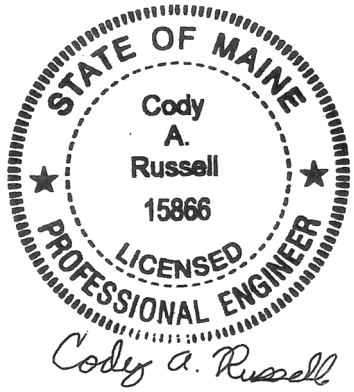
MAINE DEPARTMENT OF TRANSPORTATION
HIGHWAY PROGRAM
GEOTECHNICAL SECTION
AUGUSTA, MAINE

GEOTECHNICAL DESIGN REPORT

For Intersection Improvements on

ROUTE 4/202
ALFRED, MAINE

Prepared by:
Yueh-Ti Lee
Assistant Geotechnical Engineer



Reviewed by:
Cody Russell, P.E.
Senior Geotechnical Engineer

York County
WIN 25459.00

Soils Report 2024-57
Federal Project No. 2545900

December 3, 2024

Table of Contents

Sheets

Appendices

1.0 INTRODUCTION

The purpose of this Geotechnical Design Report is to present subsurface information and provide geotechnical design and construction recommendations for the improvements to the Route 4/202 and Gore Road intersection in Alfred. These improvements include the reconstruction of an approximately 0.25-mile portion of Route 4/202 and the realignment of approximately 225 linear feet of Gore Road, as shown on Sheet 1 – Location Map. The project is needed to improve drainage and safety. The scope includes grading, base, pavement, drainage improvements, and realignment in some areas. Route 4/202 is a Highway Corridor Priority 1 road.

2.0 GEOLOGIC SETTING

According to the Reconnaissance Surficial Geology Map of the Alfred Quadrangle, Maine, Open File No. 99-76 (1999) published by the Maine Geological Survey (MGS), the surficial soils along the project length consist of Till. Till consists of silt, sand, pebbles, cobbles, and boulders.

According to the MGS map titled Bedrock Geologic Map of Maine (1985) the bedrock along the project consists of interbedded pelite and limestone and/or dolostone of the Rindgemere Formation.

3.0 SUBSURFACE INVESTIGATION

Subsurface conditions at the site were explored by drilling a total of five (5) borings and eleven (11) probes.

Probes HB-ALF-101 through HB-ALF-106, HB-ALF-109, HB-ALF-112 through HB-ALF-114, and HB-ALF-116, and borings HB-ALF-107, HB-ALF-108, HB-ALF-110, HB-ALF-111, and HB-ALF-115 were drilled on September 14, 2022 and September 19, 2022. All explorations were drilled by the MaineDOT drill crew. The probes were drilled to depths ranging from approximately 2.2 to 10.5 feet below ground surface (bgs) using solid stem auger drilling techniques. The borings were drilled to depths ranging from approximately 9.0 to 12.0 feet bgs using solid stem auger, cased wash boring, and rock core drilling techniques. Boring and probe locations are shown on Sheets 2 through 4 Boring Location Plans. The boring logs are presented in Appendix A.

Soil samples were obtained in five (5) borings at standard 5-foot intervals using Standard Penetration Testing (SPT). No soil sampling was done in eleven (11) probes and no soil descriptions were recorded.

The MaineDOT calibrated automatic hammer delivers approximately 62 percent more energy during driving than the standard rope and cathead system. All N-values discussed in this report are corrected values (N_{60}) computed by applying an average energy transfer factor of 0.974 to the raw field N-values.

Details and sampling methods used, field data obtained, and soil and groundwater conditions encountered are shown in the boring logs in Appendix A. The MaineDOT Geotechnical Team member selected the boring locations, drilling methods, designated type and depth of sampling,

reviewed field logs for accuracy and identified field and laboratory testing requirements. A North East Transportation Training and Certification Program (NETTCP) certified subsurface inspector logged the subsurface conditions encountered. The boring and probes were located in the field by taping to site features after completion of the drilling program.

4.0 LABORATORY TESTING

A laboratory testing program was conducted on select soil samples obtained in the test borings to assist in soil classification, evaluation of engineering properties of the soils and geologic assessment of the project site. Laboratory testing consisted of eight (8) standard grain size analyses and natural water content. The results of the laboratory tests are in Appendix B – Laboratory Test Results. Laboratory test results are also summarized on the boring logs in Appendix A.

5.0 SUBSURFACE CONDITIONS

Subsurface conditions encountered at the test borings and probes generally consisted of pavement and sand fill underlain by native sand, gravelly sand, and in some areas, by bedrock. The boring locations are shown on Sheets 2 through 4 – Boring Location Plans. The boring logs are presented in Appendix A – Boring Logs & Probe Summary Sheet.

5.1 Pavement and Fill Soils

The subsurface investigations found areas of pavement and roadway fill soils along the project. Where present, the pavement thickness was approximately 4.0 inches. The fill soils consisted of:

- Brown, damp, fine to coarse sand, trace to some gravel, trace to little silt.

The thickness of the fill ranged from approximately 3.2 to 5.2 feet. SPT N_{60}-values obtained in the granular fill ranged from 29 to 55 blows per foot (bpf) indicating that the sand fill is medium dense to very dense in consistency.

Water contents from five (5) samples obtained within the fill range from approximately 3.6% to 5.8%. Grain size analyses conducted on five (5) samples of the fill resulted in the soil being classified as an A-1-b or A-2-4 under the AASHTO Soil Classification System and a SM or SW-SM under the Unified Classification System.

