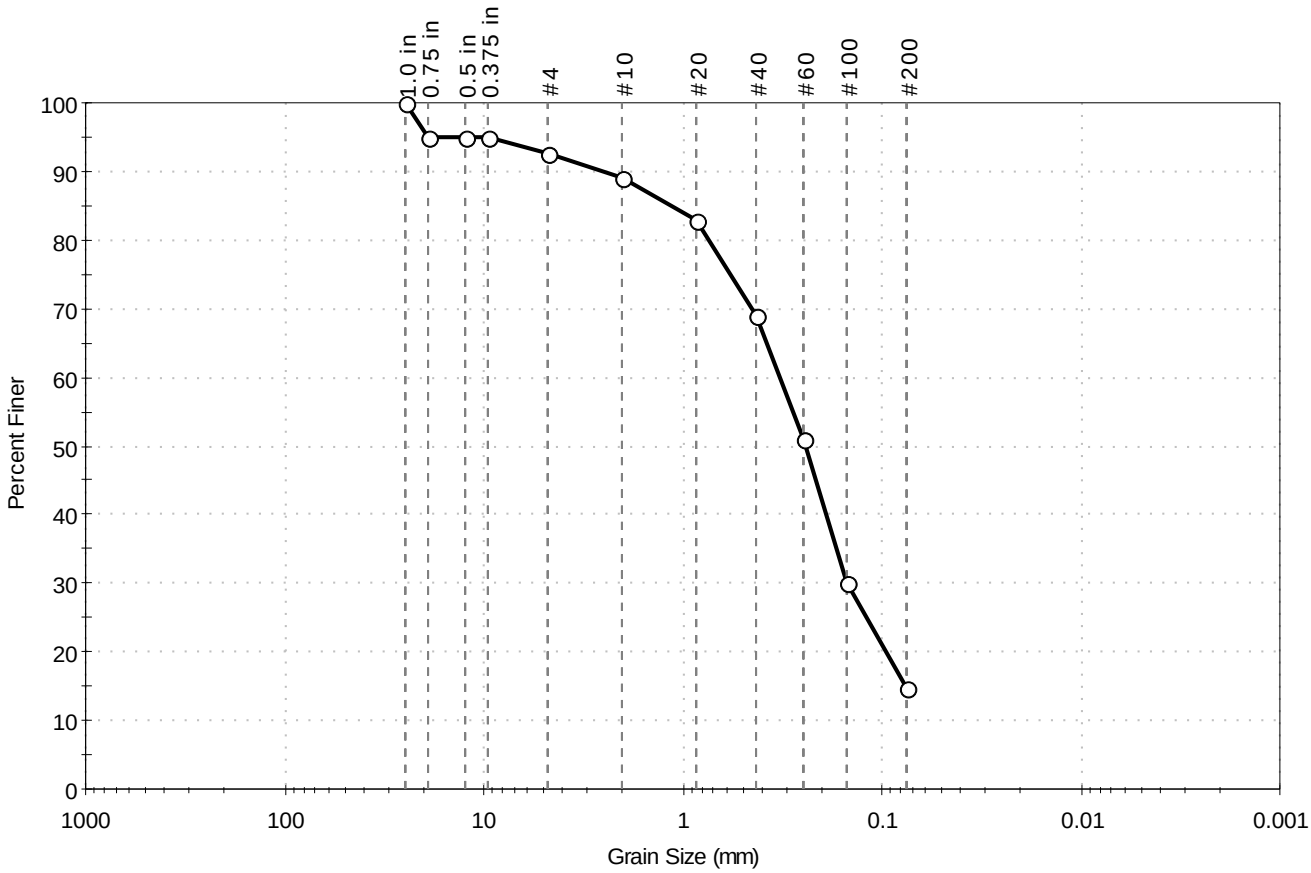
Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-102	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	10/06/17	Checked By:	emm
Depth :	4.5-6.5 ft	Test Id:	426905		
Test Comment:	---				
Visual Description:	Moist, olive brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	7.3	77.9	14.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	95		
0.5 in	12.50	95		
0.375 in	9.50	95		
#4	4.75	93		
#10	2.00	89		
#20	0.85	83		
#40	0.42	69		
#60	0.25	51		
#100	0.15	30		
#200	0.075	15		

Coefficients

D_{85} = 1.1291 mm D_{30} = 0.1496 mm

D_{60} = 0.3265 mm D_{15} = 0.0755 mm

D_{50} = 0.2441 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

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

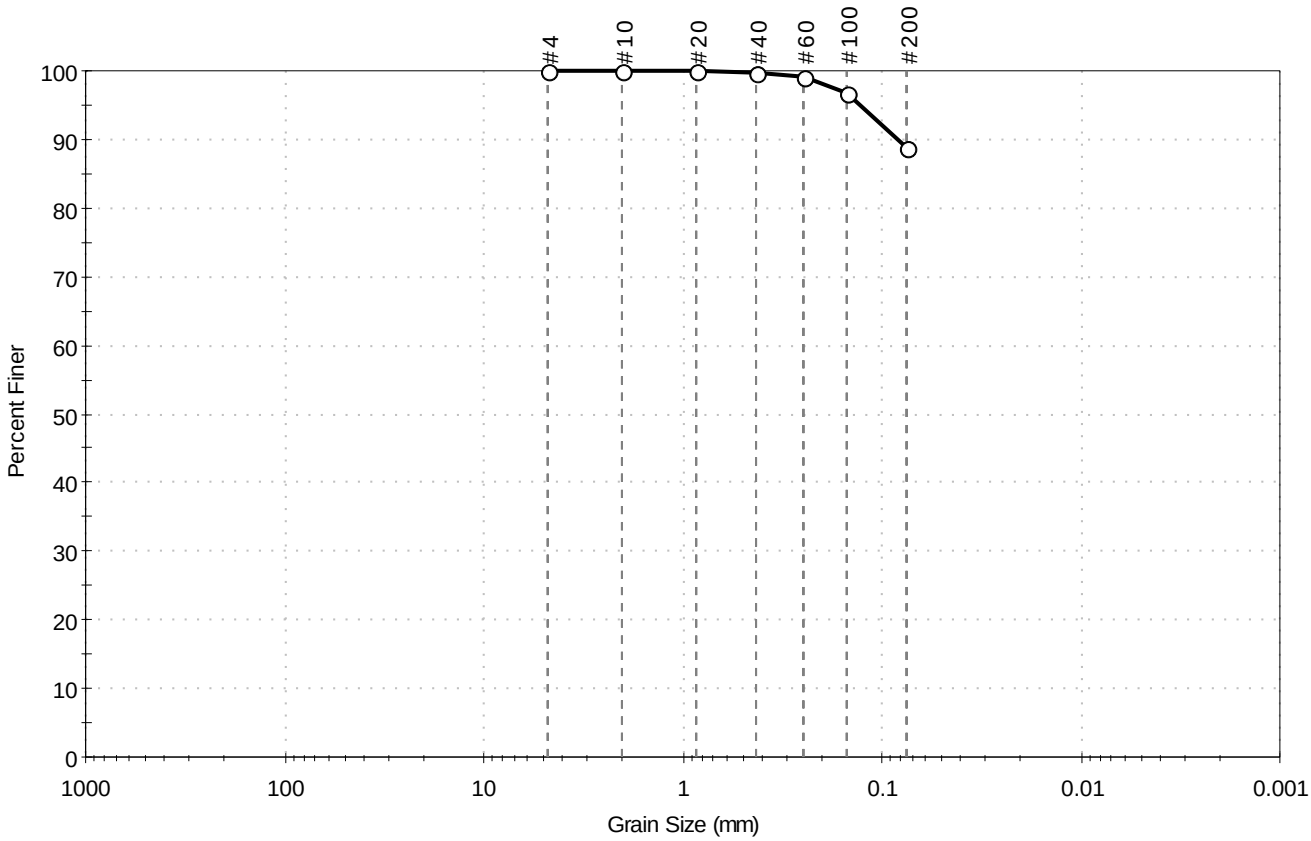
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-102	Sample Type:	jar	Tested By:	GA
Sample ID:	8DA	Test Date:	10/06/17	Checked By:	emm
Depth :	17.3-19.0 ft	Test Id:	426906		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	11.3	88.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	99		
#100	0.15	97		
#200	0.075	89		

Coefficients

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

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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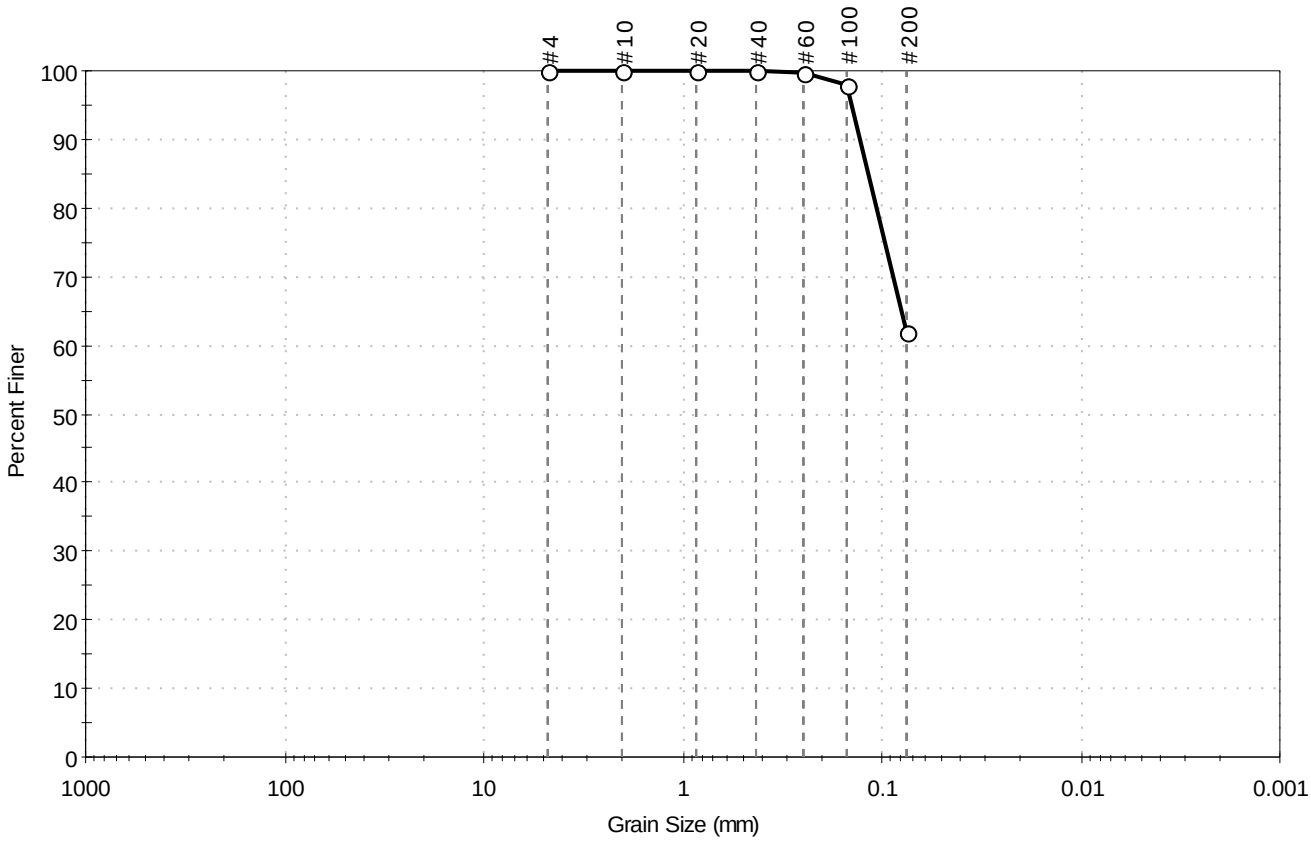
Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-103	Sample Type:	jar	Tested By:	GA
Sample ID:	3D	Test Date:	10/06/17	Checked By:	emm
Depth :	12.0-14.0 ft	Test Id:	426907		
Test Comment:	---				
Visual Description:	Moist, dark gray sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	38.1	61.9

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

Coefficients

D_{85} = 0.1169 mm D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

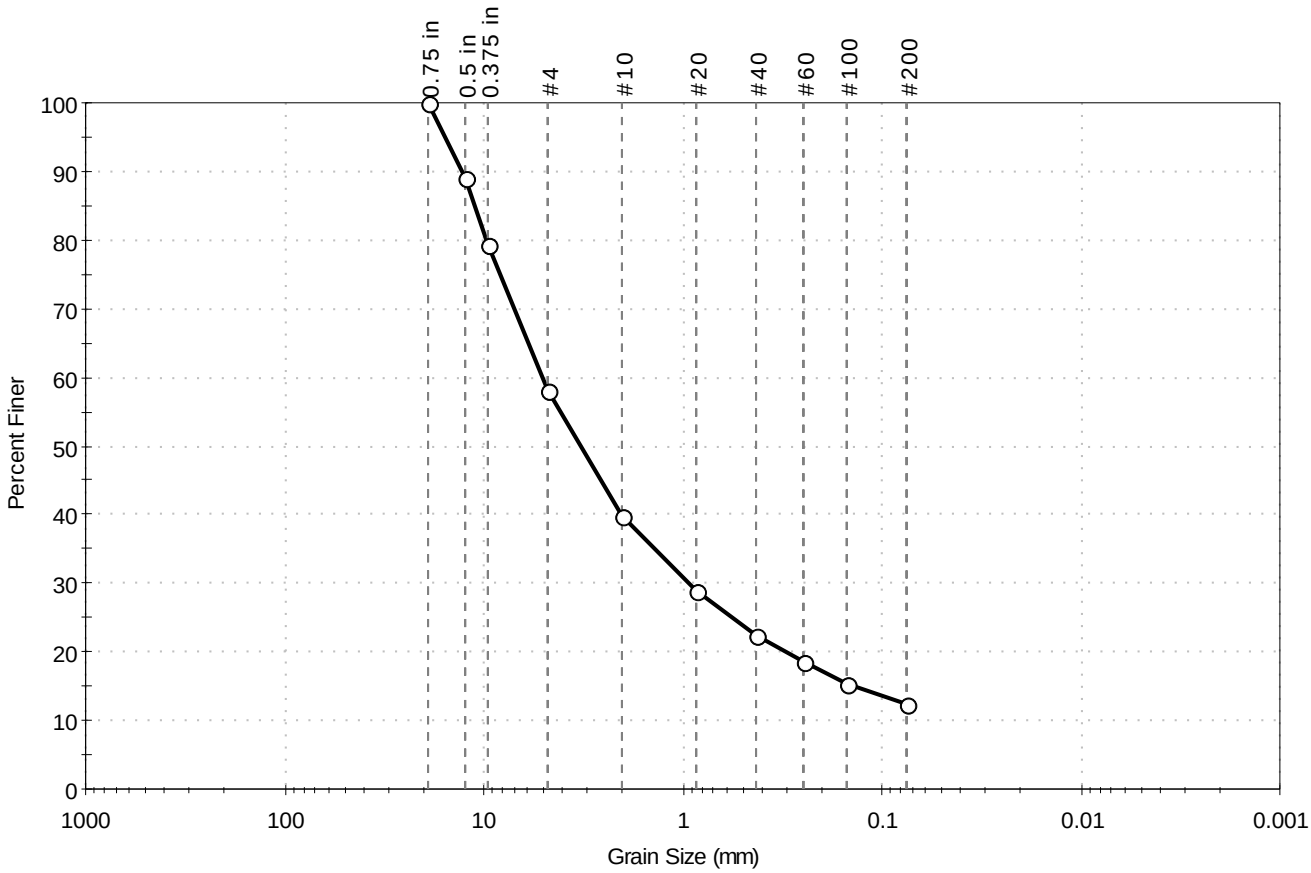
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-104	Sample Type:	jar	Tested By:	GA
Sample ID:	2D	Test Date:	10/06/17	Checked By:	emm
Depth :	3.4-3.9 ft	Test Id:	426908		
Test Comment:	---				
Visual Description:	Moist, yellowish brown silty sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	41.8	45.9	12.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	89		
0.375 in	9.50	79		
#4	4.75	58		
#10	2.00	40		
#20	0.85	29		
#40	0.42	22		
#60	0.25	19		
#100	0.15	15		
#200	0.075	12		

Coefficients

D_{85} = 11.1119 mm D_{30} = 0.9275 mm

D_{60} = 5.0327 mm D_{15} = 0.1368 mm

D_{50} = 3.2307 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

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

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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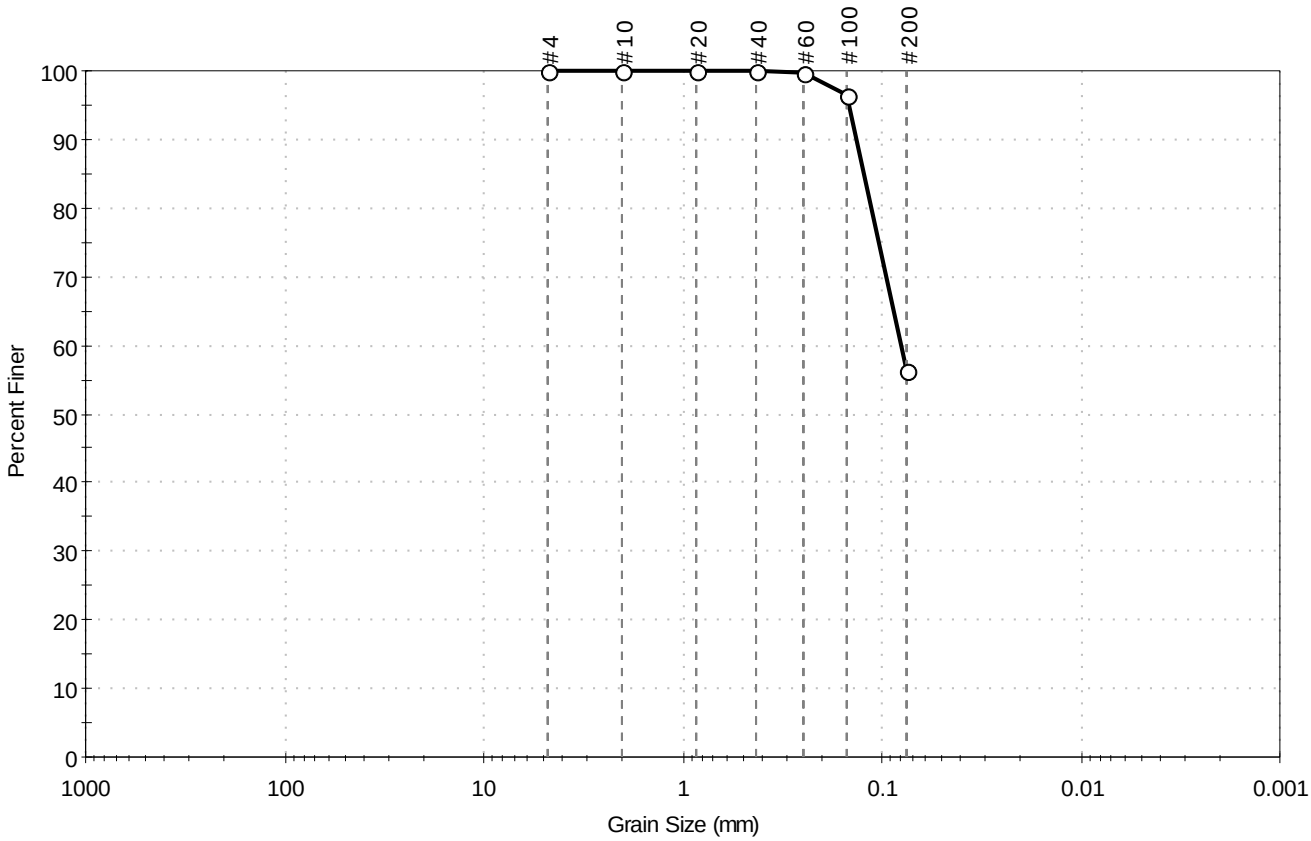
Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-105	Sample Type:	jar	Tested By:	GA
Sample ID:	12D	Test Date:	10/06/17	Checked By:	emm
Depth :	30.0-32.0 ft	Test Id:	426909		
Test Comment:	---				
Visual Description:	Moist, gray sandy silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	43.8	56.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	100		
#100	0.15	97		
#200	0.075	56		

