MAINE DEPARTMENT OF TRANSPORTATION HIGHWAY PROGRAM GEOTECHNICAL SECTION AUGUSTA, MAINE

GEOTECHNICAL DATA REPORT

For the Replacement of

CROSS CULVERT #184299 ROUTE 2 MATTAWAMKEAG, MAINE

Prepared by: Yueh-Ti Lee Assistant Geotechnical Engineer



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

Penobscot County WIN 25425.00 Soils Report 2024-47 December 31, 2024

INTRODUCTION

The purpose of this Geotechnical Data Report is to document subsurface information collected for the proposed replacement of an approximately 24-inch diameter, 104-foot long reinforced concrete pipe (RCP) culvert (Cross Culvert #184299). This report presents the results of a limited geotechnical investigation performed at the existing culvert. Cross Culvert #184299 is located on Route 2, approximately 0.4 of a mile north of the Winn Town Line, as shown in the attached Location Map. Route 2 is a Highway Corridor Priority 3 road. The proposed structure consists of a 42-inch diameter, 106-foot long Option III pipe culvert.

SUBSURFACE INVESTIGATION

Subsurface conditions were explored by drilling three (3) borings (HB-MAT-101, HB-MAT-103, and HB-MAT-104) and two (2) probes (HB-MAT-102 and HB-MAT-102A) near two (2) existing storm drain pipes, and at opposite, diagonal corners of the existing cross culvert by the MaineDOT drill crew. Exploration locations are presented in the attached Boring Location Plan. The details and sampling methods used, field data obtained, soil conditions encountered, and exploration locations are presented in the attached Boring Location

An NETTCP certified Subsurface Inspector logged the subsurface conditions encountered. The MaineDOT geotechnical engineer selected the boring and probe locations and drilling methods, designated type and depth of sampling techniques, reviewed boring and probe logs and identified field testing requirements. The borings and probes were located in the field using taped measurements at the completion of the drilling program.

LABORATORY TESTING

A laboratory testing program was conducted on select soil samples obtained in the borings to assist in soil classification. Laboratory testing consisted of five (5) standard grain size analyses with natural water content. The results of the laboratory tests are summarized in the attached Laboratory Testing Summary Sheet and Grain Size Distribution Curves. Laboratory test results for the samples obtained in the borings are also summarized on the attached Boring Logs.

CLOSURE

This Geotechnical Data Report has been prepared to document the geotechnical work conducted at Cross Culvert #184299 on Route 2 in Mattawamkeag, Maine in accordance with generally accepted geotechnical and foundation engineering practices. No other intended use or warranty is expressed or implied.

MaineDOT conducted a limited number of soil explorations at discrete locations at the culvert. No interpretations or conclusions have been derived from this geotechnical information. Data provided may not be representative of the subsurface conditions between exploration locations.

Attachments:

Location Map Boring Location Plan Key to Soil and Rock Descriptions and Terms Boring Logs Lab Testing Summary Sheet Data Grain Size Distribution Curves





	STATE OF MAINE DEPARTMENT OF TRANSPORTATION	25425.00	VIN 25425.00 HIGHWAY PLANS
URVE DATA #1 P = 259958. D = 259958. D = 259958. L = 427.54 E = 47.26	MATTAWAMKEAGE R. SOUCY BY DATE DESCRIPTION ON CONTRACT OF TAMED OF TOTAL		BORING LOCATION PLAN REVSIONS 2 DATE DATE
	0	2	

