

MEMORANDUM

TO:	Jonathan Pitre, PE
	SPS New England, Inc.

FROM: Nicholas Williams, PE Christopher Snow, PE Andrew R. Blaisdell, PE GZA GeoEnvironmental, Inc.

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SUBJECT: Geotechnical Design Basis Memorandum Remaining Overhead Sign Support Structures AC-IM-1927(000)E State WIN 019270.00 Piscataqua River Wearing Surface Replacement Kittery, Maine and Portsmouth, New Hampshire

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ENVIRONMENTAL

WATER CONSTRUCTION MANAGEMENT

GZA GeoEnvironmental, Inc. (GZA) has prepared this geotechnical design basis memorandum for the remainder of the proposed overhead sign structures and closed circuit television (CCTV) poles along Interstate 95 (I-95) (northbound and southbound shoulder/lane) in Kittery, Maine and Portsmouth, New Hampshire. Our services were provided in accordance with our executed contract dated November 30, 2020, which incorporates the scope of work in GZA's November 18, 2020 proposal No. 09.P000133.21. This memorandum is subject to the *Limitations* included in **Appendix A**.

BACKGROUND

SPS New England, Inc. (SPS) is currently constructing the project that includes the part-time shoulder use along I-95 over the Piscataqua River Bridge between Portsmouth, New Hampshire and Kittery, Maine. The roadway upgrades include new bridge and cantilever type overhead sign structures (OHSS), a road weather information system (RWIS), CCTV poles, a dynamic messaging sign (DMS) support, and one antenna tower.

This memorandum has been prepared specifically for the remaining 12 structures to supplement GZA's January 8, 2021, high priority structure group memo in Portsmouth, New Hampshire and Kittery, Maine. The remaining 12 structures are listed with the associated borings in the following section.

We understand that foundations under consideration for the proposed sign structures include spread footings, driven piles, or drilled shafts.



SUBSURFACE EXPLORATIONS

GZA completed a subsurface investigation program consisting of 13 test borings to develop subsurface conditions at the following proposed Phase II sign structures:

- GZ-1 at approximately STA. 474+00 (Cantilever Structure);
- GZ-2 at approximately STA. 496+25 (Cantilever Structure);
- GZ-3 and -3A at approximately STA. 507+75 (Cantilever Structure);
- GZ-4 at approximately STA. 519+00 (Cantilever Structure);
- GZ-5 at approximately STA. 532+50 (Self-Supporting Antenna Tower Structure);
- GZ-6 at approximately STA. 574+75 (Cantilever Structure);
- GZ-7 at approximately STA. 575+25 (Dynamic Message Sign (DMS));
- GZ-11 at approximately STA. 583+00, 102 Dennett Road, Kittery, Maine (CCTV Pole);
- GZ-12 at approximately STA. 589+25 (Cantilever Structure);
- GZ-15 at approximately STA. 617+50 (CCTV Pole);
- GZ-16 at approximately STA. 676+75 (CCTV Pole); and
- GZ-17 at approximately STA. 708+50 (CCTV Pole).

The test boring locations were laid-out in the field by SPS using optical survey to establish the locations and elevations. When the as-drilled locations were moved, GZA measured the offset using a tape and estimated the elevation difference using a hand-held level with respect to the surveyed locations. The approximate exploration locations are shown on **Figure 1**. Elevations referenced in this report are in feet and refer to the North American Vertical Datum of 1988 (NAVD88).

The test borings were drilled to depths from approximately 16 to 49 feet below ground surface (bgs) and were terminated after roller cone advancement into presumed bedrock, or after coring bedrock in accordance with the planned scope of work. The borings were drilled by New England Boring Contractors (NEBC) of Derry, New Hampshire between December 15, 2020 and January 25, 2021. Prior to the drilling, NEBC contacted Dig Safe[®] and DigSmart of Maine to complete clearance of utilities near the boring locations. GZA personnel monitored the drilling work and prepared logs of each boring that are included in **Appendix B**. SPS provided traffic control for the drilling work.

The borings were drilled using 3- and 4-inch driven casing and drive-and-wash drilling techniques. Standard penetration testing (SPT) and split-spoon sampling were typically performed continuously within the upper 15 feet, and at 5-foot typical intervals thereafter in the overburden using a 24-inch-long, 1-3/8-inch insidediameter sampler. The sampler was driven with a 140-lb calibrated automatic hammer with a 30-inch drop from the ATV- or Truck-mounted drill rig. Approximately 5.3 to 15.0 feet of bedrock core was taken from borings GZ-1, -4, -5, -11, -12, -15, -16, and -17 using NX coring equipment. A tricone roller bit was advanced approximately 1.5 feet into probable rock at GZ-2. GZ-3 was drilled at the approximate proposed location of the sign structure and was terminated due to time constraints, and GZ-3A was completed to gather the



remaining subsurface information at the same location. The borings were backfilled with soil cuttings and/or sand and patched with asphalt cold patch where they were drilled through pavement.

LABORATORY TESTING

GZA retained Thielsch Engineering's Geotechnical Laboratory in Cranston, Rhode Island to complete a soil and rock testing program to assess the gradation and engineering characteristics of the soil and the strength of the bedrock. The program included 19 gradation analysis / AASHTO Classification / Frost Classification assessments, two (2) Atterberg Limits evaluations, 19 moisture content determinations on split spoon samples from the borings; and four (4) unconfined compressive strength / secant modulus tests on recovered rock cores. Results of the testing are included in **Appendix C**.

SUBSURFACE CONDITIONS

SURFICIAL AND BEDROCK GEOLOGY

Surficial soils underlying the site are mapped¹ as the following:

- Marine Regressive Sand Deposits which consist of massive to stratified and cross-stratified, well-sorted brown to gray-brown sand, typically having a gradational basal contact with the Presumpscot Formation;
- Presumpscot formation which consists of laminated, grey and blue-grey Silt and Silty CLAY, locally containing boulders, sand, and gravel, and typically occurring as blanket deposit over bedrock and older glacial sediments; and
- Till which consists of well graded mixture of Silt, Sand, Pebbles, Cobbles, and Boulders. The Till forms a blanket deposit over bedrock, and is inferred to underlie younger sediments where not exposed at surface.

Bedrock in the vicinity of the site is mapped² as the Kittery formation of the Merrimack Group. The rock is described as variably thin- to thick-bedded, buff-weathering feldspathic and calcareous Metawacke.

SUBSURFACE PROFILE

Four principal subsurface units were encountered in the test borings beneath surficial Topsoil or Asphalt, and overlying Bedrock: Fill, Sand, Silty Clay, and Glacial Till. The generalized descriptions of the units are summarized in the following table in descending order from ground surface. Detailed descriptions of the materials encountered at specific locations are provided on the boring logs in **Appendix B**.

¹ Marvinney, Robert G., 1999, Surficial Geology of the Portsmouth Quadrangle, Maine: Maine Geological Survey, Open-File 99-96, color map, scale 1:24,000. Maine Geological Survey Maps. 99-96.

² Marvinney, Robert G., 2012, Bedrock geology of the Portsmouth quadrangle, Maine: Maine Geological Survey, Progress Map 12-29, color map, scale 1:24,000. Maine Geological Survey Maps. 12-29.



GENERALIZED SUBSURFACE CONDITIONS				
Soil Unit	Generalized Description			
Topsoil	Brown, fine to coarse SAND, little to some Silt, few to frequent roots observed. Encountered in borings GZ-5, -11, -12 and -17.			
Asphalt	Asphalt pavement. Encountered in boring GZ-1, -2, -3, -3A, -4, -6, -7, -15, and -16			
Fill	Variable: <u>From</u> Brown, loose to very dense, fine to coarse SAND, with varying amounts of Gravel and Silt <u>to</u> brown to grey, medium dense GRAVEL, trace to some Sand, trace to little Silt, with few brick and rock fragments (USCS: GP-GM, SP-SM). Cobbles/boulders were encountered within the unit at GZ-3A. Maine Department of Transportation (MaineDOT) Frost Classification = 0, II, III <i>Encountered in all borings with the exception of GZ-16</i>			
Sand	Brown, dense to very dense, Silty fine to medium SAND, with occasional coarse Sand seams (USCS: SM). Encountered in boring GZ-17 only.			
Silty Clay	Grey, hard, Silty CLAY, trace to some fine to coarse Sand. (USCS: CL) Encountered in boring GZ-15 only.			
Glacial Till	Variable: <u>From</u> brown to grey, medium dense to very dense, fine to coarse SAND, with varying amounts of Gravel and Silt <u>to</u> stiff brown Silty CLAY, little fine Sand, trace Gravel. <i>Encountered in borings GZ-1, -2, -3, -3, -3A, -4, -5, -6, -7, -12, and - 16</i>			
Bedrock	Hard, fresh to slightly weathered, aphanitic, grey, METAWACKE. Primary joints are generally described as extremely close to moderately spaced, horizontal to moderately dipping, planar to undulating, rough, fresh to discolored, tight to open. Secondary joints are close to moderately spaced, moderately dipping to vertical, planar to undulating, rough, fresh to discolored, partially open to open. RQD ranged from RQD 12 to 63% in borings GZ-15 and -17 respectively. Bedrock was cored at GZ-1, -4, -5, 11, -12, -15, -16 and -17. Roller cone and/or split spoon refusal indicated probable bedrock at borings GZ-2, -3A, and -7			

GROUNDWATER

Groundwater was measured in test borings GZ-3A, -4, -5, -7, -11, -12, -15, and -17 at depths of approximately 2 to 31 feet bgs. These observations were made during drilling which included introduction of water due to the rotary wash drilling method and were likely affected by the drilling operations. Groundwater levels vary due to season, precipitation, construction activities and other factors. Consequently, water levels during and after construction are likely to vary from those encountered in the borings.

ENGINEERING EVALUATIONS

Evaluations were based on Section 13.6.1 of AASHTO Standard Specifications for Structural Support for Highway Signs, Luminaires, and Traffic Signals 1st Edition 2015 including 2017, 2018 and 2020 interim revisions (LRFD LTS), which references Section 10 of AASHTO LRFD Bridge Design Specifications, 8th Edition with May 2018 revisions (LRFD Bridge).



FEASIBLE FOUNDATION TYPES

This report covers five cantilever structures, four 60- to 90-foot-tall CCTV Poles, and a self-supporting antenna tower structure. The structures will have the foundations outside the I-95 and side street shoulders.

Feasible foundation types for this project are influenced by site space constraints, depth to bedrock, and the strength and composition of the overlying soils. Technically feasible foundation types include driven piles, drilled shafts, and spread footings. Where available space and constructability are limited, spread footing foundations are likely not a viable solution. Spread footings are also likely not viable where soft soils are present below the bearing level due to compressibility. Where shallow rock is encountered, driven piles are not considered practical due to the lack of overburden soil to achieve the necessary embedment.

DRILLED SHAFT DESIGN BASIS AND RECOMMENDATIONS

LATERAL RESISTANCE

We understand that the designer intends to complete lateral load-deformation evaluations for drilled shafts using a design approach such as L-Pile[®] for single shafts, or using Group[®] or FBPier[®] for multiple shafts. Development of structure-specific lateral design parameters is described below.

AXIAL RESISTANCE

Per Section 13.6.1 of LRFD LTS, axial design parameters were calculated based on Section 10 of AASHTO LRFD Bridge Design Specifications. The upper 5 feet of the shaft should typically be ignored when calculating the axial capacity, unless the surrounding materials can be shown to be drained and non-frost-susceptible. Structure-specific axial design parameters are described below.

DEVELOPMENT OF FOUNDATION DESIGN PARAMETERS

GZA estimated the internal friction angle, undrained shear strength, and unit weight based on correlations with the average corrected SPT blow counts encountered in the test borings. The estimated internal friction and undrained shear strength were used to calculate the lateral analysis design parameters including horizontal subgrade moduli (k) and/or the strain corresponding to one-half the maximum principal stress difference (E₅₀), depending on soil type, based on the *LPile Technical Manual*. GZA also used the corrected SPT blow counts, estimated internal friction angles, and undrained shear strengths to calculate the nominal side and tip resistances for soil using procedures described in LRFD Bridge Section 10.8.3.5.1b and 10.8.3.5.2c for cohesionless soils using the alpha method, and LRFD Bridge Section 10.8.3.5.2b and 10.8.3.5.2c for cohesionless soils using the beta method. The side resistance of cohesionless soil was also dependent on the relative depth and overburden of each stratum, and was broken into discrete depth ranges with assigned resistance values.

Lateral and axial bedrock design properties for drilled shafts including the Rock Quality Designation (RQD), Geologic Strength Index, rock group constant (m_i), unconfined compressive strength (UCS), total unit weight (γ), and Secant Modulus were based on rock descriptions, UCS laboratory results, and LRFD Bridge Section 10.4.6.4. Based on similar bedrock conditions encountered across the boring locations, design bedrock UCSs and the strain factors at 50 percent of UCS (k_{rm}) were taken as the average of the lab results. The RQD was



based on a weighted average RQD encountered in the cores of each boring. The Equivalent Rock Modulus (E_m) was calculated as the average between the two methods shown in LRFD Bridge Table 10.4.6.5-1.

The nominal side and tip resistances for rock were estimated using procedures described in LRFD Bridge Section 10.8.3.5.4b and LRFD Bridge 10.8.3.5.4c, respectively, based on the design bedrock properties discussed above. The results of our engineering evaluations are presented in the design tables in the following sections.

RESISTANCE FACTORS

The recommended LRFD resistance factors for strength limit state design of foundations were derived from LRFD Bridge Tables 10.5.5.2.2-1, 10.5.5.2.3-1 and 10.5.5.2.4-1 and are presented in the following table.

GEOTECHNICAL RESISTANCE FACTORS – STRENGTH LIMIT STATE					
Foundation Resistance Type	Method/Condition	Resistance	AASHTO		
		Factor (ø)	Reference		
	SPREAD FOOTINGS				
Bearing/Sliding	Footing on Soil (SAND)	0.45/0.8	10.5.5.2.2-1		
Bearing/Sliding	Footing on Soil (CLAY)	0.5/0.85	10.5.5.2.2-1		
Bearing/Sliding	Footing on Rock ¹	0.45/0.8	10.5.5.2.2-1		
DRIVEN PILES					
Nominal Bearing Resistance of Single Pile – Dynamic Analysis	Axial Resistance	0.65	10.5.5.2.3-1		
Nominal Bearing Resistance of Single Pile – Wave equation analysis, no Dynamic Analysis, Field confirmation of hammer performance	Axial Resistance	0.5	10.5.5.2.3-1		
	DRILLED SHAFTS				
Nominal Axial Compressive/ Tensile Resistance (Single Shaft)	Side Resistance in Sand, No Load testing	0.55/0.45	10.5.5.2.4-1		
Nominal Axial Compressive Resistance (Single Shaft)	Tip Resistance in Sand, No Load testing	0.5	10.5.5.2.4-1		
Nominal Axial Compressive/ Tensile Resistance (Single Shaft)	Side Resistance in Clay, No Load testing	0.45/0.35	10.5.5.2.4-1		
Nominal Axial Compressive Resistance (Single Shaft)	Tip Resistance in Clay, No Load testing	0.4	10.5.5.2.4-1		
Nominal Axial Compressive/ Tensile Resistance (Single Shaft)	Side Resistance in Rock, No Load Testing	0.55/0.4	10.5.5.2.4-1		
Nominal Axial Compressive Resistance (Single Shaft)	Tip Resistance in Rock	0.5	10.5.5.2.4-1		
Notes: 1. Resistance factor for footing on rock was taken as equal to footing on sand.					

Resistance factors for service and extreme limit state design should be taken as 1.0. If used, structural resistance of driven piles should be checked at the strength limit state considering a resistance factor ϕ_c =0.50, per AASHTO LRFD Bridge Article 10.7.3.2.3 for hard driving condition.



SIGN FOUNDATION RECOMMENDATIONS

GZA developed a design subsurface profile and recommended foundation design parameters for each foundation location. These are listed by foundation location and reference test borings in the tables that follow. Resistance factors are based on LRFD Bridge Table 10.5.5.2.4-1.

STA. 474+00 Cantilever Structure (Boring ID: GZ-1)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden and the limited space along the shoulder.

	Design Profile – Boring GZ-1							
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD %	Secant Modulus @ 50% Strain, E (ksi)	Unconfined Compressive Strength, UCS (psi)		
Ground Surface	61.1							
Fill	61.1	18.5	61					
Glacial Till	42.6	13.0	45					
Bedrock	29.6			24	1800	5000		
Groundwater	42.6							

Note: Groundwater was approximated based on soil description moistures.

Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-1						
Stratum	Soil Model	Effective Unit Weight γe (pcf) Above GW / below GW	k (pci) Above GW/below GW	φ' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm
Fill	Reese Sand	125	165	36		
Glacial Till	Reese Sand	67.6	95	36		
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-1						
Stratum	Depth (feet)	Nominal Unit Side Resistance, q₅ (ksf)	Nominal Unit Tip Resistance, q _P (ksf)			
.22	0-8.0	0.5	N/A			
Fill	8.0-18.5	1.5	36			
Glacial Till	18.5-31.5	2.5	36			
Bedrock	31.5	24				



STA. 496+25 Cantilever Structure (Boring ID: GZ-2)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location and the limited space along the shoulder.

	Design Profile – Boring GZ-2						
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)	
Ground Surface	59.6						
Fill	59.6	18.5	69				
Glacial Till	41.1	19.5	47				
Bedrock	21.6			N/A	1800	5000	
Groundwater	41.1						

Note: Groundwater was approximated based on soil descriptions.

Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-2						
Stratum	Soil Model	Effective Unit Weight γ _e (pcf) Above GW / below GW	k (pci) Above GW/below GW	φ' (deg) / Sս (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	Eso/krm
Fill	Reese Sand	125	165	36		
Glacial Till	Reese Sand	67.6	95	36		
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-2						
Stratum	Depth (feet)	Nominal Unit Side Resistance, q₅ (ksf)	Nominal Unit Tip Resistance, q _P (ksf)			
Fill	0-8.0	0.5	N/A			
Fill	8.0-18.5	1.5	36			
Glacial Till	18.5-38.0	2.5	36			
Bedrock	38.0	24				



STA. 507+75 Cantilever Structure (Boring ID: GZ-3 & GZ-3A)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location and the limited space along the shoulder. The design profile was developed by using the subsurface conditions encountered in GZ-3, and the subsurface conditions encountered in GZ-3 below the termination depth of GZ-3.

	Design Profile – Boring GZ-3 & GZ-3A						
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)	
Ground Surface	55.7						
Fill	55.7	22.0	48				
Glacial Till	33.7	18.0	24				
Bedrock	15.7			N/A	1800	5000	
Groundwater	35.7						

Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-3-3A						
Stratum	Soil Model	Effective Unit Weight γe (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm
Fill	Reese Sand	125/62.6	85/55	32		
Glacial Till	Reese Sand	67.6	75	34		
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-3 and GZ-3A						
Stratum	Depth (feet)	Nominal Unit Tip Resistance, q _P (ksf)				
Fill	0-22.0	1.0	N/A			
Glacial Till	22.0-40.0	1.5	20			
Bedrock	40.0	24				



STA. 519+00 Cantilever Structure (Boring ID: GZ-4)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location and the limited space along the shoulder.