Coefficients

D_{85} = 0.1229 mm D_{30} = N/A

D_{60} = 0.0800 mm D_{15} = N/A

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

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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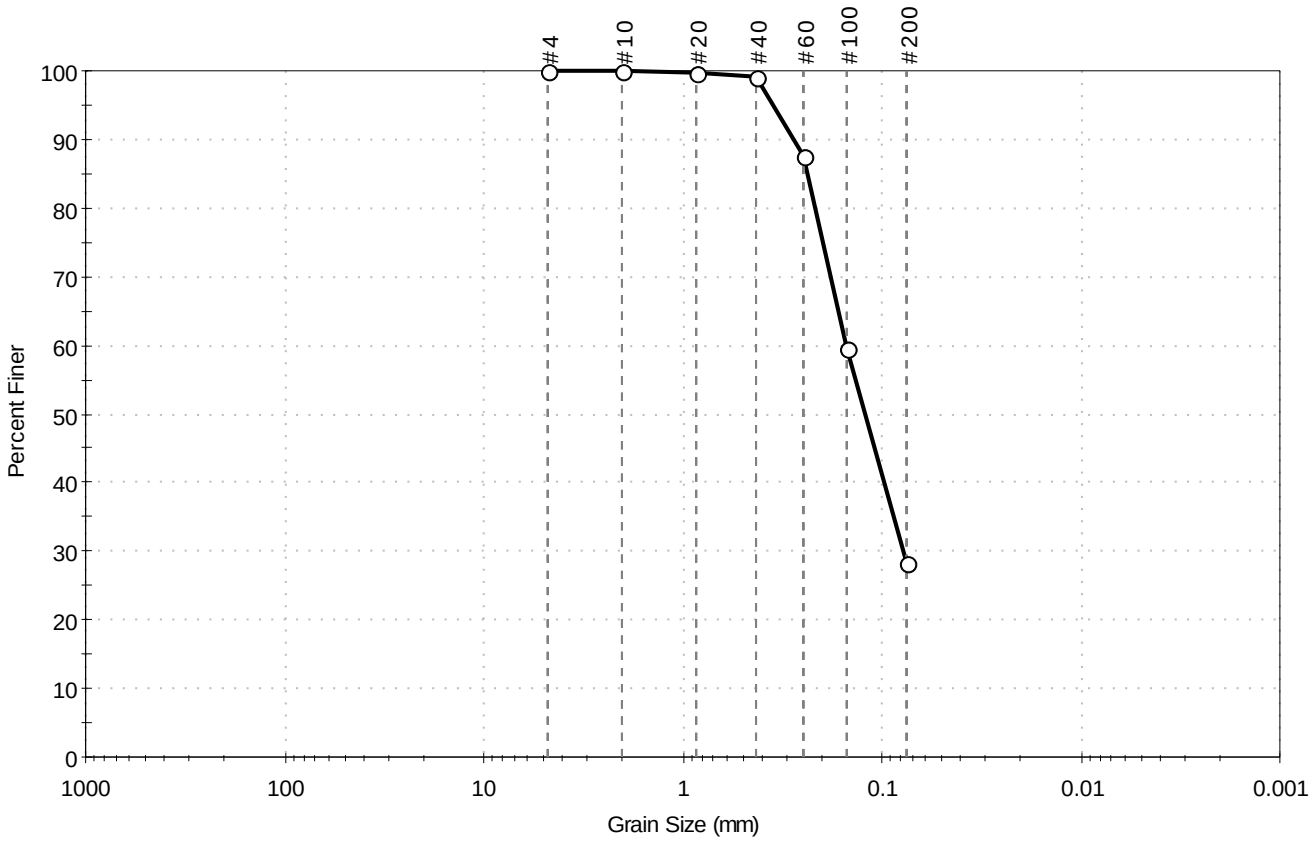
Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-106	Sample Type:	jar	Tested By:	GA
Sample ID:	10D	Test Date:	10/06/17	Checked By:	emm
Depth :	35.0-37.0 ft	Test Id:	426910		
Test Comment:	---				
Visual Description:	Moist, dark gray clayey sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	71.6	28.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	88		
#100	0.15	60		
#200	0.075	28		

Coefficients

D_{85} = 0.2380 mm D_{30} = 0.0778 mm

D_{60} = 0.1509 mm D_{15} = N/A

D_{50} = 0.1211 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

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

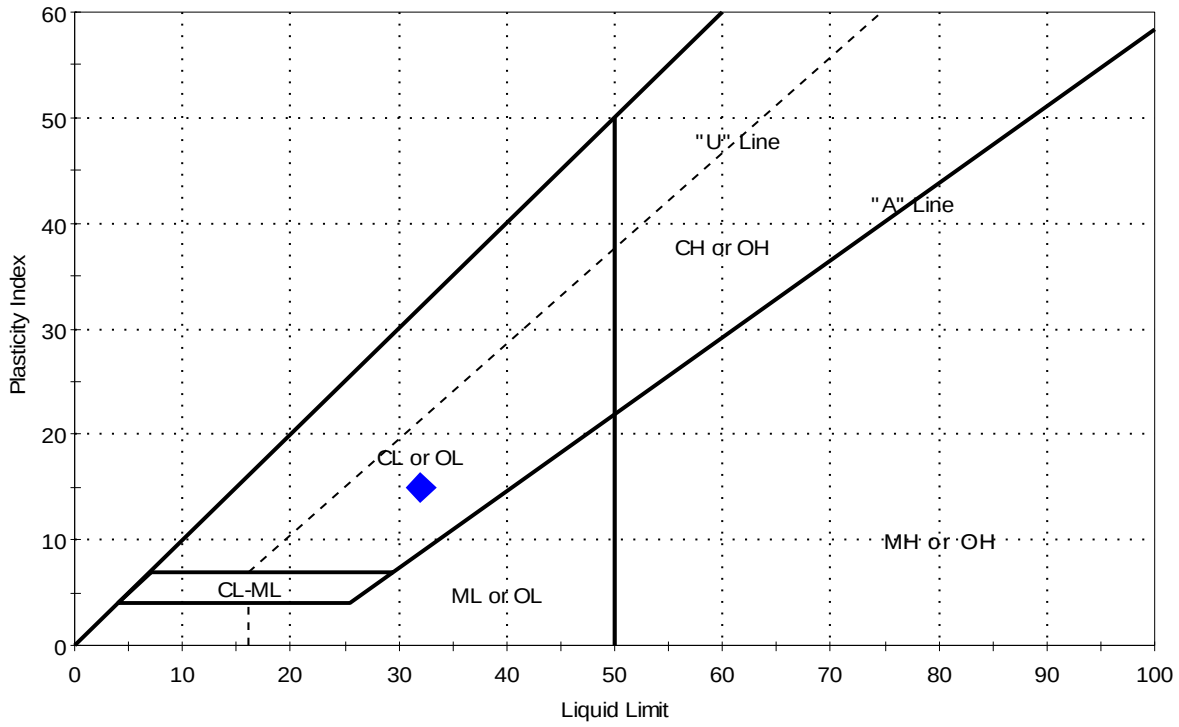
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-101	Sample Type:	jar	Tested By:	GA
Sample ID:	10D	Test Date:	10/06/17	Checked By:	emm
Depth :	22.0-24.0 ft	Test Id:	426911		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	10D	B-HSS-10	22.0-24.0 ft	20	32	17	15	0.2	

Sample Prepared using the WET method

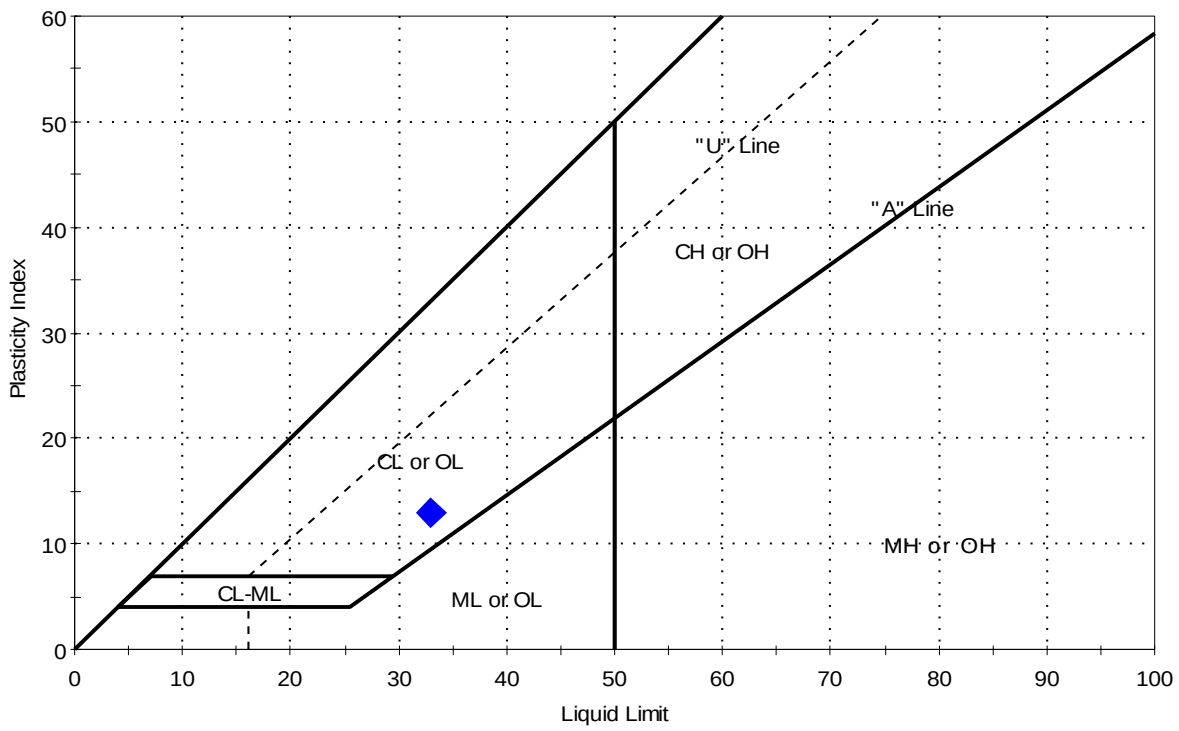
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-102	Sample Type:	jar	Tested By:	GA
Sample ID:	9D	Test Date:	10/06/17	Checked By:	emm
Depth :	25.0-27.0 ft	Test Id:	426912		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	9D	B-HSS-10	25.0-27.0 ft	23	33	20	13	0.2	

Sample Prepared using the WET method

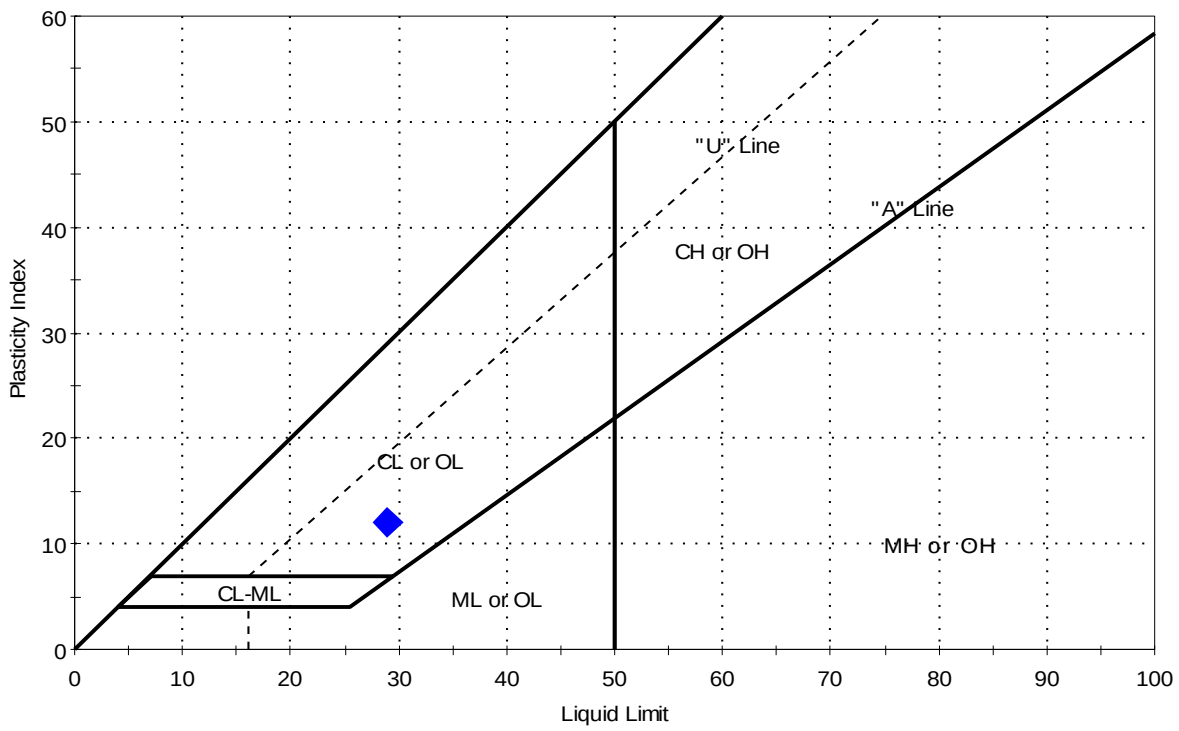
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-103	Sample Type:	jar	Tested By:	GA
Sample ID:	2D	Test Date:	10/06/17	Checked By:	emm
Depth :	7.0-9.0 ft	Test Id:	426913		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	2D	B-HSS-10	7.0-9.0 ft	22	29	17	12	0.4	

Sample Prepared using the WET method

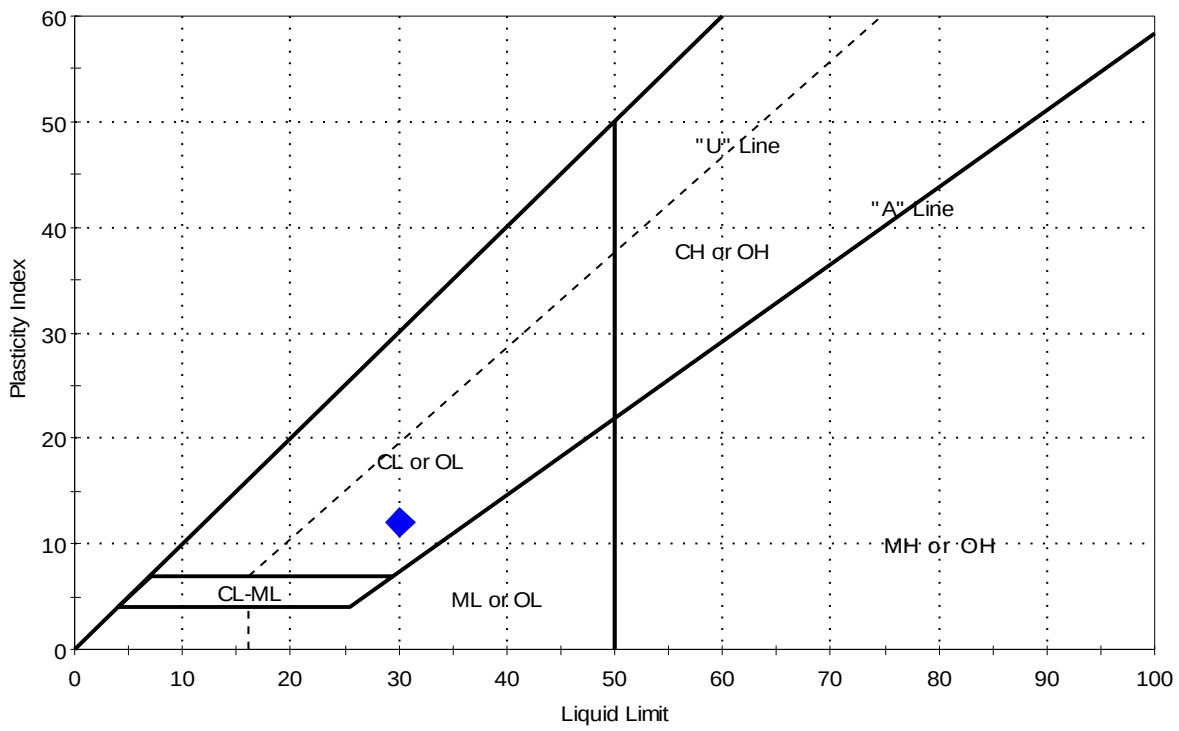
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-105	Sample Type:	jar	Tested By:	GA
Sample ID:	11D	Test Date:	10/06/17	Checked By:	emm
Depth :	25.0-27.0 ft	Test Id:	426914		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	11D	B-HSS-10	25.0-27.0 ft	24	30	18	12	0.5	

Sample Prepared using the WET method

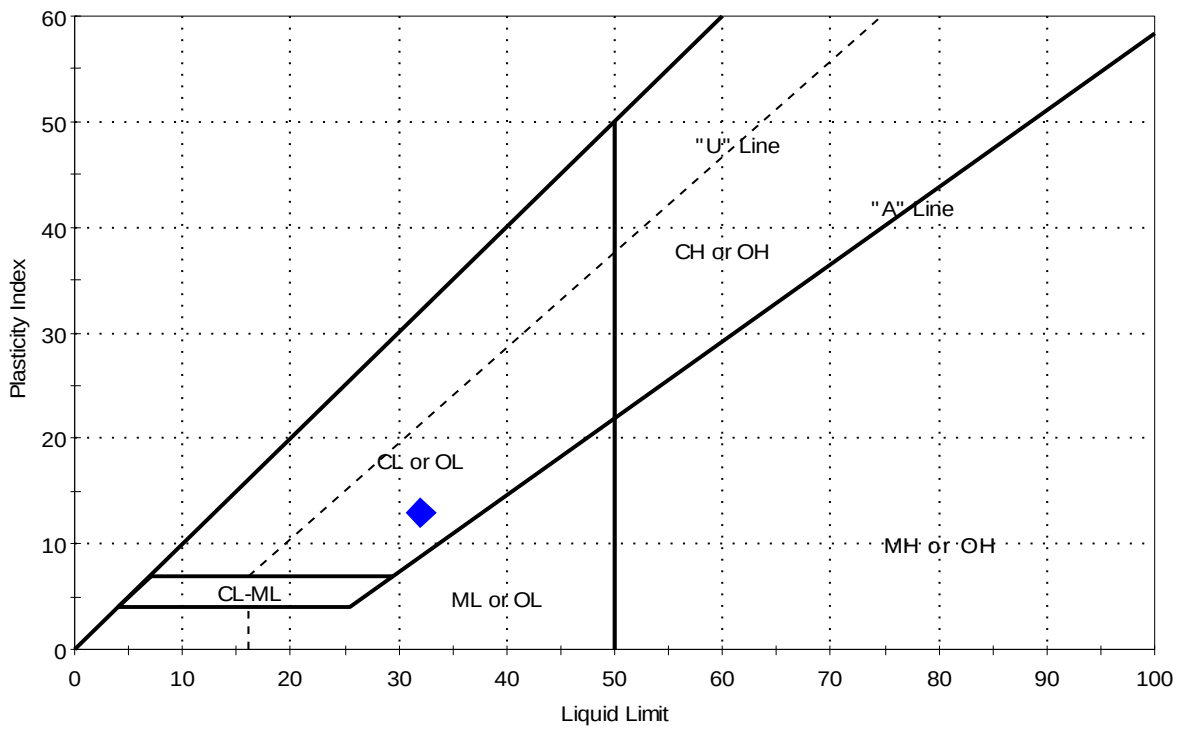
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley & Aldrich, Inc.				
Project:	Soudabscook West # 1433 and 5951				
Location:	Hampden, ME			Project No:	GTX-307097
Boring ID:	BB-HSS-106	Sample Type:	jar	Tested By:	GA
Sample ID:	7D	Test Date:	10/06/17	Checked By:	emm
Depth :	20.0-22.0 ft	Test Id:	426915		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	7D	B-HSS-10	20.0-22.0 ft	24	32	19	13	0.4	

Sample Prepared using the WET method

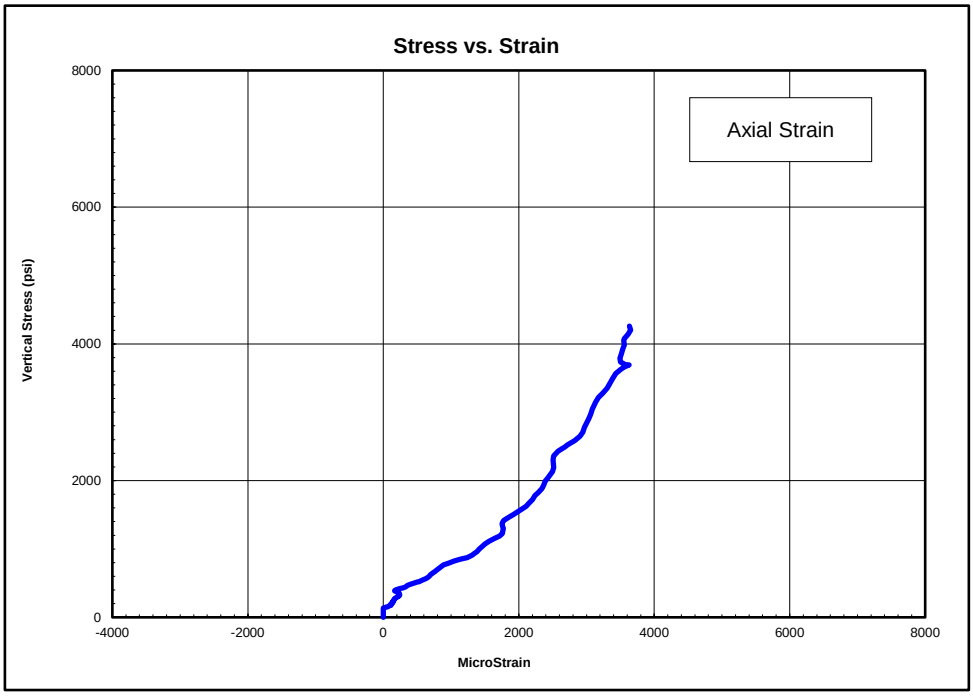
Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-102
Sample ID:	R5
Depth, ft:	56.9-57.27
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 4,762 psi

Both lateral strain gauges failed to record meaningful data. Poisson's Ratio could not be determined.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
500-1700	674,000	---
1700-3000	1,380,000	---
3000-4300	1,850,000	---