5.2 Native Sand

The fill soils were underlain by native sand consisting of:

- Brown and light brown, damp, fine to coarse sand, little silt, trace to little gravel.

- Grey, wet, gravelly fine to coarse sand, trace silt.

The thickness of the native sand ranged from approximately 5.3 to 8.5 feet. The full depth of the native sand was not encountered or fully penetrated in all of the explorations. SPT N-values obtained in the native sand ranged from 15 to 24 bpf indicating that the native sand is medium dense in consistency. Cobbles were encountered at the bottom of the sand layer in boring HB-ALF-115.

Water contents from three (3) samples obtained within the native sand range from approximately 3.3% to 8.0%. Grain size analyses conducted on three (3) samples of the native sand resulted in the soil being classified as an A-1-b or A-2-4 under the AASHTO Soil Classification System and a SM or SP-SM under the Unified Classification System.

5.3 Bedrock and Refusal Surfaces

Refusal surfaces were encountered at varying depths along the project. Refusal of the drilling tools varied from a depth of approximately 2.2 feet to 8.4 feet bgs. The table below summarizes the refusal surfaces encountered.

Boring No.	Station	Offset (feet)	Approximate Depth to Top of Refusal Surface (feet)	Approximate Elevation of Top of Refusal Surface (feet)	RQD (%)[1]
HB-ALF-106	61+00	17.0 Left	8.4	256.8	NA
HB-ALF-107	62+00	17.0 Left	4.0	262.9	92
HB-ALF-108	62+00	15.5 Right	5.5	260.6	100
HB-ALF-109	63+00	18.0 Left	6.2	261.4	NA
HB-ALF-114	300+33.5	CL	4.2	263.5	NA
HB-ALF-115	300+67.2	CL	6.0	262.7	98
HB-ALF-116	300+95.5	CL	2.2	265.6	NA

[1] RQD = Rock Quality Designation

Bedrock cores ranging from approximately 4.5 to 5.0 feet in length were drilled in the three (3) of borings where refusal was encountered. The exact nature of the refusal surface was not determined in the probes.

The bedrock consists of interbedded pelite and limestone and/or dolostone of the Rindgemere Formation. The Rock Quality Designation (RQD) of the bedrock was determined to range from 92% to 100%, correlating to a Rock Quality of Excellent. The approximate elevations of the top of bedrock or the refusal surface encountered at the boring and probe locations are presented in Appendix A – Boring Logs & Probe Summary Sheet.

5.4 Groundwater

Groundwater was not observed in borings and probes. Groundwater levels can be expected to fluctuate subject to seasonal variations, local soil conditions, topography, precipitation, and construction activity.

6.0 GEOTECHNICAL RECOMMENDATIONS

6.1 Bedrock Removal

Refusal of the drilling tools was encountered in multiple borings and probes along the project (see Section 5.3). Bedrock removal is anticipated for drainage and subgrade installation near these locations. Additional shallow bedrock should be expected during construction at other locations.

Blasting, if required, shall be conducted in accordance with MaineDOT Standard Specifications Sections 105.2.7 and 203. The Contractor is required to conduct pre- and post-blast surveys, as well as blast vibrations monitoring at nearby structures in accordance with industry standards at the time of the blast.

7.0 CLOSURE

This report has been prepared for the use of the MaineDOT Highway Program for specific application to the proposed improvements of Gore Road Intersection in Alfred, Maine in accordance with generally accepted geotechnical and foundation engineering practices. No other intended use or warranty is expressed or implied.

In the event that any changes in the nature, design, or location of the proposed project are planned, this report should be reviewed by a geotechnical engineer to assess the appropriateness of the conclusions and recommendations and to modify the recommendations as appropriate to reflect the changes in design. These analyses and recommendations are based in part upon a limited subsurface investigation at discrete exploratory locations completed at the site. If variations from the conditions encountered during the investigation appear evident during construction, it may also become necessary to re-evaluate the recommendations made in this report.

It is recommended that a geotechnical engineer be provided the opportunity for a review of the design and specifications in order that the earthwork and foundation recommendations and construction considerations presented in this report are properly interpreted and implemented in the design and specifications.

