

MEMORANDUM – VIA EMAIL

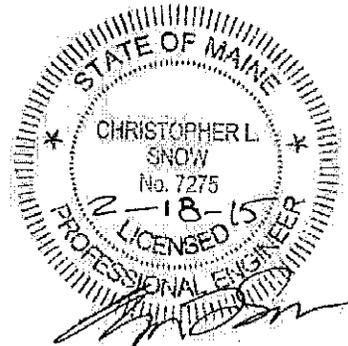
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**FROM:** Jennifer R. Baron, P.E.  
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**DATE:** February 18, 2015

**FILE NO.:** 09.0025829.00

**SUBJECT:** Preliminary Geotechnical Design Basis  
Gray Interchange Reconstruction  
Mile 63.3  
Gray, Maine



DRAFT FOR  
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This memorandum presents the results of GZA's preliminary geotechnical evaluation for the proposed Gray Interchange Reconstruction, along the Maine Turnpike in Gray, Maine. Our services were provided in accordance with our proposal No. 09.P000032.14, revised on November 25, 2014, and the attached Limitations included in **Appendix A**.

GZA is providing geotechnical engineering services as a Subconsultant to Vanasse Hangen Brustlin, Inc., who is under contract with the Maine Turnpike Authority (MTA) for design of the proposed interchange improvements.

**BACKGROUND**

The project consists of reconstruction of the Exit 63 interchange for the Maine Turnpike in Gray, Maine. The existing interchange includes northbound (NB) and southbound (SB) on- and off-ramps that pass through a single toll plaza to a signalized intersection with Route 202 on the east side of the Turnpike. The general project area is shown on **Figure 1**. The SB on- and off-ramps are carried from the west side of the Turnpike to the toll plaza on the east by an overpass bridge. The SB ramp overpass bridge crosses the Turnpike approximately 1,000 feet south of the Route 202 overpass bridge. GZA's understanding of the project is based on our review of the 30 percent plans developed by VHB, dated January 8, 2015.

Proposed Roadways

Preliminary plans call for removal of the SB ramp overpass bridge and construction of new SB on and off ramps that connect to Route 202 and the Route 26A Gray Bypass on the west side of the Turnpike. The plans include approximately 3,000 lineal feet of new embankments to carry the SB ramps. The embankment heights are on the order of 20 feet or less above existing grade. The ramp work also includes reuse/widening of portions of the existing SB ramp embankments, widening of the roadway and embankments along portions of Route 202 east and west of the Turnpike and along the Gray bypass, and widening and regrading the existing toll plaza and NB ramps. A new Park and Ride lot is proposed approximately 1,000 feet north of

Route 202 on the east side of Route 26A. Recommendations pertaining to the proposed Park and Ride were submitted in January 2015 under separate cover.

The proposed SB on and off ramps will each consist of a single lane with two shoulders. Construction of the new SB ramps will include both excavation of the existing ramps and new fill areas. Maximum cut depths and fill heights required to construct each ramp at the proposed grade are summarized in the following table:



Ramp	Approximate Length (ft)	Maximum Fill (ft)	Maximum Cut (ft)
SB On Ramp	1900	20	19
SB Off Ramp	1700	20	NA

Based on GZA's review of the 30 percent cross sections, cut and fill slopes will be constructed with a 2 horizontal to 1 vertical (2H:1V) or flatter slope inclination.

#### Proposed Structures

Proposed structures associated with the interchange project include an approximately 200-foot-long retaining wall along the north side of Route 202, west of the Turnpike; a new SB toll plaza/administration building west of the Turnpike; new toll gantries and overhead signs along the NB and SB ramps; and new traffic signals at the NB and SB ramp intersections with Route 202. We understand that VHB's current scope includes development of a Preliminary Design Report (PDR) that addresses ramp design and structural design of all proposed improvements except the toll plaza/administration. HNTB has been tasked with the toll plaza/administration building design.

#### **SUBSURFACE EXPLORATION**

GZA completed a subsurface investigation program consisting of 39 test borings, including two test borings for the proposed Park and Ride, three test borings along Route 26A, 15 test borings along Route 202, two test borings for the NB ramps, 13 test borings along the proposed SB on-ramp, and four test borings along the proposed SB off-ramp. The proposed exploration locations were surveyed by VHB prior to the start of drilling. Adjustments made in the field to surveyed exploration locations were measured by taking tape-ties to prominent site features. As-drilled locations that could not be verified by tape-ties were determined using hand-held GPS at the completion of the program. For relocated explorations, the ground surface elevations<sup>1</sup> were determined to the nearest 0.5-foot by interpolating between contours presented on the site base plan provided by VHB. Boring locations are shown on **Figures 2 through 11**.

Test borings were drilled to depths of approximately 10 to 109 feet below ground surface. New England Boring Contractors of Hermon, Maine coordinated utility clearance and provided drilling services. The drilling was completed between November 6, 2014 and December 12, 2014. GZA personnel monitored the drilling work and prepared logs of each boring. The boring logs are included in **Appendix B**.

The borings were drilled using 3- and 4-inch casing and drive-and-wash drilling techniques, 2.25-inch inside diameter hollow stem augers, and 3.5-inch solid stem augers, as noted on the boring logs. Typically, Standard Penetration Testing (SPT) and split-spoon sampling were

<sup>1</sup> Elevations referenced in this report are in feet and refer to North American Vertical Datum of 1988 (NAVD 1988).

performed continuously in the upper 6 feet, then at 5-foot intervals thereafter, using a 24-inch long, 1-3/8-inch inside diameter sampler.

Two-inch diameter bedrock cores were obtained at two boring locations (GZ-122 and GZ-124). Core lengths ranged from 5 to 13 feet.



Groundwater monitoring wells were installed in three of the test borings (GZ-114, GZ-119, and GZ-121) to measure stabilized groundwater levels. The wells consisted of 2-inch diameter, 0.010-inch slotted plastic screen and solid riser pipe set in the completed drill holes and backfilled with filter sand surrounding the screen and bentonite surface seals.

**GEOTECHNICAL LABORATORY TESTING**

GZA completed a laboratory soil testing program at the Thielsch Engineering in Cranston, Rhode Island to review visual soil classifications and estimate engineering properties of the soils. The program included 16 gradation analysis / MaineDOT Frost Classification / Unified Soil Classification System (USCS) assessments, 17 sets of Atterberg Limits, 41 moisture content tests and 3 one-dimensional consolidation tests on soil samples taken from the explorations. Results of the testing are included in **Appendix C**.

**SUBSURFACE CONDITIONS**

OVERBURDEN MATERIALS

Five subsurface units were encountered above bedrock at the site: Topsoil, Fill, Sand, Silty Clay, Glacial Till, and Weathered Rock. Asphalt pavement was encountered at the ground surface at three boring locations (GZ-106, -127A, and -128). The encountered thicknesses, generalized descriptions and engineering properties of the units encountered, in descending order from ground surface, are summarized in the following table. Detailed descriptions of the materials encountered at specific locations are provided in the boring logs in **Appendix B** and in the attached **Table 1 - Summary of Subsurface Conditions**.

Soil Unit	Approximate Encountered Thickness (ft)	Generalized Description
Topsoil	0.2 to 3	Very loose to medium dense, dark brown, fine to coarse SAND, with varying amounts of Silt and Gravel, traces of roots and leaves (USCS: SM, ML). <i>Encountered in 29 borings; all except GZ-106, -118, -119, -127A, -128, -129, -130, -138, -140, and -143</i>
Fill	2 to 16	Loose to very dense, brown, fine to coarse SAND, with some to trace Gravel, little to trace Silt (USCS: SP, SP-SM, SW, SW-SM, SM). MaineDOT Frost Classification = 0 - II <i>Encountered in borings GZ-105, -106, -112, -114 through -120, -120A, -127A, -128, -136 through -140, and -143.</i>
Sand	1 to 15	Very loose to dense, brown and gray, fine to medium SAND, some to trace Silt. (USCS: SP, SM, SP-SM) MaineDOT Frost Classification = 0 - II <i>Encountered in borings GZ-105, -106, -109, -114, -115, -118, -119, 120A, -122, -124 through -127, -129, -130, -133, -134, -136, -139, and -142.</i>



Soil Unit	Approximate Encountered Thickness (ft)	Generalized Description
Silty Clay	>1 to 75	Upper 2-8 feet: Medium stiff to very stiff, gray and brown, Silty CLAY to CLAY and SILT, little to trace fine Sand (USCS: CL); overlying Soft to medium stiff, gray, Silty CLAY, occasional trace fine Sand (USCS: CL). Sand frequently observed as lenses, seams and partings throughout deposit. MaineDOT Frost Classification = IV <i>Encountered in all borings except GZ-116, -123, -127, and -127A.</i>
Glacial Till	2 to >32	Medium dense to very dense, brown to gray, fine to coarse SAND, some to little Gravel, some to trace Silt (USCS: SM, SW-SM) MaineDOT Frost Classification = 0 - II <i>Encountered in borings GZ-102, -105, -106, -109, -112, -114, -119 through -131 -138, -140, -142, and -143.</i>
Weathered Bedrock	1 to 6	Dense to very dense, black and gray, GRAVEL and fine to coarse Sand, some to trace Silt. (USCS: GM, GP-GM, SM). MaineDOT Frost Classification = 0 - I <i>Encountered in borings GZ-109, -121, 122, -124, -128, -132, -138, -142, and -143.</i>
Top of Bedrock Elevation	<u>Encountered Top of Rock:</u> Approx. El. 208 to El. 247	

**BEDROCK**

The top of bedrock elevation was evaluated based on split spoon, roller bit, auger/casing, or probe refusals, drilling conditions, and/or rock coring results. Bedrock was cored in two of the test borings (GZ-122 and GZ-124) and was classified as Granite. The bedrock was generally described as gray, medium hard to hard, slightly weathered, and fine grained. The joints were typically very close to widely spaced, moderately dipping, undulating, rough, discolored with partially open to moderately wide spacing. The Rock Quality Designation (RQD) ranged from 17 to 85 percent, with an average RQD of 57 percent.

**GROUNDWATER**

Groundwater was measured in approximately 50 percent of explorations at depths between 1.3 and 11.5 feet below ground surface at the time of the explorations, corresponding to approximately El. 228 to El. 268. Groundwater levels in the borings were taken during or immediately after drilling and may have been affected by drilling procedures, which included introduction of water for drilling purposes. Groundwater levels measured at the time of our borings are presented in **Table 1**, relative to existing grades.

Groundwater monitoring wells were installed at the completion of drilling at boring locations GZ-114, -119, and -121. Water levels were measured in the observation wells on December 5 and December 8, 2014, at the completion of our drilling program. These measurements were taken 3 to 10 days following installation of the wells. The measured groundwater levels, relative to existing grades, are provided in the table below.

Observation Well Designation	Approximate Station/Offset	Groundwater Depth (ft) Below existing grade	Groundwater Elevation (ft NAVD 88)	Depth of Well (ft)
GZ-114	616+00, 53' LT	4.5	245.5	20
GZ-119	417+50, 35' RT	11.0	252.0	20
GZ-121	122+80, 28' RT	Dry	Dry	10



The groundwater observations were made at the times and under the conditions stated in the borings logs. Fluctuations in groundwater level occur due to variations in season, precipitation, and construction activities in the area. Consequently, water levels during construction are likely to vary from those encountered at the time the observations were made.

**PRELIMINARY DESIGN CONSIDERATIONS**

GZA has conducted preliminary evaluations of geotechnical considerations, as presented below. The findings presented below may be updated in our geotechnical design report following more detailed review of the data. Preliminary geotechnical considerations for the proposed park and ride were previously submitted, and are included in **Appendix D** for reference.

INTERPRETATION OF MARINE CLAY PROPERTIES

The marine clay profile encountered at the site includes a heavily overconsolidated upper clay crust overlying moderately overconsolidated soft to medium stiff silty clay. Nearly all of the clay has experienced greater loading in the past than in its current condition. As a result of this overconsolidation, the material is less compressible, and tends to compress more rapidly than normally consolidated clay. Based on the laboratory and in-situ testing results and our experience with similar Presumpscott clay deposits in the area, GZA has interpreted the marine clay deposit properties as follows:

- the modified recompression ratio (RR) is approximately 0.014;
- the modified recompression ratio (CR) is approximately 0.18;
- Consolidation Coefficient varies from approximately 1 to 0.1 sq. ft. / day, depending if the clay is in recompression or virgin compression, respectively; and
- Double-drainage conditions are present.

APPROACH EMBANKMENTS

At the SB on and SB off ramps, the subsurface conditions include a typical profile of approximately 8 to 12 feet of stiff marine clay, and where present, up to 22 feet of soft to medium stiff marine clay overlying glacial till and bedrock. New fill along the proposed SB on and off ramps will result in grade raises of approximately 7 to 20 feet and lesser amounts over the remainder of the ramps. Maximum fills are anticipated from approximately Sta. 203+50 to Sta. 213+50 on the SB off ramp, and from approximately Sta. 121+00 to 128+00 on the SB on ramp.

Settlement from the new embankment loads will result from primary consolidation and secondary compression. Total settlement along the proposed SB ramps will vary based on variation in the clay thickness and the fill thickness. We estimate that the maximum total settlement will be on the order of 13 inches. The estimated time to complete primary consolidation beneath the proposed SB ramp embankment fills is approximately 5 to 8 months. Approximately 3 inches of settlement is anticipated to occur as secondary compression, beginning approximately 5 to 8

months after fill placement. The time-rate of consolidation is an estimate and will vary in the field due to the variability in the clay stratum.

In our opinion, preloading the ramp alignments within the limits of the proposed fills is a feasible means to limit post-construction settlement. Preload material should be placed to a minimum height equal to the proposed finish grade plus 5 feet. Assuming that the surcharge can be kept in place for up to 8 months, it is GZA's opinion that wick drains will not be required to accelerate consolidation of the clay stratum. We recommend monitoring the embankment settlement and the excess pore pressure in the clay in order to evaluate the progress of the clay compression and assess when the surcharge should be removed.



Portions of the SB ramp embankments will be built on medium stiff to soft marine clay. Where the new fill heights exceed approximately 15 feet, the embankments should be evaluated for global stability.

Preparation for construction of the embankments should include grubbing and the removal of unsuitable materials. Wetlands are also present within the proposed alignment limits. Borings were not completed in wetland areas at the site; however, based on data from nearby test borings, up to approximately 4 feet of wetland muck/organic material may be encountered during the construction of the new SB alignments between approximately Sta. 125+50 and Sta. 128+00, Sta. 204+00 and 206+00, and Sta. 212+00 and 214+00. Wetland/organic sediments are considered highly compressible and should be removed prior to the placement of any new fill. We recommend completing additional hand probes in the wetland zones to further refine the estimate of material requiring removal prior to construction of the embankments.

#### FOUNDATION SUPPORT

Preliminary foundation support considerations for the proposed interchange improvements are outlined below. The site conditions include variable thicknesses of fill, sand and/or marine deposits overlying glacial till and bedrock. As previously described, the marine deposits typically consist of a stiff crust overlying medium stiff to soft, compressible marine clay. Marine clay was encountered in many parts of the site, including the Route 26A alignment, new park and ride lot, Route 202 alignment south of the mainline overpass, portions of the proposed SB ramps, the SB toll plaza, and the NB toll plaza area.

The marine clay is considered suitable to provide adequate bearing resistance for support of spread footing foundations and sign supports, but where these new facilities or foundations create a stress increase in the clay, settlement is anticipated. The suitability of each structure for the potential settlement will need to be considered location by location.

#### Retaining Wall

GZA has reviewed preliminary project plans for the Route 202 retaining wall, located from approximately Station 614+28 to Station 616+50. Based on preliminary conversations with VHB, we understand the preliminary concept included a vertical wall system, such as a precast modular gravity wall. Other feasible configurations include a cast-in-place concrete wall, an MSE wall, a sloped embankment, or a steepened slope embankment.

We also understand that the existing water main will be relocated prior to construction of the wall or slope to eliminate potential impacts due to settlement associated with the new retaining wall. A global stability analysis was completed for the preliminary vertical retaining wall configuration. The stability analysis results indicated that the proposed wall system would have

an adequate factor of safety against rotational failure. However, the new embankment fill will increase stresses in the clay and result in settlement of the existing water main, unless the water main is relocated.

Wall systems or embankment slopes should be designed in accordance with the Maine DOT Bridge Design Guide and AASHTO LRFD. Recommended factors of safety are 1.5 for sliding, 1.3 for global stability, and 2.5 for bearing capacity.

Based on the results of the test borings, we conclude that the preliminary retaining wall concept is feasible from a geotechnical standpoint. The retaining wall can bear on compacted structural fill or existing embankment fill, which was encountered to a depth of approximately 10 feet below existing grade. We anticipate that these strata will be exposed at the planned elevation of the bottom of the wall. The bottom of the wall leveling pad (i.e., lean concrete placed below precast block) should be at least 5 feet below finish grades for frost protection.

We anticipate that maximum settlement will be on the order of 2 to 4 inch for the preliminary vertical wall configuration, and that angular distortion of the wall would be on the order of 1/200 or less.

#### Proposed Toll Facilities – NB Plaza

We understand a new toll gantry and overhead guide sign structure are proposed at the NB toll plaza. Preliminary plans indicate the sign structure and toll gantry will be founded on a combined footing. The proposed toll gantry/overhead sign structure will have a span of approximately 110 feet. No grade changes are anticipated along the NB ramps and at the NB toll plaza.

Subsurface materials at the NB toll gantry/sign structure consist of approximately 16 feet of existing embankment fill overlying approximately 19 feet of soft to medium stiff silty clay with fine to medium sand seams up to 2-feet thick, glacial till, and bedrock. Based on the results of the test borings, we conclude spread footing foundations bearing on existing embankment fill are feasible to support the proposed toll plaza gantry and overhead sign structure. Preliminary analysis for the proposed combined footing, shown on the 30 percent plans as approximately 12 feet by 30 feet in plan dimension, indicates that the recommended maximum net allowable bearing pressure for footings founded in the embankment fill will be on the order of 6 ksf, based on post construction settlement of approximately 1/2 inch.

#### Proposed Toll Facilities – SB Plaza

Preliminary plans for the project indicate the new SB toll plaza will consist of three lane toll plaza structure along the on-ramp and a single lane off ramp separated by a raised island. A toll plaza administration building, with an approximate footprint of 20 feet by 30 feet, parking area, and generator and propane tank pads are also proposed at the SB toll plaza area. An underground septic system will be located beneath the employee parking area. Grade raises on the order of 8 to 14 feet are expected in the area of the SB toll plaza.

Subsurface materials at the proposed SB toll plaza will consist of approximately 8 to 14 feet of new imported fill overlying 4 to 7 feet of stiff marine clay and 0 to 4 feet of soft to medium stiff marine clay overlying glacial till and bedrock. Settlement from the new fill and foundation loads will result from primary consolidation and secondary compression. We estimate that the total settlement will be on the order of 2 to 4 inches. The estimated time to complete primary consolidation beneath the proposed SB toll plaza fill is approximately 2 to 4 months.



Approximately 1 inches of settlement is anticipated to occur as secondary compression, beginning approximately 2 to 4 months after fill placement. The time-rate of consolidation is an estimate and will vary in the field due to the variability in the clay stratum.

In our opinion, preloading the SB toll plaza is a feasible means to limit post-construction settlement. We anticipate that settlement can be mitigated to less than one inch by using a surcharging program. However, the marine clays are likely to experience post-construction settlements that could be up to 1 inch or more over a 50 year design life. We understand from HNTB that the toll plaza slab has an allowable post construction settlement of zero due to the tolling electronics and sensors that will be embedded in the slab.

If post construction settlements are not allowed (i.e. a tolerance of zero inches), additional settlement mitigation methods that are feasible include the use of rammed aggregate piers or timber or steel piles to support the toll plaza structure.

Spread footing foundations are considered suitable for the proposed single story, toll plaza administration building. A preliminary maximum net allowable bearing pressure of 4 ksf is recommended based on post construction settlement of less than 1 inch and differential settlement less than 1/2 inch.

#### Overhead Sign Structures/Signals

The Gray Interchange reconstruction project includes the construction of three new cantilever guide sign structures, three overhead guide sign structures, and eight mast arm signal structures, as shown on the project preliminary plans. The cantilever arms on the proposed sign structures range in length from 35 to 50 feet. The overhead guide sign structures will have spans ranging from 110 to 115 feet. Recommendations for the overhead guide sign structure located at the NB toll plaza are provided in the previous section. The proposed signal structures will have mast arm lengths ranging from 25 to 60 feet.

Traffic signals and signing structures can be founded on drilled shafts, as outlined in MaineDOT Standard Specifications 626 and 643. Required embedment length and shaft diameter should be determined in accordance with the MaineDOT Standard Detail Section 626 based on the recommendations provided in the following table. Subsurface conditions at each structure location are presented along with the recommended design profile and recommended soil properties for use in the design (friction angle or undrained shear strength).





Preliminary Design Recommendations for Sign Structures/Signals						
Structure Type	Approximate Station/Offset (ft)	Boring No.	Approx. Ground El. (ft)	Subsurface Conditions	Recommended Design Profile	Recommended Friction Angle ( $\phi^\circ$ ) or Su (psf)
			Existing (Proposed)			
Cantilever Guide Sign Structures	704+05 70LT	GZ-134	248 (245)	7' SAND 13' soft CLAY	Clay	400 psf
	607+95 60RT	GZ-135	247.5 (same)	7' CLAY crust 20' soft CLAY	Med Stiff Clay	600 psf
	628+05 35LT	GZ-139	278 (same)	4' FILL 7' CLAY crust 11' TILL	Med Stiff Clay	800 psf
Overhead Guide Sign Structures	613+60 55LT and 613+60 50RT	GZ-138	250 (same)	10' FILL 20' soft CLAY	Fill	32°
		GZ-137	252 (same)	2' FILL 10' CLAY crust >10' soft CLAY	Med Stiff Clay	800 psf
	304+30 25RT and 417+00 30RT	GZ-140	261 (same)	5' FILL 7' CLAY crust 8' soft CLAY	Med Stiff Clay	800 psf
		GZ-119	263 (same)	16' FILL >10' soft CLAY	Fill	32°
	126+50 15LT and 204+10 20LT	GZ-142	235 (246)	14' New FILL 5' CLAY crust	Fill	32°
		GZ-143 / GZ-132	234 (245)	13' New FILL 6' FILL	Fill	32°
Mast Arm Signal Structures	610+51 45LT	GZ-108	246 (same)	12' CLAY crust	Med Stiff Clay	800 psf
	128+89 20LT	GZ-109	242 (246)	4' New FILL 5' SAND 7' CLAY crust	Fill/Sand	32°
	700+91 50RT	GZ-111	245 (same)	12' CLAY crust	Med Stiff Clay	600 psf
	612+11 55RT	GZ-112	248 (same)	8' FILL 8' CLAY crust 4' soft CLAY	Med Stiff Clay	800 psf
	625+13 35LT	GZ-115	271 (same)	6' FILL 5' SAND 1' CLAY crust	Fill/Sand	32°
	300+96 25RT	GZ-116	272 (same)	12' FILL	Fill	32°
	626+09 35LT	GZ-117	273 (same)	6' FILL 6' CLAY crust	Med Stiff Clay	800 psf
	420+62 45RT	GZ-118	273 (same)	4' FILL 2' SAND 6' CLAY crust	Med Stiff Clay	800 psf

FROST AND SUBGRADE CONDITIONS FOR PAVEMENT DESIGN



- Based on the MaineDOT Highway Design Guide (HDG), the Design Freezing Index for the site is approximately 1350. Therefore, in accordance with Figure 13-3 of the HDG, considering primarily granular subgrade materials, the estimated depth of frost penetration is about 72 inches.
- To limit frost heaving, materials not susceptible to frost-heaving should be provided in the upper 72 inches beneath the paved surface in new embankments. Where this is not possible, the pavement design should allow for the presence of frost-susceptible material within the depth of freezing.
- Where roadways will be constructed in cut, or at grade locations, the frost-susceptibility of the local subgrade material should be considered in design of the new pavement section.

PAVEMENT DESIGN

The following tables summarize the two proposed pavement sections for the interchange project, as presented in the VHB 30% plan submission set dated January 8, 2015. The section proposed for the Route 202, SB ramps, and NB ramps will provide a Structural Number (SN) equal to 4.91. The section proposed for the Route 26A improvements will provide a SN equal to 4.86.

Route 202, SB and NB Ramps					
Layer	Struct. Coeff	Drain Coeff	Thickness (inches)	SN	Estimated Design Life
HMA Grading 12.5mm (Surface)	0.44	1	3.5	1.54	20 years
HMA Grading 19.0mm	0.34	1	2.5	0.85	
Base Course Type A	0.12	1	12	1.44	
Subbase Course Gravel Type D	0.09	1	12	1.08	
		<b>Sum</b>	<b>30</b>	<b>4.91</b>	

Route 26A					
Layer	Struct. Coeff	Drain Coeff	Thickness (inches)	SN	Estimated Design Life
HMA Grading 12.5mm (Surface)	0.44	1	3	1.32	20 years
HMA Grading 19.0mm	0.34	1	3	1.02	
Base Course Type A	0.12	1	12	1.44	
Subbase Course Gravel Type D	0.09	1	12	1.08	
		<b>Sum</b>	<b>30</b>	<b>4.86</b>	

Pavement sections proposed for widened sections of Route 202 and Route 26A should match the existing pavement sections in those areas. Clay or organic subgrades may be exposed in limited areas of the proposed widening, mainly in the area of the Route 202/Route 26A intersection. Over-excavation and replacement of unsuitable materials may be required in these areas to provide adequate pavement support for the proposed pavement sections outlined above.

Traffic data, provided by VHB via email on February 10, 2015, is summarized in the following table. Based on this, GZA estimated the following 20-year 18-kip ESAL equivalents for each portion of the project.



Roadway	2017 AADT (vehicle per day)	20-year 18-kip ESAL
Route 202	20,500	8,194,717
Route 26A	11,800	4,716,959
SB Ramps	7,925	3,167,958
NB Ramps	8,675	3,467,764

GZA performed pavement design analysis in accordance with the MaineDOT HDG to check if the proposed NB/SB ramp pavement section is acceptable for the encountered subgrade conditions. Our evaluations have assumed that new pavement section will typically be founded on at least one to two feet of granular material (i.e. existing or newly placed fill).

The following inputs were selected in accordance with the HDG.

Pavement Design Input	Value
Serviceability Loss (APSI)	2.0
Reliability Factor	95%
Overall Standard Deviation	0.45

GZA calculated the minimum required SN values for the roadway segments, based on the AADT values provided by VHB, and the anticipated subgrade materials. It is anticipated that subgrade materials will consist of existing embankment fill, Sand, Silty Clay or imported granular fill. The recommended soil support S-value and subgrade resilient modulus values used in section analysis are presented below:

Material	Maine Frost Classification	Recommended Soil Support S-Value	Recommended Subgrade Resilient Modulus, Mr (psi)
Existing Fill / Sand / New Clean Granular Fill	0 - II	4.5	5,100
Silty Clay	IV	3	2,800

Based on these assumptions, the minimum required SN for each pavement sections placed over in-situ Silty Clay, Sand, existing fill, or imported granular fill is presented below.