Design Profile – Boring GZ-4								
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)		
Ground Surface	64.0							
Fill	64.0	3.8	87					
Glacial Till	60.2	6.3	80					
Bedrock	53.9			39	1800	5000		
Groundwater	57.5							

Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-4										
Stratum	Soil Model	Effective Unit Weight γe (pcf) Above GW / below GW	k (pci) Above GW/below GW	φ' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm				
Fill	Reese Sand	125	165	36						
Glacial Till	Reese Sand	130/67.6	165/95	36						
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318				

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-4							
StratumDepth (feet)Nominal Unit SideNominal Unit TResistance, qs (ksf)Resistance, qp							
Fill	0-3.8	0.5	N/A				
Glacial Till	3.8-10.1	1.0	36				
Bedrock	10.1	24					



STA. 532+50 Cantilever Structure (Boring ID: GZ-5)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location.

Design Profile – Boring GZ-5								
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)		
Ground Surface	68.0							
Fill	68.0	2.0	57					
Glacial Till	66.0	2.2	51					
Bedrock	63.8			55	1800	5000		
Groundwater	63.0							

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-5										
Stratum	Soil Model	Effective Unit Weight γ _e (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / S _u (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	Eso/krm					
Fill	Reese Sand	125	165	36							
Glacial Till	Reese Sand	130/67.6	165/95	36							
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318					

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-5							
StratumDepth (feet)Nominal Unit SideNominal Unit TipResistance, qs (ksf)Resistance, qp (ksf)							
Fill	0-2.0	0.5	N/A				
Glacial Till	2.0-4.2	1.0	N/A				
Bedrock	4.2	24					



STA. 574+75 Cantilever Structure (Boring ID: GZ-6)

A drilled shaft foundation is recommended for this location, due to the limited space along the shoulder.

Design Profile – Boring GZ-6								
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)		
Ground Surface	82.4							
Fill	82.4	23.5	102					
Glacial Till	58.9	24	45					
Bedrock	NE			N/A				
Groundwater	50.5							

Note: Groundwater was approximated based on the water level measured in GZ-7 conducted directly across I-95.

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-6									
Stratum	Soil Model	Effective Unit Weight γe (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm				
Fill	Reese Sand	125	165	36						
Glacial Till	Reese Sand	130/67.6	165/95	36						

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-6								
Stratum	Depth (feet) Nominal Unit Side Nominal Uni Resistance, qs (ksf) Resistance, q							
Fill	0-8.0	0.5	N/A					
Fill	8.0-15	1.5	36					
Fill	15-23.5	2.75	36					
Glacial Till	23.5-47.5	2.5	36					



STA. 575+25 Cantilever Structure (Boring ID: GZ-7)

A drilled shaft foundation is recommended for this location, due to the limited space along the shoulder.

Design Profile – Boring GZ-7								
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)		
Ground Surface	81.6							
Fill	81.6	25.2	140					
Glacial Till	56.4	23.9	83					
Bedrock	32.5			N/A	1800	5000		
Groundwater	50.5							

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-7										
Stratum	Soil Model	Effective Unit Weight γe (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm					
Fill	Reese Sand	125	165	36							
Glacial Till	Reese Sand	130/67.6	165/95	36							
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318					

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-7								
Stratum	Depth (feet)	Nominal Unit Side Resistance, q₅ (ksf)	Nominal Unit Tip Resistance, q _P (ksf)					
Fill	0-8.0	0.5	N/A					
Fill	8.0-15	1.5	36					
Fill	15-25.2	2.75	36					
Glacial Till	25.2-491	2.5	36					
Bedrock	49.1	24						



102 Dennett Road, Kittery, Maine – CCTV Pole (Boring ID: GZ-11)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location.

Design Profile – Boring GZ-11									
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)			
Ground Surface	56.2	-							
Fill	56.2	2.6	32						
Bedrock	53.6			45	1800	5000			
Groundwater	54.2								

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-11										
Stratum	Soil Model	Effective Unit Weight γ _e (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm					
Fill	Reese Sand	125/62.6	85/55	32							
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318					

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-11						
Stratum	Depth (feet)	Nominal Unit Side Resistance, q₅ (ksf)	Nominal Unit Tip Resistance, q _P (ksf)			
Fill	0-2.6	0.5	N/A			
Bedrock	2.6	24				



STA 589+25 Cantilever Structure (Boring ID: GZ-12)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location.

Design Profile – Boring GZ-12									
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)			
Ground Surface	55.6								
Fill	55.6	4.0	20						
Glacial Till	51.6	5.0	151						
Bedrock	46.6			15	1800	5000			
Groundwater	45.6								

Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-12										
Stratum	Soil Model	Effective Unit Weight γ _e (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E50/krm				
Fill	Reese Sand	125	85	32						
Glacial Till	Reese Sand	130	165	36						
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318				

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-12							
Stratum	Depth (feet) Nominal Unit Si Resistance, q₅(k		Nominal Unit Tip Resistance, q _P (ksf)				
Fill	0-4.0	0.5	N/A				
Glacial Till	4.0-9.0	1.0	36				
Bedrock	9.0	24					



STA. 617+50 CCTV Pole (Boring ID: GZ-15)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location.

Design Profile – Boring GZ-15									
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)			
Ground Surface	31.3								
Fill	31.3	5	47						
Silty Clay	26.3	3.9	58						
Bedrock	22.4			12	1800	5000			
Groundwater	28.8								

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-15										
Stratum	Soil Model	Effective Unit Weight γ _e (pcf) Above GW / below GW	k (pci) Above GW/below GW	φ' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, Em, ksi	E₅₀/krm					
Fill	Reese Sand	125/62.6	165/95	36							
Silty Clay	Stiff Clay	55.6		3,500		0.005					
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318					

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-15							
Soil Stratum	Soil Stratum Depth (feet) R		Nominal Unit Tip Resistance, q _P (ksf)				
Fill	0-4.0	0.5	N/A				
Silty Clay	4.0-9.0	1.8	10.0				
Bedrock	9.0	24					

Note: Due to uncertainty in the mobilization of tip resistance in bedrock, we recommend ignoring the end bearing in calculating the axial resistance of the drilled shaft. The nominal tip resistance in Silty Clay has been reduced to account for imperfect bottom cleaning. GZA can revisit this issue if the design shows there is a significant impact on the shaft length.



STA. 676+75 CCTV Pole (Boring ID: GZ-16)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location.

Design Profile – Boring GZ-16									
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)			
Ground Surface	28.3								
Glacial Till	28.3	5.6	52						
Bedrock	22.7			37	1800	5000			
Groundwater	22.7								

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-16									
Stratum	Soil Model	Effective Unit Weight γe (pcf) Above GW / below GW	k (pci) Above GW/below GW	φ' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	Eso/krm				
Glacial Till	Reese Sand	130	165	36						
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318				

Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-16						
Stratum	Depth (feet)	Nominal Unit Tip Resistance, q₂ (ksf)				
Glacial Till	0-5.6	1.0	N/A			
Bedrock	5.6	24				



STA. 708+50 CCTV Pole (Boring ID: GZ-17)

A drilled shaft foundation is recommended for this location, due to the relatively shallow thickness of overburden at this location and the limited space along the shoulder.

	Design Profile – Boring GZ-17												
Stratum	Top of Layer Elevation, feet	Thickness (ft)	Average N160	Weighted Average RQD	Secant Modulus @ 50% Strain, E (psi)	Unconfined Compressive Strength, UCS, (psi)							
Ground Surface	43.9												
Fill	43.9	4.0	43										
Sand	39.9	21.2	60										
Bedrock	18.7			63	1800	5000							
Groundwater	33.9												

	Recommended Lateral Design Parameters for Drilled Shafts – Boring GZ-17												
Stratum	Soil Model	Effective Unit Weight γ _e (pcf) Above GW / below GW	k (pci) Above GW/below GW	ф' (deg) / Su (psf) / UCS (psi)	Equivalent Rock Modulus, E _m , ksi	E₅₀/krm							
Fill	Reese Sand	125	85	36									
Sand Reese Sand		130/67.6	165/95	36									
Bedrock	Weak Rock	107.6		2,000	1,215	0.00318							

Recommende	Recommended Axial Design Parameters for Drilled Shafts – Boring GZ-17												
Soil Stratum	Depth (feet)	Nominal Unit Side Resistance, q₅ (ksf)	Nominal Unit Tip Resistance, q _P (ksf)										
Fill	0-5.6	0.5	N/A										
Sand	5.6-8.0	1.0	N/A										
Sand	8.0-18.7	1.8	36										
Bedrock	18.7	24											

Note: Due to uncertainty in the mobilization of tip resistance in bedrock, we recommend ignoring the end bearing in calculating the axial resistance of the drilled shaft. GZA can revisit this issue if the design shows there is a significant impact on the shaft length.

FROST DEPTH

Based on the MaineDOT BDG, Section 5.2.1, the Freezing Index for the site is 1100, and with low-moisture content (<10 percent) soils, the estimated depth of frost penetration is approximately 5.0 feet. Consequently, the upper 5 feet of the shaft should typically be ignored when calculating the axial capacity, unless the surrounding materials can be shown to be drained and non-frost-susceptible.



Granular fill soils encountered near the surface at the structure locations were typically classified as AASHTO A-1-b and A-4 and A-2-4 with MaineDOT Frost Classification from 0 to III, indicating they are considered to exhibit low to moderate frost susceptibility. GZA can provide a location-by-location assessment of drainage and frost-susceptibility in the upper 5 feet if the designer opts to utilize this layer in estimating axial resistance.

REVIEW OF FOUNDATION ANALYSES

The generalized design profiles and geotechnical parameters provided herein are intended for foundation design by others. We recommend that GZA be provided the opportunity to review the results of the soil/rock-structure interaction analysis results to assess if the modelled behavior is consistent with the geotechnical design intent.

GZA anticipates that design refinement may be required as the designs develop. GZA can support that effort by providing refined design parameters, which may take into account other factors based on location-specific soil analyses or design methodology used by the structural designer.

CLOSURE

We trust that this information meets current project needs. Please feel free to call Nicholas Williams at (207) 358-5129 if you have any questions about this memorandum or if we can be of further assistance.

NVW/CLS/ARB:erc

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Attachments: Figure 1 – Locus Plan Figures 2-4 – Boring Location Plans Appendix A – Limitations Appendix B – Boring Logs Appendix C – Laboratory Test Results



FIGURES





LEGEND

GZ-17 BORING LOCATION AND DESIGNATION

NOTES:

1) BORINGS WERE DRILLED AT PROPOSED LOCATIONS SURVEYED BY SPS NEW ENGLAND, OR MEASURED WITH TAPE TIES FROM SURVEYED LOCATIONS. 2) THE BORINGS WERE PERFORMED BY NEW ENGLAND BORING CONTRACTORS (NEBC) IN DECEMBER 2020 AND JANUARY 2021, AND OBSERVED AND LOGGED BY GZA PERSONNEL.





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I-95 FOUNDATION EVALUATION FOR PROPOSED SIGNAGE PORTSMOUTH, NEW HAMPSHIRE AND KITTERY, MAINE

BORING LOCATION PLAN GZ-1 TO GZ-5

	PREPARED BY:	ZA _{Ge} Enginee wv	eoEnvironmen ers and Scienti vw.gza.com	tal, Inc. ists	PREPARED FOR: SPS New England, Inc.					
-	PROJ MGR:	NVW	REVIEWED BY:	CLS	CHECKED BY: ARB		FIGURE			
2	DESIGNED BY:	NVW	DRAWN BY:	ADM	SCALE: 1 " = 500 FEI	ET	^			
2	DATE:		PROJECT NO.		REVISION NO.					
le.	02/03/20)21	09.00260	90.00						



LEGEND



PRIORITY BORING LOCATION AND DESIGNATION

GZ-17 BORING LOCATION AND DESIGNATION •

NOTES:

1) BORINGS WERE DRILLED AT PROPOSED LOCATIONS SURVEYED BY SPS NEW ENGLAND, OR MEASURED WITH SURVEYED BY SPS NEW ENGLAND, OR MEASURED WITH TAPE TIES FROM SURVEYED LOCATIONS. 2) THE BORINGS WERE PERFORMED BY NEW ENGLAND BORING CONTRACTORS (NEBC) IN DECEMBER 2020 AND JANUARY 2021, AND OBSERVED AND LOGGED BY GZA PERSONNEL.





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I-95 FOUNDATION EVALUATION FOR PROPOSED SIGNAGE PORTSMOUTH, NEW HAMPSHIRE AND KITTERY, MAINE

BORING LOCATION PLAN GZ-6 TO GZ-15

	PREPARED BY:	ZA Ge Enginee wv	eoEnvironmen ers and Scient vw.gza.com	tal, Inc. ists	PREPARED FOR:	lew E	ngland, Inc.
2	PROJ MGR:	NVW	REVIEWED BY:	CLS	CHECKED BY: AF	RB	FIGURE
J.	DESIGNED BY:	NVW	DRAWN BY:	ADM	SCALE: 1 " = 350 F	FEET	•
	DATE:		PROJECT NO.		REVISION NO.		3
U	02/03/20)21	09.00260	90.00			



LEGEND

GZ-17 BORING LOCATION AND DESIGNATION

NOTES:

1) BORINGS WERE DRILLED AT PROPOSED LOCATIONS SURVEYED BY SPS NEW ENGLAND, OR MEASURED WITH TAPE TIES FROM SURVEYED LOCATIONS. 2) THE BORINGS WERE PERFORMED BY NEW ENGLAND BORING CONTRACTORS (NEBC) IN DECEMBER 2020 AND JANUARY 2021, AND OBSERVED AND LOGGED BY GZA PERSONNEL.





NLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA ECENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S LIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE HE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR I T ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITEIN CONSENT OF GAA, A RANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLENT OR OTHERS, WITHOUT THE PRIOR WRITE NRESS CONSENT OF GAZ, MILL BE AT THE USER'S SOLE RISK AND WITHOUT TAVY RISK OR LIABILITY TO GZA.

I-95 FOUNDATION EVALUATION FOR PROPOSED SIGNAGE PORTSMOUTH, NEW HAMPSHIRE AND KITTERY, MAINE

BORING LOCATION PLAN GZ-16 AND GZ-17

	GZA Ge Enginee	eoEnvironmental, Inc. ers and Scientists ww.gza.com	SPS New England, Inc.					
j	PROJ MGR: NVW	REVIEWED BY: CLS	CHECKED BY: ARB	FIGURE				
3	DESIGNED BY: NVW	DRAWN BY: ADM	SCALE: 1 " = 300 FEET					
	DATE:	PROJECT NO.	REVISION NO.	4				
	02/03/2021	09.0026090.00		-				



APPENDIX A – LIMITATIONS



LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

- 2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.
- 3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

- 4. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.
- 5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.
- 6. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.
- 7. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

Compliance with Codes and Regulations

8. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

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APPENDIX B – BORING LOGS

TEST BORING REPORT STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION Men. Manuschire BORING NO. GZ-1													1			
	STAT MA		NEW HA LS & RE	AMPSH ESEAR(IRE DEF CH BURI	PARTME EAU - G	EOTECH	RANS INICAI	SPORTATIC		DI		SHEET NO.	1	OF	2
	PROJE	ECT NA	ME NH	IDOT -	I-95 SIG	SN FOU	NDATIO	NS 16	6189BBRID	DGE NO	N/A	_	BASELINE	0	FF	
	DESCF	RIPTIO	N <u>09</u>	.00260	90.00							_	ELEVATION (f	ït)	61.1	
			GROUNI		۲			IENT	SAMPLER				START/END_	<u>1/</u> M D	<u>6/21 / 1/6</u> Ambros	/ <u>21</u> io
	DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	OF HOLE	SIZE I.D. (ir	ו):	1.375	4/3	1.875		INSPECTOR		E. Tom	e
		NOT	ENCOUNTE	ERED			HAMMER V HAMMER F	VT. (lb): ALL (in):	140 30	<u>DRIL</u>	L RIG		CLASSIFIER		E. Tom	e
							HAMMER T	YPE:	Automatic		- G18	_	EAST/NORTH (1	ft)	/	
	DEPTH (ft) - 0 -	DEPTH	ELEVATION	PER 0.5 ft	SAMPLE NUMBER	RECOVERY (ft) [%]	RANGE (ft)		FIELD	CLASSIF	ICATIO	ON A	AND REMARKS	S		STRATUM SYMBOL
	-	0.4	60.7							-	- ASPHA	LT -				
				17 24 24 21	S-1	1.6 [80]	1.0	Dense	e, brown/tan,	gravelly CC	ARSE -	FIN	E SAND, trace sil	lt. Dry	,	
				19 20 19 17	, S-2	1.6 [80]	3.0	Dense	e, brown/tan,	COARSE -	FINE SA	AND	, some gravel, tra	ace si	lt. Dry	
	- 5 -			18 17 17 17	S-3	1.6 [80]	5.0	Dense, brown/tan, COARSE - FINE SAND, some gravel, trace silt. Dry						lt. Dry		
				24 19 19	S-4	1.3 [65]	7.0	^{7.0} Dense, brown/tan, COARSE - FINE SAND, some gravel, trace silt					lt. Dry			
	- 10 -			19 14 13	S-5	1.8 [90]	9.0	90 - FILL - Medium dense, brown/tan, COARSE - FINE SAND, some grav silt. Dry				gravel	, trace —			
1B-12				13 17 16 23	S-6	1.4 [70]	11.0	Dense, brown/tan, COARSE - FINE SAND, some gravel, trace silt. Dry					lt. Dry			
10:34:26 AM	15			26 25 28 19	S-7	1.3 [65]	13.0	Very d Dry	lense, brown/	/tan, COAR	SE - FIN	IE S	AND, some grav	/el, tra	ice silt.	
1202/62/9 6-	- 15 -			18 16 14 19	S-8	1.0 [50]	15.0	Dense Moist	nse, brown/tan, COARSE - FINE SAND, some gravel, trace silt. ist							
AGE LOGS G		18.5	42.6													
ו באץ צוקו	- 20 -			12 8	50	0.8 [42]	20.0	Mediu	m dense, bro	own/gray, C	OARSE	- Fli	NE SAND, some	grave	_ I, some	
JUI FURMAI 1-95 KI				15 17	,		22.0	silt. W	et							
090.00 NHL	- 25 -			19 25	S-10	1.3 [65]	25.0	Dense	e, brown/gray	- G , COARSE	GLACIAL - FINE S	. TIL SANI	L - D, some gravel, s	ome s	– silt.	
IABASES/09.0026				23 23	}	10 1.3 [65] Dense, brown/gray, COARSE - FINE SAND, some gravel, some slit. Wet										
12 P:/GINT PROJECT DA	Sampler S SL T U O A C	Identifica Standard Large Sp Thin Wal Undisturt Open En Auger Fli Core Bar	tion Split Spoo oon (O.D.: I Tube Ded Piston d Rod ght rel	on = 3 in)	Blows/fi 0 - 2 - 5 - 9 - 1 16 - 3 > 30	COHESIV oot (N) 1 4 8 5 5 60	E SOILS <u>Consistency</u> Very Soft Soft Medium Stiff Stiff Very Stiff Hard	f <u>BI</u> 0 5 11 31 >	NON-COH <u>ows/foot (N)</u>) - 4 ; - 10 - 30 - 50 50 VOR - Weight c	ESIVE SOILS Apparent De Very Loose Loose Medium Der Dense Very Dense of Rod	ensity nse	<u>Soi</u> Caj Lov Sor Litt Tra	I Descriptions bitalized Soil Name ver Case Adjective ne e ce	Pr M 35 20 10 1	roportion lajor Compo 5% - 50% 0% - 35% 0% - 20% 1% - 10%	onent
÷	NR	Not Reco	orded		1 1			v	VOH - Weight o	of Hammer			ENG	LI9H		