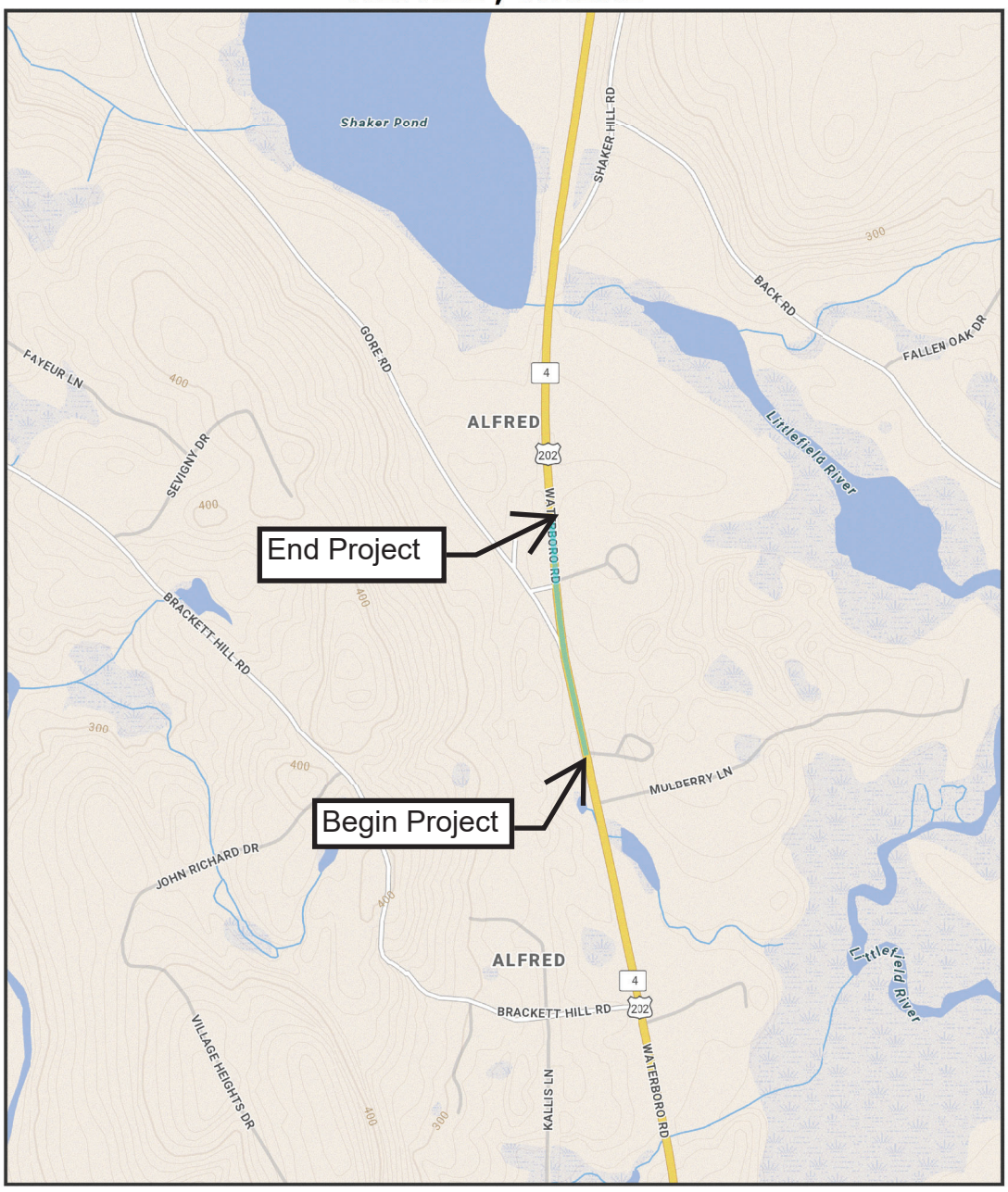
Sheets

Date:1/2/2025

Division: GEOTECH

Username: Terry.White

ALFRED, MAINE



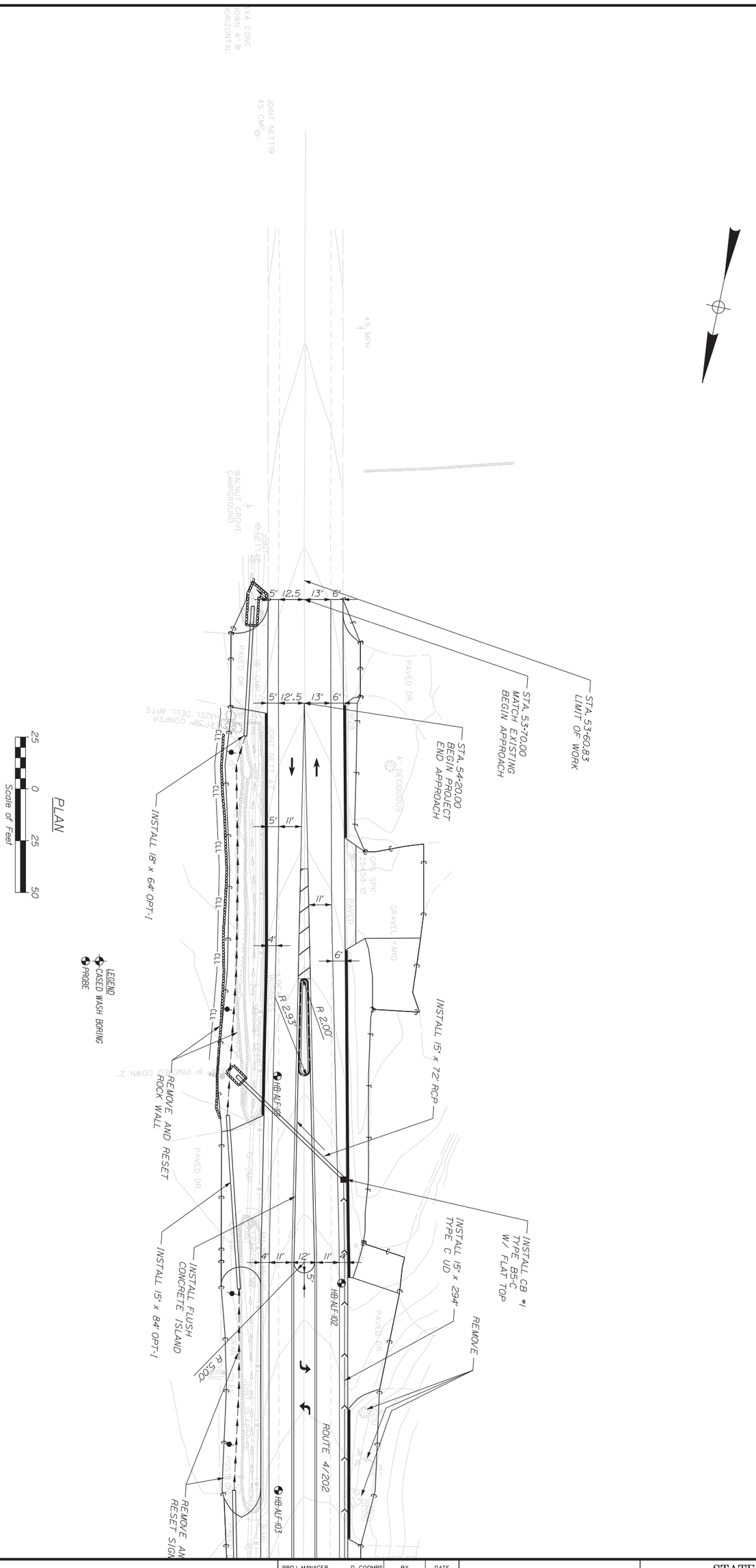
The Maine Department of Transportation provides this publication for information only. Reliance upon this information is at user risk. It is subject to revision and may be incomplete depending upon changing conditions. The Department assumes no liability if injuries or damages result from this information. This map is not intended to support emergency dispatch.