	UNIFIE	ED SOIL C	LASSIFIC	CATION SYSTEM		MODIFIED E	BURMISTER S	YSTEM
MA		ONS	GROUP SYMBOLS	TYPICAL NAMES				
COARSE- GRAINED	GRAVELS	CLEAN GRAVELS	GW	Well-graded gravels, gravel- sand mixtures, little or no fines.	Descrip tr	<u>tive Term</u> race ittle	Port	<u>ion of Total (%)</u> 0 - 10 11 - 20 21 - 25
SUILS	f coarse ıan No. 4)	(little or no fines)	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.	adjective (e.g.	. Sandy, Clayey)		21 - 35 36 - 50
	half o ger th e size						S DESCRIBIN	G
	than is lar sieve	GRAVEL	GM	Silty gravels, gravel-sand-silt	Coarse-grained	soils (more than half	of material is larger t	han No. 200
5	more	WITH FINES		mixtures.	sieve): Includes (1 Clayey or Gravelly	1) clean gravels; (2) S y sands. Density is ra	ilty or Clayey gravels ated according to star	s; and (3) Silty, ndard
s large (e)	ţı.	(Appreciable amount of	GC	Clayey gravels, gravel-sand-clay mixtures.	penetration resista	ance (N-value).	Ũ	
aterial i ieve siz		fines)			Den Cohesion	nsity of nless Soils	<u>Standard Po</u> <u>N-Valu</u>	enetration Resistance e (blows per foot)
f of m 200 s		CLEAN	SW	Well-graded sands, Gravelly	Very Lo	/ loose oose		0 - 4 5 - 10
an hal No.	SANDS	SANDS		sands, little or no fines	Mediur De	m Dense ense		11 - 30 31 - 50
than than	rse Vo. 4	(little or no	SP	Poorly-graded sands, Gravelly	Very	Dense		> 50
(mc	of coa than I e)	fines)		sand, little of no fines.	Fine-grained soil	<u>Is</u> (more than half of r	material is smaller the	an No. 200
	an half c smaller ieve size	SANDS WITH	SM	Silty sands, sand-silt mixtures	sieve): Includes (1 or Silty clays; and strength as indica	 inorganic and orgar Clayey silts. Con ted 	nic silts and clays; (2 sistency is rated acc) Gravelly, Sandy ording to undrained shear
	ore th ion is s	FINES			ou onger do maiou	iou.	Approximate	
	(m fract	(Appreciable amount of	SC	Clayey sands, sand-clay mixtures.	Consistency of	SPT N-Value	<u>Shear</u>	<u>Field</u>
		fines)			Cohesive soils	(blows per foot) WOH, WOR,	Strength (psf)	<u>Guidelines</u>
			ML	Inorganic silts and very fine	Very Soft	WOP, <2	0 - 250 250 - 500	Fist easily penetrates
				fine sands, or Clayey silts with	Medium Stiff	5 - 8	500 - 1000	Thumb penetrates with
	SILTS AN	ID CLAYS		slight plasticity.	Stiff	9 - 15	1000 - 2000	Indented by thumb with
FINE- GRAINED			CL	Inorganic clays of low to medium plasticity. Gravelly clays. Sandy	Verv Stiff	16 - 30	2000 - 4000	great effort Indented by thumbnail
SOILS	(liquid limit l	ess than 50)		clays, Silty clays, lean clays.	Hard	>30	over 4000	Indented by thumbnail
	(inquid innici	000 11011 000	OL	Organic silts and organic Silty	Rock Quality Des	signation (RQD):		with dimodity
e e				clays of low plasticity.	RQD (%) =	sum of the lengths	of intact pieces of length of core a	f <u>core* > 4 inches_</u> dvance
erial is ve siz			мн	Inorganic silts micaceous or	1	*Minimu	um NQ rock core (1.88 in. OD of core)
f mate 00 sie				diatomaceous fine Sandy or		Rock Quality Ba	ased on RQD	
half o Vo. 2(SIL IS AN	ID CLATS		Sitty solis, elastic sits.		Very Poor	<u>KQD (%)</u> ≤25	
than than 1			СН	Inorganic clays of high plasticity, fat clays.		Poor Fair	26 - 50 51 - 75	
aller	(liquid limit ar	eater than 50)	ОН	Organic clave of medium to		Good Excellent	76 - 90 91 - 100	
) ms	լոգտա ուուէ ցլ			high plasticity, organic silts.	Desired Rock C	Observations (in the	his order, if appli	cable):
					Texture (aphan	color cnart) itic, fine-grained, ef	tc.)	
	HIGHLY SC	ORGANIC 0ILS	Pt	Peat and other highly organic soils.	Rock Type (gra Hardness (verv	nite, schist, sandst hard, hard, mod. h	one, etc.) ard, etc.)	
					Weathering (fre	sh, very slight, slig	ht, moderate, mod	l. severe, severe, etc.)
Desired So Color (Mun	bil Observat sell color ch	tions (in thi art)	s order, it	rapplicable):	Geologic discor	ntinuities/jointing: -dip (horiz - 0-5 de	a., low angle - 5-3	5 dea mod. dippina -
Moisture (d	ry, damp, m	oist, wet)		-:		35-55 deg., ste	ep - 55-85 deg., ve	ertical - 85-90 deg.)
Density/Col Texture (fin	e, medium,	om above ri coarse, etc.	gnt hand :)	side)		-spacing (very close close - 1-3 feet,	se - <2 inch, close , wide - 3-10 feet, *	- 2-12 incn, mod. very wide >10 feet)
Name (San Gradation (d, Silty San	d, Clay, etc.	, including	portions - trace, little, etc.)		-tightness (tight, op	pen, or healed)	,
Plasticity (n	on-plastic, s	slightly plast	ic, modera	ately plastic, highly plastic)	Formation (Wat	terville, Ellsworth, C	Cape Elizabeth, etc.)	c.)
Structure (la	ayering, frac	tures, crack	s, etc.)		RQD and correl	lation to rock qualit	y (very poor, poor,	, etc.) Geotechnical
Cementatio	n (weak, mo	oderate, or s	strong)		Site Characte	erization, Table 4-12	2	Conconnical
Geologic O Groundwate	rigin (till, ma er level	arine clay, al	luvium, et	c.)	Recovery (inch/ Rock Core Rate	/inch and percenta e (X.X ft - Y.Y ft (mi	ge) in:sec))	
					Sample Cont	ainer Labeling I	Requirements:	
	Maine L	Jepartme Geotechi	nt of Tra nical Se	ansportation ction	WIN	/ Tour	Blow Counts	_
Ke	y to Soil a	and Rock	Descrip	otions and Terms	Bridge Name Boring Numbe	/ IOWN er	Sample Recov	ery
	Fiel	d Identific	ation Inf	ormation	Sample Numb	ber	Personnel Initia	als
					Sample Deptr	I		