			-	TEST	New Hampshire	BORING NO. G	Z-1			
	STA1 MA	ΓΕ ΟΓ Ι ΤΕRIAI	NEW HA	MPSHI SEARC	RE DEF H BURI	PARTME	NT OF		SHEET NO. 2 OF	2
	PROJE		ME_NH	DOT - I	-95 SIC	SN FOUI		DNS 16189B BRIDGE NON/A	STAOFF	
	DESC	RIPTIO	N <u>09</u> .	002609	0.00				ELEVATION (ft)6	1.1
	DEPTH (ft)	STRATUM DEPTH	CHANGE (ft) ELEVATION	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)	FIELD CLASSIFICATION	AND REMARKS	STRATUN SYMBOL
	- 30 -			24 31	S-11	1.3 [100]	30.0	Very dense, olive-brown, silty MEDIUM - I Splitspoon refusal at 31.5' bos indicates p	FINE SAND, some gravel. Wet	
		31.5	29.6	70/3"/0.3			31.3	<u>roller cone resistance during advancemer</u> - <u>BEDROCK</u>	nt at 31.5' bgs	
	- 35 -				C1	3.3 [100]	36.8	Hard, slightly weathered, aphanitic, gray, close to close, low angle, undulating, roug One secondary joint is high angle, undula partially open. RQD: 1.3 / 3.3 = 38% Rock Core Times (min:sec): 33.5-34.5' (4 35.5-36.5' (2:57), 36.5-36.8' (1:50)	METAWACKE. Joints are very gh, discolored, partially open. ting, rough, discolored, :05), 34.5-35.5' (2:36),	-
					C2	2.0 [100]	36.8 38.8	Hard, slightly weathered, aphanitic, gray, extremely close to close, low angle, undul open. RQD: 0 / 2.0 = 0% Rock Core Times (min:sec): 36.8-37.8' (2	METAWACKE. Joints are lating, rough, partially open to :53), 37.8-38.8' (4:16)	
								Bottom of Exploration @ 3	38.8 ft (El. 22.3)	
	- 40 -									
I B-12	- 45 -									
0:34:26 AM										
GPJ 6/29/2021										
I 1-95 KITTERY SIGNAGE LOGS	- 50 -									
S/09.0026090.00 NHDOT FORMA	- 55 -									
JINI PROJECT DATABASE	- 60 -									
2 P:/	- 65 -									
	05 -									

	07.17			TEST	BORI	New f	ampshin	BORING NO.	GZ-2						
	MA	TERIAL	S & RE	SEARC	IRE DEF CH BUR	EAU - G	EOTECH	I RANS INICAI			D	SHEET NO	OF <u>2</u>		
	PROJE	ECT NA	ME_NH	IDOT -	1-95 SIC	GN FOU	NDATIO	NS 16	6189B _{BRII}	DGE NO	N/A	STAOFF - BASELINEOFF	·		
	DESC	RIPTIO	N <u>09</u>	.00260	90.00							ELEVATION (ft)	59.6		
			GROUN	DWATEF	२		EQUIPN	IENT	SAMPLER	CASING	CORE	START/END <u>12/23/2</u>	<u>0 / 12/23/20</u>		
	DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	BOTTOM OF HOLE	SIZE I.D. (i	n):	S 1.375	4/3		INSPECTOR E	. Tome		
		NOT	ENCOUNT	ERED			HAMMER	WT. (lb):	140	DRIL	L RIG	CLASSIFIERE	. Tome		
							HAMMER	TYPE:	Automatic	Truck	- GT8	_ EAST/NORTH (ft)	/		
	DEPTH (ft)	STRATUM DEPTH	CHANGE (ft) ELEVATION	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)		FIELD) CLASSIF	ICATIO	N AND REMARKS	STRATUM SYMBOL		
	_ 0 _	0.4	59.2					<u> </u>			- ASPHAI	_T -	<u> </u>		
				14 16 16 19	S-1	1.2 [60]	1.0 3.0	Dense	e, brown, CO	ARSE - FIN	IE SAND,	little gravel, little silt. Dry			
				25 31	S-2	1.3 [65]		Very d	lense, browr	, COARSE	- FINE S	AND, little gravel, trace silt. D	гу		
	- 5 -			17 17 16	S-3	0.9 [64]	5.0	Dense Increa	e, brown, CO se in resista	ARSE - FIN nce durina r	IE SAND, roller cone	little gravel, little silt. Dry e advancement from 6.4' to 9	.0'		
				23/0.4 23			9.0	indicat	tes possible	cobbles/bot	ulder.		- -		
	- 10 -			15 18 16	S-4	1.2 [60]	11.0	Dense	e, brown, CO	ARSE - FIN	- FILL IE SAND,	- little gravel, little silt. Dry			
A IB-12				55 35 28 18	S-5	1.2 [60]	11.0	Dense	e, brown, CO	ARSE - FIN	IE SAND,	, little gravel, little silt. Dry			
10:34:29 AN	- 15 -			19 19 19 31	S-6	1.2 [60]	13.0	Very d	lense, browr	I, COARSE	- FINE SA	AND, little gravel, little silt. Mo	vist		
GS.GPJ 6/29/2021	10			20 14 12 11	S-7	1.1 [55]	15.0	Dense	e, brown, CO	ARSE - FIN	IE SAND,	little gravel, little silt. Moist			
Y SIGNAGE LO	- 20 -	18.5	41.1	13			20.0								
OL FORMAT 1-95 KILLEF				15 18 16	S-8	1.6 [80]	22.0	Dense	e, gray, silty l	MEDIUM - F	INE SAN	ID, trace gravel, some sand. \			
ASES/09.0026090.00 NHL	- 25 -			55 35 28 18	5			Top 6' Wet Botton Wet	': Dense, gra n 3": Very st	ay, COARSE iff, gray, CL	E - FINE S	SAND, some silt, some grave .T, some gravel, some sand.			
VIAB4										- G	SLACIAL	TILL -			
P:/GINT PROJECT DA	Sampler S SL T U O A	Identifica Standard Large Sp Thin Wal Undisturl Open En Auger Fli	<u>tion</u> I Split Spoo boon (O.D.: I Tube bed Piston d Rod ght	on = 3 in)	Blows/f 0 - 2 - 5 - 9 - 1 16 - 3	COHESIVE <u>oot (N)</u> 1 4 8 15 30	E SOILS <u>Consistenc</u> Very Soft Soft Medium Sti Stiff Very Stiff	<u>لا الم</u> 11 11	NON-COH ows/foot (N) - 4 - 10 - 30 - 50 50	ESIVE SOILS Apparent De Very Loose Loose Medium Der Dense Very Dense	ensity nse	Soil DescriptionsPropoCapitalized Soil NameMajorLower Case Adjective35%Some20%Little10%Trace1%	rtion Component - 50% - 35% - 20% - 10%		
B-12	C NR	Core Bar	rel orded		> 30		Hard	V	VOR - Weight VOH - Weight	of Rod of Hammer		ENGLISH			

TEST BORING REPORT New Hammychire BORING NO.											2
	STAT MA	TE OF	NEW HA LS & RE	MPSHI SEARC	RE DEF H BUR	PARTME EAU - GI	NT OF	TRANSPORTATION DOT	SHEET NO. 2	OF _	2
	PROJE	ECT NA	ME NH	<u>DOT - I</u>	-95 SIC	SN FOUL		DNS 16189B BRIDGE NON/A	STAOFF	•	
	DESC	RIPTIO	N <u>09</u> .	002609	90.00	1			ELEVATION (ft)	59.6	6
	DEPTH (ft)	STRATUM DEPTH	CHANGE (ft) ELEVATION	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)	FIELD CLASSIFICATION	AND REMARKS		STRATUN SYMBOL
	- 30 -									_	
	50			19 19 19 31	S-10	0.9 [46]	30.0	Dense, gray, COARSE - FINE SAND, sor	ne gravel, some silt. Wet		
							32.0	- GLACIAL TI	LL -		
	- 35 -			20			35.0			_	
				12 11	S-11	0.7 [35]	37.0	Very stiff, gray, CLAYEY SILT, some grav	vel, some sand. Wet		
	10	38.0	21.6					- BEDROCK Increase in resistance during roller cone a indicates probable bedrock; rock chips ob advanced roller cone to 39.5' bgs and terr	(- advancement at 38.0' bgs iserved in wash return; ninated boring.		
	- 40 -	1						Bottom of Exploration @ 3	39.5 ft (El. 20.1)	/	
2											
Ë	- 45 -										
29 AN											
10:34:											
2021											
6/29/											
GP.											
0GS	- 50 -										
AGEL											
SIGN											
TERY											
15 KIT											
AT I-9	_ 55 _										
-ORM	55										
H N 00											
6090.											
9.002											
SES/0	- 60 -	-									
TABA											
CT DA											
SOLEC											
NT PF											
E\G											
TB-12	- 65 -										

TEST BORING REPORT STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION Mere Hampshire Mere Hamps														3
	PROJE DESCF	ECT NA	ME NH N 09.	IDOT - .00260	I-95 SIC 90.00	SN FOU	NDATIC	ONS 16	189BBRID	OGE NO	N/A	BASELINE	OFF	,
┢			GROUNI	OWATE	R		FQUIP	JENT	SAMPI FR	CASING	CORF	START/FND	1/7/21 / 1/7/	21
┢				FLEV	BOTTOM	BOTTOM	TYPE:		S	HW/NW		DRILLERM.	D'Ambros	io
	DATE	TIME	(ft)	(ft)	OF CASING	OF HOLE	SIZE I.D. (in):	1.375	4/3		INSPECTOR	E. Tome	e
F		NOT	ENCOUNTE	ERED			HAMMER	WT. (lb):	140	DRILI	<u>L RIG</u>	CLASSIFIER	E. Tome	e
┟						+ +	HAMMER	TYPE:	Automatic	Truck	- GT8	EAST/NORTH (ft) _	/ -	
	DEPTH (ft)	STRATUM	CHANGE (ft) ELEVATION	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)		FIELD	CLASSIF	ICATION	I AND REMARKS		
	- 0 -											Γ.		Ŷ
		1.0	54.7	25			1.0					·		*****
				26	S-1	1 4 [70]		Danaa	Brown/Ton	COADEE		ND trace groupl trace	ailt Dm/	
				21	, ⁰⁻¹	1.4[70]		Dense	, Brown/Tan,	, CUARSE	- FINE SA	ND, trace gravel, trace	SIIL Dry	
	F			16 20 19 22	S-2	1.8 [90]	3.0 3.0	Top 1 silt. Dr Botton silt. Dr	5": Dense, br y n 7": Dense, v	own/tan, Ml gray, COAF	EDIUM - F RSE - FINE	INE SAND, trace grave E SAND, some gravel,	el, trace some	
ſ	- 5 —			8			5.0							
				6	S-3	1.3 [65]		Stiff, gray, silty CLAY, little coarse - fine sand, little gravel. Wet						
					7		7.0							
				15			7.0							
				21	S-4	1.2 [60]		Dense, gray/brown, silty MEDIUM - FINE SAND, little gravel. Dry						
				20)		90							
				22			9.0							
┢	- 10 —			27 45	S-5	1.2 [60]		Very d	ense, gray/b	rown, silty N	MEDIUM -	FINE SAND, little grav	el, with	
				92	2		11.0	woou	ragments. D	i y				
				20			11.0				- FILL -			
12				8	S-6	0.3 [15]		Mediu	m dense, gra	iy, GRAVEL	_, trace sa	nd, trace silt. Wet		
E E				6	6		13.0							
N AM				10			13.0							
34:3(6	S-7	0.3 [13]		Mediu	m dense, gra	y, GRAVEL	_, trace sa	nd, trace silt. Wet		
ě	_ 15 _			18	3		15.0		-	-			_	
2021	15			10			15.0							
1291				8	S-8	0.5 [25]		Medium dense, gray, COARSE - FINE SAND, some gravel, tra						
2				18	3		17.0	mot						
5														
Š														
H C L														
Ś														
א לי	- 20 -			9			20.0						-	
Ξ				1	S-9	0.5 [25]		Vond	DOSA GROUP) some gravel come a	ilt Mot	
2 2				1	1			veryla	Jose, gray, C		INE SAINL	, some graver, some s		
6-1		22.0	33.7	9	' <u> </u>		22.0			-				
AMA				10	S-10	1.0 [50]		Mediu	m dense oliv	- G e-brown si	ILACIAL T	ILL - M - FINE SAND trace	gravel	Δ Δ Δ
<u> </u>				10	7		24.0	Wet			,		5,0,0,	Ja la d
Ĩ				'			24.0		Rott	om of Expl	oration @	24.0 ft (FL 31.7)		<u></u>
ź	- 25 -								DOIL			(L		
90.0														
1970														
09.0														
SES														
ABA														
	Samplar	Identifica	ition		+			1				Soil Descriptions	Proportion	
	<u>Sampler</u> S	Standard	I Split Spoo	on	Blows/f	oot (N)	<u>Consisten</u> c	у В	ows/foot (N)	Apparent De	ensity C	Capitalized Soil Name	Major Compo	nent
ξ	SL	Large Sp	oon (O.D.:	= 3 in)	0 -	1	Very Soft	0	- 4	Very Loose		ower Case Adjective	35% - 50%	
	U U	Undistur	bed Piston		<u>∠</u> - 5 -	4 8	Son Medium Sti	iff 11	- 10 - 30	Loose Medium Der	nse L	ittle	∠0% - 35% 10% - 20%	
2 E	Ō	Open En	d Rod		9 - 1	15	Stiff	ledium Stiff 11 - 30 Medium Dense Little 10% - 20% tiff 31 - 50 Dense Trace 1% - 10%						
2	A C	Auger Fli Core Bar	ight rel		16 - 3 > 30	30	Very Stiff Hard	>	50 VOR - Weight o	Very Dense of Rod			<u>ы</u>	
Ē	NR	Not Reco	orded		1			v	VOH - Weight o	of Hammer		ENGLIS	п	

	STAT					NG RE PARTME		RANS		DN New H	ampshir	BORING	B NO .	GZ-3 OF	BA
F	INIA PROJE DESCE		.ME_NH N 09	<u>IDOT -</u> .00260	он вок <u> 1-95 SIC</u> 90.00	EAU - G SN FOU		NICAL NS 16	189BBRID	OGE NO	N/A		C)FF	
F					20.00 २		FQUIPME	=NT	SAMPI FR	CASING	CORE	- ELEVATIC	N (tt) 1/1 1/1	<u>55.7</u> 11/21 / 1/1	1/21
		TIME	DEPTH	ELEV.	BOTTOM	воттом	TYPE:		S	HW/NW		DRILLER	M. E	D'Ambros	io
	1/11/21	1520	(ft)	(ft)	OF CASING	OF HOLE	SIZE I.D. (in) HAMMER W): T (lb):	1.375 140	4/3	PIC		DR	E. Tom	e
	1/11/21	1550	20.0	35.7			HAMMER FA	ALL (in):	30	Truck	- GT8		=R ⊤⊔ (ft)	<u> </u>	e
-		STRATIUM		BLOWS	1			/PE:	Automatic		010		тн (ii) <u>—</u>	1	
	DEPTH (ft) 0 —	DEPTH	ELEVATION	PER 0.5 ft	SAMPLE NUMBER	(ft) [%]	(RANGE (ft)		FIELD	CLASSIF		N AND REMA	RKS		STRATUM SYMBOL
	5 -	. 10.0	45.7	44			10.0	Advan			ne to 10.	U bgs and set u	p to samp		XXXXX
10:34:31 AM 1D-12				44 120/6"	S-1	1.0 [100]	11.0	Very d silt, wit	ense, brown/ h brick fragn	/gray, COAI nents. Wet	RSE - FII	NE SAND, some	e gravel, s	ome	
12 LUGS.GFJ 8/28/2021	15 -			7 8 9	S-2	1.0 [50]	15.0	Mediui Increa: probat	n dense, gra se in resistar le boulder. S	ay, GRAVEL nce during r Set up to co	., some o oller con re. - FILL	coarse - fine san e advancement -	d, little sil at 18.5' in	t. Wet	
	20 —				C1	0.8 [55]	20.0	Hard, s	slightly weath	nered, apha	nitic, gra	IY, METAWACKI	E boulder.	_	T
		24.0	31.7	5	C2	0.3 [8]	24.0	Hard, s	slightly weath	nered, apha	nitic, gra	IY, METAWACKI	E boulder.		
A I ABASES/U9.UUZDU9U.UU INTI	25 –			4 5 16	S-3	1.0 [50]	26.0	Mediur Wet	n dense, bro	wn, COAR	SE - FINI	E SAND, some s	silt, some	gravel	
Sampler Identification COHESIVE SOILS NON-COHESIVE SOILS Soft dot So											onent				

			-	TEST	New Hampshire	BORING NO.	GZ-3	SZ-3A						
	STAT MA	TE OF I	NEW HA	MPSHI		PARTME	NT OF		SHEET NO2	OF	2			
	PROJECT NAME NHDOT - I-95 SIGN FOUNDATIONS 16189B BRIDGE NO. N/A BASELINE													
	DEPTH (ft)	STRATUM DEPTH	CHANGE (ft)	BLOWS PER 0.5 ft	SAMPLE	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)	FIELD CLASSIFICATION AND REMARKS						
	- 30 -			10 9 15 18	S-4	1.3 [65]	30.0 32.0	Medium dense, brown, silty COARSE - Fl gravel. Wet Increase in roller cone resistance and obs advancement at 33.5' indicate probable w	INE SAND, some silt, some served drill chatter during reathered rock.	e —				
	— 35 —			65 37 38 27	S-5	1.3 [65]	35.0 37.0	Increase in roller cone resistance and obs advancement at 33.5'. Very dense, olive-brown/gray, GRAVEL, t	served drill chatter during race silt. Wet	_				
	- 40 -			50/0"/0				S-6, 40' - 40', no recovery PROBABLE Splitspoon refusal at 40.0'; indicates prob Bottom of Exploration @	BEDROCK - able bedrock. 40.0 ft (El. 15.7)					
54:27 PM TB-12	- 45 -													
NAGE LOGS.GPJ 6/29/2021 12:	- 50 -													
OT FORMAT I-95 KITTERY SIG	- 55 -													
T DATABASES\09.0026090.00 NHD	- 60 -													
TB-12 P:\GINT PROJEC	- 65 -													

MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION Selection OF SELET NOOF SELET NOO	TEST BORING REPORT New Hampshire BORING NO. GZ-4 STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION Men Hampshire BORING NO. GZ-4												-4			
PROJECT NAME PMOUT 1-95 SIGN PROJECT Same EQUIPMENT Same EQUIPMENT Same EQUIPMENT Same EQUIPMENT Same EQUIPMENT Same EQUIPMENT Same	MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION												SHEET NO1OF1 STAOFF			
DECOMIN Trol DECOMPATER EDUIPMENT SAMPLER CASING CORE ELEVATION ID MALLING Data National Street Stre	PROJECT NAME NHDOT - I-95 SIGN FOUNDATIONS 16189B BRIDGE NO. N/A											BASELINE				
Image: Name of the least of the le			GROUNI		<u>२ २</u>		EQUIPMENT SAMPLER CASING CORE				E	START/END 1/4/21 / 1/4/21			0 4/21	
Image: Image: <thimage:< th=""> <thimage:< t<="" td=""><td colspan="7">DATE TIME DEPTH ELEV. BOTTOM BOTTOM</td><td colspan="5">TYPE: S HW/NW</td><td colspan="3">DRILLER <u>M. D'Ambrosio</u></td><td>sio</td></thimage:<></thimage:<>	DATE TIME DEPTH ELEV. BOTTOM BOTTOM							TYPE: S HW/NW					DRILLER <u>M. D'Ambrosio</u>			sio
Image: Instruct 2-word rg Im	1/4/21	1300	(ft) 6.5	57.5			SIZE I.D. HAMMER	(in): R WT. (lb):	1.3/5 4/3 INSPECTOR E. Tome NT. (b): 140 DRILL RIG OLASSIELED F. Tome							
Operation Description Description <thdescription< th=""> <thdescription< th=""> <</thdescription<></thdescription<>							HAMMER	R FALL (in): R TYPE:	30 Automatic	Truck	- GT8		EAST/NORTH	(ft)	/	
0 0.4 63.6 14 27 20 0.1 1.3 (50) 1.9 0.2 0.4 63.6 14 27 20 0.1 1.3 (50) 1.9 0.2 0.4 63.6 14 27 0.1 1.3 (50) 1.9 0.2 0.4 63.6 1.1 0.1 <th0.1< th=""> 0.1 <th0.1< th=""> <th0.1< th=""> <th0.1< th=""></th0.1<></th0.1<></th0.1<></th0.1<>	DEPTH (ft)	STRATUM DEPTH	CHANGE (ft)	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)		FIELD	CLASSIF	ICATI	ON /	AND REMARK	S		STRATUM SYMBOL
3.8 60.2 ²⁷ ¹³ ¹⁴ ¹⁴ ¹⁴ ¹⁵ ¹⁴ ¹⁵ ¹⁴ ¹⁵ ¹⁴ ¹⁵ ¹⁴ ¹⁵ ¹⁵ ¹⁴ ¹⁵ ¹⁵ ¹⁴ ¹⁵		0.4	63.6	14			0.4	<u> </u>		-	- ASPH/	ALT	-			
3.8 60.2 14 33 30 30 14 33 30 10 11.2				27 20 19	S-1	1.3 [50]		Dense	e, brown, CO	ARSE - FIN		L - D, tra RSE	ace gravel, trace	silt. Dr	y	
5 32 33 1.5 (75) 36 311. Moist 10 10.1 53.9 32 1.5 (75) No N		3.8 60.2 14 15 15 48 S-2 1.4 [70]						- GLACIAL TILL - Bottom 7": Very dense, brown, GRAVEL. some coarse - fine sar						ne sanc	d, little	
10 10.1 53.9 17 78 78 5011 S4 0.6 [30] 17 78 5011 Medium dense, brown, sandy GRAVEL, little silt. Wet 10 10.1 53.9 78 5011 38 0.6 [30] 10.1 53.9 78 5011 10.1 10.1 10.1 10.1 10.1 10.1 53.9 78 5011 10.1 <td>- 5 -</td> <td>-</td> <td></td> <td>32 22 19 12</td> <td>S-3</td> <td>1.5 [75]</td> <td>5.0 7.0</td> <td>silt. M Dense</td> <td>oist e, gray, COAl</td> <td>RSE - FINE</td> <td>SAND,</td> <td>, little</td> <td>gravel, little silt.</td> <td>Wet</td> <td>-</td> <td></td>	- 5 -	-		32 22 19 12	S-3	1.5 [75]	5.0 7.0	silt. M Dense	oist e, gray, COAl	RSE - FINE	SAND,	, little	gravel, little silt.	Wet	-	
10 10.1 53.9 46 73 501* 90 Very dense, gray, silty COARSE - FINE SAND, with silt lenses. Wet Top of Probable Bedrock - Splitspoon relusal at 10.1* indicates probable bedrock. Advanced roller cone to 12.0* 9 15 - - 10.1 53.9 85 0.8/084 - Splitspoon relusal at 10.1* indicates probable bedrock. Advanced roller cone to 12.0* Very dense, gray, GRAVEL. Wet Splitspoon relusal at 12.1*. Advanced roller cone to 14.0* and set up to core. 15 - 11 - 14.0 C1 3.0 [86] C1 Hard, slightly weathered, aphantic, gray, METAWACKE. Joints are close, low angle, undulating, rough, discolored, open. Rock is fractured into grave plices from 14.0*1.4.7* and 17.3*17.5*. ROD: 10.10, 3.5 = 27% Rock Core Times (min:sec): 14.0*15.0* (1:15), 15.0*16.0* (1:29), 16.0*17.0*15.0* C1 Hard, slightly weathered, aphantic, gray, METAWACKE. Recovery indicate rock is probably highly fractured, recovered core has one joint described as low angle, undulating, rough, discolored, partially open. ROD: 0.6 / 2.0 - METAWACKE. Primary joints are very close to close, horizontal to low angle, undulating, rough, discolored, aphantic, gray, METAWACKE. Primary joints are very close to close, horizontal to low angle, undulating, rough, discolored, aphantic, gray, METAWACKE. Primary joints are very close to close, horizontal to low angle, undulating, rough, discolored, ipht weathered, aphantic, gray, METAWACKE. Primary joints are very close to close, horizontal to low angle, undulating, rough, discolored, ipht angle, planar,				17 11 14 12	S-4	0.6 [30]	7.0	7.0 7.0 Medium dense, brown, sandy GRAVEL, little						le silt. Wet		
Splitspoor refusal at 10.1* indicates probable bedrock. Advanced roller cone to 12.0°. Very dense, gray, GRAVEL. Wet Splitspoor refusal at 12.1°. Advanced roller cone to 14.0° and set up to core. C1 3.0 [86] C1 3.0 [86] C1 3.0 [86] C2 0.3 [30] T2 C2 C3 2.0 [100] C3 2.0 [100] C4 5.0 [100]	- 10 -	10.1	53.9	46 78 50/1"	- S-5	0.8 [36]	9.0	¬ Very o	lense, gray, s	silty COARS - Top of	<u>SE - FIN</u> Probab	NE S	AND, with silt len edrock -	i <u>ses.</u> W	/ <u>et</u>	
Name South Very dense, gray, GRAVEL. Wet 1								Splitsp cone t	oon refusal o 12.0'.	at 10.1' indi	cates pi	roba	ble bedrock. Adv	anced	roller	
15 - 15 - C1 3.0 [86] C1 3.0 [86] C1 - C1 -	4:33 AM 1B-12			50/1"			14.0	Very c Splitsp core.	lense, gray, boon refusal	GRAVEL. W at 12.1'. Ad	Vet vanced	rolle	r cone to 14.0' ar	nd set	up to	
20 - 20 -	- 15 -	_			C1	3.0 [86]		C1: Ha close, into gr Rock 16.0-1	ard, slightly v low angle, u avel pieces f Core Times (7.0' (2:03), 1	veathered, a ndulating, ro from 14.0'-1 (min:sec): 1- 7.0-17.5' (1	aphaniti ough, di 4.7' anc 4.0-15.0 :10)	iscolo d 17. 0' (1:	ay, METAWACK ored, open. Rock 3'-17.5'. RQD: 1. 15), 15.0-16.0' (1 av. METAWACK	E. Join (is frac 0 / 3.5 I:29),	ts are _ ctured = 27%]]]]]]]]]]]
20 - 11.5 - 10.5 - 10.5 - - METAWACKE. - METAWACKE. - METAWACKE. - METAWACKE. - - - METAWACKE. - - - - - METAWACKE. - - - - - METAWACKE. - - - - - - METAWACKE. -	5000			C2	0.3 [30]	^{17.5} indicates rock is probably highly fracture						recovered core l	J.J.			
20.5 Out reads of signal y reads to close, horizontal to low angle, undulating, rough, discolored, partially open. RQD: 0.5 / 2.0 = 25% C4 5.0 [100] C5 6.0 [101] C4 5.0 [102] C0 C0 </td <td>20 - 20</td> <td>_</td> <td></td> <td></td> <td>C3</td> <td>2.0 [100]</td> <td>18.5 18.5</td> <td>1.0 = 0 Rock</td> <td>bed as low a)% Core Times (ard, slightly y</td> <td>ngie, unduia (min:sec): 1 - N veathered</td> <td>ating, ro 7.5-18.5 /IETAW/ aphaniti</td> <td>5' (4: ACK</td> <td>alscolored, oper 00) E - av METAWACK</td> <td>T. RQU</td> <td>): U /</td> <td>רך אר אר אר אר אר</td>	20 - 20	_			C3	2.0 [100]	18.5 18.5	1.0 = 0 Rock	bed as low a)% Core Times (ard, slightly y	ngie, unduia (min:sec): 1 - N veathered	ating, ro 7.5-18.5 /IETAW/ aphaniti	5' (4: ACK	alscolored, oper 00) E - av METAWACK	T. RQU): U /	רך אר אר אר אר אר
Sampler Identification COHESIVE SOILS Bottom of Exploration @ 25.5 ft (El. 38.5) Sampler Identification COHESIVE SOILS Bottom of Exploration @ 25.5 ft (El. 38.5) S Standard Split Spoon Elows/foot (N) Consistency Bows/foot (N) Apparent Density SL Large Spoon (O.D.= 3 in) T Thin Wall Tube 2 - 4 Soft 5 - 10 Loose Some 20% - 35% U Undisturbed Piston 5 - 8 Medium Stiff 11 - 30 Medium Dense Little 10% - 20% Yea - 30 Hard WOR - Weight of Rod ENGLISH ENGLISH	- 25 -	_			C4	5.0 [100]	20.5	joints discole open. Rock 0 C4: Hi joints discole moder open.	are very clos pred, tight to d, moderatel RQD: 0.5 / 2 Core Times (ard, slightly v are very clos pred, tight to 'ately dipping RQD: 3.0 / 5 Core Times (e to close, ł open. Secc y dipping, p 0.0 = 25% (min:sec): 1 veathered, a e to close, ł open. Secc y to high ang i to high ang i = 60%	horizont ondary jo lanar, ro 8.5-19.5 aphanitio horizont ondary jo gle, plar 0.5-21 f	tal to oints ough 5' (1: c, gr tal to oints nar, r 5' (1	are close to moc , fresh to discolo 30), 19.5-20.5' (1 ay, METAWACK low angle, undul are closely spac ough, discolored 47), 21.5-22.5' (2	lating, i derately red, pa l:40) E. Prin lating, i ced, l, partia 2:49)	nary rough, y artially nary rough, ally	
Sampler Identification COHESIVE SOILS NON-COHESIVE SOILS Soil Descriptions Proportion S Standard Split Spoon Standard Split Spoon Blows/foot (N) Consistency 0 - 4 Very Loose Capitalized Soil Name Major Component SL Large Spoon (O.D.= 3 in) 0 - 1 Very Soft 5 - 10 Loose Some 20% - 35% U Undisturbed Piston 5 - 8 Medium Stiff 11 - 30 Medium Dense Little 10% - 20% O Open End Rod 9 - 15 Stiff 31 - 50 Dense Trace 1% - 10% C Core Barrel >30 Hard WOR - Weight of Rod ENGLISH	008.002008							\ <u>22.5-2</u>	<u>3.5' (2:37), 2</u> Bot	23.5-24.5' (3 tom of Explo	3:04), 24 oration (4.5 <u>-2</u> @ 2	5.5' (5:00) 5.5 ft (El. 38.5)]	
Sampler Genutrication CONESTVE SULS NON-CONESTVE SOLS Soll Descriptions Proportion S Standard Split Spoon Standard Split Spoon Blows/foot (N) Consistency 0 - 4 Very Losse Capitalized Soil Name Major Component SL Large Spoon (O.D.= 3 in) 0 - 1 Very Soft 0 - 4 Very Losse Some 20% - 50% U Undisturbed Piston 5 - 8 Medium Stiff 11 - 30 Medium Dense Little 10% - 20% 0 O Open End Rod 9 - 15 Stiff 31 - 50 Dense Trace 1% - 10% C Core Barrel >30 Hard WOR - Weight of Rod ENGLISH ENGLISH	DAIABASES	- 1-1 - 117	-4:								. г		il Deceri di			
C Core Barrel > 30 Hard WOR - Weight of Rod ENGLISH NR Not Recorded WOH - Weight of Hammer ENGLISH	Sampler Identification COHESIN S Standard Split Spoon Blows/foot (N) SL Large Spoon (O.D.= 3 in) 0 - 1 T Thin Wall Tube 2 - 4 U Undisturbed Piston 5 - 8 O Open End Rod 9 - 15 A Auger Flight 16 - 30						E SOILS Consisten Very Soft Soft Medium S Stiff Very Stiff	ILS NUN-COHESIVE SOILS Soil Descriptions istency Blows/foot (N) Apparent Density Capitalized Soil Name Soft 0 - 4 Very Loose Lower Case Adjective 5 - 10 Loose Some um Stiff 11 - 30 Medium Dense Little 31 - 50 Dense Trace					<u>Pr</u> M 35 20 10	Proportion Major Component 35% - 50% 20% - 35% 10% - 20% 1% - 10%		
		Core Ba	rrel orded		> 30		Hard		WOR - Weight of Rod				ENGLISH			

