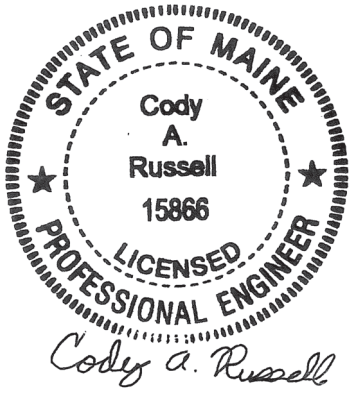
MAINE DEPARTMENT OF TRANSPORTATION
HIGHWAY PROGRAM
GEOTECHNICAL SECTION
AUGUSTA, MAINE

GEOTECHNICAL DESIGN REPORT

For Intersection Improvements on

ROUTE 4
TURNER, MAINE

Prepared by:
Cody Russell, P.E.
Geotechnical Engineer



Reviewed by:
Kathleen Maguire, P.E.
Senior Geotechnical Engineer

Androscoggin County
WIN 24201.00

Soils Report 2024-05
Federal No. 2420100

February 7, 2024

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Sheets

Appendices

1.0 INTRODUCTION

The purpose of this Geotechnical Design Report is to present subsurface information and make geotechnical design and construction recommendations for the intersection improvements at the intersection Route 4, Route 219, and Bear Pond Road, shown on Sheet 1 – Location Map. The project is needed to address safety concerns at this high crash location. The scope includes realigning the existing 4-leg intersection into two (2) 3-leg intersections and installing highway lighting. Route 4 is a Highway Corridor Priority 1 road.

2.0 GEOLOGIC SETTING

According to the Surficial Geology Map entitled Buckfield Quadrangle, Maine, Open File No. 08-68 (2008) published by the Maine Geological Survey (MGS), the surficial soils at the project site consist of glaciomarine delta (regressive) of the Turner Plains regressive delta consisting of sand and gravel.

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

3.0 SUBSURFACE INVESTIGATION

Subsurface conditions at the site were explored by drilling a total of fifteen (15) test borings.

Borings HB-TUR-101 and HB-TUR-102 were drilled on April 12, 2022 by an S.W. Cole drill rig. Borings HB-TUR-201 through HB-TUR-212 were drilled between February 8 and February 10, 2023 by the MaineDOT drill rig. The two (2) 100-series borings and boring HB-TUR-208 were drilled to refusal at depths ranging from approximately 7.5 to 10.0 feet below ground surface (bgs) using solid stem auger and cased wash boring drilling techniques. These three (3) borings were then advanced into bedrock using NQ 2-inch rock core drilling techniques to total depths ranging from approximately 12.5 to 18.2 feet bgs and the Rock Core Designation (RQD) of the core was calculated. Borings HB-TUR-202, HB-TUR-207, and HB-TUR-209 were drilled to depths of approximately 6.2 to 10.3 feet using solid stem auger and cased wash boring drilling techniques, where they encountered a refusal surface. The exact nature of the refusal surface was not determined in these three (3) borings. The remaining nine (9) borings were drilled to a depth of approximately 12.0 feet bgs without encountering a refusal surface using solid stem auger and cased wash boring drilling techniques. Boring locations are shown on Sheet 2 – Boring Location Plan. Boring Logs are presented in Appendix A.

Samples were obtained in the borings at standard 5-foot intervals using Standard Penetration Testing (SPT). The S.W. Cole and MaineDOT drill rigs are equipped with automatic hammers to drive the split spoon. The S.W. Cole and MaineDOT calibrated automatic hammers deliver approximately 52 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 0.91 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 engineer logged the subsurface conditions encountered. The borings 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 and to assist in soil classification, evaluation of engineering properties of the soils and geologic assessment of the project site. Laboratory testing consisted of four (4) standard grain size analyses with 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 generally consisted of topsoil or pavement and fill soils overlying native sand overlying bedrock. The boring locations are shown on Sheet 2 – Boring Location Plan. The boring logs are in Appendix A – Boring Logs.

5.1 Topsoil

The 100-series borings were drilled off-road and encountered a layer of topsoil at the ground surface. The thickness of the topsoil was approximately 0.2 feet.

5.2 Pavement and Fill Soils

The 200-series boring were drilled in the travelway or shoulder and encountered pavement at the ground surface underlain by fill soils along the project. The pavement thickness ranged from approximately 4 to 9 inches. The fill soils consisted of:

- Light brown and brown, damp to moist, fine to coarse sand, little to some gravel, trace to little silt, occasional cobbles.

The thickness of the fill ranged from approximately 2.7 feet to 11.7 feet, but the fill soils were not fully penetrated in all the borings. SPT N_{60}-values obtained the in the fill ranged from 11 to 138 blows per foot (bpf) indicating that the fill is medium dense to very dense in consistency.

5.3 Native Sand

Throughout the project the topsoil or fill soils are underlain by native sand. The native sand consisted of:

- Light to dark brown, damp to wet, fine to coarse sand, trace to little gravel, trace to little silt, trace roots.
- Light brown, wet, silty fine to coarse sand, little gravel.
- Light brown, moist, gravelly fine to coarse sand, trace silt.

The thickness of the native sand ranged from approximately 4.0 feet to 9.8 feet but was not fully penetrated in all the borings. Sixteen (16) SPT N_{60}-values obtained the in the native sand ranged from 3 to 39 bpf indicating that the native sand is very loose to dense in consistency.

Water contents from four (4) samples obtained within the native sand ranged from approximately 5.2% to 29.3%. Grain size analyses conducted on four (4) samples of the native sand resulted in the soil being classified as an A-1-b or A-4 under the AASHTO Soil Classification System and an SM, SP, or SP-SM under the Unified Soil Classification System.

5.4 Bedrock

Bedrock was encountered at varying depths along the project. Refusal of the drilling tools varied from a depth of approximately 6.2 to 10.3 feet bgs in six (6) borings. Bedrock was cored in three (3) of the borings where refusal was encountered. The exact nature of the refusal surface was not determined in the remaining three (3) borings.

The bedrock consists of interbedded pelite and limestone and/or dolostone of the Sangerville Formation. The Rock Quality Designation (RQD) of the bedrock was determined range from 0% to 82%, correlating to a Rock Quality of Very Poor to Good. The approximate elevations of the top of bedrock or the refusal surface encountered at the boring locations are presented on the Boring Logs in Appendix A.

5.5 Groundwater

Groundwater levels were observed in two (2) borings. The measured groundwater levels in the borings where groundwater was observed ranged from approximately 2.5 to 5.7 feet bgs. The water levels observed are indicated on the boring logs in Appendix A. Groundwater levels can be expected to fluctuate subject to seasonal variations, local soil conditions, topography, precipitation, and construction activity.

6.0 GEOTECHNICAL RECOMMENDATIONS

The following sections discuss the geotechnical-related design features of this project. Areas of geotechnical concern are:

- Light Pole Foundations
- Oversteepened Slope

6.1 Light Pole Foundations

Twelve (12) 35-foot tall lighting poles are proposed on new foundations along Route 4. The proposed foundations will consist of 30-inch diameter, 8.0-foot long cast-in-place concrete drilled shafts. The foundation design was completed in accordance with LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and AASHTO LRFD Bridge Design Specifications 9th Edition 2020 based on estimated loading conditions of the proposed light poles provided by the HNTB on August 4, 2023. The foundation designs are shown on Sheet 3 – Lighting Pole Foundations.