	Main	e Dep	artment	of Transport	ation	Project	: U.S.F	Route 2	Large Culvert Replacement	Boring No.:	HB-M.	AT-101
			Soil/Rock Exp US CUSTOM/	Ioration Log ARY UNITS		Locatio	on: Mat	tawaml	keag, Maine	WIN:	2542	25.00
Drill	er:		MaineDOT		Elevatio	n (ft.)	221.	3		Auger ID/OD:	5" Dia.	
Ope	rator:		Daggett/Jay		Datum:	()	NAV	VD88		Sampler:	Standard Split	Spoon
Log	aed Bv:		B. Wilder		Rig Typ	e:	CM	E 45C		Hammer Wt./Fall:	140#/30"	
Date	e Start/Fi	nish:	7/27/2021:10	:30-12:30	Drilling	Method:	Soli	d Stem	Auger	Core Barrel:	N/A	
Bori	ing Loca	tion:	660+74, 17.9	ft Rt.	Casing	ID/OD:	N/A		0	Water Level*:	10.0 ft bgs.	
Ham	nmer Effi	ciency F	actor: 0.89		Hamme	r Type:	Autom	atic 🖂	Hvdraulic 🗆	Rope & Cathead □		
Defini D = S MD = U = T MU = V = F MV =	itions: Split Spoon S Unsuccess Thin Wall Tu Unsuccess Tield Vane S Unsuccess	Sample sful Split Sp be Sample sful Thin Wa Shear Test, sful Field Va	oon Sample Atten III Tube Sample A PP = Pocket Pe <u>ne Shear Test Att</u>	R = Rock C SSA = Solic npt HSA = Hollk RC = Roller ttempt WOH = We netrometer WOR/C = V WOPIP = W Sample Information	I Stem Auger by Stem Auger cone ight of 140lb. H Veight of Rods eight of One P	r Iammer or Casing erson	S _u = S _{u(la} q _p = N-un Ham N ₆₀ N ₆₀	Peak/Re b) = Lab Unconfin correcte mer Effic = SPT N = (Hamn	emolded Field Vane Undrained She v Vane Undrained Shear Strength (ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annua -uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-unco	ear Strength (psf) T _V (psf) W(LL I Calibration Value PI er Efficiency G rrected C	= Pocket Torvane She C = Water Content, per = Liquid Limit = Plastic Limit = Plasticity Index = Grain Size Analysis = Consolidation Test	ar Strength (psf) cent
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) . Shear Strength (psf) or RQD (%)	N-uncorrected	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	escription and Remark	s	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/19	0.00 - 2.00	11/13/8/8	21 31	SSA	217.3		Brown, damp, dense, fine te (Fill).	o coarse SAND, some g	gravel, little silt,	
- 5 -	2D	24/14	5.00 - 7.00	15/7/5/5	12 18				Olive brown, moist, medium little gravel.	m dense, fine to coarse S	5AND, some silt,	G#340986 A-2-4, SM WC=8.9%
- 10 -	3D	24/18	10.00 - 12.00	4/8/9/12	17 25		-		Olive brown, moist, medius little gravel.	m dense, fine to coarse S	SAND, some silt,	
- 15 -	4D	24/16	15.00 - 17.00	6/11/14/30	25 37		- 204.3		Brown, wet, dense, fine to be been been been been been been been	coarse SAND, little gra	vel, little silt.	
- 20 -							-		NO REFUSAL			
							-					
<u>Strati</u>	fication line ter level rea	s represent dings have	approximate bour	ndaries between soil types; t	ransitions may	l r be gradual	Dons may d	ccur due	e to conditions other	Page 1 of 1		
thar	n those pres	sent at the t	ime measurement	ts were made.						Boring No	b.: HB-MAT	-101