	OT • P	TEST BORING REPORT New Hampshire BORING NO. GZ-5												5	
	STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION											SHEET NOOF			
	PROJECT NAME NHDOT - I-95 SIGN FOUNDATIONS 16189BBRIDGE NO BASELINE														
	DESCR	RIPTIO	N <u>09</u>	ELEVATION (ft)	68.0)									
		1	GROUN	OWATER	२		EQUIPMENT SAMPLER CA			CASING	CORE	START/END 12/	<u>12/18/20 / 12/18/20</u>		
	DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	BOTTOM OF HOLE	SIZE I.D.	(in):	S 1.375	4/3			E. Tom	Tome	
	2/18/20	1200	5.0	63.0			HAMMER	WT. (lb):	140 30	DRIL	L RIG	CLASSIFIER	E. Tom	е	
					1		HAMMER	TYPE:	Automatic	Truck	- GT8	EAST/NORTH (ft)	/		
_	DEPTH (ft) 0 —	STRATUM DEPTH	CHANGE (ft)	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (ft) [%]	DEPTH RANGE (ft)		FIELD	CLASSIF	ICATION	I AND REMARKS		STRATUM SYMBOL	
_	-	0.3	67.7	7 15 14 15	S-1	1.3 [65]	2.0	Top 3" Botton gravel	: Brown, silty n 12": Mediur , little silt. Dry	/ COARSE m dense, br /	- TOPSOI - FINE SA rown, COA	 ND, with frequent roots. RSE - FINE SAND, sor	<u>Moist</u> me		
_		3.5	64.5	10 12 14	S-2	1.7 [94]	3.8	`∽ _ Top 16			<u>- FILL -</u> GLACIAL T brown, sil	ILL - ty COARSE - FINE SAN	∫ ND, trace , .		
-				50/2"/0.3	2		0.0	Botton	. Dry <u>1 4": Gray, G</u>	RAVEL. Dr	у		/		
	5 —	-						S-3 4	- 4 2' 0 1' re	- Top of	Probable /erv dense	Bedrock -) trace		
								gravel Splitsp chatte probat	from fracture poon refusal a r from 4.2' to ole weathered	ed rock. Dry at 4.2' bgs; 9.0' bgs du d bedrock o	increase i iring roller r bedrock.	n resistance and observ cone advancement indi	ed drill cates	י אר אר ייאר אר הי אר אר	
														. [. []	
							9.0							. ر. ر. ה - ה	
TB-12	10 —				C1	5.0 [100]		Increa C1: Ha moder partial pieces Rock (se in resistar ard, fresh, ap ately spaced y open with from 13.6'-1 Core Times (nce during r hanitic, gra , low angle, one modera 3.7'. RQD: min:sec): 9	oller cone y, METAV , undulatin ately wide 2.1 / 5 = 4 .0-10.0' (3	advancement at 9.0' bg /ACKE. Joints are very g, rough, fresh to discol oint. Rock fractured into 2% (45), 10.0-11.0' (3:27),	us. – close to ored, o gravel	יין אין אין אין אין אין אין אין אין אין אין	
1:34 AM							14.0	11.0-1	2.0' (3:43), Ì	2.0-13.Ó' (3	:37), 13.0	.14.0' (3:56)		י אר אר האר אר א	
1 10:37	15 —	-					14.0			- 10			_	ר אר אר אר	
LOGS.GPJ 6/29/202					C2	4.7 [94]		C2: Ha moder tight to Rock (16.0-1	ard, fresh, ap ately spaced o open. RQD: Core Times (7.0' (5:50), 1	hanitic, gra , horizontal : 3.3 / 5 = 6 min:sec): 1- 7.0-18.0' (3	y, METAV to low any 7% 4.0-15.0' (::00), 18.0-	/ACKE. Joints are very gle, undulating, rough, fr 2:57), 15.0-16.0' (4:06), .19.0' (3:11)	close to resh,	יין אין אין אין אין אין אין אין אין אין אין אין אין אין אין אין אין אין אין	
GNAGE							19.0		Bott	om of Explo	oration @	19.0 ft (El. 49.0)			
ERY S	20 —	-								·	0	. ,			
RMAT I-95 KITTE															
DOT FO															
HN 00.	25 —	-													
ATABASES\09.0026090															
	<u>Sampler</u> S	<u>Identifica</u> Standaro	<u>ation</u> d Split Spoo	on	Blows/f	COHESIVE oot (N)	E SOILS <u>Con</u> sistend	cy Bl	NON-COHE	ESIVE SOILS <u>App</u> arent De	ensity	Soil Descriptions Capitalized Soil Name	<u>Proportion</u> Major Compo	onent	
ROJE	SL T	Large Sp Thin Wa	poon (O.D.: III Tube	= 3 in)	0 -	1	Very Soft		- 4	Very Loose		ower Case Adjective	35% - 50% 20% - 35%		
NT P	U	Undistur	bed Piston		5 -	8	Medium St		- 30	Medium Der	nse l	Little	10% - 20%		
이 Open End Rod 9 - 15 A Auger Flight 16 - 30						с 0	Stiπ Very Stiff	31	- 50 50	Dense Very Dense		Irace	1% - 10%		
TB-12	С	Core Ba	rrel		> 30		Hard		VOR - Weight o	of Rod	ENGLISH				
Ν	Aaino	e Depa	artment	of Transporta	ation		Project	: I-95 Si	gn Fou	ndations Boring No.:	iZ-6				
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		<u>9</u> 1	Soil/Rock Expl US CUSTOM/	oration Log ARY UNITS			Locatio	on: Kitte	ry, ME	- Portsmouth, NH WIN:					
Drille	or:		New England	Boring Contractors	Flev	atior) (ft)	82.4		Auger ID/OD: 4 25"					
Oner	ator:		M D'Ambrosi		Datu	m	(it.)	NAVD	88	Sampler: Standard Spli	tspoon				
Logo	od By:		F. Tome	0	Rig	Tvno		Truck	GT8	Hammer Wt /Fall: 140#/30"	tspoon				
Dete	Ctort/E	nich	01/05/2021_01	/05/2021		iype	Iathadu	Duive P	Wash						
Date	Start/FI	nisn:	01/03/2021-01	/05/2021	Drilli	ing N		Drive &	wasn		1				
Borir	ig Loca	tion:	See Plan		Casi	ng IL	-	4/4.5"		water Level : Not Measured	1				
Ham Definit	mer Effi	ciency F	actor: 0.87	R = Rock C	Ham Dre Samp	mer	Type:	Automa	tic 🛛 Peak/Re	Hydraulic Rope & Cathead molded Field Vane Undrained Shear Strength (nsf)	ear Strength (nsf)				
D = Sp MD = 1 U = Th MU = 1 V = Fie MV = 1	It Spoon S Jnsuccess in Wall Tu Jnsuccess Id Vane S Jnsuccess	Sample ful Split Spo be Sample ful Thin Wa hear Test, f <u>ul Field Va</u>	oon Sample Atter III Tube Sample At PP = Pocket Per <u>ne Shear Test Att</u>	SSA = Solic spt HSA = Holic RC = Roller tempt WOH = Wei hetrometer WOR/C = W empt WO1P = Wei	Stem Aug ow Stem A Cone ght of 140 /eight of F	ger Nuger Nb. Ha Rods o <u>ne Per</u>	immer r Casing rson	Su(la q _p = 1 N-uno Hamr N ₆₀ = <u>N₆₀ =</u>) = Lab Jnconfin corrected ner Effici SPT N-	Wane Undrained Shear Strength (psf) WC = Wate Tortnin Grin ed Compressive Strength (ksf) LL = Liquid Limit = Raw Field SPT N-value PL = Plastic Limit iency Factor = Rig Specific Annual Calibration Value Pl = Plasticity Index uncorrected Corrected for Hammer Efficiency G = Grain Size Analysis er Efficiency Factor/60%)*N-uncorrected C = Consolidation Test	ercent				
				Sample Information							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 Description and Remarks	Testing Results/ AASHTO and Unified Class.				
0								82.0	****	0'-0.4': Asphalt0.	4-				
	1D	24/16	1.0 - 3.0	46-48-35-32	83	120		-		Brown/grey, dry, very dense, gravelly fine to medium SAND, trace silt, (Fill).					
	2D	24/21	24/21 3.0 - 5.0 25-25-36-56 24/24 5.0 - 7.0 41-28-28-27							Brown, dry, very dense, fine to coarse SAND, some gravel, some silt, fractured rock in spoon tip, (Fill).	G#19 A-2-4, SM WC=6.8				
- 5 -	3D	24/24	5.0 - 7.0	41-28-28-27	56	81		-		Olive-brown, dry, very dense, fine to coarse SAND, some gravel, some silt, (Fill).					
	4D	24/24	7.0 - 9.0	20-30-30-30	60	87				Brown/tan, dry, very dense, fine to coarse SAND, some gravel, some silt, (Fill).					
- 10 -	5D	24/24	9.0 - 11.0	35-47-50-40	97	141		-		Brown/tan, dry, very dense, fine to coarse SAND, some gravel, some silt, (Fill).					
	6D	24/16	11.0 - 13.0	28-39-38-31	77	112				Brown/tan, dry, very dense, fine to coarse SAND, some gravel, some silt, (Fill).					
	7D	24/16	13.0 - 15.0	15-18-20-20	38	55		-		Brown/tan, moist, dense, fine to coarse SAND, some gravel, some sil (Fill).	t,				
- 15 -	8D	24/19	15.0 - 17.0	19-28-37-38	65	94		-		Brown/tan, moist, very dense, fine to coarse SAND, some gravel, some silt, (Fill).					
- 20 -								-		Brown/tan, wet, very dense, fine to coarse SAND. some gravel. some					
	9D	24/17	20.0 - 22.0	25-20-30-19	50	73		58.9		silt, (Fill).	5-				
25															
25 Rem 1. A 2. B 3. G	arks: utomatic orehole v round su	hammer 1 vas flushe rface eleva	NEBC #GT8. E d prior to casing ation was measu	nergy Transfer Ratio = 8 g removal; water level ne ured based on surveyed s	37%. ot obtain stake ele	ed. vatio	<u>ı</u> 15.	<u>.</u>			1				
4. Fi Mai Stratifi	ne-Grair neDOT S	ed Soil D standard b s represent	escriptions on the ased percentage approximate bour	his log are based on plas es passing specific grain idaries between soil types; t	ticity est sizes. ransitions	imate may b	ed using v	risual-ma	nual cla	assification techniques or laboratory Atterburg Limit tests if available, range 1 of 2	ather than the				
* Wate than	r level rea those pres	dings have sent at the ti	been made at time ime measurement	es and under conditions stat s were made.	ed. Grou	ndwat	er fluctuatio	ons may o	cur due	to conditions other Boring No.: GZ-6					

1	Maine	e Dep	artment	of Transporta	ation	Project	: I-95 Sig	gn Four	idations	Boring No.:	G	Z-6	
		- <u>-</u> -	Soil/Rock Exp US CUSTOM/	loration Log ARY UNITS		Locatio	n: Kitter	y, ME	- Portsmouth, NH	WIN:			
Drill	or.		New England	Boring Contractors	Flevatio		82.4			Auger ID/OD:	4 25"		
One	rator:		M D'Ambrosi	io	Datum:	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	NAVI	D 88		Sampler:	Standard Splits	noon	
Log	ned By:		E. Tome		Rig Typ	e:	Truck	- GT8		Hammer Wt./Fall:	140#/30"	poon	
Date	Start/Fi	nish:	01/05/2021-01	1/05/2021	Drilling	Method:	Drive	& Was	sh	Core Barrel:	N/A		
Bori	ng Loca	tion:	See Plan		Casing	ID/OD:	4/4.5"			Water Level*:	Not Measured		
Ham	mer Effi	ciency F	actor: 0.87		Hamme	r Type:	Automati	ic 🛛	Hydraulic 🗆	Rope & Cathead \Box			
Defini D = S MD = U = TI MU = V = Fi MV =	tions: plit Spoon S Unsuccess nin Wall Tu Unsuccess eld Vane S <u>Unsuccess</u>	Sample sful Split Spo be Sample sful Thin Wa shear Test, sful Field Va	oon Sample Atten II Tube Sample A PP = Pocket Pe Ine Shear Test Att	R = Rock C SSA = Solid RC = Roller ttempt WOH = Wei netrometer WOR/C = W WO1P = Wei	Stem Auger Stem Auger w Stem Auge Cone ght of 140 lb. /eight of Rods eight of One P	r Hammer or Casing erson	$S_{u} = P_{u}$ $S_{u}(lab)$ $q_{p} = U_{t}$ N-unco Hamme $N_{60} = 3$ $N_{60} = 4$	eak/Ren) = Lab \ nconfine orrected er Efficie SPT N-u (Hamme	nolded Field Vane Undrained She /ane Undrained Shear Strength (r d Compressive Strength (ksf) = Raw Field SPT N-value ency Factor = Rig Specific Annual incorrected Corrected for Hamme <u>r Efficiency Factor/60%)*N-uncor</u>	True True Point ssf) WC = V UL = Lit psf WC = V PL = PI Calibration Value PI = PI PI r Efficiency G = Grave G = Grave rected C = Control C = Control	ocket Torvane Shea Vater Content, pero quid Limit astic Limit asticity Index ain Size Analysis nsolidation Test	ar Strength (psf) ænt	
Jepth (ft.)	sample No.	² en./Rec. (in.)	sample Depth ft.)	Standing (16 in.) Shear Strength r ROD (%)	l-uncorrected	Casing Slows	Elevation ft.)	Braphic Log	Visual De	scription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.	
25	00 10D	24/16	0 E	19-15-14-27	29 42		Ш÷		Grey, wet, dense, fine to co	arse SAND, some gravel, so	ome silt,	G#20	
- 30 -	11D	24/17	30.0 - 32.0	25-24-17-16	41 59				(Glacial Till). Olive-brown, moist, dense, silt, (Glacial Till).	fine to coarse SAND, some	gravel, some	A-2-4, SM WC=10.7	
- 35 -	12D	24/19	35.0 - 37.0	15-16-22-24	38 55				Olive-brown, moist, dense, silt, (Glacial Till).	fine to coarse SAND, some	gravel, some		
- 40 -	13D	24/17	40.0 - 42.0	13-18-17-21	35 51				Olive-brown, moist, dense, Till).	Silty, fine to medium SAN	D, (Glacial	G#21 A-4, SM WC=24.4	
- 45 -	14D	24/14	45.0 - 47.0	15-23-42-48	65 94		34.9		Top 10": Olive-brown, mois silt, (Glacial Till). Bottom 4": Grey, wet, very (Glacial Till).	st, very dense, fine to medit hard, GRAVEL, little sand	um SAND, little , little silt, 47.5-		
							1		Bottom of Exploration	at 47.5 leet below ground	i suriace.		
						_							
50													
1. A 2. E 3. C 4. F Stratif	Stratification lines represent approximate boundaries between soil types; transitions may be gradual.												
* Wate than	er level rea those pres	dings have sent at the t	been made at tim ime measuremen	es and under conditions stat ts were made.	ed. Groundw	ater fluctuatio	ons may occ	cur due t	o conditions other	Boring No.:	GZ-6		

I	Main	e Depa	artment	of Transport	atioi	n	Project	I-95 Sign Fou	ndations	Boring No.:	G2	<u>Z-7</u>
		<u>9</u> 1	Soil/Rock Expl US CUSTOM	oration Log ARY UNITS			Locatio	n: Kittery, ME	- Portsmouth, NH	WIN:		
Drill	er:		New England	Boring Contractors	Ele	vatior	n (ft.)	81.6		Auger ID/OD:	4.25"	
Ope	rator:		K. Smith	8	Dat	um:	. ()	NAVD 88		Sampler:	Standard Splits	spoon
Log	ged By:		E. Tome		Rig	Туре	:	Truck - GT8		Hammer Wt./Fall:	140#/30"	^
Date	Start/Fi	inish:	01/25/2021-01	/25/2021	Dril	lling N	lethod:	Drive & Wash		Core Barrel:	N/A	
Bori	ng Loca	tion:	See Plan		Cas	sing II	D/OD:	4/4.5"		Water Level*:	31.1'	
Ham	mer Effi	iciency F	actor: 0.87	P - Pook (Har	nmer	Туре:	Automatic 🛛	Hydraulic	Rope & Cathead	Pockot Toryana Sha	ar Strongth (nof)
D = S MD = U = T MU = V = F MV =	plit Spoon Unsuccess hin Wall Tu Unsuccess ield Vane S <u>Unsuccess</u>	Sample sful Split Spo ube Sample sful Thin Wa Shear Test, sful Field Va	oon Sample Atter III Tube Sample A PP = Pocket Per <u>ne Shear Test Att</u>	SSA = Soli SSA = Holl RC = Rolle ttempt WOH = We netrometer WOR/C = V empt WO1P = W	d Stem A ow Stem r Cone eight of 14 Veight of 0 Veight of 0	Auger Auger 40lb. Ha Rods o <u>One Per</u>	immer r Casing son	$S_{U}(lab) = Lab$ $q_{p} = Unconfin$ $N-uncorrected$ $Hammer Effici$ $N_{60} = SPT N-$ $M_{60} = (Hamm)$	Vane Undrained Shear Strength (ed Compressive Strength (ksf) = Raw Field SPT N-value ency Factor = Rig Specific Annua uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-unco	psf) WC = LL = I PL = I Calibration Value PI = F er Efficiency G = C rrected C = C	Water Content, per Liquid Limit Plastic Limit Plasticity Index Grain Size Analysis Consolidation Test	cent
		-		Sample Information	7							Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.	Sample Deptt (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N ₆₀	Casing Blows	Elevation (ft.) Graphic Log	Visual De	scription and Remarks		Testing Results/ AASHTO and Unified Class.
0							81	80.8	0'-0.8': Asphalt		0.8	
	1D	24/18	1.0 - 3.0	29-58-57-91	115	167	51		Brown, wet, very dense, fir (Fill).	ne to coarse SAND, some	gravel, little silt,	
							105 119					
5.	2D	24/18	4.0 - 6.0	37-48-59-64	107	155	67		Brown, wet, very dense, fir (Fill).	ne to coarse SAND, some	gravel, some silt,	
5							94					
							132	1 🗱				
							80					
							85					
- 10 -	3D	24/14	9.0 - 11.0	39-38-33-38	71	103	59		Brown, wet, very dense, fir with brick fragments, (Fill)	gravel, some silt,		
10							72					
							79					
							88					
							154		Brown, wet, very dense, fir	ne to coarse SAND, some	gravel, some silt,	
- 15 -	4D	24/16	14.0 - 16.0	54-43-41-39	84	122	80		with rock fragments, (Fill).			
							113					
							120					
							147					
- 20	5D	24/18	19.0 - 21.0	33-44-44-45	88	128	80		Brown, wet, very dense, fir	ne to medium SAND, some	e silt, (Fill).	
- 20 -							74					
							78					
							94					
		20/12	24.0 25.7	24 22 56 00/21	00	120	121		Top 8": Brown, wet, very d	lense, fine to coarse SANE), some gravel,	
25 Borr		20/12	24.0 - 25.7	24-35-30-80/2"	69	129			some silt, (Fill).			
1. A 2. V 3. C 4. F Ma Stratif	Automatic Vater leve Ground su Pine-Grain ineDOT S fication line er level rea	e hammer 1 el measure Irface eleva ned Soil D Standard b Is represent Idings have	NEBC #GT8. E d prior to casin, ation was mease escriptions on t ased percentage approximate bour been made at tim	nergy Transfer Ratio = g removal. ured based on surveyed his log are based on pla es passing specific grain idaries between soil types; es and under conditions sta	87%. stake el sticity e sizes. transition ted. Gro	evation stimate ns may b pundwate	ns. ed using v be gradual. er fluctuatio	isual-manual cla	ssification techniques or labo	Page 1 of 3	ts if available, rat	her than the

than those present at the	time measurements were made
and anose present at the	

Boring No.: GZ-7

]	Maine Department of Transportation							ect:	-95 Sign Fou	ndations	Boring No.:	G.	Z-7
			Soil/Rock Exp US CUSTOM/	loration Log ARY UNITS			Loca	atior	Kittery, ME	- Portsmouth, NH	WIN:		
Drill	or:		New England	Boring Contractors	Flor	vation	(ft)		81.6			4.25"	
Ope	rator:		K. Smith	Doring Contractors	Dat	um:	(11.)		NAVD 88		Sampler:	Standard Split	spoon
Log	ged By:		E. Tome		Rig	Туре			Truck - GT8		Hammer Wt./Fall:	140#/30"	- <u>r</u>
Date	Start/Fi	inish:	01/25/2021-01	/25/2021	Dril	ling N	letho	d:	Drive & Wa	sh	Core Barrel:	N/A	
Bori	ing Loca	tion:	See Plan		Cas	ing IC)/OD:		4/4.5"		Water Level*:	31.1'	
Ham	nmer Effi	iciency F	actor: 0.87		Han	nmer	Туре	:	utomatic 🛛	Hydraulic 🗆	Rope & Cathead 🗆		
Defin D = S MD = U = T MU = V = F MV =	itions: plit Spoon S Unsuccess hin Wall Tu Unsuccess ield Vane S <u>Unsuccess</u>	Sample sful Split Sp ibe Sample sful Thin Wa Shear Test, sful Field Va	oon Sample Atten all Tube Sample A PP = Pocket Pe <u>Ine Shear Test Att</u>	R = Rock (SSA = Soil npt HSA = Hol RC = Rolle ttempt WOH = We netrometer WOR/C = 1 wempt WO1P = W Sample Information	Core Sam d Stem Au low Stem r Cone eight of 14 Weight of C leight of C	ple uger Auger 0 lb. Ha Rods or <u>One Pers</u>	ammer r Casir son	g	$\begin{array}{l} S_{u} = \text{Peak/Re} \\ S_{u(lab)} = \text{Lab} \\ q_{p} = \text{Unconfin} \\ \text{N-uncorrected} \\ \text{Hammer Effici} \\ \text{N}_{60} = \text{SPT N-} \\ \hline \\ \text{N}_{60} = (\text{Hammer}) \end{array}$	molded Field Vane Undrained She Vane Undrained Shear Strength (Jad Compressive Strength (ksf) = Raw Field SPT N-value ency Factor = Rig Specific Annual uncorrected Corrected for Hamme <u>er Efficiency Factor/60%)*N-uncor</u>	ar Strength (psf) Tv = osf) WC = LL = PL = Calibration Value PI = F r Efficiency G = C rected C = C	Pocket Torvane She Water Content, per Liquid Limit Plastic Limit Plasticity Index Srain Size Analysis <u>Consolidation Test</u>	ar Strength (psf) cent
		Ê	÷		ð								Laboratory Testing
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		Results/ AASHTO and Unified Class.
25							WA AHE	SH EAD	56.4	Bottom 4": Grey, wet, very silt, (Glacial Till).	dense, gravelly fine to co	25.2 arse SAND, trace	
- 30 -	7D	24/21	29.0 - 31.0	56-92-118-82	210	305	12			Brown, wet, very dense, fin (Glacial Till).	e to coarse SAND, little g	ravel, little silt,	
							18	6					
							21	5					
							21						
							22	5		No recovery			
- 35 -	8D	8/0	34.0 - 34.7	120-65/2"	R		20	0		no recovery.			
55							WA	SH					
							AHE	AD					
	9D	24/8	39.0 - 41.0	37-58-23-19	81	117				Brown, wet, very dense, fin	e to coarse SAND, some	gravel, trace silt.	
- 40													
									3 (- 0 - 1 3 (- 0 - 1 3 (- 0 - 1)				
									•				
	10D	24/8	44.0 - 46.0	5-4-6-6	10	15				Brown, wet, stiff, Silty CLA	AY, little fine sand, trace g	gravel, (Glacial	
- 45 -	10D	24/0	- +0.0	5-4-0-0	10	15				Till).			
									•••				
							\	/					
							\uparrow	f					
								/	32.6		6 1 1 1 1 1 1 1 1 1 1	49.0	
_ 50	11D 1/1 49.0 - 49.1 100/1" R 32.5 Grey, wet, GRAVEL, with fractured Metawacke pieces, Probable Bedrock 50												
Rem 1. 4 2. V 3. 0 4. 1 Strati	amarks: . Automatic hammer NEBC #GT8. Energy Transfer Ratio = 87%. . Water level measured prior to casing removal. . Ground surface elevation was measured based on surveyed stake elevations. . Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterburg Limit tests if available, rather than the atification lines represent approximate boundaries between soil types; transitions may be gradual.												
[°] Wat thar	er level rea those pres	idings have sent at the t	been made at tim ime measurement	es and under conditions sta ts were made.	ited. Grou	undwate	er fluct	uatior	may occur due	to conditions other	Boring No.	: GZ-7	