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley Aldrich, Inc.	Test Date:	10/6/2017
Project Name:	Soudabscook West #1433 and 5951	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307097		
Boring ID:	BB-HSS-102		
Sample ID:	R5		
Depth:	56.9-57.27 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.33	4.33	4.33
Specimen Diameter, in:	1.98	1.99	1.98
Specimen Mass, g:	597.54		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00020
Diameter 2, in (rotated 90°)	-0.00020	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Difference between max and min readings, in:

0° = 0.00030 90° = 0.00020

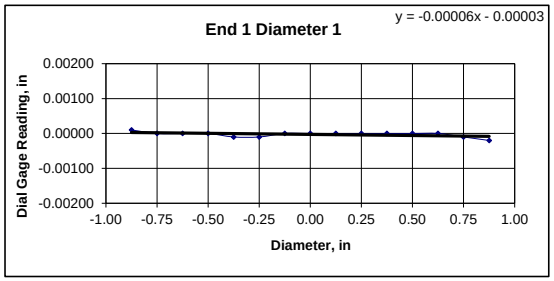
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	-0.00020	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00020	-0.00020
Diameter 2, in (rotated 90°)	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010

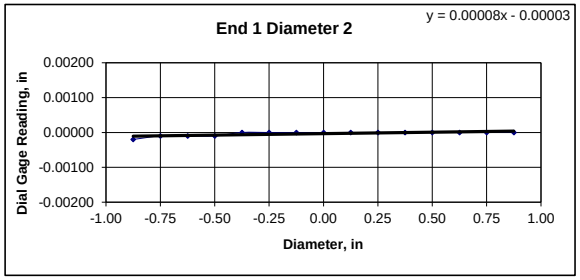
Difference between max and min readings, in:

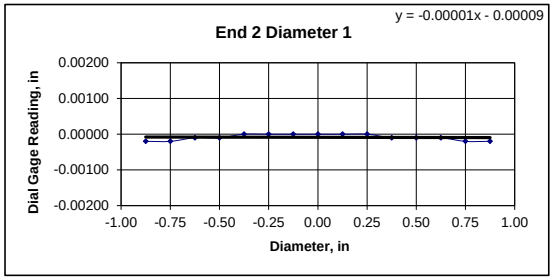
0° = 0.0002 90° = 0.0001

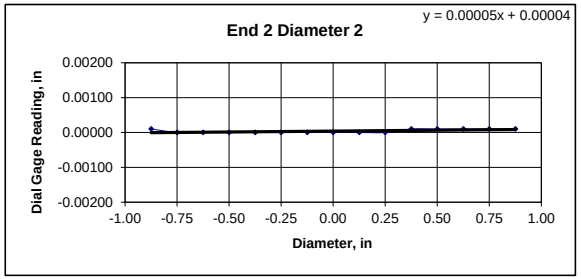
Maximum difference must be < 0.0020 in. Difference = ± 0.00015

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00006
Angle of Best Fit Line:	0.00344

End 2:

Slope of Best Fit Line	0.00001
Angle of Best Fit Line:	0.00057

Maximum Angular Difference: 0.00286

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00008
Angle of Best Fit Line:	0.00458

End 2:

Slope of Best Fit Line	0.00005
Angle of Best Fit Line:	0.00286

Maximum Angular Difference: 0.00172

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00030	1.985	0.00015	0.009	YES
Diameter 2, in (rotated 90°)	0.00020	1.985	0.00010	0.006	YES
END 2					
Diameter 1, in	0.00020	1.985	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00010	1.985	0.00005	0.003	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

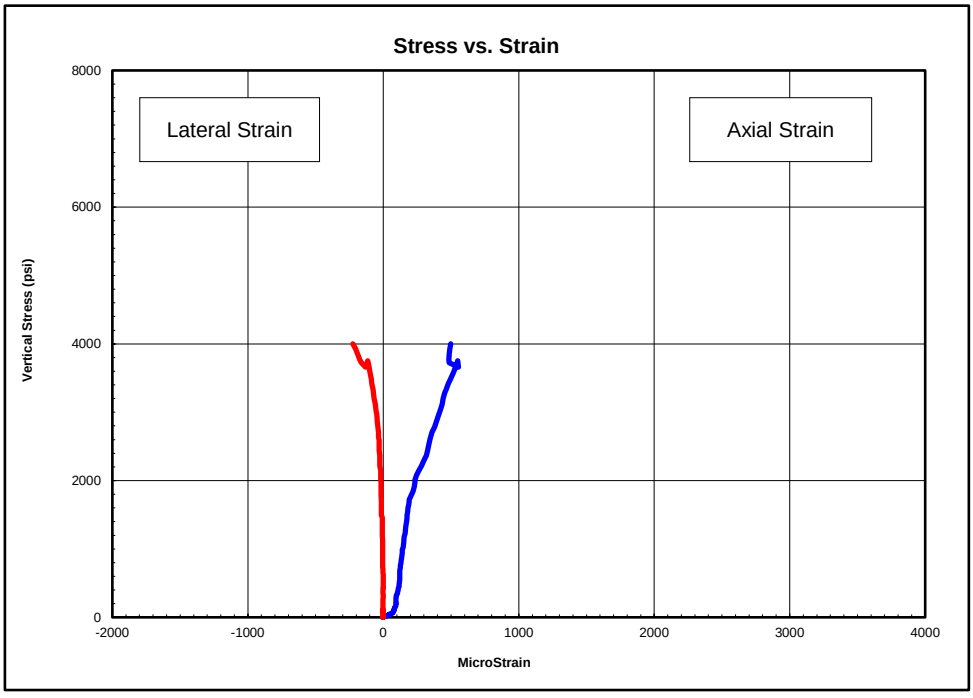
Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-102
Sample ID:	R5
Depth, ft:	56.9-57.27

After cutting and grinding

After break

Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-103
Sample ID:	R3
Depth, ft:	28.52-28.89
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 3,996 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
400-1500	16,400,000	0.19
1500-2500	5,750,000	0.11
2500-3600	5,950,000	0.39

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley Aldrich, Inc.	Test Date:	10/6/2017
Project Name:	Soudabscook West #1433 and 5951	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307097		
Boring ID:	BB-HSS-103		
Sample ID:	R3		
Depth:	28.52-28.89 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.22	4.22	4.22
Specimen Diameter, in:	1.98	1.99	1.99
Specimen Mass, g:	583.9		
Bulk Density, lb/ft^3	170	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	-0.00020	-0.00010	0.00000	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	-0.00030	-0.00030	-0.00030	-0.00030	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Difference between max and min readings, in:

0° = 0.00020 90° = 0.00030

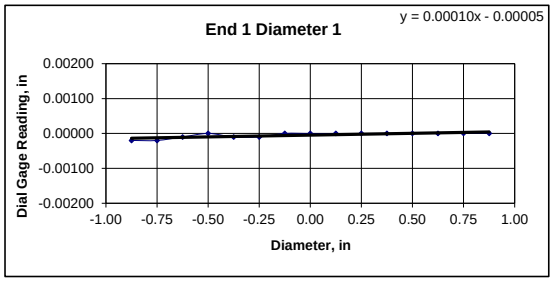
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00000	-0.00010	-0.00020	-0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00030	0.00030	0.00030

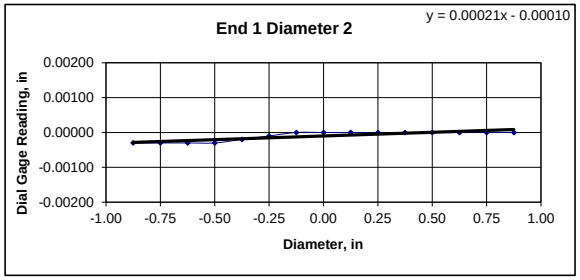
Difference between max and min readings, in:

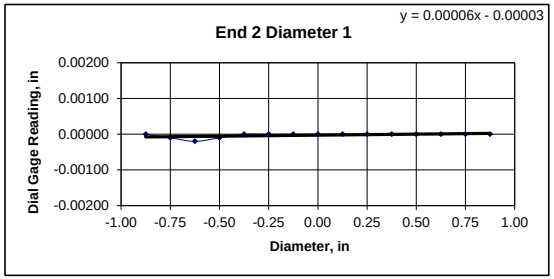
0° = 0.0002 90° = 0.0003

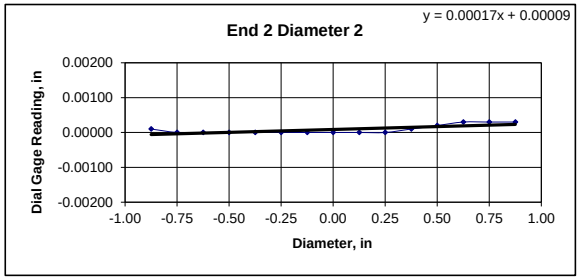
Maximum difference must be < 0.0020 in. Difference = ± 0.00015

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00010
Angle of Best Fit Line:	0.00573

End 2:

Slope of Best Fit Line	0.00006
Angle of Best Fit Line:	0.00344

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00021
Angle of Best Fit Line:	0.01203

End 2:

Slope of Best Fit Line	0.00017
Angle of Best Fit Line:	0.00974

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.985	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00030	1.985	0.00015	0.009	YES
END 2					
Diameter 1, in	0.00020	1.985	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00030	1.985	0.00015	0.009	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

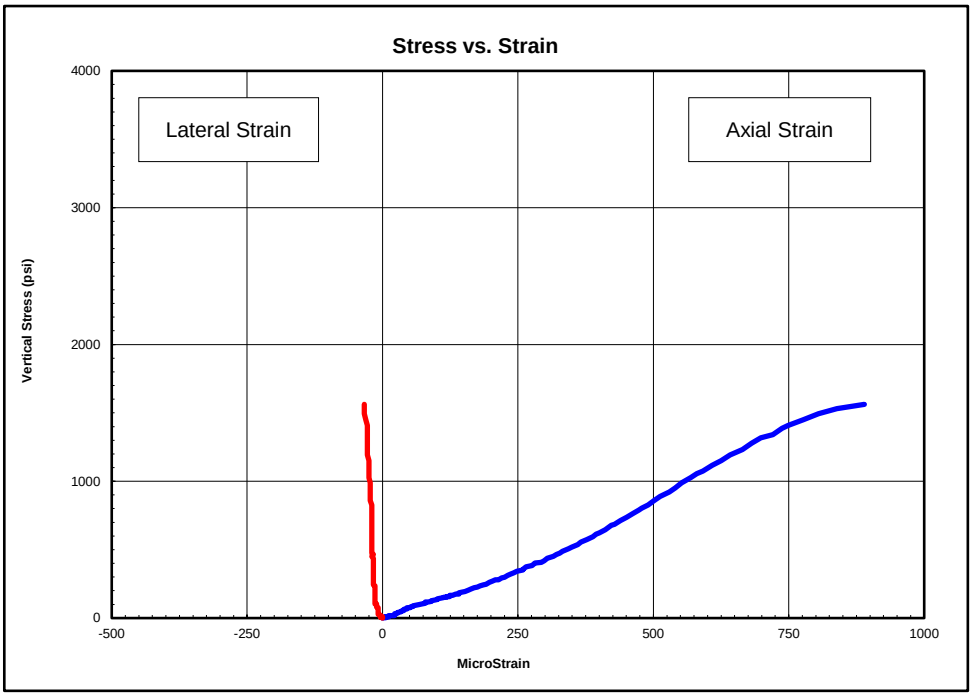
Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-103
Sample ID:	R3
Depth, ft:	28.52-28.89

After cutting and grinding

After break

Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-104
Sample ID:	R2
Depth, ft:	22.95-23.31
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 1,558 psi

One axial strain gauge failed to record meaningful data. Poisson's Ratio reported based on results of a single axial strain gauge.

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
200-600	1,680,000	0.03
600-1000	2,350,000	0.03
1000-1400	2,130,000	0.03

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley Aldrich, Inc.	Test Date:	10/6/2017
Project Name:	Soudabscook West #1433 and 5951	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307097		
Boring ID:	BB-HSS-104		
Sample ID:	R2		
Depth:	22.95-23.31 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.30	4.30	4.30
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	595.11		
Bulk Density, lb/ft^3	169	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.2	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00010	0.00000	0.00000	0.00000	0.00000	-0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000
Diameter 2, in (rotated 90°)	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	0.00000	0.00000	0.00000	0.00000	-0.00010	0.00000	-0.00010	-0.00010	-0.00010	-0.00010

Difference between max and min readings, in:

0° = 0.00010 90° = 0.00010

END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00010	0.00000	0.00000	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010	0.00020
Diameter 2, in (rotated 90°)	0.00020	0.00020	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00010	0.00020	0.00020	0.00020	0.00020	0.00020

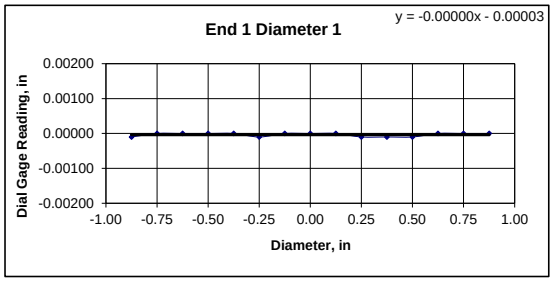
0

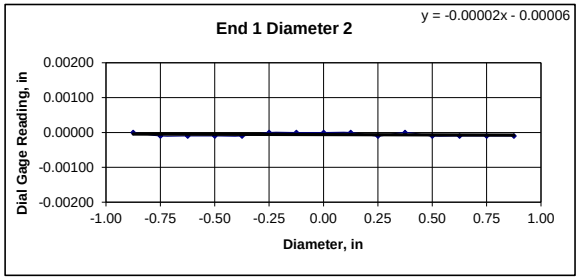
Difference between max and min readings, in:

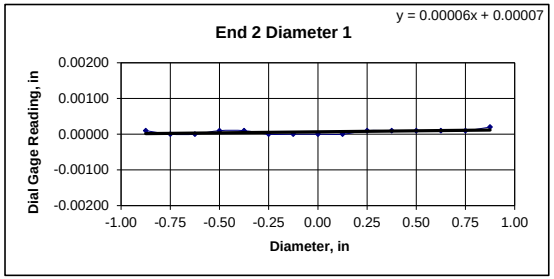
0° = 0.0002 90° = 0.0002

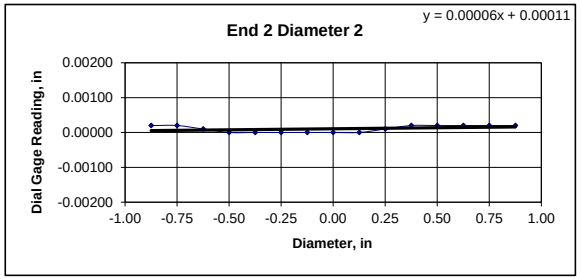
Maximum difference must be < 0.0020 in. Difference = ± 0.00010

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00000
Angle of Best Fit Line:	0.00000

End 2:

Slope of Best Fit Line	0.00006
Angle of Best Fit Line:	0.00344

Maximum Angular Difference: 0.00344

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00002
Angle of Best Fit Line:	0.00115

End 2:

Slope of Best Fit Line	0.00006
Angle of Best Fit Line:	0.00344

Maximum Angular Difference: 0.00229

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

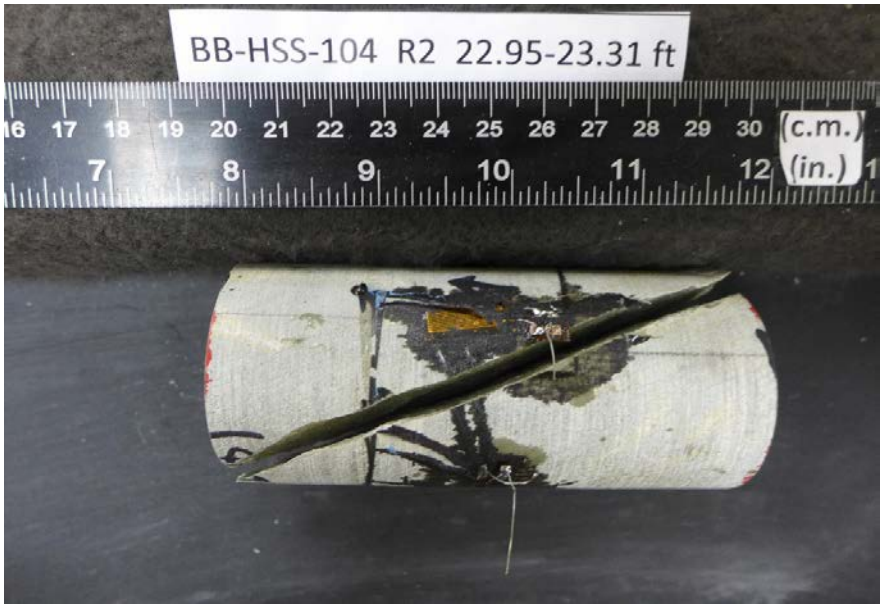
END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00010	1.988	0.00005	0.003	YES
Diameter 2, in (rotated 90°)	0.00010	1.988	0.00005	0.003	YES
END 2					
Diameter 1, in	0.00020	1.988	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00020	1.988	0.00010	0.006	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-104
Sample ID:	R2
Depth, ft:	22.95-23.31

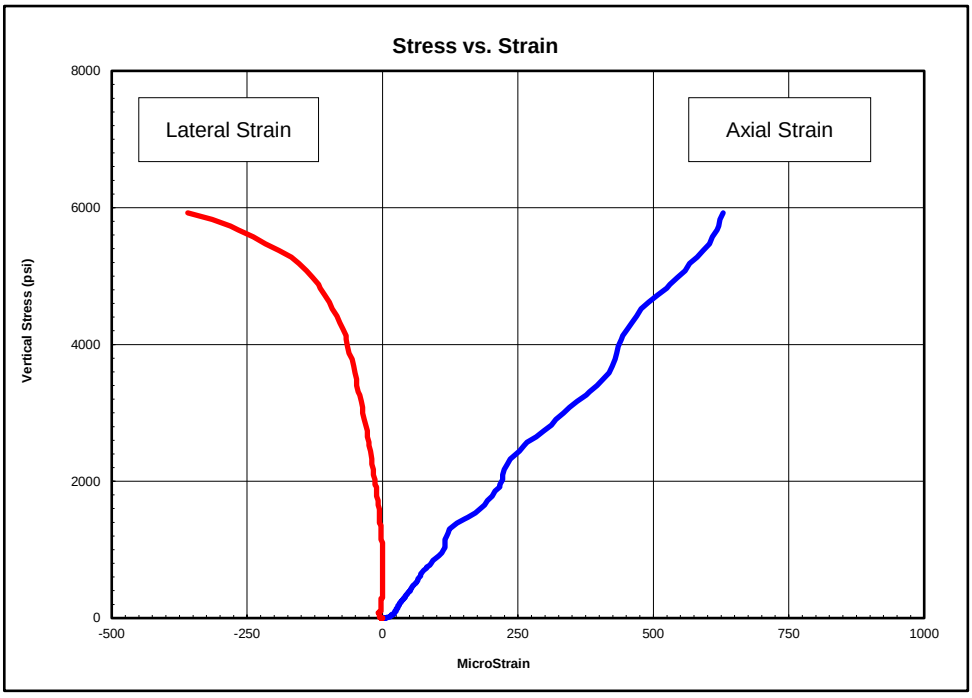
After cutting and grinding



After break

Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-105
Sample ID:	R1
Depth, ft:	42.20-42.56
Sample Type:	rock core
Sample Description:	See photographs Discontinuity failure

Compressive Strength and Elastic Moduli of Rock by ASTM D7012 - Method D



Peak Compressive Stress: 5,960 psi

Stress Range, psi	Young's Modulus, psi	Poisson's Ratio
600-2200	9,050,000	0.11
2200-3800	7,070,000	0.17
3800-5300	8,700,000	---

Notes: Test specimen tested at the approximate as-received moisture content and at standard laboratory temperature.
The axial load was applied continuously at a stress rate that produced failure in a test time between 2 and 15 minutes.
Young's Modulus and Poisson's Ratio calculated using the tangent to the line in the stress range listed.
Calculations assume samples are isotropic, which is not necessarily the case.

Client:	Haley Aldrich, Inc.	Test Date:	10/6/2017
Project Name:	Soudabscook West #1433 and 5951	Tested By:	rlc
Project Location:	Hampden, ME	Checked By:	jsc
GTX #:	307097		
Boring ID:	BB-HSS-105		
Sample ID:	R1		
Depth:	42.20-42.56 ft		
Visual Description:	See photographs		

UNIT WEIGHT DETERMINATION AND DIMENSIONAL AND SHAPE TOLERANCES OF ROCK CORE SPECIMENS BY ASTM D4543

BULK DENSITY

	1	2	Average
Specimen Length, in:	4.26	4.26	4.26
Specimen Diameter, in:	1.99	1.99	1.99
Specimen Mass, g:	488.72		
Bulk Density, lb/ft^3	140	**Minimum Diameter Tolerence Met?**	YES
Length to Diameter Ratio:	2.1	**Length to Diameter Ratio Tolerance Met?**	YES

DEVIATION FROM STRAIGHTNESS (Procedure S1)

Maximum gap between side of core and reference surface plate:

Is the maximum gap ≤ 0.02 in.? YES

Maximum difference must be < 0.020 in.