0.15 Miles

1 inch = 0.17 miles

Date: 12/3/2024
Time: 1:59:59 PM

SHEET NUMBER 1 OF 4	ALFRED ROUTE 4/202 & GORE ROAD LOCATION MAP	STATE OF MAINE DEPARTMENT OF TRANSPORTATION 2545900 WIN 25459.00 HIGHWAY PLANS



PROJ. MANAGER	D. COOMBS	BY	DATE	
DESIGN-DETAILED	_____	_____	_____	
CHECKED-REVIEWED	_____	_____	_____	SIGNATURE
DESIGN2-DETAILED2	YT LEE	T.WHITE	DEC 2024	
DESIGN3-DETAILED3	_____	_____	_____	P.E. NUMBER
REVISIONS 1	_____		_____	
REVISIONS 2	_____		_____	DATE
REVISIONS 3	_____		_____	
REVISIONS 4	_____		_____	
FIELD CHANGES	_____		_____	

ALFRED
ROUTE 4/202 & GORE RD

BORING LOCATION PLAN

SHEET NUMBER 2 OF 4

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2545900

WIN 025459.00 HIGHWAY PLANS

REMOVE PAVEMENT, LOAM, MULCH & SEED (TYP.)

INSTALL WOOD POST

STA 301+10 CROSS SECTION SEE PLAN DETAIL

REMOVE

STA. 302+25.00 LIMIT OF WORK MATCH EXISTING

INSTALL CB #2 TYPE BI-C

REMOVE PAVEMENT, LOAM, MULCH & SEED (TYP.)

INSTALL 15" x 42' OPT-III

GORE ROAD

ROUTE 4/202

WESTPOTT ROAD

HB-ALF-103

HB-ALF-104

HB-ALF-105

HB-ALF-106

HB-ALF-107

HB-ALF-108

HB-ALF-109

HB-ALF-110

HB-ALF-111

HB-ALF-112

HB-ALF-113

HB-ALF-114

HB-ALF-115

HB-ALF-116

REMOVE AND RESET SIGNS

6" UD OUTLET X 18'

INSTALL 15" x 76' OPT-I

INSTALL 15" x 74' OPT-I

INSTALL 6" x 425' TYPE B UD

INSTALL 6" x 442' TYPE B UD

REMOVE AND RESET GRANITE CURB

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2545900

WIN 025459.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER	D. COOMBS	
DESIGN-DETAILED		
CHECKED-REVIEWED		DEC 2024
DESIGN2-DETAILED2	YT LEE	T. WHITE
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