]	Main	e Dep	artment	of Transport	ation	Projec	t: I-95 S	ign Fo	undations	Boring No.:	GZ-7		
			Soil/Rock Exp	bloration Log		Locatio	on: Kitte	ery, Ml	E - Portsmouth, NH	1.A/I.N.			
			US CUSTOM	ARY UNITS									
Drill	ler:		New England	Boring Contractors	Elevati	on (ft.)	81.6			Auger ID/OD:	4.25"		
Ope	erator:		K. Smith		Datum	:	NAV	VD 88		Sampler:	Standard Splitspoon		
Log	ged By:		E. Tome		Rig Ty	pe:	Truc	ck - GT	8	Hammer Wt./Fall:	140#/30"		
Date	e Start/Fi	inish:	01/25/2021-0	1/25/2021	Drilling	Method:	Driv	re & W	ash	Core Barrel:	N/A		
Bor	ing Loca	ation:	See Plan		Casing	ID/OD:	4/4.5	5"		Water Level":	31.1'		
Defin	itions:	iciency F	actor: 0.8/	R = Rock C	Core Sample	er rype.	Automa S _u =	atic 🖂 Peak/R	Hydraunc ⊔ emolded Field Vane Undrained Sh	ear Strength (psf) $T_V = 1$	Pocket Torvane Shear Strengt	th (psf)	
D = S MD = U = T MU = V = F MV =	Split Spoon Unsuccess Thin Wall Tu Unsuccess Tield Vane S Unsuccess	Sample sful Split Sp ube Sample sful Thin Wa Shear Test, <u>sful Field Va</u>	oon Sample Atter all Tube Sample A PP = Pocket Pe ine Shear Test At	SSA = Soli mpt HSA = Holl RC = Rolle Attempt WOH = We enetrometer WOR/C = V ttempt WO1P = W	d Stem Auger ow Stem Aug r Cone eight of 140 lb Veight of Rod <u>'eight of One</u>	er . Hammer s or Casing Person	S _{u(la} q _p = N-un Ham N ₆₀ : N ₆₀ :	ab) = Lat Unconfi correcte mer Effi = SPT N = (Hamr	o Vane Undrained Shear Strength (ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annua -uncorrected Corrected for Hamm ner Efficiency Factor/60%)*N-unco	(psf) WC = LL = PL = I Calibration Value PI = F er Efficiency G = C rrected C = C	Water Content, percent .iquid Limit Plastic Limit Plasticity Index Jacin Size Analysis consolidation Test		
				Sample Information				4			Labor	ratory	
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 Remarks	Test Resi AASH an Unified	ing ults/ HTO Id Class.	
50									Rock).			ſ	
- 55							-		Bottom of Exploration	n at 49.1 feet below grou	nd surface.		
							-						
- 60 -							-						
- 65							-						
- 70							-						
75													
1. 2 2. V 3. (4. I Strati * Wat	1. Automatic hammer NEBC #GT8. Energy Transfer Ratio = 87%. 2. Water level measured prior to casing removal. 3. Ground surface elevation was measured based on surveyed stake elevations. 4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterburg Limit tests if available, rather than the tratification 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												
thar	n those pre	sent at the f	ime measuremer	nts were made.						Boring No.	: GZ-/		

Ι	Maine Department of Transportation							I-95 S	gn Fou	ndations BC	oring No.:	GZ	2-11
		2	Soil/Rock Expl	oration Log			Locatio	n: Kitte	ry, ME	- Portsmouth, NH			
		<u> </u>	JS CUSTOMA	ARY UNITS						l wi	IN:		
Deille			New England	Daning Cantus stars	Floye		/£4 \	56.2		^		4.251	
Drine	er:		New England	Boring Contractors	Eleva	ition	(π.)	56.2		Au	iger ID/OD:	4.25	
Oper	rator:		M. Soucy		Datu	m:		NAVD	88	Sa	mpler:	Standard Splits	spoon
Logo	ged By:		E. Tome		Rig T	ype:		ATV - I	353	Ha	mmer Wt./Fall:	140#/30"	
Date	Start/Fi	nish:	12/15/2020-12	2/15/2020	Drilli	ng Mo	ethod:	Drive &	: Wash	Co	ore Barrel:	NX	
Bori	ng Loca	tion:	See Plan		Casir	ng ID	/OD:	4/4.5"		Wa	ater Level*:	2.0'	
Ham	mer Effi	iciency F	actor: 0.919		Hamr	ner T	ype:	Automa	tic 🛛	Hydraulic 🗆 Rope	e & Cathead □		
Definit D = Sr	tions: olit Spoon §	Sample		R = Rock 0 SSA = Soli	Core Sample d Stem Aug	e Ier		S _u =	Peak/Re	molded Field Vane Undrained Shear Str Vane Undrained Shear Strength (psf)	rength (psf) T _v = Pc WC = V	cket Torvane She Vater Content, per	ar Strength (psf) cent
MD =	Unsuccess	ful Split Spo	oon Sample Atterr	npt HSA = Holl	ow Stem Au	uger		q _p =	Jnconfir	ed Compressive Strength (ksf)	LL = Lic	uid Limit	
0 = 1r MU =	Unsuccess	sful Thin Wa	Il Tube Sample At	ttempt WOH = We	r Cone eight of 140	b. Han	nmer	Ham	ner Effic	iency Factor = Rig Specific Annual Calib	pration Value PI = PI	isticity Index	
V = Fi MV =	eld Vane S Unsuccess	Shear Test, sful Field Va	PP = Pocket Per ne Shear Test Att	netrometer WOR/C = \ empt WO1P = W	Neight of Ro leight of On	ods or e Pers	Casing on	N ₆₀ = Neo =	⊧ SPT N ⊧ (Hamm	 -uncorrected Corrected for Hammer Efficiency Factor/60%)*N-uncorrected 	ciency G = Gra d C = Co	ain Size Analysis	
				Sample Information					`	, ··· ,			
		(;	д.	<u>_</u>	p								Laboratory Testing
0	o	j.	Jep	%)	ecte			_	-og	Visual Descrip	tion and Pemarks		Results/
ר (ft	ole 1	Rec	ole [s (/6 gth 2D (SOIT		و م	ation	hic I	visual Descrip			AASHTO
eptł	amp	en./	f.) am	hear brear sf)	n-	60	asir Iow:	t.)	rap				Unified Class.
	S		S F		z	z	ОВ	ш С	<u>()</u>	5 T 0 D 1 C /			
Ŭ	1D	24/9	0.0 - 2.0	1-3-3-3	6	9		50.0		(Topsoil).	se SAND, some silt, ro	ots present,	
								1		Bottom 7": Loosa harrow Cite	fine to coarse SAND +		
										dry, (Fill).	nne to coarse SAND, I	ace glavel,	
	2D	7/5	2.0 - 2.6	13-55/1"	R			53.6		Brown, dry, medium dense, Silty	y SAND, trace gravel,	(Fill).	
	D 1	60/60	20.80	POD = 489/						Splitspoon refusal at 2.6' bgs ind	licates bedrock. Advan	ced roller cone	
	KI	00/00	5.0 - 8.0	KQD - 48%						to 3.0' bgs and set up to core.	METAWACKE Drive	ami i ainta ana	
										very close to moderately spaced,	, horizontal to low ang	e, planar to	
- 5 -										undulating, smooth to rough, free	sh, tight to partially op	en. Secondary	
								joints are close to moderately spa	aced, high angle to ver	tıcal, planar,			
										Rock Quality = Poor			
										Recovery = 100%	4.01 (2.20) 4.0.5.01 (2	57) 50 601	
										(3:15), 6.0-7.0' (3:03), 7.0-8.0' (3	-4.0 (2:30), 4.0-3.0 (2 3:00)	37), 3.0-6.0	0001.0
	R2	60/60	8.0 - 13.0	RQD = 53%						R2: Hard, fresh, aphanitic, grey,	MÉTAWACKE. Prim	ary joints are	q _p =999 kst
										very close to close, low angle, pl with one moderately wide joint	lanar, rough, fresh to d Secondary joints are h	iscolored, tight,	
10										vertical, moderately spaced, und	lulating, rough, fresh, p	artially open.	
10										Rock Quality = Poor			
										Recovery = 100% Rock Core Times (min:sec): 8.0-	-9.0' (2:02), 9.0-10.0' (2:30), 10.0-	
										11.0' (2:27), 11.0-12.0' (2:46), 12	2.0-13.0' (3:00)		
								-		R3: Hard, fresh to slightly weath	nered, aphanitic, grey,		
	R3	60/60	13.0 - 18.0	RQD = 35%						METAWACKE. Primary joints	are very close to close,	low angle to	
]		moderately dipping, undulating,	rough, fresh to discol	ored, partially	
- 15 -								-		rough, discolored, partially open	1.	ingle, planar,	
										Rock Quality = Poor			
								1		Recovery = 100% Rock Core Times (min:sec): 13.0	0-14.0' (2:05), 14.0-15	0' (2:35), 15.0-	
										16.0' (2:25), 16.0-17.0' (3:51), 17	7.0-18.0' (5:08)		
								20.0				10.0	
								38.2		Bottom of Exploration at 1	18.0 feet below ground	surface.	
								4		. r			
- 20 -													
								1					
25	aulu												
Rem	arks:												
1. A	utomatic	hammer N	NEBC #D26. Ei	nergy Transfer Ratio =	91.9%.								
2. B	orehole v	vas tlushe rface eleve	a prior to casing	g removal; water level: ured based on surveyed	not obtain stake elev	ed.	5.						
4. F	ine-Grain	ned Soil De	escriptions on t	his log are based on pla	sticity esti	matec	l using v	isual-ma	nual cl	assification techniques or laborator	ry Atterburg Limit tests	if available, rat	her than the
Mai	neDOT S	Standard ba	ased percentage	es passing specific grain	sizes.						Dama 4 - 6 f		
Stratifi	cation lines	s represent	approximate bour	ndaries between soil types;	transitions r	may be	e gradual.				Page 1 of 1		
* Wate	er level rea	dings have	peen made at time	es and under conditions sta	ited. Groun	dwater	r fluctuatio	ns may o	ccur due	to conditions other	Boring No .	G7 11	
than	those pres	sent at the ti	me measurement	s were made.								UZ-11	

Ι	Maine Department of Transportation							I-95 S	ign Fou	ndations Boring N	lo.: <u>G</u> Z	2-12	
			Soil/Rock Expl US CUSTOM/	loration Log ARY UNITS			Locatio	n: Kitte	ery, ME	- Portsmouth, NH WIN:			
<u> </u>				D			(61.)	/			-		
Drille	er:		New England	Boring Contractors	Elev	ation	(ft.)	55.6		Auger ID/O	D: 4.25"		
Oper	rator:		M. Soucy		Dati	um:		NAVD	88	Sampler:	Standard Split	spoon	
Loge	ged By:		E. Tome		Rig	Туре		ATV -	B53	Hammer Wi	:./Fall: 140#/30"		
Date	Start/Fi	nish:	12/15/2020-12	2/15/2020	Drill	ing N	lethod:	Drive &	2 Wash	Core Barrel	: NX		
Bori	ng Loca	tion:	See Plan		Casi	ing IC	D/OD:	4/4.5"		Water Leve	10.0 '		
Ham	mer Effi	iciency F	actor: 0.919		Ham	nmer	Туре:	Automa	ntic 🛛	Hydraulic 🗆 Rope & Cathea	ıd 🗆		
Definit D = SI MD = U = TI MU = V = Fi MV =	tions: plit Spoon S Unsuccess nin Wall Tu Unsuccess eld Vane S <u>Unsuccess</u>	Sample sful Split Sp be Sample sful Thin Wa shear Test, sful Field Va	oon Sample Atterr all Tube Sample At PP = Pocket Per <u>ine Shear Test Attr</u> S	R = Rock (SSA = Soil PPT HSA = Hol RC = Rolle WOH = W HOH = W WOH = W WO1P = W Sample Information	Core Samp id Stem Au low Stem A er Cone eight of 140 Weight of F Veight of O	ole Iger Auger Olb. Ha Rods ol I <u>ne Per</u>	mmer r Casing son	S _u = S _{u(la} q _p = N-un Ham N ₆₀ = <u>N₆₀ =</u>	Peak/Re b) = Lab Unconfir corrected mer Effic = SPT N = (Hamm	molded Field Vane Undrained Shear Strength (psf) Vane Undrained Shear Strength (psf) ed Compressive Strength (ksf) d = Raw Field SPT N-value iency Factor = Rig Specific Annual Calibration Value -uncorrected Corrected for Hammer Efficiency er Efficiency Factor/60%)*N-uncorrected	T _V = Pocket Torvane Shé WC = Water Content, per LL = Liquid Limit PL = Plastic Limit PI = Plasticity Index G = Grain Size Analysis C = 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	N ₆₀	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and I	Remarks	Laboratory Testing Results/ AASHTO and Unified Class.	
0	1D	24/16	0.0 - 2.0	3-5-2-2	7	11		55.1		Top 6": Brown, dry, fine to medium S AN (Topsoil).	D, some silt, with few roots,		
										Bottom 10": Brown, dry, medium dense, fi	ne to coarse SAND, little		
	2D	24/2	2.0 - 4.0	4-6-7-9	13	20				silt, trace gravel, (Fill). Brown, dry, medium dense, Silty SAND, v	with few roots, (Fill).		
- 5 -	3D	24/18	4.0 - 6.0	14-21-39-53	60	92		51.6		Olive-brown, dry, very dense, Sandy GRA Till).	4.0 VEL, little Silt, (Glacial	G#22 A-1-b, GM WC=7.1	
	4D	24/17	6.0 - 8.0	29-44-55-111	99	152				Olive-brown, dry, very dense, Sandy GRA fragments, (Glacial Till).	VEL, little Silt, with rock		
								-					
- 10 -	R1	36/22	9.0 - 12.0	RQD = 0%				46.6		Increase in roller cone resistance at 9.0' inc up to core.	9.0 licates probable bedrock; se	t	
10										R1: Very hard, moderately weathered, aph METAWACKE. Rock fractured into disco 9 0'-12 0'	anitic, grey, lored gravel pieces from		
	R2	48/46	12.0 - 16.0	RQD = 27%						Rock Quality = Very Poor Recovery = 61%	R) 10.0.11.0/(4.00) 11.0		
				-						Rock Core Times (min.sec). 9.0-10.0 (2.5 12.0' (4:15) R2: Hard, slightly weathered, aphanitic, gr Primary joints are very close to close low	ey, METAWACKE.		
- 15 -										dipping, undulating, rough, discolored to s open to open. Two secondary joints are hig slightly weathered. Rock fractured into gra	slightly weathered, partially gh angle, undulating, rough vel pieces from 13.2'- 14.0'		
								39.6		and 14.6'-16.0'. Rock Quality = Poor Recovery = 96%			
										Rock Core Times (min:sec): 12.0-13.0' (1: 15.0' (2:02), 15.0-16.0' (2:15)	51), 3.0-14.0' (1:43), 14.0- 	-	
										Bottom of Exploration at 16.0 feet b	elow ground surface.		
- 20 -													
								-					
								1					
25													
1. A 2. B 3. C 4. F	 kemarks: 1. Automatic hammer NEBC #D26. Energy Transfer Ratio = 91.9%. 2. Borehole was flushed prior to casing removal; water level not obtained. 3. Ground surface elevation was measured based on surveyed stake elevations. 4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterburg Limit tests if available, rather than the 												
Mai Stratif	ineDOT S	s represent	approximate bour	es passing specific grain	transitions	s may h	e gradual			Page	of 1		
* 14/		ding- h	hoop made stu	as and under an illing	ad O	undur d	e flueto d	no	0017-01-0	to conditions other			
vvate than	those pres	uings have sent at the t	been made at time	es and under conditions stats is were made.	ated. Grou	mawate	er nuctuatio	ns may o	cour due	Bori	ng No.: GZ-12		