Straightness Tolerance Met? YES

END FLATNESS AND PARALLELISM (Procedure FP1)

END 1	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	0.00000	-0.00010	-0.00010	0.00000	0.00010	0.00010	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Diameter 2, in (rotated 90°)	0.00010	0.00010	0.00000	0.00010	0.00020	0.00010	0.00000	0.00000	0.00000	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010

Difference between max and min readings, in:

0° = 0.00020 90° = 0.00020

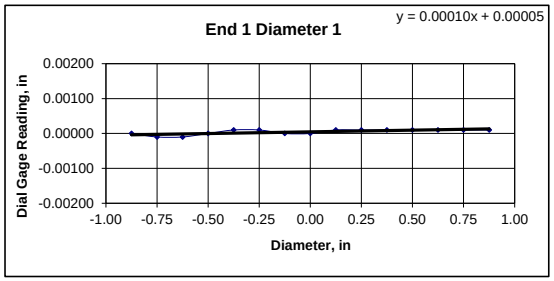
END 2	-0.875	-0.750	-0.625	-0.500	-0.375	-0.250	-0.125	0.000	0.125	0.250	0.375	0.500	0.625	0.750	0.875
Diameter 1, in	-0.00020	-0.00020	-0.00010	0.00000	0.00000	-0.00010	0.00000	0.00000	-0.00010	0.00000	0.00010	0.00020	0.00020	0.00010	0.00000
Diameter 2, in (rotated 90°)	0.00000	0.00000	0.00000	0.00000	0.00010	0.00010	0.00000	0.00000	0.00000	-0.00010	-0.00010	-0.00010	-0.00010	-0.00010	0.00000

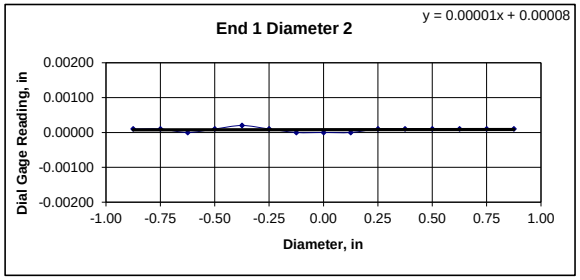
Difference between max and min readings, in:

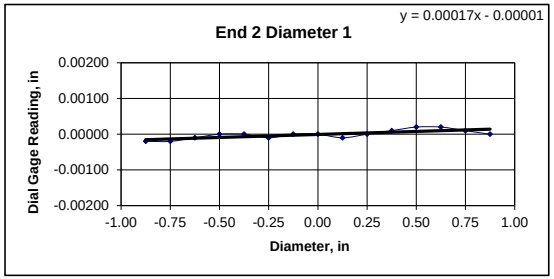
0° = 0.0004 90° = 0.0002

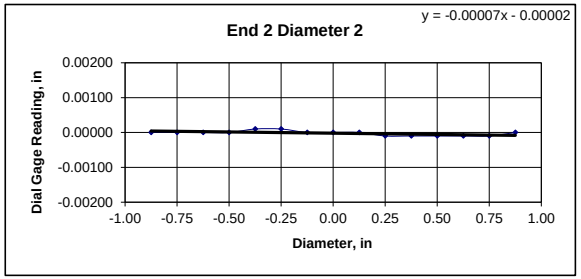
Maximum difference must be < 0.0020 in. Difference = ± 0.00020

Flatness Tolerance Met? YES









DIAMETER 1

End 1:

Slope of Best Fit Line	0.00010
Angle of Best Fit Line:	0.00573

End 2:

Slope of Best Fit Line	0.00017
Angle of Best Fit Line:	0.00974

Maximum Angular Difference: 0.00401

Parallelism Tolerance Met? YES

Spherically Seated

DIAMETER 2

End 1:

Slope of Best Fit Line	0.00001
Angle of Best Fit Line:	0.00057

End 2:

Slope of Best Fit Line	0.00007
Angle of Best Fit Line:	0.00401

Maximum Angular Difference: 0.00344

Parallelism Tolerance Met? YES

Spherically Seated

PERPENDICULARITY (Procedure P1) (Calculated from End Flatness and Parallelism measurements above)

END 1	Difference, Maximum and Minimum (in.)	Diameter (in.)	Slope	Angle°	Perpendicularity Tolerance Met?
Diameter 1, in	0.00020	1.991	0.00010	0.006	YES
Diameter 2, in (rotated 90°)	0.00020	1.991	0.00010	0.006	YES
END 2					
Diameter 1, in	0.00040	1.991	0.00020	0.012	YES
Diameter 2, in (rotated 90°)	0.00020	1.991	0.00010	0.006	YES

Maximum angle of departure must be ≤ 0.25°

Perpendicularity Tolerance Met? YES

Client:	Haley Aldrich, Inc.
Project Name:	Soudabscook West #1433 and 5951
Project Location:	Hampden, ME
GTX #:	307097
Test Date:	10/9/2017
Tested By:	rlc
Checked By:	jsc
Boring ID:	BB-HSS-105
Sample ID:	R1
Depth, ft:	42.20-42.56

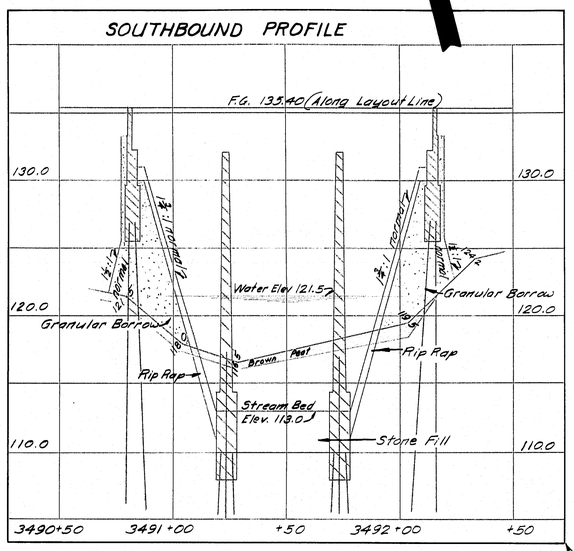
After cutting and grinding

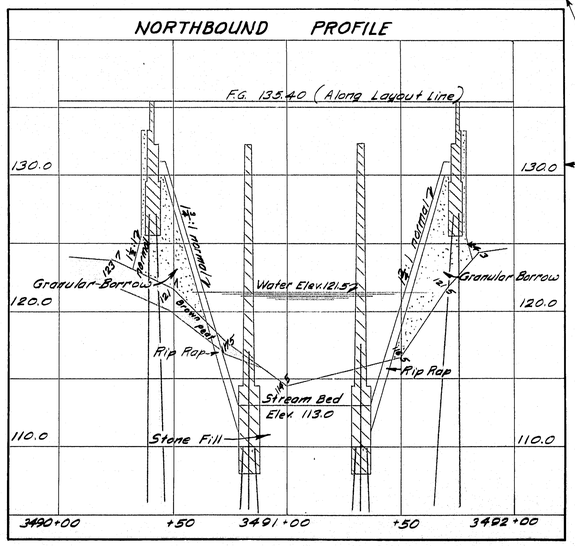
After break

APPENDIX D

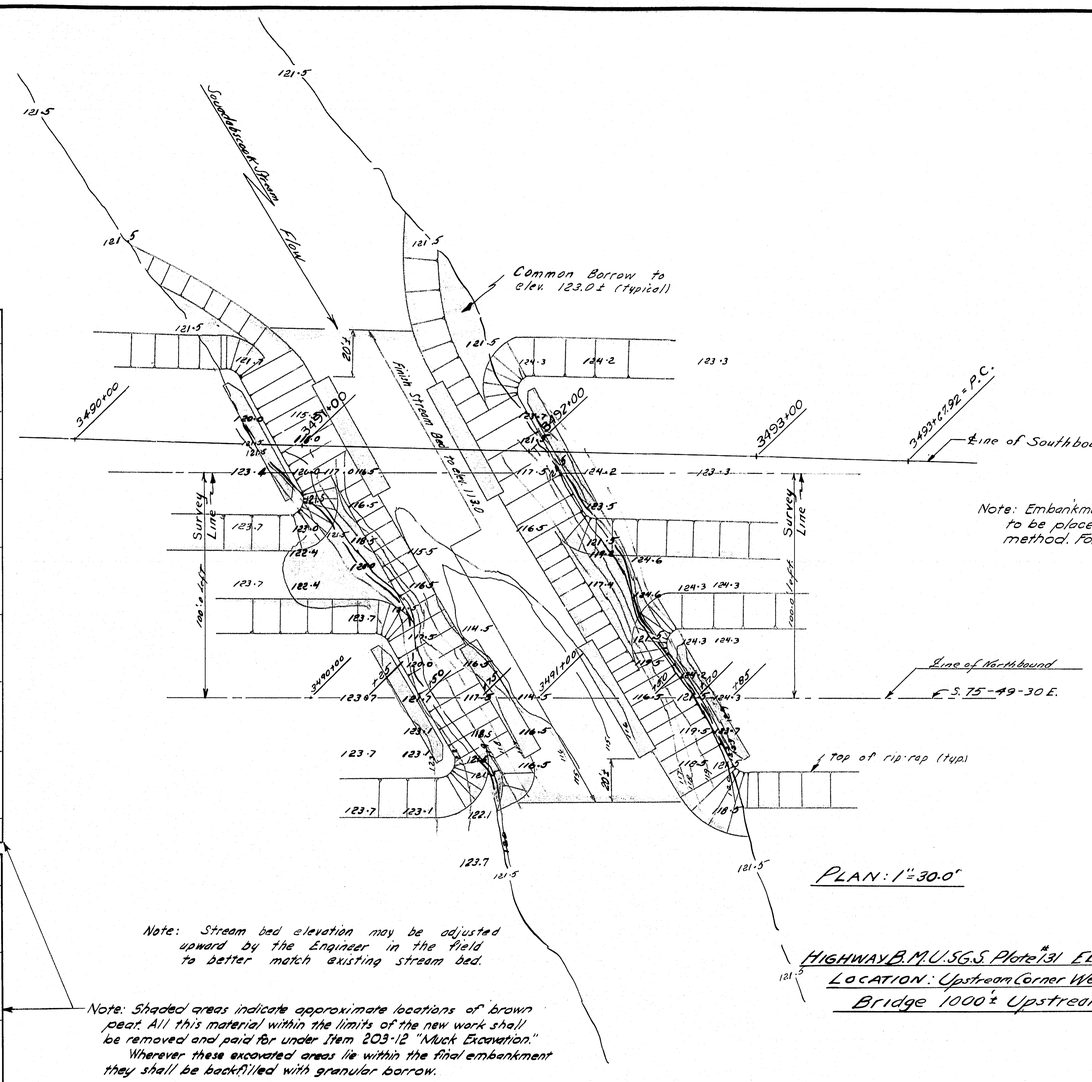
Historic Drawings

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	F.A.P. 2-95-7(14)	8	14





Scales : Horizontal 1"=30', Vertical 1"=5'



Note: Embankment adjacent to abutments to be placed by the controlled density method. For limits see Highway Plans.

PLAN: 1"=30.0'

HIGHWAY B.M. U.S.G.S. Plate #131 El. 131.49.
LOCATION: Upstream Corner West Abutment.
Bridge 1000'± Upstream.

Note: Stream bed elevation may be adjusted upward by the Engineer in the field to better match existing stream bed.

Note: Shaded areas indicate approximate locations of brown peat. All this material within the limits of the new work shall be removed and paid for under Item 203-12 "Muck Excavation." Wherever these excavated areas lie within the final embankment they shall be backfilled with granular borrow.

Excavation above El. 110.00 to be paid for under Item 204-16 "Structural Earth Excavation - Channel," except "Muck Excavation." Excavation below El. 110.00 to be paid for under Item 204-14 "Structural Earth Excavation, Piers."

NOTES

Flat bog with meandering stream. Extreme high water El. 130.5 in 1936 and 1953
Low water El. 120.0±

Note: See Sh. 6. for "Estimated Quantities"

Work this sheet with sheet #6.

DESIGN –
TRACE – J.H.B.
CHECK – H.L.D.
BRIDGE NO.
SURVEY – R.T.Clarke
PLOT – D.H.B.

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY
SURVEY

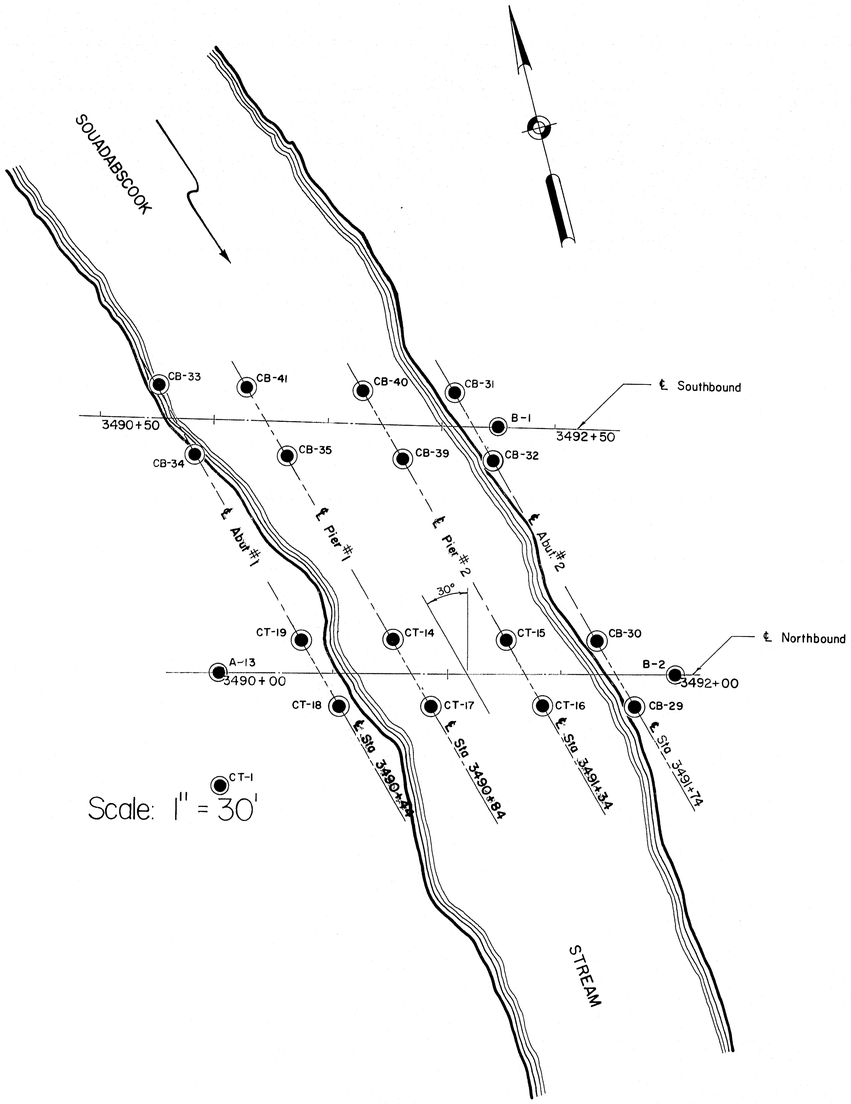
SHEET 1 OF 14 AUGUSTA, MAINE MARCH 19

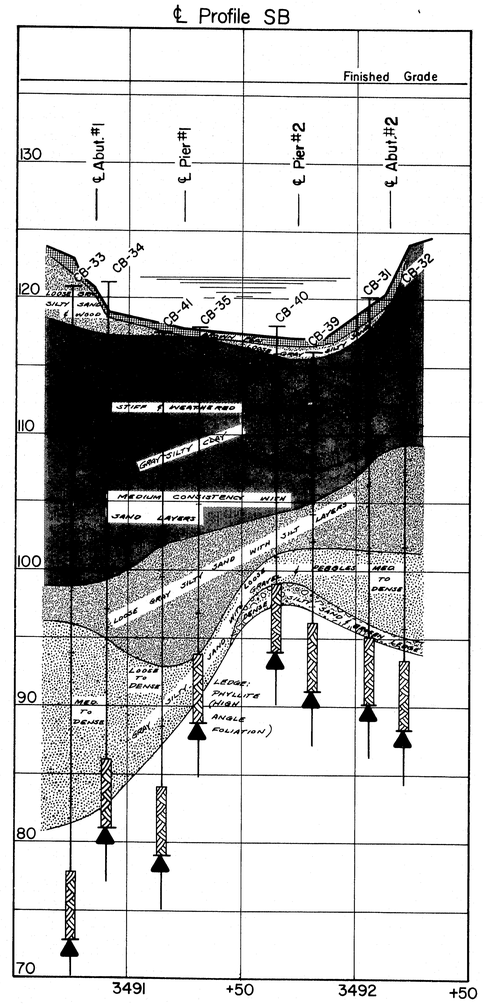
M-1500

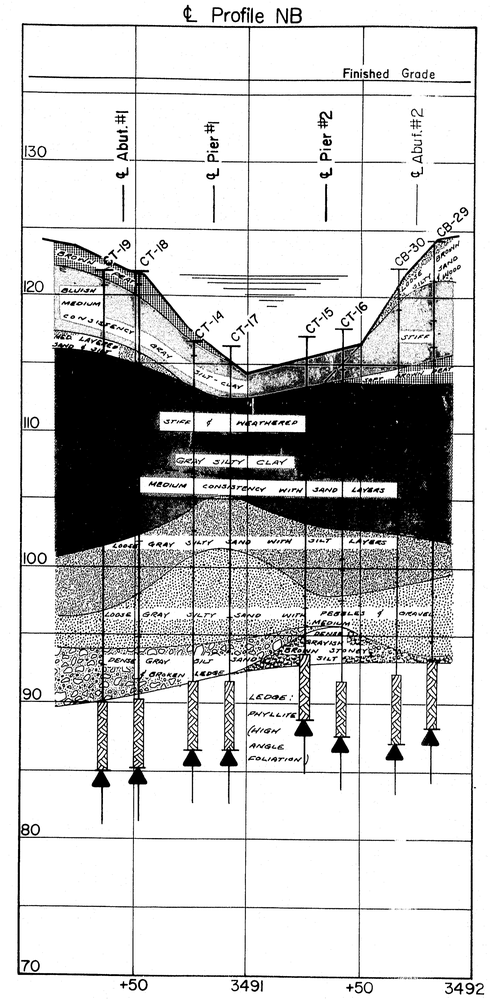
C. H. CO., NO. 379 24088

0 1 2 3 4 5 INCHES

B. P. R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	I-95-7(14)	9	145







NOTE: Borings CT-15 and CT-16, Pier No. 2. Northbound indicate some artesian flow.