Material	Minimum Required SN	Proposed Section SN S-Value
Existing Fill / Sand / New Clean Granular Fill	4.5	4.91
Silty Clay	5.1	

The proposed pavement section for the NB/SB ramps is acceptable at most locations, except where marine silty clay, organics or other unsuitable material is present at the bottom of pavement section elevation. At those locations, we recommend overexcavating to a depth of at least 6 inches and replacing the unsuitable material with compacted Subbase Course Gravel Type D.

Pavement design recommendations for the proposed park and ride were submitted under separate cover and have been included in **Appendix D** of this report for reference.

#### PAVEMENT DRAINAGE DESIGN CONSIDERATIONS

Pavement drainage details should be developed that promote subsurface water removal beneath the pavement section. This is of particular concern in cut areas where the subgrade material transitions from frost-susceptible soils to non-frost-susceptible soils. Due to the low permeability of the silty clay subgrade materials, there is potential for perched water to accumulate adjacent to the pavement, when founded on silty clay, and provide a source of water for possible frost action beneath pavement. To promote drainage of the pavement section, ditches should be provided on either side of the roadway alignment, and the bottom of the ditches should be at least 12 inches below the bottom of the subbase layer of the proposed pavement sections. Where possible, the prepared clay subgrade should be graded to drain toward the ditches.

#### SOIL HYDRAULIC PARAMETERS

It is our understanding, based on our review of the 30 percent plans, that the proposed SB toll plaza septic leach field will be located in an area where approximately 7 feet of new fill will be placed. Existing subgrade consists of approximately 2.5 feet of topsoil overlying 7.5 feet of silty clay. It is our understanding that the leach field could be designed within the 7 foot new fill zone, therefore hydraulic parameters of the material could be specified as required for the leach field design.

#### REUSE OF ON-SITE MATERIALS

- In general, we anticipate that the excavated Marine Deposit will be suitable for reuse as Common Borrow in accordance with MaineDOT Standard Specification Section 703.18, assuming unsuitable material is removed and can be moisture conditioned to within 2 percent of optimum moisture content to allow for compaction of the material.
- We anticipate that existing fill and Glacial Till may be suitable for reuse as Granular Borrow, MaineDOT 703.19. If the contractor wishes to reuse excavated material as embankment fill, we recommend that the proposed material be stockpiled and tested for grain size distribution. Stockpiled materials meeting the appropriate MaineDOT specifications may be reused on the project.

#### ADDITIONAL GEOTECHNICAL WORK

As discussed above, additional geotechnical explorations are recommended to further assess the thickness of the wetland/muck material within the limits of the proposed ramp alignments. We recommend an additional day to complete hand probes to provide additional data and refine estimates of the thickness of wetland material. Hand probe data would provide valuable insight for determining the estimated volume of wetland material that will require removal prior to fill placement within the limits of the ramp alignments. Upon request, GZA can develop a scope of work for additional hand probe explorations.



## **CLOSURE**

We trust this information meets current project needs. Please feel free to call Jennifer Baron at (207) 358-5119 for additional information.

Attachments: Table 1 – Boring Summary Table  
Figure 1 - Locus Plan  
Figures 2 through 11 - Boring Location Plan  
Appendix A - Limitations  
Appendix B - Boring Logs  
Appendix C - Laboratory Results  
Appendix D – Preliminary Pavement Design Basis, Gray Park and Ride





**TABLE**

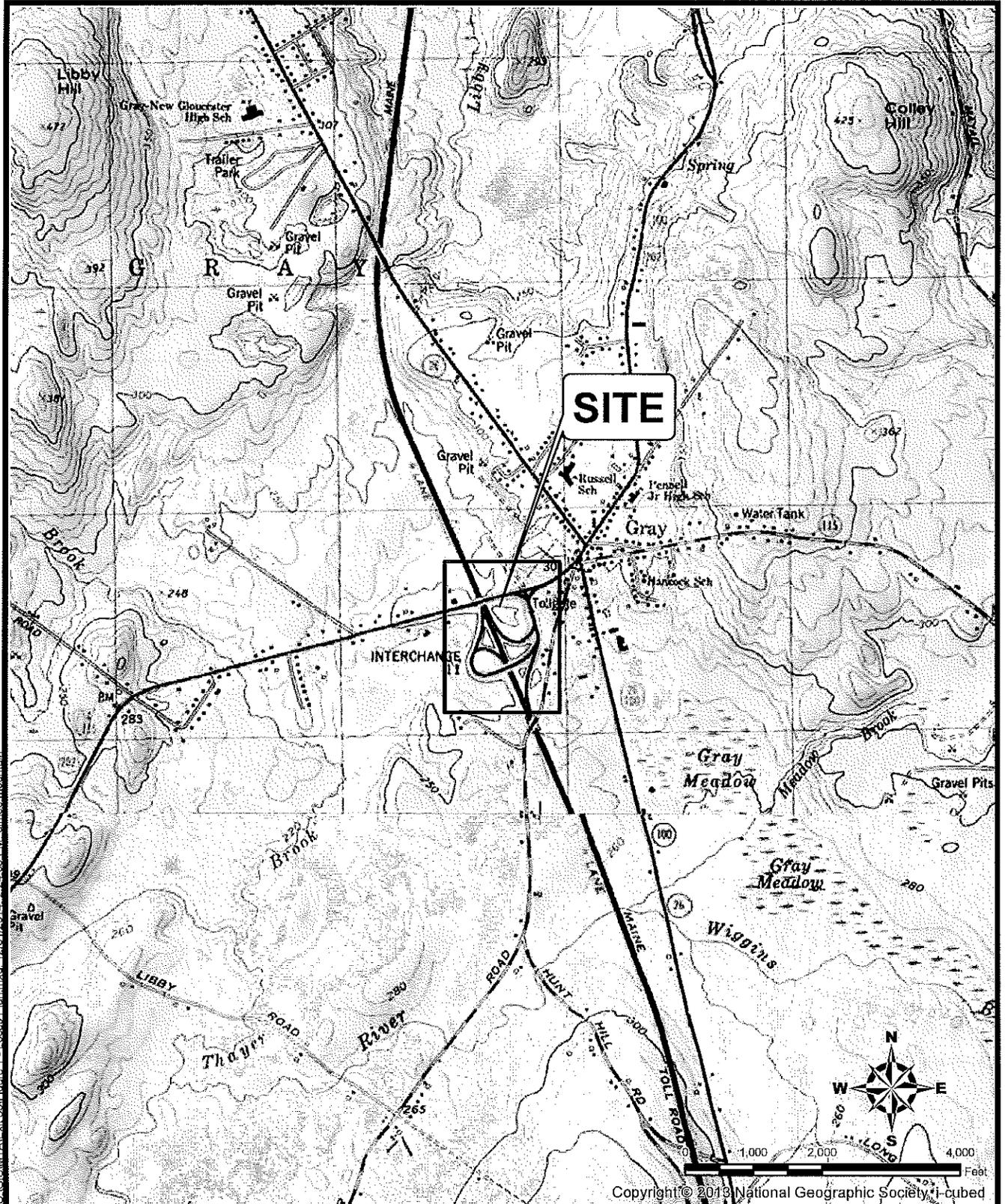
TABLE 1  
SUMMARY OF GZA TEST BORINGS  
Mabro Turnpike Authority - Ony Interchange (Est 63)  
Gray, Mabro

Boring Number	Station	Offset	Notching	Footing	Structure	Ground Surface Elev. of (ft)	Boring Depth (ft)	Groundwater <sup>1,2</sup>		Thickness of Deposit <sup>3</sup> (ft)						Top of Bedrock <sup>4</sup> (ft)	
								Depth to (ft)	Elev. of (ft)	Asphalt	Topsoil	Fill	Sand	SH & Clay	Glacial Ill.	Weathered Rock	Depth to (ft)
PARK & RIDE																	
GZ-101	21+79	75' LT	384192.05	993504.41	PNR	244.0	21.0	8.5	235.5	NE	0.5	NE	NE	20.5	NE	NE	NE
GZ-102	20+79	31' RT	384670.33	994225.00	PNR	242.5	42.0	11.5	231.0	NE	0.5	NE	NE	74.5	7.0	NE	NE
ROUTE 30A																	
GZ-103	70+50	51' RT	382957.07	993765.72	OHSS	248.0	21.0	7.5	246.5	NE	1.0	NE	4.5	15.5	NE	NE	NE
GZ-104	70+50	50' LT	382957.78	993885.91	OHSS	248.0	22.0	6.0	247.0	NE	2.0	NE	8.0	13.0	NE	NE	NE
GZ-105	705+00	44' LT	383847.84	993533.33	RDWY	244.5	70.0	NM	NM	NE	0.5	3.5	2.0	53.0	9.0	NE	NE
ROUTE 30B																	
GZ-106	606+00	40' RT	382436.17	993261.57	RDWY	246.0	109.0	NM	NM	0.3	NE	2.7	6.0	68.0	32.0	NE	NE
GZ-107	608+00	77' RT	382438.23	993563.40	OHSS	247.5	71.0	NM	NM	NE	2.0	NE	NE	60.0	9.0	NE	NE
GZ-108	608+00	41' LT	382572.75	994744.89	OHSS	247.0	22.0	4.7	242.3	NE	0.3	3.7	2.0	16.0	NE	NE	NE
GZ-109	610+62	60' LT	382644.82	993833.73	SIGNAL	246.0	17.0	NM	NM	NE	2.0	NE	NE	10.0	NE	NE	NE
GZ-110	610+82	110' RT	382484.09	993746.20	SIGNAL	242.0	33.0	NM	NM	NE	0.5	NE	4.3	22.0	2.5	3.5	33.0
GZ-111	611+92	95' LT	382710.19	993803.42	SIGNAL	245.0	12.0	7.4	237.6	NE	1.0	NE	NE	11.0	NE	NE	NE
GZ-112	612+10	60' RT	382884.13	993938.33	SIGNAL	247.5	38.0	6.2	241.3	NE	2.0	6.0	NE	12.5	18.1	NI	38.6
GZ-113	614+75	51' RT	382622.39	994055.09	OHSS	253.0	45.0	1.3	230.7	NE	0.3	1.7	NE	37.0	4.0	NE	44.0
GZ-114	614+15	49' LT	382719.43	994030.53	OHSS/RT/WALL	250.0	62.0	NM	NM	NE	NE	10.0	NE	45.3	6.7	NE	NE
GZ-115	614+00	53' LT	382768.06	994209.48	RET WALL	251.0	76.5	4.0	246.0	NE	3.0	7.0	19.5	45.5	1.5	NE	NE
GZ-116	615+22	38' LT	382982.62	995105.81	SIGNAL	271.5	12.0	NM	NM	NE	2.0	4.0	5.0	1.0	NE	NE	NE
GZ-117	615+28	94' RT	382856.19	995143.65	SIGNAL	272.0	12.0	NM	NM	NE	0.3	11.7	NE	NE	NE	NE	NE
GZ-118	616+14	35' LT	382933.76	995155.39	SIGNAL	275.0	12.0	NM	NM	NE	0.2	5.8	NE	6.0	NE	NE	NE
GZ-119	617+50	70' RT	382910.08	995256.77	SIGNAL	273.0	12.0	NM	NM	NE	NE	4.0	2.0	6.0	NE	NE	NE
GZ-120	617+87	35' LT	383149.18	995338.62	OHSS	278.0	22.0	10.0	268.0	NE	0.4	3.6	NE	7.0	11.0	NE	NE
NB RAMP																	
GZ-121	30+64	40' RT	382412.80	995223.34	OHSS	261.0	31.5	NM	NM	NE	NE	4.8	NE	15.2	11.5	NE	31.5
GZ-122	41+50	31' RT	382403.44	995322.58	TOLL GANTRY	263.0	57.5	11.0	252.0	NE	NE	16.3	16.0	16.7	7.0	NE	50.0
SB OFF RAMP																	
GZ-123	119+23	8' LT	381860.91	994439.33	RDWY	252.0	28.3	NM	NM	NE	0.3	1.7	NE	10.0	15.7	NE	27.7
GZ-124	119+79	9' RT	381806.33	994554.18	RDWY	257.5	30.0	ND	246.6	NE	0.3	10.4	4.3	5.0	16.0	NE	30.0
GZ-125	120+45	72' LT	382146.05	993905.53	OHSS	251.0	21.5	7.7	227.4	NE	0.3	NE	5.0	14.5	NE	3.5	23.5
GZ-126	120+95	25' LT	382301.62	993924.59	OHSS	234.0	27.0	NM	NM	NE	NE	6.0	NE	14.0	2.5	4.5	27.0
GZ-127	122+80	28' RT	381997.01	994084.53	TOLL FACILITY	251.0	12.0	Dry	Dry	NE	2.5	NE	NE	7.5	1.5	0.5	12.0
GZ-128	122+25	100' RT	382100.59	994177.69	TOLL FACILITY	241.5	39.5	4.5	237.0	NE	0.2	NE	3.8	4.0	12.0	6.3	26.3
GZ-129	122+25	58' LT	382060.81	994169.72	TOLL FACILITY	245.0	10.0	6.7	238.3	NE	0.3	NE	NE	NE	7.7	NR	8.0
GZ-130	122+25	9' LT	382003.14	994144.00	TOLL FACILITY	246.5	26.7	8.3	238.2	NE	0.3	NE	3.7	7.0	4.0	5.2	21.2
GZ-131	122+25	56' LT	381929.84	994127.64	TOLL FACILITY	248.0	25.7	8.8	239.2	NE	0.2	NE	3.9	6.0	15.7	NE	25.7
GZ-132	122+10	28' LT	381926.55	994150.83	TOLL FACILITY	246.5	19.5	8.2	238.3	NE	0.5	NE	3.3	7.5	8.0	NE	19.5
GZ-133	114+00	CL	381631.40	994868.71	RDWY	239.0	15.0	3.5	245.5	NE	0.3	NE	6.2	NE	8.5	NR	15.0
GZ-134	104+63	4' LT	381169.69	995135.08	RDWY	237.0	11.9	NM	NM	0.6	NE	4.0	NE	7.3	NE	11.0	245.1
GZ-135	104+00	CL	380745.70	995223.03	RDWY	239.0	13.3	7.0	251.0	0.5	NE	6.0	NE	4.5	1.5	0.8	17.3
SB OFF RAMP																	
GZ-136	215+00	CL	382447.88	994546.52	RDWY	245.5	42.0	NM	NM	NE	NE	NE	2.0	33.0	7.0	NR	NE
GZ-137	212+50	CL	382202.56	994575.08	RDWY	239.0	27.5	5.0	234.0	NR	NE	NE	2.0	13.0	12.5	NR	27.5
GZ-138	210+50	CL	382054.14	994450.43	RDWY	245.0	26.6	NM	NM	NE	0.3	NE	NE	11.7	14.6	NR	26.6
GZ-139	212+50	14' LT			RDWY	234.5	22.0	NM	NM	NE	1.0	NE	NE	18.5	2.5	NR	22.0

- NOTES:  
1. Refer to Appendix B for test boring logs.  
2. "NM" indicates not encountered; "NE" indicates not encountered.  
3. Groundwater measurements taken during the drilling process and should not be considered stabilized.  
4. Ground surface elevations estimated by interpolating from contours of existing ground surface shown on the existing conditions plan.  
5. The order that strata were encountered in the test borings may vary from the order shown on this table. Refer to the boring logs for detailed descriptions of the materials encountered at specific locations.  
6. Bollock was confirmed at boring locations GZ-122 and GZ-124. Depth to bollock at all other locations is based on drilling behavior and/or casing, casing, probe or split spoon refusal.



**FIGURES**



© 2014 GZA GeoEnvironmental, Inc. C:\GIS\MA\Exit 63\Figure 1 - Locus Plan.mxd 12/31/2014 9:24:05 PM aimes mountain

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MAINE TURNPIKE EXIT 63  
INTERCHANGE IMPROVEMENTS  
GRAY, MAINE

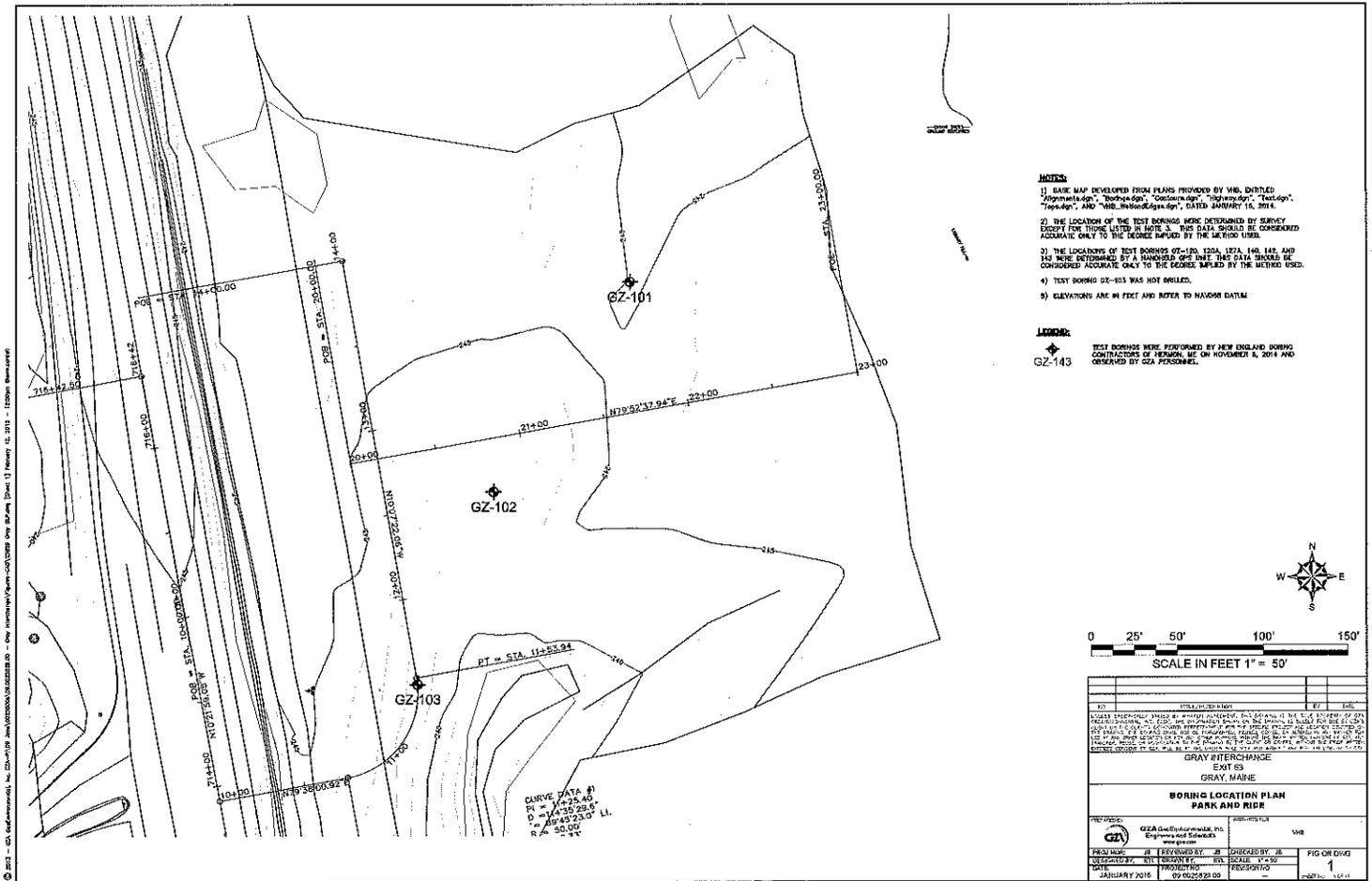
PREPARED BY:  
**GZA** GZA GeoEnvironmental, Inc.  
Engineers and Scientists  
www.gza.com

PREPARED FOR:  
VHB

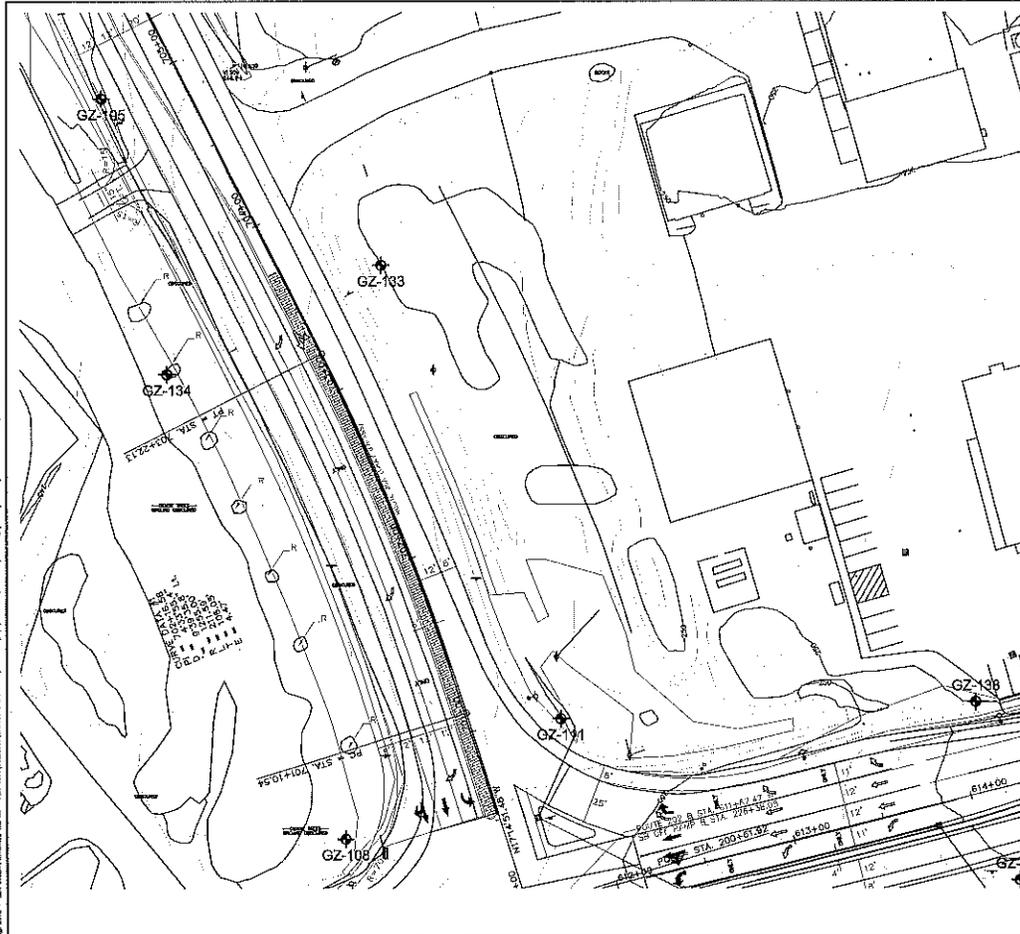
LOCUS PLAN

PROJ MGR: JRB	REVIEWED BY: CLS
DESIGNED BY: JRB	DRAWN BY: ADM
DATE: 12/31/2014	PROJECT NO. 09.0025829.00

CHECKED BY: RJM	FIGURE 1
SCALE: 1 in = 2,000 ft	
REVISION NO.	



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- NOTES:**
- 1) BASE MAP DEVELOPED FROM PLANS PROVIDED BY MR. ENTLED, "Alignments.dwg", "Barbours.dwg", "Cantons.dwg", "Highways.dwg", "Track.dwg", "Twp.dwg", AND "Twp\_Maintenance.dwg", DATED JANUARY 15, 2014.
  - 2) THE LOCATION OF THE TEST BORINGS WERE DETERMINED BY SURVEY. EXCEPT FOR THOSE LISTED IN NOTE 3, THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE SHOWN BY THE METHOD USED.
  - 3) THE LOCATIONS OF TEST BORINGS 07-110, 120A, 122A, 140, 142, AND 143 WERE DETERMINED BY A HANDSHAKE OF DATA. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE SHOWN BY THE METHOD USED.
  - 4) ELEVATIONS ARE IN FEET AND REFER TO NAVD83 DATUM.

**LEGEND:**

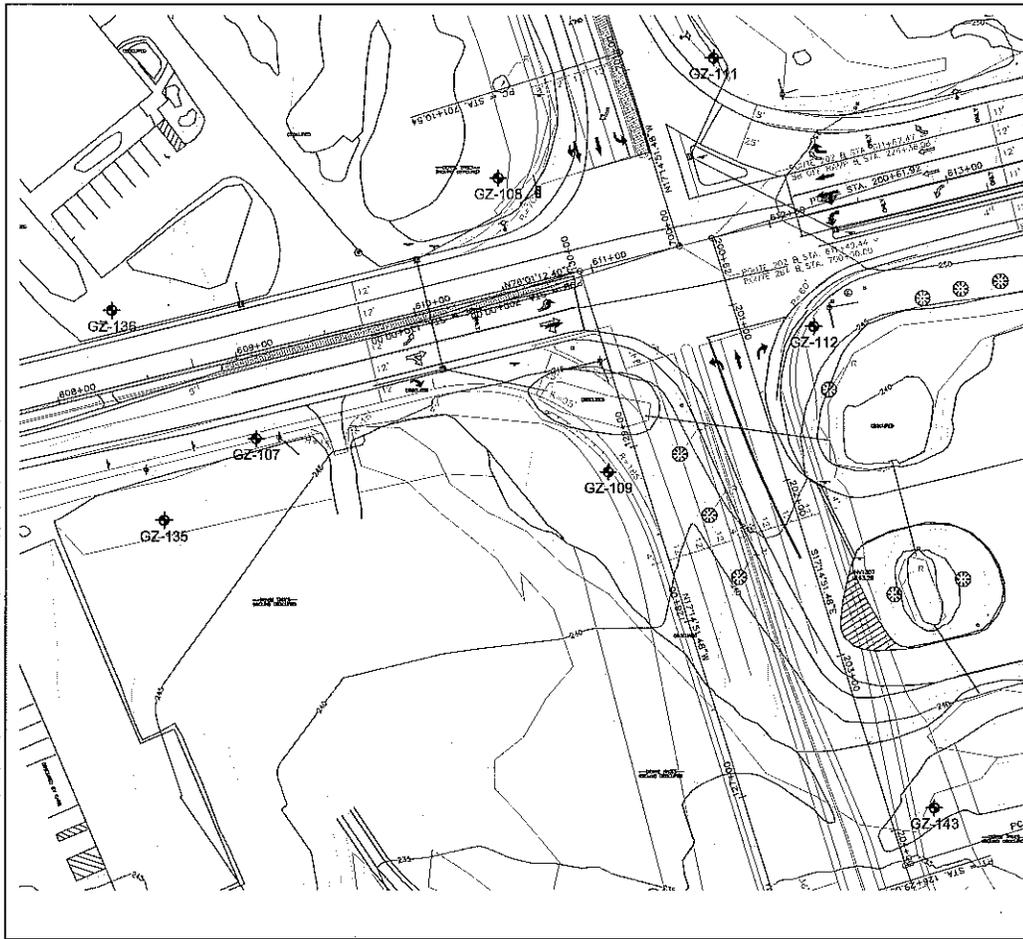
TEST BORINGS WERE PERFORMED BY NEW ENGLAND TRUCK CONTRACTORS OF BERGTON, ME ON NOVEMBER 6, 2014 AND DESIGNED BY GEA PERSONNEL.