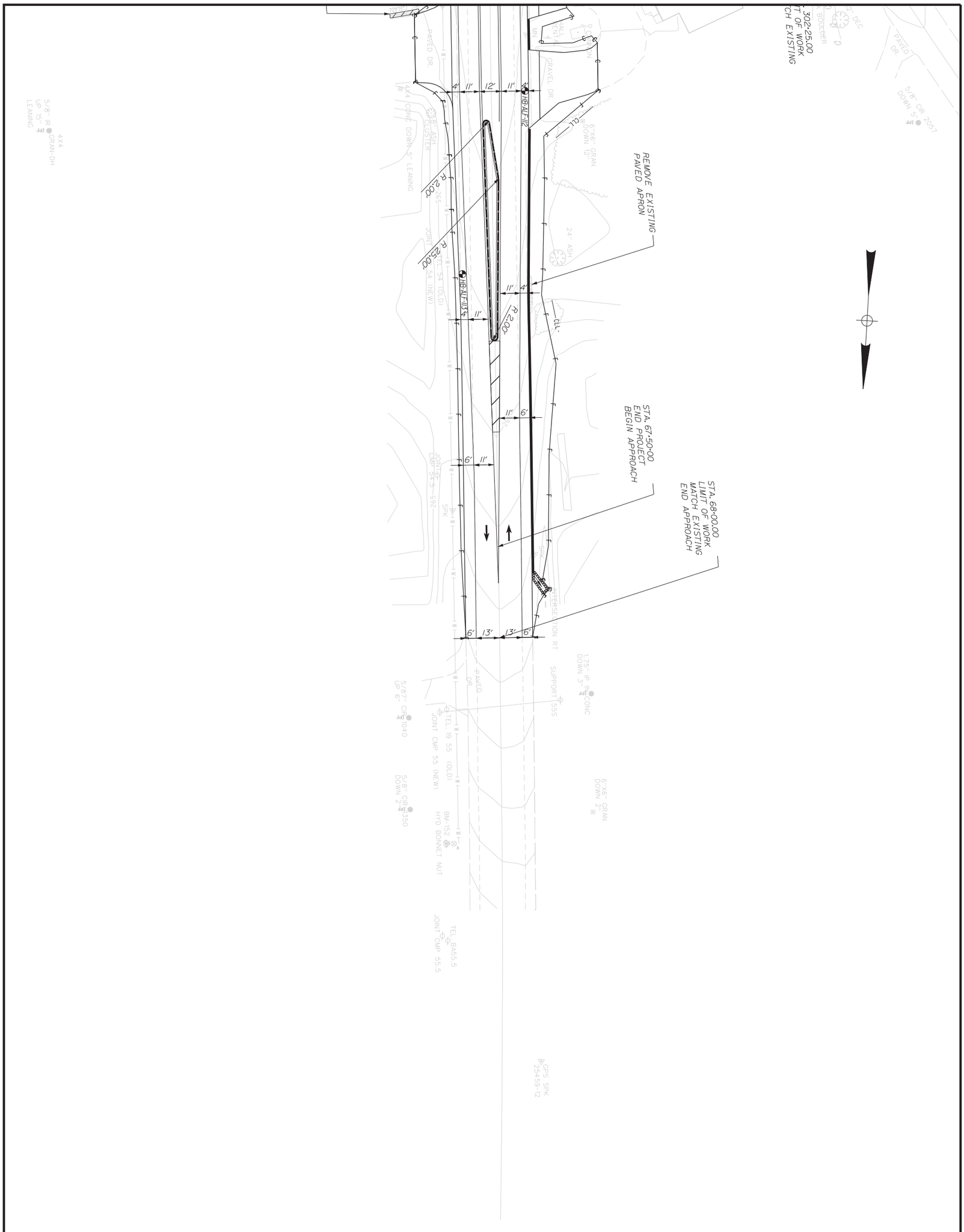
ALFRED
ROUTE 4/202 & GORE RD

BORING LOCATION PLAN

SHEET NUMBER

3

OF 4



SHEET NUMBER 4 OF 4	ALFRED ROUTE 4/202 & GORE RD BORING LOCATION PLAN	PROJ. MANAGER: D. COOMBS; BY; DATE DESIGN-DETAILED CHECKED-REVIEWED DESIGN2-DETAILED2: YT LEE; T.WHITE; DEC 2024 DESIGN3-DETAILED3 REVISIONS 1 REVISIONS 2 REVISIONS 3 REVISIONS 4 FIELD CHANGES	SIGNATURE P.E. NUMBER DATE	STATE OF MAINE DEPARTMENT OF TRANSPORTATION 2545900 WIN 025459.00 HIGHWAY PLANS

Appendix A

Boring Logs & Probe Summary Sheet

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection Route 4/202 and Gore Road

Location: Alfred, Maine

Boring No.: HB-ALF-107

WIN: 25459.00

Driller:	MaineDOT	**Elevation (ft.)**	266.9	**Auger ID/OD:**	5" Solid Stem
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	9/14/2022; 12:30-13:15	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	62+00, 17.0 ft Lt.	**Casing ID/OD:**	NW-3"	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.974		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	266.6		4" HMA. 0.3	
	1D	24/10	1.00 - 3.00	4/18/16/13	34	55				Brown, damp, very dense, fine to coarse SAND, some gravel, trace silt, (Fill).	G#379866 A-1-b, SW-SM WC=3.6%
							50				
	R1	60/60	4.00 - 9.00	RQD = 92%			NQ-2	262.9		4.0	
5										Top of Bedrock at Elev. 262.9 ft. R1: Bedrock: Interbedded PELITE and LIMESTONE and/or DOLOSTONE, [Rindgemere Formation]. Rock Quality = Excellent R1: Core Times (min:sec) 4.0-5.0 ft (2:00) 5.0-6.0 ft (1:15) 6.0-7.0 ft (1:42) 7.0-8.0 ft (2:10) 8.0-9.0 ft (1:55) 100% Recovery	
								257.9		9.0	
10										**Bottom of Exploration at 9.0 feet below ground surface.**	
15											
20											
25											

Remarks:

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

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

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection Route 4/202 and Gore Road
Location: Alfred, Maine

Boring No.: HB-ALF-108
WIN: 25459.00

Driller:	MaineDOT	**Elevation (ft.)**	266.1	**Auger ID/OD:**	5" Solid Stem
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	9/14/2022; 08:30-09:30	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	62+00, 15.5 ft Rt.	**Casing ID/OD:**	NW-3"	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.974	**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 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	265.8		4" HMA, shoulder. 0.3	
	1D	24/14	1.00 - 3.00	8/9/12/19	21	34				Brown, damp, dense, fine to coarse SAND, some gravel, little silt, (Fill).	G#379867 A-1-b, SM WC=5.6%
5	2D R1	6/6 60/60	5.00 - 5.50 5.50 - 10.50	40(6") RQD = 100%	---		a40 NQ-2	260.6		Brown, damp, dense, fine to coarse SAND, little gravel, little silt, (Fill). a40 blows for 0.5 ft. 5.5	G#379868 A-1-b, SM WC=5.6%
										Top of Bedrock at Elev. 260.6 ft. R1: Bedrock: Interbedded PELITE and LIMESTONE and/or DOLOSTONE, [Rindgemere Formation]. Rock Quality = Excellent R1: Core Times (min:sec) 5.5-6.5 ft (1:59) 6.5-7.5 ft (2:03) 7.5-8.5 ft (3:17) 8.5-9.5 ft (4:11) 9.5-10.5 ft (5:26) 100% Recovery	
10								255.6		10.5	
										Bottom of Exploration at 10.5 feet below ground surface.	
15											
20											
25											