N	laine	Depa	artment	of Tra	nsporta	tion	P	roject:	U.S. F	Route 2 Large Culvert Replacement	Boring No.:	HB-MA	T-102
		<u>s</u> L	Soil/Rock Exp US CUSTOM/	loration Log ARY UNITS	L		L	ocation	: Mat	tawamkeag, Maine	WIN:	2542	25.00
Drillin	na Cont	ractor:	MaineDOT			Flovat		[†)	221	3		5" Dia	
Opera	ator:		Daggett/Jay			Datum	:	,	NAV	VD88	Sampler:	N/A	
Loga	ed Bv:		B. Wilder			Ria Tv	oe:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fi	nish:	7/27/2021:10	:30-12:30		Drillin	I Met	thod:	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	661+74.4, 16.	5 ft Rt.		Casino	ID/C	DD:	N/A		Water Level*:	None Observe	1
Definiti	ons: D =	Spilt Spoo	n Sample		MU = Unsucce	ssful Thin V	/all Tu	ibe Samp	le Atterr	wo1P = Weight of 1 Person			
S = Sa B = Bu MD = U U = Th MV = U V = Fie	mple oπ Al cket Samp Jnsuccess in Wall Tuł Jnsuccessi <u>Id Vane Sl</u>	lger Flights le off Auge ful Split Spo oe Sample ful Field Va <u>near Test,</u>	s r Flights con Sample Atten ne Shear Test Att _PP= Pocket Per	npt tempt netrometer	R = Rock Core SSA = Solid SI HSA = Hollow RC = Roller Co WOH = Weigh WOR/C = Weig	e Sample tem Auger Stem Auge one t of 140lb. F ght of Rods	amme or Cas	er sing		$\begin{array}{l} S_{u} = \text{PearKemolece} - \text{rela Vane Un}\\ S_{u}(\text{lab}) = \text{Lab Vane Undrained Shex}\\ q_{p} = \text{Unconfined Compressive Strer}\\ N-value = \text{Raw Field SPT N-value}\\ T_{v} = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent a = 5 \end{array}$	tarained Shear Strength (pst) ar Strength (psf) ngth (ksf) h (psf) Similar or Equal too	LL = Liquid Lim PL = Plastic Lin PI = Plasticity II G = Grain Size C = Consolidati	it nit ndex Analysis on Test
				Sample Inf	ormation								Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strendth	(psf) or RQD (%)	N-value	Blows	Elevation (ft.)	Graphic Log	Visual Descr	iption and Remarks		Testing Results/ AASHTO and Unified Class.
0						s	SA			Probe, no material description give	en.		
- 5 -													
- 10 -								208.8		Bottom of Exploration at REFUSAL, possible boulder.	12.5 feet below ground	surface.	
- 15 -													
- 20 -													
Rema	arks:	1											
Stratific	cation lines	represent	approximate bou	ndaries betwee	en soil types; tra	ansitions ma	ıy be c	gradual.			Page 1 of 1		
* \Water		linge hove	heen made at tim	les and under		d Ground	lator f	luctuation	s may a	occur due to conditions other			
than t	those pres	ent at the ti	me measurement	ts were made.	Jonutions state	a. Ground	vater f	luciuation	s may o	ucear que lo conditions otner	Boring No	: HB-MAT	-102

N	laine	Depa	rtment	of Transport	ation	Pr	roject:	U.S. F	Route 2 Large Culvert Replacement	Boring No.:	HB-MA	Г-102А
		<u>s</u> L	oil/Rock Exp IS CUSTOM/	loration Log ARY UNITS		Lo	ocation	: Mat	tawamkeag, Maine	WIN:	254	25.00
Drillio	na Cont	ractor	MaineDOT		Flevatio		÷)	221	1		5" Die	
Oper	ator:	actor.	Daggett/Jay		Datum	, , , ,)	NAV	/D88	Sampler:	J Dia.	
Loga	ator.		Daggett Jay		Dia Tun			CM	E 45C	Hommor W/t /Folly	N/A	
Logg	eu Бу:		B. wilder	20.12.20	Rig Typ	e:		CM	19.	Cana Damak	N/A	
Date	Start/FII	nisn:	//2//2021; 10	:30-12:30	Drilling	Met	noa:	Soli	d Stem Auger	Core Barrel:	N/A	,
Definiti	g Locat	ION:	661+70.8, 18.0	6 ft Rt.		ID/C	DD:	N/A	Int WO1P = Weight of 1 Person	Water Level":	None Observe	d
S = Sai B = Bui MD = U U = Thi MV = U V = Fie	mple off Au cket Samp Insuccessf n Wall Tub Insuccessf Id Vane Sh	uger Flights le off Auger ful Split Spo be Sample ful Field Van hear Test,	Flights on Sample Atten e Shear Test Att <u>PP= Pocket Per</u>	R = Rock Cor SSA = Solid S npt HSA = Hollow RC = Roller C tempt WOR = Weig tetrometer WOR/C = We	e Sample Stem Auger Stem Auger Stem Auger Cone ht of 140lb. Ha ight of Rods o	amme <u>er Cas</u>	er sing		$\begin{array}{l} \text{WOT} = \text{VestRemolded Field Vane Ur}\\ \text{S}_{u} = \text{Peak/Remolded Field Vane Ur}\\ \text{S}_{u(lab)} = \text{Lab Vane Undrained Shea}\\ \text{q}_{p} = \text{Unconfined Compressive Strem}\\ \text{VestRemole Raw Field SPT N-value}\\ \text{T}_{v} = \text{Pocket Torvane Shear Strengt}\\ \text{WC} = \text{Water Content, percent} \equiv \text{S} \end{array}$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) n (psf) similar or Equal too	LL = Liquid Lin PL = Plastic Li PI = Plasticity G = Grain Size C = Consolidat	nit mit ndex Analysis ion Test
			;	Sample Information								Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-value Casing	Blows	Elevation (ft.)	Graphic Log	Visual Descri	ption and Remarks		Testing Results/ AASHTO and Unified Class.
0					SS	A			Probe, no material description give	en.		
- 5 - - 10 - - 15 -												
						\square						
						\square						
25						/						
Rema Stratific	arks: ation lines	represent a	ipproximate boui een made at tim	ndaries between soil types; t	ransitions may	/ be g	gradual.	s may o	ccur due to conditions other	Page 1 of 2		
than t	hose prese	ent at the tir	ne measurement	ts were made.				uy U		Boring No.	: HB-MAT	-102A