Profile Scale
Horiz. 1" = 30'
Vert. 1" = 5'

DESIGN— TRACE— CHECK— } - Soils Division
BRIDGE NO. SURVEY— F. Boyce PLOT—

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

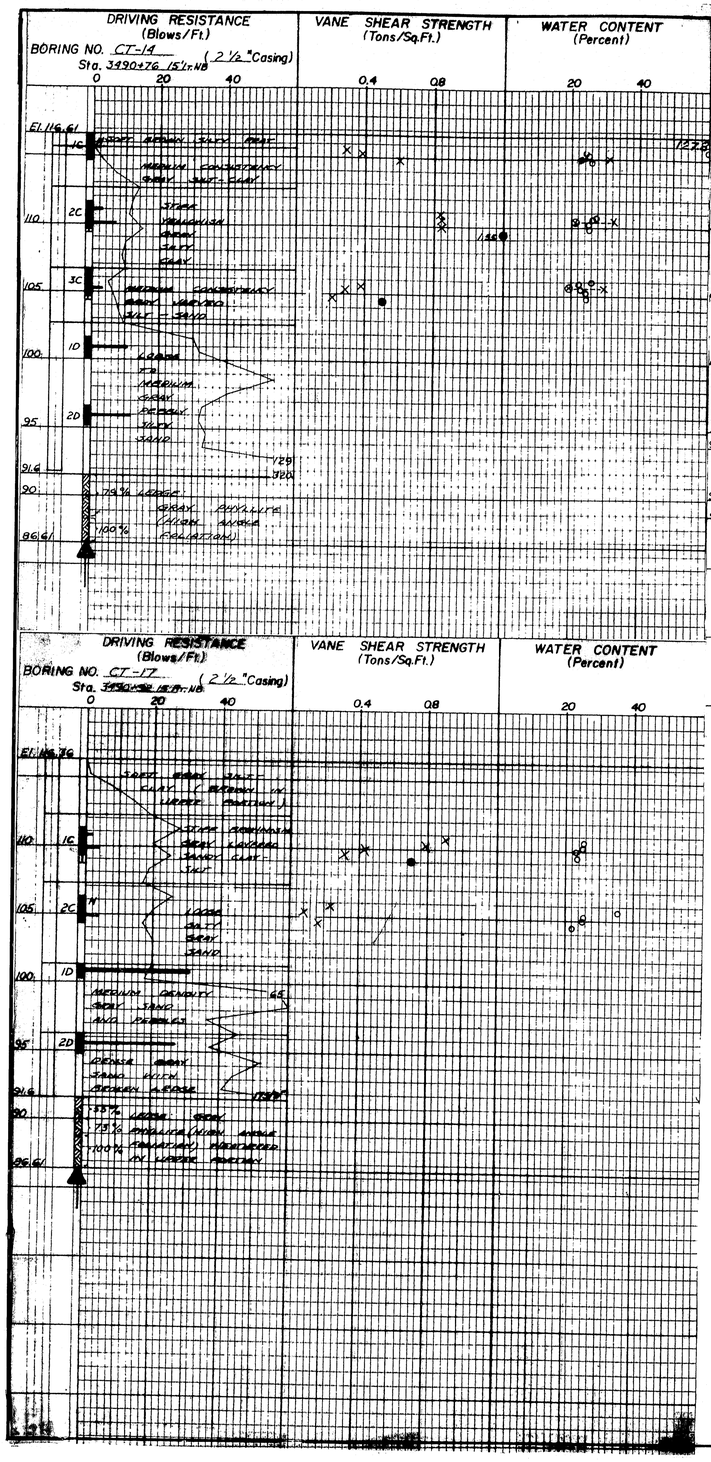
SOUADABSCOOK STREAM BRIDGE
WEST
IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY
FOUNDATION SURVEY
SHEET 2 OF 14 AUGUSTA, MAINE

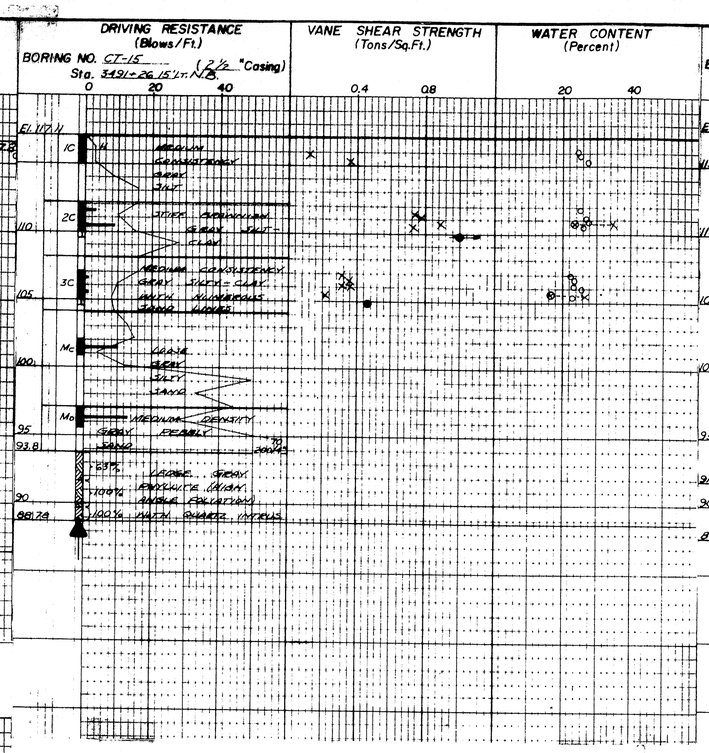
M-1501

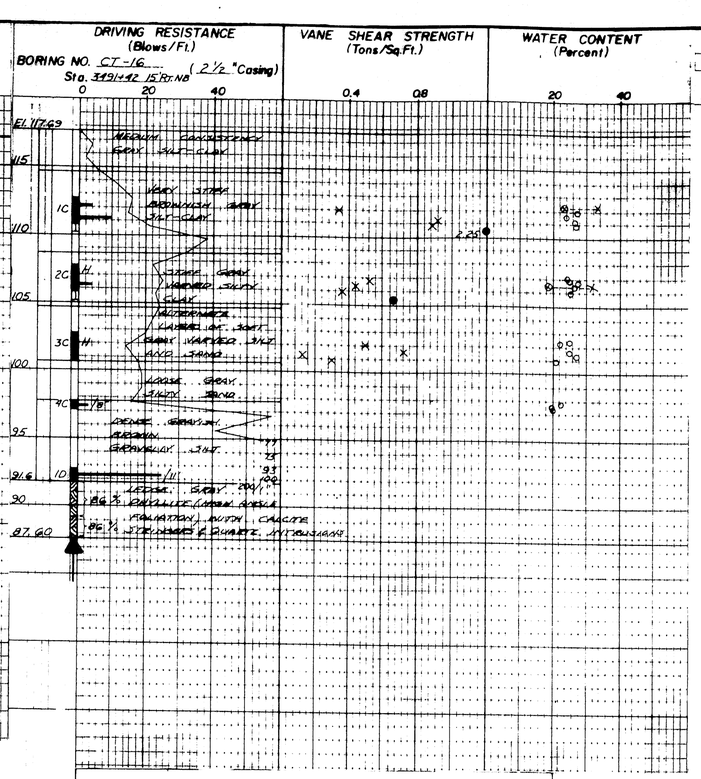
K+E 188 IMPERIAL TRACING CLOTH 5, N. B. L. M. INC. 67871

0 1 2 3 4 5 INCHES

B.P.R. REG. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
	MAINE	I-95-7(14)	10	145







SHEAR AND WATER CONTENT NOTES

Shear Notes:

1. Field vane shear strengths indicated thus: ●
2. Laboratory vane shear strengths indicated thus: x
3. Pocket penetrometer unconfined compressive strengths indicated thus: ○
4. Strengths beyond range of plot indicated at right edge of plot by numerical values and symbols thus: 162●
5. Field vane shear strengths in excess of capacity of equipment indicated thus: —●—
6. Laboratory vane shear strengths in excess of capacity of equipment indicated thus: —x—
7. Field vane shear strengths in excess of capacity of equipment and beyond range of plot indicated at right edge of plot thus: 150(+)●
8. Laboratory vane shear strength in excess of capacity of equipment (1.0 tsf) and beyond range of plot indicated at right edge of plot thus: 100(+)x

Water Content Notes:

1. Natural water contents, given as percent of dry weight, are indicated thus: ○
2. Plastic and liquid limits are indicated thus: ⊗ — — — x
3. Ignition losses are given as percent of dry weight.

DESIGN TRACE & DETAIL CHECK - Soils Division

BRIDGE NO. SURVEY & PLOT - F. Boyce

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

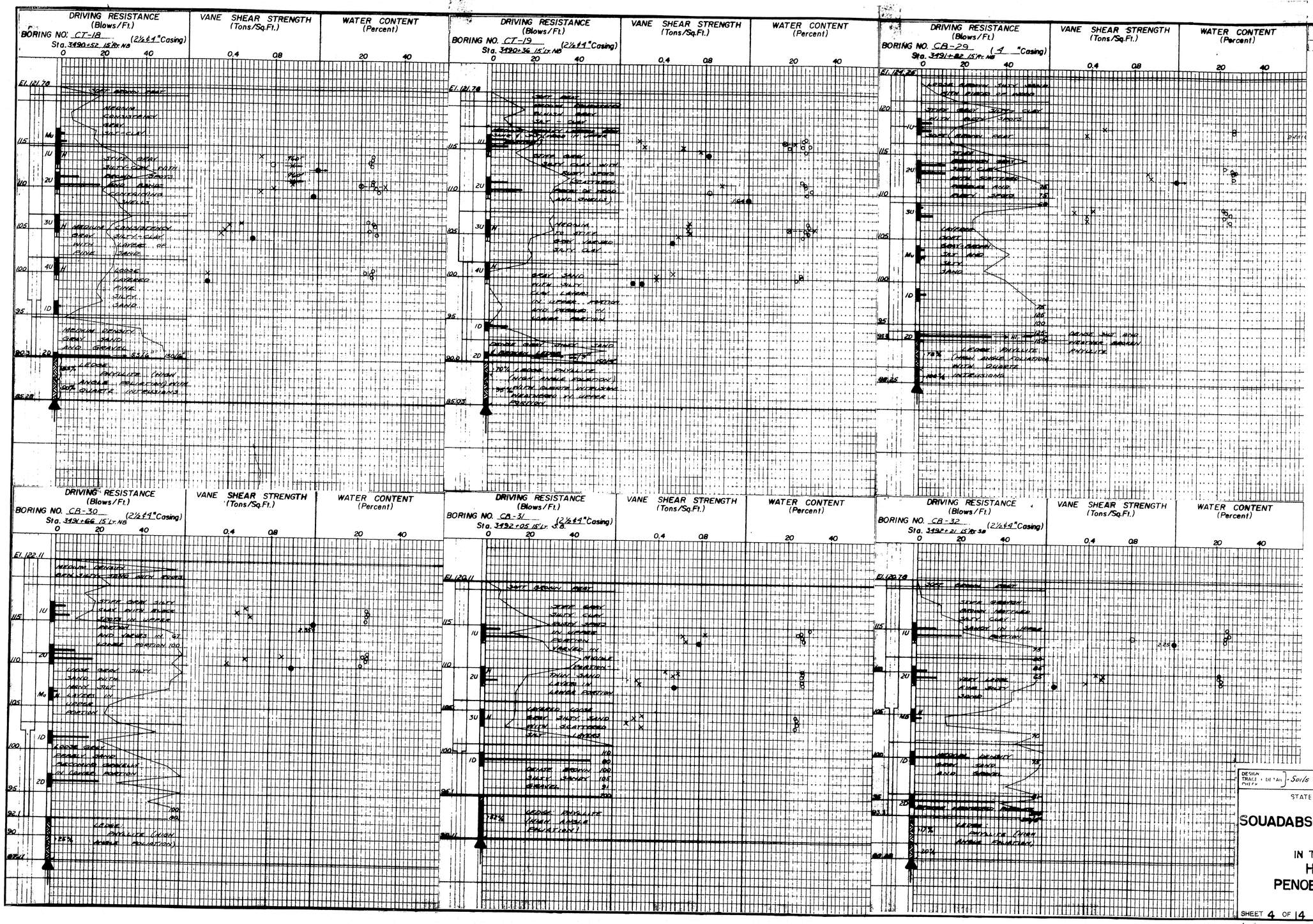
BORING DETAILS

SHEET 3 OF 14 AUGUSTA, MAINE

M-15

0 1 2 3 4 5 INCHES

F.P.# REG. NO	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE	I-95-7(14)	11	145



DESIGN TRACE + DETAIL CHECK - Soils Division | BRIDGE NO SURVEY PLOT F. B.

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRID WEST

IN THE TOWN OF

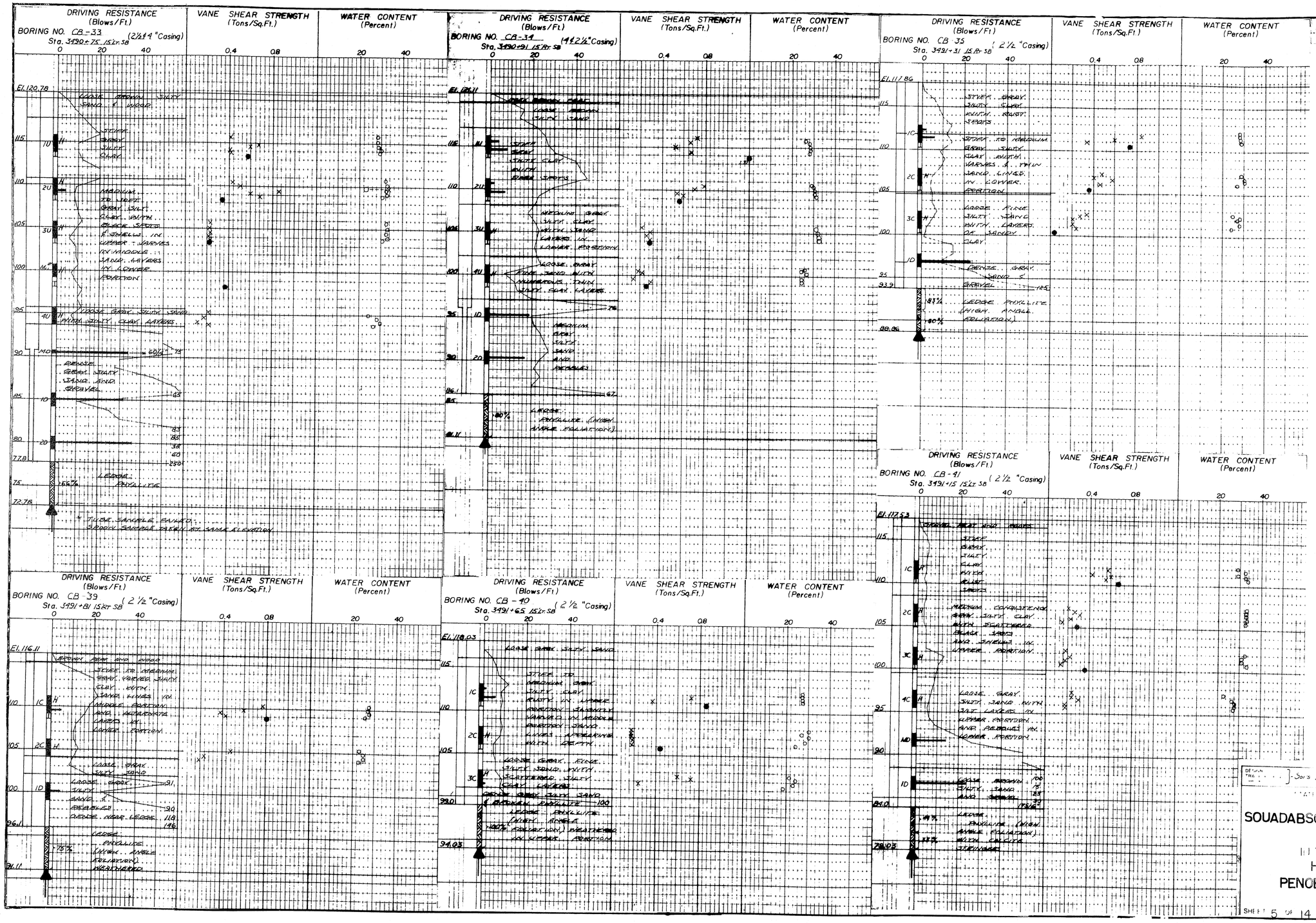
HAMPDEN

PENOBSCOT COUNTY

BORING DETAILS

SHEET 4 OF 14 AUGUSTA, MAINE

0 1 2 3 4 5 INCHES

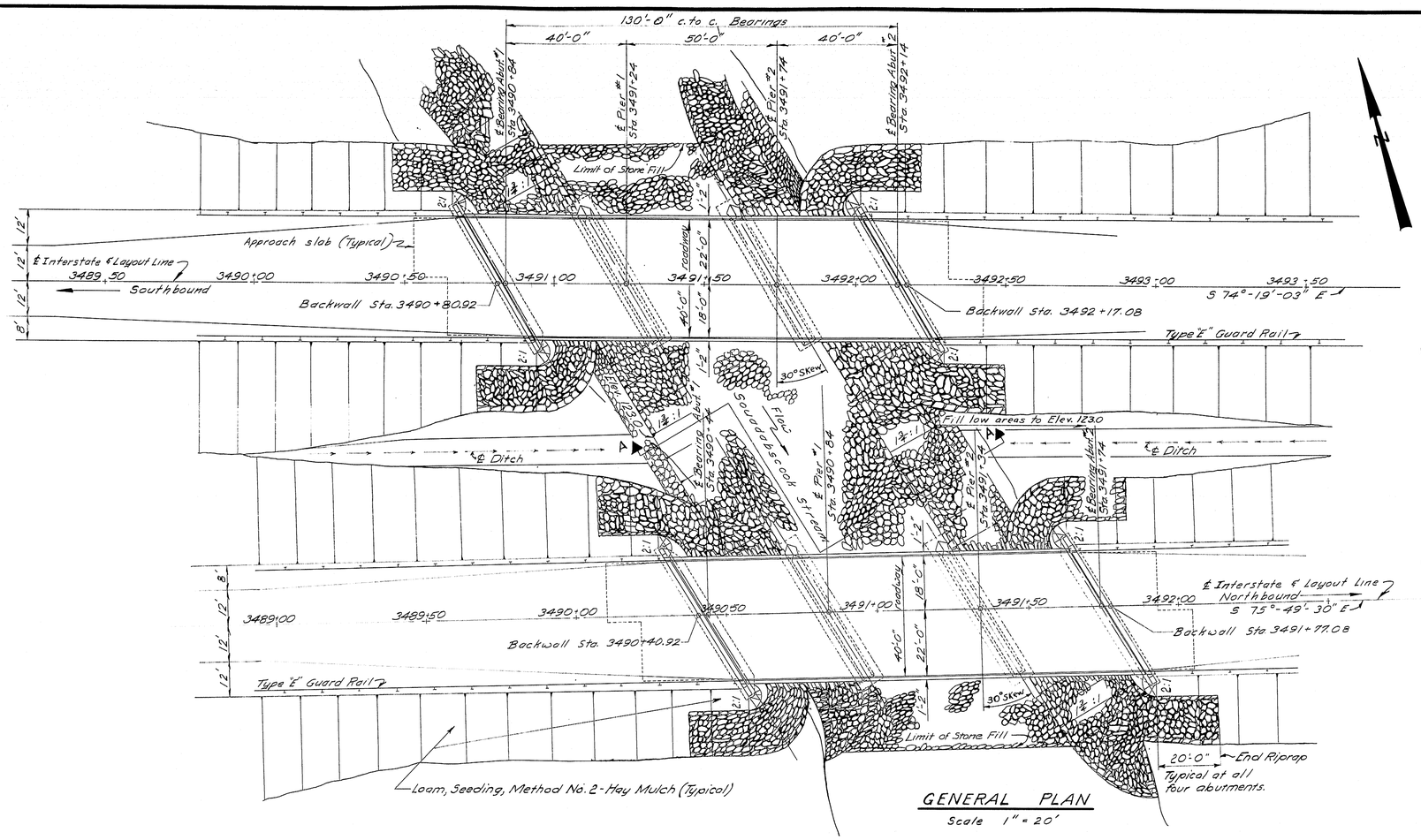


PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
95-7(14)	12	14

STATE HIGHWAY COMMISSION
DIVISION OF DESIGN

SOUADABSCOOK STREAM REST
IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY
BORING DETAILS

SHEET 5 OF 14 AUGUSTA, MAINE



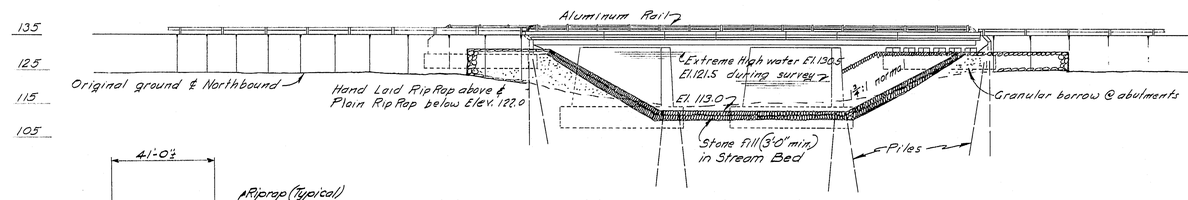
GENERAL PLAN

Scale 1" = 20'

ESTIMATED QUANTITIES

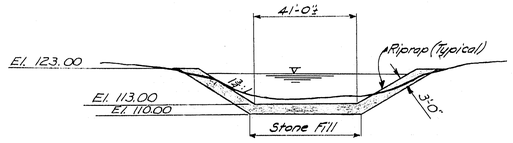
Muck Excavation	850	c.y.
Structural Earth Excavation, Piers	200	c.y.
Structural Earth Excavation, Channel	3,000	c.y.
Common Borrow	100	c.y.
Granular Borrow	3,450	c.y.
Gravel Base Course In Place Measurement	130	c.y.
► Bituminous Concrete Surface Course, Type "A"	130	Tons
Portland Cement Concrete, Abutments and Retaining Walls	295	c.y.
Portland Cement Concrete, Piers	480	c.y.
Portland Cement Concrete, Piers (Placed under water)	460	c.y.
Portland Cement Concrete, Roadway and Sidewalk Slabs on Steel Bridges	380	c.y.
Portland Cement	2,390	bbls.
Structural Steel, Fabricated and Delivered	236,000	lbs.
Structural Steel, Erection	236,000	lbs.
Structural Steel, Field Painting	236,000	lbs.
Bronze or Copper-Alloy Bearing and Expansion Plates, Delivered	410	lbs.
Bronze or Copper-Alloy Bearing and Expansion Plates, Placing	410	lbs.
Reinforcing Steel, Delivered	124,500	lbs.
Reinforcing Steel, Placing	124,500	lbs.
Steel H-Beam Piles, 42 lbs/ft.	5,033	l.f.
Cofferdams for Piers, Souadabscook Stream Bridge, West	Lump Sum	
Aluminum Rail	525	l.f.
► Membrane Waterproofing	1,180	s.y.
Plain Riprap	1,500	c.y.
Hand Laid Riprap	1,400	c.y.
Stone Fill	1,100	c.y.

► Not part of this Contract



ELEVATION NORTHBOUND LANE

Scale 1" = 20'



SECTION A-A

CONTRACT SPECIFICATIONS

State of Maine, State Highway Commission Standard Specifications, Revision of January 1956.

DESIGN SPECIFICATIONS

A.A.S.H.O. Standard Specifications for Highway Bridges 1957 and Subsequent Revision.

LOADING

H20-S16-44 as Modified for Interstate Highway.

TRAFFIC

A.D.T. 1960 7390
A.D.T. 1980 10310
D.H.V. 1235
D. 60
T. 11
V. 60

CONCRETE CLASSIFICATION

Class "A" - Abutments, Approach Slabs, & Superstructure.
Class "B" - Pier Shafts.
Class "S" - Pier Footings.

fs = 18000 p.s.i. Str. Steel
fs = 20000 p.s.i. Rein. Steel
fc = 1200 p.s.i.
n = 10

PLAN : GOPULEY
TRACE : RJ.P.
CHECK : P.M.W.