Ι	Maine Department of Transportation							I-95 S	ign Fot	indations	Boring No.:	GZ	2-15
		2	Soil/Rock Exp	loration Log			Locatio	n: Kitte	erv. Mł	E - Portsmouth, NH			
		<u> </u>	US CUSTOM	ARY UNITS					,		WIN:		
Drille	ər.		New England	Boring Contractors	Fle	vatior	(ft)	31.3			Auger ID/OD:	4 25"	
Onei	ator:		M D'Ambrosi	io	Dat	tum.	. ()	NAVD	88		Sampler:	Standard Splits	spoon
	ator.		E Toma	10	Bio			Truck	GTS		Hammor Wt /Fall:	140#/20"	spoon
Loge			E. Tome	22/20	Rig	Туре		D · ·	W 1			140#/30	
Date	Start/FI	nisn:	12/22/20 - 12/	22/20	Dri	lling N	letnoa:	Drive &	c wash		Core Barrel:	NA	
Borii	ng Loca	tion:	See Plan		Cas	sing II	D/OD:	4/4.5"			Water Level :	2.5'	
Ham	mer Effi	ciency F	actor: 0.87	R = Pook (Hai	mmer	Туре:	Automa	tic \boxtimes	Hydraulic	Rope & Cathead	Pookot Tonyona Cha	ar Strangth (paf)
D = Sp	olit Spoon \$	Sample		SSA = Sol	id Stem A	luger		S _u – S _{u(la}	b) = Lab	Vane Undrained Shear Strength (VC = 0.05	Water Content, per	cent
MD = U = Th	Unsuccess nin Wall Tu	sful Split Spo be Sample	oon Sample Atten	npt HSA = Hol RC = Rolle	low Stem r Cone	Auger		q _p = N-uno	Unconfii correcte	ned Compressive Strength (ksf) d = Raw Field SPT N-value	LL = L PL = F	iquid Limit Plastic Limit	
MU =		sful Thin Wa	II Tube Sample A	ttempt WOH = W	eight of 1	40lb. Ha	immer	Ham	ner Effic	ciency Factor = Rig Specific Annual	Calibration Value PI = P	lasticity Index	
MV =	Unsuccess	ful Field Va	ne Shear Test Att	tempt WO1VO = V	/eight of (One Per	son	N ₆₀ =	= (Hamn	ner Efficiency Factor/60%)*N-uncor	rected C = C	onsolidation Test	
				Sample Information									Laboratorv
		, i	bth		ted				5				Testing
ft.)	No		De	/6 ir h (%	rrec			Ę	:Lo	Visual De	scription and Remarks		Results/
th (aldr	, A		vs (aar (QD	loor	_	ing vs	/atic	phic				and
Dep	San	Pen	San (ft.)	Blov Stre (psf or R	n-N	N6C	Cas	(ft.)	Gra				Unified Class.
0								30.9		_ 0'-0.4': Asphalt			
								50.5		Drawn dry dance fine to a	aaraa SAND littla silt litt	0.4-	-
	1D	24/8	1.0 - 3.0	13-17-16-10	33	48				Brown, dry, dense, nine to c	oarse SAND, nute shi, nu	ie gravei, (Fill).	
								1					
No recovery. Sand observed in wash return.													
2D 24/0 3.0 - 5.0 6-7-11-10 18 26 No recovery. Sand observed in wash return.													
- 5 -							26.3				5.0	-	
5	3D	3D 24/6 5.0 - 7.0 10-13-12-12			25	36				Olive-brown, moist, hard, S	ilty CLAY, some fine to c	oarse sand,	
										(Silty Clay).			
											The CLANCE C		11.27
	4D	23/23	7.0 - 8.9	11-13-22-65/5"	35	51				Olive-brown, moist, nard, S	inty CLAY, trace line sand	i, (Sitty Clay).	PL=20
													PI=17
								22.4					WC=23.1
										Splitspoon refusal at 8.9' ind	dicates probable bedrock.		
- 10 -	D 1	27/26	10.5 12.9	POD = 150/									
		27/20	10.3 - 12.8	KQD = 13%						Advanced roller cone to 10.	5' bgs and set up to core.	VACKE	
										Primary joints are very clos	e to close, low angle to mo	oderately	
	D 2	12/25	12.9 16.2	POD = 10%						dipping, undulating, rough,	discolored, partially open	to open. One	
	K2	42/33	12.8 - 10.5	RQD - 1070						Rock Quality = Very Poor	ertical, undulating, rough,	discolored.	
										Recovery = 96%			
										Rock Core Times (min:sec)	: 10.5-11.5' (1:36), 11.5-12	2.5' (1:42), 12.5'-	
- 15 -										R2: Hard, moderately weath	nered, aphanitic, grey, ME	TAWACKE.	
										Joints are close, low angle, wide Rock is fractured into	undulating, rough, open to gravel pieces from 12.8'-	moderately	
								15.0		14.7'-16.3'.	graver preces from 1210	1019 und from	
										Rock Quality = Very Poor Recovery = $820/$			
										Rock Core Times (min:sec)	: 12.8-13.8' (3:11), 13.8-14	4.8' (3:24), 14.8'-	
								1		15.8' (4:23), 15.8-16.3' (1:3)	2)	16 2	
								-		Bottom of Exploration	at 16.3 feet below groun	d surface.	
- 20 -							1	1					
								1					
25 Rem	arks:						1		L				
<u>rtem</u>	<u>ai n.5.</u>				0.50								
1. A	utomatic	hammer I	NEBC #GT8. E	nergy Transfer Ratio = ured relative to surveye	87%. d stake i	elevati	ons						
3. G	round wa	ater level r	neasured after	completion of boring w	ith casin	ig in th	e ground.						
4. F	ine-Grain	ned Soil De	escriptions on t	his log are based on pla	sticity e	stimate	ed using vi	isual-ma	nual cl	assification techniques or labo	ratory Atterburg Limit tes	ts if available, rat	her than the
Stratifi	cation line	s represent	aseu percentage	ndaries between soil types	transition	is mav F	e gradual				Page 1 of 1		
* \\/		dinge heve	heen made at t	es and under conditions		undwot	or fluotuoti-	ne movie	our du	to conditions other			
than	those pres	sent at the ti	me measuremen	ts were made.	aleu. Gro	unuwat		па тау о	Jour QUE	to conditions other	Boring No.:	GZ-15	

Ι	Aaine	e Depa	artment	of Transporta	ation		Project	: I-95 S	ign Foı	undations	Boring No.:	GZ	2-16
		<u>ç</u> <u> </u>	Soil/Rock Expl US CUSTOM/	oration Log ARY UNITS			Locatio	n: Kitte	ery, MI	E - Portsmouth, NH	WIN:		
Drille			New England	Paring Contractors	Flov	ation	(ft)	28.2				1 25"	
Oner	ator:		M D'Ambrosi		Datu	im [.]	(11.)	NAVD	88		Sampler:	Standard Splits	noon
	ed By:		E Tome	0	Rig	Tyne		Truck -	GT8		Hammer Wt /Fall	140#/30"	spoon
Date	Start/Ei	nieh	$\frac{12}{21/20} = \frac{12}{2}$	21/20	Drilli	ing M	lothod:	Drive &	Wash		Coro Barrol:	NY	
Bori		tion:	See Plan	21/20	Casi	ng IF		4/4 5"	3/3 5"		Water Level*	Not Encounter	ed
Ham	nor Effi	ciency F	actor: 0.87		Ham	mer	Type:	Automs	tic⊠	Hydraulic 🗆	Rope & Cathead	Not Encounter	cu
Definit	ons:	cicicy i		R = Rock C	ore Sampl	le	1900.	S _u =	Peak/Re	emolded Field Vane Undrained She	ear Strength (psf) $T_V = P$	ocket Torvane She	ar Strength (psf)
D = Sp MD = 1 U = Th MU = 1 V = Fie MV = 1	lit Spoon S Jnsuccess in Wall Tu Jnsuccess eld Vane S Jnsuccess	Sample sful Split Spo ibe Sample sful Thin Wa Shear Test, sful Field Va	oon Sample Attern II Tube Sample At PP = Pocket Per <u>ne Shear Test Att</u>	SSA = Solid upt HSA = Hollc RC = Rolle RC = Rolle wOH = Wei hetrometer WOR/C = Weiter wOP/C = Weiter Sample Information	I Stem Au ow Stem A Cone ight of 140 /eight of R eight of Or	ger Auger Olb. Ha Rods or <u>ne Per</u> s	mmer ^r Casing son	S _{u(la} qp = N-un Ham N ₆₀ : N ₆₀ :	b) = Lab Unconfir correcter mer Effic = SPT N <u>= (Hamn</u>	vAne Undrained Shear Strength (ned Compressive Strength (ksf) d = Raw Field SPT N-value ciency Factor = Rig Specific Annual -uncorrected Corrected for Hamme ner Efficiency Factor/60%)*N-uncor	psf) WC = 1 LL = Li PL = P PL = P I Calibration Value PI = PI refficiency G = Gr rected C = Cc	Water Content, peri quid Limit lastic Limit asticity Index ain Size Analysis insolidation 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	scription and Remarks		Laboratory Testing Results/ AASHTO and Unified Class.
0								27.8	. Papage	0'-0.5': Asphalt		0.5-	
	1D	24/13	1.0 - 3.0	13-16-18-21	34	49		-		Brown, dry, dense, fine to c (Glacial Till).	coarse SAND, little silt, trac	ce gravel,	G#23
	2D	24/15	3.0 - 5.0	11-11-14-13	25	36				Top 9": Brown, dry, dense, gravel, (Glacial Till). Bottom 6": Grey, dry, dense gravel (Glacial Till)	fine to coarse SAND, little e, fine to coarse SAND, litt	silt, trace le silt, trace	A-1-b, SP-SM WC=8.5 G#24 A-1-A, GM
- 5 -	3D	7/7	5.0 - 5.6	44-50/1"	R			22.7		Grey, dry, dense, GRAVEL ∖ fractured rock in tip of spoo	., some fine to coarse sand, on, (Glacial Till).	little silt,	WC=6.7
										Splitspoon refusal at 5.6' in	dicates probable bedrock.	5.6-	
	R1	5/3	8.0 - 8.4	ROD = 0%				-		Advanced roller cone to 8.0)' and set up to core.	VACVE	
10	<u>R2</u>	10/5	8.4 - 9.2	RQD = 0%						Rock Quality = Very Poor Recovery = 52%		VACKE.	
- 10 -	R3 R4	2/2 10/10	10.0 - 10.2 10.2 - 11.0	$\begin{array}{c} RQD = 0\% \\ RQD = 0\% \end{array}$						Rock Core Times (min:sec) R2: Hard, slightly weathere Fractured into gravel pieces): 8.0-8.4' (1:18) ed, aphanitic, grey, METAV 5.	VACKE.	
	R5	18/15	11.0 - 12.5	RQD = 22%						Rock Quality = Very Poor Recovery = 94%			
	R6	10/9	12.5 - 13.3	RQD = 0%						Rock Core Times (min:sec) R3: Hard, slightly weathere Rock Quality = Very Poor): 8.4-8.8' (2:58) ed, aphanitic, grey, METAV	VACKE.	
	R7	36/36	13.3 - 16.3	RQD = 14%				-		Recovery = 100% Rock Core Times (min:sec)	: 10.0-10.2' (0:30)		
- 15 -								_		are closely spaced, low ang open, fractured into gravel p	le, undulating, rough, disco pieces from 10.8'-11.0'.	blored, partially	
										Recovery = 100% Rock Core Times (min:sec)): 10.2-11.0' (4:54)		
	R8	42/42	17.0 - 20.5	RQD = 64%				-		R5: Hard, slightly weathere are very close, low angle to discolored, partially open.	ed, aphanitic, grey, META' moderately dipping, undul	WACKE. Joints ating, rough,	
								-		Rock Quality = Very Poor Recovery = 83%	v 11 0-12 0' (2·24) −12 0 12	5' (1.20)	
- 20 -	R9	54/54	20.5 - 25.0	RQD = 63%						R6: Hard, slightly weathere is fractured into gravel piec Rock Quality = Very Poor	ed, aphanitic, grey, METAV es.	VACKE. Rock	
								-		Recovery = 94% Rock Core Times (min:sec)	: 12.5-13.3' (2:36)		q _p =594 ksf
								-		K /: Hard, slightly weathere Primary joints are extremel dipping, undulating, rough.	a, aphanitic, grey, METAV y close to close, low angle partially open to moderate	VACKE. to moderately ely wide.	
								4.3		Secondary joints are moder rough, partially open. Rock	ately spaced, high angle to c is fractured into gravel pic	vertical, planar, ces from 13.3' to	
25 <u>Rem</u>	arks:	I					1		L	II 14.5 [°] .			
 Automatic hammer NEBC #GT8. Energy Transfer Ratio = 87%. Ground surface elevation was measured relative to surveyed stake elevations. Ground water level measured after completion of the boring with casing in the ground. Fine-Granded Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterburg Limit tests if available, rather than the MaineDOT Standard based percentages passing specific grain sizes 													
Stratifi	cation lines	s represent	approximate bour	idaries between soil types; t	ransitions	may b	e gradual.				Page 1 of 2		
* Wate than	r level rea those pres	dings have sent at the ti	been made at tim me measurement	es and under conditions stat s were made.	ed. Grour	ndwate	er fluctuatio	ons may o	ccur due	e to conditions other	Boring No.:	GZ-16	

Ι	Main	e Dep	artment	of Transport	ation	Proje	ct: I-9	5 Sig	gn Fou	ndations	Boring No.:	GZ	2-16
		<u> </u>	<u>Soil/Rock Exp</u> US CUSTOM	oloration Log		Loca	tion: K	Citter	y, ME	- Portsmouth, NH	WIN-		
					_						wiit.		
Drille	er:		New England	Boring Contractors	Elevati	on (ft.)	2	8.3			Auger ID/OD:	4.25"	
Oper	rator:		M. D'Ambros	sio	Datum:		Ν	IAV	D 88		Sampler:	Standard Splits	spoon
Logo	ged By:		E. Tome		Rig Typ	be:	Т	ruck	- GT8	3	Hammer Wt./Fall:	140#/30"	
Date	Start/F	inish:	12/21/20 - 12	2/21/20	Drilling	Method	l: [Drive	& Wa	ish	Core Barrel:	NX	
Bori	ng Loca	tion:	See Plan		Casing	ID/OD:	4	/4.5"	, 3/3.5	,"	Water Level*:	Not Encounter	ed
Ham Definit	mer Eff	iciency F	actor: 0.87	R = Rock (Hamme	er Type:	Auto	mat = P	ic 🛛	Hydraulic	Rope & Cathead	Pocket Torvane She	ar Strength (nsf)
D = Sp MD = U = Tr MU = V = Fit MV =	plit Spoon Unsuccess nin Wall Tu Unsuccess eld Vane S <u>Unsuccess</u>	Sample sful Split Sp ube Sample sful Thin Wa Shear Test, sful Field Va	oon Sample Atte III Tube Sample / PP = Pocket Pe ine Shear Test A	R - Rotk SSA = Soli mpt HSA = Hol RC = Rolle Attempt WOH = W WONP = W	d Stem Auger low Stem Auger er Cone eight of 140 lb. Weight of One F	er Hammer s or Casing Person	5 S Q N H N N	u - P u(lab p = U -unco amm 60 = 60 =) = Lab nconfin prrected er Effici SPT N- (Hamm	Vane Undrained Shear Strength (led Compressive Strength (ksf) = Raw Field SPT N-value iency Factor = Rig Specific Annua uncorrected Corrected for Hamme er Efficiency Factor/60%)*N-unco	psf) IV = r PL = L LL = L PL = f I Calibration Value PI = P F er Efficiency G = G crected C = C	Water Content, per iquid Limit Plastic Limit lasticity Index rain Size Analysis onsolidation Test	cent
		<u> </u>		Sample Information	7								Laboratory
Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	Casing	Elevation	(ft.)	Graphic Log	Visual De	scription and Remarks		Testing Results/ AASHTO and Unified Class.
<u>-</u> 25 - 30 - - 35 - - 40 -								(1)	0	Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec) 16.3' (2:44) R8: Hard, slightly weathere are close to moderately spa discolored, tight to open, ro 20.5'. One secondary join is discolored. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec) 20.0' (2:14), 20.0-20.5' (2:0 R9: Hard, slightly weathere are very close to moderatel discolored, partially open to from 22.5'-22.6' and from 2 Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec) 23.5' (3:09), 23.5-24.0' (3:2) Bottom of Exploration): 13.3-14.3' (1:50), 14.3-1: ed, aphanitic, grey, META' ced, low angle, undulating ock fractured into gravel pi s high angle, undulating, r): 17.0-18.0' (2:32), 18.0-19 (7) ed, aphanitic, grey, META' y spaced, low angle, undul o open, rock is fractured in 23.7'-24.0'.): 20.5-21.5' (4:26), 21.5-2: (6) n at 24.0 feet below groun	5.3' (2:01), 15.3- WACKE. Joints , rough, ecces from 20.2'- ough, 9.0' (2:01), 19.0- WACKE. Joints ating, rough, to gravel pieces 2.5' (2:56), 22.5- 	
- 45 -													
50	arko												
1. A 2. G 3. G 4. F Stratifi	Remarks: 1. Automatic hammer NEBC #GT8. Energy Transfer Ratio = 87%. 2. Ground surface elevation was measured relative to surveyed stake elevations. 3. Ground water level measured after completion of the boring with casing in the ground. 4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterburg Limit tests if available, rather than the 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 pre	sent at the t	ime measuremer	nts were made.		_		-	-		Boring No.:	GZ-16	

1	Maine Department of Transportation							I-95 S	gn Fou	ndations Boring No.:	GZ	2-17
		<u>;</u>	Soil/Rock Exp US CUSTOM/	loration Log ARY UNITS			Locatio	n: Kitte	ery, ME	- Portsmouth, NH WIN:		
Drill	er:		New England	Boring Contractors	Ele	vation	n (ft.)	43.9		Auger ID/OD: 4	1.25"	
Ope	rator:		M. D'Ambrosi	0	Dat	um:		NAVD	88	Sampler: S	Standard Splits	poon
Log	ged By:		E. Tome		Rig	Туре	:	Truck -	GT8	Hammer Wt./Fall: 1	40#/30"	
Date	Start/Fi	inish:	01/08/2021-01	/08/2021	Dril	ling N	lethod:	Drive &	: Wash	Core Barrel:	NХ	
Bori	ng Loca	tion:	See Plan		Cas	sing II	D/OD:	4/4.5",	3/3.5"	Water Level [*] : 1	0.0'	
Ham	mer Effi	iciency F	actor: 0.87	R = Rock	Core Sam	nmer	Туре:	Automa	tic 🛛	Hydraulic Rope & Cathead	et Torvana Sha	ar Strength (nef)
Delini D = S MD = U = TI MU = V = Fi MV =	olit Spoon S Unsuccess hin Wall Tu Unsuccess eld Vane S <u>Unsuccess</u>	Sample sful Split Spo ibe Sample sful Thin Wa Shear Test, <u>sful Field Va</u>	oon Sample Atten III Tube Sample A PP = Pocket Pe Ine Shear Test Att	SSA = SO spt HSA = Hc RC = Roll ttempt WOH = W netrometer WOR/C = empt WO1P = 1 WOHP = 1 WOHP = 1	lid Stem A ollow Stem er Cone /eight of 14 Weight of <u>Weight of 0</u>	uger Auger 10lb. Ha Rods o <u>Dne Per</u>	immer r Casing son	S _u – S _{u(la} q _p = N-uno Hamr N ₆₀ = <u>N₆₀ =</u>	b) = Lab Jnconfir corrected ner Effic SPT N (Hamm	Induced Field Value Ontrained Shear Strength (psr) Ty - POX Vane Undrained Shear Strength (psr) WC = Wa ed Compressive Strength (ksr) LL = Liqui = Raw Field SPT N-value PL = Plass ency Factor = Rig Specific Annual Calibration Value PL = Plass uncorrected Corrected for Hammer Efficiency G = Grain er Efficiency Factor/60%)*N-uncorrected C = Cons	ter Forvane She iter Content, pero id Limit tic Limit icity Index olidation Test	cent
pth (ft.)	mple No.	n./Rec. (in.)	mple Depth	ws (/6 in.) ear ength f) COD (%)	incorrected	0	sing ws	vation	aphic Log	Visual Description and Remarks		Laboratory Testing Results/ AASHTO and
De	Sa	Ре	(ft.	er_bs	ź	2 ⁹ N	Вса Вса	E∎ €	ö			Unilled Class.
0	1D	24/15	0.0 - 2.0	7-8-11-12	19	28		43.6		Top 3": Brown, dry, fine to medium SAND, little silt, (To Bottom 12": Brown/tan, dry, medium dense, fine to medi	opsoil). 0.3- ium SAND,	
										little silt, trace gravel, (Fill).	tropp grannel	C#25
	2D	24/4	2.0 - 4.0	28	41				(Fill).	trace gravei,	G#25 A-2-4, SP-SM WC=7.8	
- 5 -	3D	24/12	4.0 - 6.0	2-3-10-9	13	19		39.9		Olive-Brown, wet, medium dense, silty fine to medium S gravel, (Sand).	AND, trace	
	4D	24/24	6.0 - 8.0	14-16-16-15	32	46				Olive-Brown, wet, dense, silty fine to medium SAND, tra (Sand).	ace gravel,	
										Olive Preum wat dance gilty fine to modium SAND to	a a a anaval	C#26
	5D	24/24	8.0 - 10.0	12-13-15-17	28	41	41			(Sand).	ace graver,	A-4, SM WC=14.1
- 10 -	6D	24/19	10.0 - 12.0	12-15-17-17	32	46				Olive-Brown, wet, dense, silty fine to medium SAND, tra (Sand).	ace gravel,	
	7D	24/18	12.0 - 14.0	15-17-20-25	37	54				Olive-Brown, wet, dense, silty fine to coarse SAND, trac (Sand).	e gravel,	
- 15 -	8D	24/19	14.0 - 16.0	20-16-14-20	30	44				Olive-Brown, wet, dense, silty fine to coarse SAND, trac (Sand).	e gravel,	G#27 A-4, SM WC=10.4
- 20 -	9D	24/21	20.0 - 22.0	29-49-65-57	114	165				Olive-Brown, wet, very dense, silty fine to coarse SAND (Sand).	, trace gravel,	
							26					
							35					
							29					
25							20					
1. A 2. C 3. C 4. F Mai Stratif	arks: automatic groundwa ground su ine-Grain (neDOT S ication line er level rea	hammer 1 Iter level n Irface eleva Ned Soil D Standard b s represent Idings have	NEBC #GT8. E neasured after c ation was meas escriptions on t ased percentage approximate bour been made at tim	nergy Transfer Ratio = ompletion of the borin ured based on surveyed his log are based on pl s passing specific grai daries between soil types es and under conditions sl	= 87%. g with ca d stake el asticity e: n sizes. ; transition tated. Gro	sing in evation stimate s may b undwate	the groun ns. ed using vi be gradual. er fluctuatio	id. sual-ma	nual cl	Assification techniques or laboratory Atterburg Limit tests in Page 1 of 2 to conditions other	f available, rat	her than the