N	laine	Depa	artment	of Tra	nsport	ation	Р	roject:	U.S. F	Route 2 Large Culvert Replacement	Boring No.:	HB-MA7	C-102A
		<u>s</u> L	Soil/Rock Exp JS CUSTOM	loration Lc ARY UNIT	<u>g</u> <u>S</u>		L	ocation	: Mat	tawamkeag, Maine	WIN:	2542	25.00
Drillin	na Cont	ractor:	MaineDOT			Elevat	on (ft.)	221	1	Auger ID/OD:	5" Dia	
Opera	ator:		Daggett/Jav			Datum	:	,	NAV	/D88	Sampler:	N/A	
Logg	ed By:		B Wilder			Rig Ty	ne:		CM	E 45C	Hammer Wt./Fall:	N/A	
Date	Start/Fi	nish:	7/27/2021 · 10	-30-12-30		Drilling	1 Me	thod:	Soli	d Stem Auger	Core Barrel:	N/A	
Borin	a Locat	ion:	661+70.8 18	6 ft Rt		Casino			N/A	a Stelli Mager	Water Level*	None Observed	1
Definiti	ons: D =	Spilt Spoor	Sample		MU = Unsuco	essful Thin V	Vall Tu	ube Sampl	e Attem	pt WO1P = Weight of 1 Person			·
S = Sai B = Bu MD = U U = Thi MV = U V = Fie	mple off Au cket Samp Insuccessf in Wall Tub Insuccessf Id Vane Sh	uger Flights le off Auger ful Split Spo pe Sample ful Field Var <u>near Test,</u>	Flights on Sample Atten ne Shear Test Att <u>PP= Pocket Per</u>	npt tempt <u>netrometer</u>	R = Rock Cor SSA = Solid S HSA = Hollov RC = Roller C WOH = Weig <u>WOR/C = We</u>	e Sample Stem Auger Stem Auger Cone Int of 140lb. H ight of Rods	amme or Ca	er sing		$\begin{array}{l} S_u = \text{Peak/Remolded Field Vane U}\\ S_{U(lab)} = \text{Lab Vane Undrained She}\\ q_p = \text{Unconfined Compressive Stret}\\ N-value = \text{Raw Field SPT N-value}\\ T_v = \text{Pocket Torvane Shear Strengt}\\ WC = Water Content, percent able Shear Strengt = Shear Shear Strengt = Shear Shear Shear Strengt = Shear Sh$	ndrained Shear Strength (psf) ar Strength (psf) ngth (ksf) h (psf) Similar or Equal too	LL = Liquid Lim PL = Plastic Lir PI = Plasticity Ir G = Grain Size C = Consolidati	it nit Analysis on Test
epth (ft.)	ample No.	en./Rec. (in.)	ample Depth .)	ows (/6 in.) near	rength sf) RQD (%)	-value	SWO	evation .)	aphic Log	Visual Descr	iption and Remarks		Testing Results/ AASHTO and Unified Class
<u>م</u>	Š	Pe	(t Se	<u>مَ بِع</u>	ਹ ਦੂ ਸ਼ੁ	z č	ő Ħ	道 ぎ 1961	Ū	Λ		-25.0	onnied Class.
- 30 - - 35 - - 40 -										Bottom of Exploration at NO REFUSAL	25.0 feet below ground :	surface.	
Stratific	ation lines	represent	approximate bou	ndaries betwe	een soil types; t	ransitions ma	ay be	gradual.			Page 2 of 2		
* Water than t	level read	lings have t ent at the ti	been made at tim me measuremen	nes and under its were made	conditions stat	ed. Ground	vater 1	fluctuation	s may o	ccur due to conditions other	Boring No.	: HB-MAT	-102A