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF

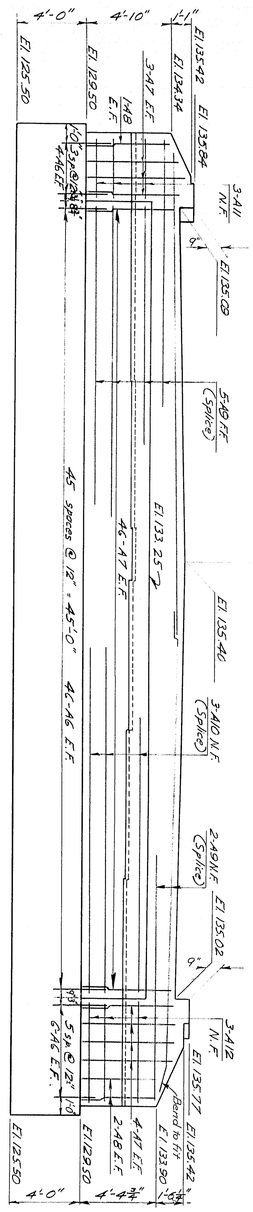
HAMPDEN
PENOBSCOT COUNTY

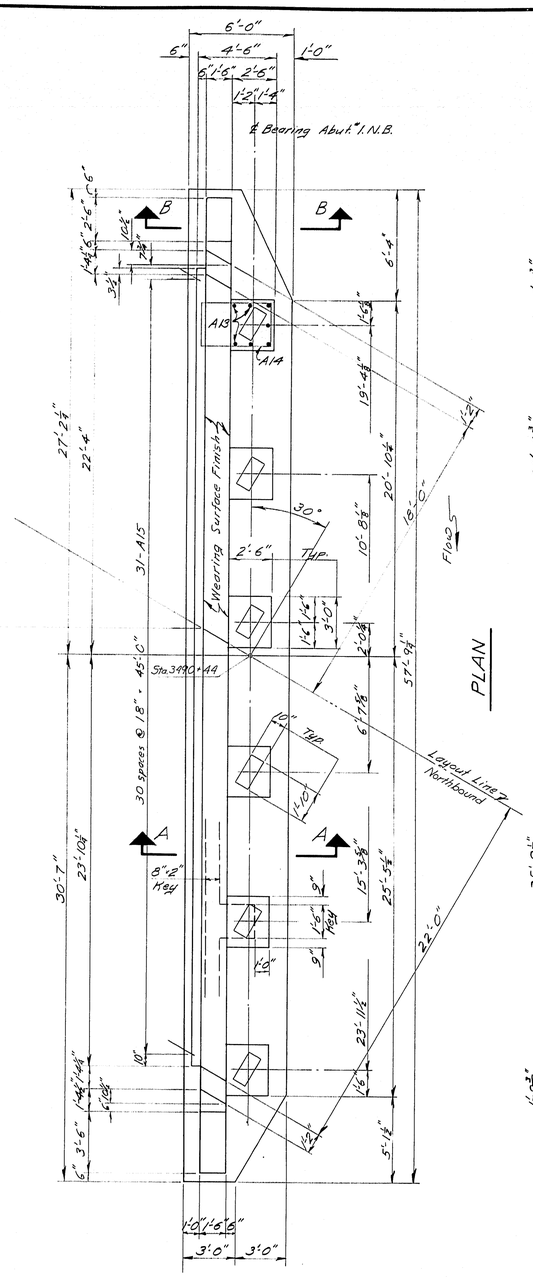
GENERAL PLAN

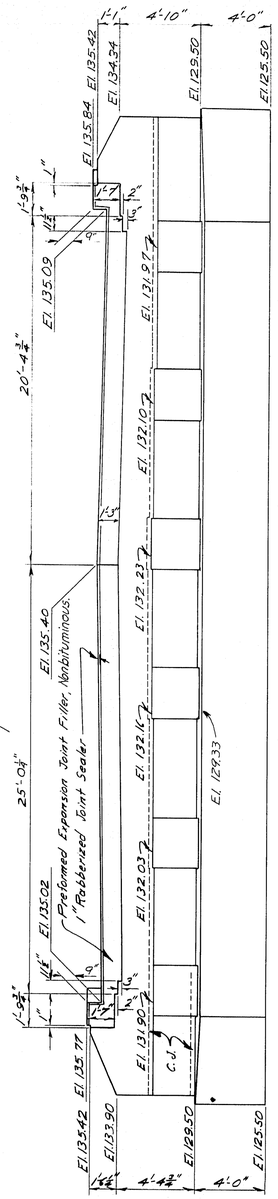
SHEET 6 OF 14 AUGUSTA, MAINE JULY 1961

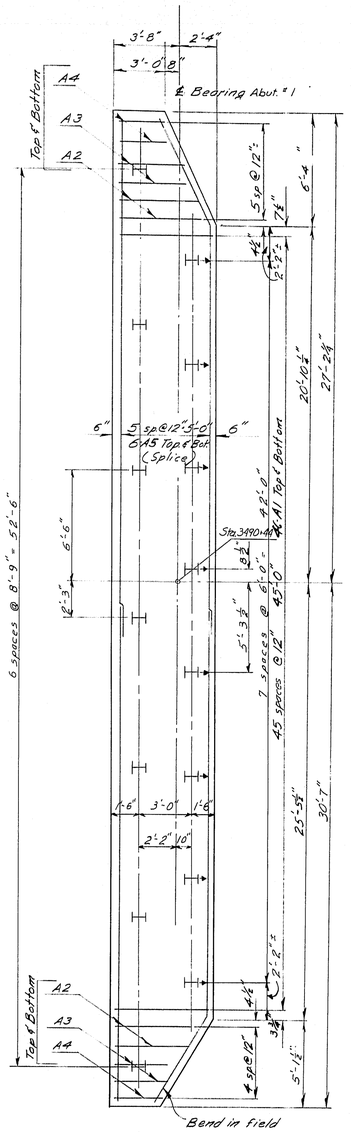
M-1505

0 1 2 3 4 5 INCHES



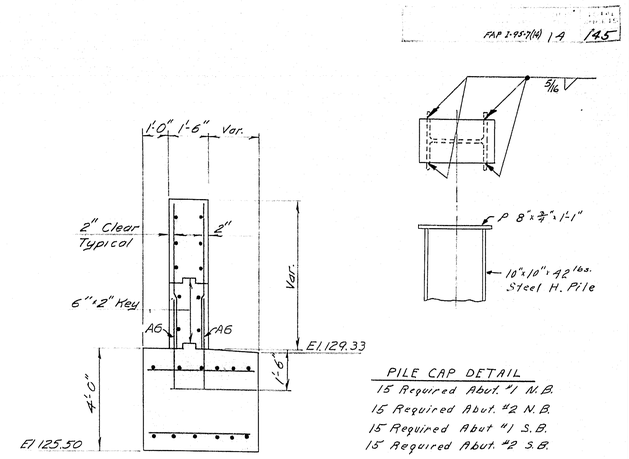






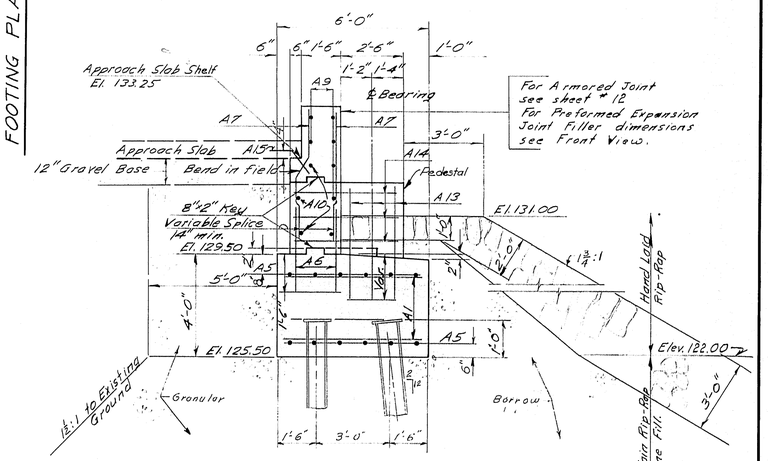
NOTES: 10"x10"x42.1# Steel H Bearing piles driven to refusal or practical refusal.
15 Required Abut. #1 - Estimated Length 40'.
15 Required Abut. #2 - Estimated Length 40'.
Allowable load 37 tons/pile.
Piles shown thus ⊕ to be battered 2" in the direction of the arrow.

FOOTING PLAN



PILE CAP DETAIL
15 Required Abut. #1 N.B.
15 Required Abut. #2 N.B.
15 Required Abut. #1 S.B.
15 Required Abut. #2 S.B.

SECTION B-B



Note: Place granular borrow to elevation bottom of footing before piles are driven.
Stones not to exceed 6" diameter in area where piles are to be driven.

SECTION A-A

N.B. = Northbound
S.B. = Southbound

N.F. = Near Face
F.F. = Far Face
E.F. = Each Face

GENERAL NOTES

Concrete in backwall and bridge seat pedestals to be placed integrally.

Dress shaded bearing areas to dimensions & exact elevations shown.

All reinforcing steel to be 2" clear unless otherwise shown.

REINFORCING STEEL & SECTIONS A-A & B-B ARE TYPICAL FOR ALL FOUR ABUTMENTS.

Work this sheet with Sh. 8 of 8

DESIGN - T.H.K.
TRACE - R.G.E.
CHECK - [illegible]

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE

WEST

IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY

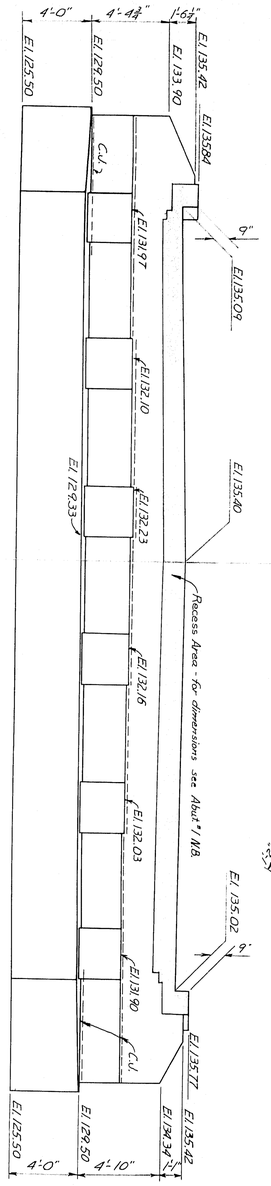
ABUT. 1 N.B.

SHEET 7 OF 14 AUGUSTA, MAINE JULY 1961

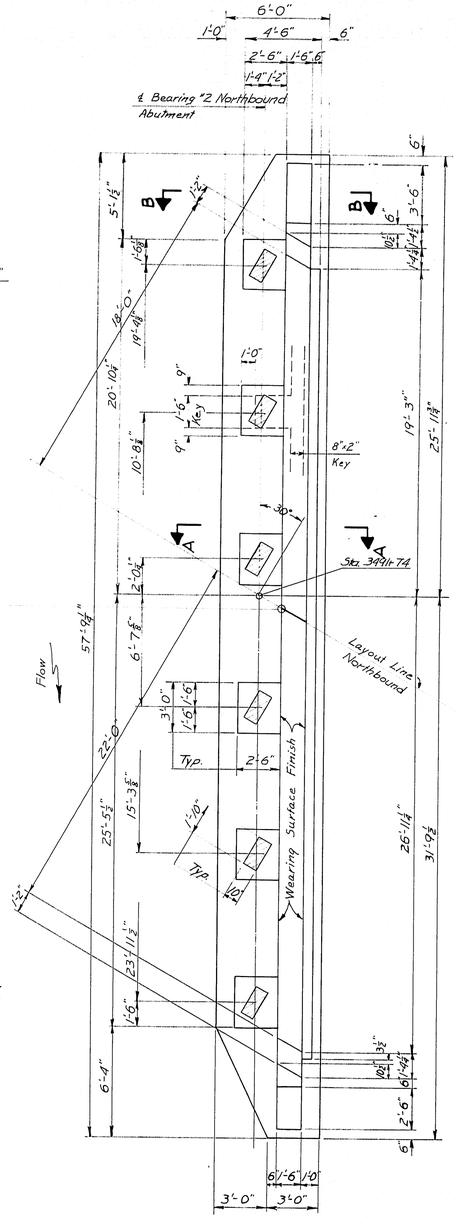
M-1506

0 1 2 3 4 5 INCHES

FAP 2-88-7(14) 1 5 145

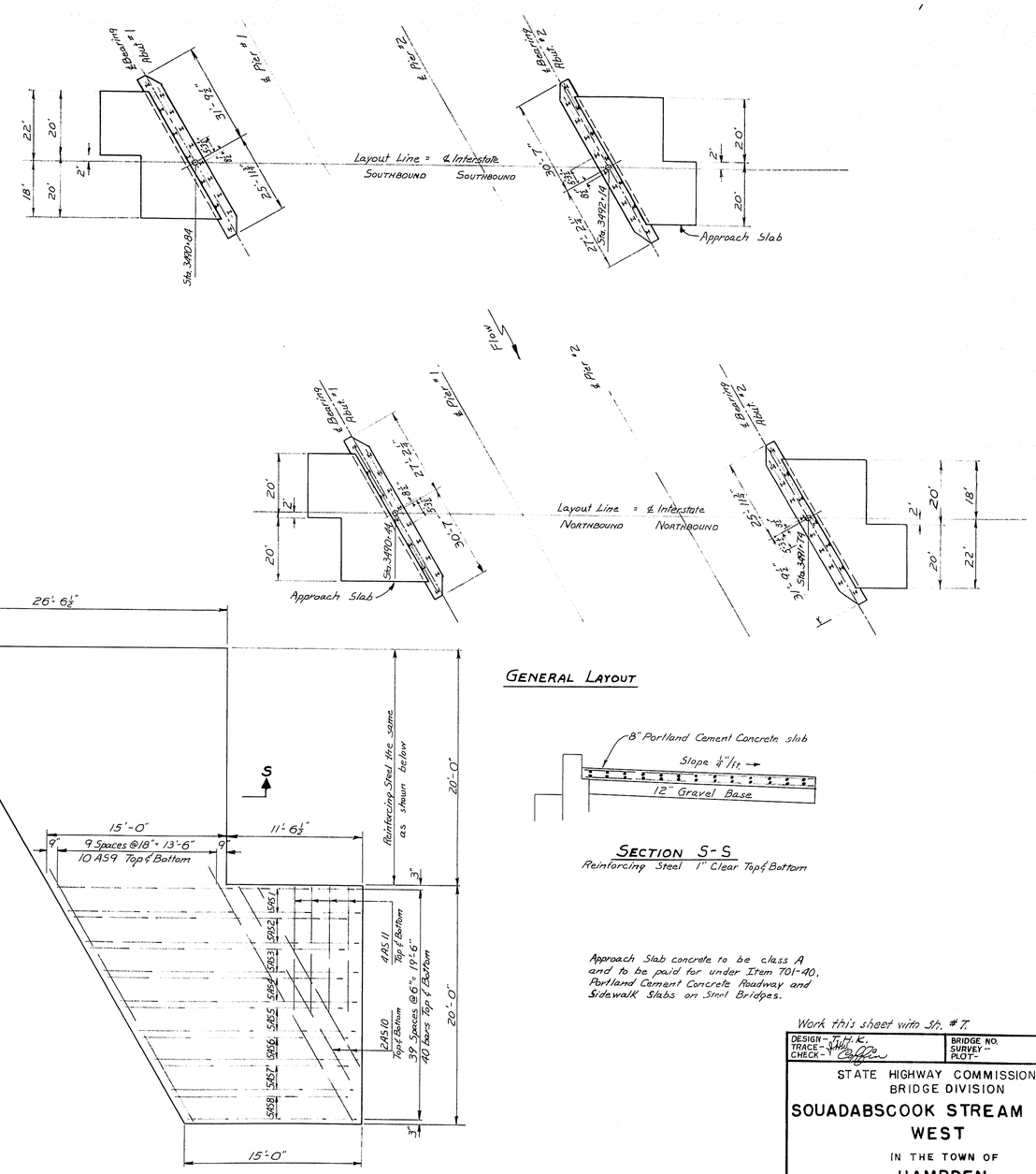


FRONT VIEW



PLAN

For footing plan, showing piles, see Abut. #1 N.B. Sh. #7.



GENERAL LAYOUT

SECTION S-S

Reinforcing Steel 1" Clear Top & Bottom

Approach Slab concrete to be class A and to be paid for under Item 701-40, Portland Cement Concrete Roadway and Sidewalk Slabs on Steel Bridges.

For Sections A-A & B-B, Reinforcing Steel & General Notes see sheet #7 Abutment #1 N.B.

APPROACH SLAB — N.B. & S.B.

For location see GENERAL LAYOUT (above)

Work this sheet with Sh. #7.

DESIGN - J.W.K. TRACE - J.W.K. CHECK -	BRIDGE NO. SURVEY - PLOT -

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF

HAMPDEN

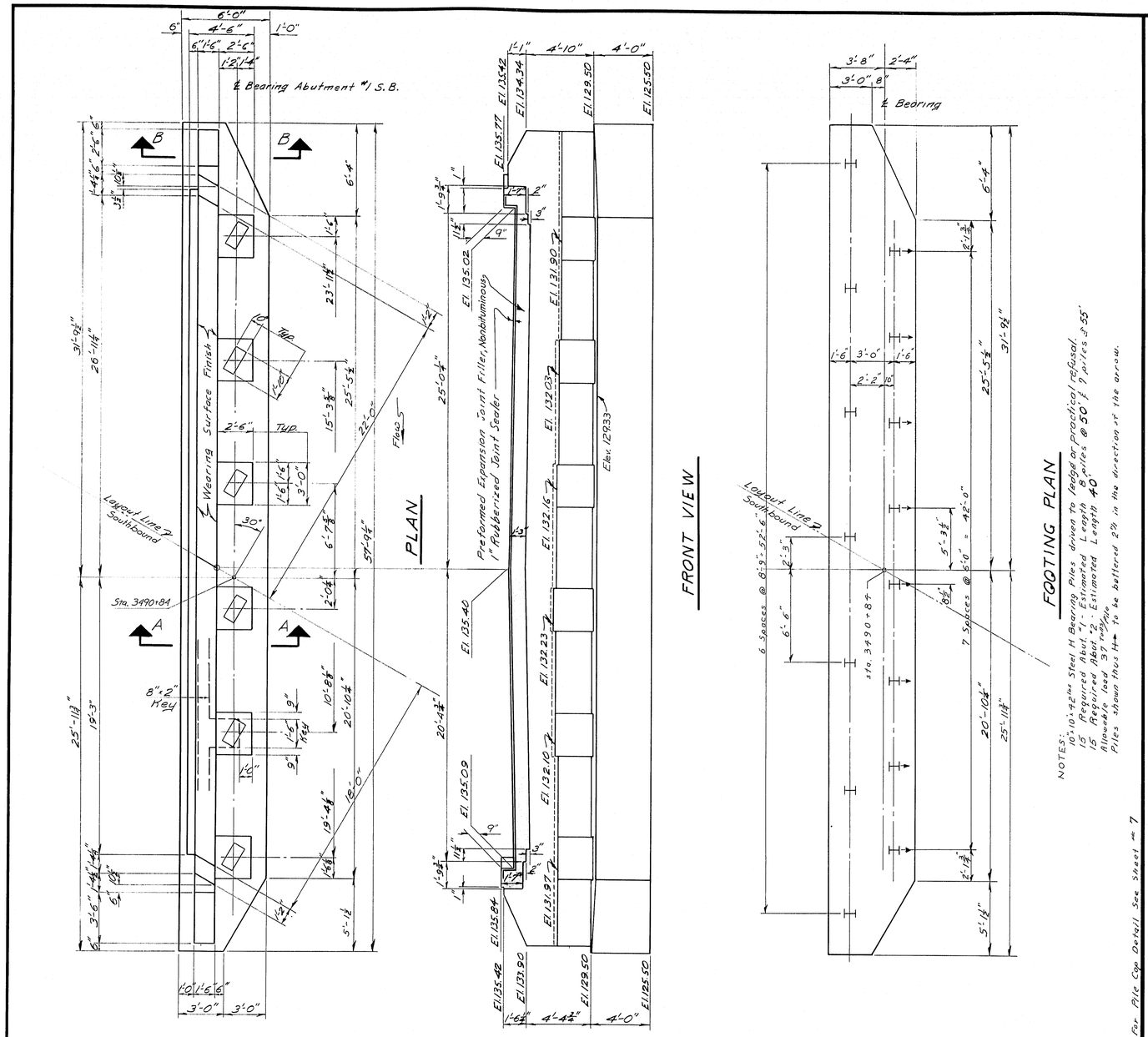
PENOBSCOT COUNTY

ABUT. 2 N.B.