6.2 Oversteepened Slope

A new 1.75H:1V fill slope is proposed between approximate stations 201+67 to 202+70. A critical slope section was identified at approximate station 202+20 and this slope cross section was analyzed to evaluate the proposed slope stability. Geostudio Slope/W software was used to evaluate the slope. The stability analysis was based on subsurface conditions encountered in borings drilled at the proposed crest and toe of the slope. In accordance with AASHTO LRFD Bridge Design Specifications 9th Edition 2020 (LRFD) Article 11.6.3.7 evaluation of earth slopes where geotechnical parameters are well defined shall achieve a factor of safety of 1.3 (equivalent to a resistance factor of 0.75).

The cross section at station 202+20 was analyzed at three (3) slope angles to evaluate the slope stability of the final slope configuration. The slopes steeper than 2H:1V were analyzed with 3 feet of plain riprap while the slope at 2H:1V was analyzed without riprap. The table below provides the results of these analyses:

Station	Proposed Slope Angle	Riprap Type	Riprap Thickness (feet)	Proposed Slope Factor of Safety
202+20	2H:1V	None	None	1.348
202+20	1.75H:1V	Plain	3	1.312
202+20	1.5H:1V	Plain	3	1.141

Based on these analyses the design team determined that the proposed slope would be constructed at the 1.75H:1V slope. Appendix C – Slope Stability Analyses presents the stability results from these analyses. The proposed riprap slope shall be constructed as shown on the project plans and shall be armored with 3 feet of riprap conforming to MaineDOT Standard Specification Section

703.26 Plain Riprap underlain by a 1-foot layer of Protective Aggregate Cushion conforming to MaineDOT Standard Specification 703.19 Granular Borrow Material for Underwater Backfill that is underlain by a non-woven Class 1 Erosion Control Geotextile that meets the requirements for MaineDOT Standard Specification 722.03.

6.3 Settlement

No settlement issues are anticipated for the roadway. No soft or compressible soils were encountered in the area of the proposed fill. Any settlement due to elastic compression of the native granular soils will be immediate and will not have an effect on the final roadway configuration.

7.0 CLOSURE

This report has been prepared for the use of the MaineDOT Highway Program for specific application to the proposed intersection improvements on Route 4 in Turner, 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.

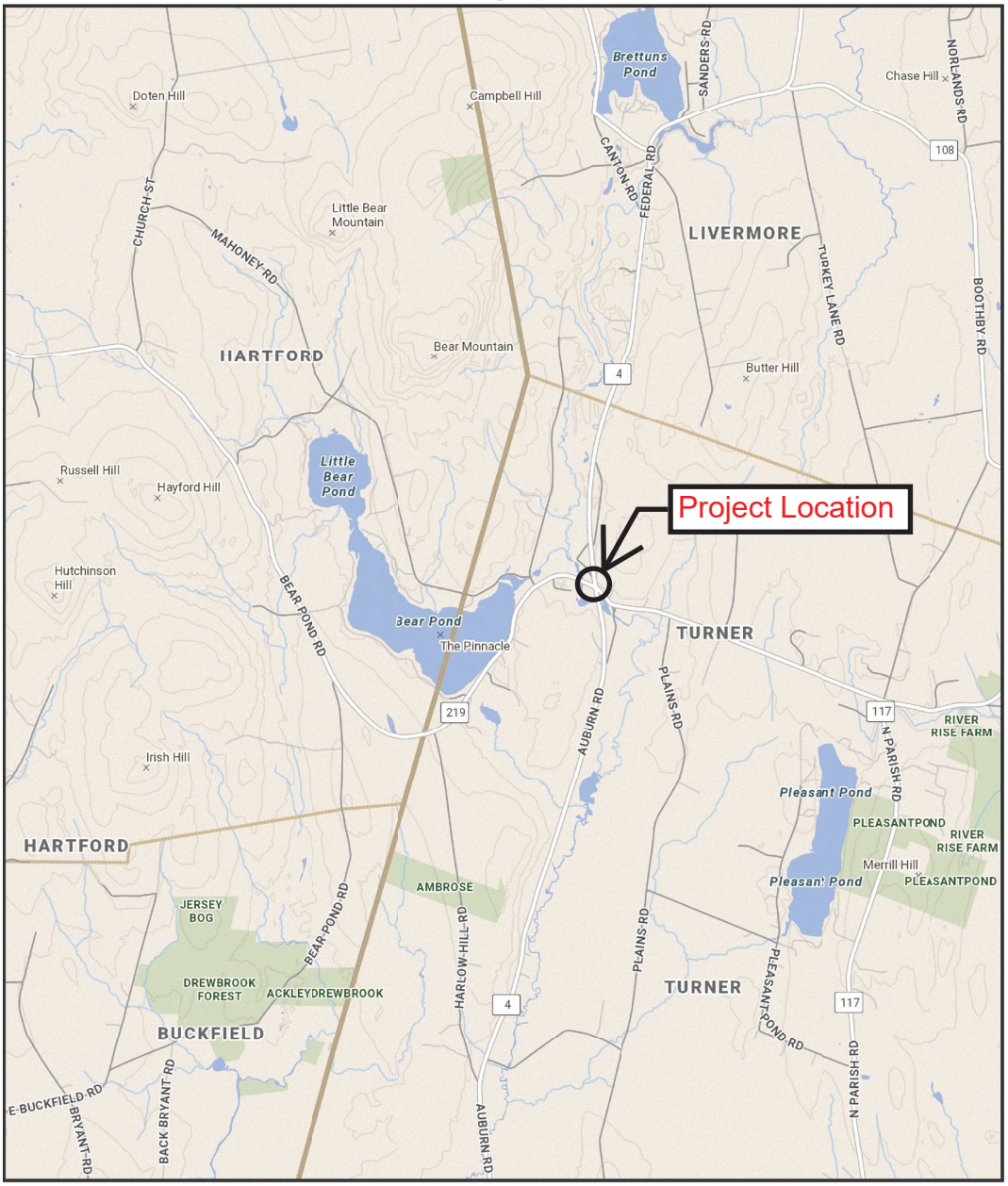
Sheets

Date:2/2/2024

Division: GEOTECH

Username: terry.white

TURNER, 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.