Ι	Maine	e Dep	artment	of Transporta	atio	n	Project	: U.S.F	Loute 2	Large Culvert Replacement	Boring No.:	HB-M	AT-103
		<u>s</u>	Soil/Rock Expl	loration Log ARY UNITS			Locatio	on: Mat	tawaml	keag, Maine	WIN	254	25.00
											vviiv.	2342	23.00
Drille	er:		MaineDOT		Ele	vation	(ft.)	220.	9		Auger ID/OD:	5" Solid Stem	
Oper	rator:		Daggett/Jay		Dat	tum:		NAV	/D88		Sampler:	Standard Split	Spoon
Loge	ged By:		B. Wilder	20.10.00	Rig	Type		CM	E 45C		Hammer Wt./Fall:	140#/30"	
Date	Start/Fi	nish:	7/2//2021; 0/:	:30-10:00	Dri	lling IV	lethod:	Case	d Was	h Boring	Core Barrel:	NQ-2"	
Born	ng Loca		001+80.8, 10.2	2 IT LT.		sing IL	7/0D:	NW	-3"	The descelles 🗖	Water Level :	14.0 π bgs.	
Definit	tions:	ciency r	actor. 0.89	R = Rock Co	ore Sam	ple	Type.	Su =	Peak/Re	emolded Field Vane Undrained She	ear Strength (psf) $T_V =$	Pocket Torvane She	ar Strength (psf)
D = S MD = U = T MU = V = Fi MV =	plit Spoon S Unsuccess hin Wall Tu Unsuccess eld Vane S <u>Unsuccess</u>	Sample ful Split Spo be Sample ful Thin Wa hear Test, ful Field Va	oon Sample Atten III Tube Sample A PP = Pocket Per ne Shear Test Att	SSA = Solid hpt HSA = Hollc RC = Roller ttempt WOH = Wei netrometer WOR/C = W WO1P = Wei Sample Information	Stem A w Stem Cone ght of 14 /eight of 0	Auger Auger 40lb. Ha Rods of One Pers	mmer r Casing son	S _{u(la} q _p = N-un Ham N ₆₀ N ₆₀	b) = Lab Unconfir correcte mer Effic = SPT N = (Hamn	vAne Undrained Shear Strength (ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annual -uncorrected Corrected for Hammener Efficiency Factor/60%)*N-uncor I	psf) WC = LL = PL = I Calibration Value PI = I ar Efficiency G = C crected C = C	- Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	cent
		(· i			g				1				Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in	Sample Dept (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrecte	N ₆₀	Casing Blows	Elevation (ft.)	Graphic Log	Visual De	scription and Remarks		AASHTO and Unified Class.
0							SSA	220.3	~~~~	7" HMA.		0.6	
	1D	24/14	1.50 - 3.50	17/17/19/23	36	53		-		Brown, damp, very dense, occasional cobbles, (Fill).	Gravelly fine to coarse SA	ND, little silt,	G#340985 A-1-a, SW-SM WC=2.4%
- 5 -	2D	24/19	5.00 - 7.00	11/10/30/20	40	59		-		2D (5.5-7.0 ft bgs.) Brown, some gravel, some silt.	moist, very dense, fine to	coarse SAND,	
- 10 -								- 210.9					C //2 10007
10	3D	24/12	10.00 - 12.00	3/3/4/6	7	10				Olive brown, wet, stiff, fine	e to coarse Sandy SILT, lit	ttle gravel.	G#340987 A-4, SM WC=15.1%
- 15 -								-			— — — — — — — — — — — — — — — — — — —		
	4D	24/16	15.00 - 17.00	4/14/23/20	37	55	16			Grey brown, wet, nard, SIL	1, some fine to coarse sar	id, intile gravel.	A-4, SM
							78 57						WC=13.6%
							99						
- 20 -							50	200.9				20.0	G#340989
	5D	24/15	20.00 - 22.00	12/24/19/15	43	64	30 14	-		Brown, wet, very dense, fir	e to coarse SAND, some	sut, little gravel.	A-2-4, SM WC=8.7%
							18]					
							115						
25							153						
Rem Stratifi	arks:	s represent	approximate bour	ndaries between soil types; t	ransition	ns may b	e gradual.				Page 1 of 2		
* Wate	er level rea	dings have	been made at tim	es and under conditions stat	ed. Gro	oundwate	- er fluctuatio	ons mav o	ccur due	e to conditions other			
than	those pres	ent at the ti	me measurement	ts were made.	2.0			., •			Boring No.	: HB-MAT	-103