GZ-143



DATE		PROJECT		REVISION	
JANUARY 7, 2016		08 50 20 25 00		2	
DRAWN BY		CHECKED BY		PGS ORL/IVG	
EBC		EBC		2	
DATE		PROJECT		REVISION	
JANUARY 7, 2016		08 50 20 25 00		2	

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- NOTES:**
- 1) BASE MAP DEVELOPED FROM PLANS PROVIDED BY VMS, ENTITLED "ALIGNMENT.dwg", "BORING.dwg", "CONCRETE.dwg", "HIGHWAY.dwg", "TIE.dwg", "TIE.dwg", AND "VMS\_04/09/04.dwg", DATED JANUARY 16, 2014.
  - 2) THE LOCATION OF THE TEST BORINGS WERE DETERMINED BY SAMPEY EXCEPT FOR THOSE LISTED IN NOTE 3. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
  - 3) THE LOCATIONS OF TEST BORINGS GZ-105, 106, 107, 108, 109, AND 110 WERE DETERMINED BY A HANGULOG GPS UNIT. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
  - 4) ELEVATIONS ARE IN FEET AND REFER TO HAVANA DATUM.

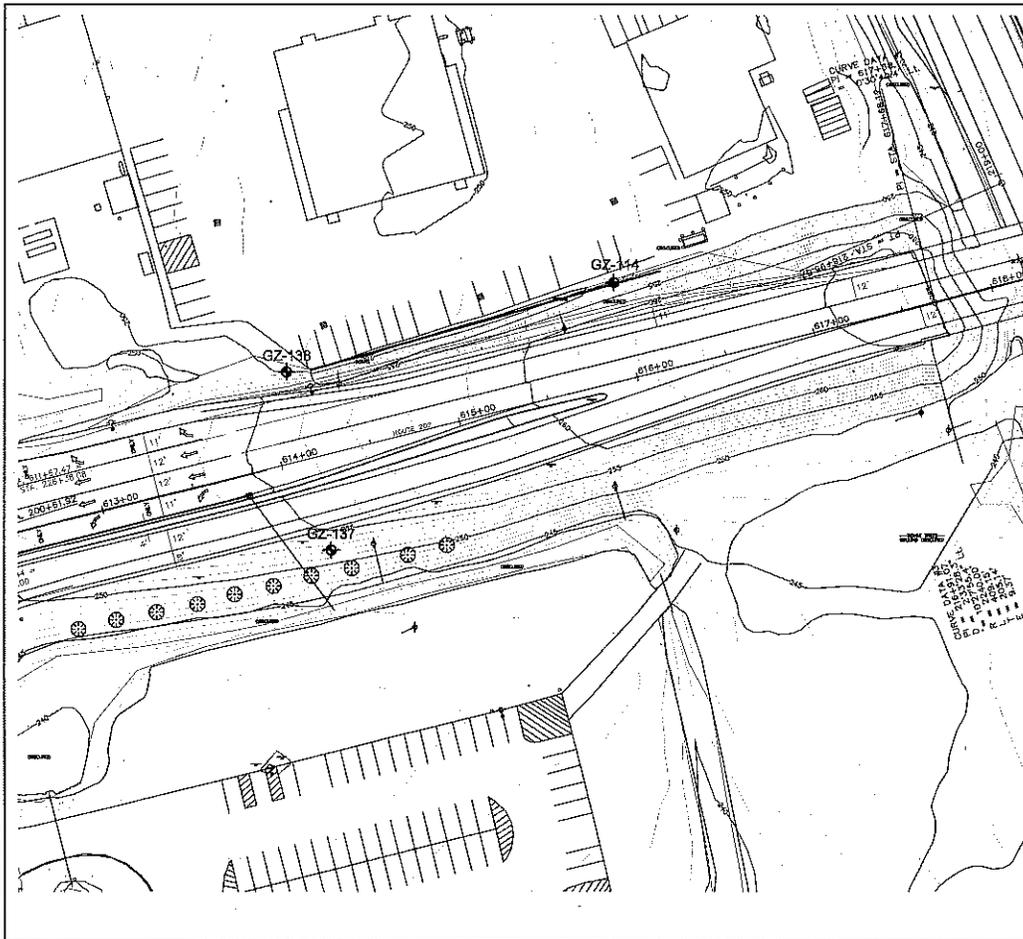
**LEGEND:**

◆ TEST BORING WERE PERFORMED BY NEW ENGLAND BORING CONTRACTORS OF BEDFORD, MA ON NOVEMBER 5, 2014 AND OWNED BY GEA PROFESSIONAL.

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<b>GRAY INTERCHANGE</b> <b>EXIT 63</b> <b>GRAY JAMME</b>			
<b>BORING LOCATION PLAN</b> <b>ROUTE 202/SOUTH BOUND RAMP</b>			
DRAWN BY: <b>GR</b> CHECKED BY: <b>AS</b> DATE: <b>JANUARY 2015</b>	DESIGNED BY: <b>AS</b> DRAWN BY: <b>GR</b> PROJECTED: <b>03/02/2015</b>	PREPARED BY: <b>VMS</b> CHECKED BY: <b>AS</b> SCALE: <b>AS SHOWN</b> PROJECT NO.: <b>1501</b>	NO. <b>3</b> SHEET NO. <b>1</b> OF <b>11</b>



- NOTES**
- 1) BASE MAP DEVELOPED FROM PLANS PROVIDED BY WIS, ENTITLED "APPROXIMATE", "DRAINAGE", "CONCRETE", "HIGHWAY", "TRUCK", "TOP", AND "WATER-EDGE", DATED JANUARY 18, 2014.
  - 2) THE LOCATION OF THE TEST BORINGS WERE DETERMINED BY SURVEY EXCEPT FOR THOSE LISTED IN NOTE 3. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
  - 3) THE LOCATIONS OF TEST BORINGS 02-130, 130A, 137A, 140, 142, AND 143 WERE DETERMINED BY A NUMBER ONE SURVEY. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
  - 4) ELEVATIONS ARE IN FEET AND REFER TO NAVD83 DATUM.

**LEGEND**

GZ-143 TEST BORING WERE PERFORMED BY NEW ENGLAND BORING CONTRACTORS OF PERSIMMON, ME ON NOVEMBER 6, 2014 AND OBSERVED BY GEA PERSONNEL.



DATE		BY	
DESCRIPTION		BY	
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<b>GRAY INTERCHANGE</b> <b>EXIT 03</b> <b>GRAY RAMP</b>			
<b>BORING LOCATION PLAN</b> <b>ROUTE 202</b>			
PREPARED BY <b>GEA Consultants, Inc.</b> 1000 Main Street Portland, ME 04101 www.gea.com	PROJECT NO. <b>09 002229 00</b>	DRAWN BY <b>WIS</b>	CHECKED BY <b>JR</b>
DATE <b>JANUARY 2015</b>	PREPARED BY <b>09 002229 00</b>	SCALE <b>1" = 50'</b>	FIG. OR. DESC. <b>4</b>

© 2015 - GEA Consultants, Inc. 09 002229 00 - Gray Interchange/Exit 03/Route 202 - Boring Location Plan - 1/15/15 - 1500px Resolution

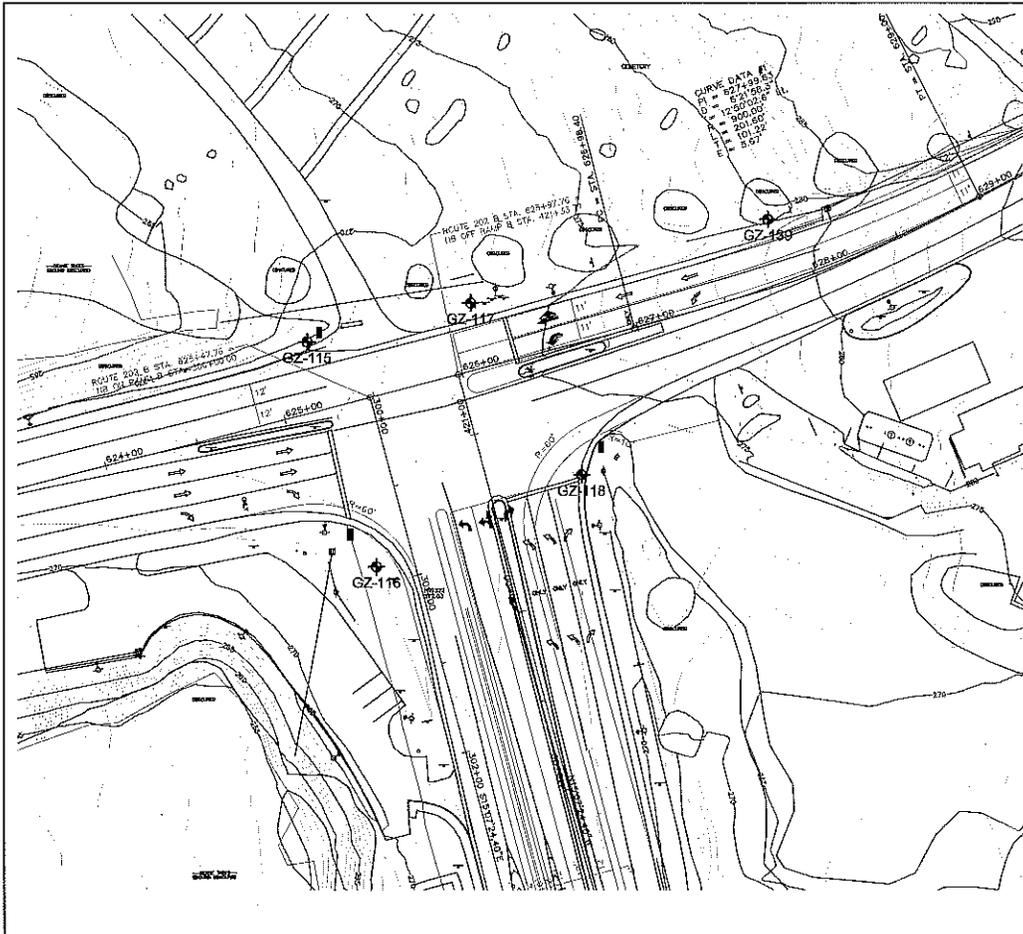








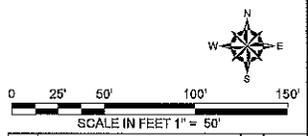




- NOTES:**
- 1) BASE MAP DEVELOPED FROM PLANS PROVIDED BY MBL, ENTITLED "Alignment", "Topography", "Contours", "Elevation", "Traffic", "Transfer", AND "HYDROLOGICAL", DATED JANUARY 15, 2014.
  - 2) THE LOCATION OF THE TEST BORINGS WERE DETERMINED BY SURVEY EASERS FOR THOSE LISTED IN NOTE 3. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
  - 3) THE LOCATIONS OF TEST BORINGS GZ-115, 116, 117, 118, 140, 142, AND 143 WERE DETERMINED BY A HANDED SURVEY. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
  - 4) ELEVATIONS ARE IN FEET AND REFER TO MANGRO DATUM.

**LEGEND:**

GZ-143 TEST BORING WERE PERFORMED BY BOB GARLAND BORING CONTRACTORS OF HOPKINS, ME ON NOVEMBER 8, 2014 AND OBSERVED BY GZA PERSONNEL.



NO. 10		DATE	
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<b>GRAY INTERCHANGE</b> EXIT 83 GRAY, MAINE			
<b>BORING LOCATION PLAN</b> ROUTE 200 NORTH BOUND RAMP			
PREPARED BY: GZA DESIGNED BY: BML DATE: JANUARY 2016	REVIEWED BY: BML DATE: 01/22/2016	PROJECT NO.: 06-025230-00	SHEET NO.: 10 OF 11

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**APPENDIX A**  
**LIMITATIONS**



## GEOTECHNICAL 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 contract documents, 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.
4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

### Subsurface Conditions

5. 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. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.
6. 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.
7. Water level readings have been made in test holes (as described in this 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.

8. 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.



Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

#### Compliance with Codes and Regulations

10. 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.

#### Cost Estimates

11. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

#### Additional Services

12. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.



**APPENDIX B**

**BORING LOGS**

**TEST BORING LOG**



**GZA**  
GeoEnvironmental, Inc.  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-101  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 244  
Final Boring Depth (ft.): 21  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/6/14	1410	8.5'	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.0-2.0	24	14	1 1 7 10	8	S-1: Top 6": Topsoil. Bottom 8": Medium stiff, gray-brown, Clayey SILT, some fine to medium Sand. (ML)			0.5	TOPSOIL	243.5
		S-2	2.0-4.0	24	16	8 10 11 13	21	S-2: Very stiff, brown-gray, CLAY & SILT, trace Sand. (CL)			SILTY CLAY		
		S-3	4.0-6.0	24	20	2 3 6 6	9	S-3: Stiff, gray and brown, Silty CLAY, little fine Sand. (CL)			6	238.0	
10		S-4	9.0-11.0	24	20	1 1 2 2	3	S-4: Soft to medium stiff, gray, Silty CLAY, trace fine Sand. (CL)					
15		S-5	14.0-16.0	24	24	WOR		S-5: Soft to medium stiff, gray, Silty CLAY. (CL) Note: Approximately 1/8" seam of coarse to medium Sand at 15.0'.	1				
20		S-6	19.0-21.0	24	3	WOR		S-6: Soft to medium stiff, gray, Silty CLAY, wet. (CL)			21		223.0
								End of exploration at 21 feet.	2				

**REMARKS**  
1 - Soil appeared very wet at top of 14.0' sample.  
2 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-101**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:07:56 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-102  
SHEET: 1 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA & Rod Probe

Boring Location: See Plan  
Ground Surface Elev. (ft.): 242.5  
Final Boring Depth (ft.): 82  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/6/14	1230	11.5'	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-1	0.0-2.0	24	14	1 1 1 5	2	S-1: Top 6": Very loose, dark brown, fine to medium SAND and Clayey Silt, with organic material (roots). (SM) Bottom 8": Gray, Silty CLAY, trace fine Sand. (CL)			0.5	TOPSOIL	242.0
			5	S-2	4.0-6.0	24	18				7 7 9 11	16	S-2: Very stiff, gray, Silty CLAY, trace fine Sand. (CL)
10		S-3	9.0-11.0	24	20	1 1 2 1	3	S-3: Soft to medium stiff, gray, Silty CLAY, wet. (CL)					
15		S-4	14.0-16.0	24	24	1 1 WOH	1	S-4: Soft to medium stiff, gray, Silty CLAY, wet. (CL)					
20		S-5	19.0-21.0	24	20	WOR		S-5: Soft to medium stiff, gray, Silty CLAY, wet. (CL)					
25		S-6	24.0-26.0	24	6	WOR		S-6: Soft to medium stiff, gray, Silty CLAY, wet. (CL)					
30		S-7	29.0-	24	10	WOR		S-7: Soft to medium stiff, gray, Silty CLAY, wet. (CL)					

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-102**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:07:56 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-102  
SHEET: 2 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA & Rod Probe

Boring Location: See Plan  
Ground Surface Elev. (ft.): 242.5  
Final Boring Depth (ft.): 82  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
11/6/14	1230	11.5'	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
			31.0										
35		S-8	34.0-36.0	24	16	WOR		S-8: Soft to medium stiff, gray, Silty CLAY, wet. (CL)	1				
	WOR												
	WOR												
40	1												
	WOR												
	WOR												
	1												
	1												
45	WOR											SILTY CLAY	
	WOR												
	WOR												
	WOR												
	1												
	1												
	2												
	1												
	3												
	4												
55	8												
	3												
	3												
	3												
	3												
60	3										60		182.5

**REMARKS**  
1 - Began rod probe at 36.0' bgs. Blows per foot to drive AW rod are recorded on log under casing blows.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-102**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:07:56 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-102  
SHEET: 3 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA & Rod Probe

Boring Location: See Plan  
Ground Surface Elev. (ft.): 242.5  
Final Boring Depth (ft.): 82  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/6/14	1230	11.5'	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample					Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)						
28												
11												
8												
9												
13												
65												
12												
11												
15											POSSIBLE SAND OR SILTY CLAY	
18												
15												
70												
13												
15												
13												
13												
16										75		167.5
75												
20												
19												
21												
24												
80												
24												
20												
37									2	82		160.5
							End of exploration at 82 feet.					
85												
90												

**REMARKS**  
2 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-102**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:07:56 PM

**TEST BORING LOG**



**GZA**  
GeoEnvironmental, Inc.  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-105  
SHEET: 1 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA & Rod Probe

Boring Location: See Plan  
Ground Surface Elev. (ft.): 244.5  
Final Boring Depth (ft.): 70  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time

Depth (ft)	Casing Blows/ Core Rate	Sample						SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)	
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)									
5	S-1	0.0-2.0	24	18	1 4	10	S-1: Top 6": Loose, brown and black, fine to medium SAND, some Silt, roots. (SM) Bottom 12": Medium dense, brown, fine to coarse SAND, little Silt. (SP-SM)				0.5	TOPSOIL	244.0		
		2.0-4.0	24	21	5 5 4 6						9	S-2: Dense, brown, fine to medium SAND and Silt. (SM)	4	FILL	240.5
	S-3	4.0-6.0	24	18	2 3 3 4	6	S-3: Top 12": Medium dense, brown, fine to medium SAND, some Silt, trace roots. (SM) Bottom 12": Medium stiff, gray, Silty Clay. (CL)				6	SAND	238.5		
	10	S-4	9.0-11.0	24	24	WOH		S-4: Soft to medium stiff, gray, Silty CLAY. (CL)							
	15	S-5	14.0-16.0	24	18	WOH		S-5: Soft to medium stiff, gray, Silty CLAY. (CL)							
20	S-6	19.0-21.0	24	10	WOR		S-6: Soft to medium stiff, gray, Silty CLAY. (CL)								
25	S-7	24.0-26.0	24	10	WOR		S-7: Soft to medium stiff, gray, Silty CLAY. (CL)								
30	WOR										26		218.5		

**REMARKS** 1 - Began rod probe at 26.0' bgs. Blows per foot to drive AW rod are recorded on log under casing blows.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-105**

GZA TEMPLATE TEST BORING: 2/18/2015, 4:07:57 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-105  
SHEET: 2 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA & Rod Probe

Boring Location: See Plan  
Ground Surface Elev. (ft.): 244.5  
Final Boring Depth (ft.): 70  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time

Depth (ft)	Casing Blows/ Core Rate	Sample					Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)						
	WOR											
	WOR											
	WOR											
	WOR											
	WOR											
35	WOR											
	WOR											
	WOR											
	WOR											
	WOR											
40	WOR											
	WOR											
	WOR											
	WOR											
	WOR											
45	WOR											
	WOR											
	WOR											
	WOR											
	WOR											
50	WOR											
	WOR											
	WOR											
	WOR											
	WOR											
55	WOR											
	WOR											
	WOR											
	WOR											
	WOR											
60	WOR											

PROBABLE  
SILTY CLAY

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-105**

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-105  
SHEET: 3 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA & Rod Probe

Boring Location: See Plan  
Ground Surface Elev. (ft.): 244.5  
Final Boring Depth (ft.): 70  
Date Start - Finish: 11/6/2014 - 11/6/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./f.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
	WOR												
12									2		61		183.5
12													
15													
23													
65													
27													
31													
28													
31													
70	50								3		70		174.5
								End of exploration at 70 feet.					
75													
80													
85													
90													

**REMARKS**  
2 - Transition to probable glacial till inferred based on rod probe resistance.  
3 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-105**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:07:58 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-106  
SHEET: 1 of 4  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 246  
Final Boring Depth (ft.): 109  
Date Start - Finish: 11/20/2014 - 11/20/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-1	1.0-3.0	24	18	14 21 19 18	40	S-1: Dense, brown, fine to coarse SAND and Gravel, trace Silt. (Road base) (SP)			0.3	ASPHALT	245.7
												FILL	
		S-2	3.0-5.0	24	15	9 7 9 10	16	S-2: Medium dense, brown, fine to medium SAND, little Silt. (SM)			3		243.0
5		S-3	5.0-7.0	24	20	10 8 5 6	13	S-3: Medium dense, brown/gray, fine to medium SAND and Silt. (SM)				SAND	
											9		237.0
		S-4	10.0-12.0	24	20	2 3 2 3	5	S-4: Medium stiff, gray, Silty CLAY, little fine Sand lenses. (CL)					
		S-5	13.5-15.5	24	24	WOR		S-5: Soft to medium stiff, gray, Silty CLAY. (CL)					
		V-1	17.0-	7	0			V-1: Field Vane, $T_{raw} = 115$ in.-lbs ( $S_u = 295$ psf)	1			SILTY CLAY	
		V-2	17.6-18.0-18.6	7	0			V-2: Field Vane, $T_{raw} = 110/50$ in.-lbs ( $S_u = 285/130$ psf)	2				
20		S-6	20.0-22.0	24	24	WOR		S-6: Soft to medium stiff, gray, Silty CLAY. (CL)					
25		S-7	25.0-27.0	24	24	WOR		S-7: Soft to medium stiff, gray, Silty CLAY. (CL)					
		WOR							3		27		219.0
		WOR										PROBABLE SILTY CLAY	
30		WOR											

**REMARKS**

1 - Tapered vane with 2.5" diameter, 4.5" height and 45 degree taper was used for field vane tests.  $T_{raw}$  = measured torque,  $S_u$  = calculated undrained shear strength.  
 2 - Vanes conducted with AW rods, no stabilizer to maintain elevation, rods dropped 4"-6" during tests, test interval likely disturbed.  
 3 - Began rod probe at 27.0' bgs. Blows per foot to drive AW rod are recorded on log under casing blows.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-106**

GZA TEMPLATE TEST BORING: 2/18/2015; 4:07:58 PM



**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-106  
SHEET: 3 of 4  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 246  
Final Boring Depth (ft.): 109  
Date Start - Finish: 11/20/2014 - 11/20/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)						
PUSH												
PUSH												
PUSH												
PUSH												
PUSH												
65												
PUSH												
PUSH												
PUSH												
PUSH												
70												
PUSH												
PUSH												
PUSH												
PUSH												
75												
PUSH												
PUSH												
PUSH												
										77		169.0
22												
25												
40												
80												
36												
26												
20												
31												
85												
21												
20												
26												
23												
31												
90												
34												

PROBABLE SILTY CLAY

PROBABLE SAND OR GLACIAL TILL

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-106**

GZA TEMPLATE TEST BORING: 2/18/2015; 4:07:59 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
 Exit 63  
 Gray, Maine

EXPLORATION NO.: GZ-106  
 SHEET: 4 of 4  
 PROJECT NO: 09.0025829.00  
 REVIEWED BY: J. Baron

Logged By: N. Williams  
 Drilling Co.: New England Boring Contractors  
 Foreman: Rich Leonard

Type of Rig: Truck  
 Rig Model:  
 Drilling Method:  
 Drive & Wash

Boring Location: See Plan  
 Ground Surface Elev. (ft.): 246  
 Final Boring Depth (ft.): 109  
 Date Start - Finish: 11/20/2014 - 11/20/2014

H. Datum:  
 V. Datum:

Hammer Type: Donut  
 Hammer Weight (lb.): 140  
 Hammer Fall (in.): 30  
 Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
 Sampler O.D. (in.): 2.0  
 Sampler Length (in.): 24  
 Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
28													
18													
21													
17													
16													
95													
16													
16													
19													
23													
18													
100												PROBABLE SAND OR GLACIAL TILL	
17													
15													
18													
22													
105													
15													
19													
18													
19													
18									4		109		137.0
110								End of exploration at 109 feet.					

**REMARKS**  
 4 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-106**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:07:59 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-108  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 246  
Final Boring Depth (ft.): 12  
Date Start - Finish: 11/7/2014 - 11/7/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft.)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-1	0.0-2.0	24	10	1 4 6 4	10	S-1: Medium dense, gray and brown, SILT & CLAY, some fine Sand, trace roots and grass. (ML)			2	TOPSOIL	244.0
5		S-2	4.0-6.0	24	22	5 8 10 12	18	S-2: Very stiff, gray, CLAY & SILT, trace fine Sand. (CL)				CLAY & SILT	
10		S-3	10.0-12.0	24	6	2 3 3 4	6	S-3: Medium stiff, gray, CLAY & SILT, trace fine Sand. (CL)	1 2		12		234.0
		End of exploration at 12 feet.											