Remarks:

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

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

Boring No.: HB-ALF-108

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection Route 4/202 and Gore Road
Location: Alfred, Maine

Boring No.: HB-ALF-110
WIN: 25459.00

Driller:	MaineDOT	**Elevation (ft.)**	267.4	**Auger ID/OD:**	5" Solid Stem
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	9/14/2022; 10:30-11:30	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	64+00, 19.0 ft Lt.	**Casing ID/OD:**	NW-3"	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.974		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
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MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	267.1		4" HMA, shoulder. 0.3	
	1D	24/19	1.00 - 3.00	10/10/10/11	20	32				Brown, damp, dense, fine to coarse SAND, little gravel, trace silt, (Fill).	G#379869 A-1-b, SW-SM WC=3.6%
								263.9		3.5	
5	2D	24/17	5.00 - 7.00	5/6/6/8	12	19				Light brown, damp, medium dense, fine to coarse SAND, little silt, trace gravel.	G#379870 A-2-4, SP-SM WC=3.3%
10	3D	24/22	10.00 - 12.00	4/5/7/8	12	19				Light brown, damp, medium dense, fine to coarse SAND, little silt, trace gravel.	
								255.4		12.0	
15										**Bottom of Exploration at 12.0 feet below ground surface.** NO REFUSAL	
20											
25											

Remarks:

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

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

Boring No.: HB-ALF-110

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection Route 4/202 and Gore Road

Location: Alfred, Maine

Boring No.: HB-ALF-111

WIN: 25459.00

Driller:	MaineDOT	**Elevation (ft.)**	267.3	**Auger ID/OD:**	5" Solid Stem
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	9/14/2022; 09:30-10:30	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	N/A
Boring Location:	64+00, 16.0 ft Rt.	**Casing ID/OD:**	NW-3"	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.974	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
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MV = Unsuccessful Field Vane Shear Test Attempt
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WOH = Weight of 140lb. Hammer
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S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
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N-uncorrected = Raw Field SPT N-value
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WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	267.0		4" HMA, shoulder. 0.3	
	1D	24/18	1.00 - 3.00	9/8/10/12	18	29				Brown, damp, medium dense, fine to coarse SAND, little silt, little gravel, (Fill).	G#379871 A-2-4, SM WC=5.8%
								263.3		4.0	
5	2D	24/20	5.00 - 7.00	5/5/6/6	11	18				Light brown, damp, medium dense, fine to coarse SAND, little gravel, little silt.	G#379872 A-2-4, SP-SM WC=8.0%
10	3D	24/19	10.00 - 12.00	4/4/5/6	9	15				Light brown, damp, medium dense, fine to coarse SAND, little gravel, little silt.	
								255.3		12.0	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

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

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

Boring No.: HB-ALF-111

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection Route 4/202 and Gore Road
Location: Alfred, Maine

Boring No.: HB-ALF-115
WIN: 25459.00

Driller:	MaineDOT	**Elevation (ft.)**	268.7	**Auger ID/OD:**	N/A
Operator:	Daggett	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	CME 45C	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	9/19/2022; 10:00-11:30	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	300+67.2, CL	**Casing ID/OD:**	NW-3"	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.974	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.00 - 2.00	4/6/9/40	15	24	10	268.5		0.2 ft Topsoil, sod. 0.2	G#379873 A-1-b, SM WC=15.7%
							28			(1D) 0.2-2.0 ft bgs.) Brown, damp, medium dense, fine to coarse SAND, little gravel, little silt.	
							55				
							47				
							88				
5	2D	6/3	5.00 - 5.50	50(6")	---		50	263.2		Grey, wet, dense, Gravelly fine to coarse SAND, trace silt. 5.5	
	R1	60/60	5.50 - 10.50	RQD = 98%			NQ-2	262.7		Cobble from 5.5-6.0 ft bgs. 6.0	
										Top of Bedrock at Elev. 262.7 ft. R1: Bedrock: Interbedded PELITE and LIMESTONE and/or DOLOSTONE, [Rindgemere Formation]. Rock Quality = Excellent R1: Core Times: (min:sec) 5.5-6.5 ft (2:16) 6.5-7.5 ft (2:02) 7.5-8.5 ft (1:59) 8.5-9.5 ft (2:36) 9.5-10.5 ft (2:42) 100% Recovery	
10								258.2		10.5	
										Bottom of Exploration at 10.5 feet below ground surface.	
15											
20											
25											

Remarks:

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

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

State of Maine - Department of Transportation

Probe Summary Sheet

Town(s): Alfred Work Number: 25459.00

Station (Feet)	Offset (Feet)	Weathered Rock (Feet)	Weathered Rock Elevation	Refusal (Feet)	No Refusal (Feet)	Bottom of Boring Elevation	Comments 9/14, 19/2022
56+00	13.0 Rt.				10.5	242.9	HB-ALF-101
57+00	18.0 Lt.				10.5	244.5	HB-ALF-102
58+00	12.5 Rt.				10.5	247.0	HB-ALF-103
59+00	16.0 Lt.				8.0	252.6	HB-ALF-104
60+00	16.0 Rt.				10.5	251.8	HB-ALF-105
61+00	17.0 Lt.			8.4		256.8	HB-ALF-106
63+00	18.0 Lt.			6.2		261.4	HB-ALF-109
65+00	19.0 Lt.				10.5	256.1	HB-ALF-112
66+00	17.0 Rt.				10.5	256.2	HB-ALF-113
300+33.5	CL			4.2		263.5	HB-ALF-114
300+95.5	CL			2.2		265.6	HB-ALF-116
HB-ALF-104 hit a 3/4" water line at 6.0 ft bgs.							