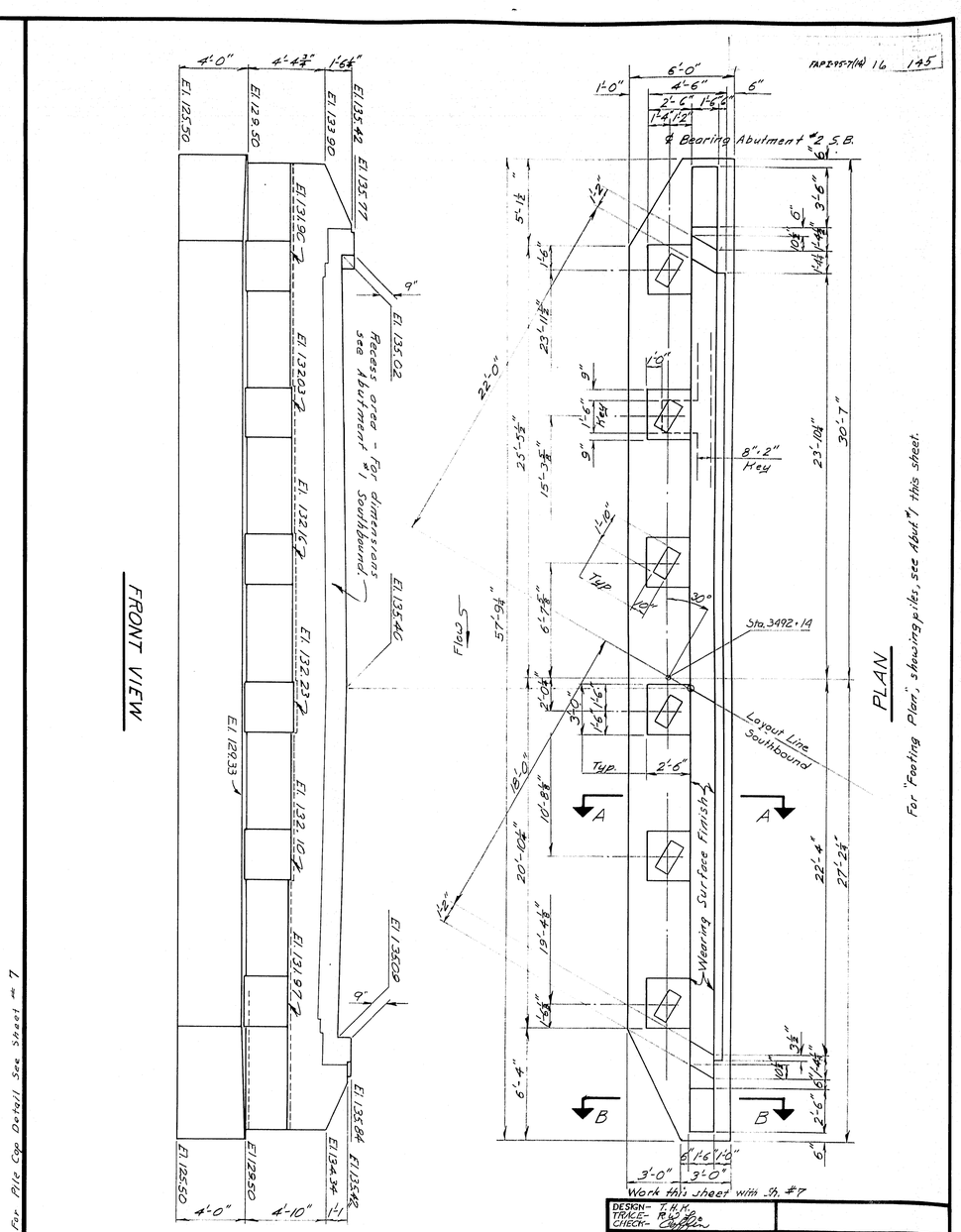
SHEET 8 OF 14 AUGUSTA, MAINE JULY 1961

M-1507

0 1 2 3 4 5 INCHES



SOUTHBOUND ABUTMENT NO. 1



SOUTHBOUND ABUTMENT NO. 2

NOTES:
For Sections A-A & B-B, Reinforcing Steel & General Notes see sheet #7, Abut. #1, N.B.

DESIGN- F.H.H.
TRACE- R.W.H.
CHECK- [illegible]

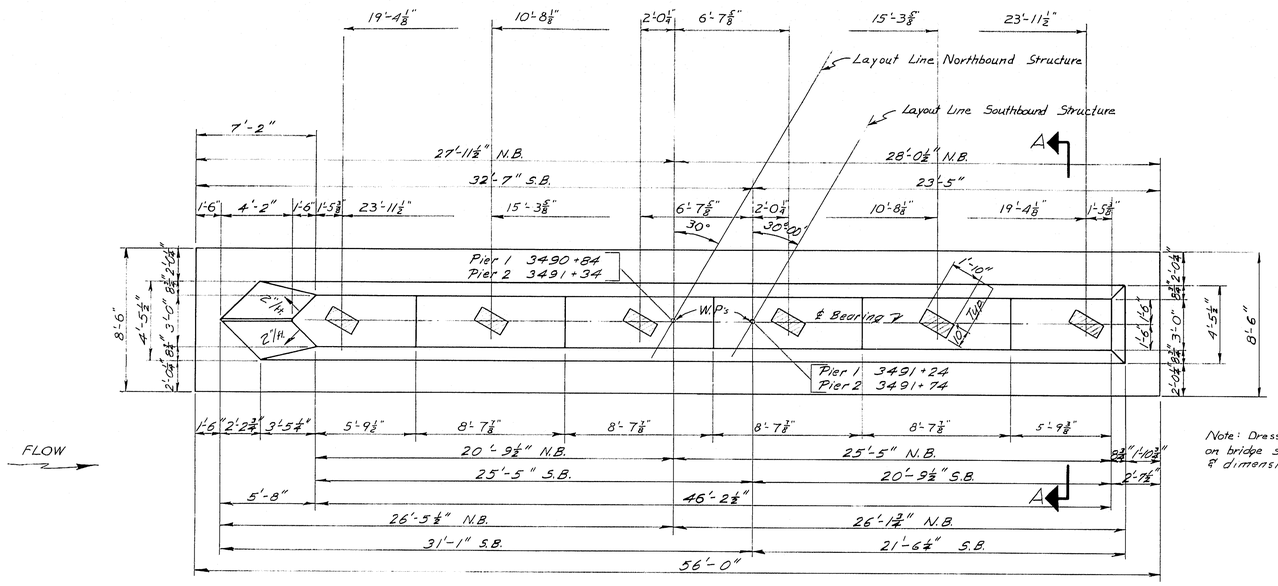
STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE
WEST
IN THE TOWN OF
HAMPDEN

PENOBSCOT COUNTY
ABUT. 1 & 2 S.B.

SHEET 9 OF 14 AUGUSTA, MAINE JULY 1961

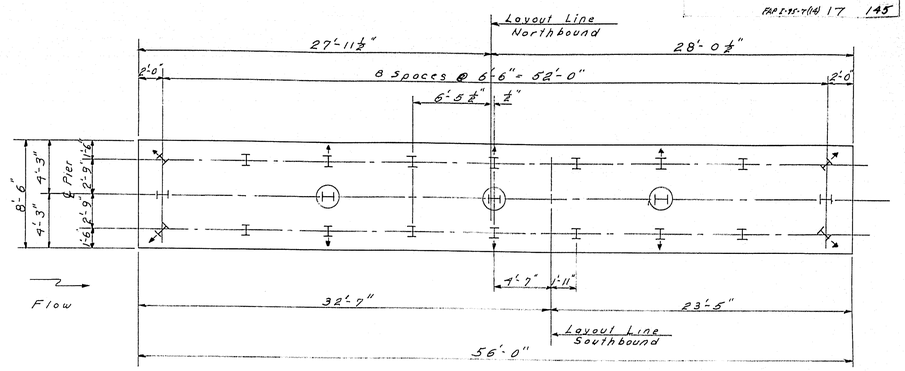
M-1508



PLAN

NOTE: Dimensions in "PLAN" are to control elevation shown in "SECTION A-A".

Note: Dress shaded bearing areas on bridge seats to exact elevations & dimensions shown.



FOOTING PLAN

NOTES: 10"·10"×42 lbs. Steel Bearing Piles driven to ledge or practical refusal.

PILES REQUIRED:

N.B. Pier #1 - 20 piles 25' long - 3 piles 30' long
Pier #2 - 20 piles 25' long - 3 piles 30' long

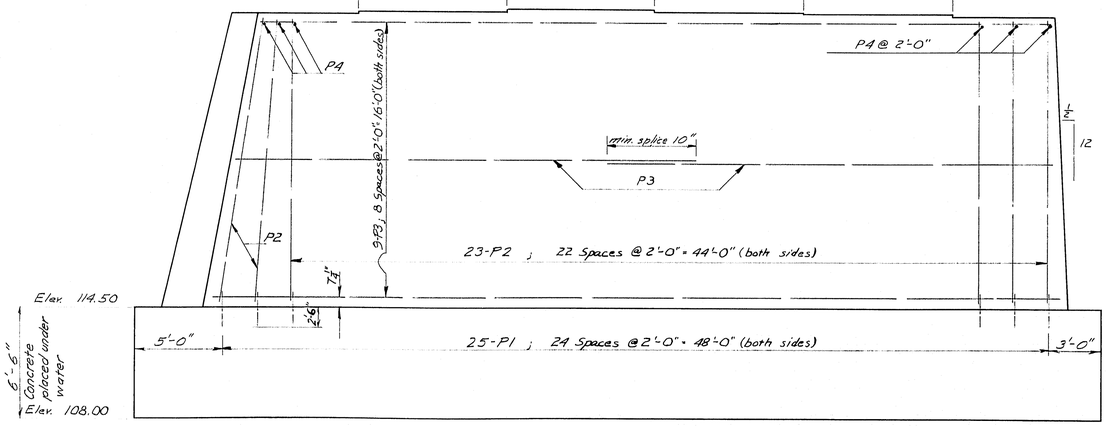
S.B. Pier #1 - 11 piles 25' long - 9 piles 30' long - 3 piles 36' long
Pier #2 - 20 piles 18' long - 3 piles 25' long

Allowable load 37 tons/pile

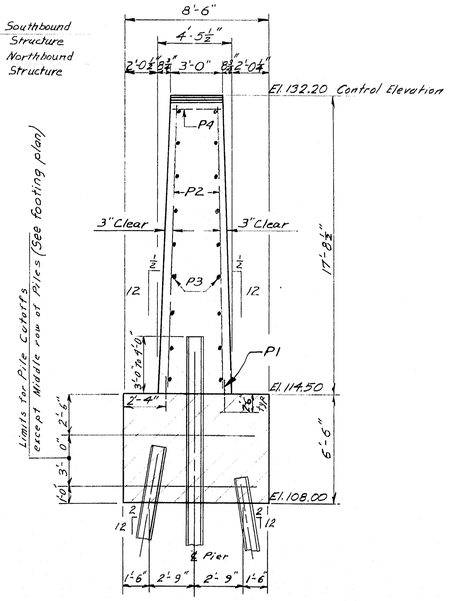
Piles shown thus H→ to be battered 2" in the direction of the arrow.

Piles shown thus (H) to extend into pier shaft as shown in Section A-A.

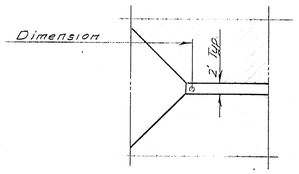
Elevation Bearing Areas							
Elev. 131.70	Elev. 131.83	Elev. 131.96	Elev. 132.03	Elev. 131.90	Elev. 131.77	Pier No. 1	Southbound Structure
Elev. 131.87	Elev. 132.00	Elev. 132.13	Elev. 132.20	Elev. 132.07	Elev. 131.94	Pier No. 2	
Elev. 131.94	Elev. 132.07	Elev. 132.20	Elev. 132.13	Elev. 132.00	Elev. 131.87	Pier No. 2	Northbound Structure
Elev. 131.77	Elev. 131.90	Elev. 132.03	Elev. 131.96	Elev. 131.83	Elev. 131.70	Pier No. 1	



ELEVATION



SECTION A-A



PIER NOSE DETAIL

N.B. = Northbound
S.B. = Southbound

DESIGN - THK UNWM TRACE - WMM CHECK -	BRIDGE NO. SURVEY - PLOT -

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE

WEST

IN THE TOWN OF

HAMPDEN

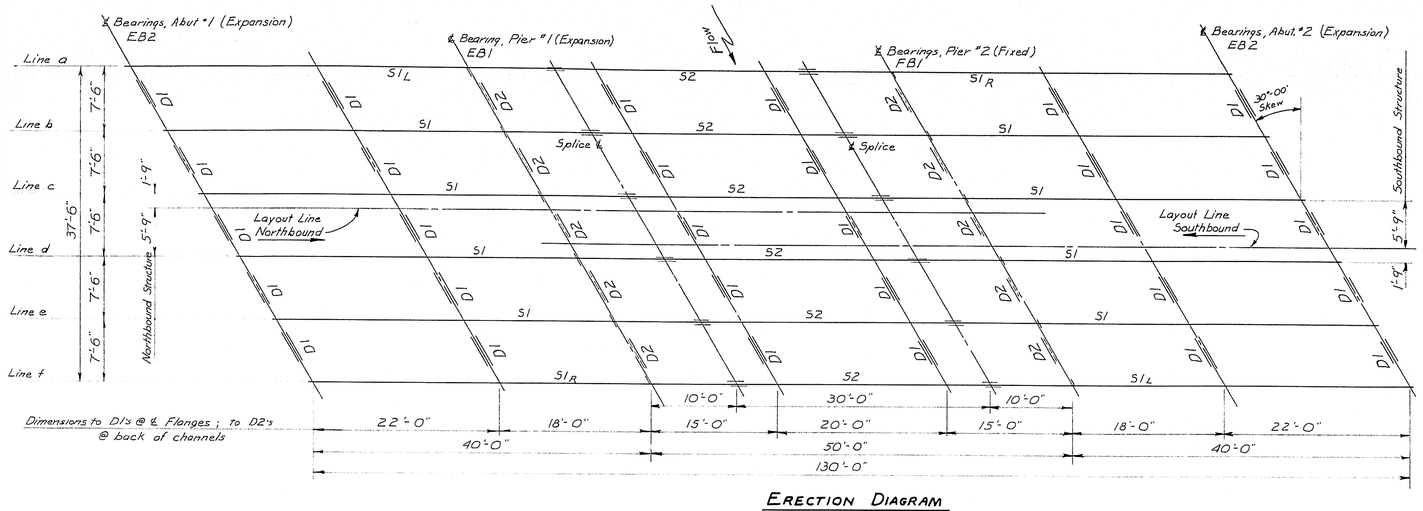
PENOBSCOT COUNTY

PIERS 1 & 2 - N.B. & S.B.

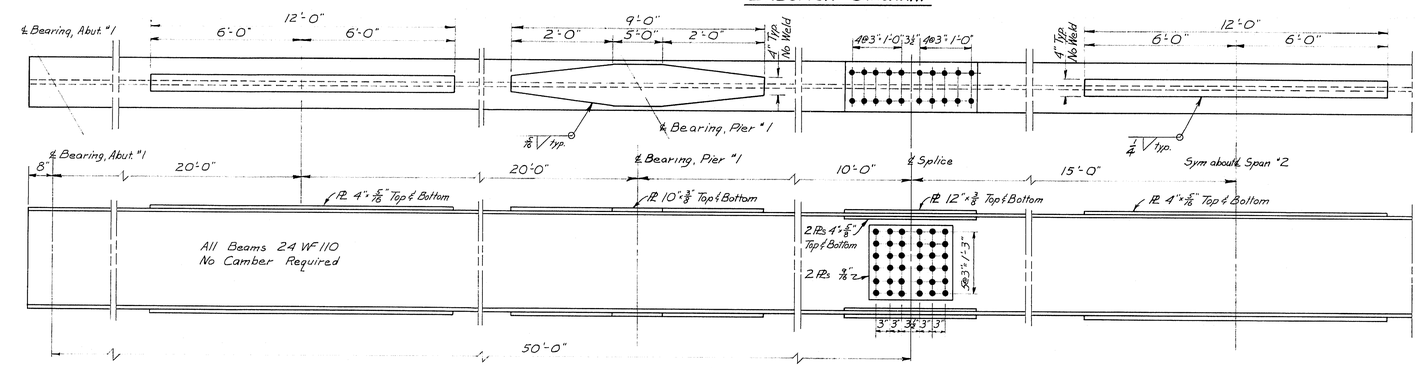
SHEET 10 OF 14 AUGUSTA, MAINE JULY 1961

M-1509

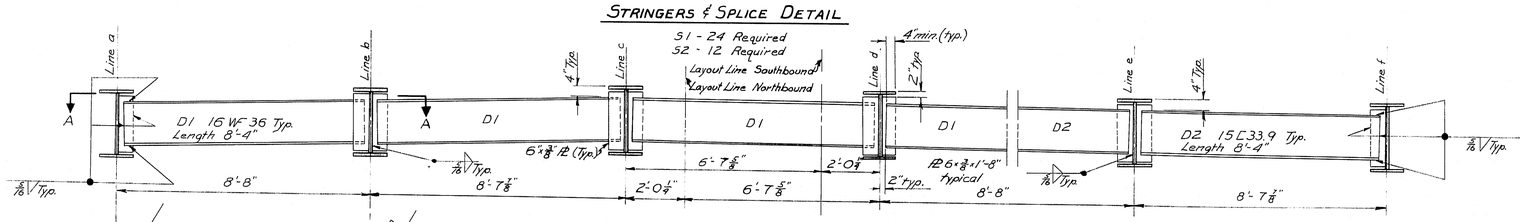
0 1 2 3 4 5 INCHES



Erection Diagram



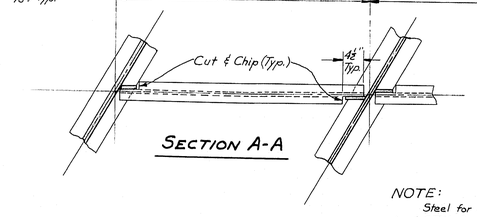
Stringers & Splice Detail



S1 - 24 Required
S2 - 12 Required

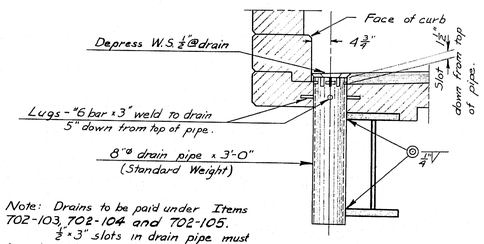
Diaphragms

D1 - 60 Required
D2 - 20 Required



Section A-A

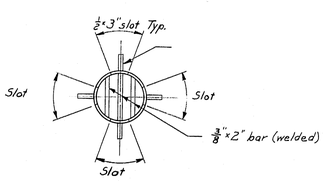
NOTE:
Steel for beams and cover plates shall conform to A.S.T.M. Designation A-373. Other steel members shall conform to A.S.T.M. Designation A-373 or A.T. Field connections shall be 3/4" rivets or 3/4" high tensile strength bolts.
No paint required where steel is in contact with concrete.



Note: Drains to be paid under Items 702-103, 702-104 and 702-105.
3/4"×3" slots in drain pipe must be cleared of concrete and membrane water proofing.

Drain Detail

24 Required



Plan View of Drain

NOTE: See Sheet No. 13. for location of drains.

Northbound Structure

Bottom of Slab Elevations

	Line a	Line b	Line c	Line d	Line e	Line f
℄ Bearings Abut.	134.40	134.53	134.66	134.59	134.46	134.33
+10	134.41	134.54	134.67	134.60	134.47	134.34
+20	134.42	134.55	134.68	134.61	134.48	134.35
+30	134.41	134.54	134.67	134.60	134.47	134.34
℄ Bear. Pier +40	134.40	134.53	134.66	134.59	134.46	134.33
+50	134.41	134.54	134.67	134.60	134.47	134.34
+60	134.42	134.55	134.68	134.61	134.48	134.35
℄ Span #2 +65	134.42	134.56	134.69	134.62	134.49	134.36

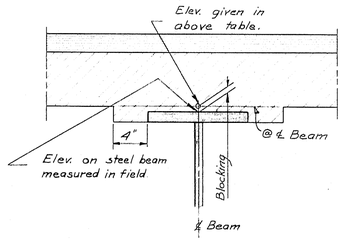
NOTE: The line designated by the letter "a" is the upstream line of stringers on both North and Southbound Structures. (See "Erection Diagram")

Southbound Structure

Bottom of Slab Elevations

	Line a	Line b	Line c	Line d	Line e	Line f
℄ Bearings Abut.	134.33	134.46	134.59	134.66	134.53	134.40
+10	134.34	134.47	134.60	134.67	134.54	134.41
+20	134.35	134.48	134.61	134.68	134.55	134.42
+30	134.34	134.47	134.60	134.67	134.54	134.41
℄ Bear. Pier +40	134.33	134.46	134.59	134.66	134.53	134.40
+50	134.34	134.47	134.60	134.67	134.54	134.41
+60	134.35	134.48	134.61	134.68	134.55	134.42
℄ Span #2 +65	134.36	134.49	134.62	134.69	134.56	134.42

NOTE: In order to compensate for the dead load deflection and any irregularities in the rolling of the steel, elevations will be taken at the above points after the erection of the steel, but before any forms have been constructed. These elevations will be subtracted from elevations given in the tables and the results will be the blocking. (See "Blocking Detail")



Blocking Detail

Blocking over ℄ Bearings for all beams is 1" to top of WF beam.