1 Miles

1 inch = 1.14 miles

Date: 2/2/2024
Time: 9:08:32 AM

SHEET NUMBER 1 OF 3	TURNER ROUTE 4 LOCATION MAP	STATE OF MAINE DEPARTMENT OF TRANSPORTATION 2420100 WIN 24201.00 HIGHWAY PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2420100

WIN 24201.00

HIGHWAY PLANS

PROJ. MANAGER	R. MOULTON	BY	DATE
DESIGN-DETAILED	C. SULLOWAY	---	---
CHECKED-REVIEWED	---	---	---
DESIGN2-DETAILED2	K.MAGUIRE	T. WHITE	FEB. 2024
DESIGN3-DETAILED3	---	---	---
REVISIONS 1	---	---	---
REVISIONS 2	---	---	---
REVISIONS 3	---	---	---
REVISIONS 4	---	---	---
FIELD CHANGES	---	---	---

SIGNATURE

P.E. NUMBER

DATE

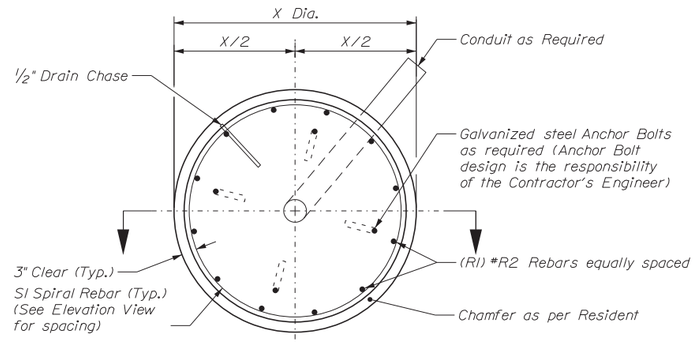
TURNER
ROUTE 4

BORING LOCATION PLAN

SHEET NUMBER

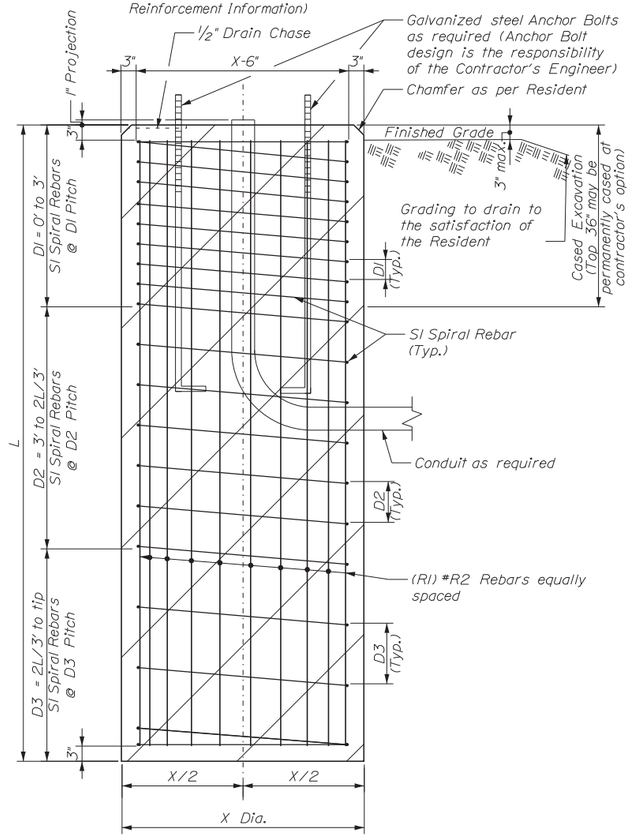
2

OF 3



Drilled Shaft Plan View

Not to Scale (See Table for Drilled Shaft & Reinforcement Information)



Drilled Shaft Elevation View

Not to Scale (See Table for Drilled Shaft & Reinforcement Information)

LIGHT POLES

See Boring Location Plan for Boring and Lighting Pole Locations.

NOTES:

1. All reinforcing steel is to be grade 60 and conform to MaineDOT Standard Specification requirements along with any project specific Supplementals or Special Provisions.
2. All rebar shall have 3" cover unless otherwise noted.
3. Should there be a discrepancy between these Details and actual observed field conditions report it to the Resident immediately.
4. Do not proceed with dependent work until any such discrepancy is resolved to the satisfaction of the Resident.
5. Concrete to be Class LP with f'c = 5,000 PSI.
6. Foundation sizes are designed based on estimated loading conditions and are subject to change based on the design of the above-ground components and the actual loading conditions at the top of each foundation submitted by the Contractor in accordance with Standard Specification Section 626.034. Any increase in foundation size based on the submitted loading conditions shall be paid for at the unit price bid by the Contractor. Any reduction in foundation size shall be to the benefit of the Department at the unit price bid by the Contractor.

DRILLED SHAFT FOUNDATIONS

	Drilled Shaft Dimensions		Reinforcing Steel			Spiral Bar Spacing		
	X	L	R1	R2	S1	D1 (in)	D2 (in)	D3 (in)
	Diameter (feet)	Length (feet)	Longitudinal Rebars Quantity	Longitudinal Rebars Size	Spiral Rebars Size	0 to 3 ft	3 ft to 2L/3 ft	2L/3 ft to tip
ALL 35 FOOT TALL LIGHT POLES	2.5	8.0	12	#8	#5	4	8	12

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2420100

WIN 24201.00

HIGHWAY PLANS

	BY	DATE
PROJ. MANAGER		
DESIGN-DETAILED		
CHECKED-REVIEWED	K.MAGUIRE	FEB 2024
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE

P.E. NUMBER

DATE

TURNER
ROUTE 4

LIGHT POLE FOUNDATIONS

SHEET NUMBER

3

OF 3

Appendix A

Boring Logs

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS (more than half of material is larger than No. 200 sieve size)	GRAVELS (more than half of coarse fraction is larger than No. 4 sieve size)	CLEAN GRAVELS (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.
		GRAVEL WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (more than half of coarse fraction is smaller than No. 4 sieve size)	CLEAN SANDS (little or no fines)	SW	Well-graded sands, Gravelly sands, little or no fines
			SP	Poorly-graded sands, Gravelly sand, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (more than half of material is smaller than No. 200 sieve size)	SILTS AND CLAYS (liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, Silty or Clayey fine sands, or Clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, Gravelly clays, Sandy clays, Silty clays, lean clays.
			OL	Organic silts and organic Silty clays of low plasticity.
	SILTS AND CLAYS (liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine Sandy or Silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

Desired Soil Observations (in this order, if applicable):

Color (Munsell color chart)
Moisture (dry, damp, moist, wet)
Density/Consistency (from above right hand side)
Texture (fine, medium, coarse, etc.)
Name (Sand, Silty Sand, Clay, etc., including portions - trace, little, etc.)
Gradation (well-graded, poorly-graded, uniform, etc.)
Plasticity (non-plastic, slightly plastic, moderately plastic, highly plastic)
Structure (layering, fractures, cracks, etc.)
Bonding (well, moderately, loosely, etc.,)
Cementation (weak, moderate, or strong)
Geologic Origin (till, marine clay, alluvium, etc.)
Groundwater level

Maine Department of Transportation
Geotechnical Section
Key to Soil and Rock Descriptions and Terms
Field Identification Information

MODIFIED BURMISTER SYSTEM

Descriptive Term	Portion of Total (%)
trace	0 - 10
little	11 - 20
some	21 - 35
adjective (e.g. Sandy, Clayey)	36 - 50

TERMS DESCRIBING DENSITY/CONSISTENCY

Coarse-grained soils (more than half of material is larger than No. 200 sieve): Includes (1) clean gravels; (2) Silty or Clayey gravels; and (3) Silty, Clayey or Gravelly sands. Density is rated according to standard penetration resistance (N-value).