**REMARKS**  
1 - Appears wet at 9.0'.  
2 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-108**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:06:00 PM

### TEST BORING LOG



**GZA**  
GeoEnvironmental, Inc.  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-109  
SHEET: 1 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 242  
Final Boring Depth (ft.): 33  
Date Start - Finish: 12/2/2014 - 12/2/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)	
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value							
		S-1	0.0-	24	15	2	15	S-1: Top 6": Topsoil. Bottom 9": Dense, medium to coarse SAND and Gravel. (SP)			0.5	TOPSOIL	241.5	
			2.0			25	15							40
		S-2	2.0-	24	17	11	14	S-2: Medium dense, gray, fine to medium SAND, trace Silt. (SP)				SAND		
			4.0			13	11							27
5		S-3	4.0-	24	24	5	7	S-3: Top 12": Medium dense, gray, fine to medium SAND, trace Silt. Bottom 12": Stiff, gray, Silty CLAY. (CL)			5		237.0	
	6.0		8			10	15							
10		S-4	10.0-	24	24	4	4	S-4: Stiff, gray, Silty CLAY. (CL)						
	12.0		5			4	9							
15		S-5	15.0-	24	18	4	2	S-5: Soft to medium stiff, gray, Silty CLAY, some fine to medium Sand. (CL)					SILTY CLAY	
	17.0		1			WOR	3							
20		S-6	20.0-	24	24	WOR/24"		S-6: Soft to medium stiff, gray, Silty CLAY. (CL)						
	22.0													
25		S-7	25.0-	24	24			S-7: Gray, Silty CLAY. (CL)						
	27.0		7											
		V-1	27.0	7				V-1: Field Vane, $T_{raw} = 70/30$ in.-lbs ( $S_u = 180/75$ psf)	1		27		215.0	
		V-2	25.4-	7				V-2: Field Vane, $T_{raw} = 290/55$ in.-lbs ( $S_u = 750/140$ psf)						
			26.0						2			POSSIBLE GLACIAL TILL		
			26.4-											
30			27.0											212.5
														WEATHERED ROCK

**REMARKS**  
1 - Tapered vane with 2.5" diameter, 4.5" height and 45 degree taper was used for field vane tests.  $T_{raw}$  = measured torque,  $S_u$  = calculated undrained shear strength.  
2 - Medium to coarse Sand with Gravel in tip of spoon.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-109**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:00 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-109  
SHEET: 2 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 242  
Final Boring Depth (ft.): 33  
Date Start - Finish: 12/2/2014 - 12/2/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum	
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)				SPT Value	Depth (ft.)
									3		
								4			WEATHERED ROCK
							End of exploration at 33 feet.				
35											POSSIBLE BEDROCK
40											
45											
50											
55											
60											

**REMARKS**  
3 - Possible weathered rock based on increased drilling resistance and observations of wash return.  
4 - Roller bit refusal, possible top of bedrock.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-109**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:00 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-111  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 245  
Final Boring Depth (ft.): 12  
Date Start - Finish: 11/7/2014 - 11/7/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
11/7/14	1145	7.4'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	24	2 4 2 6	6	S-1: Top 12": Medium stiff, gray and black, SILT & CLAY, some fine Sand, trace roots and organics. (ML) Bottom 12": Medium stiff, gray and brown, CLAY & SILT, some fine Sand. (CL)			1	TOPSOIL	244.0
		S-2	5.0-7.0	24	15	4 4 6 6	10	S-2: Stiff, gray, CLAY & SILT, trace fine Sand. (CL)			CLAY & SILT		
		S-3	10.0-12.0	24	20	2 2 3 3	5	S-3: Medium stiff, gray, CLAY & SILT, little fine Sand. (CL)			12	233.0	
								End of exploration at 12 feet.	1				

**REMARKS**  
1 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
GZ-111

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-112  
SHEET: 1 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 247.5  
Final Boring Depth (ft.): 38.6  
Date Start - Finish: 11/14/2014 - 11/14/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/14/14	0730	6.2'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)				
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)											
5		S-1	0.0-2.0	24	6	3 5 11 8	16	S-1: Medium dense, dark brown, fine SAND and Silt, trace roots and leaves. (SM)	1 2		2	TOPSOIL	245.5				
		S-2	2.0-4.0	24	10	6 7 10 12	17	S-2: Medium dense, brown, fine to coarse SAND and Gravel, trace Silt. (SP)			6	FILL	241.5				
		S-3	4.0-6.0	24	16	6 6 20 29	26	S-3: Medium dense, fine to coarse SAND and Gravel, trace Silt. (SP)			6.5	COBBLE / BOULDER	241.0				
		S-4	6.0-8.0	24	6	36 19 10 7	29	S-4: Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. (SP)			8	FILL	239.5				
		S-5	8.0-10.0	24	4	6 8 11 15	19	S-5: Very stiff, gray, CLAY & SILT, some fine to coarse Sand and Gravel. (CL)			3		20.5	SILTY CLAY	227.0		
		S-6	10.0-12.0	24	12	8 7 8 6	15	S-6: Stiff, gray, Silty CLAY, trace fine to medium Sand. (CL)									
		S-7	12.0-14.0	24	0	5 4 5 5	9	S-7: No recovery.									
		S-8	14.0-16.0	24	12	6 5 5 4	10	S-8: Stiff, gray, Silty CLAY, trace Sand, trace Gravel. (CL)									
		S-9	16.0-18.0	24	24	WOH/18", 1		S-9: Soft to medium stiff, gray, Silty CLAY. (CL)									
		S-10	20.0-22.0	24	24	WOH		S-10: Very loose, gray, fine SAND and Clayey Silt. (SM)									
25		PROBABLE SAND OR GLACIAL TILL															
30	12																

**REMARKS**

1 - Moved 15.0'-20.0' southwest of original location.  
2 - Used Auto Hammer for boring, rope too icy.  
3 - Begin rod at 22.0' bgs. Blows per foot to advance AW rod probe are recorded on log under casing blows column.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-112**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:01 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
 Exit 63  
 Gray, Maine

EXPLORATION NO.: GZ-112  
 SHEET: 2 of 2  
 PROJECT NO: 09.0025829.00  
 REVIEWED BY: J. Baron

Logged By: N. Williams  
 Drilling Co.: New England Boring Contractors  
 Foreman: Brad Enos

Type of Rig: ATV  
 Rig Model:  
 Drilling Method:  
 Drive & Wash

Boring Location: See Plan  
 Ground Surface Elev. (ft.): 247.5  
 Final Boring Depth (ft.): 38.6  
 Date Start - Finish: 11/14/2014 - 11/14/2014

H. Datum:  
 V. Datum:

Hammer Type: Donut  
 Hammer Weight (lb.): 140  
 Hammer Fall (in.): 30  
 Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
 Sampler O.D. (in.): 2.0  
 Sampler Length (in.): 24  
 Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/14/14	0730	6.2'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
10													
7													
21													
26													
40													
35												PROBABLE SAND OR GLACIAL TILL	
54													
37													
18													
20									4		38.6		208.9
40	30/0"							End of exploration at 38.6 feet.					
45													
50													
55													
60													

**REMARKS**  
 4 - Rod probe refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-112**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-114  
SHEET: 1 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 250  
Final Boring Depth (ft.): 76.5  
Date Start - Finish: 11/26/2014 - 12/1/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/25/14	1040	4.5	0
12/5/14	1230	4.0	10 days

Depth (ft)	Casing Blows/ Core Rate	Sample					Sample Description Modified Burmister	Remark	Field Test Data	Stratum Description Elev. (ft.)	Equipment Installed
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)					
0-3	VAC		0.0-3.0				: Brown, medium to coarse SAND and Gravel. (Topsoil) (SP)	1		247.0	Road Box Filter Sand 2" ID Solid Sch 40 PVC Well Riser 2' 4' 5' 2" ID Slotted Sch 40 PVC Well Screen (0.01" Slot)
3-10	VAC		3.0-10.0				: Brown, medium to coarse SAND, some Gravel. (SP)				
10-12	VAC	S-1	10.0-12.0	24	23	1 3 9 2	S-1 : Stiff, gray, Silty CLAY. (CL)			240.0	
15-17	VAC	S-2	15.0-17.0	24	24	WOR/24"	S-2 : Soft, gray, Silty CLAY. (CL)				Filter Sand
20-22	VAC	S-3	20.0-22.0	24	24		S-3 : Soft, gray, Silty CLAY. (CL)	2			20'
22-21	VAC	V-1	22.0	7			V-1 : Field Vane, T <sub>raw</sub> = 125/55 in.-lbs (Su = 320/140 psf)				
21-22	VAC	V-2	21.4-22.0	7			V-2 : Field Vane, T <sub>raw</sub> = 120/40 in.-lbs (Su = 310/100 psf)				

**REMARKS**

1 - Vacuum excavation 0'-10.0' bgs. Descriptions from cutting and sidewall observations.  
 2 - Tapered vane with 2.5" diameter, 4.5" height and 45 degree taper was used for field vane tests. T<sub>raw</sub> = measured torque, Su = calculated undrained shear strength.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-114**

GZA TEMPLATE TEST BORING W/ EQUIP.; 2/18/2015; 4:07:17 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-114  
SHEET: 2 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardall  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 250  
Final Boring Depth (ft.): 76.5  
Date Start - Finish: 11/26/2014 - 12/1/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/25/14	1040	4.5	0
12/5/14	1230	4.0	10 days

Depth (ft)	Casing Blows/ Core Rate	Sample				Blows (per 6 in.)	SPT Value	Sample Description Modified Burmister	Remark	Field Test Data	Stratum		Equipment Installed
		No.	Depth (ft.)	Pen. (In)	Rec. (in)						Depth (ft.)	Description	
35		U-1	30.0-32.0	24	24			U-1 : Gray, CLAY & SILT. (CL)					
		S-4	32.0-	24	24			S-4 : Soft, gray, CLAY. (CL)					
		V-3	34.0	7				V-3 : Field Vane, T <sub>raw</sub> = 70/20 in.-lbs (Su = 180/50 psf)					
		V-4	32.4-33.0-33.4-34.0	7				V-4 : Field Vane, T <sub>raw</sub> = 115/55 in.-lbs (Su = 295/140 psf)					
40		S-5	40.0-	24	24			S-5 : Soft to medium stiff, gray, CLAY & SILT. (CL)			CLAY & SILT		
		V-5	42.0	7				V-5 : Field Vane, T <sub>raw</sub> = 180/25 in.-lbs (Su = 465/65 psf)					
		V-6	40.4-41.0-41.4-42.0	7				V-6 : Field Vane, T <sub>raw</sub> = 265/60 in.-lbs (Su = 685/155 psf)					
50		S-6	50.0-52.0	24	19	7 14 15 14	29	S-6 : Medium dense, brown, fine to medium SAND, some Silt, wet. (SM)			50.5	199.5	
		S-7	55.0-57.0	24	18	10 13 19 18	32	S-7 : Dense, brown, fine to medium SAND, trace Silt, wet. (SM)					SAND

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-114**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-114  
SHEET: 3 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 250  
Final Boring Depth (ft.): 76.5  
Date Start - Finish: 11/26/2014 - 12/1/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/25/14	1040	4.5	0
12/5/14	1230	4.0	10 days

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description Modified Burmister	Remark	Field Test Data	Stratum		Equipment Installed
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)					Depth (ft)	Description	
65		S-8	60.0-62.0	24	16	11 16 20 16	36	S-8 : Dense, brown, fine to medium SAND, trace Silt, wet. (SM)			65	SAND	
		S-9	65.0-67.0	24	24	9 4 7 8	11	S-9 : Stiff, gray, Silty CLAY, little fine to medium, Silty Sand. (CL)			65	SILTY CLAY	185.0
		S-10	70.0-72.0	24	24	19 20 18 13	38	S-10 : Dense, brown, fine to medium SAND, trace Silt, wet. (SM)			70	SAND	180.0
		S-11	75.0-76.5	18	14	49 63 108	R	S-11 : Very dense, gray-brown, fine to coarse SAND, some Gravel, little Silt, wet. (SM)			75	GLACIAL TILL	175.0 173.5
80							Split spoon refusal. End of exploration at 76.5 feet.			76.5			

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-114**

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
 Exit 63  
 Gray, Maine

EXPLORATION NO.: GZ-115  
 SHEET: 1 of 1  
 PROJECT NO: 09.0025829.00  
 REVIEWED BY: J. Baron

Logged By: N. Williams  
 Drilling Co.: New England Boring Contractors  
 Foreman: Rich Leonard

Type of Rig: Truck  
 Rig Model:  
 Drilling Method:  
 SSA

Boring Location: See Plan  
 Ground Surface Elev. (ft.): 271.5  
 Final Boring Depth (ft.): 12  
 Date Start - Finish: 11/19/2014 - 11/19/2014

H. Datum:  
 V. Datum:

Hammer Type: Donut  
 Hammer Weight (lb.): 140  
 Hammer Fall (in.): 30  
 Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
 Sampler O.D. (in.): 2.0  
 Sampler Length (in.): 24  
 Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	5	1 4 3 2	7	S-1: Loose, dark brown, fine to medium SAND, some Silt, roots and grass. (SM)			2	TOPSOIL	269.5
		S-2	2.0-4.0	24	9	2 4 7 8	11	S-2: Medium dense, light brown, medium to coarse SAND, some Gravel, trace Silt. (SP)			6	FILL	265.5
		S-3	4.0-6.0	24	10	6 4 3 5	7	S-3: Loose, light brown, medium to coarse SAND, some Gravel, trace Silt. (SP)			11	SAND	260.5
		S-4	10.0-12.0	24	10	4 6 8 6	14	S-4: Top 12": Medium dense, brown, fine to medium SAND, some Clayey Silt. (SM) Bottom 12": Stiff, gray, CLAY & SILT, trace fine Sand. (CL)	1		12	CLAY & SILT	259.5
15								End of exploration at 12 feet.					

REMARKS  
 1 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-115**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:02 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-116  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
SSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 272  
Final Boring Depth (ft.): 12  
Date Start - Finish: 11/20/2014 - 11/20/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	10	5 9 13 18	22	S-1: Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. (SW-SM)			0.3	TOPSOIL	271.7
		S-2	2.0-4.0	24	6	11 17 18 6	35	S-2: Dense, brown, fine to coarse SAND, some Gravel, trace Silt. (SW-SM)					
		S-3	4.0-6.0	24	0	5 4 5 5	9	S-3: No recovery.					
		S-4	10.0-12.0	24	8	5 4 3 9	7	S-4: Loose, brown, fine to coarse SAND, some Gravel, trace Silt. (SW-SM)	1		12		260.0
								End of exploration at 12 feet.					

**REMARKS**  
1 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-116**

**TEST BORING LOG**



**GZA**  
GeoEnvironmental, Inc.  
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Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-117  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
SSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 273  
Final Boring Depth (ft.): 12  
Date Start - Finish: 11/21/2014 - 11/21/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/21/14	0935	NE	0

Depth (ft)	Casing Blows/ Core Rate	Sample						SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)								
5		S-1	0.0-2.0	24	14	20 16 12 10	28	S-1: Medium dense, brown, medium to coarse SAND and Gravel, trace Silt. (SP)			0.2	TOPSOIL	272.8	
		S-2	2.0-4.0	24	10	7 11 9 7	20	S-2: Medium dense, brown, medium to coarse SAND and Gravel, trace Silt. (SP)				FILL		
		S-3	4.0-6.0	24	8	8 5 4 3	9	S-3: Loose, brown, medium to coarse SAND and Gravel, trace Silt. (SP)			6		267.0	
10		S-4	10.0-12.0	24	16	2 4 8 9	12	S-4: Stiff, gray, Silty CLAY, trace fine Sand lenses. (CL)	1		12	SILTY CLAY	261.0	
								End of exploration at 12 feet.						

**REMARKS**  
1 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-117**

**TEST BORING LOG**



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**GeoEnvironmental, Inc.**  
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Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-118  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
SSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 273  
Final Boring Depth (ft.): 12  
Date Start - Finish: 11/21/2014 - 11/21/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remarks	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.0-2.0	24	11	2 4 7 8	11	S-1: Medium dense, brown, fine to coarse SAND, some Gravel, little Silt, trace leaves, roots. (SW-SM)					
		S-2	2.0-4.0	24	9	8 5 3 3	8	S-2: Loose, brown, fine to coarse SAND, some Gravel, trace Silt, trace roots. (SW-SM)			4	FILL	269.0
		S-3	4.0-6.0	24	8	3 4 4 3	8	S-3: Loose, brown/gray, fine to medium SAND, some Clayey Silt. (SM)			6	SAND	267.0
10		S-4	10.0-12.0	24	24	5 5 7 9	12	S-4: Stiff, gray, CLAY & SILT, trace fine Sand. (CL)	1		12	CLAY & SILT	261.0
								End of exploration at 12 feet.					

**REMARKS**  
1 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-118**



**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-119  
SHEET: 2 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 263  
Final Boring Depth (ft.): 57.5  
Date Start - Finish: 12/5/2014 - 12/5/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
12/8/14	1545	11.0'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description Modified Burmister	Remark	Field Test Data	Stratum		Equipment Installed
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)					Depth (ft.)	Description	
35		S-8	30.0-32.0	24	20	3 3 1 6	4	S-8 : Soft to medium stiff, gray, Silty CLAY, seams of fine to medium Sand. (CL)					
40		S-9	35.0-37.0	24	24	1 1 1 2	2	S-9 : Loose, brown, fine to medium SAND, trace Silt, wet. (SP-SM)			35	228.0	
45		S-10	40.0-42.0	24	14	5 5 4 4	9	S-10 : Loose, brown, fine to medium SAND, trace Clay, wet. 1" clay seam. (SP-SC)			43	220.0	
50		S-11	47.0-48.3	15	12	14 16 100/3"	R	S-11 : Very dense, brown, fine to coarse SAND and Gravel, trace Silt. (SW-SM)			50	213.0	
55													
60								End of exploration at 57.5 feet.			57.5	205.5	

**REMARKS**

2 - Drilling effort increased at 43.0' bgs. Possible top of glacial till.  
3 - Casing refusal at 48.5' bgs.  
4 - Advanced roller bit with consistent resistance from 50.0' - 57.5' bgs when truck ran out of water. Possible bedrock at 50.0' bgs.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-119**

GZA TEMPLATE TEST BORING W/ EQUIP.: 2/18/2015; 4:07:18 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-120  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 252  
Final Boring Depth (ft.): 28.3  
Date Start - Finish: 11/13/2014 - 11/13/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	14	1 3 5 5	8	S-1: Top 3": Topsoil. Middle 9": Stiff, gray, SILT & CLAY, little fine to coarse Sand, trace roots. (ML)			0.3	TOPSOIL	251.7
		S-2	2.0-4.0	24	17	5 5 6 7	11	Bottom 2": Loose, brown, fine to coarse SAND, little Silt, trace Gravel. (SM)			2	FILL	250.0
		S-3	4.0-6.0	24	12	7 8 8 8	16	S-2: Stiff, gray, CLAY & SILT, little fine to coarse Sand. (CL) S-3: Very stiff, gray, Silty CLAY, trace fine to coarse Sand, trace Gravel. (CL)				SILTY CLAY	
10	6 14	S-4	10.0-12.0	24	20	2 3 3 7	6	S-4: Medium stiff, gray to dark brown, CLAY & SILT, trace fine Sand, trace root fibers. (CL)			12		240.0
		S-5	15.0-17.0	24	16	5 18 18 27	36	S-5: Dense, brown, fine to coarse SAND, some Gravel, little Silt. (SM)				GLACIAL TILL	
15	38 23	S-6	20.0-22.0	24	10	13 12 11 9	23	S-6: Medium dense, gray, fine to coarse SAND, some Gravel, trace Silt. (SM)					
		S-7	25.0-27.0	24	8	17 14 8 6	22	S-7: Medium dense, gray to brown, fine to coarse SAND and Gravel, trace Silt. (SM)					
25	54										27.7		224.3
											28.3	POSSIBLE BOULDER OR BEDROCK	223.7
30								End of exploration at 28.3 feet.	1				

**REMARKS**  
1 - Roller bit refusal at 28.3' bgs, probably boulder or bedrock.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-120**

GZA TEMPLATE TEST BORING: 2/18/2015; 4:08:04 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-120A  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 257.5  
Final Boring Depth (ft.): 30  
Date Start - Finish: 11/13/2014 - 11/13/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/13/14	1030	10.9'	20 min

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.0-2.0	24	18	1 1 7 7	8	S-1: Loose, gray-brown, fine to coarse SAND, some Silt, little Gravel. (SM)			0.3	TOPSOIL	257.2
5		S-2	2.0-4.0	24	17	7 7 6 4	13	S-2: Top 12": Medium dense, fine to coarse SAND, little Silt. (SM) Bottom 5": Stiff, gray, CLAY & SILT, some fine to medium Sand. (Possible Reworked Material) (CL)			3	FILL	254.5
5		S-3	4.0-6.0	24	10	3 3 4 6	7	S-3: Medium stiff, gray, CLAY & SILT, trace Sand. (Possible Reworked Material) (CL)				POSSIBLE FILL	
10	20	S-4	10.0-12.0	24	10	1 6 7 7	13	S-4: Top 8": Stiff, gray, CLAY & SILT, little fine Sand. (Possible Reworked Material) (CL) Bottom 2": Medium dense, brown, fine SAND, little Silt. (SM)			10.7	SAND	246.8
15	25	S-5	15.0-17.0	24	17	5 4 3 10	7	S-5: Medium stiff, gray, SILT & CLAY, trace fine Sand. (CL)	1		15	SILT & CLAY	242.5
20	36	S-6	20.0-22.0	24	9	15 24 17 16	41	S-6: Dense, brown, fine to coarse SAND, some Gravel, little Silt. (SM)			20	GLACIAL TILL	237.5
25	63	S-7	25.0-26.9	22	8	11 15 38 26/4"	53	S-7: Very dense, brown, fine to coarse SAND, some Gravel, little Silt. (SM)					
30										30		227.5	

**REMARKS**

1 - Drilling resistance change at 15.0' bgs indicated possible top of Silt & Clay.  
2 - Rod was bouncing, split spoon refusal at 26.9' bgs.  
3 - Roller bit refusal.

End of exploration at 30 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-120A**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:04 PM

**TEST BORING LOG**



**GZA**  
GeoEnvironmental, Inc.  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-121  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardall  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 251  
Final Boring Depth (ft.): 12  
Date Start - Finish: 12/2/2014 - 12/2/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
12/5/14	1240	Dry	3 days

Depth (ft)	Casing Blows/ Core Rate	Sample				SPT Value	Sample Description Modified Burmister	Remark	Field Test Data	Stratum Description	Equipment Installed
		No.	Depth (ft.)	Pen. (in)	Rec. (in)						
5		S-1	0.0-2.0	24	12	2 2 3 6	5	S-1 : Topsoil.	1	TOPSOIL	
		S-2	2.0-4.0	24	18	6 8 8 8	16	S-2 : Very stiff, gray, Silty CLAY, some fine to medium Sand. (CL)		248.5	
		S-3	4.0-6.0	24	24	10 13 16 16	29	S-3 : Very stiff, gray, Silty CLAY, trace fine to medium Sand. (CL)		241.0	
		S-4	10.0-12.0	24	20	6 23 44 42	67	S-4 : Top 14": Dense, brown, fine to medium SAND and Gravel, trace Silt. (SM) Bottom 6": Rock fragments.		239.5 239.0	
10										GLACIAL TILL	
15										POSSIBLE BOULDER OR WEATHERED ROCK	

**REMARKS** 1 - Top of Well Standpipe is 2.6' above ground surface. Top of PVC well riser is 2.1' above ground surface.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
GZ-121

GZA TEMPLATE TEST BORING W/ EQUIP.; 2/18/2015; 4:07:19 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-122  
SHEET: 1 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
SSA/Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 241.5  
Final Boring Depth (ft.): 39.5  
Date Start - Finish: 11/11/2014 - 11/11/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size: NX

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/11/14		4.5'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	12	1 1 2 6	3	S-1: Very loose, brown, fine SAND, little Silt, trace roots. (SM)		0.2	TOPSOIL	241.3	
		S-2	2.0-4.0	24	17	6 9 9 7	18	S-2: Medium dense, brown and gray, fine SAND, little Silt. (SM)		4	SAND	237.5	
		S-3	4.0-6.0	24	15	6 6 7 4	13	S-3: Stiff, brown, SILT, some fine Sand. (ML)		8	SILT	233.5	
10		S-4	10.0-12.0	24	10	7 5 8 11	13	S-4: Medium dense, gray, fine to coarse SAND, some Gravel, little Silt. (SM)			GLACIAL TILL		
15		S-5	15.0-17.0	24	8	30 13 9 10	22	S-5: Medium dense, gray, fine to coarse SAND, some Gravel, little Silt. (SM)					
20		S-6	20.0-22.0	24	3	22 21 17 16	38	S-6: Dense, black and gray, GRAVEL, some coarse Sand, little Silt. (GM)		20	POSSIBLE WEATHERED ROCK	221.5	
25		S-7	25.0-26.3	15	10	34 91 100/3"	R	S-7: Very dense, gray-brown, GRAVEL and fine to coarse Sand, little Silt. (Weathered Rock) (GP-GM)		26.3		215.2	
55		C-1	26.5-	60	50	RQD = 58%		C-1: Gray, medium to hard, slightly weathered, fine grained, GRANITE. Joints are very close to moderately close, moderately dipping, undulating, rough, discolored, moderately open.	1		BEDROCK		
54			31.5										
55													
58													

**REMARKS**

1 - Advanced casing to 26.5' bgs and began coring.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-122**

### TEST BORING LOG



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
 Exit 63  
 Gray, Maine

EXPLORATION NO.: GZ-122  
 SHEET: 2 of 2  
 PROJECT NO: 09.0025829.00  
 REVIEWED BY: J. Baron

Logged By: N. Williams  
 Drilling Co.: New England Boring Contractors  
 Foreman: Brad Enos

Type of Rig: ATV  
 Rig Model:  
 Drilling Method:  
 SSA/Drive & Wash

Boring Location: See Plan  
 Ground Surface Elev. (ft.): 241.5  
 Final Boring Depth (ft.): 39.5  
 Date Start - Finish: 11/11/2014 - 11/11/2014

H. Datum:  
 V. Datum:

Hammer Type: Donut  
 Hammer Weight (lb.): 140  
 Hammer Fall (in.): 30  
 Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
 Sampler O.D. (in.): 2.0  
 Sampler Length (in.): 24  
 Rock Core Size: NX

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/11/14		4.5'	0

Depth (ft)	Casing Blows/Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)				
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)											
49		C-2	31.5-	36	30.5	RQD = 17%	C-2: Gray, medium to hard, slightly weathered, fine grained, GRANITE. Joints are very close to close, moderately dipping, undulating, rough, discolored, partially open to open.  C-3: Gray, hard, slightly weathered, fine grained, GRANITE. Joints are close to wide, moderately dipping, undulating, rough, discolored, partially open.			39.5	BEDROCK	202.0					
10	34.5																
62																	
35		C-3	34.5-	60	60	RQD = 85%											
50	39.5																
42																	
47																	
46																	
47																	
40													End of exploration at 39.5 feet.				
45																	
50																	
55																	
60																	

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-122**

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-123  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
HSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 245  
Final Boring Depth (ft.): 10  
Date Start - Finish: 11/11/2014 - 11/11/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 2 1/4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/11/14	0700	6.7'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.0-2.0	24	10	1 1 3 8	4	S-1: Loose, brown and gray, fine to medium SAND, little Silt, trace Gravel, with roots in top 4". (SM)			0.3	TOPSOIL	244.7
		S-2	2.0-3.3	15	12	11 44 50/3"	R	S-2: Very dense, gray, fine to medium SAND, some Gravel, little Silt. (SM)					
		S-3	4.0-6.0	24	15	28 22 22 35	44	S-3: Dense, brown and gray, fine to coarse SAND and Gravel, trace Silt. (SM)					
10									1 2	8 10		POSSIBLE BOULDER OR BEDROCK	237.0 235.0
							End of exploration at 10 feet.						