DESIGN - T.H.E. & Det. Div.
TRACE - [illegible]
CHECK - [illegible]

BRIDGE NO.
SURVEY -
PLOT -

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF

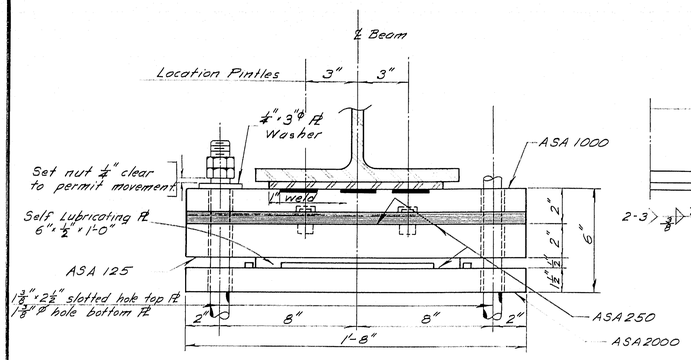
HAMPDEN
PENOBSCOT COUNTY

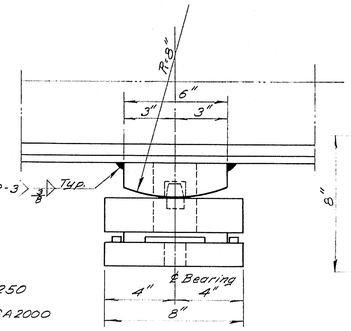
STRUCTURAL STEEL

SHEET 11 OF 14 AUGUSTA, MAINE JULY 1961

M-1510

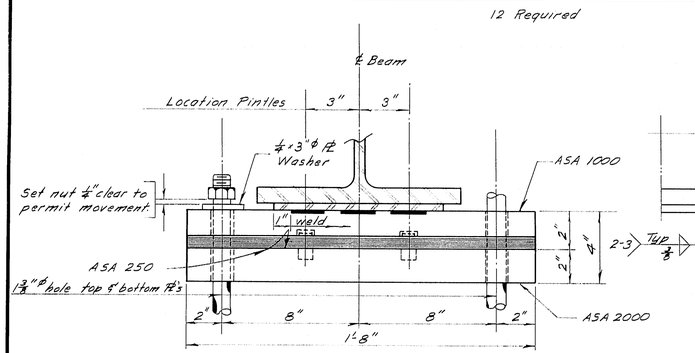
0 1 2 3 4 5 INCHES

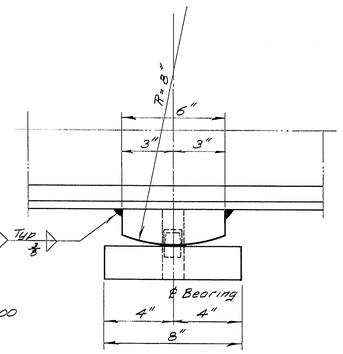




EXPANSION BEARING EB1

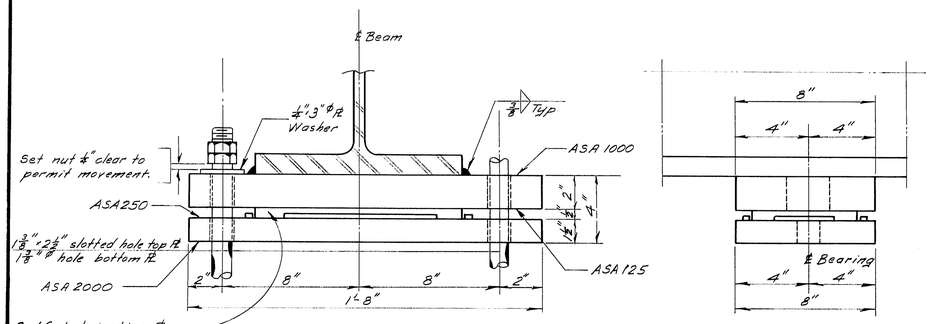
12 Required





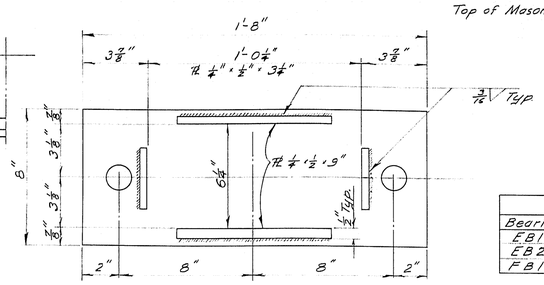
FIXED BEARING FB1

12 Required

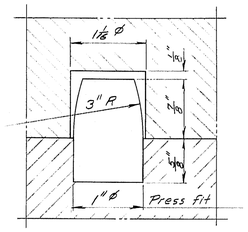


EXPANSION BEARING EB2

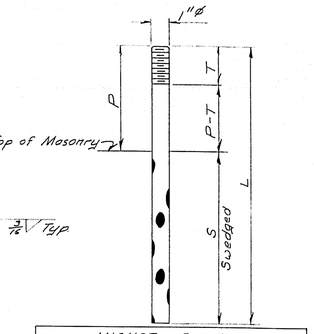
24 Required



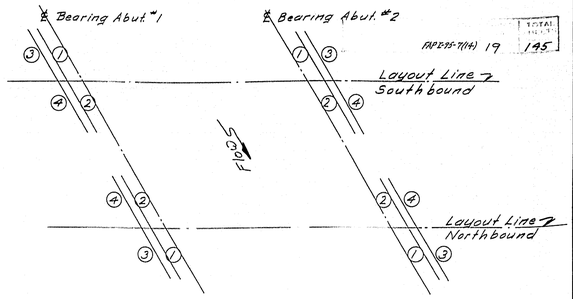
MASONRY PLATE FOR EB1 & EB2



PINTLE DETAIL

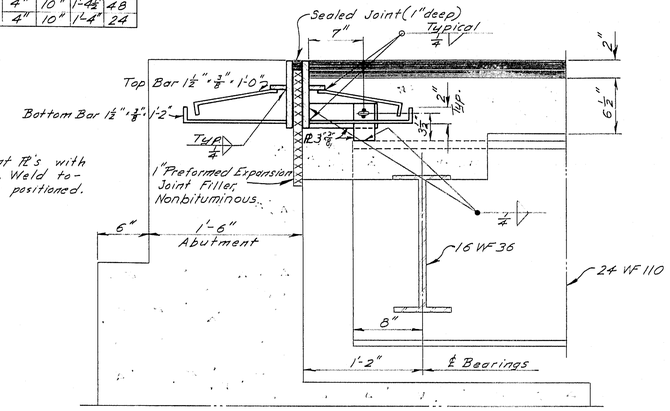


ANCHOR BOLTS						
Bearing	P	T	P-T	S	L	Reqd
EB1	8¾"	2½"	6"	10"	1'-6¾"	24
EB2	6¾"	2½"	4"	10"	1'-4¾"	48
FB1	6"	2"	4"	10"	1'-4"	24

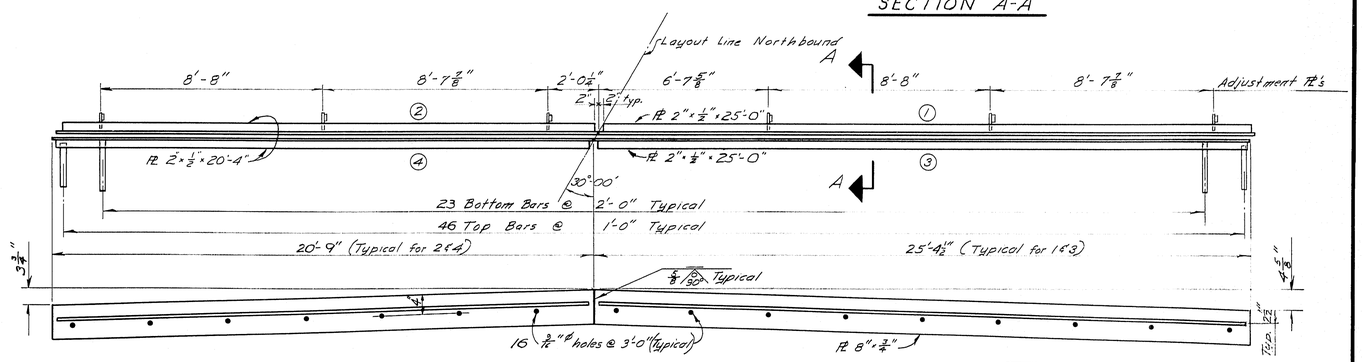


LOCATION OF ARMORED JOINTS

Note: ⅜" adjustment Pl's with ⅜"×2" slotted holes. Weld together when joint is positioned.



SECTION A-A



Note: For Southbound Layout see "Location of Armored Joints."

ARMORED JOINT

DESIGN - PMW & MNF
TRACE - RLS
CHECK - [illegible]

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

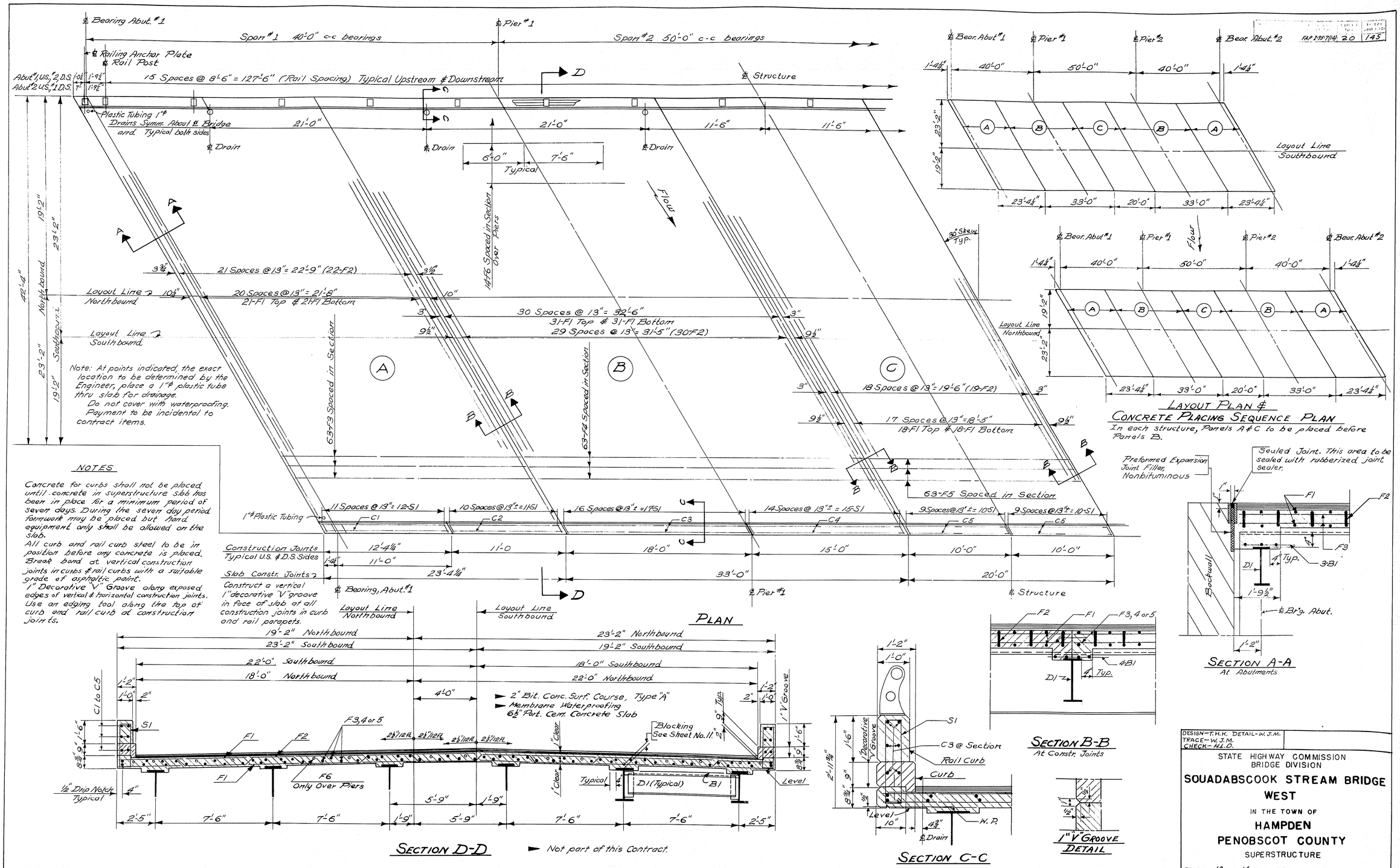
SOUADABSCOOK STREAM BRIDGE
WEST

IN THE TOWN OF
HAMPDEN
PENOBSCOT COUNTY

STRUCTURAL STEEL

SHEET 12 OF 14 AUGUSTA, MAINE JULY 1961

M-151.1



NOTES

Concrete for curbs shall not be placed until concrete in superstructure slab has been in place for a minimum period of seven days. During the seven day period formwork may be placed but hand equipment only shall be allowed on the slab.

All curb and rail curb steel to be in position before any concrete is placed.

Break bond at vertical construction joints in curbs & rail curbs with a suitable grade of asphaltic paint.

1" Decorative "V" Groove along exposed edges of vertical & horizontal construction joints. Use an edging tool along the top of curb and rail curb at construction joints.

DESIGN-T.H.K. DETAIL-W.J.M. TRACE-W.J.M. CHECK-A.L.C.	

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF

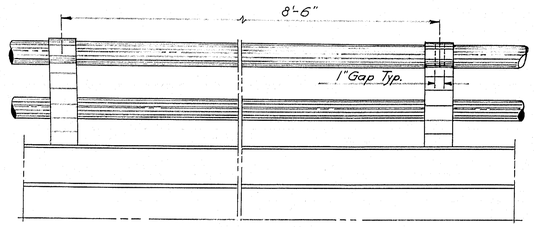
HAMPDEN

PENOBSCOT COUNTY

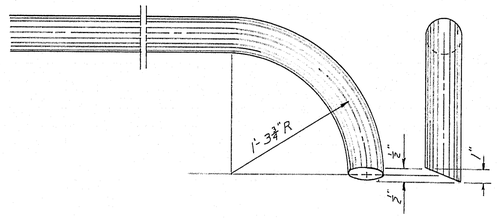
SUPERSTRUCTURE

SHEET 13 OF 14 AUGUSTA, MAINE JULY 1961

M-1512

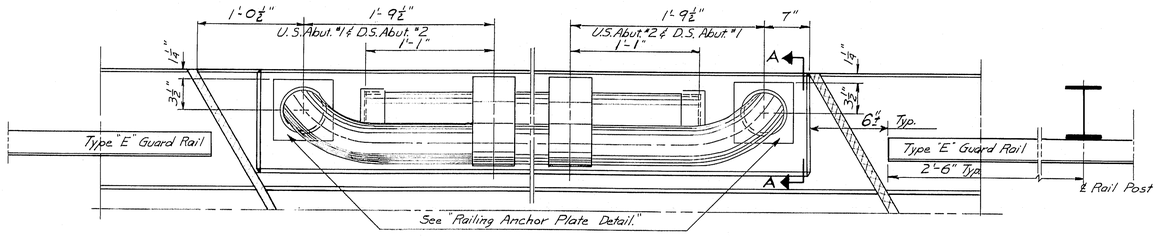


SIDE VIEW

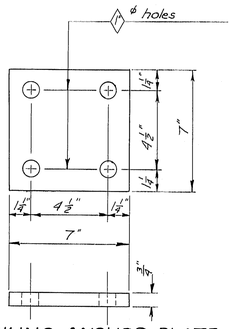


DETAIL OF END TUBE

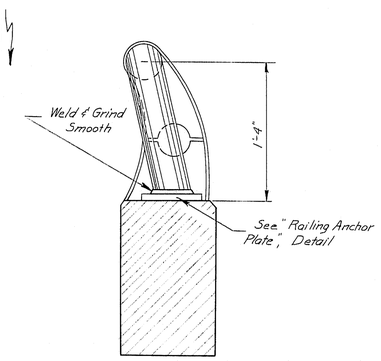
NOTE: Bent portion of Aluminum tube to be paid for under Item 806-7, "Aluminum Rail."



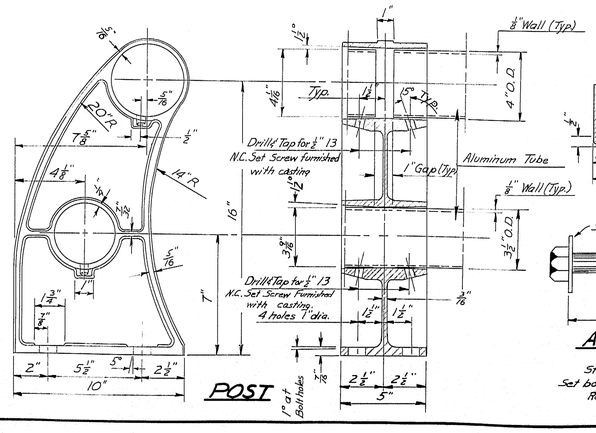
PLAN VIEW OF RAIL ENDS



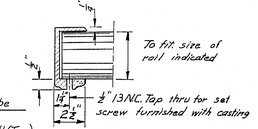
RAILING ANCHOR PLATE (ALUMINUM)



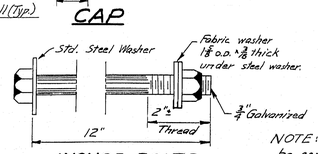
SECTION A-A



POST

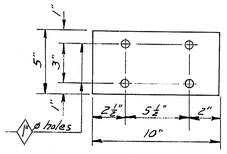


CAP



ANCHOR BOLTS

Structural Steel Galvanized.
Set bolts with 2" projecting out of concrete.
Req'd: 4 each rail post
4 each anchor plate.

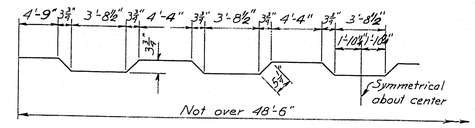


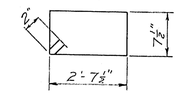
SHIM

Aluminum Alloy Shims 5" × 1/16" × 0'-10" to be used and cut as necessary. Furnish in the amount of 50% of number of rail posts.

NOTE: To the extent possible Aluminum pipe shall be continuous for two panels with joints staggered. One set screw to be tight, all others to bear, for each length of pipe.
Rail details shall be submitted to the Engineer for approval.

SUPERSTRUCTURE
REINFORCING STEEL N.B. & S.B.



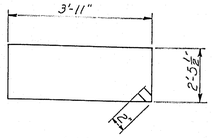


Dimensions to ℄ of bars.

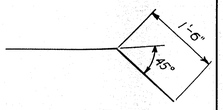
MARK	SIZE	NO.	LENGTH	LOCATION
		BENT BARS		
F2	#6	246	49'-9"	Slab
S1	#4	520	6'-10"	Curbs
		STRAIGHT BARS		
F1	#6	488	48'-6"	Slab
F3	#5	252	23'-0"	Slab (Panel A)
F4	5	252	32'-8"	do (Panel B)
F5	5	126	19'-8"	do (Panel C)
F6	5	56	13'-6"	Slab (Over Piers)
C1	#4	48	12'-0"	Curb (Panel A)
C2	4	48	10'-8"	do
C3	4	48	17'-8"	Curb (Panel B)
C4	4	48	14'-8"	do
C5	4	48	9'-8"	Curb (Panel C)
B1	#5	220	7'-6"	@ Const. Joints & End Diaphragms

Checked H.L.D.

ABUTMENTS, APPROACH SLABS, & PIERS
REINFORCING STEEL N.B. & S.B.



A14



A15

All dimensions to ℄ of bars.

MARK	SIZE	NO.	LENGTH	LOCATION
		BENT BARS		
A14	#5	72	13'-1"	Bridge Seat Pedestals
A15	#5	124	2'-6"	Backwall - Appro. Slab
		STRAIGHT BARS		
A1	#6	368	5'-6"	Footing
A2	6	32	4'-2"	
A3	6	32	3'-3"	
A4	6	24	2'-10"	
A5	6	96	29'-3"	Footing
A6	#5	448	3'-6"	Footing - Backwall
A7	5	424	5'-4"	Backwall & Wings
A8	5	24	4'-3"	Wings
A9	#4	56	29'-0"	Backwall & Wings
A10	4	24	23'-6"	Backwall
A11	4	12	5'-0"	Wings
A12	4	12	7'-6"	Wings
A13	#6	168	4'-0"	Footings - Pedestals
		APPROACH SLAB		
AS1	#6	80	24'-9"	Approach Slab
AS2	6	80	23'-3"	
AS3	6	80	21'-10"	
AS4	6	80	20'-5"	
AS5	6	80	18'-11"	
AS6	6	80	17'-6"	
AS7	6	80	16'-1"	
AS8	6	80	14'-7"	
AS9	#4	160	23'-9"	
AS10	4	32	18'-0"	
AS11	4	64	11'-0"	Approach Slab
		PIERS		
P1	#8	200	5'-0"	Piers
P2	6	200	16'-8"	
P3	#4	144	24'-5"	
P4	#6	72	2'-6"	Piers

Note: All steel to be intermediate grade.

DESIGN - TRACE - Mkl. CHECK - 1 as noted
BRIDGE NO. SURVEY - PLOT -

STATE HIGHWAY COMMISSION
BRIDGE DIVISION

SOUADABSCOOK STREAM BRIDGE WEST

IN THE TOWN OF

HAMPDEN

PENOBSCOT COUNTY

REINFORCED STEEL & RAIL DETAILS

SHEET 14 OF 14 AUGUSTA, MAINE JULY 1961

M-1513

0 1 2 3 4 5 INCHES