Density of Cohesionless Soils	Standard Penetration Resistance N-Value (blows per foot)
Very loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

Fine-grained soils (more than half of material is smaller than No. 200 sieve): Includes (1) inorganic and organic silts and clays; (2) Gravelly, Sandy or Silty clays; and (3) Clayey silts. Consistency is rated according to undrained shear strength as indicated.

Consistency of Cohesive soils	SPT N-Value (blows per foot)	Approximate Undrained Shear Strength (psf)	Field Guidelines
Very Soft	WOH, WOR, WOP, <2	0 - 250	Fist easily penetrates
Soft	2 - 4	250 - 500	Thumb easily penetrates
Medium Stiff	5 - 8	500 - 1000	Thumb penetrates with moderate effort
Stiff	9 - 15	1000 - 2000	Indented by thumb with great effort
Very Stiff	16 - 30	2000 - 4000	Indented by thumbnail
Hard	>30	over 4000	Indented by thumbnail with difficulty

Rock Quality Designation (RQD):

$$\text{RQD (\%)} = \frac{\text{sum of the lengths of intact pieces of core* > 4 inches}}{\text{length of core advance}}$$

*Minimum NQ rock core (1.88 in. OD of core)

Rock Quality Based on RQD

Rock Quality	RQD (%)
Very Poor	≤25
Poor	26 - 50
Fair	51 - 75
Good	76 - 90
Excellent	91 - 100

Desired Rock Observations (in this order, if applicable):

Color (Munsell color chart)
Texture (aphanitic, fine-grained, etc.)
Rock Type (granite, schist, sandstone, etc.)
Hardness (very hard, hard, mod. hard, etc.)
Weathering (fresh, very slight, slight, moderate, mod. severe, severe, etc.)
Geologic discontinuities/jointing:
-dip (horiz - 0-5 deg., low angle - 5-35 deg., mod. dipping - 35-55 deg., steep - 55-85 deg., vertical - 85-90 deg.)
-spacing (very close - <2 inch, close - 2-12 inch, mod. close - 1-3 feet, wide - 3-10 feet, very wide >10 feet)
-tightness (tight, open, or healed)
-infilling (grain size, color, etc.)
Formation (Waterville, Ellsworth, Cape Elizabeth, etc.)
RQD and correlation to rock quality (very poor, poor, etc.)
ref: ASTM D6032 and FHWA NHI-16-072 GEC 5 - Geotechnical Site Characterization, Table 4-12
Recovery (inch/inch and percentage)
Rock Core Rate (X.X ft - Y.Y ft (min:sec))

Sample Container Labeling Requirements:

WIN
Bridge Name / Town
Boring Number
Sample Number
Sample Depth
Blow Counts
Sample Recovery
Date
Personnel Initials

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-101

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	368.1	**Auger ID/OD:**	5" Solid Stem
Operator:	Kevin/Brian	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	4/12/2022; 09:00-11:00	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	201+42.7, 6.9 ft Lt.	**Casing ID/OD:**	HW-4"	**Water Level*:**	5.7 ft bgs.
Hammer Efficiency Factor: 0.91		**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	24/18	0.00 - 2.00	1/1/1/1	2	3	SSA	367.9		0.2 ft Topsoil	
										0.2	G#337035 A-1-b, SM WC=17.7%
										1D (0.2-2.0 ft bgs.) Brown, moist, loose, fine to coarse SAND, little silt, trace gravel, roots.	
5	2D	24/17	5.00 - 7.00	2/2/3/3	5	8	13			Light brown, moist, loose, fine to coarse SAND, trace gravel, trace silt.	G#337036 A-1-b, SP WC=5.2%
							24				
							26				
							61				
							187				
10	R1	32.4/31	10.50 - 13.20	RQD = 0%			NQ-2	358.1		10.0	
										Top of Bedrock at Elev. 358.1 ft. Roller Coned ahead to 10.5 ft bgs. R1:Bedrock: Interbedded pelite and limestone and/or dolostone. (Sangerville Formation) Rock Quality = Very poor R1:Core Times (min:sec) 10.5-11.5 ft (2:01) 11.5-12.5 ft (2:07) 12.5-13.2 ft (2:00) Core Blocked 97% Recovery	
	R2	60/56	13.20 - 18.20	RQD = 82%						R2:Bedrock: Interbedded pelite and limestone and/or dolostone. (Sangerville Formation) Rock Quality = Good R2:Core Times (min:sec) 13.2-14.2 ft (2:34) 14.2-15.2 ft (1:48) 15.2-16.2 ft (2:13) 16.2-17.2 ft (2:16) 17.2-18.2 ft (2:48) 93% Recovery	
15											
								349.9		18.2	
20										**Bottom of Exploration at 18.2 feet below ground surface.**	
25											

Remarks:

Auto Hammer #367

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 of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-102

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	352.2	**Auger ID/OD:**	5" Solid Stem
Operator:	Kevin/Brian	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Diedrich D-50	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	4/12/2022; 09:00-11:00	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	201+42, 39.1 ft Rt.	**Casing ID/OD:**	HW-4"	**Water Level*:**	2.5 ft bgs.
Hammer Efficiency Factor: 0.91		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/17	0.00 - 2.00	1/1/1/1	2	3	SSA	352.0		0.2 ft Topsoil	G#337037 A-1-b, SP-SM WC=29.3%
										0.2 — 1D (0.2-2.0 ft bgs.) Dark brown, wet, loose, fine to coarse SAND, trace silt, trace gravel, roots.	
								349.7		2.5	
5	2D	24/20	5.00 - 7.00	2/6/11/12	17	26	13			Light brown, wet, medium dense, Silty fine to coarse SAND, little gravel.	G#337038 A-4, SM WC=21.5%
							126				
	R1	60/59	7.50 - 12.50	RQD = 52%			a95 NQ-2	344.9		a95 blows for 0.3 ft. 7.3 — Top of Bedrock at Elev. 344.9 ft. Roller Coned ahead to 7.5 ft bgs. R1:Bedrock: Interbedded pelite and limestone and/or dolostone. (Sangerville Formation) Rock Quality = Fair R1:Core Times (min:sec) 7.5-8.5 ft (2:02) 8.5-9.5 ft (2:02) 9.5-10.5 ft (2:18) 10.5-11.5 ft (2:16) 11.5-12.5 ft (2:38) 98% Recovery	
10								339.7		12.5 — **Bottom of Exploration at 12.5 feet below ground surface.**	
15											
20											
25											

Remarks:

Auto Hammer #367

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: Intersection of Route 4/219
Location: Turner, Maine

Boring No.: HB-TUR-201
WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	378.4	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 10:30-11:30	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	11+76.6, 12.9 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	378.1		4" HMA (0.3)	
	1D	6/4	1.00 - 1.50	50	---					2.0 ft frost. Brown, moist (frozen), fine to coarse SAND, little silt, little gravel, (Fill).	
										Boulder from 4.0-5.0 ft bgs.	
5	2D	24/12	5.00 - 7.00	6/11/11/13	22	33				Light brown, moist, dense, fine to coarse SAND, little gravel, trace silt, (Fill).	
10	3D	24/18	10.00 - 12.00	17/16/22/35	38	58				Similar to above, except very dense, (Fill).	
								366.4		(12.0) **Bottom of Exploration at 12.0 feet below ground surface.** NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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 of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-202