**REMARKS**  
1 - Advanced roller bit through increased resistance from 8.0'-10.0' bgs (possible boulder or bedrock).  
2 - Auger refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-123**

GZA TEMPLATE TEST BORING: 2/18/2015; 4:08:06 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-124  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 246.5  
Final Boring Depth (ft.): 26.7  
Date Start - Finish: 11/11/2014 - 11/11/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size: NX

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/11/14	0640	8.3'	12 hrs

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-1	0.0-2.0	24	6	1 1 1 1	2	S-1: Very loose, dark brown, fine to medium SAND, little Silt, trace roots. (SM)			0.3	TOPSOIL	246.2
		S-2	2.0-4.0	24	19	1 2 3 7	5	S-2: Loose, brown, fine SAND and Silty Clay. (SM)			4	SAND	242.5
5		S-3	4.0-6.0	24	18	5 5 8 10	13	S-3: Stiff, gray/brown, CLAY & SILT, trace fine Sand. (CL)				SILTY CLAY	
10	17	S-4	10.0-12.0	24	10	15 20	49	S-4: Top 12": Very stiff, gray, Silty CLAY and fine to coarse SAND, little Gravel. (CL) Bottom 12": Very dense, gray to black, fine to coarse SAND and Gravel, little Silt. (SM)			11		235.5
	27					29 24							
	65	S-5	15.0-17.0	24	12	16 25	62	S-5: Very dense, gray-brown, GRAVEL and fine to coarse Sand, some Silt. (Weathered Rock) (GM)			15		231.5
15	84					37 33							
20		S-6	20.0-21.2	14	8	49 62 53/2"	R	S-6: Very dense, gray, fine to coarse SAND, some Gravel, little Silt. (Weathered Rock) Split spoon refusal. (SM)			21.2		225.3
		C-1	21.7-26.7	60	56	RQD = 68%		C-1: Gray, moderately hard to hard, fresh, medium grained GRANITE. Joints are fresh, high angle.				BEDROCK	
25											26.7		219.8
								End of exploration at 26.7 feet.					
30													

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-124**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-125  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 248  
Final Boring Depth (ft.): 25.7  
Date Start - Finish: 11/11/2014 - 11/11/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/11/14	1600	8.8'	50 min

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	15	1 1 1 1	2	S-1: Very loose, brown, fine to medium SAND and Silt, trace roots. (SM)		0.2	TOPSOIL	247.8	
		S-2	2.0-4.0	24	17	3 7 5 4	12	S-2: Medium dense, brown, fine to medium SAND, some Silt. (SM)		4	SAND	244.0	
		S-3	4.0-6.0	24	18	3 6 6 6	12	S-3: Stiff, gray, Silty CLAY, little fine Sand. (CL)			SILTY CLAY		
10		S-4	10.0-11.2	14	10	37 25 50/2"	R	S-4: Very dense, gray and brown, fine to coarse SAND, some Silt, some Gravel. (SM)		10		238.0	
15	78	S-5	15.0-17.0	24	12	16 21 23 18	44	S-5: Dense, gray and brown, fine to coarse SAND, some Gravel, some Silt. (SM)			GLACIAL TILL		
	43												
	81												
	80												
20	56	S-6	20.0-22.0	24	9	17 12 14 15	26	S-6: Medium dense, gray, fine to coarse SAND, some Gravel, little Silt. (SM)					
	20												
	77												
	71												
25		S-7	25.0-25.7	8	4	24 50/2"	R	S-7: Dense, gray, fine to medium SAND and Gravel, little Silt. Split spoon refusal. (SM)		25.7		222.3	
								End of exploration at 25.7 feet.					

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-125**

**TEST BORING LOG**



**GZA**  
GeoEnvironmental, Inc.  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-126  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 246.5  
Final Boring Depth (ft.): 19.5  
Date Start - Finish: 11/10/2014 - 11/10/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/10/14		8.2'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	10	1 1 1 5	2	S-1: Top 6": Topsoil. Bottom 4": Loose, brown, fine SAND, some Silt, trace roots, leaves. (SM)	1		0.5	TOPSOIL	246.0
		S-2	2.0-4.0	24	14	4 10 12 12	22	S-2: Dense, brown, fine SAND, little Silt (seams, lenses). (SM)			4	SAND	242.5
		S-3	4.0-6.0	24	18	7 6 8 8	14	S-3: Stiff, gray-brown, CLAY & SILT, trace fine Sand. (CL)				CLAY & SILT	
10		S-4	10.0-12.0	24	12	WOH 1 1 8	2	S-4: Soft to medium stiff, gray-brown, CLAY & SILT, little fine Sand. (CL)			11.5		235.0
15	59/6"	S-5	15.0-17.0	24	10	11 9 9 17	18	S-5: Medium dense, gray, fine to medium SAND, some Gravel, little Silt. (SM)				GLACIAL TILL	
20	30/1"	End of exploration at 19.5 feet.											

**REMARKS**

- 1 - Top of Glacial Till strata inferred from drilling behavior and observations of washwater. Coarse Sand to fine Gravel encountered at 11.5', mixed with Clay & Silt.
- 2 - Advanced roller bit from 18.2'-19.5' bgs with significant resistance (possible weathered rock).
- 3 - Roller bit refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-126**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-127  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 259  
Final Boring Depth (ft.): 15  
Date Start - Finish: 11/13/2014 - 11/13/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
11/13/14	0657	3.5'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Description	Depth (ft.)	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.0-2.0	24	12	1 3 7 8	10	S-1: Loose, brown, fine SAND, trace Silt, trace roots.	1		SAND	0.3	258.7
		S-2	2.0-4.0	24	17	10 6 8 9	14	S-2: Medium dense, brown, fine SAND, little Silt. (SM)					
		S-3	4.0-6.0	24	22	10 10 7 7	17	S-3: Medium dense, brown, fine SAND, some Silt. (SM)					
10		S-4	10.0-12.0	24	16	11 7 8 15	15	S-4: Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. (SM)			GLACIAL TILL	6.5	252.5
15	60/6"							End of exploration at 15 feet.	2			15	244.0

**REMARKS**  
1 - Based on drilling behavior, gravel was encountered at approximately 6.5' bgs.  
2 - Casing refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-127**

GZA TEMPLATE TEST BORING: 2/18/2015; 4:08:07 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-127A  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 257  
Final Boring Depth (ft.): 11.9  
Date Start - Finish: 11/18/2014 - 11/18/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-1	0.6-2.6	24	10	10 15 17 21	32	S-1: Dense, brown, medium to coarse SAND, some Gravel, trace Silt. (Road base) (SP-SM)			0.6	ASPHALT	256.4
		S-2	2.6-4.6	24	12	21 32 70 80	>100	S-2: Very dense, brown, medium to coarse SAND, some Gravel, trace Silt. (Road base) (SP-SM)			4.6	FILL	252.4
5		S-3	4.6-5.2	7	7	60 50/1"	R	S-3: Very dense, brown, fine to coarse SAND, little Gravel, trace Silt, wet. (SP-SM)	1		7	COBBLE / BOULDER	250.0
10		S-4	10.0-11.9	21	13	23 17 25 50/3"	42	S-4: Dense, brown, fine to coarse SAND, some Silt, little Gravel. (SM) Split spoon refusal.			11.9	GLACIAL TILL	245.1
								End of exploration at 11.9 feet.				POSSIBLE BEDROCK OR BOULDER	

**REMARKS**  
1 - Roller bit to 6.3' bgs, could not seat casing, switched back to augers. Ground through boulder to approximately 7.0' bgs and continued advancing borehole with casing.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-127A**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:08 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-128  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
SSA

Boring Location: See Plan  
Ground Surface Elev. (ft.): 259  
Final Boring Depth (ft.): 13.3  
Date Start - Finish: 11/19/2014 - 11/19/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/19/14	1100	7.0'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.5-2.5	24	14	12 13 11 12	24	S-1: Medium dense, brown, medium to coarse SAND, little Gravel, trace Silt. (Road base) (SP-SM)			0.5	ASPHALT	258.5
		S-2	2.5-4.5	24	17	14 18 21 22	39	S-2: Dense, brown, fine to coarse SAND, little Gravel, trace Silt. (SM)				FILL	
		S-3	4.5-6.5	24	18	32 22 15 13	37	S-3: Top 12": Dense, brown, medium to coarse SAND and Gravel, trace Silt. (SP-SM) Bottom 6": Very stiff, Silty CLAY, trace fine Sand, trace root fibers. (CL)			5.5		253.5
		S-4	10.0-12.0	24	15	23 20 43 30	63	S-4: Top 9": Dense, gray, fine to coarse SAND and Gravel, little Silt. (SM) Bottom 6": Very dense, brown and black, GRAVEL, some medium to coarse Sand, trace Silt. (GM)	1 2		10		249.0
										11.5	GLACIAL TILL	247.5	
										12.3	WEATHERED BEDROCK	246.7	
										13.3	POSSIBLE BEDROCK	245.7	
15								End of exploration at 13.3 feet.					
20													
25													
30													

**REMARKS**  
1 - Auger advancing slowly with significant resistance from 12.3'-13.3' bgs, auger refusal at 13.3' bgs.  
2 - Auger refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-128**



**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-129  
SHEET: 2 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 245.5  
Final Boring Depth (ft.): 42  
Date Start - Finish: 12/3/2014 - 12/3/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Description Elev. (ft.)	
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value				Depth (ft.)	Elev. (ft.)
35		S-8	35.0-37.0	24	14	15 14 14 17	28	S-8: Medium dense, gray, fine to medium SAND, little Gravel, little Silt, wet. (SM)			35	210.5
40												
									1		42	203.5
								End of exploration at 42 feet.				
45												
50												
55												
60												

**REMARKS**  
1 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-129**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-130  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 239  
Final Boring Depth (ft.): 27.5  
Date Start - Finish: 12/4/2014 - 12/4/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
12/4/14	0830	5.0'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	15	1 6 6 10	12	S-1: Medium dense, brown, fine to coarse SAND, trace Silt. (SM)			2	SAND	237.0
		S-2	2.0-4.0	24	4	9 12 10 11	22	S-2: Very stiff, gray, Silty CLAY, little fine to medium Sand. (CL)					
		S-3	4.0-6.0	24	11	10 8 7 9	15	S-3: Stiff, gray, Silty CLAY. (CL)					
10		S-4	10.0-12.0	24	24	2 2 3 2	5	S-4: Medium stiff, gray, Silty CLAY. (CL)					
15		S-5	15.0-17.0	24	13	19 26 20 32	46	S-5: Dense, brown, medium to coarse SAND, little Silt, trace Gravel, wet. (SM)			15		224.0
20	61	S-6	20.0-22.0	24	3	22 15 13 11	28	S-6: Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet. (SM)					
25	36 34 28 30	S-7	25.0-27.0	24	1	9 4 7 20	11	S-7: Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, wet. (SM)					
30								End of exploration at 27.5 feet.	1 2		27.5	POSSIBLE BOULDER OR BEDROCK	211.5

**REMARKS**  
1 - Advanced roller bit from 27.0'-27.5' bgs with significant resistance, possible boulder or bedrock.  
2 - Roller bit refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-130**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-131  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 245  
Final Boring Depth (ft.): 26.6  
Date Start - Finish: 11/12/2014 - 11/12/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	12	1 1 3 5	4	S-1: Medium stiff, gray, Silty CLAY, little fine to medium Sand, trace roots. (CL)		0.3	TOPSOIL	244.7	
		S-2	2.0-4.0	24	12	3 6 6 4	12	S-2: Stiff, gray to brown, CLAY & SILT, trace fine to medium Sand. (CL)					
		S-3	4.0-6.0	24	14	2 4 6 10	10	S-3: Stiff, gray, Silty CLAY, trace fine Sand. (CL)					
6		S-4	10.0-12.0	24	24	1 1 1 2	2	S-4: Soft to medium stiff, gray, Silty CLAY, trace fine Sand. (CL)		12		233.0	
14		S-5	15.0-17.0	24	19	WOH 14 13 14	27	S-5: Dense, gray to brown, fine to coarse SAND, some Gravel, trace Silt. (SM)					
21		S-6	20.0-22.0	14	5	11 14 14 17	28	S-6: Dense, brown, fine to coarse SAND and Gravel, trace Silt. (SM)					
26.6		S-7	25.0-26.6	19	8	5 7 5 50/1"	12	S-7: Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. (SM) Split spoon refusal.		26.6		218.4	
								End of exploration at 26.6 feet.					

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:  
GZ-131**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:06:10 PM

**TEST BORING LOG**



**GZA**  
GeoEnvironmental, Inc.  
Engineers and Scientists

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-132  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 234.5  
Final Boring Depth (ft.): 22  
Date Start - Finish: 11/12/2014 - 11/12/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	15	1 1 1 7	2	S-1: Top 12": Very loose, dark brown, fine SAND and Silt. Roots and leaves. (SM)			1	TOPSOIL	233.5
		S-2	2.0-4.0	24	18	10 10 8 7	18	S-2: Very stiff, gray to brown, CLAY & SILT, some fine Sand. (Varves) (CL)			CLAY & SILT WITH FINE SAND		
		S-3	4.0-6.0	24	24	8 9 8 3	17	S-3: Top 18": Medium dense, brown, fine SAND, little Silt. (SM) Bottom 6": Brown/gray, Silty CLAY, little fine Sand. (CL)			5.5	229.0	
10		S-4	10.0-12.0	24	24	WOH/18		S-4: Soft to medium stiff, gray, Silty CLAY, wet. (CL)				SILTY CLAY	
15		S-5	15.0-17.0	24	12	12 29 18 32	47	S-5: Dense, gray, fine to coarse SAND and Silty Clay. (SM)					
20		S-6	20.0-20.7	8	3	33 50/2"	R	S-6: Very dense, GRAVEL. (GP) Split spoon refusal.	1 2		19.5	GLACIAL TILL	215.0
								End of exploration at 22 feet.			22		212.5
25													
30													

GZA TEMPLATE TEST BORING: 2/18/2015; 4:08:10 PM

**REMARKS**

1 - Change in strata inferred based on change in observed drilling behavior.  
2 - Roller bit refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-132**





**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-135  
SHEET: 1 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 247.5  
Final Boring Depth (ft.): 71.9  
Date Start - Finish: 11/10/2014 - 11/10/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Description	Depth (ft.)	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
		S-1	0.0-2.0	24	12	1 1 1 3	2	S-1: Loose, brown, fine to medium SAND, some Silt. Roots and organics, leaves. (SM)			TOPSOIL	2	245.5
5	WOH												
		S-2	5.0-7.0	24	18	3 5 6 4	11	S-2: Stiff, gray to brown, CLAY & SILT, little fine Sand. (CL)					
	WOH												
10		S-3	10.0-12.0	24	20	WOH/24"		S-3: Soft to medium stiff, gray, Silty CLAY. (CL)					
15		S-4	15.0-17.0	24	10	WOH/24"		S-4: Soft to medium stiff, gray, Silty CLAY. (CL)					
20		S-5	20.0-22.0	24	17	WOH/24"		S-5: Soft to medium stiff, gray, Silty CLAY. (CL)					
25		S-6	25.0-27.0	24	20	WOH/24"		S-6: Soft to medium stiff, gray, Silty CLAY. (CL)					
30	PUSH PUSH PUSH								1			27	220.5
													PROBABLE SILTY CLAY

**REMARKS**

1 - Begin probe at 27.0' bgs. Blows per foot to advance AW rod are recorded on log in Casing Blows column.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-135**





**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-136  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 247  
Final Boring Depth (ft.): 22  
Date Start - Finish: 11/20/2014 - 11/20/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/20/14	0845	4.7'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	12	1 3 2 3	5	S-1: Loose, brown, fine to medium SAND, little Clayey Silt, trace roots. (SM)			0.3	TOPSOIL	246.7
		S-2	2.0-4.0	24	10	1 2 2 2	4	S-2: Loose, brown, fine to medium SAND, some Silt, trace Gravel. (SM)			4	FILL	243.0
		S-3	4.0-6.0	24	16	1 1 1 2	2	S-3: Very loose, brown/gray, fine to medium SAND, some Clayey Silt, wet. (Organic odor) (SM)	1		6	SAND	241.0
10		S-4	10.0-12.0	24	24	1 2 2 1	4	S-4: Soft to medium stiff, gray, Silty CLAY, trace fine Sand. (CL)				SILTY CLAY	
15		S-5	15.0-17.0	24	24	WOR		S-5: Soft to medium stiff, gray, Silty CLAY. (CL)					
20		S-6	20.0-22.0	24	24	WOR		S-6: Soft to medium stiff, gray, Silty CLAY. (CL)	2		22		
								End of exploration at 22 feet.					

**REMARKS**  
1 - Transition from Sand to Silty CLAY inferred based on observed drilling behavior and change in color/consistency of return water.  
2 - No refusal.

See Log Key for explanation of sample description and Identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-136**

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-137  
SHEET: 1 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 252  
Final Boring Depth (ft.): 44  
Date Start - Finish: 11/14/2014 - 11/14/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/14/14	0930	1.3'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value					
0.3		S-1	0.0-2.0	24	8	2 6 9 7	15	S-1: Medium dense, brown, medium to coarse SAND and Gravel, trace Silt, trace roots. (SM)			TOPSOIL	251.7
			FILL	250.0								
5		S-2	5.0-7.0	24	5	7 8 8 10	16	S-2: Very stiff, gray, Silty CLAY, some fine to coarse Sand. (CL)				
10		S-3	8.0-10.0	24	22	3 5 5 7	10	S-3: Stiff, gray, Silty CLAY. (CL)				
		S-4	10.0-12.0	24	20	4 6 4 6	10	S-4: Stiff, gray, Silty CLAY, trace fine Sand (lenses). (CL)				
15		S-5	12.0-14.0	24	24	2 2 2 3	4	S-5: Soft to medium stiff, gray, Silty CLAY. (CL)			SILTY CLAY	
		S-6	14.0-16.0	24	24	WOH WOH 1 2	1	S-6: Soft to medium stiff, gray, Silty CLAY. (CL)				
20		S-7	16.0-17.4	24	24			S-7: Medium stiff, gray, Silty CLAY. (CL)				
		V-1	18.0	7				V-1: Field Vane, T <sub>raw</sub> = 240/60 in.-lbs (Su = 620/155 psf)	1			
25		V-2	16.4-17.0	7				V-2: Field Vane, T <sub>raw</sub> = 260/75 in.-lbs (Su = 670/190 psf)				
		S-8	18.0-20.0	24				S-8: Medium stiff, gray, Silty CLAY. (CL)				
30		V-3	22.0	7				V-3: Field Vane, T <sub>raw</sub> = 175/30 in.-lbs (Su = 450/75 psf)				
		V-4	20.4-21.0	7				V-4: Field Vane, T <sub>raw</sub> = 200/40 in.-lbs (Su = 520/100 psf)	2		230.0	
	WOH		21.4-22.0								PROBABLE SILTY CLAY	

**REMARKS**  
1 - Tapered vane with 2.5" diameter, 4.5" height and 45 degree taper was used for field vane tests. T<sub>raw</sub> = measured torque, Su = calculated undrained shear strength.  
2 - Began rod probe at 22.0' bgs. Blows per foot to drive AW rod are recorded on log under casing blows.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-137**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:14 PM

### TEST BORING LOG



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
 Exit 63  
 Gray, Maine

EXPLORATION NO.: GZ-137  
 SHEET: 2 of 2  
 PROJECT NO: 09.0025829.00  
 REVIEWED BY: J. Baron

Logged By: N. Williams  
 Drilling Co.: New England Boring Contractors  
 Foreman: Brad Enos

Type of Rig: ATV  
 Rig Model:  
 Drilling Method:  
 Drive & Wash

Boring Location: See Plan  
 Ground Surface Elev. (ft.): 252  
 Final Boring Depth (ft.): 44  
 Date Start - Finish: 11/14/2014 - 11/14/2014

H. Datum:  
 V. Datum:

Hammer Type: Donut  
 Hammer Weight (lb.): 140  
 Hammer Fall (in.): 30  
 Auger or Casing O.D./I.D Dia (in.): 3

Sampler Type: SS  
 Sampler O.D. (in.): 2.0  
 Sampler Length (in.): 24  
 Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/14/14	0930	1.3'	0

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
6													
15													
11													
10													
7												PROBABLE SILTY CLAY	
35													
6													
5													
6													
7													
40											39		213.0
17													
27													
22													
26												POSSIBLE SILTY CLAY OR SAND OR GLACIAL TILL	
26													
45	50/0"								3		44		208.0
								End of exploration at 44 feet.					

**REMARKS**  
 3 - Probe refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-137**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:14 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-138  
SHEET: 1 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 250  
Final Boring Depth (ft.): 62  
Date Start - Finish: 11/25/2014 - 11/26/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5	VAC		0.0-2.0				Brown, medium to coarse SAND, trace Gravel. (SP)	1			FILL		
	VAC		2.0-10.0				Brown, medium to coarse SAND, little Gravel. (SP)						
	VAC												
	VAC												
	VAC												
	VAC												
	VAC												
	VAC												
10		S-1	10.0-12.0	24	14	4 3 4 3	S-1: Medium stiff, gray-brown, Silty CLAY. (CL)	2			SILTY CLAY	240.0	
15		U-1	15.0-17.0	24	24		U-1: Gray, Silty CLAY. (CL)						
20		S-2	17.0-18.0	24	24		S-2: Soft to medium stiff, gray, Silty CLAY. (CL)						
		V-1	19.0	7			V-1: Field Vane, T <sub>raw</sub> = 200/70 in.-lbs (Su = 515/180 psf)						
		V-2	17.4-18.4	7			V-2: Field Vane, T <sub>raw</sub> = 180/40 in.-lbs (Su = 465/100 psf)						
25		U-2	25.0-27.0	24	24		U-2: Gray, SILT & CLAY. (CL)						
30		S-3	27.0-28.0	24	0		S-3: No recovery.						
		V-3	29.0	7			V-3: Field Vane, T <sub>raw</sub> = 170/40 in.-lbs (Su = 440/100 psf)						
		V-4	27.4	7			V-4: Field Vane, T <sub>raw</sub> = 150/30 in.-lbs (Su = 390/80 psf)						

**REMARKS**

1 - Vacuum excavation to 10.0' bgs. Descriptions from cuttings and sidewall observations.  
2 - Tapered vane with 2.5" diameter, 4.5" height and 45 degree taper was used for field vane tests. T<sub>raw</sub> = measured torque, Su = calculated undrained shear strength.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-138**

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
 Exit 63  
 Gray, Maine

EXPLORATION NO.: GZ-138  
 SHEET: 2 of 3  
 PROJECT NO: 09.0025829.00  
 REVIEWED BY: J. Baron

Logged By: B. Cardali  
 Drilling Co.: New England Boring Contractors  
 Foreman: Rich Leonard

Type of Rig: Truck  
 Rig Model:  
 Drilling Method:  
 Drive & Wash

Boring Location: See Plan  
 Ground Surface Elev. (ft.): 250  
 Final Boring Depth (ft.): 62  
 Date Start - Finish: 11/25/2014 - 11/26/2014

H. Datum:  
 V. Datum:

Hammer Type: Donut  
 Hammer Weight (lb.): 140  
 Hammer Fall (in.): 30  
 Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
 Sampler O.D. (in.): 2.0  
 Sampler Length (in.): 24  
 Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
			28.4-29.0										
35		U-3	35.0-37.0	24	0			U-3: No recovery.					
		S-4	37.0-	24	24			S-4: Soft to medium stiff, gray, Silty CLAY. (CL)					
		V-5	39.0	7				V-5: Field Vane, T <sub>raw</sub> = 90/25 in.-lbs (Su = 230/65 psf)					
		V-6	37.4-	7				V-6: Field Vane, T <sub>raw</sub> = 200/40 in.-lbs (Su = 515/100 psf)					
40		U-4	38.4-39.0	24	0			U-4: No recovery.					
			40.0-42.0										
		V-7	43.4-	7				V-7: Field Vane, T <sub>raw</sub> = 140/60 in.-lbs (Su = 360/155 psf)					
45		V-8	44.0	7				V-8: Field Vane, T <sub>raw</sub> = 255/10 in.-lbs (Su = 660/25 psf)					
		S-5	44.4-45.0-45.0-47.0	24	20	4 6 9 10	15	S-5: Stiff, brown, Silty CLAY and fine to medium Sand. (CL)					
50		S-6	50.0-52.0	24	24	WOR WOR WOR WOH	0	S-6: Soft to medium stiff, gray, Silty CLAY, trace fine to medium Sand. (CL)					
55		S-7	55.0-55.3	4	4	100/3"	R	S-7: Gray, Silty CLAY, trace fine to medium Sand, fractured rock in tip of spoon. (CL)			55.3		194.7
													GLACIAL TILL

**REMARKS**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-138**

GZA TEMPLATE TEST BORING: 2/18/2015; 4:08:15 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-138  
SHEET: 3 of 3  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: Truck  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 250  
Final Boring Depth (ft.): 62  
Date Start - Finish: 11/25/2014 - 11/26/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

Groundwater Depth (ft.)			
Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-8	60.0-62.0	24	4	32 41 32 31	73	S-8: Dense, brown, GRAVEL and fine to medium Sand, trace Silt, wet. (GM)	3		62	GLACIAL TILL	188.0
65								End of exploration at 62 feet.					
70													
75													
80													
85													
90													

**REMARKS**  
3 - No refusal.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-138**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:06:15 PM



**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-140  
SHEET: 1 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 261  
Final Boring Depth (ft.): 31.5  
Date Start - Finish: 12/4/2014 - 12/5/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample				SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
			Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5	PUSH	S-1	0.0-2.0	24	15	3 6 8 4	14	S-1: Medium dense, fine to medium SAND, trace Silt. (SM)					
	PUSH	S-2	2.0-4.0	24	16	3 3 11 10	14	S-2: Medium dense, fine to medium SAND, trace Silt. (SM)					
5	PUSH	S-3	4.0-6.0	24	24	11 14 17 23	31	S-3: Top 10": Medium dense, fine to medium SAND, trace Silt. (SM) Bottom 14": Stiff, gray, Silty CLAY. (CL)			4.8		256.2
	PUSH		88 127 185										
10		S-4	10.0-12.0	24	24	3 4 4 4	8	S-4: Medium stiff, gray, Silty CLAY. (CL)					
15		S-5	15.0-17.0	24	24	WOR 1 2 1	3	S-5: Soft to medium stiff, gray, Silty CLAY. (CH)					
20		S-6	20.0-22.0	24	16	4 6 7 9	13	S-6: Medium dense, fine to medium SAND, trace Silt, wet. (SM)			20		241.0
25		S-7	25.0-27.0	24	2	26 84 60 33	>100	S-7: Very dense, fine to medium SAND, trace Silt, wet. (SM)					

**REMARKS**  
1 - Advanced roller bit through increased resistance from 27.0'-31.5' bgs.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.: GZ-140**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:16 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-140  
SHEET: 2 of 2  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 261  
Final Boring Depth (ft.): 31.5  
Date Start - Finish: 12/4/2014 - 12/5/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
									1				
								End of exploration at 31.5 feet.	2		31.5	GLACIAL TILL POSSIBLE BEDROCK	229.5
35													
40													
45													
50													
55													
60													

**REMARKS** 2 - Roller bit refusal, possible boulder or bedrock at 31.5' bgs.

**Exploration No.:**  
**GZ-140**

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

GZA TEMPLATE TEST BORING: 2/18/2015, 4:08:16 PM

**TEST BORING LOG**



Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-142  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: N. Williams  
Drilling Co.: New England Boring Contractors  
Foreman: Brad Enos