	Main	e Dep	artment	of Transpor	tation	Project	: U.S. I	Route 2	Large Culvert Replacement	Boring No.:	HB-M.	AT-103
			Soil/Rock Exp US CUSTOM	loration Log ARY UNITS		Locatio	n: Mat	tawaml	eag, Maine	WIN:	2542	25.00
Drill	or:		MaineDOT		Flevatio	n (ft)	220	9		Auger ID/OD:	5" Solid Stem	
Ope	rator:		Daggett/Jay		Datum:		NA	VD88		Sampler:	Standard Split	Spoon
Log	aed By:		B. Wilder		Rig Typ	e:	CM	E 45C		Hammer Wt./Fall:	140#/30"	opeen
Date	Start/Fi	inish:	7/27/2021: 07	:30-10:00	Drilling	Method:	Cas	ed Was	1 Boring	Core Barrel:	NO-2"	
Bori	ng Loca	tion:	661+86.8, 10,	2 ft L t.	Casing	D/OD:	NW	-3"	Doning	Water Level*:	14.0 ft bgs.	
Ham	mer Effi	iciency F	actor: 0.89		Hamme	Type:	Autom	atic 🖂	Hvdraulic 🗆	Rope & Cathead □		
Defini D = S MD = U = T MU = V = F MV =	itions: plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S Unsuccess	Sample sful Split Sp ibe Sample sful Thin Wa Shear Test, sful Field Va	oon Sample Atter all Tube Sample A PP = Pocket Pe ane Shear Test At	R = Roc SSA = S mpt HSA = H RC = Ro Attempt WOH = V enetrometer WOR/C tempt WOIP =	Core Sample olid Stem Auger ollow Stem Auger ller Cone Weight of 140 lb. 1 = Weight of Rods Weight of One Pe	Hammer or Casing erson	S _u = S _{u(la} qp = N-ur Ham N ₆₀ N ₆₀	Peak/Re ab) = Lab Unconfin correcte mer Effic = SPT N = (Hamn	emolded Field Vane Undrained Sh Vane Undrained Shear Strength Ned Compressive Strength (ksf) = Raw Field SPT N-value iency Factor = Rig Specific Annue -uncorrected Corrected for Hamm rer Efficiency Factor/60%)*N-uncc	ear Strength (psf) Tv = (psf) WC LL = PL = Il Calibration Value PI = er Efficiency G = rrected C =	Pocket Torvane She = Water Content, pero Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	ar Strength (psf) cent
		1	1	Sample Information	n							Laboratory
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 De	escription and Remarks		Testing Results/ AASHTO and Unified Class.
25	6D R1	6/6 60/60	25.00 - 25.50 25.50 - 30.50	50 ROD = 45%		NQ-2	195.4		Brown, wet, very dense, fin weathered rock in tip of sp	ne to coarse SAND, some oon.	silt, little gravel,	
		25,00							Top of Bedrock at Elev. 19	95.4 ft.	25.5-	
							1		R1: Bedrock: R1: Core Times (min:sec)			
							-		25.5-26.5 ft (1:10)			
									26.5-27.5 ft (1:07) 27.5-28.5 ft (1:19)			
									28.5-29.5 ft (1:19) 20.5 20.5 ft (1:52)			
- 30 ·						$\uparrow \forall \uparrow$	190.4		100% Recovery			
							-		Bottom of Exploratio	n at 30.5 feet below grou		
							-					
							1					
- 35 -							1					
							-					
							4					
						-	1					
- 40 ·							-					
							4					
]					
	<u> </u>					-	1					
							-					
- 45 -							4					
						1	1					
							-					
							-					
							4					
50												
Rem	harks:	1	1					1	1			
Stratit	fication line	s represent	approximate bou	ndaries between soil tvpe	s; transitions may	be gradual.				Page 2 of 2		
* Wat	er level rea	dings have	been made at tim	nes and under conditions	stated. Groundwa	iter fluctuatio	ons may o	ccur due	to conditions other			100
thar	n those pres	sent at the t	ime measuremen	ts were made.						Boring No	.: HB-MAT	-103