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	378.5	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 11:30-12:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	12+76, 14.9 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.91	**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	378.2		4" HMA (0.3)	
	1D	12/12	1.50 - 2.50	43/50	---					2.0 ft frost. Brown, frozen, fine to coarse SAND, some gravel, trace silt, (Fill).	
5	2D	14.4/13	5.00 - 6.20	12/19/50(2.4")	---					Similar to above, (Fill).	
								372.3		(6.2) **Bottom of Exploration at 6.2 feet below ground surface.** Boulder REFUSAL, moved to HB-TUR-202A.	
10											
15											
20											
25											

Remarks:

Auto Hammer #2021021

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-TUR-202

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-202A

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	378.4	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 12:00-12:30	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	12+78.7, 14.2 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**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			See HB-TUR-202 for material descriptions.	
5											
10	1D	24/19	10.00 - 12.00	12/15/18/21	33	50				Light brown, moist, dense, fine to coarse SAND, trace gravel, trace silt, (Fill).	
								366.4		12.0	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-203

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	378.7	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 12:30-13:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	13+68.3, 17.0 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	378.4		4" HMA (0.3)	
										2.0 ft frost.	
	1D	24/19	2.00 - 4.00	14/13/20/23	33	50				Brown, damp, dense, fine to coarse SAND, little gravel, trace silt, layer of old pavement, (Fill).	
5	2D	12/12	5.50 - 6.50	8/50	---					Cobble from 4.8-5.4 ft bgs. Brown, damp, dense, fine to coarse SAND, some gravel, trace silt, (Fill). Cobble from 6.5-6.8 ft bgs.	
10	3D	24/20	10.00 - 12.00	6/8/8/10	16	24				Light brown, damp, medium dense, fine to coarse SAND, little gravel, trace silt, (Fill).	
								366.7		(12.0) **Bottom of Exploration at 12.0 feet below ground surface.** NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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

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Boring No.: HB-TUR-203

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219
Location: Turner, Maine

Boring No.: HB-TUR-204
WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	380.4	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 13:30-14:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	14+96.6, 18.5 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**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	380.0		4½" HMA (0.4)	
										2.0 ft frost.	
	1D	24/18	2.00 - 4.00	28/19/15/19	34	52				Brown, damp, very dense, fine to coarse SAND, some gravel, trace silt, occasional cobbles, (Fill).	
5	2D	18/14	5.00 - 6.50	43/33/58	91	138				Similar to above, (Fill).	
								372.4		(8.0)	
10	3D	24/18	10.00 - 12.00	12/10/9/11	19	29				Light brown, damp, medium dense, fine to coarse SAND, little gravel, trace silt.	
								368.4		(12.0)	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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Boring No.: HB-TUR-204

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-205

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	382.7	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 14:00-14:30	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	16+09.4, 18.9 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	382.3		4½" HMA (0.4)	
										2.0 ft frost.	
	1D	6/6	2.00 - 2.50	50	---					Brown, damp, dense, fine to coarse SAND, some gravel, trace silt, old pavement, (Fill). Cobble from 2.5-3.0 ft bgs.	
								378.7		(4.0)	
5	2D	24/17	5.00 - 7.00	14/11/8/8	19	29				Light brown, damp, medium dense, fine to coarse SAND, little gravel, trace silt.	
10	3D	24/24	10.00 - 12.00	1/1/2/2	3	5				Similar to above, except loose.	
								370.7		(12.0)	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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

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Boring No.: HB-TUR-205

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-206

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	384.4	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/8/2023; 14:30-15:15	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	16+85.4, 27.9 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**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	384.0		5" HMA	
										0.4	
										2.0 ft frost.	
										(Off Auger Flights) Brown, damp, fine to coarse SAND, little gravel, trace silt, (Fill).	
								380.4		4.0	
5	1D	24/20	5.00 - 7.00	4/4/4/5	8	12				Light brown, damp, medium dense, fine to coarse SAND, little gravel, trace silt.	
10	2D	24/22	10.00 - 12.00	3/3/3/3	6	9				Similar to above, loose.	
								372.4		12.0	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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

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Boring No.: HB-TUR-206

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-207

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	387.0	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/9/2023; 09:00-10:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	18+09.9, 19.9 ft Rt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**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	386.6		5" HMA — 0.4	
	1D	12/8	1.50 - 2.50	40/55	---					2.0 ft frost Brown, damp, dense (frozen), fine to coarse SAND, some gravel, trace silt, (Fill).	
								383.5		3.5	
5	2D	24/24	5.00 - 7.00	5/4/5/5	9	14				Light brown, wet, medium dense, fine to coarse SAND, trace gravel, trace silt.	
										Large cobble from 9.0-9.9 ft bgs.	
10	3D	2.4/2.4	10.00 - 10.20	50(2.4")	---			376.8		Similar to above. — 10.2 **Bottom of Exploration at 10.2 feet below ground surface.** REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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-TUR-207

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219
Location: Turner, Maine

Boring No.: HB-TUR-208
WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	389.1	**Auger ID/OD:**	5" Solid Stem
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/9/2023; 11:00-13:00	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	19+09.1, 24.3 ft Lt.	**Casing ID/OD:**	HW-4"	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.91	**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	388.4		9" HMA (0.8)	
	1D	24/17	1.50 - 3.50	31/24/16/14	40	61				1.5 ft frost. Brown, damp, very dense, fine to coarse SAND, some gravel, trace silt, (Fill).	
								385.6		(3.5)	
5	2D	24/19	5.00 - 7.00	3/2/2/3	4	6				Brown, wet, loose, fine to coarse SAND, little gravel, trace silt.	
							a50	381.1		[a]50 blows from 7.5-8.0 ft bgs. (8.0)	
	R1	60/57	8.50 - 13.50	RQD = 67%			NQ-2	380.6		Weathered ROCK. Roller Coned ahead to 8.5 ft bgs. (8.5)	
10										Top of Bedrock at Elev. 380.6 ft. R1: Bedrock: Interbedded pelite and limestone and/or dolostone (Sangerville Formation) Rock Quality = Fair R1: Core Times (min:sec) 8.5-9.5 ft (4:03) 9.5-10.5 ft (5:12) 10.5-11.5 ft (5:11) 11.5-12.5 ft (4:36) 12.5-13.5 ft (5:19) 95% Recovery	
								375.6		(13.5)	
15										**Bottom of Exploration at 13.5 feet below ground surface.**	
20											
25											

Remarks:

Auto Hammer #2021021

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-TUR-208

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219
Location: Turner, Maine

Boring No.: HB-TUR-209
WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	389.6	**Auger ID/OD:**	5" Solid Stem
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/10/2023; 10:00-11:30	**Drilling Method:**	Cased Wash Boring	**Core Barrel:**	NQ-2"
Boring Location:	20+13.3, 16.0 ft Lt.	**Casing ID/OD:**	NW-4"	**Water Level*:**	None Observed
Hammer Efficiency Factor:	0.91	**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	389.1		6" HMA (0.5)	
	1D	24/18	2.00 - 4.00	12/12/16/22	28	42				Brown, damp, dense, fine to coarse SAND, little gravel, trace silt, (Fill).	
	R1	24/16	4.80 - 6.80				a22	384.8		(4.8)	
5							20			[a]22 blows from 4.8-5.0 ft bgs. R1: Cobbles. R1: Core Times (min:sec) 4.8-5.8 ft (2:16) 5.86.8 ft (0:45) Roller Coned ahead to 8.0 ft bgs.	
							36	382.8			
							83			(6.8)	
	2D	24/15	8.00 - 10.00	10/11/15/19	26	39				Light brown, moist, dense, Gravelly fine to coarse SAND, trace silt.	
10	3D	3.6/3	10.00 - 10.30	50(3.6")	---			379.3		Similar to above. (10.3) **Bottom of Exploration at 10.3 feet below ground surface.** REFUSAL, possible weathered Rock.	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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

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Boring No.: HB-TUR-209

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219
Location: Turner, Maine

Boring No.: HB-TUR-210
WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	390.0	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/10/2023; 11:30-12:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	21+33.6, 16.3 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	389.5		6" HMA (0.5)	
										2.0 ft frost.	
	1D	24/16	2.00 - 4.00	25/18/13/12	31	47				Brown, moist, dense, fine to coarse SAND, little gravel, trace silt, (Fill).	
								385.5		(4.5)	
5	2D	24/16	5.00 - 7.00	4/5/5/7	10	15				Light brown, damp, medium dense, fine to coarse SAND, little gravel, trace silt.	
10	3D	24/18	10.00 - 12.00	3/4/8/14	12	18				Similar to above.	
								378.0		(12.0)	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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 of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-211

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	390.7	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/10/2023; 12:30-13:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	22+58.3, 16.0 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**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
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							SSA	390.2		6" HMA (0.5)	
										2.0 ft frost.	
	1D	24/18	2.00 - 4.00	18/14/11/12	25	38				Light brown, moist, dense, fine to coarse SAND, little gravel, trace silt, (Fill).	
5	2D	24/17	5.00 - 7.00	5/6/6/8	12	18				Similar to above, medium dense.	
10	3D	24/20	10.00 - 12.00	3/3/4/4	7	11				Similar to above.	
								378.7		(12.0) **Bottom of Exploration at 12.0 feet below ground surface.** NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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-TUR-211

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: Intersection of Route 4/219

Location: Turner, Maine

Boring No.: HB-TUR-212

WIN: 24201.00

Driller:	S.W. Cole	**Elevation (ft.)**	387.4	**Auger ID/OD:**	5" Dia.
Operator:	Matt/Jay	**Datum:**	NAVD88	**Sampler:**	Standard Split Spoon
Logged By:	B. Wilder	**Rig Type:**	Mobile B-48, Track	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/9/2023; 10:30-11:00	**Drilling Method:**	Solid stem Auger	**Core Barrel:**	N/A
Boring Location:	300+83.9, 4.7 ft Lt.	**Casing ID/OD:**	N/A	**Water Level*:**	None Observed
Hammer Efficiency Factor: 0.91		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
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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	387.1		4" HMA	
										0.3	
	1D	24/17	2.50 - 4.50	10/9/5/10	14	21				Cobble from 1.5-2.5 ft bgs. Brown, damp, medium dense, fine to coarse SAND, little gravel, little silt, (Fill).	
								382.9		4.5	
5	2D	24/14	5.00 - 7.00	8/6/6/5	12	18				Light brown, moist, medium dense, fine to coarse SAND, little gravel, little silt.	
10	3D	24/16	10.00 - 12.00	2/3/3/5	6	9				Light brown, moist, loose, fine to coarse SAND, trace gravel, trace silt.	
								375.4		12.0	
										Bottom of Exploration at 12.0 feet below ground surface. NO REFUSAL	
15											
20											
25											

Remarks:

Auto Hammer #2021021

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.

Appendix B

Laboratory Test Results

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Town(s): Turner Work Number: 24201.00

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-TUR-101, 1D	201+42.7	6.9 Lt.	0.2-2.0	337035	1	17.7			SM	A-1-b	II
HB-TUR-101, 2D	201+42.7	6.9 Lt.	5.0-7.0	337036	1	5.2			SP	A-1-b	0
HB-TUR-102, 1D	201+42	39.1 Rt.	0.2-2.0	337037	1	29.3			SP-SM	A-1-b	0
HB-TUR-102, 2D	201+42	39.1 Rt.	5.0-7.0	337038	1	21.5			SM	A-4	III

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.

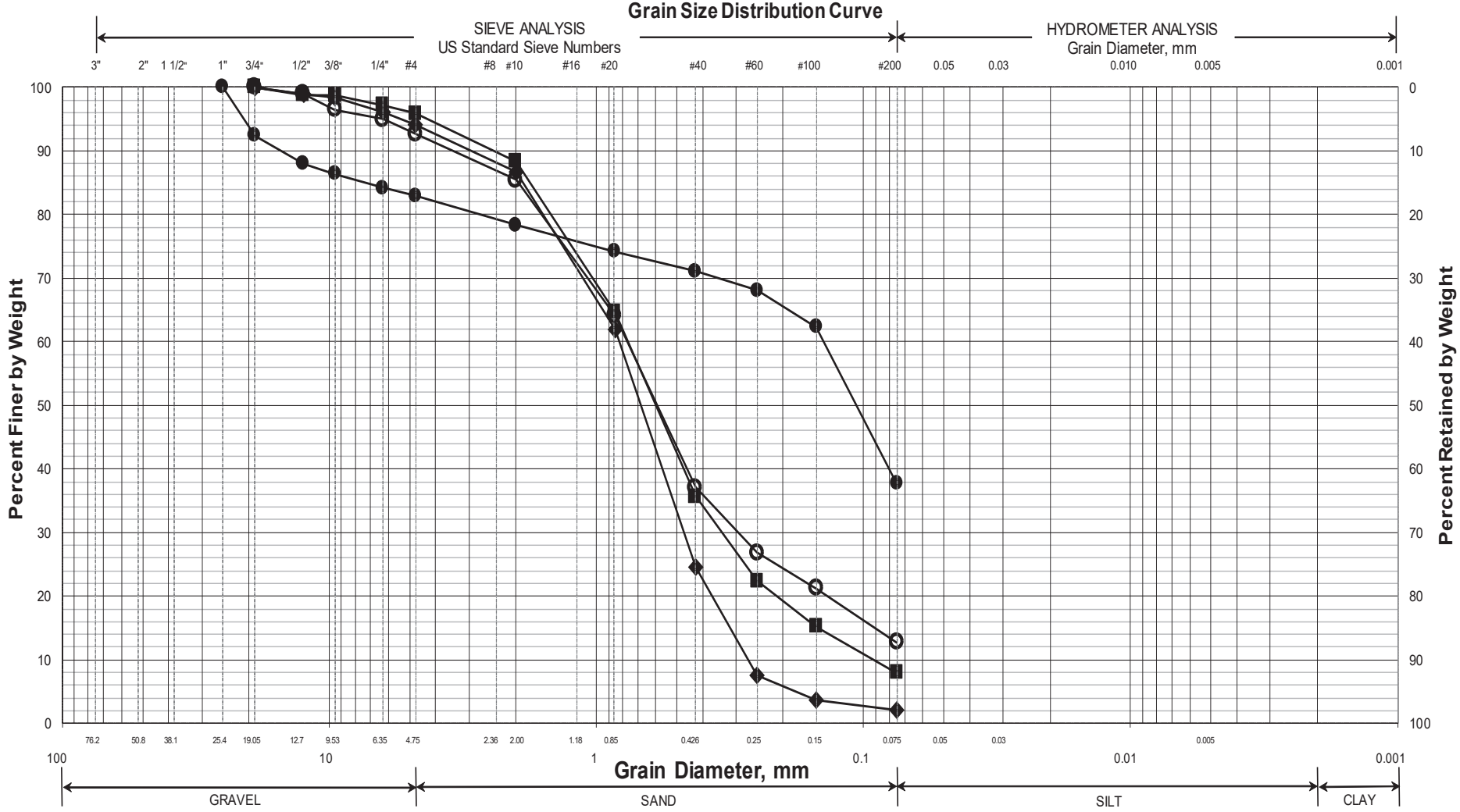
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