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 235  
Final Boring Depth (ft.): 24.5  
Date Start - Finish: 11/13/2014 - 11/13/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
11/13/14	1500	7.2'	0

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	5	1 1 1 2	2	S-1: Soft, gray, SILT & CLAY, some fine Sand, trace roots. (CL)			0.3	TOPSOIL	234.7
		S-2	2.0-4.0	24	19	2 4 8 8	12	S-2: Stiff, gray/brown, SILT & CLAY, little fine Sand. (CL)					
		S-3	4.0-6.0	24	15	3 5 6 6	11	S-3: Stiff, gray/brown, Silty CLAY, trace fine Sand, trace root fibers. (CL)					
10		S-4	10.0-12.0	24	24	WOR/24"		S-4: Soft to medium stiff, gray, Silty CLAY, trace fine Sand. (CL)					
15		S-5	15.0-17.0	24	10	3 WOH WOH WOH	0	S-5: Very loose, gray, fine to medium SAND, trace Silt. (SM)			15	SAND	220.0
20		S-6	20.0-22.0	24	5	10 12 25 16	37	S-6: Dense, black to gray, fine to coarse SAND and Gravel, little Silt. (Weathered Rock) (SM)			20	WEATHERED ROCK	215.0
25	20/6"								1		23.5	POSSIBLE BEDROCK	211.5
								End of exploration at 24.5 feet.			24.5		210.5

**REMARKS**  
1 - Casing and roller bit refusal at 24.5' bgs.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-142**

GZA TEMPLATE TEST BORING; 2/18/2015; 4:08:17 PM

**TEST BORING LOG**



**GZA**  
**GeoEnvironmental, Inc.**  
*Engineers and Scientists*

Maine Turnpike Authority  
Exit 63  
Gray, Maine

EXPLORATION NO.: GZ-143  
SHEET: 1 of 1  
PROJECT NO: 09.0025829.00  
REVIEWED BY: J. Baron

Logged By: B. Cardali  
Drilling Co.: New England Boring Contractors  
Foreman: Rich Leonard

Type of Rig: ATV  
Rig Model:  
Drilling Method:  
Drive & Wash

Boring Location: See Plan  
Ground Surface Elev. (ft.): 236  
Final Boring Depth (ft.): 27  
Date Start - Finish: 12/3/2014 - 12/3/2014

H. Datum:  
V. Datum:

Hammer Type: Donut  
Hammer Weight (lb.): 140  
Hammer Fall (in.): 30  
Auger or Casing O.D./I.D Dia (in.): 4

Sampler Type: SS  
Sampler O.D. (in.): 2.0  
Sampler Length (in.): 24  
Rock Core Size:

**Groundwater Depth (ft.)**

Date	Time	Water Depth	Stab. Time
NOT MEASURED			

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft)	Stratum Description	Elev. (ft)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0-2.0	24	4	3 9 11 4	20	S-1: Medium dense, brown, fine to medium SAND, trace Gravel, trace Silt. (SM)			6	FILL	230.0
		S-2	2.0-4.0	24	6	3 3 3 2	6	S-2: Loose, brown, fine to medium SAND, trace Gravel. (SP)					
		S-3	4.0-6.0	24	4	2 2 1 2	3	S-3: Loose, brown, fine to medium SAND, trace Gravel, trace Silt. (SM)					
10		S-4	10.0-12.0	24	18	1 2 2 2	4	S-4: Soft to medium stiff, gray, Silty CLAY, trace fine to medium Sand. (CL)				SILTY CLAY	
15		S-5	15.0-17.0	24	24	2 2 2 2	4	S-5: Soft to medium stiff, gray, Silty CLAY. (CL)					
20		S-6	20.0-22.0	24	7	16 13 19 25	32	S-6: Dense, gray, medium to coarse SAND and Gravel, trace Silt. (SM)			20	GLACIAL TILL	216.0
											22.5	POSSIBLE WEATHERED ROCK	213.5
25													
											27	POSSIBLE BEDROCK	209.0
30								End of exploration at 27 feet.	1				

**REMARKS**  
1 - Advanced roller bit through increased resistance from 22.5'-27.0' bgs, possible weathered rock.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

**Exploration No.:**  
**GZ-143**

GZA TEMPLATE TEST BORING: 2/18/2015, 4:08:17 PM



**APPENDIX C**  
**LABORATORY RESULTS**

**LABORATORY TESTING DATA SHEET**

*Matthew P. Kelly*

Project Name Exit 63 Interchange  
 Project No. 09.0025829.00  
 Project Manager J. Baron

Project Location Gray, Maine  
 Assigned By J. Baron  
 Date 12/23/2014

Reviewed By \_\_\_\_\_  
 Date Reviewed 12/23/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests				Consol.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2 $\mu$ %	ORG %	G <sub>s</sub>	Dry unit wt. pcf	Torvane	Remolded Torvane	Failure Criteria	Strain %	$\frac{C_c}{1+e_0}$	
GZ-114	U-1	30- 32	1	Average Total Unit Weight (30.0-32.0') = 111.5 pcf													Gray CLAY & SILT (CL) Very Soft Consistency ("Sensitive Clay")  Maine Frost Classification = IV AASHTO = A6
		30.2		48.4								Tv= 0.10 tsf	RTv= 0 tsf				
		30.2- 30.7		(Sample Saved)													
		30.8		48.4								Tv= 0.15 tsf	RTv= 0 tsf				
		31.0- 31.1		42.6							79.3				0.15		
		31.1- 31.2		53.9	40	21											
		31.4		52.1								Tv= 0.08 tsf	RTv= 0 tsf				



195 Frances Avenue  
 Cranston, RI 02910  
 401-467-6454

Soil Consolidation Test ASTM D2435



195 Frances Ave., Cranston, RI 02910

Project Exit 63 Interchange

Project Location Gray, ME

File # 09.0025829.00

Boring GZ-114

Sample U-1

Depth 31.0-31.1'

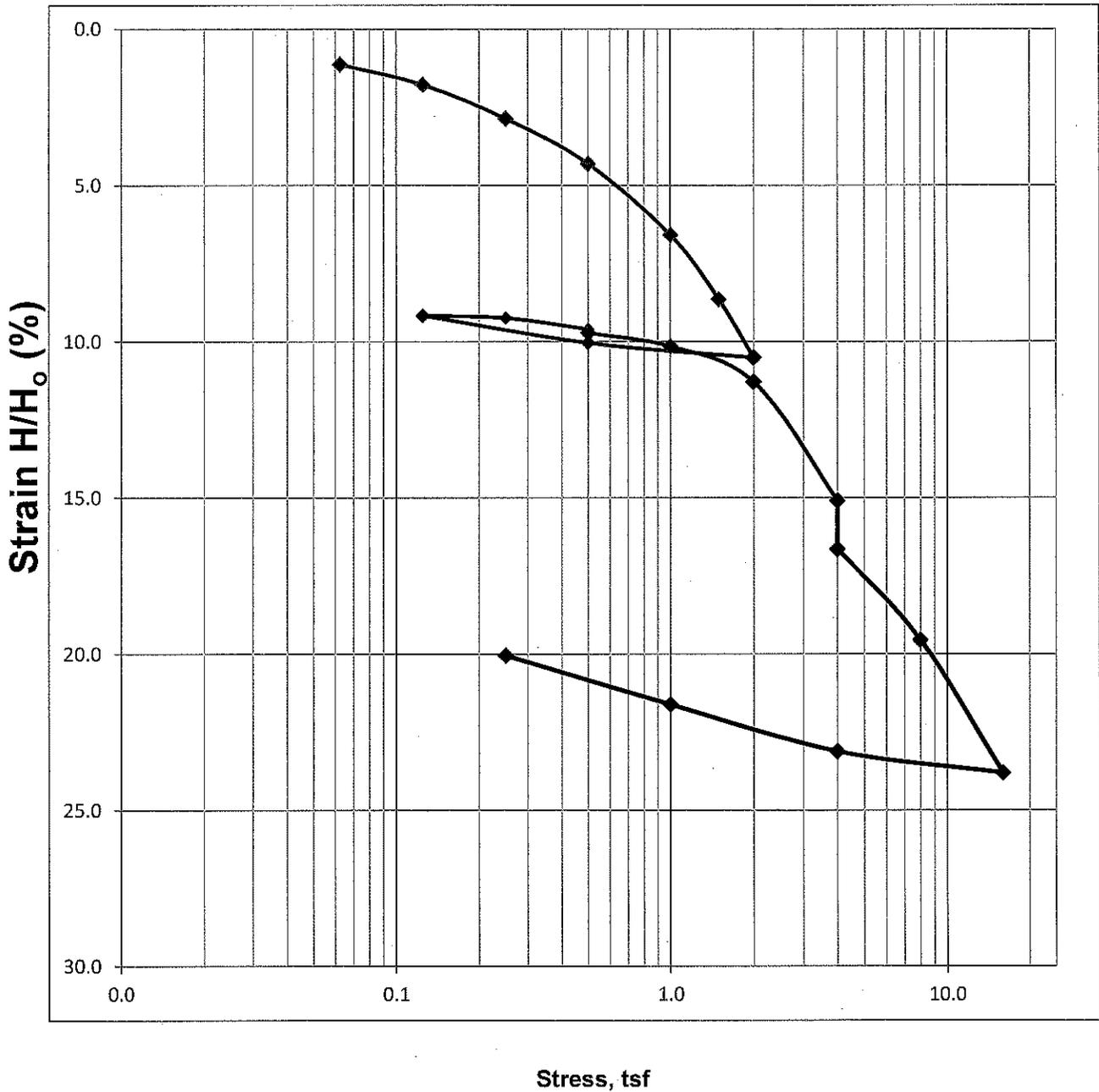
Set Up By AS

Description See Summary Sheet

Water Content % 42.6%

$\gamma_d$  (pcf) 79.3

Test # C 1



One-Dimensional Consolidation Testing Of Soil (ASTM D2435-04)  
Method B (End of Primary Increments)

Project Name Exit 63 Interchange  
 Location Gray, ME  
 Project Number 09.0025829.00  
 Boring Number GZ-114  
 Depth 31.0-31.1'

Technician AS  
 Reviewer MBP  
 Sample Number U-1  
 Test Number C 1

Specific Gravity 2.65 (estimated)  
 Initial Water Content 42.6%  
 Final Water Content 28.0%  
 Initial Sample Height (in.) 0.800  
 Final Sample Height (in.) 0.615

Initial Dry Unit Weight (pcf) 79.3  
 Final Dry Unit Weight (pcf) 103.1  
 Initial Void Ratio 1.086  
 Final Void Ratio 0.603

Notes: \_\_\_\_\_

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T <sub>90</sub> (min)	Cv <sub>90</sub> (cm <sup>2</sup> /sec)	C <sub>α</sub>
1	0	0	0			
2	0.0625	0.0091	1.138			
3	0.125	0.0143	1.788	1.7	8.15E-03	
4	0.25	0.0230	2.875	10.2	1.31E-03	
5	0.5	0.0345	4.313	11.6	1.10E-03	
6	1	0.0527	6.588	13.0	9.40E-04	
7	1.5	0.0692	8.650	11.6	1.01E-03	
8	2	0.0841	10.513	13.0	9.11E-04	
9	0.5	0.0803	10.038			
10	0.125	0.0733	9.163			
11	0.25	0.0739	9.238	4.0	2.98E-03	
12	0.5	0.0768	9.600	4.0	2.97E-03	
13	0.5	0.0778	9.719			0.00031
14	1	0.0812	10.150	4.0	2.87E-03	
15	2	0.0903	11.288	4.0	2.63E-03	
16	4	0.1207	15.088	4.0	2.54E-03	
17	4	0.1331	16.638			0.00350
18	8	0.1564	19.550	6.0	1.41E-03	
19	16	0.1904	23.800	4.8	1.78E-03	
20	4	0.1849	23.113			
21	1	0.1729	21.613			
22	0.25	0.1604	20.050			

**LABORATORY TESTING DATA SHEET**

*Matthew O'Neil*

Project Name Exit 63 Interchange  
 Project No. 09.0025829.00  
 Project Manager J. Baron

Project Location Gray, Maine  
 Assigned By J. Baron  
 Date 12/23/2014

Reviewed By \_\_\_\_\_  
 Date Reviewed 12/23/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests				Consol. $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2 $\mu$ %	ORG %	G <sub>s</sub>	Dry unit wt. pcf	Torvane	Remolded Torvane	Failure Criteria	Strain %		
GZ-138	U-1	15- 17	2	Average Total Unit Weight (15.0-17.0') = 112.0 pcf													Gray Silty CLAY (CL) Very Soft to Soft Consistency ("Sensitive Clay") Maine Frost Classification = IV AASHTO = A7
		15.2		38.4								Tv= 0.28 tsf	RTv= .10 tsf				
		15.2- 15.7		(Sample Saved)													
		15.8		42.1								Tv= 0.19 tsf	RTv= .05 tsf				
		15.9- 16.0		38.7							84.1				0.18		
		16.0- 16.1		40.7	43	22											
		16.4		37.2								Tv= 0.25 tsf	RTv= .05 tsf				
		16.4- 16.9		(Sample Saved)													



195 Frances Avenue  
 Cranston, RI 02910      401-467-6454

Soil Consolidation Test ASTM D2435



195 Frances Ave., Cranston, RI 02910

Project Exit 63 Interchange

Project Location Gray, ME

File # 09.0025829.00

Boring GZ-138 Sample U-1

Depth 15.9-16.0'

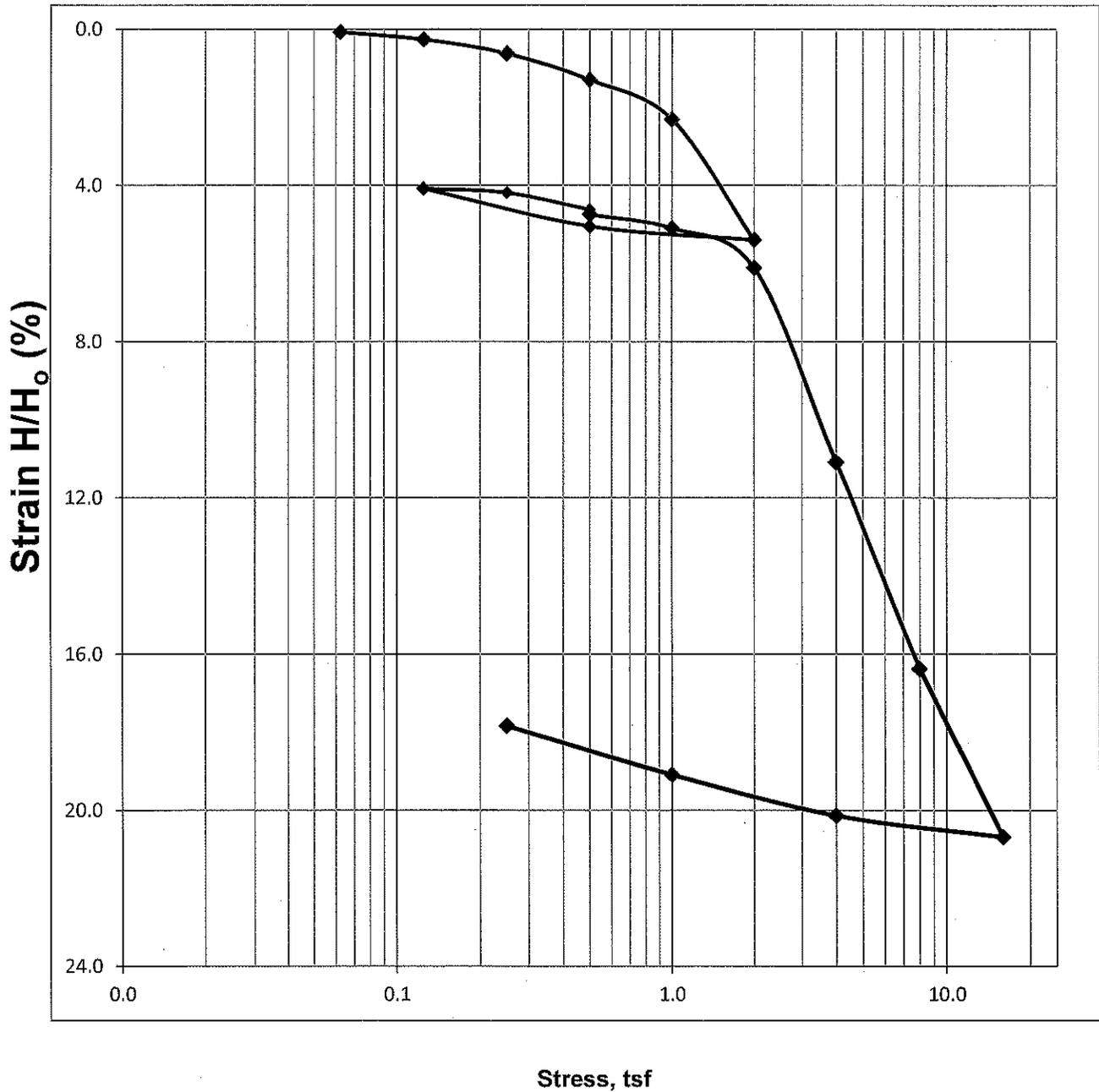
Set Up By AS

Description See Summary Sheet

Water Content % 38.7%

$\gamma_d$  (pcf) 84.1

Test # C 2



One-Dimensional Consolidation Testing Of Soil (ASTM D2435-04)  
Method B (End of Primary Increments)

Project Name <u>Exit 63 Interchange</u>	Technician <u>AS</u>
Location <u>Gray, ME</u>	Reviewer <u>MBP</u>
Project Number <u>09.0025829.00</u>	
Boring Number <u>GZ-138</u>	Sample Number <u>U-1</u>
Depth <u>15.9-16.0'</u>	Test Number <u>C 2</u>
Specific Gravity <u>2.67</u> (estimated)	
Initial Water Content <u>38.7%</u>	Initial Dry Unit Weight (pcf) <u>84.1</u>
Final Water Content <u>26.7%</u>	Final Dry Unit Weight (pcf) <u>102.4</u>
Initial Sample Height (in.) <u>0.800</u>	Initial Void Ratio <u>0.981</u>
Final Sample Height (in.) <u>0.657</u>	Final Void Ratio <u>0.627</u>

Notes: \_\_\_\_\_

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T <sub>90</sub> (min)	C <sub>v90</sub> (cm <sup>2</sup> /sec)	C <sub>α</sub>
1	0	0	0			
2	0.0625	0.0006	0.075			
3	0.125	0.0021	0.263	6.0	2.40E-03	
4	0.25	0.0050	0.625	3.0	4.74E-03	
5	0.5	0.0104	1.300	3.0	4.64E-03	
6	1	0.0185	2.313	2.3	5.81E-03	
7	2	0.0432	5.400	7.3	1.80E-03	
8	0.5	0.0404	5.050			
9	0.125	0.0327	4.088			
10	0.25	0.0335	4.188	2.0	6.64E-03	
11	0.5	0.0370	4.625	3.0	4.41E-03	
12	0.5	0.0380	4.750			0.000313
13	1	0.0408	5.100	2.0	6.43E-03	
14	2	0.0489	6.113	3.0	3.85E-03	
15	4	0.0887	11.088	6.0	1.70E-03	
16	8	0.1310	16.375	5.8	1.59E-03	
17	16	0.1655	20.688	3.0	3.10E-03	
18	4	0.1611	20.138			
19	1	0.1527	19.088			
20	0.25	0.1427	17.838			

### LABORATORY TESTING DATA SHEET

*Matthew Dally*

Project Name Exit 63 Interchange  
 Project No. 09.0025829.00  
 Project Manager J. Baron

Project Location Gray, Maine  
 Assigned By J. Baron  
 Date 12/23/2014

Reviewed By \_\_\_\_\_  
 Date Reviewed 12/23/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests				Consol.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2 $\mu$ %	ORG %	G <sub>s</sub>	Dry unit wt. pcf	Torvane	Remolded Torvane	Failure Criteria	Strain %	$\frac{C_c}{1+e_0}$	
GZ-138	U-2	25- 27	3	Average Total Unit Weight (25.0-27.0') = 111.8 pcf													Gray SILT & CLAY (CL) Very Soft Consistency ("Sensitive Clay")  Maine Frost Classification = IV AASHTO = A-4
		25.4		50.5								Tv= 0.10 tsf	RTv= 0 tsf				
		25.4- 25.9		(Sample Saved)													
		25.9		31.8								Tv= 0.09 tsf	RTv= 0 tsf				
		26.0- 26.1		27.5							99.3				0.08		
		26.2- 26.3		29.7	24	17											
		26.5		41.8								Tv= 0.10 tsf	RTv= 0 tsf				
		26.5- 27.0		(Sample Saved)													



195 Frances Avenue  
 Cranston, RI 02910      401-467-6454

Soil Consolidation Test ASTM D2435



195 Frances Ave., Cranston, RI 02910

Project Exit 63 Interchange

Project Location Gray, ME

File # 09.0025829.00

Boring GZ-138

Sample U-2

Depth 26.0-26.1'

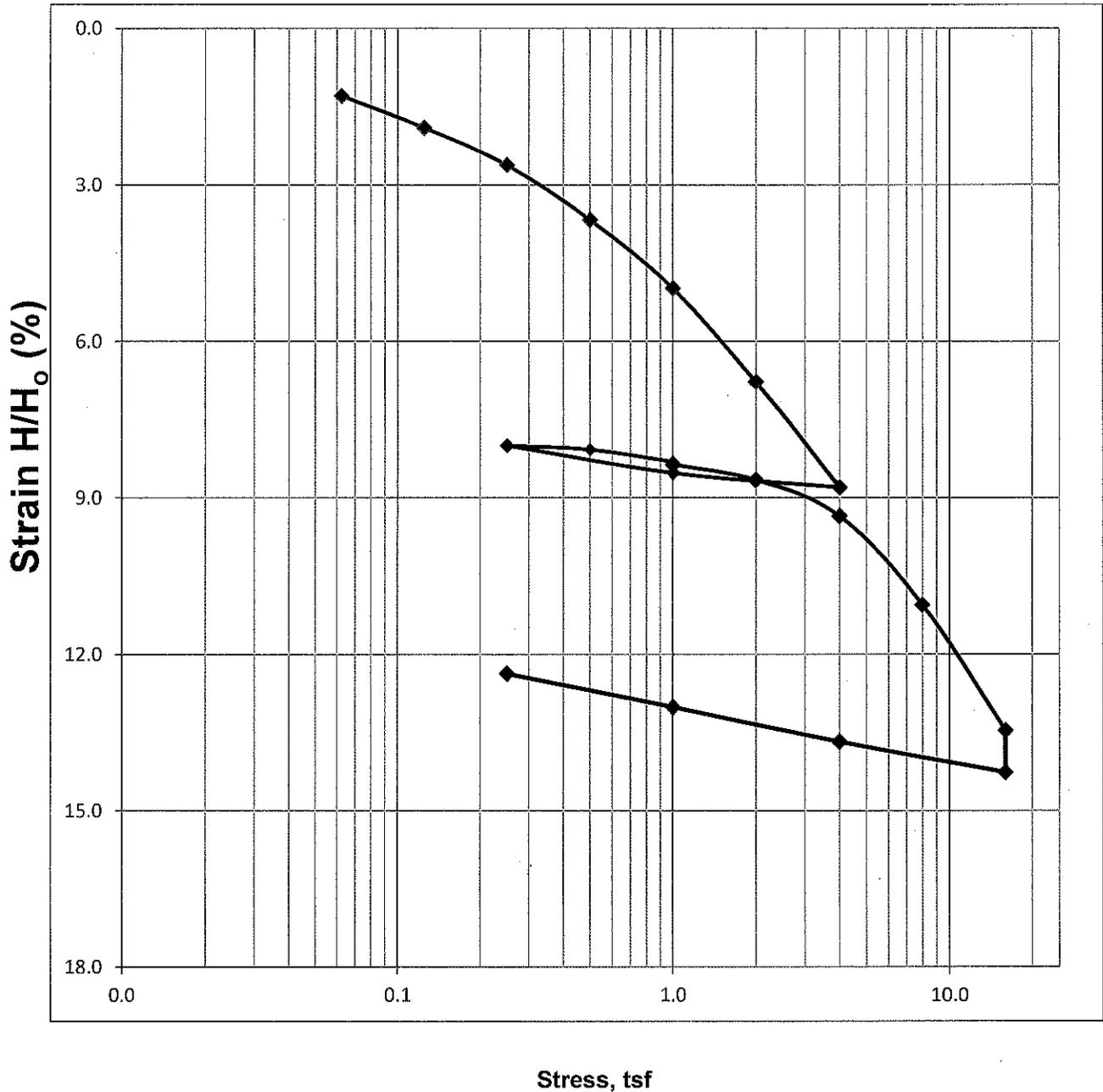
Set Up By AS

Description See Summary Sheet

Water Content % 27.5%

$\gamma_d$  (pcf) 99.3

Test # C 3



One-Dimensional Consolidation Testing Of Soil (ASTM D2435-04)  
Method B (End of Primary Increments)

Project Name Exit 63 Interchange  
 Location Gray, ME  
 Project Number 09.0025829.00  
 Boring Number GZ-138  
 Depth 26.0-26.1'

Technician AS  
 Reviewer MBP  
 Sample Number U-2  
 Test Number C 3

Specific Gravity 2.65 (estimated)  
 Initial Water Content 27.5%  
 Final Water Content 19.7%  
 Initial Sample Height (in.) 0.800  
 Final Sample Height (in.) 0.701

Initial Dry Unit Weight (pcf) 99.3  
 Final Dry Unit Weight (pcf) 113.4  
 Initial Void Ratio 0.665  
 Final Void Ratio 0.459

Notes: \_\_\_\_\_

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T <sub>90</sub> (min)	Cv <sub>90</sub> (cm <sup>2</sup> /sec)	C <sub>α</sub>
1	0	0	0			
2	0.0625	0.0104	1.300			
3	0.125	0.0153	1.913	14.0	9.88E-04	
4	0.25	0.0210	2.625	9.0	1.50E-03	
5	0.5	0.0294	3.675	7.3	1.81E-03	
6	1	0.0399	4.988	4.8	2.62E-03	
7	2	0.0542	6.775	4.4	2.75E-03	
8	4	0.0704	8.800	2.6	4.77E-03	
9	1	0.0682	8.525			
10	0.25	0.0640	8.000			
11	0.5	0.0646	8.075	1.0	1.23E-02	
12	1	0.0665	8.313	1.0	1.23E-02	
13	1	0.0669	8.363			0.00009
14	2	0.0693	8.656	1.2	9.91E-03	
15	4	0.0748	9.350	1.5	7.70E-03	
16	8	0.0884	11.050	1.5	7.29E-03	
17	16	0.1077	13.463	1.5	7.15E-03	
18	16	0.1141	14.263			0.00237
19	4	0.1094	13.675			
20	0.25	0.0990	12.375			