MaineDOT Drill Crew
Logged By: B. Wilder
Drill Rig: CME 45C

5" Solid Stem Auger

Appendix B

Laboratory Test Results

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Alfred Work Number: 25459.00

Boring & Sample Identification Number	Station (Feet)	Offset (Feet)	Depth (Feet)	Reference Number	G.S.D.C. Sheet	W.C. %	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
HB-ALF-107, 1D	62+00	17.0 Lt.	1.0-3.0	379866	1	3.6			SW-SM	A-1-b	0
HB-ALF-108, 1D	62+00	15.5 Rt.	1.0-3.0	379867	1	5.6			SM	A-1-b	II
HB-ALF-108, 2D	62+00	15.5 Rt.	5.0-5.5	379868	1	5.6			SM	A-1-b	II
HB-ALF-110, 1D	64+00	19.0 Lt.	1.0-3.0	379869	1	3.6			SW-SM	A-1-b	0
HB-ALF-110, 2D	64+00	19.0 Lt.	5.0-7.0	379870	1	3.3			SP-SM	A-2-4	0
HB-ALF-111, 1D	64+00	16.0 Rt.	1.0-3.0	379871	2	5.8			SM	A-2-4	II
HB-ALF-111, 2D	64+00	16.0 Rt.	5.0-7.0	379872	2	8.0			SP-SM	A-2-4	0
HB-ALF-115, 1D	300+67.2	CL	0.0-2.0	379873	2	15.7			SM	A-1-b	II

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MaineDOT and Corps of Engineers Classification Systems.

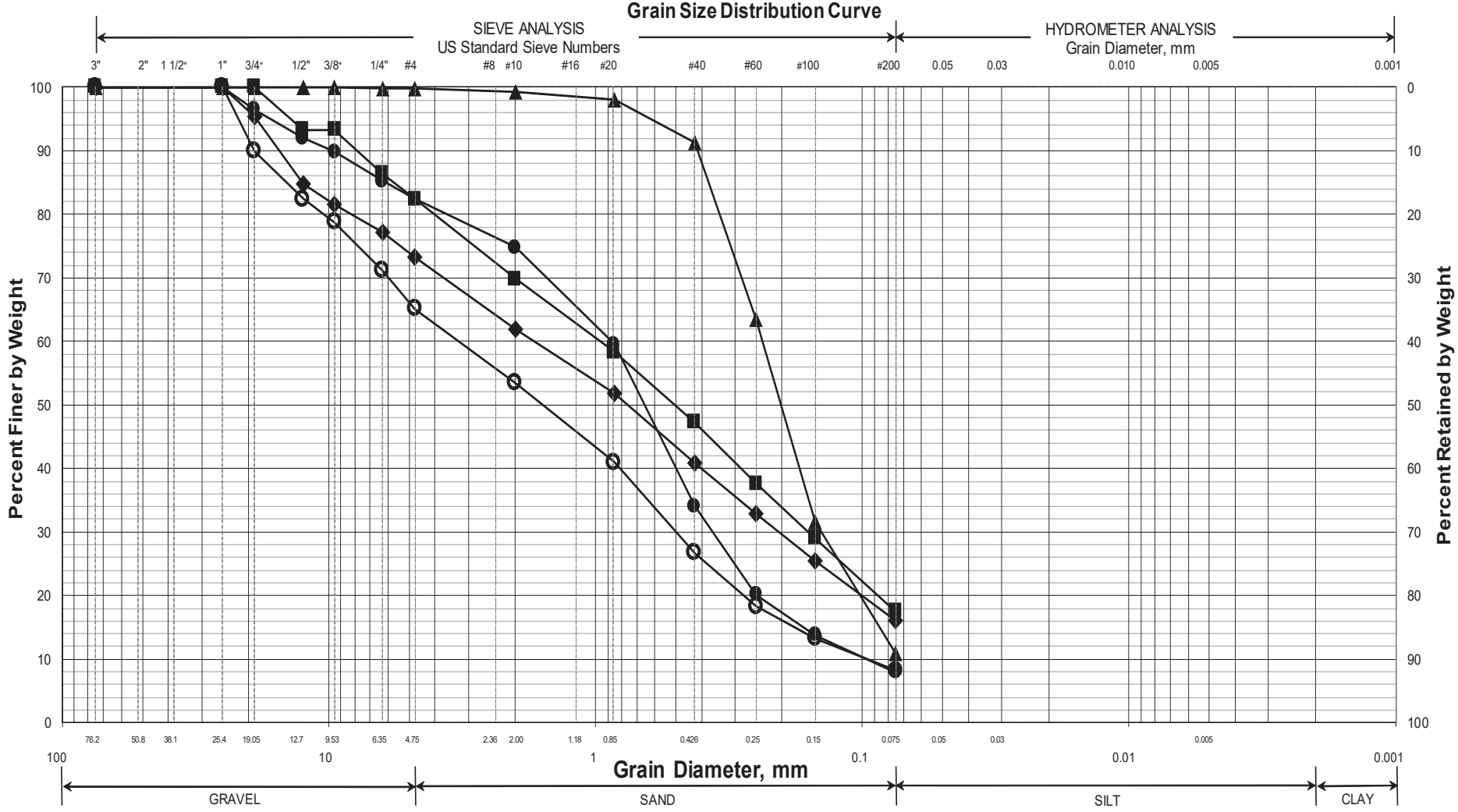
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98 NP = Non Plastic