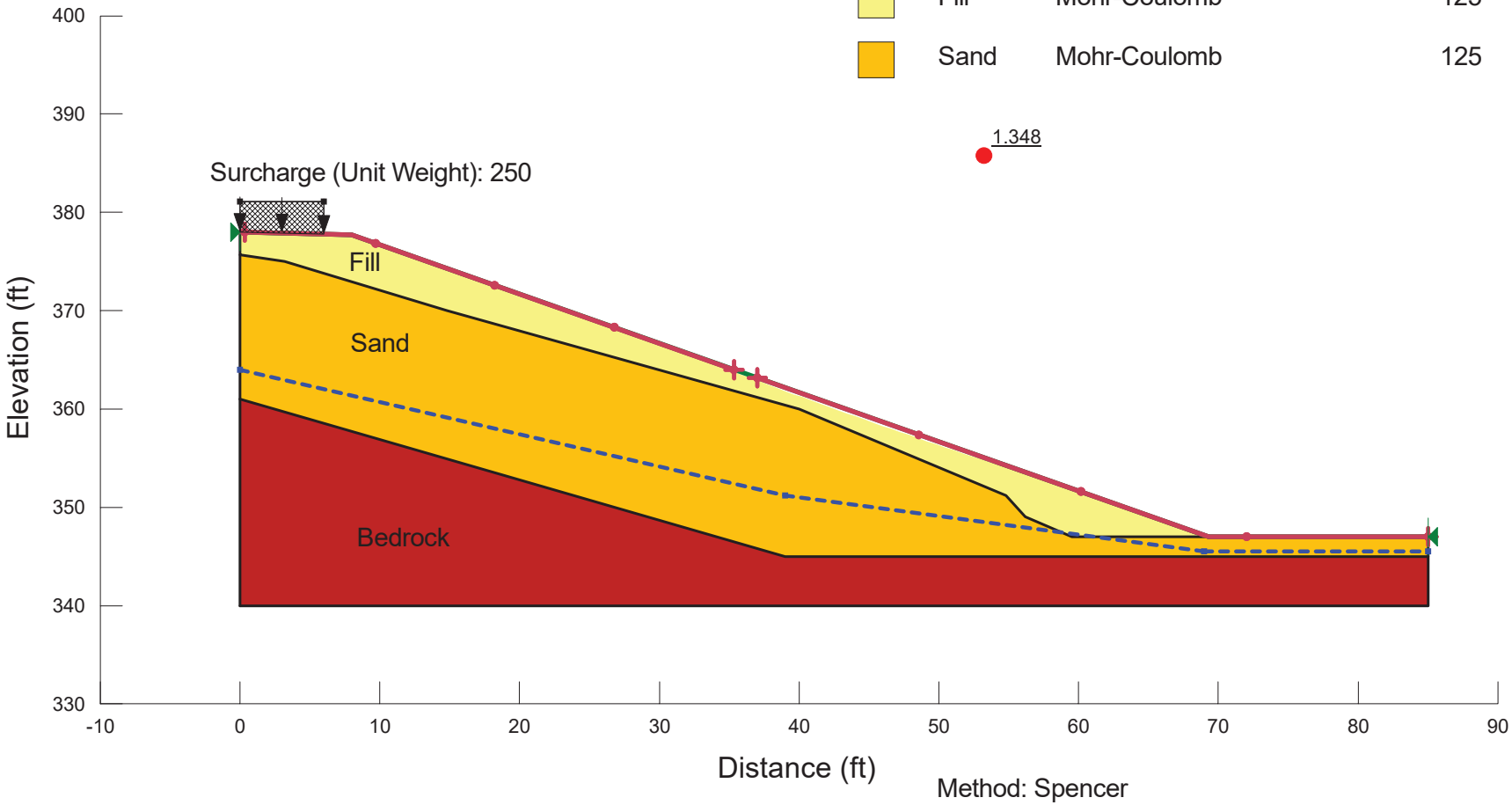
	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	WC, %	LL	PL	PI
○	HB-TUR-101/1D	201+42.7	6.9 LT	0.2-2.0	SAND, little silt, trace gravel.	17.7			
◆	HB-TUR-101/2D	201+42.7	6.9 LT	5.0-7.0	SAND, trace gravel, trace silt.	5.2			
■	HB-TUR-102/1D	201+42	39.1 RT	0.2-2.0	SAND, trace silt, trace gravel.	29.3			
●	HB-TUR-102/2D	201+42	39.1 RT	5.0-7.0	Silty SAND, little gravel.	21.5			
▲									
×									