State of Maine - Department of Transportation  
Laboratory Testing Summary Sheet

**Exit 63 Interchange**

**MDOT Project Number:**

**GZA Project Number: 09.0025829.00**

**Town(s): Gray, ME**

Boring & Sample Identification Number	Station (Feet)	Sample No.	Depth (Feet)	Lab Number	Organic %	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
GZ-129		S-4	10-12	28		34.2	47	23	CL	A-7	IV
GZ-129		S-6	20-22	29		43.1	39	18	CL	A-6	IV
GZ-140		S-4	10-12	30		43.5	49	25	CL	A-7	IV
GZ-140		S-5	15-17	31		53.1	52	30	CH	A-7	IV
GZ-101		S-2	2-4	32		27.6			CL	A-6	IV
GZ-102		S-3	9-11	33		38.8	39	18	CL	A-6	IV
GZ-102		S-8	34-36	34		43.5	32	13	CL	A-6	IV
GZ-114		S-1	10-12	35		41.2	43	22	CL	A-6	IV
GZ-105		S-2	2-4	36		21.9			SM	A-4	II
GZ-105		S-6	19-21	37		44.4	39	17	CL	A-6	IV
GZ-108		S-2	4-6	38		28.5			CL	A-6	IV
GZ-133		S-5	14-16	39		50.5	43	21	CL	A-7	IV
GZ-106		S-4	10-12	40		38.1	39	14	CL	A-6	IV
GZ-106		S-6	20-22	41		45.5	39	17	CL	A-6	IV
GZ-142		S-3	4-6	42		30.7	40	15	CL	A-6	IV
GZ-126		S-3	4-6	43		34.0	47	24	CL	A-7	IV
GZ-109		S-7	25-27	44		35.2	30	10	CL	A-4	IV

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

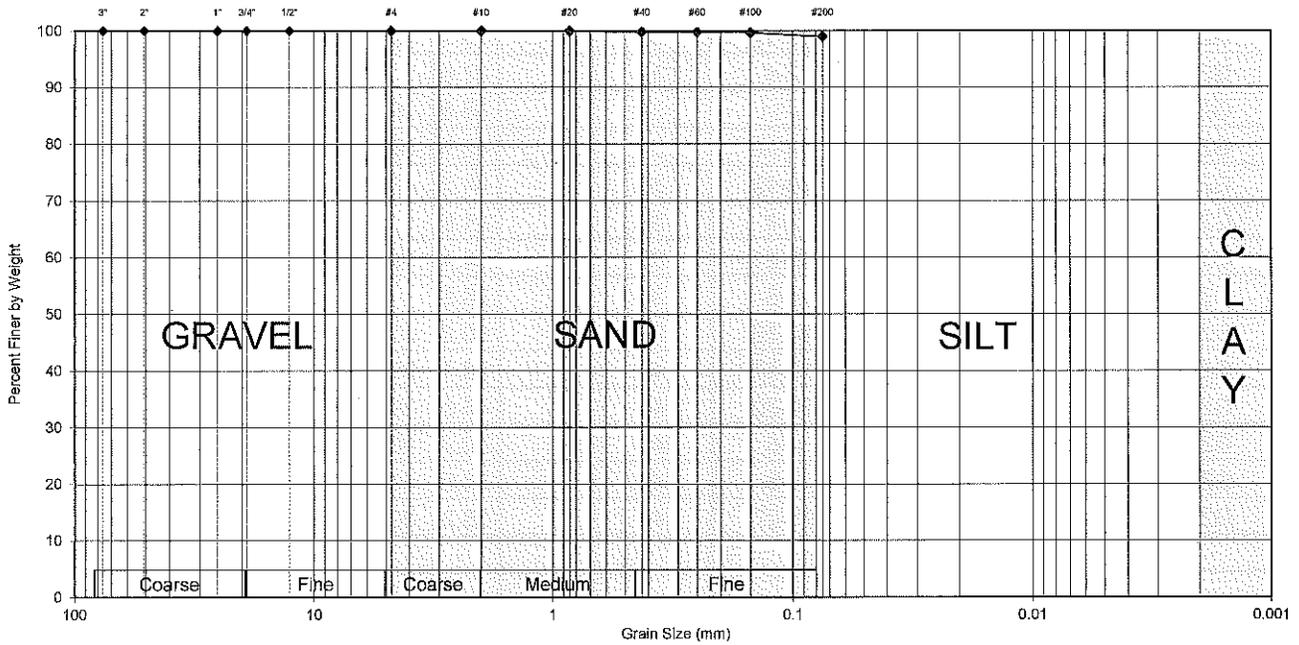
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

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

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
0.0%

Sand  
1.1%

Fines  
98.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
32	GZ-101	S-2	2-4'	Gray-brown CLAY & SILT, trace Sand (CL)	27.6			

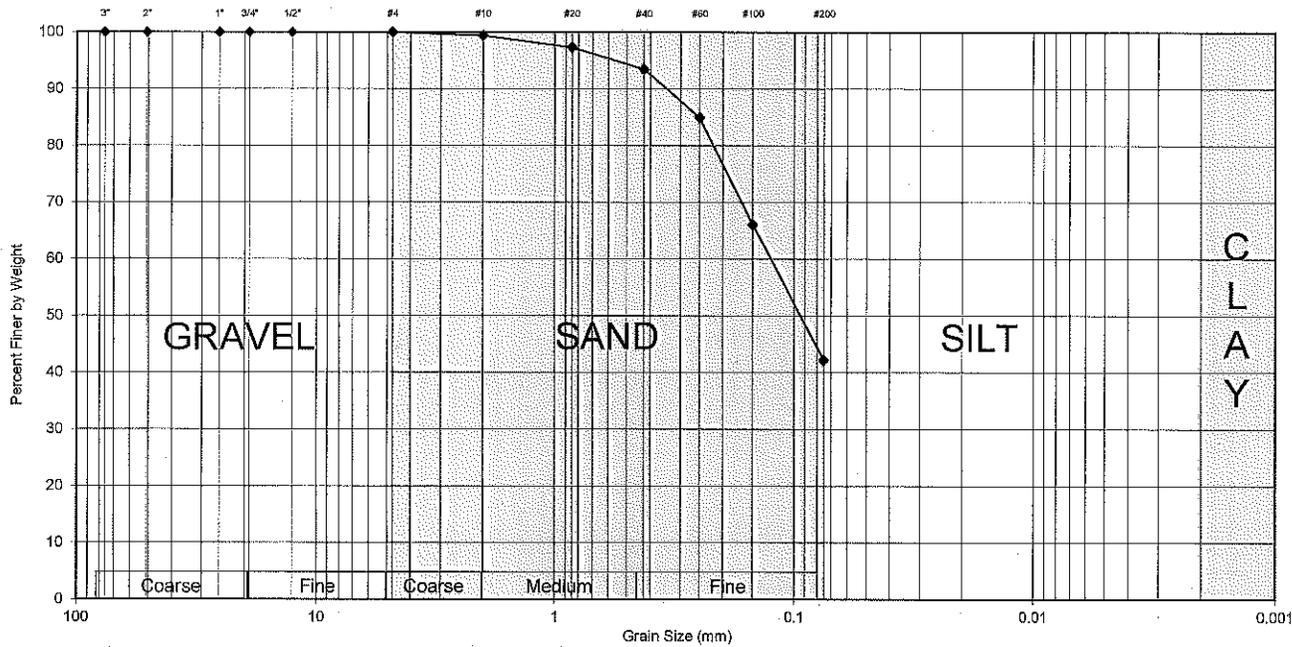
Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.8
#60	99.7
#100	99.6
#200	98.9



195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel 0.0%      Sand 57.8%      Fines 42.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
36	GZ-105	S-2	2-4'	Brown f-m SAND and SILT (SM)	21.9			

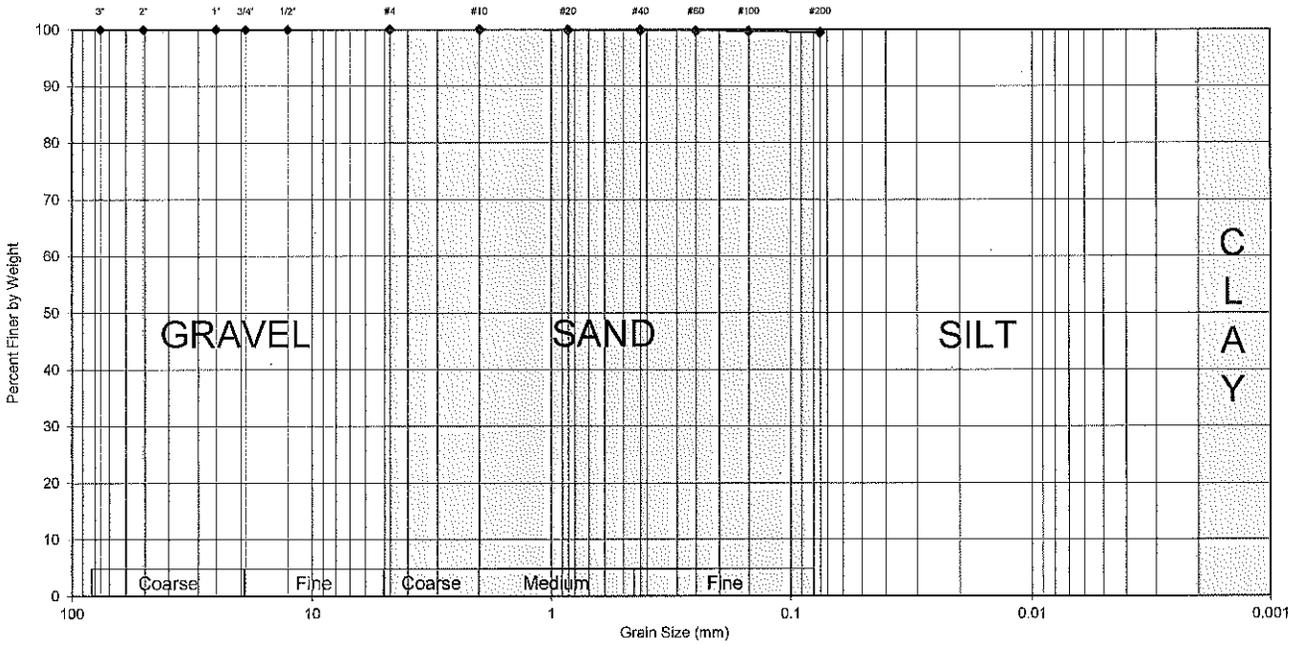
Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	99.4
#20	97.3
#40	93.4
#60	84.9
#100	66.0
#200	42.2

**THIELSCH**  
**ENGINEERING**

195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM      Date: 12/17/14  
Reviewed by: MBP      Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
0.0%

Sand  
0.6%

Fines  
99.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
38	GZ-108	S-2	4-6'	Gray CLAY & SILT, trace Sand (CL)	28.5			

Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	100.0
#20	100.0
#40	99.9
#60	99.8
#100	99.7
#200	99.4

**THIELSCH**  
**ENGINEERING**

195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14



State of Maine - Department of Transportation  
Laboratory Testing Summary Sheet

**Exit 63 Interchange**

**MDOT Project Number:**

**GZA Project Number: 09.0025829.00**

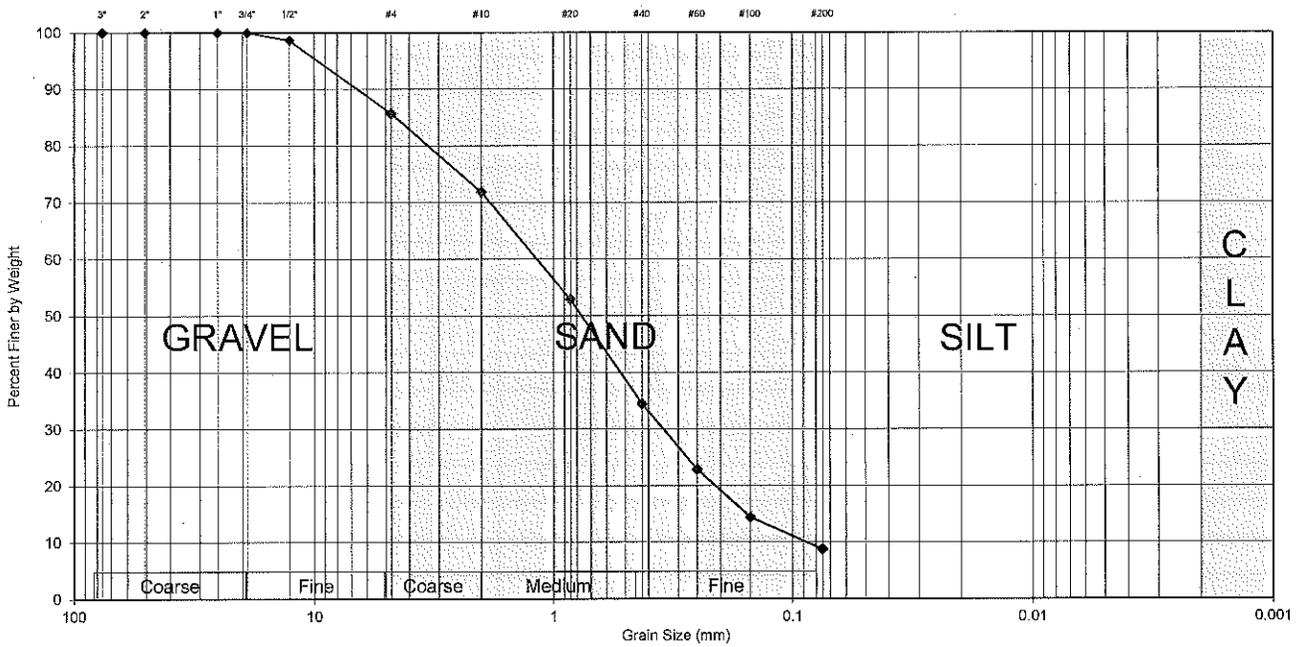
**Town(s): Gray, ME**

Boring & Sample Identification Number	Station (Feet)	Sample No.	Depth (Feet)	Lab Number	Organic %	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
GZ-119		S-3	4-6	4		4.8			SW-SM	A-1-b	0
GZ-139		S-2	2-4	5		8.7			SM	A-1-b	II
GZ-116		S-2	2-4	6		6.5			SW-SM	A-1-b	0
GZ-127		S-2	2-4	7		23.2			SM	A-2-4	II
GZ-122		S-3	4-6	8		24.9			ML	A-4	IV
GZ-133		S-2	2-4	9		19.2			SP-SM	A-3	0
GZ-136		S-2	2-4	10		18.4			SM	A-2-4	II
GZ-114		S-11	75-77	11		10.6			SM	A-1-b	II
GZ-106		S-3	5-7	12		21.7			SM	A-4	II
GZ-122		S-5	15-17	13		8.8			SM	A-1-b	II
GZ-122		S-7	25-26.3	14		7.9			GP-GM	A-1-a	0
GZ-124		S-5	15-17	15		8.1			GM	A-1-b	I
GZ-127A		S-4	10-11.9	16		11.9			SM	A-2-4	II

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

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
14.4%

Sand  
76.9%

Fines  
8.7%

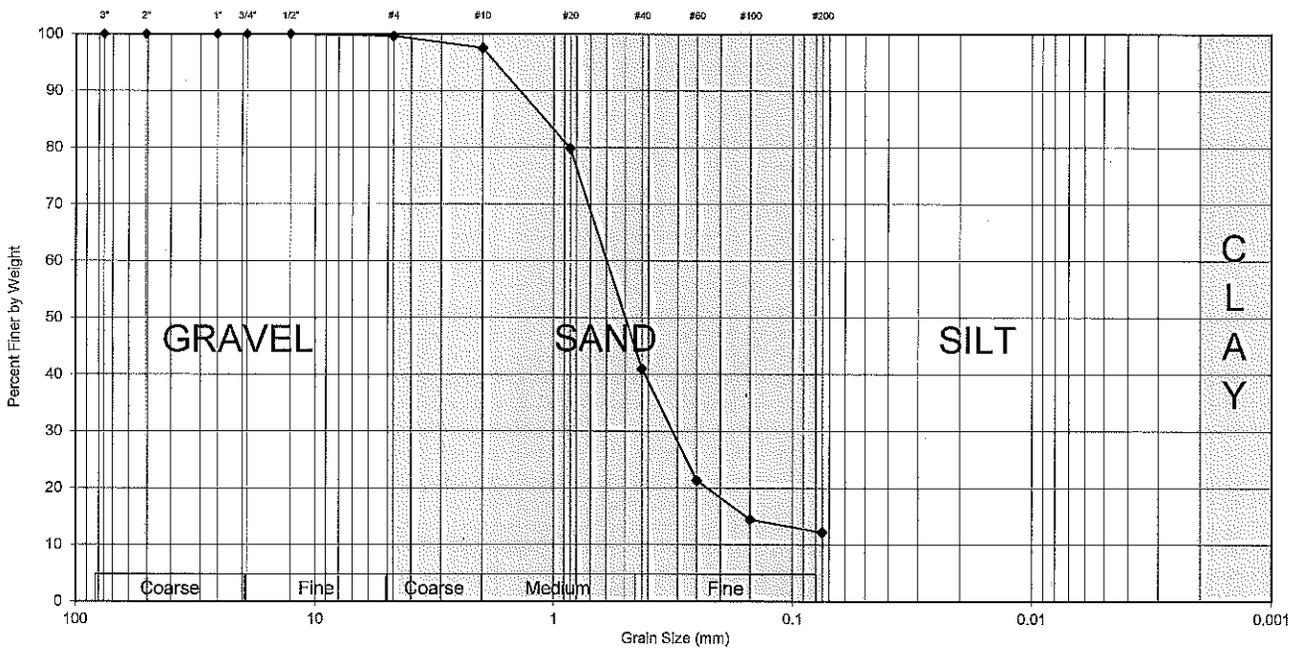
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
4	GZ-119	S-3	4-6'	Brown f-c SAND, little fine Gravel, trace Silt (SW-SM)	4.8			

Sieve Size	% Passing
3/4"	100.0
1/2"	98.6
#4	85.6
#10	71.9
#20	52.9
#40	34.5
#60	22.8
#100	14.4
#200	8.7

**THIELSCH**  
**ENGINEERING**  
195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel 0.4%      Sand 87.5%      Fines 12.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
5	GZ-139	S-2	2-4'	Brown f-m SAND, little Silt (SM)	8.7			

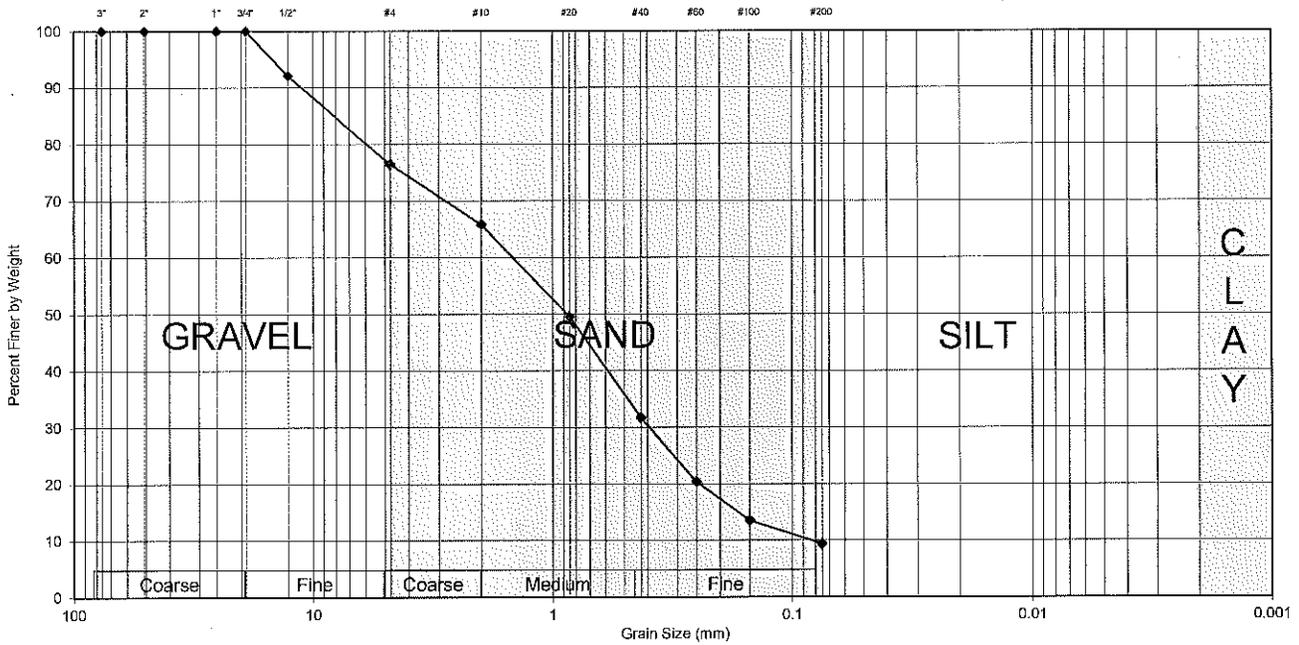
Sieve Size	% Passing
3/2"	100.0
1/2"	100.0
#4	99.6
#10	97.5
#20	79.8
#40	41.0
#60	21.3
#100	14.4
#200	12.1

**THIELSCH**  
**ENGINEERING**

195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM      Date: 12/17/14  
Reviewed by: MBP      Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
23.5%

Sand  
67.1%

Fines  
9.4%

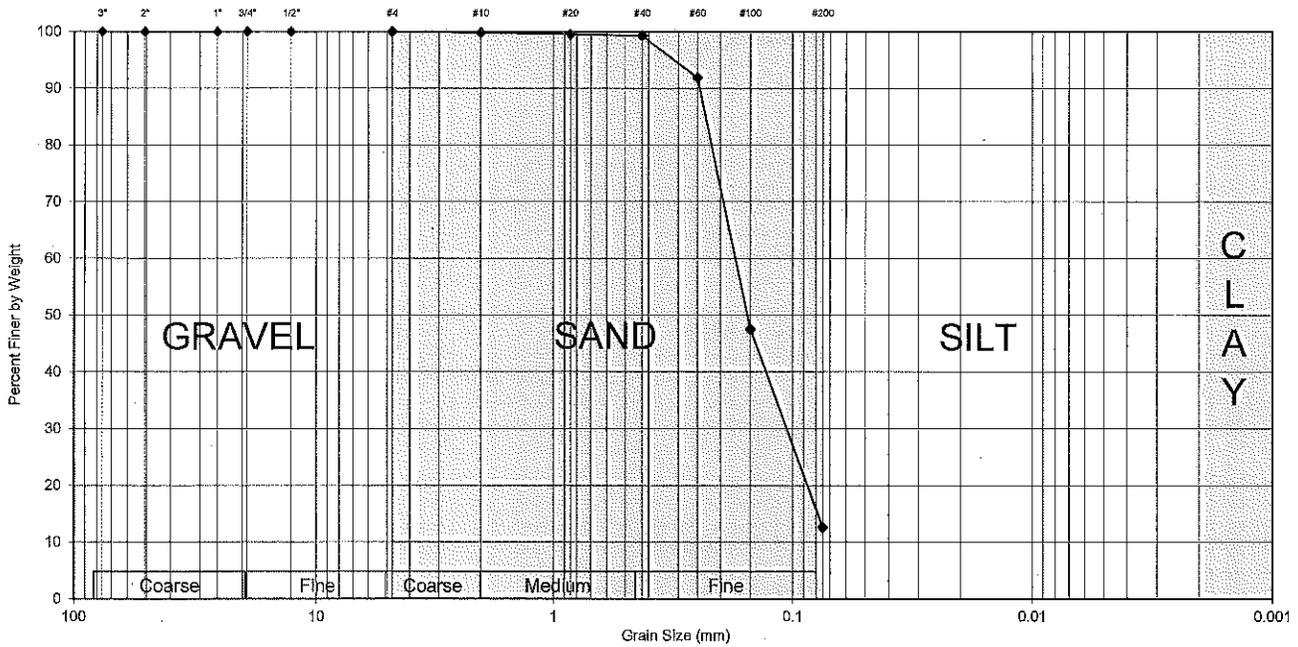
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
6	GZ-116	S-2	2-4'	Brown f-c SAND, some fine Gravel, trace Silt (SW-SM)	6.5			

Sieve Size	% Passing
3/4"	100.0
1/2"	92.1
#4	76.5
#10	65.8
#20	49.6
#40	31.7
#60	20.3
#100	13.5
#200	9.4

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14

**THIELSCH**  
**ENGINEERING**  
195 Frances Ave., Cranston, RI 02910  
401-467-6454

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
0.0%

Sand  
87.4%

Fines  
12.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
7	GZ-127	S-2	2-4'	Brown fine SAND, little Silt (SM)	23.2			

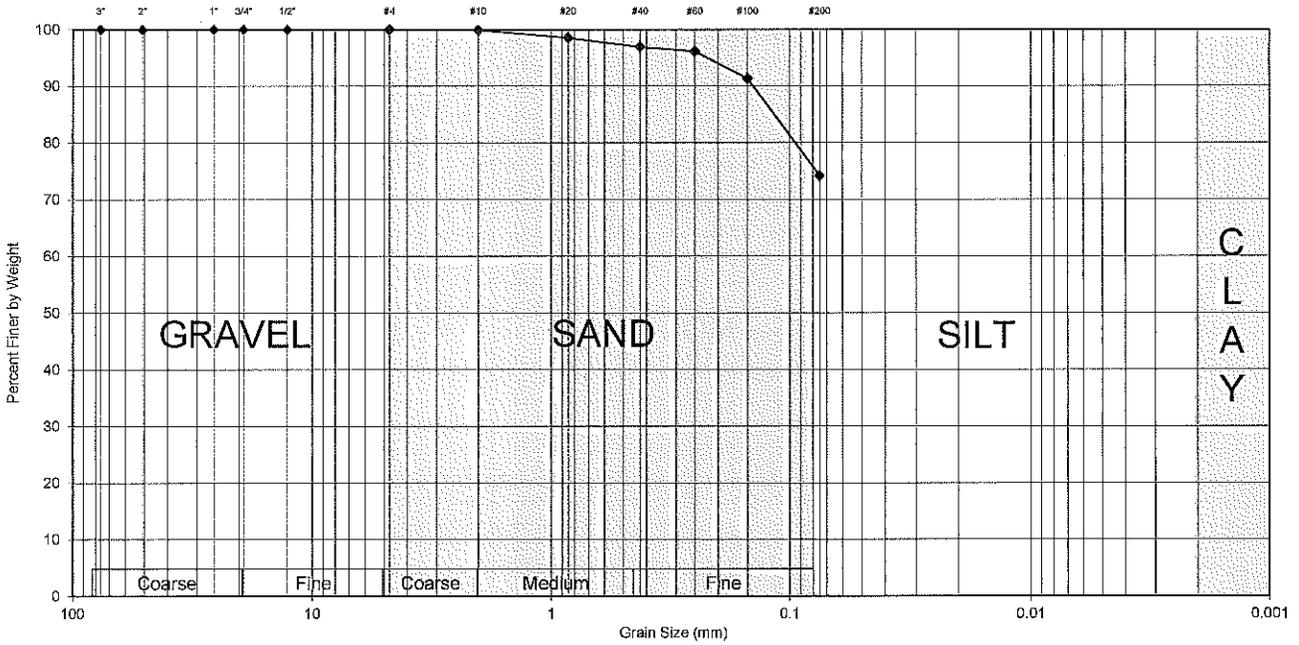
Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	99.8
#20	99.5
#40	99.3
#60	91.8
#100	47.5
#200	12.6