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98

Maine Department of Transportation
Grain Size Distribution Curve

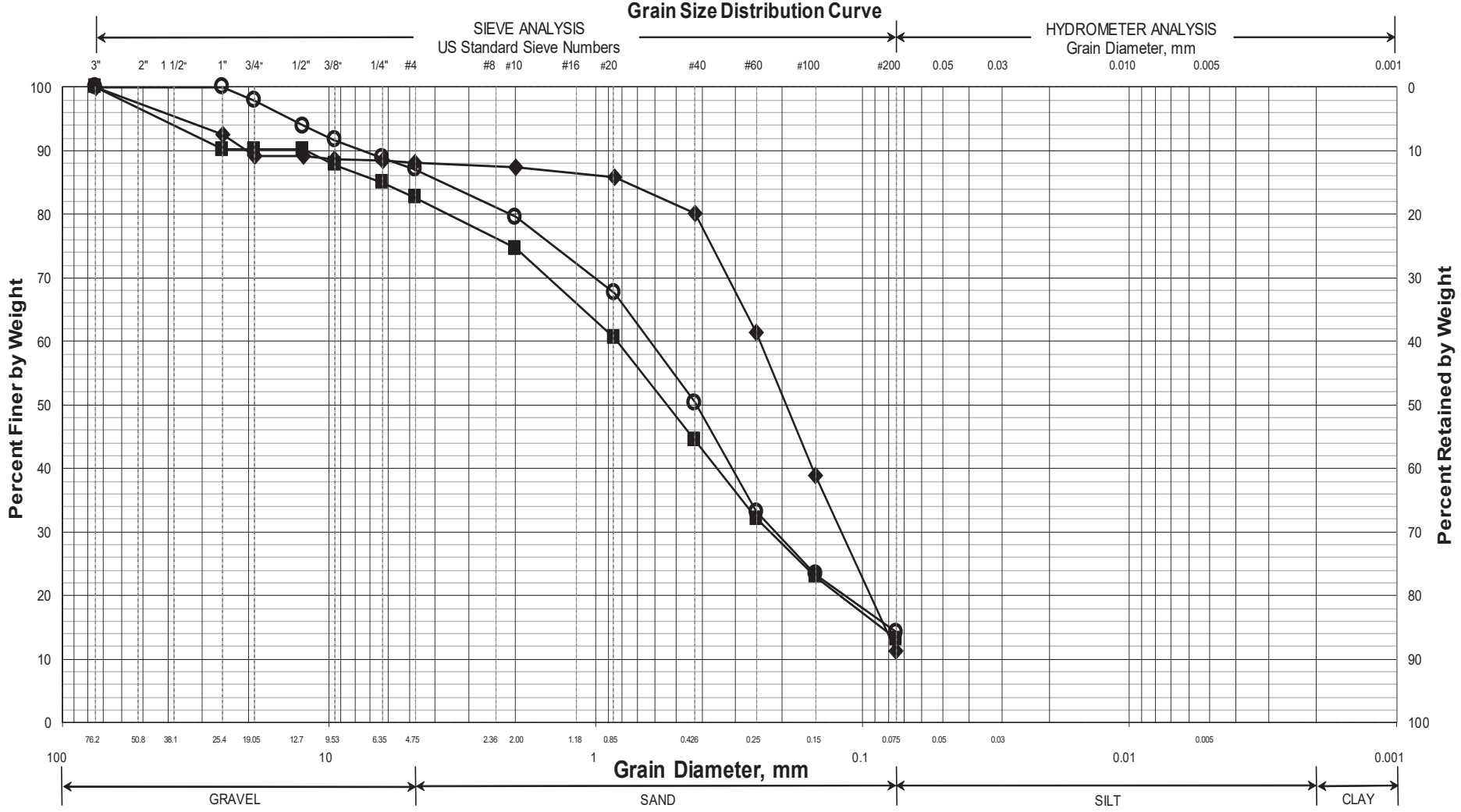


UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	WC, %	LL	PL	PI
○	HB-ALF-107/1D	62+00	17.0 LT	1.0-3.0	SAND, some gravel, trace silt.	3.6			
◆	HB-ALF-108/1D	62+00	15.5 RT	1.0-3.0	SAND, some gravel, little silt.	5.6			
■	HB-ALF-108/2D	62+00	15.5 RT	5.0-5.5	SAND, little gravel, little silt.	5.6			
●	HB-ALF-110/1D	64+00	19.0 LT	1.0-3.0	SAND, little gravel, trace silt.	3.6			
▲	HB-ALF-110/2D	64+00	19.0 LT	5.0-7.0	SAND, little silt, trace gravel.	3.3			
×									

WIN
025459.00
Town
Alfred
Reported by/Date
WHITE, TERRY A 10/17/2022

Maine Department of Transportation
Grain Size Distribution Curve



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	WC, %	LL	PL	PI
○	HB-ALF-111/1D	64+00	16.0 RT	1.0-3.0	SAND, little silt, little gravel.	5.8			
◆	HB-ALF-111/2D	64+00	16.0 RT	5.0-7.0	SAND, little gravel, little silt.	8.0			
■	HB-ALF-115/1D	300+67.2	CL	0.2-2.0	SAND, little gravel, little silt.	15.7			
●									
▲									
×									

WIN
025459.00
Town
Alfred
Reported by/Date
WHITE, TERRY A 10/17/2022

SHEET 2