Ι	Aaino	e Depa	artment	of Transport:	ation	Project	I-95 S	ign Foi	undations	Boring No.: GZ-17				
		<u>s</u>	Soil/Rock Exp	loration Log		Locatio	n: Kitte	erv. MI	E - Portsmouth, NH					
		Ī	JS CUSTOM	ARY UNITS			11100	,		WIN:				
Drille	er:		New England	Boring Contractors	Elevatio	1 n (ft.)	43.9			Auger ID/OD:	4.25"			
Oper	ator:		M. D'Ambros	io	Datum:	,	Standard Splitspoon							
Logo	jed By:		E. Tome		Rig Type	e:	Truc	k - GT	8	Hammer Wt./Fall:	140#/30"			
Date	Start/Fi	nish:	01/08/2021-0	1/08/2021	Drilling	Method:	Driv	e & W	ash	Core Barrel:	NX			
Borii	ng Loca	tion:	See Plan		Casing I	D/OD:	4/4.5	5", 3/3.	5"	Water Level*:	10.0'			
Ham	mer Effi	ciency F	actor: 0.87		Hammer	Type:	Automa	atic 🛛	Hydraulic 🗆	Rope & Cathead □				
Definit D = Sp	ions: blit Spoon \$	Sample		R = Rock C SSA = Solid	ore Sample Stem Auger		S _U =	Peak/R	emolded Field Vane Undrained Sho Vane Undrained Shear Strength (ear Strength (psf) T _V = P (psf) WC =	ocket Torvane She Water Content. per	ar Strength (psf) cent		
MD =	Unsuccess	ful Split Spo be Sample	oon Sample Atter	mpt HSA = Hollo BC = Boller	w Stem Auger		q _p =	Unconfi Correcte	ned Compressive Strength (ksf)	LL = L PI = P	iquid Limit			
MU =	Unsuccess	ful Thin Wa	II Tube Sample A	Attempt WOH = Wei	ght of 140 lb. F	lammer	Ham	mer Effic	ciency Factor = Rig Specific Annua	I Calibration Value PI = P	asticity Index			
V = FIE MV = I	Jnsuccess	ful Field Va	ne Shear Test At	tempt WOR/C = W	eight of One Pe	rson	N60 N60	= SPT K = (Hamr	ner Efficiency Factor/60%)*N-unco	rrected C = Co	ain Size Analysis			
			1	Sample Information								Laboratory		
	ö	(in.)	epth	() ()	cted			b				Testing Results/		
(ft.)	ĕ e	Sec.	Ŭ e	(/6 i D (%	orre		ion	ic Lo	Visual De	escription and Remarks		AASHTO		
spth	Idma	h./F	Idma (ows near reng sf) RQI	00 nuce	asinç ows	evat	aph				and Unified Class		
<u>ط</u>	S	Å	CH So	ਤ ਲੈ ਨੇ ਨੇ ਕੋ	ż z	ů ă	± ≣€	Ū			25.0	onnied Olass.		
23	10D	2/2	25.0 - 25.2	50/2" POD - 66%	R	26	18.7		Grey, wet, very dense, GR.	AVEL, (Weathered Bedroc	k).			
		-00/52.5	25.5 - 50.5	KQD = 0078					Splitspoon refusal at 25.2'	bgs indicates probable bedr	ock. Advanced			
									roller cone to 25.5' and set R1: Hard, slightly weather	up to core. ed. aphanitic, grev, METAV	VACKE. Joints			
						ly dipping,								
									pieces from 27.2'-27.4'.	red, open. Rock is fractured				
									Rock Quality = Fair					
- 30 -									Recovery = 88% Rock Core Times (min:sec): 25.5-26.5' (3:46), 26.5-27				
	R2	42/33	30.5 - 34.0	RQD = 35%					28.5' (3:45), 28.5-29.5' (3:2 R2: Hard, slightly weather	26), 29.5-30.5' (4:43) ed. aphanitic, grev, METAV	VACKE. Joints			
									are very close to moderatel	ating, rough,				
									open. One secondary joint open.	ough, partially				
									Recovery = /9% Rock Core Times (min:sec): 30.5-31.5' (2:16), 31.5-32				
	R3	60/60	34.0 - 39.0	RQD = 81%					33.5' (3:01), 33.5-34.0' (3:3 R3: Hard_slightly weather	88) ed anhanitic grev METAV	VACKE Joints			
- 35 -									are close to moderately spa	ced, low angle, undulating	, rough, partially	/		
									open to open. Rock Ouality = Good					
									Recovery = 100%					
									37.0' (2:40), 37.0-38.0' (2:3): 34.0-35.0° (3:21), 35.0-36 30), 38.0-39.0' (2:05)	0.0" (2:31), 36.0-			
									R4: Hard moderately weat	hered anhanitic grev MF	ΓΔ₩ΔϹΚΕ			
40	R4	18/18	39.0 - 40.5	RQD = 0%					Joints are very close to close	se, low angle, undulating, re	ough, open. One			
- 40 -							3.4		high angle joint, undulating Rock Ouality = Very Poor	g, rough, partially open.				
									Recovery = 100%					
									Measured)): 39.0-40.0 (3:00), 40.0-40	0.5' (Not			
									Bottom of Exploratio	n at 40.5 feet below groun	40.5- d surface.			
- 45 -														
							1							
50 Rem	arks:							<u> </u>						
1 ^	utomatic	hammer	VEBC #GTS F	nerov Transfer Patio - 9	37%									
2. G	roundwa	ter level m	neasured after o	completion of the boring	with casing i	n the grour	nd.							
3. G 4. F	round su	rface eleva ied Soil Da	ation was meas	sured based on surveyed s this log are based on plas	stake elevation ticity estimate	ons. ed using v	isual-m	nual cl	lassification techniques or labo	oratory Atterburg Limit test	s if available. rat	ther than the		
Stratifi	cation line	s represent	approximate bou	ndaries between soil types; t	ransitions may	be gradual.			ques or how	Page 2 of 2				
* Wate	er level rea	dings have l	been made at tim	nes and under conditions stat	ed. Groundwa	ter fluctuatio	ns may o	ccur due	e to conditions other					

than those present	at the time measuremen	ts were made.
and anoto procont	at the time theadar entern	to more made.

Boring No.: GZ-17



APPENDIX C – LABORATORY TEST REPORTS

	195 Frances Avenue	Client Information:	Project Information:					
	Cranston RI, 02910	GZA GeoEnvironmental	Portsmouth/Kittery I-95 Sign Structures					
	Phone: (401)-467-6454	South Portland, ME	Portsmouth, NH and Kittery, ME					
	Fax: (401)-467-2398	PM: Nicholas Williams	GZA Project Number: 09.0026090.00					
ENGINEEDING	thielsch.com	Assigned By: Nicholas Williams	Summary Page:	1 of 2				
ENGINEERING	Let's Build a Solid Foundation	Collected By: E. Tome	Report Date:	02.03.21				

LABORATORY TESTING DATA SHEET, Report No.: 7421-A-142, Rev.1

				Identification Tests							Proctor / CBR / Permeability Tests									
Boring No.	Sample No.	Depth (Ft)	Laboratory No.	As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	Gs	Dry unit wt. pcf	Test Water Content %	$\begin{array}{c} \gamma_{d} \\ \underline{MAX} \\ \underline{(pcf)} \\ W_{opt} (\%) \end{array}$	γ _d <u>MAX (pcf)</u> W _{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	Laboratory Log and Soil Description
				D2216	D4	318		D6913		D2974	D854			D	1557					
GZ-1	S-1	1-3	G-09	2.0			37.5	58.5	4.0											Light Brown Gravelly f-c SAND, trace Silt
GZ-1	S-10	25-27	G-10	10.1			25.0	50.2	24.8											Brown f-c SAND, some fine Gravel, some Silt
GZ-2	S-4	9-11	G-11	6.4			19.5	64.2	16.3											Brown f-c SAND, little fine Gravel, little Silt
GZ-2	S-10	30-32	G-12	8.9			30.5	36.6	32.9											Gray f-c SAND, some Clayey Silt, some f-c Gravel
GZ-2	S-11	35-37	A-4	9.7	17	16														Gray Clayey SILT
GZ-3	S-2 (top 15")	3-5	G-13	16.6			0.7	89.9	9.4											Brown f-m SAND, trace Silt, trace fine Gravel
GZ-3	S-2 (bot. 7")	3-5	G-14	9.0			27.1	46.2	26.7											Dark Brown f-c SAND, some fine Gravel, some Silt
GZ-3A	S-3	24-26	G-15	13.7			20.8	54.3	24.9											Brown f-c SAND, some Silt, some fine Gravel
GZ-3A	S-4	30-32	G-16	11.8			5.0	58.2	36.8											Brown Silty f-c SAND, trace fine Gravel
GZ-4	S-4	7-9	G-17	8.9			48.8	39.7	11.5											Brown Sandy f-c GRAVEL, little Silt
GZ-5	S-2 (top 16")	2-3.8	G-18	18.0			5.4	56.9	37.7											Brown Silty f-c SAND, trace fine Gravel

Date Received:

01.19.21

Reviewed By:

Stabo

Date Reviewed:

02.03.21

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	Cranston RI, 02910	GZA GeoEnvironmental	Portsmouth/Kittery I-95 Sign Structures					
	Phone: (401)-467-6454	South Portland, ME	Portsmouth, NH and Kittery, ME					
	Fax: (401)-467-2398	PM: Nicholas Williams	GZA Project Number: 09.0026090.00					
ENGINEEDING	thielsch.com	Assigned By: Nicholas Williams	Summary Page:	2 of 2				
ENGINEERING	Let's Build a Solid Foundation	Collected By: E. Tome	Report Date:	02.03.21				

LABORATORY TESTING DATA SHEET, Report No.: 7421-A-142, Rev.1

				Identification Tests							Proctor / CBR / Permeability Tests									
Boring No.	Sample No.	Depth (Ft)	Laboratory No.	As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	Gs	Dry unit wt. pcf	Test Water Content %	$\begin{array}{c} \gamma_{d} \\ \underline{MAX} \\ \underline{(pcf)} \\ W_{opt} (\%) \end{array}$	$\begin{array}{c} \gamma_{d} \\ \underline{MAX \ (pcf)} \\ W_{opt} \ (\%) \\ (Corr.) \end{array}$	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	Laboratory Log and Soil Description
				D2216	D4	318		D6913		D2974	D854			D	1557					
GZ-6	2D	3-5	G-19	6.8			21.3	55.9	22.8											Brown f-c SAND, some Silt, some f-c Gravel
GZ-6	10D	25-27	G-20	10.7			29.2	44.4	26.4											Dark Brown f-c SAND, some f-c Gravel, some Silt
GZ-6	13D	40-42	G-21	12.4			6.2	53.4	40.4											Light Brown Silty f-m SAND, trace fine Gravel
GZ-12	3D	4-6	G-22	7.1			48.5	35.5	16.0											Brown Sandy f-c GRAVEL, little Silt
GZ-15	4D	7-8.9	A-5	23.1	37	20														Brown CLAY & SILT
GZ-16	2D (top 9")	3-5	G-23	8.5			9.8	79.2	11.0											Brown f-c SAND, little Silt, trace fine Gravel
GZ-16	2D (bot. 6")	3-5	G-24	6.7			55.4	32.0	12.6											Dark Brown fine GRAVEL, some f-c Sand, little Silt
GZ-17	2D	2-4	G-25	7.8			8.5	80.1	11.4											Brown f-m SAND, little Silt, trace fine Gravel
GZ-17	5D	8-10	G-26	14.1			7.3	49.1	43.6											Brown Silty f-m SAND, trace fine Gravel
GZ-17	8D	14-16	G-27	10.4			8.3	51.4	40.3											Brown Silty f-c SAND, trace fine Gravel

Date Received:

01.19.21

Reviewed By: Star ho

Date Reviewed:

02.03.21

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Portsmouth/Kittery I-95 Sign Structures

MDOT Project Number:

GZA Project Number: 09.0026090.00

Town(s): Portsmouth, NH / Kittery, ME

Boring & Sample	Station	Sample	Depth	Lab	Organic	W.C.	L.L.	P.I.	C	lassification	
Identification Number	(Feet)	No.	(Feet)	Number	%				Unified	AASHTO	Frost
GZ-1		S-1	1-3	G-09		2.0			SP	A-1-b	0
GZ-1		S-10	25-27	G-10		10.1			SM	A-1-b	II
GZ-2		S-4	9-11	G-11		6.4			SM	A-1-b	II
GZ-2		S-10	30-32	G-12		8.9			SM	A-2-4(0)	
GZ-2		S-11	35-37	A-4		9.7	17	1	ML	A-4	IV
GZ-3		S-2 (Top 15")	3-5	G-13		16.6			SP-SM	A-3	0
GZ-3		S-2 (Bot. 7")	3-5	G-14		9.0			SM	A-2-4(0)	
GZ-3A		S-3	24-26	G-15		13.7			SM	A-2-4(0)	II
GZ-3A		S-4	30-32	G-16		11.8			SM	A-4(0)	
GZ-4		S-4	7-9	G-17		8.9			GP-GM	A-1-a	I
GZ-5		S-2 (Top 16")	2-3.8	G-18		18.0			SM	A-4(0)	
GZ-6		2D	3-5	G-19		6.8			SM	A-2-4(0)	II
GZ-6		10D	25-27	G-20		10.7			SM	A-2-4(0)	II
GZ-6		13D	40-42	G-21		24.4			SM	A-4(0)	
GZ-12		3D	4-6	G-22		7.1			GM	A-1-b	Ι
GZ-15		4D	7-8.9	A-5		23.1	37	17	CL	A-6	
GZ-16		2D (Top 9")	3-5	G-23		8.5			SP-SM	A-1-b	II
GZ-16		2D (Bot 6")	3-5	G-24		6.7			GM	A-1-a	
GZ-17		2D	2-4	G-25		7.8			SP-SM	A-2-4(0)	II
GZ-17		5D	8-10	G-26		14.1			SM	A-4(0)	
GZ-17		8D	14-16	G-27		10.4			SM	A-4(0)	
Classificat is followed	tion of these d by the "Fr	e soil samples is in ost Susceptibility I	accordance w Rating" from ze	vith AASHTO Cl ero (non-frost s	assificatio usceptible	on Syste e) to Cla	em M- [.] ass IV	145-40 (highl). This clas y frost sus	sification ceptible).	

The "Frost Susceptibility Rating" is based upon the MDOT 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

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












































LABORATORY TESTING DATA SHEET, Report No.: 7421-A-144

				Specimen Data					Compressive Strength Tests									
Boring No.	Sample No.	Depth (ft)	Laboratory No.	Mohs Hard- ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G _s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	στ PSI	Is ₅₀ psi	(8) s _c PSI	Rock Formation or Description or Remarks
GZ-1	R1	34.3- 34.9	21-S-185		1.992	4.432	170.0				3493	0.162	1.74	0.32				Slate
Broke along quartz vein.																		
GZ-5	R1	9.9- 10.3	21-S-186		1.992	3.982	172.1				8163	0.309	2.29	0.19				Slate
	Minor break at 6953psi. All breaks were fresh.																	
GZ-11	R2	11.1- 11.6	21-S-187		1.996	4.019	168.7				6939	0.538	1.41	0.34				Slate
Minor break at 4195psi. All breaks were fresh.																		
GZ-16	R9	21.1- 21.8	21-S-188		1.991	4.434	167.8				4126	0.304	1.41	0.30				Slate
Broke along existing fault.																		
 (1) Volume Determined By Measuring Dimensions (2) Determined by Measuring Dimensions and 				(3) PLD=Point Load (diam				trical),				(5) Strain at Peak Deviator Stress						
				Votes	PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength (4) Taken at Peak Deviator Stress				nsile	Notes	(6) Represents Secant Modulus at 50% of Total Failure Stress							
Weight of Saturated Sample			1	gth					1			(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress						
										(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)								
Date R	Date Received: 01.19.21 Reviewed By: Date Reviewed: 01.25.21									By:	54	The	1		Date	Review	ved:	01.25.21

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	Phone: (401) 467-6454	Bedford, NH	Portsmouth, NH and Kittery, ME
	Fax: (401) 467-2398	PM: Nicholas Williams	Project Number: 09.0026090.00
ENGINEERING	www.thielsch.com	Assigned by: Nicholas Williams	Technician: JM
ENGINEERING	Let's Build a Solid Foundation	Collected by: E. Tome	Report Date: 01.22.21





Broke along quartz vein.

	195 Frances Avenue	Client Information:	Project Information:
THEFT	Cranston, Rhode Island 02910	GZA GeoEnvironmental	Portsmouth/Kittery I-95 Sign Structures
	Phone: (401) 467-6454	Bedford, NH	Portsmouth, NH and Kittery, ME
	Fax: (401) 467-2398	PM: Nicholas Williams	Project Number: 09.0026090.00
ENGINEERING	www.thielsch.com	Assigned by: Nicholas Williams	Technician: JM
ENGINEERING	Let's Build a Solid Foundation	Collected by: E. Tome	Report Date: 01.22.21
	•	-	-











	195 Frances Avenue	Client Information:	Project Information:
THEFCOM	Cranston, Rhode Island 02910	GZA GeoEnvironmental	Portsmouth/Kittery I-95 Sign Structures
	Phone: (401) 467-6454	Bedford, NH	Portsmouth, NH and Kittery, ME
	Fax: (401) 467-2398	PM: Nicholas Williams	Project Number: 09.0026090.00
ENGINEERING	www.thielsch.com	Assigned by: Nicholas Williams	Technician: JM
	Let's Build a Solid Foundation	Collected by: E. Tome	Report Date: 01.22.21





Broke along existing fault.