WIN
024201.00
Town
Turner
Reported by/Date
WHITE, TERRY A 5/2/2022

Appendix C

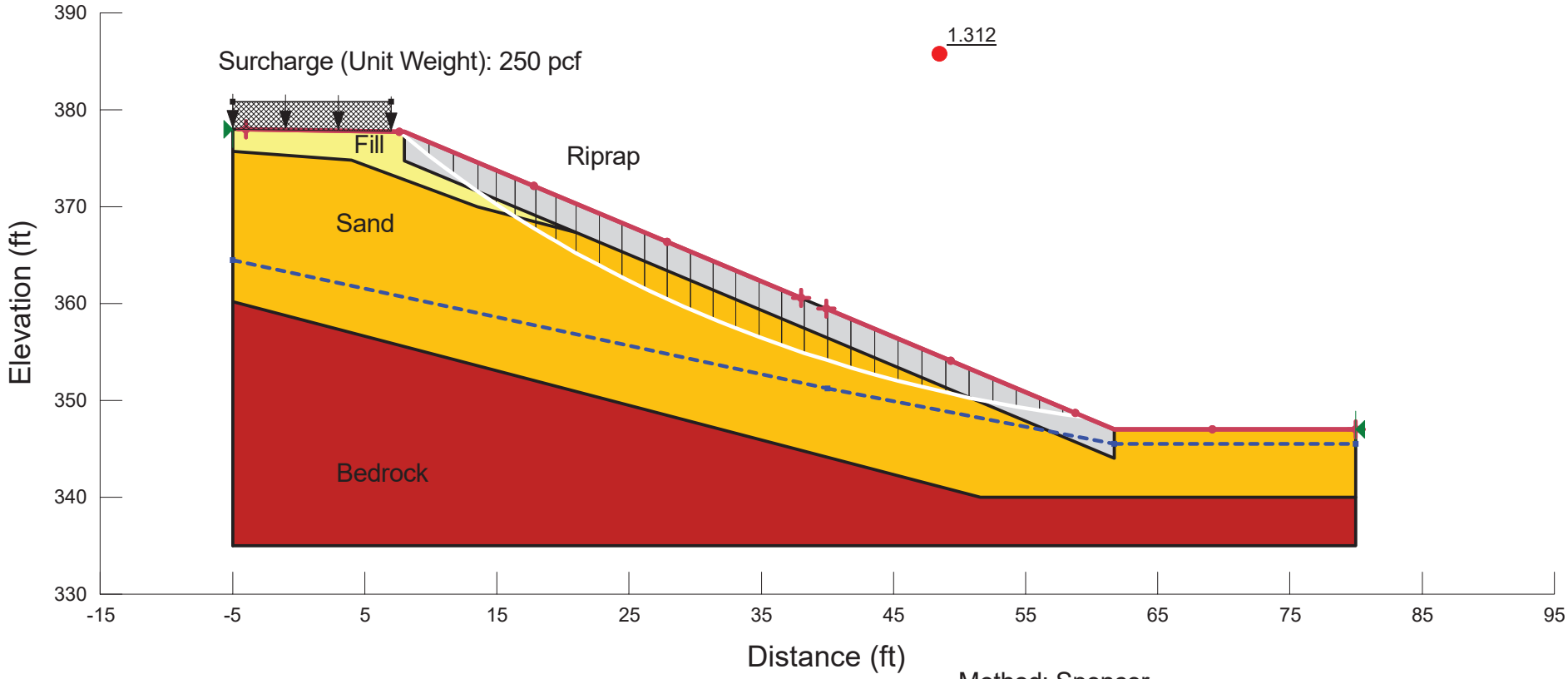
Slope Stability Analyses

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Friction Angle (°)
	Bedrock	Bedrock (Impenetrable)		
	Fill	Mohr-Coulomb	125	34
	Sand	Mohr-Coulomb	125	34



Method: Spencer
File Name: Sta 202+20 - 2 to 1 slope.gsz

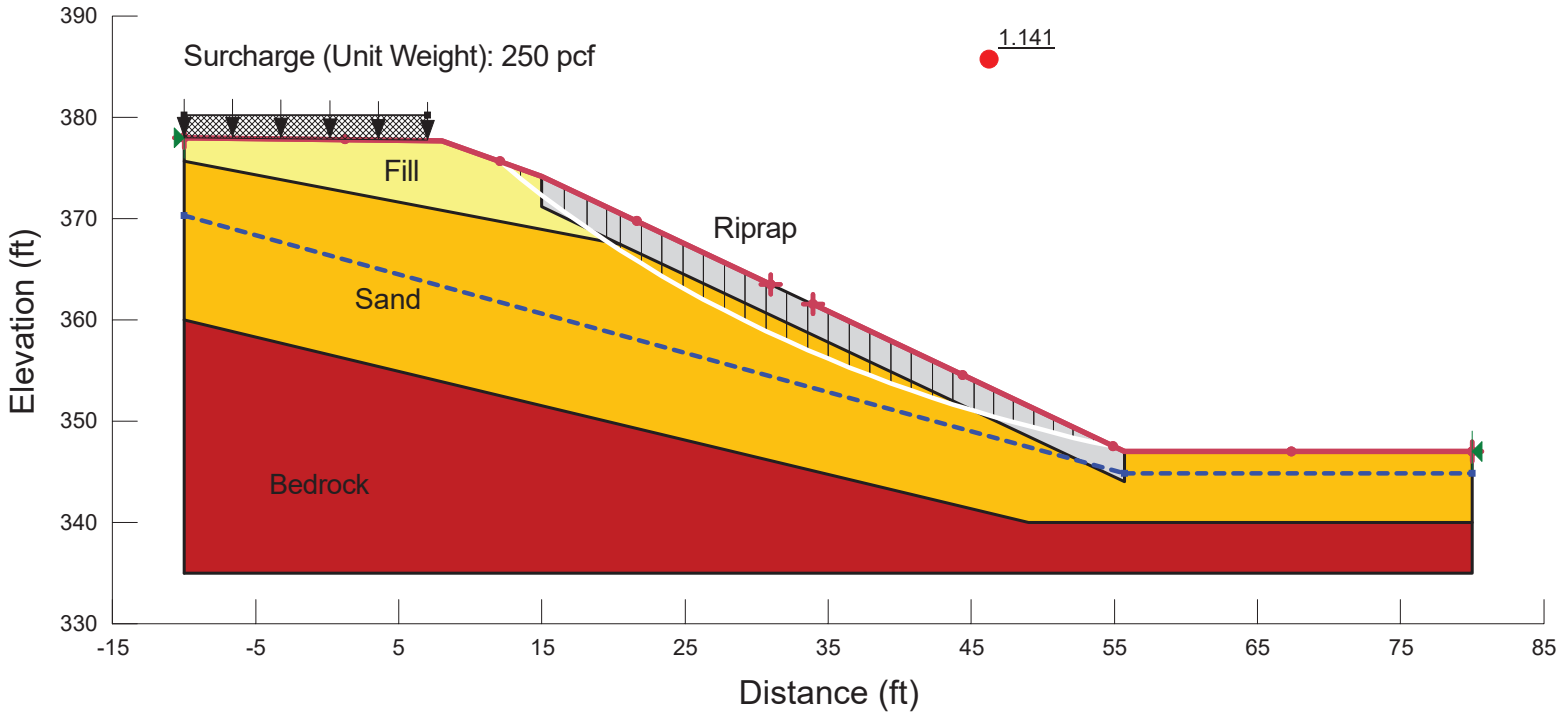
Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Friction Angle (°)
	Bedrock	Bedrock (Impenetrable)		
	Fill	Mohr-Coulomb	125	34
	Riprap	Mohr-Coulomb	145	42
	Sand	Mohr-Coulomb	125	34



Method: Spencer

File Name: Sta 202+20 1.75 to 1 slope.gsz

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Friction Angle (°)
	Bedrock	Bedrock (Impenetrable)		
	Fill	Mohr-Coulomb	125	34
	Riprap	Mohr-Coulomb	145	42
	Sand	Mohr-Coulomb	125	34



Method: Spencer

File Name: Sta 202+20 - 1.5 to 1 slope.gsz