**THIELSCH**  
**ENGINEERING**

195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
0.0%

Sand  
25.8%

Fines  
74.2%

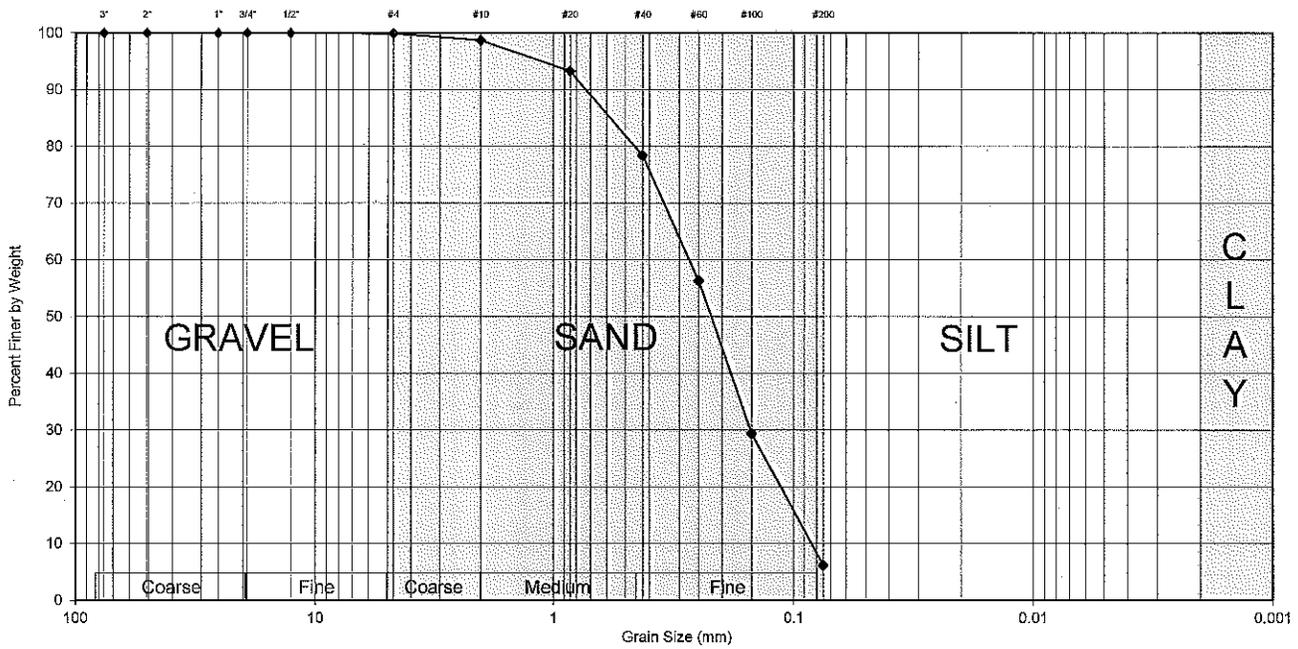
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
8	GZ-122	S-3	4-6'	Brown SILT, some fine Sand (ML)	24.9			

Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	99.9
#20	98.5
#40	96.9
#60	96.1
#100	91.3
#200	74.2

**THIELSCH**  
**ENGINEERING**  
195 Frances Ave., Cranston, RI 02910  
401-467-6454

74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel 0.1%      Sand 93.7%      Fines 6.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
9	GZ-133	S-2	2-4'	Brown f-m SAND, trace Silt (SP-SM)	19.2			

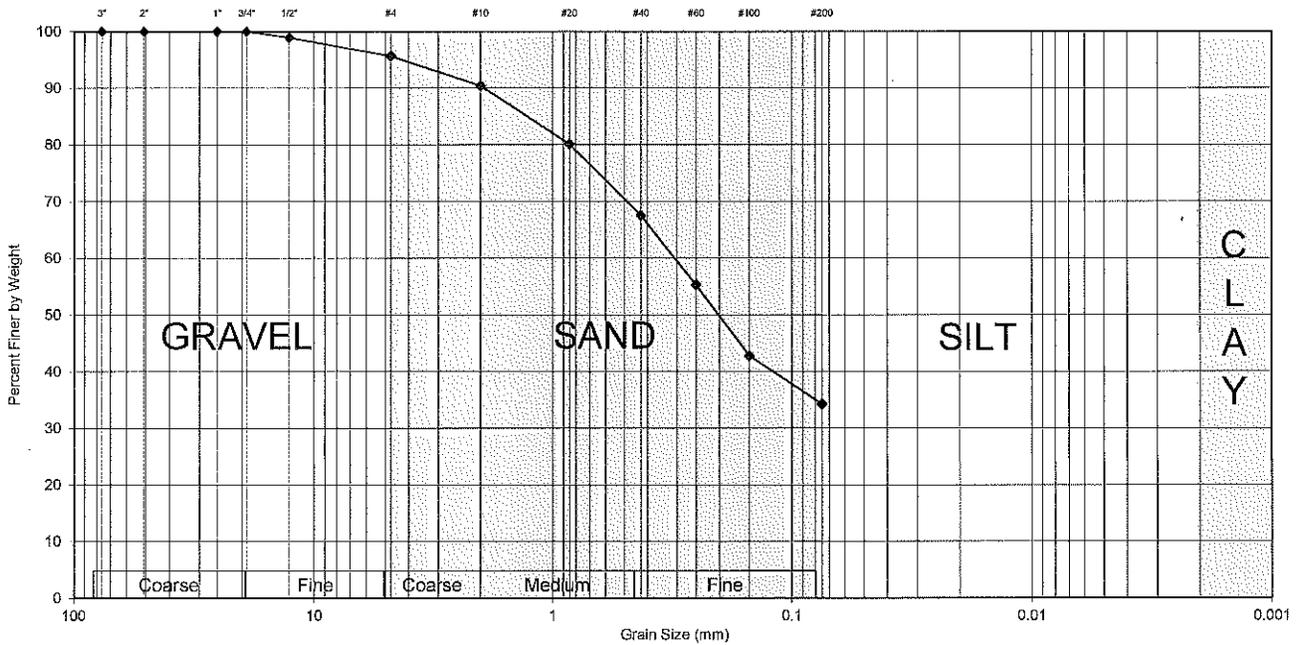
Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	99.9
#10	98.7
#20	93.3
#40	78.4
#60	56.3
#100	29.3
#200	6.2

74-14-0003  
 Exit 63 Interchange  
 Gray, ME  
 GZA Project # 09.0025829.00  
 Tested by: LM      Date: 12/17/14  
 Reviewed by: MBP      Date: 12/24/14



195 Frances Ave., Cranston, RI 02910  
 401-467-6454

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
4.3%

Sand  
61.4%

Fines  
34.3%

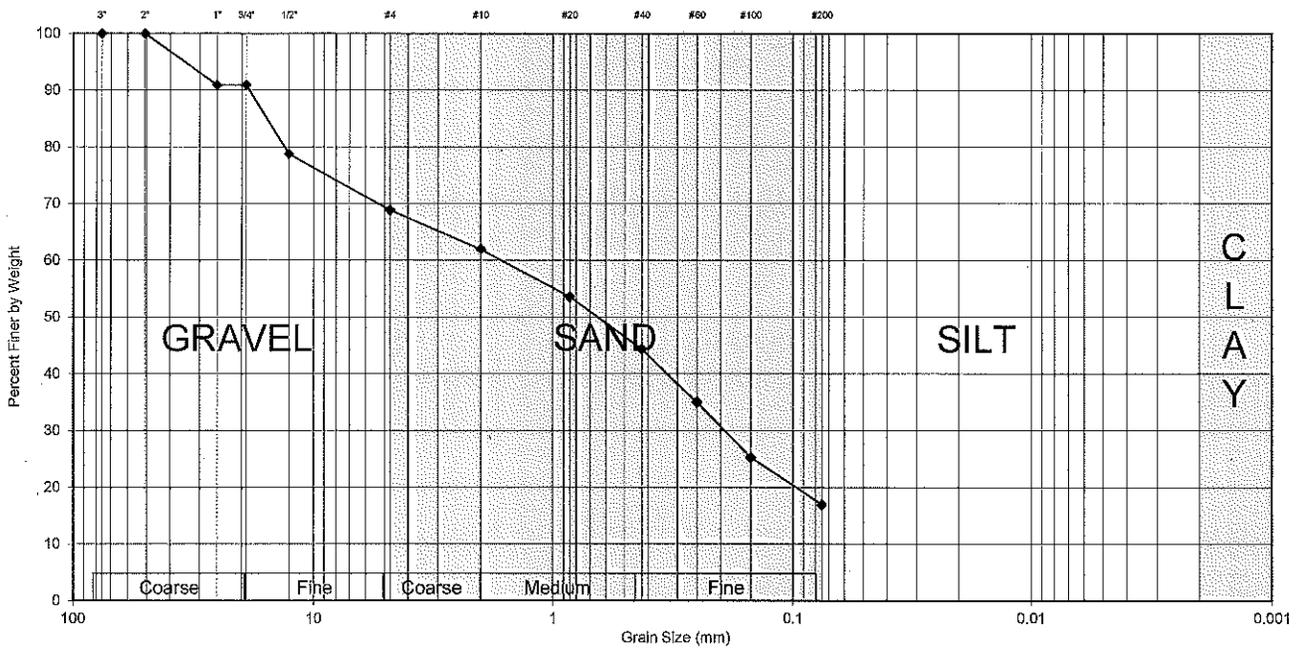
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
10	GZ-136	S-2	2-4'	Brown f-m SAND, some Silt, trace Gravel (SM)	18.4			

Sieve Size	% Passing
3/4"	100.0
1/2"	98.9
#4	95.7
#10	90.4
#20	80.1
#40	67.5
#60	55.3
#100	42.8
#200	34.3

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74-14-0003  
Exit 63 Interchange  
Gray, ME  
GZA Project # 09.0025829.00  
Tested by: LM Date: 12/17/14  
Reviewed by: MBP Date: 12/24/14

U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
31.1%

Sand  
52.0%

Fines  
16.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
11	GZ-114	S-11	75-77'	Gray-brown f-c SAND, some f-c Gravel, little Silt (SM)	10.6			

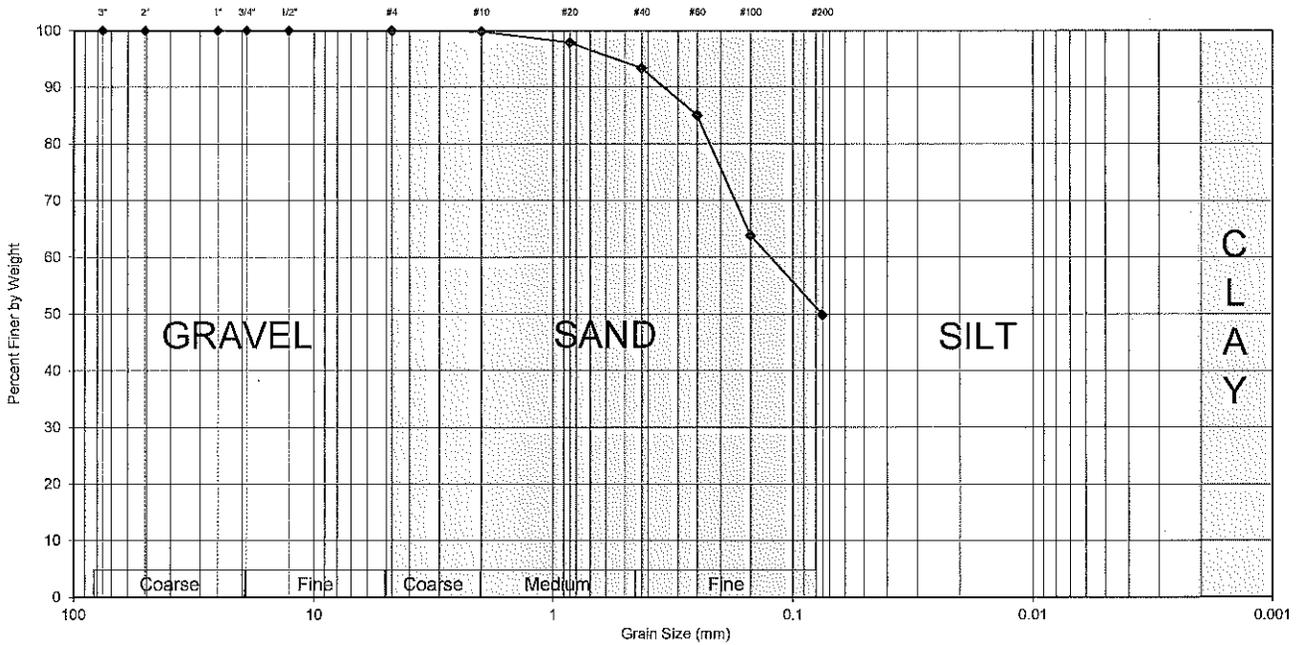
Sieve Size	% Passing
3/4"	90.9
1/2"	78.8
#4	68.9
#10	61.9
#20	53.6
#40	44.3
#60	35.0
#100	25.2
#200	16.9

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U.S. STANDARD SIEVE AND HYDROMETER



Gravel 0.0%      Sand 50.2%      Fines 49.8%

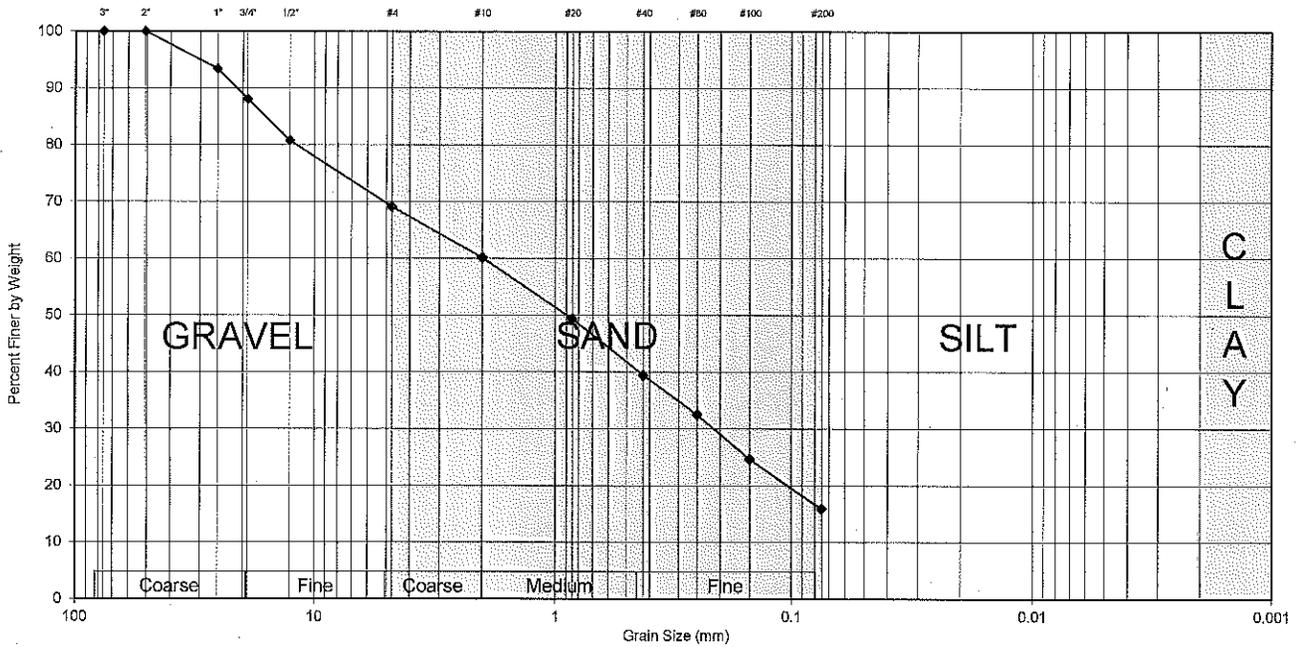
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
12	GZ-106	S-3	5-7'	Brown f-m SAND and SILT (SM)	21.7			

Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	99.9
#20	97.9
#40	93.3
#60	85.0
#100	63.8
#200	49.8

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U.S. STANDARD SIEVE AND HYDROMETER



Gravel 30.9%      Sand 53.2%      Fines 15.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
13	GZ-122	S-5	15-17'	Gray f-c SAND, some f-c Gravel, little Silt (SM)	8.8			

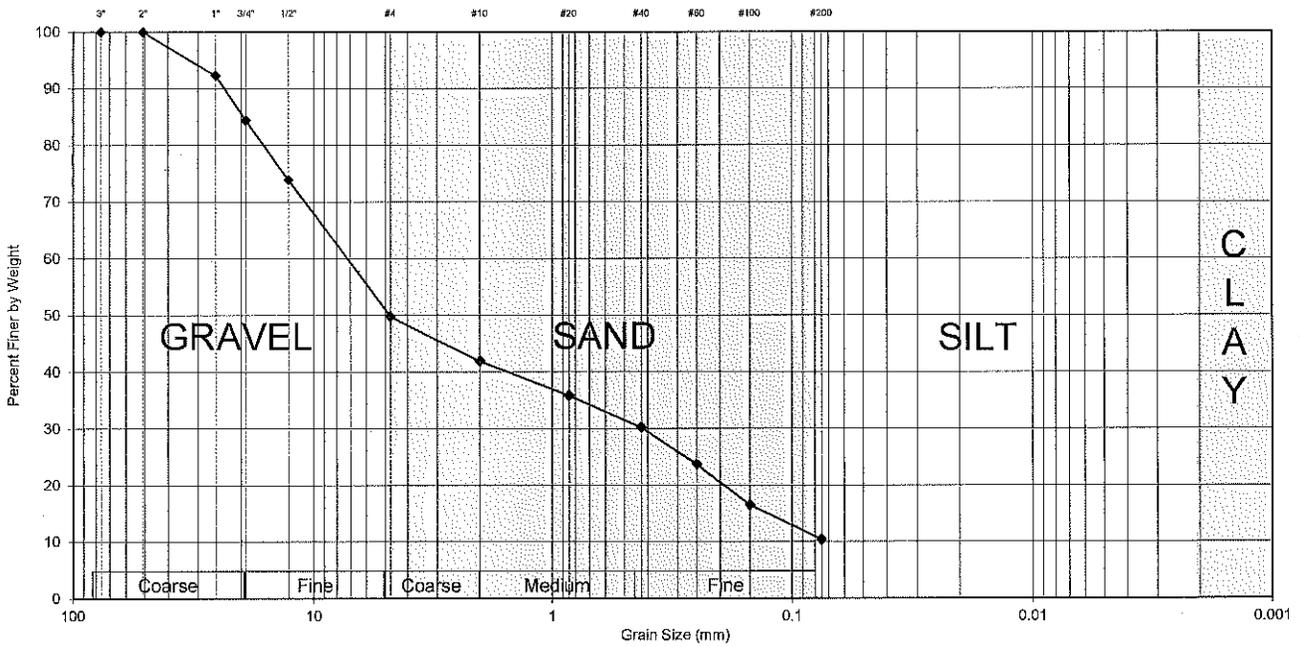
Sieve Size	% Passing
3/4"	88.1
1/2"	80.8
#4	69.1
#10	60.2
#20	49.4
#40	39.4
#60	32.5
#100	24.6
#200	15.9

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U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
50.2%

Sand  
39.4%

Fines  
10.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
14	GZ-122	S-7	25-26.3'	Gray-brown f-c GRAVEL and f-c SAND, little Silt (GP-GM)	7.9			

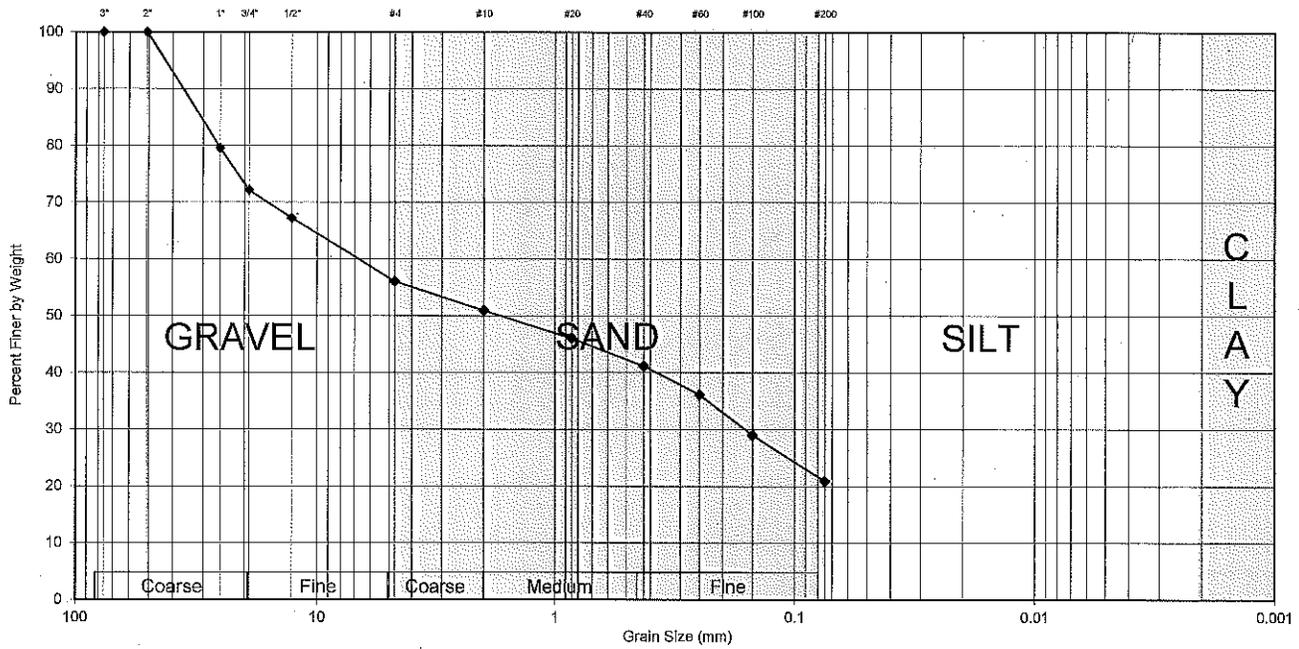
Sieve Size	% Passing
3/4"	84.3
1/2"	73.9
#4	49.8
#10	41.9
#20	35.8
#40	30.2
#60	23.7
#100	16.5
#200	10.4

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U.S. STANDARD SIEVE AND HYDROMETER



Gravel  
43.9%

Sand  
35.2%

Fines  
20.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
15	GZ-124	S-5	15-17'	Gray-brown f-c GRAVEL and f-c SAND, some Silt (GM)	8.1			

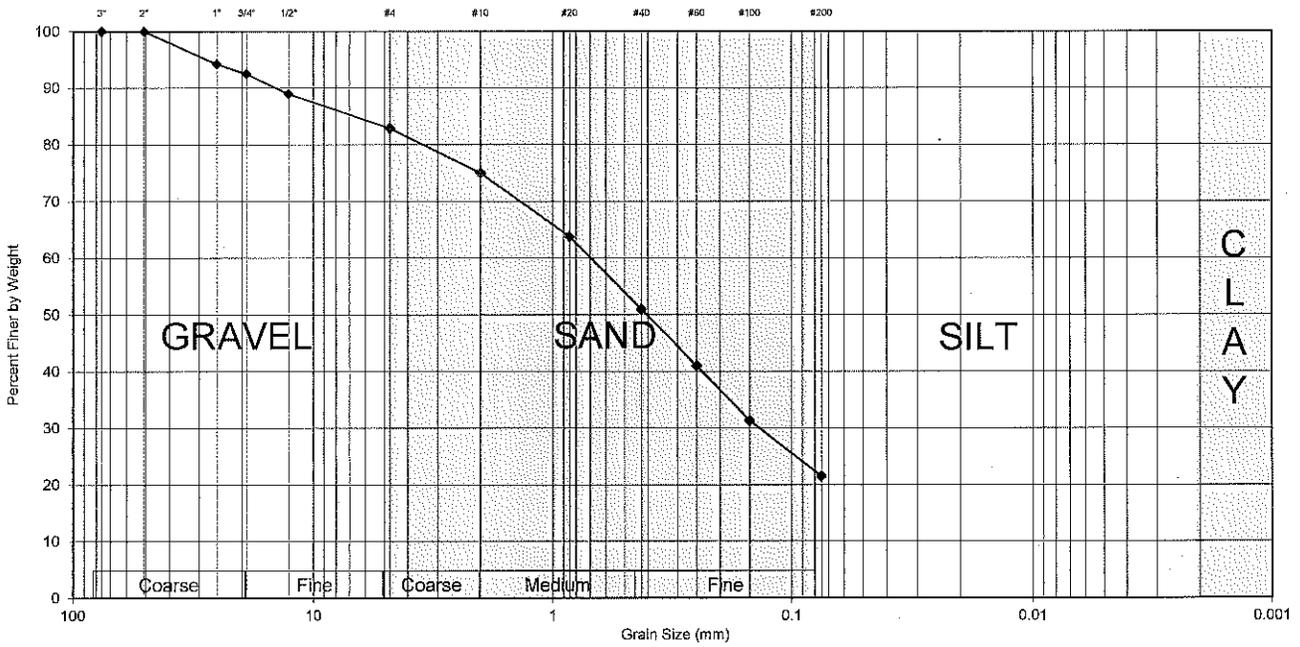
Sieve Size	% Passing
3/4"	72.1
1/2"	67.2
#4	56.1
#10	50.9
#20	46.1
#40	41.2
#60	36.1
#100	29.0
#200	20.9

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U.S. STANDARD SIEVE AND HYDROMETER



Gravel 17.1%      Sand 61.4%      Fines 21.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
16	GZ-127A	S-4	10-11.9'	Brown f-c SAND, some Silt, little f-c Gravel (SM)	11.9			

Sieve Size	% Passing
3/4"	92.4
1/2"	88.9
#4	82.9
#10	75.0
#20	63.8
#40	51.0
#60	41.0
#100	31.3
#200	21.5

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