I	Main	e Dep	artment	of Transporta	ation		Project:	U.S. R	oute 2	Large Culvert Replacement	Boring No.:	HB-M.	AT-104
		-	Soil/Rock Exp	loration Log			Locatio	n: Mat	awam	keag, Maine			
			US CUSTOM/	ARY UNITS							WIN:	2542	25.00
Drill	er:		MaineDOT		Eleva	tior	n (ft.)	221.	6		Auger ID/OD:	5" Dia.	
Ope	rator:		Daggett/Jay		Datu	n:		NAV	/D88		Sampler:	Standard Split	Spoon
Log	ged By:		B. Wilder		Rig T	ype	:	CMI	E 45C		Hammer Wt./Fall:	140#/30"	
Date	e Start/Fi	nish:	7/27/2021; 12	:30-14:30	Drilli	ng N	lethod:	Solie	l Stem	Auger	Core Barrel:	N/A	
Bori	ng Loca	tion:	662+75.6, 11.	9 ft Rt.	Casir	ng IE	D/OD:	N/A			Water Level*:	10.5 ft bgs.	
Ham Defini	mer Effi	ciency F	actor: 0.89	R = Rock C	Hamr	ner	Туре:	Automa S., =	ıtic⊠ Peak/R	Hydraulic emolded Field Vane Undrained Sho	Rope & Cathead \Box	Pocket Torvane She	ar Strength (psf)
D = S MD = U = T MU = V = Fi MV =	ield Vane S Unsuccess hin Wall Tu Unsuccess ield Vane S	Sample sful Split Sp be Sample sful Thin Wa shear Test, sful Field Va	con Sample Atten Il Tube Sample A PP = Pocket Pe <u>ne Shear Test Att</u>	SSA = Solic SSA = Solic RC = Roller WOR/C = W empt WOIP = We Sample Information	Stern Aug ow Stern Au Cone ght of 1401 /eight of Ro eight of On	er uger b. Ha ods o <u>e Per</u>	immer r Casing ison	Su = S _u (la q _p = N-un Ham N ₆₀ : N ₆₀ :	b) = Lal Unconfi correcte mer Effi = SPT N = (Hami	 b Vane Undrained Shear Strength (ned Compressive Strength (ksf) id = Raw Field SPT N-value ciency Factor = Rig Specific Annual I-uncorrected Corrected for Hammoner Efficiency Factor/60%)*N-unconsection 	(psf) WC (psf) LL = PL = I Calibration Value PI = er Efficiency G = (rrected C = 0	= Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	cent
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 De	escription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/14	0.00 - 2.00	9/11/12/13	23	34	SSA			Brown, moist, dense, fine t	o coarse SAND, some gra	wel, little silt, old	
- 5 -	2D	24/16	5.00 - 7.00	3/4/15/20	19	28		216.1					
										2D (5.5-7.0 ft bgs) Grey br coarse SAND, little gravel	own, wet, medium dense,	Silty fine to	
- 10 -	3D	24/13	10.00 - 12.00	4/10/16/22	26	39		211.6		Brown, wet, dense, fine to	coarse SAND, little grave		
- 15 -	4D	24/13	15.00 - 17.00	7/13/22/37	35	52				Brown, wet, very dense, fir	ne to coarse SAND little	gravel, little silt.	
								204.6		Bottom of Exploration NO REFUSAL	n at 17.0 feet below grou	nd surface.	
- 20 -													
25													
Stratif * Wate	iarKS: fication line er level rea	s represent dings have	approximate boui	ndaries between soil types; t	ransitions r	may t	pe gradual. er fluctuation	ns may o	ccur du	e to conditions other	Page 1 of 1		
than	n those pres	sent at the t	me measurement	ts were made.				-			Boring No	: HB-MAT	-104

State of Maine - Department of Transportation Laboratory Testing Summary Sheet

Town(s):	Matta	wam	keag		Work	ς Νι	ımk	ber	: 2542	25.00	
Boring & Sample	Station	Offset	Depth	Reference	G.S.D.C.	W.C.	L.L.	P.I.	Cla	ssification	۱
Identification Number	(Feet)	(Feet)	(Feet)	Number	Sheet	%			Unified	AASHTO	Frost
HB-MAT-101, 1D	660+74	17.9 Rt.	5.0-7.0	340986	1	8.9			SM	A-2-4	
HB-MAT-103, 2D	661+86.8	10.2 Lt.	1.5-3.5	340985	1	2.4			SW-SM	A-1-a	0
HB-MAT-103, 2D	661+86.8	10.2 Lt.	10.0-12.0	340987	1	15.1			SM	A-4	
HB-MAT-103, 2D	661+86.8	10.2 Lt.	15.0-17.0	340988	1	13.6			SM	A-4	
HB-MAT-103, 2D	661+86.8	10.2 Lt.	20.0-22.0	340989	1	8.7			SM	A-2-4	
Classification of th	l lasa soil samr	les is in ar	cordance wit		lassificativ	n Svet	om M	.145-4	0 This cla	ssification	,
is followed by the	"Frost Suscer	otibility Rat	ing" from zer	non-frost s	uscentible	a) to Cl	ass IV	(high	lv frost su	sceptible)	
The "Frost Sus	ceptibility Rat	ting" is bas	sed upon the M	MaineDOT an	d Corps of	f Engin	eers C	lassif	ication Sv	stems	
GSDC = Grain Size Distribu	ution Curve as	determined	by AASHTO T	88-93 (1996)	and/or AS	TM D 4	22-63	(Reap	proved 199	98)	

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



UNIFIED CLASSIFICATION

	Boring/Sample No.	Station	Offset, ft	Depth, ft	Description	WC, %	LL	PL	PI
0	HB-MAT-101/2D	660+74	17.9 RT	5.0-7.0	SAND, some silt, little gravel.	8.9			
	HB-MAT-103/1D	661+86.8	10.2 LT	1.5-3.5	Gravelly SAND, little silt.	2.4			
	HB-MAT-103/3D	661+86.8	10.2 LT	10.0-12.0	Sandy SILT, little gravel.	15.1			
	HB-MAT-103/4D	661+86.8	10.2 LT	15.0-17.0	SILT, some sand, little gravel.	13.6			
	HB-MAT-103/5D	661+86.8	10.2 LT	20.0-22.0	SAND, some silt, little gravel.	8.7			
X									

1
n
oy/Date
10/8/2021